Welcome to the 22nd Annual Massachusetts Statewide Undergraduate Research Conference!

Nearly 1,200 undergraduate student researchers have prepared presentations for today. These students, representing 26 of the public higher education institutions in Massachusetts, have convened at the Commonwealth’s flagship campus to share their work and learn from peers.

These students have been working directly with faculty to contribute knowledge to their fields—in fields ranging from art history to public health to veterinary science. In sessions throughout the day, the students are exhibiting not only their original research, but also their drive and effort to better understand aspects of our world.

While exploring the conference, be sure to engage with these presenters. Your questions are invited and your comments encouraged.

This year’s Undergraduate Research Conference is co-sponsored by Commonwealth Honors College at the University of Massachusetts Amherst, the Massachusetts Department of Higher Education, and the Massachusetts State University Council of Presidents.
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KEYNOTE SPEAKER

Superbosses: How Exceptional Leaders Master the Flow of Talent

Sydney Finkelstein, Ph.D.
Steven Roth Professor of Management and Faculty Director, Tuck Center for Leadership
Tuck School of Business
Dartmouth College

Based on the research described in his new book *Superbosses: How Exceptional Leaders Master the Flow of Talent*, author Sydney Finkelstein explains how leaders effectively create a powerful network and nurture extraordinary talent.

Imagine a world where the work you did really mattered. Where the person who you call your boss changed your life by helping you accomplish more than you ever thought possible. Where your own opportunities would multiply in ways you may have been afraid to even dream of. That's the world that *Superbosses* is about, the world of superbosses and the incredible yet often disarmingly simple things they do to make all this happen.

Sydney Finkelstein is the Steven Roth Professor of Management and Director of the Center for Leadership at the Tuck School of Business at Dartmouth College, where he teaches courses on leadership and strategy. He is also the faculty director of the flagship Tuck Executive Program, and has experience working with executives at a number of other prestigious universities around the world. He holds degrees from Concordia University and the London School of Economics, as well as a doctorate from Columbia University in strategic management.

Finkelstein has published 20 books and 80 articles, with several bestsellers, including the #1 bestseller in the U.S. and Japan, *Why Smart Executives Fail*.

Sydney is a Fellow of the Academy of Management, and has had three books nominated for the Academy of Management’s Terry Book Award, the most prestigious of such honors in the field. He is a recognized thought leader on leadership, strategy, and corporate governance, and is listed on the “Thinkers 50,” the most prominent ranking of management thinkers in the world. He is well known for his keynote speeches and television appearances, and is a regular columnist for the BBC. He has worked as a consultant and speaker for major companies around the world.
Floor Plan of Conference Facilities
Auditorium, Poster Sessions
Floor Plan of Conference Facilities
Concourse

22nd Annual Massachusetts Statewide Undergraduate Research Conference
ACCOUNTING

3  Auditorium  11:45-12:30  Board A61
Miriam Asangong
Jia Wu (Faculty Sponsor)
Department of Accounting, UMass Dartmouth
Characteristics of Accounting Firms with Weak Internal Control Systems

The purpose of this honors thesis is to examine different accounting firms with weak internal control systems. The research will also include detailed analyses to assess the type of weaknesses that these firms have. A comparison will then be made to determine if these internal control systems are common between larger firms or smaller firms. Throughout the project I will examine the auditor's internal control reports. The database includes internal control weaknesses that have been researched in different accounting firms. With the help of excel charts and graphs, I will summarize the data in these reports and draw conclusions based on my findings.
This thesis is comparing eleven credit unions and eleven banks from across Massachusetts. The ultimate goal is to determine which financial institution is more stable during a recession, therefore, which is better to invest with. I am using data that spans from the years 2004 through 2014 to come to this conclusion. This will allow for an effective coverage of before, during, and after the recession. Using the financial statements, I can compare many different aspects of the institution. Then I will analyze all of the data that I find to come to my conclusion. The eleven banks and credit unions were chosen because it is important the data is comparable to each other. I picked banks and credit unions whose asset size was between $325,000,000 - 475,000,000. I also specifically chose banks that are considered savings banks, as they have a similar risk to credit unions. Financial information has been obtained from the NCUA website for credit unions and the FDIC website for the banks. I have hypothesized that credit unions will be more stable during economic downturns. Once the data has been analyzed, I will prove whether my hypothesis was correct or incorrect.
There have been numerous accounting fraud scandals occurring over the past decades within major companies. One of the most notable cases of accounting fraud is Enron. Following an SEC investigation and bankruptcy, many of the company’s employees and executives were found guilty of committing fraud; some sentenced to decades in prison. When a company’s fraudulent financial reporting is discovered, the consequences are ultimately detrimental to the company. Like Enron, many companies that were once successful and worth millions, even billions of dollars are now bankrupt, with executives of these companies even serving time in prison. As a result of the accounting fraud transpired, there have been new laws and acts introduced in order to prevent major fraud scandals from occurring. The Sarbanes-Oxley Act of 2002 was enacted in order to combat accounting fraud. Using articles as well as the SEC website, this thesis will show the similarities and differences of these scandals, and how these cases have changed over time; before and after the Sarbanes-Oxley Act. This thesis will incorporate analysis of the fraudulent numbers reported by the company, as well as the longevity of the accounting fraud, and how long the company was able to commit fraud before being investigated. Included will be financial statements, as well as charts and graphs, in order to clearly illustrate findings within the research. Excel will be used as a tool to illustrate these findings. The key questions this thesis will investigate are: How are these fraud scandals still occurring? Is Sarbanes-Oxley working?
AFRICAN AMERICAN STUDIES

4  Concourse 1:30-2:15  Board C01
Aeffia Z. Feuerstein
Rhonda Vanessa Gray (Faculty Sponsor)
Department of English, Roxbury Community College
"Anaconda": A Primitive or Progressive Feminist Anthem

In August 2014, Nicki Minaj, rapper and pop culture icon, released her hit single “Anaconda.” In the music video she celebrates the black female body by sexually objectifying it. Since then, journalists, in print and online, have argued that Minaj’s “Anaconda” is an example of modern feminism. This consensus is still being purported in articles today which was most recently reflected in Vanessa Grigoriadis’s piece for the New York Times Magazine in October of 2015. Also, journalist Diana Veiga of the Huffington Post praised Minaj, in her 2014 article, for taking charge of how other people perceive her body. Whether or not one should believe the media’s interpretation of Minaj calls for a cultural critique of the intersection of mass media, popular culture, and the historical legacy of racial stereotypes in American entertainment. Through the lens of feminist theory, one realizes that the media has a history of misrepresenting feminism as well as reinforcing racist and sexist images of black people for commercial value. The mass media’s support of race, class, and gender oppression creates a framework by which the black body (Minaj) is exploited. As a result, it is the job of pop and rap fans alike to speak out about the way in which feminism and black women are being portrayed through the media’s uncritical interpretation of Minaj’s “Anaconda.”
ANIMAL SCIENCES

5 Auditorium 8:30-9:15 Board A25
Kylie Briana Amaral
Cassandra Uricchio (Faculty Sponsor)
Stockbridge School of Agriculture, UMass Amherst
Parasite Resistance within the UMass Hadley Farm Equine Herd

The susceptibility towards parasite infection and managing anthelmintic resistance has become a great area of interest in the equine industry. The American Association of Equine Practitioners (AAEP) developed a new set of guidelines outlining strategic deworming approaches for veterinarians to recommend for horses of all ages (AAEP Parasite Control Guidelines, 2013). According to the AAEP, successful parasitic control programs should aim to minimize the risk of disease, control egg shedding, and maintain effective drugs by avoiding anthelmintic resistance. This research project involved conducting fecal egg counts on the University of Massachusetts’ equine herd using the Modified Wisconsin method (Dryden, M. W., P. A. Payne, R. Ridley, and V. Smith, 2005) to determine the number of parasite eggs being shed by each individual horse. The objective of this study was to determine anthelmintic resistance within the university’s equine herd, understand herd dynamics of varying levels of shedders, distinguish parasite contamination of the different pastures, and cyathostomin (small strongyle) egg reappearance. These strongyles are the most prevalent parasites and are found in horses worldwide. Young horses are the most vulnerable (which is depicted in the observed egg count results); however, horses of all ages are susceptible. This project increases our understanding and ability to develop a strategic deworming plan which minimizes anthelmintic use while maximizing heard health by choosing an anthelmintic with the highest efficacy towards the parasite of interest. The observed results help us pinpoint which animals are considered high shedders (>500 eggs/gram of fecal matter) whom produce 80% of the parasitic load on the farm, it provides a comparison between the level of shedding between different age groups of horses (i.e. yearlings vs. older horses), and lastly helps us determine the level of resistance that strongyles have towards the anthelmintics administered.
Over the past few decades, populations of the bonefish, Albula vulpes, have declined. Exposure to contaminants associated with high human density is detrimental to bonefish health and suspected to be contributing to the decline. One way that environmental exposures can impact fish health is through aberrant DNA methylation resulting in silencing of key genes. Several contaminants including arsenic, cadmium, xenoestrogens, and mercury, have been show to alter DNA methylation in wild populations. We proposed to compare DNA methylation in two populations of bonefish to determine the extent to which aberrant methylation was associated with living in an environment that was highly impacted by humans. Comparisons were made between bonefish collected from south Florida, an urbanized area, and the Bahamas, a non-urbanized area. Additionally, we used bonefish collected from Puerto Rico to optimize our methods of assessing DNA methylation. DNA from the blood of each organism was obtained through phenol-chloroform-isoamyl alcohol isolation. The first method utilized to analyze global DNA methylation was an enzyme-linked immunosorbent assay (ELISA). High variability was observed between technical replicates and across ELISA plates. ELISAs from two different companies were utilized and no correlation was seen between the levels of global DNA methylation in samples using the two different ELISAs. The second method, the LUMinometric Methylation Assay (LUMA), uses methylation-sensitive restriction enzymes and a base pair extension pyrosequencing assay to estimate global DNA methylation. Results obtained with the LUMA assay were consistent across runs, and variability between technical replicates was low. However, LUMA requires non-fragmented DNA, and concerns over the fragmentation of DNA in our samples led us towards developing an assay based on bisulfite-modification and sequencing of specific cytosines in cytosine-guanine repeats (CpGs). Using sequences from related fish species, we identified microsatellite sequences that may be appropriate for a bonefish-specific DNA methylation assay.
The purpose of this study was to determine if a concentrated whey protein supplement aids in the development of topline muscling in horses. Topline muscling over the back, loin, and croup affect the horse’s athletic ability. Whey protein sources provide the best amino acid profile for horses as well as the highest levels of lysine, a limiting essential amino acid. Diets that have a low bioavailability of amino acids can contribute to poor topline development. Utilizing a paired experimental design, sixteen horses were coupled based on age, gender, breed, forage type and workload. The control group received a 30% standard protein supplement consisting of soybean meal and the experimental group received a 55% whey protein supplement. Topline drawings, body weights, body condition scores and topline evaluation scores were recorded for each horse at the beginning and end of the study. The topline evaluation score was categorized by Grade A, being ideal muscling, through Grade D, being that the entire topline was atrophied. The Henneke body condition score assessed fat deposition on the horses and was on a scale from 1, being severely emaciated, to 9, being obese. After five weeks of the trial, no significant difference was found between the two groups. Further studies are needed to better understand the development of a horse’s topline including saddle and equipment fit, proper riding and exercise, and metabolic or muscle disorders, all of which could lead to poor topline development.
More than half of cancer cases are related to a mutation in a gene called TP53, which regulates cell proliferation. Similar to humans, a mutation in the gene Trp53 in mice is linked to tumor development. However, different strains of laboratory mice exhibit variable susceptibility for mammary tumor development. The BALB/c mouse strain, when heterozygous for the Trp53 mutation, frequently develop mammary tumors. However, C57BL/6 mice do not develop mammary tumors when heterozygous for the Trp53 mutation. Previous research proposes that a gene (or genes) within a small region of chromosome 7 is a genetic modifier that confers mammary tumor resistance to the Trp53 heterozygous C57BL/6 mouse strain. Confirming the region of chromosome 7 and analyzing the genes in the region will determine which of the approximately 200 genes play a role in tumor resistance in C57BL/6 mice and tumor susceptibility in BALB/c mice. Preliminary data shows that there is a difference in DNA repair mechanisms for C57BL/6 and BALB/c mice, indicating that DNA repair-related genes within the interval of interest may be responsible for the difference in tumor susceptibility between the two strains. A similar pathway may be present in humans, so narrowing down the interval in order to identify the specific gene that confers mammary tumor resistance would provide hope for thousands of women carrying TP53 mutations who would otherwise frequently develop cancer, just like the susceptible BALB/c mice. With that knowledge, we could target that pathway through gene therapy and produce tumor resistant BALB/c mice.
Selective Activation of Proliferation and Surveillance Pathways by Estrogen Receptor Agonists

For centuries breast cancer has plagued humans and the disease has touched and affected many people. While improvements in detection and treatments have been made, it still remains a leading cause of cancer death in women. Exposures to estrogens impact breast cancer risk and, paradoxically, estrogen has been found to both increase and decrease a woman’s risk of breast cancer. Extended lifetime exposure to estrogen increases the risk of breast cancer. However, early parity decreases the lifetime risk of postmenopausal breast cancer by up to 50%. In mice, a prior parity or estrogen-treatment to mimic parity increases causes a sustained increase in radiation-induced apoptosis, a genomic surveillance mechanism to oppose inappropriate estrogen-induced proliferation. Estrogen mediates gene transcription through two different estrogen receptors: estrogen receptor α (ERα) and estrogen receptor β (ERβ). These receptors bind as dimers to activate genes that mediate proliferation and genomic surveillance. Which estrogen receptor combination modulates surveillance versus proliferation is unknown. The protective effects of parity can be mimicked with E2 treatment, an agonist that has equal affinity for ERα and ERβ. However, ERα can be specifically activated with the agonist PPT, while ERβ can be specifically activated with the agonist ERB041. This project’s objective is to compare proliferation and radiation-induced apoptosis in mice treated with different receptor agonists in order to determine how estrogens mediate the protective effects of early pregnancy. I hypothesize that treatment (14 days) with the ERβ agonist will mimic the protective effect of parity by inducing persistent surveillance in mouse mammary epithelium.
DNA methylation is important in understanding breast carcinogenesis because i) methylation, especially in the promoter region, can alter gene expression; turning off tumor suppressor genes and turning on oncogenes, ii) it is thought that methylation occurs early in disease progression and may therefore be useful in early detection or risk assessment, and iii) methylation may be reversible, which provides the opportunity to prevent and treat disease. It is important to know to what extent cancer-associated methylation is present in the surrounding non-tumor tissue to understand breast cancer etiology and to assess the risk of recurrence. DNA methylation may contribute to the cancerization field, making it a target for prevention. We aim to discover the extent to which promoter methylation of target genes associated with breast cancer is specific to tumor tissue and the extent to which global methylation patterns differ between tumor tissue and adjacent and contralateral normal tissue. Contralateral normal tissue from bilateral mastectomies provides a more representative control to compare tumor and adjacent normal tissue against than reduction mammoplasty tissue from healthy women. This allows our study to be specific to individuals, for each individual has different environmental exposures which may be a confounder in analyzing their epigenetic profile. We compare tumor, adjacent normal, contralateral normal, and atypia breast tissues from 9 women as a sample population and by individual. We also used Laser Capture Microdissection to solely extract epithelial cells from these tissues, so as to not include connective tissue. Then we isolated the DNA from these cells for methylation analysis. The Infinium MethylationEPIC Kit (Illumina) assess DNA methylation at just over 850,000 CpG sites across the human genome, which we will use for global analysis in addition to gene-targeted analysis of several breast cancer-associated genes. We are currently analyzing methylation data with Genome Studio. It currently appears that of the 3 main tissue types we are investigating, the 8 tumor samples are the most differentially methylated in comparison to the 9 contralateral normal breast samples. This indicates that the normal tissue adjacent to the tumor has an intermediate DNA methylation status to the tumor and the contralateral breast, which supports the theory of the field effect in breast cancer. More analyses will be done targeting breast cancer associated genes and on individual women.
Francisella tularensis is a bacterial, zoonotic pathogen that causes the disease tularemia. This disease is commonly known as “rabbit fever” because its main reservoir host mammal is the rabbit. Tularemia can be transmitted through direct, indirect or fomite spread. Historically, tularemia has been researched as a potential biological weapon. This disease causes symptoms similar to the flu but with ulcers at the site of infection. This thesis will examine tularemia and its possible threat to today’s world through the use of scholarly journal articles, government-based public health websites and newspaper articles. Tularemia can be considered a purposeful threat in history and a naturally occurring threat to certain career paths such as landscaping and hunting in today’s society. This paper also shows that tularemia still has potential as a biological weapon with antibiotic resistant strains and genetically modified strains to cause more severe symptoms. Therefore the less virulent strain of Francisella tularensis should be researched further to develop a vaccine that is effective and has minimal side effects for protection along with researching other antibiotics that will be effective against tularemia. Building and having a stockpile of antibiotics is an option for the United States to be prepared for a bacterial, biological weapons attack.
Identifying Candidate Genes with Putative Roles in Murine Liver Development

The liver is the largest internal organ in the body and is vital for life. Despite its significance, very little is known about the liver during embryonic development. Understanding liver development has vast potential for applications in cancer and disease research, regenerative medicine, and in vitro hepatocyte generation. This project seeks to identify candidate genes involved in murine embryonic liver development and to characterize their expression pattern in a temporospatial manner. Genes were selected for analysis using two methods. The first method includes the use of an RNA-sequencing dataset produced from the two liver progenitor precursors. RNA-seq analysis reveals that the two progenitors have distinct transcriptional profiles. We believe that these differences may underlie unique, liver specific function. The second method of gene selection involves identifying genes that display a function in liver development in other species. If either set of genes are involved in early liver development in the mouse, they should be expressed in the early hepatoblasts at a stage indicative of their role. To determine if the candidate genes display the expected expression for genes involved in early liver induction and growth we analyzed embryonic livers at 8.5, 9.5, and 10.5 days post coitum using both RT-PCR and in situ hybridization. In conclusion, the in situ experiments have demonstrated unique patterns of expression at time points in later development. Results will continue to be generated, liver markers will be identified, and gene expression will be characterized.
11 Auditorium  8:30-9:15  Board A31  
Grace Christine Trombley  
Lisa M. Minter (Faculty Sponsor)  
Department of Veterinary Science, UMass Amherst  
Exploring the Influence of PKCθ Phosphorylation at Residue T538 on Notch1 Activation and T Helper Cell Differentiation

The T cell-specific kinase, Protein Kinase C theta (PKCθ) is essential to T cell activation and differentiation. PKCθ integrates T cell receptor (TCR) and CD28 signaling, and ultimately activates transcription factors necessary for full T cell activation and proliferation, survival, and differentiation into T helper subsets. Th1, Th2, Th17 and Treg cells are the four major lineages of T helper cells, differentiated from CD4 T cells, and each have different requirements for PKCθ. PKCθ, itself, is regulated through phosphorylation of specific residues, including tyrosine (Y)90 and threonine (T)538. Following T cell stimulation, PKCθ is phosphorylated on Y90 by the kinase, LCK, and translocates to the cell membrane. There it remains associated with LCK in a structural complex known as the immunological synapses. Loss of PKCθ in T cells produces a phenotype that is similar to loss of another important T cell protein, Notch1, suggesting these two proteins may function in the same signaling pathway. Our lab has shown that PKCθ can interact with Notch1, but how this interaction regulates Notch1 function is not known. We will use two means of inhibiting PKCθ function to evaluate its regulation of Notch1 in differentiated T cells: 1) we will block the association of PKCθ and LCK, thereby preventing its movement to the immunological synapse and 2) we will prevent PKCθ phosphorylation on T538. Understanding how PKCθ interacts with and regulates Notch1 to influence T cell differentiation may lay the foundation for specifically modulating T cell responses.
ANTHROPOLOGY

30 Auditorium  2:30-3:15  Board A13
Maia Hill Batista
Jason Kamilar (Faculty Sponsor)
Department of Anthropology, UMass Amherst
Effects of Anthropogenic and Climatic Variables on the Distribution of Hapalemur aureus, Hapalemur griseus, and Prolemur Simus

Madagascar is home to the most endangered vertebrates on earth. According to the IUCN, an estimated 94% of lemur species are threatened. Many factors contribute to the increasing threat to lemurs including climate change and habitat fragmentation. While some studies have assessed the effects of climatic variables on lemur distribution, most ignore anthropogenic impacts. Therefore, the goal of our study was to examine the relative effects of climate and anthropogenic factors on the distribution of one vulnerable and two critically endangered bamboo lemurs: Hapalemur griseus, Hapalemur aureus, and Prolemur simus. We used several climate variables representing rainfall and temperature patterns, as well as four anthropogenic variables: distance to rangelands, croplands, villages, and dense urban settlements. We used these variables and known locality data for each of the species in ecological niche models produced by the MaxEnt software package. We created two sets of models for each species, one using only climatic variables, and the second adding anthropogenic variables. We found that all models performed well, though the anthropogenic models performed best. In addition, species were not equally impacted by anthropogenic factors. P. simus was most impacted by anthropogenic factors (distance to cropland, urban settlements, and villages) and H. aureus was least affected. Overall, the addition of anthropogenic data to ecological niche models for bamboo lemur species improves its predictive abilities and helps us better understand the effects of human activities on lemur distribution.
This research paper analyzes the different aspects of race and ethnicity that affects our modern world, particularly focusing on the society of the United States of America. It explains in detail the terminology with respect to these subjects while explaining their differences and misconceptions. Additionally, the text explores the diversity of our nation and the inequality among minority groups. As a country of immigrants, diversity plays an important role in the development of the nation, thus carrying along issues such as discrimination, prejudice, and racism also described in this research. The final section of the text focuses on the emerging largest minority group in the United States which is the Latino ethnic group. Finally, this research paper conveys information to bring awareness of the correct use of terminology to help avoid misconceptions that carry negative consequences such as racism.
No Longer Separate but Still Unequal: The Perpetuation of Inequality in the United States Education System

This paper explores the ways in which educational inequality has been perpetuated in the United States. Brown v. Board of Education made equal opportunity for all students a possibility with the removal of separate but equal. However, the case did not bring as much change as it intended. This paper explores the ways in which Brown allowed inequality to continue. There has also been a lack of focus on the other factors that contribute to the achievement gap and differences in educational opportunity. School funding is considered as a contributor to the achievement gap. The reliance on local funding through property taxes is a major reason for differences in educational opportunity and outcomes. In part determined by funding, resources play an important role in educational equality. Teachers, classroom based resources and curriculum content determine that to which a student has access. Variations and disparities in these three limit the current and future educational opportunities and academic achievement of a student. This research examines the way Brown allowed inequality to continue as well as factors such as funding and resources that contribute to the issue and have yet to be fully addressed in education policy and legislation.
Machismo in Latin America

The strong, exaggerated sense of masculine pride of machismo runs deep within Latin America. Male chauvinistic values embedded in machismo have caused a gender gap prevalent in Latino culture due to a number of historical attributes. Faith, chivalry, tradition, and social norms each play an integral role in machismo’s unique reign over Latin culture. Murder, abuse, sexual harassment, and workforce discrimination are damaging women because of this male dominated society’s machismo values. This paper aims to analyze the negative effects Machismo has on Latin America. The history of machismo, both positive and negative effects, and advancements against machismo are explored using newspaper articles, government reports, educational journals, and survivor accounts. With a deep social stigma on women, machismo is a social concept deeply rooted in Latin American culture, creating an obstacle in the struggle for social gender equality.
Sociospatial Inequality: Mechanisms and Results of Racial Segregation in Urban and Suburban Areas

In this thesis, I will explore the historical and contemporary ways in which urban developmental practices have contributed to the hyper-segregation of blacks in urban and suburban areas in the United States. Several mechanisms involving both systems and individuals have continuously discriminated against blacks, preventing them from residential and therefore socioeconomic integration. I detail the largely failing role of the government through legislative rulings demonstrating a lack of commitment to protect its most vulnerable citizens. Lastly, I cover the deleterious effects of black isolation and how they result in self-perpetuating oppression.
Medieval sagas give modern readers an insight into the mores and social structures of past societies. In the Viking world, relationships were often forged, strengthened, or broken through means of material exchange. Gifting was a common and important practice that had rules of reciprocity that signaled and affected the social status of those involved. Once a gift had been given, the way in which the receiver returned the gesture determined the relationship between the two. Exchange of goods was generally a public issue, and an ill-executed exchange could trigger a long-lasting feud between families. Laxdæla saga tells the story of Guðrun, who fails to marry Kjartan, considered to be her appropriate match. This creates personal and emotional tension, which is embodied in a physical item, a headdress given to Kjartan by the sister of the king of Norway to be presented to Guðrun as a wedding gift. When Kjartan returns to Iceland to find that Guðrun has married his foster brother, he gives it to another woman whom he marries. Despite never having been given it, Guðrun considers the headdress to be hers. Ultimately, it is lost, suspected stolen, and a feud between Guðrun and Kjartan’s families arises. Feuds over property are common in sagas. The difference in this case is the personal nature of the dispute and the non-utilitarian nature of the property. Because of this, feelings of ownership become muddled with actual ownership, causing each party to feel slighted by the other, until the tension culminates in feud, making a private quarrel very public.
In this work, I examine the correlation between the rise in economic inequality and the demise of union density in the United States. I explore whether or not the link between these two phenomena is causational and, if so, to what degree. I present a comprehensive history of labor and unions spanning from the late nineteenth century to present day. I look at specific pieces of legislation, changes in political rhetoric and cultural shifts that contributed to organized labor’s downfall. I consider other factors that have altered the landscape of labor such as advancements in technology and a shift in corporate governance style that have arguably resulted in the rise of economic inequality. I analyze the studied impacts of unions on the political economy and discuss the norms they have established historically. Based on my exploration of the unions’ role in the United States’ political economy, I have come to the conclusion that a strong current of organized labor is a crucial component in upholding a democracy and thereby balancing resources and wealth among all citizens.
This thesis illuminates the way that educational policy in the United States is tied to the maintenance of the racial hierarchy as it is defined by mass incarceration. First, this paper gives context to the argument by providing a historical overview of the ways that education has been tied to race throughout American history, from slavery through the Civil Rights Movement. It then shows how specific policies, like zero tolerance policies, specifically impact African American children and funnel them into the school-to-prison pipeline. This paper provides a case study of the 2001 No Child Left Behind Act as a piece of education policy that devastates African American students and reinforces mass incarceration. Conducted from a framework of critical race theory, this paper also seeks to provide an analysis of how and why such detrimental policies can be passed. Finally, this paper analyzes the parallel trends of privatization as it relates to both education and incarceration.
In this thesis, I explore how the current state of prostitution in the United States necessitates serious legal reform through legalization. I discuss how a departure from the current policy of criminalization is needed in order to appropriately and proactively address the prevalent issues street prostitutes face such as assault, rape, and recurrent issues with safety. In tandem with discussion on outdoor prostitution, I examine how the structure of indoor prostitution, specifically brothel prostitution, facilitates more secure transactions between the women and clients, largely in context to how the environment affects the power dynamic between them. The contrast between the two sets up a foundation for a comparative analysis on which I synthesize a thoughtful proposal for legislative change. One of the most important aspects I review about prostitution is the unavoidable argument on the morality and ethics of sex work and how several legislative proposals have been both influenced and impeded by disagreements about autonomy, consent, and coercion. Through my research, I found that circumstances such as poverty and education play a large role in facilitating entry into prostitution, effectively making the “prostitution issue” a wider-affecting “socioeconomic issue.” Overall, this study will thoroughly examine the nuances of prostitution often overlooked by government and the public, in an effort to assess the best way to serve a marginalized group of women who will benefit from progressive reform sensitive to their needs and their circumstances.
27 Concourse  1:30-2:15  Board C05
Meiyu Li
Jessica Bethoney (Faculty Sponsor)
Honors Program, Bunker Hill Community College
Parenting Styles: The Different Culture and Technology’s Impact

This paper discusses the parenting styles of American and Chinese families and how technology altered them. Parents serve as the most important role models to their children because they are the primary teachers of social expectations; parenting style is a major influence on cultural identity. With modern technological development, advancement affected and impacted families. Parents generally utilize methods stemming from cultural expectations, but this paper asserts that technology homogenizes these styles. To demonstrate this, American and Chinese parenting values are first contrasted, then compared in the context of television, mobile devices, and computers. Technological influence has impacted many aspects of cultural practice, and parenting is certainly not immune to this phenomenon. Indeed, the conclusion finds that parenting styles in those different cultures tend to become more homogenous following the widespread use of identical technologies.
Matthew Allan Litchfield
Robin A. Robinson (Faculty Sponsor)
Department of Sociology and Anthropology, UMass Dartmouth

Shared Spaces through Life and Literature: How Spaces and Stories Affect Who We Are

This project aims to explore how shared spaces in society and literature function to produce observable effects in people’s behaviors. Shared spaces are those in which people intentionally come together to participate in personal, communal, public, or civic engagement. By challenging assumptions about the nature of spaces people typically encounter in life and literature, this project will prompt a discussion on how barriers to shared spaces (both intentional and unforeseen) shape our collective culture. The main methods of the project were participant observation and literary review & criticism. My findings have been presented in the form of a blog, which is a shared space in and of itself where others joined me in reflecting on my findings. The blog was active during the fall 2015 and spring 2016 semesters, and became more active in the spring upon my return from studying abroad in Grenoble, France. Multi-media and bilingual elements were included. My findings indicate that shared spaces are essentially social constructs; however, these constructs continually re-construct our individual experiences, identities and cultures. An effective designer of physical spaces - or literary ones - should take these factors into consideration as she designs a space; attention to these constructions may ultimately define not just the experience of their participants, but also their identities and worldviews. Working on this project has been a profound exercise in reflection through which I hope to encourage others to read and live with greater consciousness of how spaces and stories affect who we are.
Child sexual abuse is a grave public health issue that affects all children across the world, including the United States. The prevalence of child sexual abuse is much higher than what is statistically found in the data and literature due to the fact that a majority of cases go undetected and unreported. Child sexual abuse has both short and long-term physical and psychological impacts on child victims. The negative health consequences include contracting venereal disease, muscle tension, headaches, post-traumatic stress disorder, depression, anxiety, and a low self-esteem. The warning signs of child sexual abuse include these symptoms as well as behavioral changes, developmental issues, and hyper-sexuality, to name a few. It is the law in the United States for people in certain positions to report suspicions of child sexual abuse to child protective services and law enforcement. Professionals in these positions include teachers. Although teachers are required to report suspicions of sexual abuse, they are not required to undergo training on the warning signs and indicators of child sexual abuse. This leads to a lack of cases being reported by teachers because they do not know what to look for in their students that would raise suspicions of sexual abuse. This paper was produced through secondary research of peer-reviewed and scholarly journal articles on the topics of child sexual abuse and lack of teacher awareness on the warning signs. Government provided sources were used as well. All these sources were written and published by experts in the field.
Robert Jude Rice  
Ben Alberti (Faculty Sponsor)  
Department of Social Sciences, Framingham State University  
Experiential GIS: Investigating Computer Applications in Subject-Centered Archaeology

Archaeological landscape phenomenology and Geographic Information Systems may seem like two methodological approaches that are incompatible with each other. Phenomenology is rooted in human experience, how a subject might have viewed (or does view) his or her landscape, and how these views may have shaped actions. Geographic information systems (hereafter GIS), seemingly, takes humanity out of the interpretive picture, relying on computer applications to compute and analyze quantitative information. This research examines the ways in which GIS can augment phenomenological interpretation, and the various positions that surround the issue. By examining several sites along the Rio Grande Gorge in Northern New Mexico, using data collected during fieldwork during Summers 2013, 2014, and 2015, the capabilities of GIS to assist in interpretation will be highlighted. Such examples make use of both subject-centered accounts and also GIS analyses. Using examples (Llobera; Gillings) to guide such examinations, an effort will be made to show that GIS and phenomenology can work together. By illustrating such examples, the utility of GIS in phenomenological archaeology will become clear, and further theories and methodologies can be developed.
Many cultures have accepted genders that do not directly correspond to the Western understanding of either “male” or “female.” Colonialism and globalization have led to any gender identities that fall outside of the male-female dichotomy being subsumed by the Western binary. Binarism is the term associated with this particular aspect of colonial oppression. The indigenous people of North America and of Southern Asia, for example, have gender systems that do not conform to Western standards. This paper will examine the effect binarism has historically had in silencing and erasing these groups of nonconformant people in order to maintain the power of the Western patriarchal system and how those individuals who maintain their nonbinary identities in the face of colonial influence actively resist personal silencing and the erasure of their culture.
In this work, I explore the implications of the past and present infringements on women’s rights to bodily autonomy. I present here a study of the different facets of bodily autonomy, the ways in which the freedoms afforded to women by this right have been curtailed, and the implications of such an infringement. In order to explore the topic, I did library research and used peer-reviewed sources to examine the issues of no-procreation orders, coerced sterilization, abortion and contraception access and funding. I compare the rights of women to those of men and advocate for the use of substantial rights rather than equal rights. Additionally, I will illustrate how these infringements demonstrate a broader issue of excessive government power. I found that infringement on women’s rights to bodily autonomy was often employed by the government to serve a social end. Eugenics and the idea of “race-suicide” were prominent catalysts, and often the infringement affected one specific group of women disproportionately, i.e., the poor, American Indians, and sexually active individuals. These trends continue today. I conclude that this is due to what I refer to as the “male standard”; because men are the standard used when enacting legislation, and these are written through a lens of “equal rights,” women are impacted differently and their needs are seen as luxuries. Rather than treat men and women as equal, the law should recognize and account for the differences that exist.
Compared to other global competitors, East Africans have dominated the field of long-distance running for many years. The reason was unknown until it was established that East Africans grow up running barefoot, which provides holistic preparations for long-distance running. When running barefoot, your body automatically uses a defense mechanism against the impact of running on a hard surface. We begin to go up onto our forefoot, our toes spread out across the ground, our foot expands, and we absorb the shock from the ground. This also helps us to not over stride. The mechanics of running barefoot – which is our natural form of running – changes dramatically when runners wear ‘high-tech’ cushioned running shoes that are popular in places such as the United States, Australia, and Europe. This can be the difference between becoming a world champion, and taking second place. This research project examines the cultural context that supports and promotes the competitive advantage of East African long distance runners over their global counterparts.
“We Are What We Eat”: The Reflection of Elite Status in Bone Chemistry of the Classic Lowland Maya

Studying ancient civilizations is almost exclusively reliant on physical remains left behind in the archaeological past, giving a tantalizingly fractured glimpse at how early cultures developed, survived, and operated. Isotopic analysis of carbon, nitrogen, and strontium in human remains is one procedure that anthropologists can use to establish what someone ate, where their food came from, and where that person lived in relation to their food. Analyzing human remains of the Classic Maya can reveal a correlation between type and variety of diet with social class, dependent on a geographic and temporal scale. By gathering information from peer-reviewed articles from the University of Massachusetts Amherst library database, this paper looks at this correlation and determines whether or not there was institutionalized decision making in food resource distribution amongst the Classic Maya. Researchers determined the status of individuals before isotopic analysis by using grave goods, tomb elaboration, and geographic location. If there was evidence of decision making from the higher status group, then there are implications to a greater system of control at work in the Classic Maya society before its fall. If there is enough data to make a strong correlation between social status and diet, then this information can be used to determine the status of individuals with no other in situ information in other cultures, as well as provide a more dynamic image of how people interacted with each other, different social classes, and how defined those classes were.
Matthew Winn
Kathleen A. Brown-Perez (Faculty Sponsor)
Honors College, UMass Amherst
Dazed and Confused: How Ignorance, Fear and Bigotry Have Shaped Drug Policy in the United States

The United States spends upwards of $18 billion a year fighting the War on Drugs. We have more people in prison for drug crimes than are incarcerated for all crimes in the United Kingdom, France, Germany, Italy, and Spain combined. Our drug policy is marked by strict enforcement, zero tolerance, and extreme punitiveness. Despite these efforts, the United States continues to have one of the biggest drug problems in the world. Using the available literature on U.S. drug policy, I examine the origin of America’s current War on Drugs and place it in relation to the various drug scares that America has grappled with throughout its history. Additionally, I discuss the different policy approaches that we have taken to confront the drug problem and analyze the effectiveness of each. Ultimately, I conclude that the way we have been thinking about drug policy is fundamentally flawed and stems, largely, from a misconception about the nature of addiction. Prohibition of drugs is not a realistic or appropriate goal for public policy. America’s War on Drugs is expensive, intrusive, divisive, and ultimately, ineffective. I suggest an approach to drug policy that is informed by harm reduction, autonomy, and compassion.
ART

33 Room 163  11:45-12:30  Panel 3
Roger Joseph Alix
Marisa Millard (Faculty Sponsor)
Department of Visual and Performing Arts, Bristol Community College
Riot Grrrl Redux: Using Non-digital Design and Distribution Techniques to Inspire Social Activism

Social activist groups and punk rock bands from the late 80s and 90s made their own leaflets, basically DYI fanzines with an activist focus. One important example is Riot Grrrl – their movement was about music, activism and politics (especially gender-centric issues and topics such as date rape, social treatment etc.) I am inspired by such examples, where individuals were tackling heavy-hitting issues armed with glue sticks, scissors and typewriters. With this project I chose to channel this, “do it yourself; don’t wait for someone else to do it” movement, putting my convictions out into the world using the skills in design and project management that I have gained while a Graphic Design student at BCC. With this historical basis, my own passion for specific social issues and input from an ad hoc advisory group made up of a diverse group of people in terms of age, education, sexual orientation and gender identity, I am launching a monthly series of informational leaflets introducing lesser-known topics pertaining to but not limited to the LGBT community. Using pre-digital techniques, I wrote, designed and produced a prototype for limited distribution. These leaflets are geared to visually grabbing people’s attention, sparking conversation and providing additional resources so people can delve deeper into the topic of the month. It has been important to me to design and distribute this publication using hands-on techniques rather than digital methods.
When one looks at a facial expression, there is a psychological process that links the expression to an emotion. Facial expressions have the ability to invoke or alter one's emotions. This process is something that most are not aware of, yet has the capability to affect them throughout their lives. When one observes another person's facial expression, there is a process the brain goes through in order to link the facial expression to a particular emotion. Recognizing emotion from facial expressions comes from a diverse psychological process using a large amount of neural structures. The perceptual process that happens when one looks at a facial expression involves using the occipital and temporal lobes, which puts together detailed representation from the formation of the facial feature. This recognition then involves the use of the amygdala and orbitofrontal cortex, which connects the perceptual formation of the facial expression to the person's past knowledge about the emotion being displayed. Therefore, associating the facial expression with a particular emotion. To show the relationship between facial expressions and emotion, I have made paper collage portraits with exaggerated expressions to evoke specific emotions within my audience. Each portrait displays a different facial expression. The color of paper being used for each collage will also differ based on the facial expression to better enhance the emotion. By doing this I am using color to further enhance each emotional response, causing my audience to go through a psychological and emotional response as a result of my work.
This study investigates how the pressure for technical perfection and an idealized body image in the ballet world can affect a ballet dancer’s lifestyle and mental health. The life of a pre-professional or professional ballet dancer consists of a regimented routine to maintain their overall health, injury prevention, stamina and skill. Even for those adhering to the most careful routines, unexpected physical traumas can occur, and physical stress and injury regularly impact a dancer’s body and performance. Psychological stresses resulting from trauma and injury can adversely impact the dancer’s life and career. Through research, I hope to determine whether or not the beauty of ballet dancing justifies the physical and mental tolls on the body and mind of a pre-professional and/or professional female ballet dancer.
41  Auditorium  1:30-2:15  Board A27
Kaci T. Dumas
Jennifer Koop (Faculty Sponsor)
Department of Biology, UMass Dartmouth
Artificial Ocean: Using Novel Design Tools to Show How Plastics Are Affecting Seabird Populations

Ocean pollution is increasingly becoming a problem for marine animals. Sea birds are arguably one of the most effected, despite many of the pollutants that are harming these animals being easily preventable by simple human action. Plastic pollution is one such form of pollution. While many studies have focused on this topic, the information gathered is often not presented with a public audience in mind. My research aims to bridge the gap between primary scientific literature and the general public by presenting information in a novel, engaging format. Visualized data and infographics are used in place of heavy blocks of text to better communicate how ocean plastics are harming seabird populations. My goal is to create awareness of this growing issue and reenergize the public's interest in finding a solution. I am producing a series of eco-friendly posters, mailers, and stickers that describe the human role in creating plastic waste, the permanency of plastics in the environment, and the ecological impacts of plastic waste.
Our world has become increasingly more individualistic and we often only consider what affects us directly. Many people preoccupied with individual pursuits forget the importance of a broad view of our existence, one that promotes sustainability for all. To understand where we are going we need to open our eyes to where we have been and where we are in the present. Instead of only focusing on individual prosperity we need to consider our collective impact on our environments. The act of connecting ourselves to each other and our surroundings inspires sustainability, and collective consciousness establishes individual responsibility for our environments. I have created a series of constructed environments that will promote the importance of collective consciousness by visually linking the past with the present. Though the artwork is two dimensional, screens will be fixed over the surface creating a barrier between the work and the viewer suggesting a lack of connection. This notion aims to embolden the viewer to look more closely at their own environment, acknowledge their lack of connection, and consider a more intimate relationship with their surroundings.
42 Room 811 1:30-2:15 Panel 4
Farah Rita Khazen
Carly Rose Kraszewski
Diana Lisa Riggieri
Stacey L. Parker (Faculty Sponsor)
Department of Visual and Performing Arts, Worcester State University
Aesthetics in Dentistry

Dentistry is a growing field with an increasing demand. Some of the essential characteristics of a skillful dentist include manual dexterity, detail orientation and the consideration of visual aesthetics. Visual arts are often incorporated into the practice of dentistry in order to enhance patient care. Our goal is to shine the light on how visual arts impact dentistry. Our research focused on the importance of color theory, sculpture, and the critical analysis of visual art in relation to the field of dentistry. There are specific art techniques, practices and theories that are critical to delivering quality dental care. The proper use of these will ultimately affect the patient on multiple levels. We can clearly see the important relationship between your smile and creative aesthetics. This goes beyond the gesture of a smile, and into the fine arts of dentistry. A good smile communicates just as strongly as visual art. Both transcend social, economic, cultural and language barriers. Without the arts, you get a toothache.
43  Room 811  1:30-2:15  Panel 4  
Kara Lowkes  
Rachel Adele Rugo  
Stacey L. Parker (Faculty Sponsor)  
Department of Visual and Performing Arts, Worcester State University  
Abstract Art in Everyday Life

The primary focus in our panel is taking abstract ideas and applying them in two different visual concepts. While the ideas are widely varying, the underlying research shows the flexibility of abstract art concepts in everyday life situations. The basis of the research consists of emotional understanding of art, and the effects on the creator and audience. One concept is using abstract art in an educational setting, which focuses on how art can be cross-disciplinary and beneficial for all students, as they learn in a variety of ways and styles. Artwork was created within a classroom of students focusing on a wide range of Common Core topics and skills, as well as creating personal pieces, working more directly with color theory, and using children’s art materials. The other concept explored the therapeutic outcomes art can bring through abstract expressionism and automatism. This project tested the process of letting go and healing in a positive, creative way. This concept has not only investigated therapeutic outcomes, but also the expressive qualities of color, different surface textures, methods of application, and scale of canvas. As a result, large-scale abstract expressionism paintings were created. These concepts have shown the flexibility of abstract art concepts in relatable life situations, and the positive effects on both viewer and creator.
The ocean instills in me awe of a power greater than human imagination. The water, sky, clouds, and shoreline provide a myriad of opportunities to study my attraction to the sea. My paintings reflect various emotions I have experienced from countless hours spent by the sea. My research focused on techniques and inspiration of artists that paint sea scenes, historical documents that describe how artists and writers over the years depicted their love, fear, awe and fascination with the ocean, and paintings from books and museums. My respect for the power of the sea, and love of the beauty and peace the sea gives me inspired me to create seascapes using acrylic and watercolor on canvas. A variety of compositions represent ocean scenes that reflect awe, fear, peace, humor and joy. Along with research information, I used personal memories, photographs and pictures of beaches in New England and Florida to assist me in the creation of my work. I join artists from many past and present generations in an attempt to portray wonders of nature on canvas.
Art has always been a way to express ourselves. Even after we are dead and records are forgotten there is still the chance our work may remain. Art is a still shot of our creativity captured in a moment. In my time at Salem State my work regardless of the project, has always been driven by me. The hours I spent on each piece were not peaceful, I worked for what I have created and it was thrilling. The pencil, the computer, the knife, the camera are just a few of my tools. The theme of my work is me; my creativity is not limited to one medium or one particular expectation. Works included in my portfolio include examples of painting, drawing, animation, graphic design and typography. My portfolio reflects my expression and shows the levels I have reached. I chose art because there are endless possibilities for me to make my views visible.
Laura Nicole Provost
Brian A. Alves (Faculty Sponsor)
Department of Art + Design, Salem State University

A Growing Career in Animation

I have always been inspired by the life behind artwork. Michelangelo once said that he looked into the marble he carved to find the soul inside. I try to give each one of my pieces a soul, a personality, and lately mere pencil and paper haven’t been enough. I want my work to soar, to live, and so I have begun to learn animation through After Effects. I have developed my skills so much over the last few months and I look forward to showing what I have brought to life, and what I plan to create in the future.
Barrier of Shadows

U.S. - Mexican border inspires my artistic pursuits due to the fact that I had to conceal my father being an illegal immigrant from Mexico. Mexican immigrants choose to leave everything behind to pursue a brighter future in America. My research is about why Mexican immigrants come to America, how they’re able to assimilate into society; and how it impacts them. As an adult I am now able to ask the questions I've never dared to ask as a child; and understand the determination, will and resolve of those that have crossed. Through conducting interviews in the Mexican community I have learned why Mexicans risk incarceration, disease, and death to cross the U.S. - Mexican border. Undocumented Mexicans depend on each other to survive. They are able to stay and work in America by having connections in obtaining identification cards, Social Security numbers, or by working under someone else’s name, and having the other person know about it. Mexican immigrants have had to sacrifice a lot to never return to their home. I want society to walk away questioning human morality, rights, and desperation.
40 Auditorium 1:30-2:15 Board A26
Colton J. Simmons
Marisa Millard (Faculty Sponsor)
Department of Visual and Performing Arts, Bristol Community College
Design Strategies for Social Media Lead Development

I will be helping a local start-up company create a presence on social media in order to generate leads. During this project I will research social media marketing and use my educational focus on graphic design and web design, as well as my experience in conceiving and launching "Faces of New Bedford" to help inform my design and marketing initiatives. My goal is to answer the question, "How can I best contribute to and document a critical dialogue focused on developing social media strategies in collaboration with a business graduate student in order for me to create a targeted design-curated presence?"
Concourse 1:30-2:15 Board C06
Danielle Marie Wilbur
Stacey L. Parker (Faculty Sponsor)
Department of Visual and Performing Arts, Worcester State University
Interpersonal Connections

The interpersonal connections we share with others affect us as individuals and future relationships that we may have. For myself, the past few years have brought about some challenging situations; including moving, transferring schools, the end of relationships, and deaths. Most of my comforts, people or places, have been lost and replaced. With all of this shifting going on and the continuous process of letting go, it makes me wonder how truly attached we really are with someone or something if we can just replace it after we grieve its loss. I find myself wondering, as well, if it is healthy to let ourselves become so attached to others if, in the end, everything is temporary. I am researching how we interact with one another and how the threads of relationships that tie us together effect the strength of other ties. From the minute we are born we begin to form relationships; first with our parents, then our family, and then our peers. Along the way we learn from these relationships and they contribute to our development as individuals. Depending on the strength of these relations, the nature of relationships that follow may be effected to the prior. My intention is to demonstrate this intricate web of relationships through mixed media art pieces using figurative forms and physical strings to represent the connections between people. This body of work will include hand sewn figures and threaded photographs.
ART HISTORY

47 Room 909 3:30-4:15 Panel 6
Maria Joao Bastos-Stanek
Nancy Noble (Faculty Sponsor)
Department of Art History, UMass Amherst
Queering Prohibition: Gender and Sexual Nonconformity in Paul Cadmus's Greenwich Village Cafeteria

American artist Paul Cadmus (1904-1999) is understood today as a satirical artist whose best-known painting, The Fleet’s In! (1934), was famously censored for its risqué depiction of drunken sailors on shore leave. This presentation challenges the dominant understanding of Cadmus's work as satirical and addresses the ways in which the artist adapted his lived experiences as a queer man to respond to emerging changes in pre-World War II urban gay subculture during the Prohibition years (1920-1933). I analyze the artist's 1934 oil painting, Greenwich Village Cafeteria, to argue that Cadmus depicted scenes of gay life that actually occurred and were not attempts at satire. I situate the painting within the context of the current state of scholarship on Cadmus with emphasis on art historians’ rediscovery of him as a gay artist in the late 20th century, Cadmus's biography, the painting's historical context, and the organization of gender and sexual nonconformity in early 20th century New York City. I use Greenwich Village Cafeteria to explore how Prohibition facilitated the growth of a highly visible and integrated gay subculture in Greenwich Village, the epicenter of bohemian life in New York City. In my presentation I will argue that critical changes Cadmus made to the painting’s composition from preliminary sketch to final work demonstrate the limitations he faced in representing gay subculture for a largely gender and sexual conforming audience.
The concept of post-industrial ruins has recently been a popular subject of research in the art historical field. Frequently present in art and scholarship on the subject is the trend of fetishizing abandoned buildings which has led to the cultivation of ruins and, more dangerously, the romanticization of dilapidated and economically-disadvantaged cities. I hypothesize that this interest grows out of a long history of representations of these sites in art and visual culture. Focusing on the origins of New England’s industrial cities as gateway cities, or the cities through which immigrants entered America and began their journey to the American Dream, I show how the representations of these cities has changed over time. Whereas artists like Charles Sheeler admired machinery and industrial landscapes in their paintings, recent artists are focused on abandoned factories and sites. When factories began closing in the late-1970s, many American artists began to document and display them in their works, expressing—perhaps—their concern for the death of the American Dream or even projecting a deep nostalgia for a glorious past. I explore these issues in a research essay that will present the history of the visualization of the abandoned industrial sites in the New England post-industrial city. First, I will consider the history of the fetishization of ruins in the New England region by looking at a few selected examples of visual imagery in the popular press and the popular discourse. After understanding the historic role of the ruins in the public imagination of New Englanders, I will begin to explore the post-industrial ruin as presented in the realm of the fine arts. The abandoned factories in Massachusetts Gateway cities carry a mysterious beauty exemplified by the many examples of ruins in the work artists like Stephen Vitiello and Mark Dion. I will formally analyze their art pieces and also discuss and synthesize the works of art historians like Magali Arriola. My criticism of these artists is by no means focused on downgrading the inherent quality of their works. Indeed, I am equally interested in those aspects of their works that can help us reimagine the future of post-industrial cities in a more positive and constructive way. I will conclude by emphasizing the role of (art) history and visual culture in fostering future rehabilitation projects. Indeed, without (art) historical knowledge, we cannot offer better solutions for the future of these economically declining cities.
Lindsay Joleigh Todaro  
Ray Kinoshita Mann (Faculty Sponsor)  
Department of Architecture, UMass Amherst  
A Holistic Evaluation of Northeastern Native American Vernacular Architecture and Its Implications for the Future Community Center of the Nipmucs of Central Massachusetts

The significant influence architecture asserts on the holistic sustainability of a community cannot be underestimated. The Nipmuc Tribe of central Massachusetts is working to design a cultural center to support a myriad of cultural and educational activities. The design of this building must go beyond function to actively support the holistic sustainability of the Nipmuc community, in order to ensure the survival of their culture in future generations. My project analyzes the vernacular typologies of northeastern Native American architecture. Deep disruptions in community structures when Europeans permanently settled in America has resulted in architecture built for native communities which continues, even today, to be out of touch with Native American values, beliefs, and goals. By revisiting the typologies of an era in which Native Americans autonomously designed and built their societies, we find an immense resource to inform design today. By recognizing vernacular architecture as a product of the social, cultural, economic, and environmental contexts in which they developed, relevance can be drawn from and applied to projects such as the Nipmuc Tribe’s cultural center. Research centers around not only vernacular typologies, but also current conditions of the Nipmuc community, and exemplary precedents of Native American vernacular knowledge applied to modern buildings. My project draws parallels between past and present to generate design considerations and suggestions for the cultural center. The end goal is to create for the Nipmuc a building which actively supports the traditions of the past while guiding the goals of the future.
ASTRONOMY

49  Auditorium  2:30-3:15  Board A54
Jessica Marie Angelini
Mark Reinhold (Faculty Sponsor)
Department of Natural Sciences, Northern Essex Community College
Jupiter and Its Moons: Io, Europa, Ganymede, and Callisto

The purpose of this study is to calculate the combined mass of Jupiter and each of its individual moons using a formula derived from Kepler’s Third Law of Planetary Motion. The process includes nightly observations of Jupiter and its four moons as a means of data collection. A necessity for this to be successful is to capture each moon at the edge of its orbit. A scale is then created from this data collected, using Jupiter’s known diameter, to calculate the distance between Jupiter and each moon. The anticipated outcome is to use this information and to plug it into the manipulated formula to calculate the combined masses of: Jupiter and Io, Jupiter and Europa, Jupiter and Ganymede, and Jupiter and Callisto.
This project evaluates the scientific validity of a variety of explanations of the anomaly around the astronomical object KIC 846285. Several explanations for the anomaly have been offered by the scientific community, including the idea that the anomaly is the result of extraterrestrial mega-structures. Since it is rare in astronomy that extraterrestrials are considered among scientifically-studied phenomena, this will provide a good opportunity to understand the criteria by which scientific theories are compared and evaluated in astronomy. A quantitative approach to evaluating scientific explanations will be applied to this case study and the various explanations will be ranked in order of plausibility based on the criteria applied. This will help determine if there is a scientific basis for considering extraterrestrial sources among explanations for this phenomenon, which could have implications for science research, policy, and funding opportunities in the field.
Turbulence has been identified in molecular clouds, but the origin, means of sustenance, and evolution remain debated. One possibility is that stellar feedback injects enough energy into the cloud to drive observed motions on parsec scales. Recent numerical studies of molecular clouds have found that feedback from stars injects energy and impacts turbulence. Expanding upon these studies, we analyze magnetohydrodynamic simulations which vary the stellar mass-loss rates and magnetic field strength. We generate synthetic 12CO(1-0) maps assuming that the simulation is at the distance of the nearby Perseus molecular cloud. By comparing the outputs from different initial conditions and evolutionary times, we are able to identify differences in our synthetic observations and characterize the sensitivities of common astroastatistics. We quantify the different responses using a variety of metrics proposed in the literature. We find that multiple astrostatistics, such as principle component analysis, velocity component spectrum, and dendrograms, are sensitive to changes in stellar mass-loss rates and/or magnetic field strength. This demonstrates that stellar feedback influences molecular cloud turbulence and can be identified and quantified observationally using these statistics.
We have built a prototype wideband spectrometer for SEQUOIA to include on the Large Millimeter Telescope (LMT). We have tested the spectrometer for core alignment in the analog-to-digital converters, linearity, dynamic range, and Allan variance. The spectrometer is based on a field programmable gate array (FPGA) which has astounding processing power and memory bandwidth, a PowerPC that runs Linux and allows for communication and programming of the FPGA via a PC and two docks that support ADCs. Such a spectrometer does not yet exist and its inclusion on the LMT would allow for scientific endeavors such as mapping external galaxies. A focal plane array spectrometer will also allow observers to map several spectral lines at the same time. This will cut down the telescope time necessary to make the maps of the individual lines, which is a very intense investment. Seeing as most works published these days use multiple spectral lines as evidence, this boost in efficiency has the potential to free up telescope time for even more discoveries.
We present an On-The-Fly (OTF) mapping tool developed in Python for use with focal plane arrays. OTF mapping is an observing method commonly used by radio telescopes in which many short spectral observations are taken sequentially and later convolved with spatial and noise weighting functions into a 3D data cube. This program was initially designed for use specifically with the SEQUOIA instrument prior to its installation at the Large Millimeter Telescope (LMT) in Summer 2016. We have added support for multiple data types such that the program will be able to fit into existing data reduction pipelines for other telescopes and astronomers. OTF mapping has a large data output, so we have incorporated multiprocessing capabilities as well as wrapped C code to increase the rate at which astronomers can create output maps. This tool will enable astronomers at the University of Massachusetts as well as those at other radio telescopes to analyze their data and create images faster than was previously available.
Utilizing Faraday Rotation Measure Synthesis to Examine Galactic Magnetic Fields

The composition and features of galactic magnetic fields are not well defined, and understanding these features will allow us to better quantify the mechanics and evolution of galaxies. This is a substantial unresolved question in astrophysics that our data set provides a unique opportunity to answer. We expect that by performing a statistical analysis of several edge-on spiral galaxies and their background sources we will be able to identify some of the general characteristics of galactic magnetic fields. To do so we utilize Faraday Rotation Measure Synthesis, which takes polarization data of our radio frequency images and transforms it into a polarization angle. Using this angle we can determine the direction of the magnetic field through which the light along our line of sight passes. Applying this technique to our edge-on galaxy observations will allow us to analyze general galactic magnetic field properties for these galaxies, allowing better characterization of these magnetic fields. Our results will lead to a more complete understanding of galactic magnetic fields and how they are generated.
Randall Alfonso Rojas Bolivar  
Daniela Calzetti (Faculty Sponsor)  
Department of Astronomy, UMass Amherst  

Covariance between Star Formation Rates and Dust Mass of KINGFISH Galaxies

We present the initial results for a study of the potential covariance between galaxy physical parameters (e.g., the star formation rate and dust mass) derived from the infrared spectral energy distributions (SEDs) of galaxies. With the emergence of powerful facilities and instruments in the millimeter and sub-millimeter wavelengths, which complement data from infrared space telescopes like Herschel, scientists have been able to observe the infrared SEDs of faraway galaxies (with redshifts between 2 and 5). These SEDs are being used to derive both star formation rates (SFR) and dust masses, the latter related to gas masses. The relationship between SFRs and gas masses determine the fundamental scaling laws of star formation (the Schmidt Kennicutt Law). Thus, it is fundamental to ascertain whether derivation of these quantities from IR SEDs may be affected by covariance. We will use the Spitzer and Herschel data from the nearby survey: Key Insights on Nearby Galaxies: A Far-IR Survey with Herschel (KINGFISH), which includes 61 nearby galaxies observed between 3.6 and 500 micron.
BIOCHEMISTRY

75    Concourse 2:30-3:15    Board C83
Kaivon Ahmad
Jungwoo Lee (Faculty Sponsor)
Department of Chemical Engineering, UMass Amherst
Intestinal Mucin and Its Biophysical Properties

Understanding the function of intestinal mucin is critical to observing the innate immune response and analyzing the toll on the entire immune system. Mucins are large, extracellular glycoproteins that serves as the main component in mucus that gives it its gel-like viscous and elastic properties. These properties are essential as intestinal mucous is the first barrier that nutrients, drugs, and pathogenic agents such as bacteria interact with and diffuse through in order to be properly absorbed. To be able to sufficiently study the biophysical properties of mucin, the extraction process is an important component. We took porcine intestines and placed the intestines in 3 L of 0.25 M NaOH and extracted the raw mucus secreted by the intestines through coarse filtration. This was a simple and time efficient way to further characterize the mucus. The mucus was then purified into mucin to be able to interact with different biological agents. At a neutral pH the purified mucin behaved like a viscous, honey-like substance with a brownish color. The gelatinization of mucin is critical in the effectiveness of the mucus barrier. At low pH ≤ 4 and concentration of about 10 mg/ml gelatinization occurs. This is beneficial due to the acidic pH of the stomach is around 2 allowing the mucin layer to protect the underlying cells and tissue in the stomach. This gelatinization could also be affected by common cationic nutrients found in the diet such as Calcium. We compared the gelatinization of mucin without the presence of calcium versus mucin with the presence of calcium. We found that mucin with calcium began to gelatinize at a higher pH of around 6 versus 5 for mucin without calcium. We suspected that the positively charged calcium ions expose the hydrophobic regions by protonating the carboxylate groups. These findings were important as we than compared the diffusion of the bacterial strain Salmonella in regular mucin versus mucin with calcium present at identical pHs. We found that bacterial motility was reduced in mucin with calcium, evidently due to the gelatinous environment. In this study we show the effects of acidic environments to the gelatinization of mucin and how that affects the diffusion of pathogenic agents such as bacteria that will affect the state of the immune system and prevent disease such as gastrointestinal cancer.
The study of endophytes—fungi that live within a host plant—is a relatively new arena of study with much to be discovered. Through a mutualistic relationship with their plant counterpart, endophytes provide protection against various pathogens, predation from insects, and enhanced nutrient uptake for the host, while simultaneously receiving nutrients and protection from the plant. Salt marshes characterize much of the shoreline in the United States, and the Greater Boston area is no exception. With their relatively proximity to Salem State University, endophytes of the pervasive Limonium carolinianum—Carolina sea lavender—were analyzed for antimicrobial and antifungal properties.
Co-localization Studies Emphasize the Importance of HSP101 to Arabidopsis thaliana's Survival of Heat Stress

During heat stress, proteins vital to cell survival become unfolded and can form toxic aggregates. Plants have evolved highly specialized mechanisms to cope with these conditions. Acquired thermotolerance is the ability of a plant to acclimate to normally lethal high temperatures. One protein that is crucial for acquired thermotolerance is Heat Shock Protein 101 (HSP101). Studies in Arabidopsis have shown that plants without Hsp101 are unable to acquire tolerance to 45°C, while wild-type plants can acquire tolerance and continue to grow normally. During heat stress, HSP101 is involved in disaggregating and resolubilizing unfolded proteins. Our previous immunolocalization studies have shown that HSP101 and small HSPs localize together in cytosolic foci that may include stress-aggregated proteins. Although there have been many studies on the mechanism of HSP101, little is known about the different stress response mechanisms in which it may participate. Specifically, it is unknown if HSP101 plays any role in mRNA stalling during heat stress or with the degradation of misfolded proteins. To investigate if HSP101 plays a role in these processes, we conducted co-localization studies between HSP101-GFP and specific protein markers for cytosolic foci containing mRNA or the 26S proteasome. Our results and previous data indicate that HSP101 most likely localizes to mRNA-containing foci during heat stress. We also saw no co-localization of HSP101 and a 26S proteasome marker. Additional co-localization studies will be performed with different tools, such as fluorescently tagged primers targeted to mRNA, to determine if HSP101 is involved in recovery of translationally stalled mRNAs.
Testing the Effects of 2-Acetamido-1,2-dideoxy-D-galactonojirimycin Binding on a Chimeric α-galactosidase dimer

Mutations in the GLA gene, which encodes the lysosomal enzyme α-galactosidase (α-GAL), lead to a buildup of the substrate globotriaosylceramide (GB3) in affected tissues, ultimately resulting in Fabry disease. Mutations in the NAGA gene, which encodes the lysosomal enzyme α-N-acetylgalactosaminidase (α-NAGAL), result in Schindler/Kanzaki disease. These lysosomal storage diseases lead to progressive deterioration of organs, including the liver and kidney, and eventually result in death. Because lysosomal storage diseases are caused by defects in single proteins, they are in principle repairable and thus active topics of clinical research. To date, enzyme replacement therapy, pharmacological chaperone therapy, substrate reduction therapy, and gene therapy have been approved or tested. Pharmacological chaperones (PC) stabilize their target proteins to increase the amount of enzyme activity in the lysosome. Previously, we have engineered the human α-GAL dimer to contain two α-NAGAL-like active sites (α-GALE203S/L206A). Extending from this result, we have designed a chimeric version of the α-GAL dimer, with one α-GAL active site and one α-NAGAL active site. We hypothesize that the chimeric molecule can be chaperoned in one active site, increasing the activity of the other active site of the heterodimer. We have designed the chimeric molecule to have two distinct affinity tags, allowing purification by tandem affinity chromatography, using nickel and streptavidin columns. Then, we will test our chaperoning hypothesis, using the PC 2-acetamido-1, 2-dideoxy-d-galactonojirimycin (DGJNAc). We predict that binding of chaperone to one half of the chimeric molecule will increase enzymatic activity in the other active site, 50Å away.
In the United States and abroad, synthetic chemicals are manufactured and released into the environment, with little to no data available on their effects on human health or the ecosystem. To address this growing problem, the National Institute of Environmental Health Sciences developed the Tox21 program to identify and analyze a library of synthetics that have become ubiquitous in manufactured goods across the US. I proposed to characterize the stem cell and micro environmental response to 80 synthetics in using an established screening method developed by the Markstein Lab using Drosophila melanogaster mid gut. Three candidates, Methyl Mercury II Chloride, Colchicine, and Berberine caused an increase in the intestinal stem cell (ISC) population. Methyl Mercury in particular increased the entire cell population by 40%, suggesting hyperplastic growth of the stem cells. Additionally, ten compounds including Rotenone, Permethrin, and DDT were identified to kill the fruit flies at standard concentration. Sub-lethal doses were determined through serial dilutions and the cellular response to these chemicals is being investigated using image processing programs to quantify the cell populations. Once the synthetics that stimulate over proliferation of stem cells are identified, the molecular mechanisms will be investigated. I will study the molecular mechanisms behind this growth by (1) applying transgenic reporters to track activation of the Jak-Stat pathway and developmental growth pathways, and (2) using immunohistochemistry techniques to determine cellular activities, to identify each cell type, and to observe if cell polarity has been disrupted.
Understanding the Importance of Dimerization and Substrate Binding of the RcdA Adaptor

Protein degradation occurs in all living things and can signal many mechanisms in cells. In Caulobacter crescentus, protein degradation controls cell cycle progression. Proteolysis occurs via a protease, ClpXP, which consists of an unfoldase portion and a peptidase portion. The protease ClpXP, works with auxiliary proteins, called adaptors, in order to enhance specific degradation of substrates. Adaptors work by binding substrates and delivering them to the protease. In C. crescentus, an adaptor hierarchy is required in order to deliver different classes of substrates. One adaptor, CpdR, effectively delivers one class of substrates; CpdR also primes the protease for another adaptor, RcdA. RcdA binds a different class of substrates and delivers them to primed ClpXP for degradation. RcdA can only effectively degrade substrates in the presence of CpdR. What is not fully understood is exactly how RcdA binds its substrates before delivery to this primed protease complex. We hypothesize that by mutating the RcdA protein sequence in areas of noted key residues, we may disrupt the binding of RcdA and its substrate and observe a lack or decrease in degradation. Additionally, the RcdA adaptor protein has been crystallized and its structure determined; RcdA is a dimerized protein consisting of two helical monomers. We hypothesize if we disrupt the dimerization of RcdA, a decrease or lack of substrate degradation may occur. A deeper understanding of how the ClpXP protease functions could give novel information to be applied to pathogenic bacteria or used as targets in designing new drugs.
Dollar spot is caused by the fungus Sclerotinia homoeocarpa and is the most economically taxing disease on golf courses. Isolates from New England golf courses have developed practical field resistance to propiconazole (a demethylation inhibitor fungicide) commonly used to control dollar spot. Previous studies have observed upregulated expression of the transcription factor Shxdr1 in resistant isolates. Shxdr1 increases expression of downstream efflux transporter genes such as: ShatrD and ShPDR1, which are involved in facilitating propiconazole resistance through detoxification systems. The goal of the project is to express a double stranded (ds) RNA hairpin complementary to Shxdr1 in propiconazole resistant S. homoeocarpa isolates to dismantle the detoxification mechanisms. When the dsRNA expressing S. homoeocarpa mutants are treated with propiconazole the previously resistant S. homoeocarpa will become highly sensitive. Quantitative real-time PCR of S. homoeocarpa mutants will allow for evaluation of the Shxdr1, ShatrD and ShPDR1 transcript levels. Host Induced Gene Silencing (HIGS) allows for host RNA expression to downregulate the Shxdr1 transcription factor. Eventually we want to express the complementary dsRNA of Shxdr1 in Arabidopsis to prevent infection of S. homoeocarpa since pathogen virulence factors might be metabolized and effluxed. It is hypothesized that when Arabidopsis transformants expressing the dsRNA are inoculated with propiconazole resistant S. homoeocarpa isolates, propiconazole application will prevent mycelial growth of pathogen due to HIGS. If successful, the development of this HIGS system conferring hypersensitivity to propiconazole resistant S. homoeocarpa may be applied to turfgrasses to improve management strategies of dollar spot and possibly other diseases.
Bacterial microcompartments, BMCs, are proteinaceous structures found in roughly 15% of bacterial species. It is believed that these icosahedral-shaped organelles allow for various metabolic reactions to be performed at a higher efficiency as well as prevent toxic intermediates from entering the cytosol during the processes. They are recognized by their vertex/shell proteins whose genes typically are found in large operons along with transporters and related enzymes. Comparative genomics and genetic analysis has allowed us to form hypotheses regarding the origin and function of different BMC types. If the details of each related pathway were to be defined, many potential applications could be also found. As it has been identified that BMCs are in human gut microbes, particular interest has recently been directed toward the improvement of human health via these species. This project will focus on investigating the evolution of specific BMCs using phylogenetics and sequence alignments. Analysis of the genetic data of species containing the operon, as well as their close relatives for different genes, namely the key enzyme, will give insight to the function and progression of the BMC. This information will be valuable in characterizing BMCs in the future and understanding the possible uses that they might have.
Hsp90 is a highly conserved chaperon protein found across many eukaryotes including Homo-sapiens. It contains 3 domains and in particular the middle domain has been known to interact with many unstable clients such as mutated kinases that can lead to cancer. These interactions help stabilize these mutated clients and enhances them to be detrimental to the organism. Using EMPIRIC, a methodical and parallel investigational protocol, the fitness of organisms, each with a different mutation in the middle domain, can help identify and produce further areas of research where Hsp90 may be involved in chaperone folding and client binding. We expected to see in this region of a 50-aa window, many mutations that produced null like results because it limits the chaperone-client binding interactions. We utilized deep sequencing to determine the fitness of the individual mutants in a 50-aa window as well as function of S. cerevisiae Hsp90 homolog Hsp82. Mutations are accounted for via of a barcode with every mutant. This method provides more accurate association reads during deep sequencing. From our results, many of the mutants were wild type-like and therefore not sensitive to mutations. However, there was small window of positions of amino acids, that was very sensitive to the mutations, and it showed a null-like curve. This reveals that this area of S. cerevisiae Hsp82 is not extremely mutation sensitive. We conclude that these positions may not be directly involved in client interactions. In the future, we will evaluate single mutant growth competitions and pull down assays.
Antibody Drug Conjugates in Targeted Cancer Immunotherapy: Workflow and Preclinical Results

Antibody drug conjugates (ADC) for cancer treatment have demonstrated great therapeutic potential in recent years. The use of monoclonal antibodies (mAb) to flag biomarkers on cancer cells and target them for drug delivery has caused a significant paradigm shift in the search for a cure. In this study we identified a target, protein X, via high-throughput screening and proteomic profiling of primary tumors. Protein X is overexpressed in small cell lung cancer, triple negative breast cancer, and colorectal cancer, among others. This protein promotes metastasis by enhancing cancer cell survival, migration and resistance to hypoxic conditions. During my time as an intern at Bluefin Biomedicine, I worked to characterize human mAbs against protein X that had been developed and validated in vitro and in vivo, using the methods of cellular subcloning, Western blotting, and flow cytometry. We found that some of these antibodies can cause target internalization and degradation. Furthermore, when conjugated to a cytotoxic drug, these antibodies can kill tumor cells grown in culture, and inhibit tumor growth in xenograft mouse models. In a xenograft efficacy mouse study, after 22 days of treatment, and 45 days post injection, the average tumor size for the vehicle control group underwent a 157% increase, while an ADC group experienced an 88% decrease. These pre-clinical results suggest our antibody drug conjugates against protein X may be therapeutically useful in the treatment of relevant cancers, which have a high level of unmet medical need.
Biofuels, produced by microorganisms found in the environment, are a potential cost-effective alternative to fossil fuels. Clostridium phytofermentans is a bacterium that naturally converts a range of biomass sources directly to biofuels without expensive thermochemical pretreatment. ABC transporter proteins mediate carbohydrate uptake, a key step in biomass conversion to biofuels. Unlike well-characterized E.coli ABC transporters that have a specific pairing between transmembrane and ATPase domains expressed from the same operon, the C.phy cellobiose transporter appears to use a ‘multitask’ ATPase (Cphy_3611) that serves multiple transmembrane domains. Sequence and structure modeling found that the ATPase in C.phytofermentans and its homologs of known structure have a TOBE-TOBE domain at the C-terminus, which, may play a role in regulation. Biochemical methods to successfully express Cphy_3611 in E.coli and purify the ATPase protein for characterization were performed. Experiments are in progress to discover regulatory molecules that affect the protein, including ATPase assays to screen for inhibitors. The objective of this project is to determine the regulatory functions of the TOBE domain in C. phytofermentans. Inhibition of a multi-task ATPase such as Cphy_3611 could inhibit transport of multiple carbohydrates, thus serving as a master regulator of oligosaccharide transport. By understanding the regulation of oligosaccharide transport, we may be able to use this bacterium as a prototype for further biofuel technology.
Caspases are a family of cysteine-aspartate proteases that are involved in the execution of apoptosis, or regulated cell death, amongst other functions. As such, the regulation of these executioner caspases, caspases-3, 6, and 7 is extremely important. Dysregulation of apoptosis has been linked to both degenerative diseases, such as Alzheimer’s or Huntington’s, as well as proliferative diseases such as cancer. Understanding the systems of regulation could lead to insights in how these diseases progress. In this project, the tangle of relationships between PAK2 and caspases in interrogated. Caspase-3 activates PAK2 by cleaving it, and PAK2 is known to inactivate caspase-7 via phosphorylation. There is evidence that PAK2 is also able to phosphorylate caspase-3, but the exact form of caspase-3 phosphorylated and the impact on activity from this phosphorylation has not yet been deduced. In this project the relationship between the structure of caspase-3, the degree of phosphorylation by PAK2, and the resulting impact on activity is being assessed. Several different versions of recombinant caspase-3 have been purified, as well as a constitutively active version of PAK2. When incubated with radioactively labeled ATP, the degree of phosphorylation of different proteins can be quantified. Preliminary results indicate that active, processed versions of caspase-3 are most heavily phosphorylated while inactive unprocessed versions of caspase-3 are least phosphorylated. Future studies will continue to explore how PAK2 recognizes the differences between the two caspase-3 species as well as untangle what effect the phosphorylation has on activity.
Introduction of Benzoyl-L-Phenylalanine into Hsp16.6 in Synechocystis sp. PCC6803 in Order to Study Interactions with Intracellular Protein Substrates

Small Heat Shock Proteins (sHSPs) are a class of ATP-independent chaperones that are thought to act as molecular life vests to protect misfolding proteins from irreversible aggregation. The typical architecture of a sHSP monomer consists of three domains: a disordered N-terminal arm, a highly conserved α-crystallin domain, and a flexible C-terminal extension. In their native state sHSP monomers form oligomers of 12 or more subunits. Upon stress, these oligomers disassemble into active dimers, exposing hydrophobic surfaces that can interact with nonpolar patches on misfolded substrates. Despite this known information, interactions between sHSPs and substrates, particularly in vivo, remain poorly understood. The goal of this work is to examine in vivo interactions of a sHSP with substrates in Synechocystis 6803, a cyanobacterium with a single sHSP, Hsp16.6, which is required for survival of heat stress. The photoinducible cross-linker, benzoyl-L-phenylalanine (BPA), will be introduced at the position of five residues within the different sHSP domains; positions were chosen based on successful in vitro cross-linking results with a homologous higher plant sHSP. Residues were also chosen based on chemical similarities to BPA in order to minimize compromising the three dimensional structure of Hsp16.6. The modified proteins will be expressed and purified from E.coli, and their activity as chaperones will be tested. Proteins with wild type activity will be introduced into a Synechocystis strain engineered to incorporate BPA, enabling crosslinking to sHSP substrates in vivo. Crosslinked proteins can then be identified by mass spectrometry, increasing our understanding of the role of sHSPs during stress.
FoldEco is a program for predicting the folding fates of proteins given certain information about the proteins in question and the folding environment. FoldEco has been shown to be sufficiently accurate at making these predictions and is periodically improved as new data becomes available. Currently, FoldEco does not have functionality for reversing these calculations, so if an experiment yields data about protein folding fates FoldEco is unable to provide information about the protein and its folding environment. This kind of functionality would be highly beneficial as it would allow for confident measurements of protein properties from relatively quick and inexpensive experiments. This project is an attempt to create such a program. The most primitive way to do this kind of analysis would be to simply try every possible value and run a FoldEco simulation based on them. This strategy is neither efficient nor useful as it is incredibly slow and provides wide ranges of answers. These problems are tackled by applying knowledge of the effects of various parameters to construct more efficient algorithms to find sets of parameters that fit the profile and by combining data from different types of simulations and using the intersection of the solutions to narrow down the solution set. Although the project is still relatively young several powerful techniques have already allowed the program to arrive at relatively small solution sets in a relatively efficient manner.
The function of the lens is to fine focus light onto the retina. However, during cataract formation the aggregation or precipitation of lens proteins prevents the lens from working optimally. Approximately fifty-percent of juvenile cataract is due to genetic mutations. These mutations can cause abnormalities in the proteins in the lens leading to aggregation and/or precipitation. In particular, genetic studies has linked one case of congenital cataract to a R77S substitution in human γD crystallin (HγD-Crys), but it is unknown if this mutation leads to structural defects, instability and/or a loss of solubility of the protein. To investigate the effects of this substitution, the arginine was substituted with serine at position 77 of HγD-Crys utilizing site-directed mutagenesis. This mutation was confirmed using DNA sequencing. Next, thermal unfolding experiments will be performed and analyzed using fluorescence spectroscopy to compare the relative stability of the wild-type and R77S HγD-Crys protein. Solubility experiments will be performed to determine if the R77S substitution leads to precipitation of the protein. If the relative stability and/or solubility of R77S HγD-Crys is reduced, this will indicate that this mutation could lead to this type of congenital cataract.
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Detecting Bacterial Contamination in Egg-Chicken

This research project is about optimizing a process for the molecular detection of Salmonella sp. because bacterial pathogens are a significant health risk in food processing. Since poultry meat is considered to be leading source of human foodborne infections, I will analyze egg and chicken samples for bacterial contamination. In the experiment, I will be using the Polymerase Chain Reaction (PCR) to identify the presence of Salmonella sp., using primers which have been shown to be specific to all species of Salmonella.
This research focuses on the characterization of polyphenol oxidase (PPO) and its isoenzymes. The PPO enzyme can be found in barley, Hordeum Vulgare, and is known to catalyze the conversion of o-dihydroxyphenols to o-quinones. These quinone products can polymerize and react with amino acids that result in the browning of fruits and plants. Polyphenol oxidase catalyzes the oxidation of L-3,4-dihydroxyphenylalanine. This substrate was used in order to measure the activity of PPO and its isolated isoenzymes through its conversion to dopachrome, which has a characteristic absorption spectrum at 470nm. We hypothesize that there are two to three different isoenzymes of PPO present due to evidence of both anionic and cationic species found within purified barley. There are many aspects to consider when analyzing these isoenzymes with the main focus of this study to observe the enzyme kinetics. The Km of Mushroom Tyrosinase was found to be 0.57mM and is used as our control for comparison to the isolated isoenzymes, which were separated through electrophoresis on a 1% agarose gel at pH 8.0. Once characterized, these isoenzymes can be used for further studies to determine their specific function within a cell.
Matrix Deposition Mimicked by Sticky Peptides in Synthetic Hydrogel

The spread of cancer, or metastasis, throughout the body results in 90% of all cancer-related deaths. Features of the tissue microenvironment such as the stiffness and extracellular matrix proteins have been shown to dictate cell movement. In the Peyton Lab, we use a 4-arm PEG maleimide hydrogel platform to mimic the microenvironment of various tissues and organs in the body. Functional peptides are inserted into these synthetic materials to mimic the biochemical complexity of tissue. However, a limitation of this hydrogel is that tissue stiffening, through protein deposition, cannot be studied. We performed a phage display assay to find 2 candidate peptides that restrict protein deposition. Using FMOC solid phase peptide synthesis followed by resin cleavage, short peptides with specific amino acid sequences were synthesized to ilicit biological functions. After synthesis, the peptides undergo electrospray ionization or matrix-assisted laser desorption/ionization mass spectrometry to confirm their identity and later are purified using reversed phase high-performance liquid chromatography. To validate peptide-protein interactions, I will further do a protein staining assay to validate that these peptides can attach to proteins such as fibronectin or collagen in the hydrogel. By incorporating the synthesized peptides into 3D PEG hydrogels, matrix stiffening through protein secretion can be tracked and the progression of tumors can be studied in a novel and controlled manner. Ultimately, this will allow us to study how tumor stiffening through matrix deposition regulates metastasis.
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Bone Paper and the Art of Kirigami in the Creation of a Reversible 2D to 3D Cell Culture Platform

Hematopoiesis is the process taking place within the spongy bone in which red and white blood cells are generated from hematopoietic stem cells (HSCs). Mimicking the microporous architecture of the spongy bone has demonstrated significantly enhanced HSC survival and function outside of the body. However, the 3D microporous structure limits homogenous distribution of the bone marrow stromal cells or mesenchymal stem cells (MSCs) that are critical for supporting hematopoiesis and effective retrieval of functionally-competent HSCs ex vivo. Additionally, bone is a composite material that is comprised of hierarchically-assembled organic and inorganic components. Although this molecular architecture plays a critical role in directing MSC and HSC function, it remains a major challenge to recreate. Here we introduce a biomaterial engineering strategy involving kirigami or the Japanese art of paper cutting to create a reversible 2D to 3D microporous architecture from natural bone from which to culture bone marrow stem cells. Bovine bone is first stripped of inorganic calcium component, leaving behind a collagen scaffold from which 100-µm thick thin sections are generated. These thin sections are assembled into larger sheets of 2D “bone paper” with surgical glue and cut with a plotter. We are currently testing the biological significance of the bone paper and its 3D configurations in supporting bone marrow stem cell growth and function. We envision that the kirigami bone paper could be a transformative approach to realize ex vivo expansion of HSCs.
Characterizing the Distinct Interaction of PAK2 with Caspase-7

Many cancers and neurodegenerative disorders, such as Alzheimer’s disease, exhibit an intrinsic misregulation of cellular apoptotic pathways. Caspases and kinases are caught in a complex web of regulation. Kinases phosphorylate and inactivate caspases, while caspases cleave and activate the very kinases that phosphorylate them. How caspases and kinases selectively recognize one another is a subject of significant academic and pharmaceutical interest. We have measured the interaction affinity between one apoptotic caspase, caspase-7, and one of its cognate kinases, PAK2, and have observed how phosphorylation impacts their interaction affinity. A much more complete understanding of how these enzymes recognize each other using both their active sites and exosites can be obtained by determining the x-ray crystal structures of the caspase-kinase complex. In this work we have purified relevant caspase-kinase pairs for co-crystallization to determine the interface and nature of their interactions. Identification of these essential chemical interactions will provide a scaffold for the development of small molecules that can be used to better understand this dynamic interplay and influence the development of biotherapeutics.
Optimization of the Caspase-Activatable Apoptosis Reporter, CA-GFP

Discovering an apoptosis reporter that works in organisms would be very beneficial for understanding the cellular apoptotic process. It is important that apoptosis is not only studied in diseases, but also how it regulates cellular development and homeostasis. In 2011, a caspase-activatable green fluorescent protein (GFP) reporter was developed. This reporter consisted of a peptide derived from the tetrameric proton channel domain of influenza M2 protein, linked to GFP through a caspase-recognition sequence DEVD. The fluorescence of GFP is completely quenched until the quenching peptide is cleaved off by caspases, indicating apoptosis. Unfortunately, the CA-GFP reporter forms higher order oligomers in vitro, suggesting that it may be aggregating within the cell, disabling the development of a stably transfected cell line. The goal is to create a version of CA-GFP that does not aggregate in vitro or within the cell. We believe this will allow cells to proliferate while expressing the reporter. A widespread literature search was done to find a small dimerizing peptide that can quench fluorescence of the reporter and not form higher order oligomers. The M2 quenching peptide was replaced with the dimerizing domain of the GCN4 yeast transcription factor, but failed to stop the fluorescence of GFP. The next step is to add segments of the M2 quenching peptide to the new GCN4-GFP reporter. Having a specific, low background reporter for apoptosis which works in whole organisms will give science a chance to understand diseases and develop effective drugs to treat them.
Keeping Up with the Kinesins: TPX2 as a Mitotic Regulator

Hundreds of different factors work to ensure the proper assembly of a bipolar mitotic spindle, successful chromosome segregation, and cell division. These include motor proteins operating upon spindle microtubules to generate spindle pole-separating forces and microtubule-associated proteins (MAPs) functioning to assemble and organize microtubules and modulate the activity of the aforementioned motors. The MAP TPX2 plays major roles in mammalian spindle assembly, has enriched expression during mitosis, and is also a prominent regulator of two major mitotic kinesin motors: Eg5 and Kif15. Previous research has indicated that TPX2 dampens the motor activity of each protein and localizes them to the mitotic spindle. However, what is not known are the concentrations of Eg5, Kif15, and TPX2 relative to each other in the cell. The following study is designed to measure the total protein level of the two motor proteins and their common regulatory protein, TPX2. By immunoblotting samples of mitotically-arrested mammalian whole cell extracts for each protein in question, and subsequently comparing results with those of immunoblots for standard samples of each protein, this study will determine the relative concentrations of Eg5, TPX2, and Kif15, and thus learn if there is an excess of MAP over the motor or vice versa. As perturbations in these protein levels lead to aberrations in chromosome segregation and mitosis, research into the relative cellular levels of three major mitosis proteins can provide further insight into potential therapeutic targets.
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Does Oxidative Stress Play a Role in Pancreatic Development in the Zebrafish Embryo Model?

There is increasing experimental and clinical evidence that oxidative stress is involved in the pathogenesis of diabetes, however the effect of oxidative stress on pancreas development has not been extensively researched due to the difficulty of in utero studies in mammals. Zebrafish is an ideal system for developmental research as it is transparent, grows rapidly, is easy to manipulate and has a large number of offspring. Nrf2 is a transcription factor that activates expression of antioxidant defense genes. Using transgenic insulin-GFP zebrafish as a model, endocrine pancreatic development was observed at 96 hours post fertilization. Zebrafish were exposed at 24 hours, 48 hours, or at 72 hours post fertilization to Nrf2 dependent or Nrf2 independent prooxidants, Nrf2 dependent or Nrf2 independent antioxidants, DMSO control or water control. Next, in order to investigate pancreatic deviations during absence of Nrf2 activation, Nrf1 paralogs (Nrf1a and Nrf1b) were silenced through morpholino oligonucleotides. Nrf2 markers were then analyzed through quantitative PCR. Nrf1, a possible alternative pathway (other than Nrf2) that regulates expression of antioxidant proteins during oxidative stress, could serve as a compensatory pathway that is upregulated during absence of Nrf2 and vice versa. Understanding the effects of oxidative stress on pancreatic development may enhance further studies on the mechanism and development of diabetes.
Probiotics and their supposed benefits have stirred a fair amount of controversy in regards to nutritional value over the past decade. The main inquiry at the epicenter of all this commotion is: Are we truly benefitting by taking daily probiotic supplements? In other words, can adding probiotics to our daily regime effectively alter our microbial environment? A collaborative experiment designed by my mentor and I aim to put such claims to the test. By creating an in-vitro battle ground between gram positive and gram negative bacteria cells to fight for dominance, we will gain insight and understanding as to how helpful these fellow bacteria are for our complex inner ecosystems.
BIOLOGY

107  Concourse  11:45-12:30  Board C91
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The Effects of Dehydration on the Human Body

Water is a very important substance for human existence. The human body is made up of nearly 70% of water. Many people might neglect the importance of drinking water in abundant quantities. Most people ignore the significance of their negligence, and its negative impact and many complications on their health. Furthermore, a decrease in body water percentage can cause many problems. Some of these issues concern the external appearance, whereas others interfere with internal organs functionalities. Di-hydrogen monoxide, (H2O), is the elixir of life. Humans need it every day, every moment, and every second. Every area of the human body needs water, thus, insufficient amounts of water trouble the body organs, and limit their performances. Unfortunately, this is a widespread problem among individuals. Everyone knows that the body needs water, but most people do not even realize that they live in a state of dehydration. Meaning they do not drink the appropriate amount of water. Every ten kilograms of the human body needs approximately 333 milliliters of water on daily basis. That is the minimum amount of water required by the body for optimal functioning. Many people became used to think that they do not need water, or that they only drink when they are thirsty. However, when a person feels thirsty that is considered a late response from the body. At these moments of thirst the body is screaming “I Need Water Urgently!” Moreover, the “thirsty” feeling brings the individual’s attention back to the already existing lack of water. Di-hydrogen monoxide deficiency leads to diseases and behaviors that can be observed on daily basis in people around us.
Wild bees are ecologically and economically vital pollinators experiencing widespread population reductions due in part to parasitism. The parasite Crithidia bombi decreases bumble bee (Bombus genus) lifespan and colony reproduction. Previous work in our lab found dramatically reduced Crithidia infections in B. impatiens fed sunflower pollen (Helianthus annuus) over those fed other diets including buckwheat pollen (Fagopyrum cymosum). Analysis of sunflower pollen revealed high concentrations of triscoumaroyl spermidine, which was absent in the other pollens. The current experiment was conducted to determine whether triscoumaroyl spermidine is the mechanism underlying the dramatic effect of sunflower pollen on Crithidia. Bombus impatiens workers were inoculated with Crithidia and assigned to one of six pollen treatments: sunflower pollen (positive control), buckwheat pollen (negative control), or buckwheat pollen treated with 1%, 0.1%, 0.01% or 0.001% by weight of triscoumaroyl spermidine. Pollen consumption was also recorded for each bee. Seven days after inoculation, bees were dissected and infection assessed. Only the sunflower positive control reduced parasite loads. The four spermidine treatments did not differ from the buckwheat negative control. Furthermore, treatment did not affect mortality or pollen consumption. These findings indicate that triscoumaroyl spermidine is not the mechanism by which sunflower pollen reduces Crithidia infections. One explanation is that a different pollen compounds may be responsible. Alternatively, the effect of sunflower pollen on Crithidia could be due to nutrient deficiencies, or to a mixture of compounds that synergistically reduce infection.
Each year, close to 4 billion trees are harvested for paper production. The pulp that is used to produce paper comes primarily from cellulose found within the cell wall of trees. If it were possible to increase natural cellulose production, the number of harvested trees could be reduced. Cellulose production in plants stops naturally at a certain point. This process is controlled by multiple genes, and every plant species has its own regulating system. This makes it difficult to study cell wall growth across various plant species. However, because histones are widely conserved in most organisms, and histone modifications can regulate the expression of multiple genes simultaneously, it may be possible to use these modifications to modulate genes associated with cellulose production across multiple plant species. Previous studies have shown that dominant expression of specific lysine residues caused the regulation of transcription for multiple genes. The purpose of this study is to determine if dominant expression of modified histone lysine residues can be used to modulate gene expression associated with cell wall biosynthesis across various plant species, and subsequently increase pulp production in trees.
iCons: Elucidating the Function of an Unknown Bacterial Microcompartment in the Soil Isolate KNHS206

Bacterial microcompartments are intracellular proteinaceous units that encapsulate metabolic processes. These structures are composed of a proteinaceous outer shell that encases numerous enzymes. Substrates diffuse into microcompartments degrading the metabolite into its respective byproducts. Several physiological types of microcompartments have been identified. In a soil isolate KNHS206 discovered by Kelly Haas in our lab, bioinformatic analysis revealed a novel microcompartment type. Numerous genes in the operon have distinct annotations that do not suggest an obvious metabolic pathway. Therefore, in order to understand the function of this microcompartment, multiple growth conditions were tested based off of predictions from the annotated genes present in the operon. It was found that the strain grows on minimal media supplemented with rhamnose and glycerol, respectively. High performance liquid chromatography was performed in the hopes to elucidate what byproducts are formed. Lastly, qualitative polymerase chain reaction will be conducted in order to confirm that the novel microcompartment genes are expressed under the various growth conditions. Interestingly, other species that have been isolated from humans also contain this unknown microcompartment. Therefore, by gathering information regarding this soil isolate and it’s various metabolic structures, possible applications can be made to the environment, biofuels and human health.
Gecko toepads can support up to 250% of their body weight on smooth surfaces. Although numerous studies have focused on various other factors in gecko toe adhesion, few have examined gecko toepads in relation to how the geckos adapt their toe angles to different body postures. Many gecko species have differing toepad areas and shapes, some even have only 4 functional toes such as the Phelsuma genus. The variation in gecko species leads us to hypothesize that these geckos will differ in how they use and spread their toes. We analyzed this relationship through imaging various gecko species clinging to vertical glass in different orientations (up, down and sideways). Using these photographs, we calculated each toe angle for both fore and hind feet. Thus far, we have found correlations between body orientation and hind limb total angle spread as well as gecko species and toe angles. The strong effect of species on toe angles provides evidence that the geckos consistently use their toepads differently. Our study provides vital insight into the mechanics of how animals that vary in size from several grams to almost 100 grams are able to adhere in an effective way. This work may provide insight into the mechanism of adhesion which can then be applied to new synthetic adhesive technologies. In addition, further research may help us understand why some geckos can spread their toes about 70 degrees while others use a much greater 190 degrees to adhere to the same surface.
133  Room 177  2:30-3:15  Panel 5
Rebecca Lynn Brigham
John Fabel (Faculty Sponsor)
Commonwealth Honors College, UMass Amherst
The Innate Ability of the Limulus polyphemus Immune Response to Isolate Rogue Breast Cancer Cells and Prevent Metastasis

Human, metastatic breast cancer migrates through both the circulatory and lymph systems to reach vital organs including the bones, brain, liver and lungs. Various tumorigenic cell-signaling pathways that up-regulate the expression of proteins involved in cell proliferation and differentiation promote metastasis by exploiting these systems. Once in circulation, the cancerous cells utilize the mechanisms of the immune response to bind to capillary walls and invade the surrounding tissue. When infected with a bacterium, the limulus polyphemus (Horseshoe Crab) immune response utilizes similar adhesion mechanisms to isolate and degrade the infection. This suggests that study of I. polyphemus could provide insight into breast cancer treatment. Through extensive literature review, the immunological mechanisms of both humans and horseshoe crabs were analyzed. The comparison identified cell-signaling components of horseshoe crabs that may genetically and structurally identify with those employed by metastatic cancer cells, which suggests that the blood of limulus polyphemus may have therapeutic potential in the prevention of metastasis and in cancer treatment.
Arielle Burgos  
Jeanie M. Tietjen (Faculty Sponsor)  
Department of English, Massachusetts Bay Community College  
Comatose Patient Awareness

The purpose of my study is how the medical community treating coma patients defines awareness, and which characteristics and behaviors define a coma. My research examines studies describing the level of brain activity in a comatose patient's brain. Better understanding of a comatose patient's brain activity might help clinicians and families gain better insight on how to stimulate the brain and provide a more comfortable state for a comatose patient to live. EEG scans used to study the unconscious would be to compare and contrast the difference between a comatose patient and a healthy person. Undergoing these electroencephalogram (EEG) to tests electrical brain activity, you can see if the brain lights up in a comatose patient as opposed to a healthy brain. EEG tests have also shown that comatose patients are aware of the commands that are given to them by doctors. When a comatose patient is told to move a hand, the test shows that part of the brain lights up. Unfortunately, not all comatose patients follow the command, but minimally conscious patients sometimes follow the command. From the numerous studies done on comatose patients we can conclude that coma patients are either minimally or fully aware. A beneficial use of the information affiliated with comatose patients would be to apply it to improve quality of life.
Ca2+ Extrusion Mechanisms in Auditory Hair Cells

In the auditory periphery of vertebrates, hair cells are responsible for turning mechanical vibrations into membrane potential changes through mechanotransduction. The membrane potential changes modulate Ca2+ influx in real time, which controls the release of neurotransmitter glutamate from hair cells onto afferent fibers. In response to sound stimulation, glutamate release occurs in an oscillatory pattern, following the acoustic cycles faithfully. Therefore, Ca2+ ions must be rapidly extruded or cleared from the presynaptic space between cycles. In this study, we use the amphibian papilla of adult bullfrogs to study various Ca2+ extrusion mechanisms in hair cells and their contributions to high-fidelity synaptic transmission from hair cells to afferent fibers. These mechanisms may include the plasma membrane Ca2+-ATPase pumps (PMCA pumps), the sarcoplasmic-endoplasmic reticulum Ca2+ pumps (SERCA pumps), the Na+/Ca2+ exchangers, and the mitochondria. Although the Ca2+ extrusion pathways in auditory hair cells are poorly understood, PMCA pumps are likely to play a major role based on previous reports in similar cells. Without effective extrusion of Ca2+, subsequent sound waves cannot be transduced into afferent fibers with adequate precision and therefore it is hypothesized that hair cells might combine multiple pathways to clear Ca2+ ions rapidly and effectively.
Chlamydomonas reinhardtii is used as a model organism to study cilia. Many of its genes encoding ciliary proteins are very similar to human genes. In addition, advanced genetics, biochemistry, and microscopy can be applied to study C. reinhardtii cilia. Wild-type C. reinhardtii were cultured and electroporated to introduce a DNA fragment conferring resistance to the antibiotic hygromycin. This ‘transformation’ procedure generates random mutations since DNA integrates at random locations throughout the genome. Afterwards, transformed cells were plated on hygromycin-containing plates. 1248 hygromycin-resistant colonies were screened and 23 were identified as either swimming defective or had delayed ciliary assembly. Six of these strains were chosen for further analysis. DNA was extracted from the strains and a polymerase chain reaction-based method was used to amplify the flanking regions on both sides of the hygromycin gene cassette in the genome.

After analyzing the PCR results using agarose gel electrophoresis, the most prominent bands were sent for sequencing. The C. reinhardtii genome database was searched with the resulting sequences. Eight out of 10 bands generated useful sequence information and identified hygromycin insertions in five different genes. Consistent with the ciliary defects in the mutants, two of the identified mutations were in genes encoding proteins with known connections to cilia. One was in the VFL1 gene which is known to help determine basal body number and position, consistent with reduced cilia number in that mutant. The other was in the FAP141 gene, encoding a protein previously found in the ciliary axoneme.
Cell walls are crucial to plant growth and development; they have a significant impact on human activities. While the chemical composition of the wall has been well researched, the arrangement and relative locations of the carbohydrates of the cell wall are unclear. Cellulose is found in almost all cell walls generally in the form of microfibrils. It is believed that these cellulose microfibrils are in a matrix of hemicelluloses and pectin; however, the precise relative arrangement of these carbohydrates remains unknown. Using scanning electron microscopy, the fibers of the plant cell wall can be visualized. By labeling the cell wall with antibodies recognizing different types of hemicellulose and pectin epitopes, and a gold conjugated secondary antibody, the carbohydrate of interest can be located through detection of the gold nanoparticle. By using this method, we are imaging the location of specific carbohydrate epitopes among the fibers of the cell wall and will ultimately use these to determine the relative arrangement of hemicelluloses and pectin.
When Push Comes to Shove: Behavioral Flexibility in Two Sympatric Moles

Eastern moles (Scalopus aquaticus) are sympatric with Hairy-tailed moles (Parascalops breweri) but have a larger body size. Large size may be a challenge for digging animals because they would need to excavate and move more soil to the surface. Previous studies show that both species build elaborate tunnels systems and burrow at similar speeds. We wondered if they also shared similar behaviors. This study investigated the burrowing behavior used by each species and examined how it changed in response to varying soil compactness. We placed animals in a tank resembling an ant-farm filled with topsoil of different levels of compactness. The animals’ movements were recorded and assigned to four behavioral categories: building new tunnels, transporting soil between existing tunnels, accumulating soil at the surface, and resting. We found that Hairy-tailed moles always worked for a significantly shorter time than Eastern moles. In loose soil they typically built new tunnels by pushing soil aside and into the tunnel walls and then rested. They did not expend energy moving soil to the surface. In more compact soil Hairy-tailed moles changed their burrowing behavior and moved the soil to the surface. In contrast, Eastern moles were more active than Hairy-tailed moles and moved soil to the surface regardless of soil compactness. This suggests that despite their larger size, the need to transport soil does not limit Eastern moles. We suggest that the more specialized forelimbs of Eastern moles provide energy efficiency to compensate for their larger body size when excavating and transporting soil.
The blue mussel, *Mytilus edulis*, is a rocky intertidal ecosystem builder that contributes to significant nutrient cycling through plankton herbivory. To better understand how such feeding contributes to shell and tissue growth, I examined the effects of diet on growth within a laboratory setting. Mussels were collected from three sites: Chamberlain, ME, Gloucester, MA and Boston Harbor, MA. Mussels were fed with three different concentrations of concentrated microalgae (*Isocrysis* sp.) twice daily. Shell growth was estimated through weekly measurements of buoyant weight while tissue growth was estimated through calculated differences between total weight and shell weight. Through this research, I hope to better understand 1) if excessive food contributes to shell or tissue (potentially reproductive) growth, 2) what the optimal food concentrations are that maximize either shell or tissue growth. Combined with subsequent spawning trials of experimental mussels designed to help determine patterns of relative investment in reproductive growth, this research will allow us to better understand the dietary factors that promote different types of growth in the blue mussel.
Understanding a species is very important to manage it effectively. Effective conservation efforts require detailed, accurate information. Such information is lacking for Loggerhead Sea Turtles, Caretta caretta, which are currently listed as endangered. Thorough data for all marine turtles, not just Loggerhead Sea Turtles, is nonexistent. Lacking are details of their life cycle and demography. The majority of management practices focus on nesting females, eggs, and hatchlings. Clearwater Marine Aquarium in Pinellas County, Florida is permitted to conduct Nesting Surveys. Data collected through surveys conducted during nesting seasons 2010 through 2015, inclusive, was analyzed for trends within and among nesting seasons. Observed trends supported a high success rate of hatching and turtle emergence for nests in this region. Relocation of nests as a management tool was not effective. Beach renourishment did not negatively affect nesting success and possibly improved it. Nesting surveys to protect sea turtle nests should expanded to protect and monitor other life stages of the species.
The current and emerging methods and evolution of artificial organs is the focus of this research. Artificial or synthetic organs are man-made devices that could be implanted or integrated into a human to replace a natural organ, in order to allow return to a healthy and functioning state; the organ being the substitute for metabolic bodily functions. The current research paradigm is shifting, from synthetic mechanical prostheses to tissue/stem-cell engineered replacement organs. Future developments on artificial organs have the goal of eliminating the need for organ donors and animal or human test subjects, a permanent solution for organ problems, a lower risk of rejection, as well as being testable for new treatments and the effects. This presentation will explore the current research related to artificial organ engineering.
The effect of mint aversion on the foraging behavior of the harvester ant (Pogonomyrmex barbatus) was analyzed during fall of 2015 in a classroom of Wilson Hall at Westfield State University. It was hypothesized that in the presence of mint, ants would forage away from the mint regardless of sugar quantity in the food source. Ants were separated into three groups and each group was exposed to one of three treatments: Treatment 1, the control treatment, exposed ants to food sources of both rich and poor sugar quantities with no mint present; Treatment 2 exposed ants to two food sources of poor sugar quantities with mint present in one of the sources; Treatment 3 exposed ants to food sources of both rich and poor sugar quantities with mint present in only the rich source. The number of ants around the food sources in each treatment was recorded every five minutes for thirty minutes. Out of 20 replicates, the means for the number of ants at each food source per treatment were calculated (Treatment 1 T-test; p< 0.2314; Treatment 2 T-test; p< 0.0002; Treatment 3 T-test; p< 0.0001). Results supported the hypothesis as a significant difference was found between the average number of ants at each food source of Treatments 2 and 3. The mean number of ants in both treatments foraged away from the mint, regardless of the sugar quantities available. The prediction that more ants would forage at the food source with greater sugar quantity was not supported as there was no significance in the differences in the mean number of ants at the rich and poor food sources for Treatment 1. It was concluded that harvester ants have an aversion to mint and they do not have a preference between food sources with greater sugar quantity over ones with less sugar quantity.
Humans heavily rely on fossil fuels as their main source of energy. The burning of fossil fuels releases heat-trapping gases into earth’s atmosphere. This has led to the phenomenon known as global warming. Additionally, the heavy reliance of fossil fuels will lead to a global shortage. One approach to address these issues is to utilize renewable energy sources such as biofuels. Although biofuels are a promising technology, there are several challenges the industry faces to produce carbon neutral or negative biofuel. One uncertainty is the effect increased temperature will have on energy crop bioconversion efficiency. We tested five accession of Brachypodium distachyon, Bd3-1, Bd21, Bd21-3, CSR-6, and S6D, for an effects of increasing temperatures on bioconversion efficiency. Plants were grown under two different conditions, control conditions and warmer experimental conditions. Flowering time, seed yield, biomass accumulation were also measured. Stem tissue will then be prepared for a Clostridium phytofermentans digestibility assay, which will measure how much ethanol can be produced from each plant. This data will then be used to determine how an increase in average temperature may affect biofuel production efficiency.
Celiac disease (CD) is an autoimmune disorder affecting millions of people worldwide, and approximately 1 in 100 Americans (Harasym, Towards Sustainable Degrowth). It is triggered by the ingestion of gluten, a protein found in wheat, rye, and barley (Badenhorst, Celiac Disease). Beer is traditionally produced from the fermentation of barley and with brewer’s yeast and flavored with hops. In individuals with CD, beer consumption leads to tissue-specific inflammation of the small intestine, which is manifested by chronic gastrointestinal pain and discomfort, diarrhea, and nutrient malabsorption, among other responses. The only treatment of CD is a strict adherence to a gluten-free diet (GFD), which leads to rapid improvement in small intestine epithelia in addition to secondary effects such as increased nutritional absorption. However, different patients with CD have different gluten “thresholds” that their bodies can accept. Studies have shown that gluten content in beer varies considerably among different styles of beer, but clear associations have not been made between yeast strain, fermentation style and gluten content. Using a monoclonal antibody test to measure gluten content in beers that were brewed using various brewing conditions, a link between fermentation processes and gluten content will be determined that could provide patients with CD with better guidelines for beers that can be tolerated by their immune system. Brewing trials are currently being undertaken to assess relative content amongst beers based on yeast strain and fermentation style.
Zackary Delisle  
Tim Parshall (Faculty Sponsor)  
Department of Biology, Westfield State University  
Celastrus orbiculatus (Oriental Bittersweet) and Its Effect on Quercus rubra (Red Oak) Radial Growth

Celastrus orbiculatus has been established in Massachusetts since 1919 and is now present in 26 states. Negative impacts of this liana include stem girdling, an increase in weather related damage, and a decrease of radiant energy intake from canopy coverage. Eventually host enervation leads to the collapse of major limbs or even the entire tree. We investigated the effects of C. orbiculatus on Quercus rubra radial growth and hypothesized that the vine reduces radial growth of the Q. rubra host. We collected cores using an increment borer from trees that were either modestly infested by C. orbiculatus or not infested at all. We found no significant difference in radial growth between trees that were infested compared to those that were uninfested (t-test, $p=0.7245$) even when controlling for dbh (t-test, $p = 0.7515$). However, we did find weak, but not statistically significant, support for an effect of C. orbiculatus on radial growth 10 years before and after infestation (t-test, $p = 0.0710$). This trend of decreasing radial growth may be an effect of C. orbiculatus or simply a natural decrease in growth over a tree’s life. C. orbiculatus often affects trees very rapidly right before toppling the host. Therefore, future studies on this subject should look more closely at heavily infested trees in order to see if these trees are affected by C. orbiculatus just before collapsing.
The Development of Floral Sexuality in the Grasses

Sexual development in the grasses is highly variable, ranging from hermaphroditic flowers to separate male and female individuals within a species. These diverse systems evolved over millions of years and are under the control of multiple genetic factors. One gene in particular, six-rowed spikelet (Vrs1), is shown to be involved in the abortion of female organs in developing spikelets of Hordeum vulgare, and knockouts of Vrs1 have resulted in the successful development of female organs where none existed before. This gene sequence has been strongly conserved throughout the grasses, and orthologous genes controlling sex determination have even been characterized in species beyond the grass family. These observations indicate that Vrs1 is critical to the development of floral sexuality, and may be part of similar pathways across a wide range of species. The goal of this project is to explore whether Vrs1 and its orthologs have been repeatedly recruited throughout evolutionary history to fulfil this role of sex determination in the grasses. This will be accomplished using molecular biology methods including qRT-PCR and in situ hybridization to determine locations and levels of gene expression in various species within the grass family. This data will be compared to existing data found in the literature to better understand this gene’s role throughout the history of the grasses. In addition, a gene tree will be created comparing the sequences of Vrs1 homologs in the grass family, which have been obtained through mining public databases and molecular cloning methods in the past semester of research.
A major problem facing cancer therapeutics is that tumors that are initially responsive to chemotherapy often return as aggressive, drug resistant tumors. A salient feature of these resistant tumors is the expression of high levels of transmembrane efflux pumps called ABC transporters. These pumps are able to efflux most compounds that can cross the cell membrane by passive diffusion and are responsible for the multi-drug resistance observed in 50% of human cancers. Clinically it is advantageous to find inhibitors that block their activity. However, inhibitors that have worked well in vitro have proven too toxic in vivo. We are taking a new strategy in blocking the transcriptional upregulation of transporters. Here I present a new system to study the expression of ABC transporters in real time using Drosophila intestinal stem cell tumors as a model system. Drosophila stem cell tumors have many molecular and cellular features in common with their mammalian counterparts, and provide a genetically tractable system to study ABC transporters. I show that we can culture Drosophila intestines ex vivo and monitor the growth of stem cell tumors using time-lapse microscopy. My work shows that it is possible to monitor tumor cell division and drug efflux in this ex vivo tissue. Our next steps involve monitoring the expression of fluorescently tagged ABC transporters to determine which become upregulated in response to chemotherapeutics. We will use this system to screen for inhibitors of transcription factors that regulate ABC transporter expression levels, as these may be practical clinical targets.
GAMMA-AMINOBUTYRIC ACID (GABA) is an inhibitory neurotransmitter critical for nervous system function and development. GABA receptors are ion channels that mediate most of the rapid inhibitory signaling within the brain, and are critical for normal nervous system function. Abnormal GABA signaling is implicated in several different neurological disorders, such as epilepsy and autism. Despite their importance, GABA receptors are not fully understood due to the large number of receptor isoforms and the complexities of the mammalian systems in which the majority of studies have taken place. The smaller nervous system, broad suite of genetic resources, and similar complement of GABA receptors in zebrafish indicate that this system can be used to deepen our understanding of GABA signaling. For this project we aim to identify GABA receptors that control locomotor behavior in zebrafish. First, we are using the Clustered Regularly Interspersed Palindromic Repeat (CRISPR)-Cas9 system to target individual GABA receptor subunit genes. Then, to evaluate mutational efficiency, we are establishing a fluorescence-based PCR genotyping strategy. Finally, we are using quantitative behavioral analysis to determine the effects of disrupting GABA receptor genes on zebrafish locomotor behavior. Zebrafish display convulsing behavior when exposed to drugs that block GABA receptors. We predict that mutation of specific GABA subunit(s) will cause similar convulsing behavior. We will present our progress in targeting three GABA receptor genes, which lay a foundation to target additional GABA receptor subunits and establish a multiplex strategy to target multiple subunits simultaneously. Taken together, this project will identify GABA receptors types essential for locomotor behavior and establish a new model system to better understand GABA signaling.
The relationship between anemonefish and sea anemones is one of the most famous examples of a symbiotic relationship. The underlying mechanisms that allow this relationship, however, are poorly understood. The sea anemone recognizes prey by the presence of glycosylated proteins on the surface which is followed by the sea anemone stinging the target using its nematocysts. A transcriptome study has shown that several genes involved in glycosylation pathways were not detected in the false clown anemonefish (Amphirion ocellaris) and the two-band anemonefish (A. bicinctus). I am investigating one glycosylation gene, glucosaminyl-N-acetyltransferase-3 (GCNT3), to determine whether GCNT3 lost its function in anemonefish so that the fish are not detected as prey by their hosts. Degenerate PCR primers were designed based on conserved areas in the amino acid sequences of related fish species and used to amplify GCNT3 in a nonsymbiotic species, Chrysiptera springeri. Specific primers designed from this sequence were then used to successfully amplify a 125 bp fragment of GCNT3 from the genomes of C. springeri and two anemonefish species, A. ocellaris, and A. clarkii. This shows that at least two anemonefish species do still have the gene present in their genomes. Moving forward, I am using inverse PCR to sequence a larger portion of this gene in anemonefish species. Once a sufficient amount of the gene has been sequenced, quantitative PCR will be used to measure the expression of GCNT3 in various tissues to assess the role that GCNT3 may play in the anemonefish-sea anemone symbiosis.
**121  Concourse  1:30-2:15  Board C86**

Tianna Edwards
Tracie Ferreira (Faculty Sponsor)
Department of Bioengineering, UMass Dartmouth

**Characterization of Inflammation in a Mouse Model of Asthma**

Asthma is a chronic disorder of the lungs in which the bronchi (airways) constrict in response to the triggering allergen, thus affecting one’s ability to breathe. Although this disorder affects millions and takes thousands of lives each year, there is still little in the way of a treatment for the disease itself. Therefore, good animal models of asthma are needed to investigate the specific cause of this disease and possibly help researchers find a cure. The purpose of this study was to generate a relevant mouse model of asthma in order to understand the lungs’ inflammatory response to the model allergen ovalbumin (OVA). Hypothesis: Compared to normal (non-sick) mice, asthmatic mice will demonstrate an enhanced inflammatory response in the lung, as noted by an increase in total white blood cell counts and an increase in eosinophils.

Results: Ovalbumin-challenged mice showed an enhanced lung immune response compared to normal mice as noted by a significant increase in airway white blood cells, specifically eosinophils. Eosinophils are most characteristically found in asthmatic airways and their presence is thought to be indicative of disease severity.
Diabetes is a disease affecting how the body regulates glucose. Multiple factors contribute to Diabetes: including hypoglycemia and hyperglycemia. Previous studies in patients with hypoglycemia identified two mutations in the coding region of the fructose-1, 6-bisphosphatase (FBPase) gene. Based on the mutations identified, the initial focus of our project was a full kinetic analysis of the mutant proteins of the recombinant pig kidney FBPase enzyme. Results of this analysis showed an approximately 8-fold decrease in the relative catalytic constant (Kcat) and catalytic efficiency (CE) compared to wild-type enzyme (WTE). A separate mutation was done in the active site of the enzyme in order to investigate if the enzyme could be activated. Kinetic analysis of this mutation showed a 30-fold increase in the relative Kcat and catalytic efficiency (CE). Other Mutations in the adenosine monophosphate (AMP) binding-site (K112A and Y113A) showed marked decrease in AMP inhibition (AMP is the enzyme’s natural inhibitor). Kinetic analysis of the enzyme in the absence of AMP resulted in maximum velocity (Vmax) values for K112A and Y113A mutants that were similar to the wild-type Vmax. This suggests that mutations of this type promote hyperglycemia by preventing AMP inhibition of the FBPase. Clinical implications for these results are discussed in relation to the project.
The Effects of a Diet Intervention on Inflammation and Methylation Markers in the Breast

Epidemiological studies suggest that a diet rich in fruits and vegetables can reduce a woman’s risk of developing breast cancer. Results are inconsistent, however, and no clear mechanism for the reduction in risk has been elucidated. We propose that consumption of 8-10 daily servings of darkly pigmented, nutrient dense fruits and vegetables can reduce levels of two biomarkers associated with breast cancer risk: 1) inflammation, and 2) aberrant DNA hypomethylation. To examine the effect of increased fruits and vegetable intake on breast cells, we propose to conduct a case-control diet intervention study in breastfeeding women. Samples will be collected at baseline and after 12 weeks. Breastmilk provides an unparalleled opportunity to assess breast health, as a few ounces of milk contains secreted proteins, including inflammatory cytokines, as well as millions of sloughed epithelial cells. This pilot study is a collaborative effort being conducted with assistance from members of the departments of Veterinary and Animal Sciences, Epidemiology, Nutrition, Food Sciences, and Dining Services. We have received Institutional Review Board approval and plan to enroll 10 women by March 31, 2016. In addition to the baseline and 12-week breast milk collections, the study includes completion of a health and history questionnaire, weekly delivery of fruits and vegetables to women randomized to the intervention, and weekly counseling to help women reach the goal of 8-10 daily servings of fruits and vegetables. This study also includes baseline and 12-week collection of infant stool samples to assess the effects of changes in maternal diet on a breastfeeding infant's gut microbiome. Results from this study will be the first to directly assess the effects of a 12-week dietary intervention, characterized by increased fruit and vegetable intake, on the inflammatory and DNA methylation profile of the breast.
General public and non-medical community skepticism regarding the use of human subjects in medical research deeply impacts the overall health of our society. Reported instances of unethical or dubious experiments using human subjects such as the Tuskegee experiments and the case of Henrietta Lacks present clear evidence that the medical community has violated human rights. At the same time, the use of human subjects in research also paves the way for groundbreaking results in both the bioethical and medical fields. My research is concerned with how bioethics shape the modern understanding of medical research, and what sorts of implications this awareness has for ongoing research.
Tibial Fractures in Soccer: Analyzing the Effectiveness of Shin Guards and Identifying Alternative Measures

One of the most prevalent career-ending injuries in soccer is the tibial fracture. Despite mass production of a variety shin guards from established companies, players continue to sustain fractures that negatively impact their ability to play in the future. Studies suggest that enhanced training strategies have increased the ferocity of the sport and because of this, shin guards no longer provide adequate protection. Through studying previous research, analyzing video footage of injuries, I was able to design a model system. The model system suggests that it may be possible to redirect impact force, and reduce the time the force will be in contact with the tibia. We are currently using this model to develop and evaluate improvements and alternatives to the traditional shin guard and so help reduce tibial fractures.
Exploring Peptide Nanotubes as a Substrate for Cell Culture

The objective of the research is to determine the viability of peptide based nanotubes as a substrate for cell growth and proliferation. This project is part of a long-term project to synthesize a biosensor using peptide nanotubes for the detection of biochemicals that are released by a cell externally in the extracellular matrix (ECM). Currently in order to detect the release of these biochemicals by cells, we need to use a chemical assay, or test, to determine their presence in the medium that they are contained in or use a single point detection method which does not get an overall picture of the environment. This poses many issues as they can be slow, lack sensitivity, and lack resolution. One solution to this problem that has been implemented is using carbon nanotubes (CNTs) as biosensors, but research has shown that they can be cytotoxic (poisonous) to cells. By determining the ability of cells to grow on these nanotubes, we not only address the issue of biocompatibility of such peptide-based nanotubes but also take us a step closer to creating a valuable device for elucidating the fundamentals of cellular signaling.
Investigating the Role of MSTN, IGF1, and TLL1 in Regulating Flight Muscle Size in White-Throated Sparrows during Migration

During migration, birds mainly catabolize fat to fuel their flights. They also break down a large quantity of protein, resulting in substantial reductions in muscle and organ mass, which is quickly rebuilt after flight. Myostatin, a key regulator of the muscle rebuilding process, is typically expressed in developing and adult skeletal muscle as an inhibitor of muscle cell proliferation. Additionally, insulin-like growth factor 1 (IGF1) stimulates muscle cell production and tolloid-like proteinase 1 (TLL1) is an enzyme that cleaves myostatin to its active form. Therefore, this suite of genes may play an important role in regulating muscle mass in migratory birds. To gain a better understanding of the role these proteins play in regulating muscle mass within the migration period, we simulated a migration in white-throated sparrows using a 48-hour fasting protocol to mimic long duration flight. Pectoralis muscle samples were obtained from birds prior to the fast, after a 48-hour fast, and then after 24 and 48 hours of refeeding. These samples were quantitatively extracted at each sampling point and expression of MSTN, IGF1, and TLL1 were quantified using qPCR. We show a 10% reduction in muscle mass after just 48 hours of fasting and after 24 hours of refeeding, birds had regained almost all mass lost during the flight showing the dynamic muscle regulation of these birds. We predicted MSTN and TLL1 would be upregulated and IGF1 to be downregulated during fasting and this pattern will be reversed during refeeding to promote muscle regeneration. The changes in gene expression will be related to whole animal changes in muscle mass.
Bacteria are essential to the process of winemaking. When vineyard grapes are first pressed, the resulting mixture of juice and grape remnants is called “must”. Previous research has been conducted identifying the bacteria present in wine must in European grapes. The bacteria (part of the “microbiome”) present in wine must grape varieties native to Western Massachusetts have not yet been identified. The difference in microbiome could account for some of the differences in wine quality between European and Native American grapes. In this project, bacterial DNA will be extracted from wine must and sequenced to work out which bacteria are present and their quantity. The bacteria found in this project will be compared to previous research on European grapes. This knowledge could have future applications in increasing wine quality when using Native American grapes.
83 Auditorium  8:30-9:15  Board A51
Robert C. Green
Geunhwa Jung (Faculty Sponsor)
Stockbridge School of Agriculture, UMass Amherst
Unraveling the Hidden Mechanisms of Fungicide Resistance through Whole Genome Comparisons in Sclerotinia homoeocarpa

iCons: Sclerotinia homoeocarpa (F.T. Bennett) is one of the most economically important pathogens on high amenity cool-season turfgrasses where it causes dollar spot. Many species of pathogenic fungi have gained insensitivity or resistance to fungicides due to their overreliance and misuse in clinical and field applications. In 2012, Popko et al. assessed the practical field resistance of populations of S. homoeocarpa to the Demethylation Inhibitor (DMI) class of fungicides. One of these populations showed a bimodal population with almost half of the isolates being highly sensitive to DMIs and the other half being highly resistant. Two isolates from this population were chosen to explore the mechanisms of DMI insensitivity using molecular and genomic tools. The first isolate was HRS10, which is sensitive to DMI fungicides and the second was HRI11, which is insensitive to DMI fungicides. To understand the genetic mechanisms of fungicide resistance, which has become highly prevalent, the whole genomes of two strains with varying resistance levels to fungicides, were sequenced.
Subsistence harvest of several wildlife species typically allows a particular subset of individuals to harvest species that are otherwise protected. For example, the native peoples in Alaska are permitted to hunt bowhead whales, harbor seals, and sea lions as a part of their culture. These programs often target long-lived species with sensitive life history characteristics that increase the risk of overharvesting. For instance, common snapping turtles (Chelydra serpentina) have been historically harvested for the purpose of meat consumption; however, populations of many turtle species are particularly susceptible to overharvesting due to their life history traits. Additionally, long-lived organisms have a tendency to accumulate toxins which could have negative effects on the health of the consumer. These issues collectively raise the question of whether or not subsistence harvest of long-lived species, such as the common snapping turtle, should be permitted. Although these harvests are an important aspect of certain cultures, they simultaneously could be damaging to both the wildlife population and the consumer. Conversely, harvests may play a valuable role in controlling nuisance wildlife populations in areas where the majority of predators have been removed. For example, many parts of North America have excessive populations of white-tailed deer due to the increase in preferred habitat and the concomitant loss of their natural predators, such as wolves. The potential issues surrounding subsistence harvests are complex, with humans attempting to manage wildlife populations as a public resource while simultaneously permitting exceptions by select groups of peoples.
According the Optimal Foraging Theory, a forager will acquire food that requires the lowest amount of time needed to forage and obtain, resulting in a net energy gain for the forager. It was hypothesized that if given the choice, Pogonomyrmex barbarous, a species of harvester ant, choose the shortest path over the longer paths to obtain the same amount of food, in order to spend the least amount of energy. We expected the ants to follow each other to the shortest path because of their pheromone trails. To test this hypothesis, 20 ants were randomly selected for both experimental and control groups from an original 100-count group. Each colony of 20 ants was placed in a container with either all the same length tubes (control) or all different length tubes (experimental). We counted how many ants went to the food in each tube. After four weeks we had 16 replicates of controls and experiments. There was no significant difference in the mean number of ants in the control, and there was a significant difference in the mean number of ants in the experimental. These results supported our hypothesis.
Characterizing Defective Nitrogen-Fixation Mutants in M. truncatula

Chemical nitrogen fertilizers improved crop yield and lessened famine, but they also exert a large, negative impact on the environment. Greenhouse gases and nitrous oxide are the by-products of nitrogen fertilizer usage. Nitrogen’s mobility causes eutrophication to terrestrial and aquatic systems, exasperating global acidification and stratospheric ozone loss. Biological nitrogen fixation can be an environmental friendly solution to nitrogen pollution. The legume-rhizobium symbiosis draws many interests because legumes account for one-third of the world’s crop production; it is a source of food, feed for living stock, and industrial materials. Establishing a functional symbiosis relationship is a complex process that involves many host genes and molecular-level interactions between the host plant and the bacteria. Fix-minus mutants embody errors that prevent a functional symbiosis. They may provide further understandings to the molecular mechanisms of a successful mutualism. To characterize the mutation, measurable traits including nodule tissue development, rhizobia presence and distribution in nodules, nodule color quantification and nitrogen-fixation defective plants’ reactions to nitrogen fertilizer administration are documented and analyzed. Staining with reporters shows that in both mutant lines 11299 and 12952, defective rhizobia are present in the nodules. However, the manifestation of their phenotype seems to be influenced by the environment. The genes responsible for dnf4 and dnf7 mutants have been cloned, and encode defensin-like peptides from the host. Surprisingly, when exposed to exogenous nitrogen fertilizer, the mutants display some recovery of its symbiotic ability, suggesting a previously unknown process linking the symbiotic behavior of the host plant with its nitrogen budget.
Michelle Jennette
Jonathan Roling (Faculty Sponsor)
Department of Biology, Bridgewater State University
Carbohydrate Metabolism in Apis mellifera (European Honeybee) after Treated with Natural and Artificial Sugars

Over the past few years, bee populations have drastically decreased due to Colony Collapse Disorder (CCD). CCD is when all of the honeybees abandon their hive and queen and do not return. There may be a correlation between the types of food bees are given to CCD. This research concentrates specifically on carbohydrate metabolism, as well as metabolic genes of honeybees. Primers were designed and corresponded to metabolic pathway genes and were tested using Quantitative Polymerase Chain Reaction (QPCR). Primer pairs were tested to develop standard curves for each gene, including L-lactate Dehydrogenase (LDHA), Glyceraldehyde 3-Phosphate Dehydrogenase (GAPDH), Phosphofructokinase (PFK), Phosphoglycerate Kinase (PGK) and Fructose 1, 6-Bisphosphate (FBP). To measure changes in honeybee metabolism, an exposure was conducted to determine if up-regulation or down-regulation occurs when exposed to multiple sugar variants. For one week, bees were kept in eight-ounce glass jars and fed honey, denatured honey, sugar water, corn syrup, and high fructose corn syrup. A total of twelve hives were exposed to each of these five sugars, giving a total of 60 jars involved with the exposure. RNA was extracted from these bee samples successfully and complimentary DNA (cDNA) was made. The cDNA made from the exposure samples was run in QPCR with a housekeeping gene, and then with corresponding metabolic gene primers to determine if an increase or decrease in gene regulation had occurred.
Carbaryl is an insecticide and parasiticide that is responsible for the inhibition of the enzyme cholinesterase. Since carbaryl is applied to agricultural crops, it is vital to study how it affects the human brain. Astrocyte cells are an essential part of the central nervous system and are responsible for maintaining homeostasis by regulating glucose, synaptic transmission, and ion levels. Although studies have been conducted on neurons, neuroblastoma and nerve-tissue, little research has been done examining how carbaryl affects astrocytes. In this study, C6 astrocyte cells were treated with 0.075 mg/ml or 0.15 mg/ml of carbaryl for 24 hours. Cells were then stained with Hoechst and propidium iodide to identify cell nuclei and dead cells, respectively. Fluorescence microscopy and image analysis were used to measure both total cells and percentage of cell death. We hypothesized that carbaryl would have a negative effect on the astrocytes and cause cell death. Indeed, carbaryl caused significant cell death compared to control in a dose-dependent manner. This research will provide valuable information regarding how C6 astrocytes respond to carbaryl and will help us better understand how the central nervous system is affected by this insecticide. Future studies will examine the mechanism of this cell death in astrocytic cells.
Kourtney Victoria Kacian  
Amy Knapp (Faculty Sponsor)  
Department of Biology, Framingham State University  
Can Isoflavone Treatment Affect Muscle Function Postmenopause?

Under normal conditions, women will undergo menopause around the age of 50. At this time the endogenous hormone, estrogen, will rapidly decline resulting in potential health complications such as osteoporosis and muscle wasting, also known as sarcopenia. While osteoporosis caused by the decline of estrogen has been popularly studied, the mechanism by which estrogen affects sarcopenia is not well known. Recently, estrogen receptors have been discovered on skeletal muscle suggesting that estrogen could have a direct effect on this muscle wasting condition. This discovery has led to increased interest in treatments of sarcopenia in postmenopausal women such as the use of hormone replacement therapy (HRT) to improve muscle mass and strength. However, the use of HRT has been linked to dangerous side effects such as breast cancer. An alternative method of hormone therapy is the use of isoflavones, which bind to estrogen receptors and have the same effects as estrogen. The use of isoflavone treatments have the potential to reduce the effects of muscle wasting during menopause, while reducing the risk of developing diseases associated with estrogen replacement therapy. Limited studies have explored the effects of isoflavones on muscle function in postmenopausal women, therefore, warranting research in this area.
Vinyl Ester Resin (VER) is a low cost material that was introduced in the 1960’s and can be processed to form a matrix of fiber reinforced composites that are used in hulls and transportation vehicles. There is an increased need of VER in marine industry, construction, transportation and in wind energy industries. VER is normally synthesized from petroleum feedstock which is not sustainable, however, our process uses glycerin generated as a waste product from biodiesel manufacturing plant at Maine Standard Biofuel (Portland, ME). The waste Glycerin was found useful in the making of Glycidyl methacrylate (GMA), a precursor of Vinyl Ester Resin. GMA thus made can then be used to react with Bisphenol A (BPA) to make Vinyl Ester resin (VER). The main component (glycerin) of this method of VER production is readily available as a biodiesel waste product, making this process more environmentally friendly. This approach will not only reduce the need for petroleum feedstock, it will also increase the use of glycerin which is renewable, low cost and is becoming increasingly abundant.

Key Contributors of this work include: - Mr. Ryan Burnett, Dr. Priyank Shah, and Dr. Yongwoo Lee
Strategic ignorance is when people remain intentionally ignorant of an issue in order to continue a practice relative to that issue. It has been identified in a variety of issues such as the death of bees from agrichemicals, color-blindness in the issue of racism, and gender pay gap in the issue of sexism. These are just a few examples. Strategic ignorance is also readily observed in the U.S. commercial fishing industry. Based on current harvest rates, wild fish populations are expected to be depleted by 2048. Yet, the seafood industry is promoted as a major part of our economy. Furthermore, current fisheries management policies only target the recovery of a few species at a time. Alarmingly, 47% percent of seafood in the U.S. is discarded as food waste at the consumer level each year, and this practice is viewed as normal. Although overfishing is occurring, the U.S. Department of Health and Human Services suggests that Americans double their current rate of seafood consumption. Strategic ignorance is in play to enable authorities in political and corporate arenas to deny liability after crises. In addition, public ignorance, or social silence, helps to facilitate fishing practices for profit. Current regulations and funding mechanisms are not sufficient to prevent overfishing, and America’s capitalistic system is fostering a culture of strategic ignorance. My research will detail the rampant case of strategic ignorance in the U.S commercial fishing sector.
Weedy rice varieties (Oryza spp.) have undergone rapid adaptive evolution in response to the development of agriculture, adopting traits which allow them to invade and survive in agricultural fields, evading grain collection, and diverting resources from crop plants. Their presence in crop fields has caused a decrease in cultivated rice yields worldwide, threatening the majority of the population who depend on rice as a staple in their diet. By investigating the mechanisms by which genes underlying potentially adaptive traits evolve over time in weedy rice, differential evolution patterns may be uncovered. The Rc gene is associated with pericarp color in weedy, wild, and cultivated rice. In general, individuals which possess the wild-type Rc allele show a red pericarp phenotype, and those which possess the rc or Rs-salleles show a white phenotype. Previously, a 14 base pair insertion-deletion (InDel) region was identified, with the presence of an insertion being connected to the weed-associated Rc allele and a deletion being connected to the rc allele most common in cultivated rice varieties. Through cleaved amplified polymorphisms (CAPs) analysis of the Rc gene region, the correlation between this InDel region and the corresponding phenotype can be verified. The results of this CAPs analysis shine a light on the high amount of diversity in South Asian weedy rice; an area that was previously unexplored. By developing a greater understanding of the genetic variations underlying agricultural weeds, it may be possible to successfully combat their invasion of crop fields in the future.
Transcranial stimulation or more casually known as ‘brain hacking’ has been in use for at least 2000 years, as shown by the clinical literature of the early Roman physician, Scribonius Largus. While use of electricity in its direct or alternating pattern has been in use in for centuries, the popularity rose in the beginning of the 21st century. As studies advanced in order to popularize the technique, an alternative route arose which used electromagnetic waves. This method known as Transcranial magnetic stimulation was found to be more effective and had fewer side effects when compared to electrotherapy. Transcranial magnetic stimulation (TMS) is a noninvasive method used to stimulate small regions of the brain which uses a magnetic field generator, or "coil" that is placed near the head of the person receiving the treatment. The coil produces small electric currents in the region of the brain just under the coil via electromagnetic induction. TMS is used diagnostically to measure the connection between the brain and a muscle to evaluate damage from stroke, multiple sclerosis etc. and is therapeutically used in migraine and treatment-resistant major depressive disorder. The use of this technique is still in its infancy stage as its full potential is just being explored. This research explores the history of transcranial stimulation and how the magnetic stimulation technique in particular is reshaping the medical industry as an alternative mode to drug treatment. Additionally, the promising results in treating common ailments such as chronic pain to more elaborate psychological disorders are explored, as are the cons of unsupervised usage and how this growing field is changing the future of medical treatment.
104  Concourse  10:45-11:30  Board C80
Jessica Mae Leslie
Lynn S. Adler (Faculty Sponsor)
Department of Biology, UMass Amherst
The Role of Sunflower Pollen in Bumble Bee Health and Colony Performance

Diet composition and quality can affect an organism’s ability to survive, grow and reproduce, and an organism's dietary needs may change depending on its health status. Bees are critical pollinators that strongly influence plant reproduction and agricultural production, and their survival is in part determined by diet quality and health. Furthermore, diet could influence bee performance and health through nutritional quality or the presence of secondary compounds with medicinal effects. Previous research found that sunflower (Helianthus annuus) pollen dramatically reduced infection by the gut parasite Crithidia bombi in the common eastern bumble bee, Bombus impatiens, relative to other monofloral pollens including buckwheat (Fagopyrum cymosum). However, this previous work did not evaluate impacts of diet and infection on bee performance. In this study, we assessed the impacts of two pollen diets, sunflower and buckwheat, and infection status (infected or not with C. bombi), on bee survival and colony performance using microcolonies of queenless workers. Sunflower pollen significantly reduced C. bombi parasite load and improved microcolony performance relative to buckwheat pollen. Per bee usage of sunflower pollen was significantly higher than per bee usage of buckwheat pollen, and bees maintained usage of sunflower pollen over the course of the experiment, whereas usage of buckwheat pollen decreased over time. These results suggest that sunflower pollen is a crucial diet component for bee health and colony performance. Future studies will examine potential mechanisms by which sunflower pollen reduces C. bombii infection. This study highlights an important tritrophic interaction between plants, pollinators and parasites.
Behavioral Observations of Coenobita compressus (Coenobitidae) in Southwestern Costa Rica

From the remote field station, Campanario, in Southwestern Costa Rica, behavioral observations of Coenobita compressus (H. Milne Edwards), the Ecuadorian hermit crab, were taken. Previously documented qualitative observations stated that larger individuals are generally nocturnal and smaller individuals are generally diurnal. In this study, we sampled once during the wet season, June 30th and twice during the dry season, February 12th-13th. All samples were collected at least three hours after high tide and nighttime collections at least an hour after sunset. The opening of each gastropod shell was measured and used as an indicator for crab size. The daylight group collected during the wet season have an average shell opening width of 7.7mm with a maximum of 19mm and a minimum of 4mm. The average width of the shell openings for the nighttime group was 16.6mm with a maximum of 22mm and a minimum of 11mm. The average February 12th-13th dry season samples were statistically and observationally consistent with the wet season June 30th samples. Our studies showed that behaviors of large and small Ecuadorian hermit crabs are significantly different (p<0.001). Larger Ecuadorian hermit crabs are generally nocturnal while smaller individuals are generally diurnal.
The Effects of Cannabis on Both Type I and Type II Diabetes

In recent years, many studies have revealed several medical benefits of the marijuana plant (Cannabis sativa) and its cannabinoid chemicals in both human and animal models of disease. Although cannabinoids have been shown to attenuate the painful symptoms associated with many diseases, including diabetes, their effects on the cellular physiology of type I and type II diabetics has not. We will be investigating the cellular mechanisms by which cannabinoid compounds may alleviate both insulin-dependent and non-insulin-dependent diabetes and how they affect progression of both forms of the disease. We will be conducting primary literature searches to provide background information on both cannabis and diabetes and will present the most recent scientific data available.
123  Concourse  1:30-2:15  Board C88

Lindsey Ly
Vanni Bucci (Faculty Sponsor)
Department of Biology, UMass Dartmouth

Single Nucleotide Polymorphism in hemA Confers Phototoxicity Resistance to Visible Light for Citrobacter rodentium

Because traditional antimicrobials, such as antibiotics, are rapidly losing efficacy due to resistance genes propagating throughout nature, new approaches of eradicating microbes are being explored. Recent studies have reported the bactericidal effect of visible light (400-500nm), known as the phototoxic effect. In this study, one of the mechanisms that confers phototoxicity resistance was explored using Citrobacter rodentium as the model organism. Wild-type C. rodentium NC_013716 were aged in water for 120 days under the constant selective pressure of visible light. Whole-genome shotgun sequencing was performed on the isolates from day 0 and 120. Results demonstrated that a single nucleotide polymorphism occurred in the hemA gene, creating a missense mutation at one of the binding sites on glutamyl-tRNA reductase (GTR), which is an enzyme in the heme biosynthetic pathway. One of the downstream intermediates in this pathway, photoporphyrin IX, absorbs visible light and transitions into its excited state that reacts with triplet oxygen to form singlet oxygen, a reactive oxygen species (ROS). Because ROS are highly toxic to the cell, we hypothesize that the mutant was selected for due to its ability to disrupt the heme biosynthetic pathway. To test our hypothesis we performed a set of hydrogen peroxide resistance assays. Because heme is a cofactor for catalase, we predicted that the mutant would be less resistant to hydrogen peroxide than the wild-type, which was confirmed by our data. Additionally supplementation with delta-aminolevulinic acid restored the WT phenotype. Our data suggest that enteric pathogens populations can adapt to environmental stresses by buffering sunlight-mediated oxidation.
Metalloids such as arsenic (As) and excess boron (B) can be toxic to plants and cause lowered crop production. Additionally, these metals/metalloids can travel up the food chain and affect higher order animals. Recently, the members of NIP subfamily of aquaporins (AQP) were shown to be involved in the transport of arsenite (AsIII), a reduced form of As, and B in plants. Inactivation of AQP homologs in rice caused a decrease in As accumulation. However, it is not clear if overexpression of NIP genes in plants will increase the AsIII and B transport from soil to roots and accumulation in roots and shoots. To test this, rice NIP transporter gene, OsAQP9-3, was overexpressed in Brassica juncea. Brassica plants germinated in AsIII and B growth medium were qualitatively assessed for tolerance, sensitivity, and transport compared to wilt type plants. Transport of As and B in transgenic brassica along with wild type controls were performed using short term influx and efflux assays. Expression of OsAQP9-3 transporter protein is expected to increase uptake and detoxification of As and B. Preliminary data suggests that transgenic brassica overexpressing rice NIP1;1 showed strong tolerance to both AsIII and B. Accumulation of As and B in brassica lines expressing AQP9-3 is progress. If the expected results are seen, then NIP genes can be used to improve the tolerance of crops to toxic metals/metalloids and enhanced or reduced accumulation of metals. This study can have potentially huge impacts on the environment and on future crop yield and production.
Role of DYRK1A in Dopaminergic Cell Death in the Anteroventral Periventricular Nucleus (AVPV) of the Brain

This experiment will investigate the presence and physiological effect of the enzyme dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1A (DYRK1A) in the brain, specifically, on the dopaminergic (TH+) neurons of the anteroventral periventricular nucleus (AVPV). Previous studies have shown that there is a sex difference in the number of TH+ neurons that is regulated by testosterone. There are more TH+ neurons in the AVPV of females, or males deprived of testosterone, than in the AVPV of males, since their testosterone causes more of these cells to die off. Treatment of neonatal female rats with testosterone also reduces the number of TH+ neurons in the AVPV to that characteristic of male animals. Testosterone can be converted to 17-β-estradiol by the cytochrome P450 aromatase enzyme and either testosterone or estradiol will promote apoptosis of the TH+ neurons. DYRK1A is reported to prevent TH+ cell death in some other parts of the brain including the substantia nigra, which is located close to the AVPV. The enzyme DYRK1A increased survival of TH+ neurons in the mesencephalon during development by inhibiting the activity of the intrinsic apoptotic pathway, specifically by phosphorylating caspase 9, which inhibits caspase 3. We hypothesize that DYRK1A will 1) be present in the TH+ cells in the AVPV and 2) have the same protective effect on the AVPV’s TH+ neuron population. Hence, TH+ neurons in the female AVPV should express more DYRK1A than those neurons in the AVPV of males or testosterone treated females.
This study examined the academic motivation, or self-determination, of freshman students in an introductory Biology course. Self-determination theory concerns the extent to which behaviors controlled by motivation are autonomous (intrinsically based) or controlled (extrinsically based). By investigating the motivations behind student participation in their own learning, instructors and students can further understand the ways in which they are motivated and can develop appropriate interventions. Both intrinsic and extrinsic motivational factors were assessed using the Learning Self-Regulation Questionnaire (LSRQ) adopted from Black and Deci (2000) and the Motivated Strategies for Learning Questionnaire (MSLQ) from Pintrich (1991). Pre and post-surveys were administered at the start and completion of the course, and student grades were also collected. We hypothesized that students who received an A or B would be more extrinsically motivated by the reinforcing nature of grades, and external sources of praise or pressure. We also hypothesized that C, D, and F students may be more intrinsically driven, by focusing on material of interest instead of current topics being assessed. Preliminary results from the 2014 LSRQ study did not find major differences between students who received varied grades; however, it did suggest that for all students, the highest responses answered were mainly associated with intrinsic motivation, and the lowest response averages were associated with extrinsic motivation. Furthermore, results from the 2015 MSLQ study demonstrated that student grades were not strongly correlated with motivation. However, when results from the LSRQ and MSLQ were combined (n= 63), it was found that intrinsic motivation decreased in C/D students, whereas it increased in A/B students (p<.05) over the course of the semester. Whereas, extrinsic motivation decreased for A/B students, and extrinsic motivation increased for C/D students (non-significant p value for these averages) over the course of the semester.
Within the Centrarchidae family of endemic sunfishes the genus Lepomis is unique because they are the only centrarchid genus to exhibit an exaggerated opercle flare. We have previously demonstrated that two centrarchid genera, Lepomis and Micropterus, are both undergoing rapid diversification rates but they are likely the result of different selective pressures. It is thought that diversification in Micropterus is due to their expansion into a novel pursuit predator niche while diversification in Lepomis is due to increased sexual selection. Their exaggerated opercle flare is likely a secondary sexual trait that is used in courtship rituals, and a trait that is key to their success. Here I seek to identify the genes responsible for the exaggeration of the Lepomis opercle flare. I hypothesize that the exaggerated trait is likely controlled by one or more of the following genes: igfr1, ar, era, erb, ptc1, runx2, and sp7. These genes are growth factor or bone development genes, and thus good candidates. I predict that gene expression levels will be elevated in ornamented Lepomis opercle tissue as compared to the nonornamented Micropterus opercle tissue. This will be determined using real-time quantitative PCR (RT-qPCR). I predict further that igfr1 will show the greatest difference in expression, as the trait appears to be exaggerated in both male and females. This may represent a new signaling pathway in bony tissue development that many be studied in other instances where sexual selection acts on mineralized tissue.
Genetic Expression Profile of Postpartum Depression

Postpartum depression is a serious psychiatric condition that, if not addressed in a timely manner, has deleterious effects on the mother, and poses a risk for the mother-infant relationship and ultimately the infant’s development. Current clinical literature consistently relates postpartum depression to compromised parenting, although the neurobiological mechanisms by which parenting is disrupted in postpartum depression have not been completely elucidated. A significant amount of research implicates a role for altered dopamine (DA) dysfunction at discrete cortical and striatal structures, in the pathophysiology of cognitive and motivational symptoms of depression. This study used the Wistar-Kyoto (WKY) genetic rat model of depressive-like behavioral symptomatology to investigate the gene expression profile underlying the relationship between dopamine dysfunction, depressive-like cognitive deficits and parenting disturbances. We aimed to examine whether alteration in gene expression in discrete cortical structures critically involved in cognitive processes, are related to the observed deficits in parenting in WKY mothers. Our experiments utilized quantitative real-time PCR (qPCR) to profile the expression of genes related to DA signaling within the medial prefrontal cortex and orbitofrontal cortex in postpartum WKY and control Sprague-Dawley (SD, an outbred reference strain) females. Our results so far are consistent with the working hypothesis that mesocorticolimbic DA function is hypoactive in WKY mothers and likely underlies aspects of the cognitive impairments that thereby lead to deficits in parenting.
Urinary voiding dysfunction, manifest as Lower Urinary Tract Symptoms (LUTS), is a common occurrence among aging men. Although inflammation and abnormal muscle contraction are known to play key roles, recent evidence suggests that tissue fibrosis may also contribute to LUTS. Tissue fibrosis, and the differentiation of fibroblasts into myofibroblasts, is usually accomplished by activation of the TGF-β/TGFRII axis, leading to increased levels of collagen and α-smooth muscle actin. However, our group has reported that the CXC-type chemokine, CXCL12, and its receptor, CXCR4, which are up-regulated with aging and inflammation in the prostate, can drive this differentiation process as well through non-canonical mechanisms. We hypothesized in this study that CXCL12 might utilize unique intracellular signaling mechanisms, different from TGF-β, to promote myofibroblast phenoconversion. RNASeq experiments showed that immortalized prostate fibroblasts treated with CXCL12 exhibited higher transcript levels for members of the Cullin-RING (CRL) ubiquitin ligase family of proteins, required for the secretion of procollagen from the ER to the extracellular space compared to vehicle or TGF-β-treated cells. Western blot analysis showed that in CXCL12-treated cells exhibited higher CRL3 member protein levels compared to vehicle and TGF-β-treated cells. Moreover, increased CRL3 member protein expression correlated with higher procollagen secretion. The results of these studies are consistent with our hypothesis and demonstrate that CXCL12/CXCR4-mediated myofibroblast phenoconversion is mechanistically distinct from that mediated by TGF-β/TGFβR axis activation in prostate fibroblasts. Moreover, these data show that activation of the CXCL12/CXCR4 axis, but not the TGF-β/TGFβR, facilitates collagen secretion into the extracellular matrix.
Notch1 is a transmembrane receptor that undergoes a series of proteolytic cleavages following binding to one of its cognate ligands, culminating in the cleavage of Notch1 by gamma-secretase, generating the active intracellular domain of Notch (NICD). This intracellular domain is then able to interact with several binding partners regulating a variety of processes related to cell growth and differentiation. Similarly, the mTOR Complex 2 (mTORC2) pathway acts to integrate a variety of signals relaying levels of growth factors and nutrients, and other environmental conditions, thereby serving as a central control for processes related to growth control and survival. Given the overlapping functions of the Notch1 and mTORC2 pathways, we investigated whether points of interaction exist between the two pathways. Using a combination of conditional Notch1 knock-out mice, drugs inhibiting gamma-secretase activity, and the NF-kB pathway, we show that T-cell activation initiates Notch-dependent signaling through the mTORC2 axis. Further, our data suggest that Notch1 may exert this regulatory function over mTORC2 via NF-kB.
A major obstacle in cancer therapeutics is that tumors that initially respond to drug treatment, tend to come back resistant to it. 50% of these recurring tumors become drug resistant through the high expression of a class of transmembrane pumps called ABC transporters. ABC transporters use energy from ATP hydrolysis to efflux lipophilic molecules from the cell. Since most drugs rely on lipophilic properties to diffuse across the membrane of cells these pumps efflux the before they can act on the cell. Therefore to overcome multidrug resistance it is necessary to either block the pumps or find new drugs that cannot be substrates of the pumps. We attempted the later, developing a new class of drugs that cannot be substrates of the pumps. Specifically we report using nanocapsules to deliver cargo that is too large and hydrophilic to be substrates of ABC transporters. Toward this end we developed a feeding strategy and benchmarks for delivery using different types of fluorescent markers, GFP, dsRED and mCherry in the Drosophila melanogaster system. We have found that GFP is able to get into daughter cells but not stem cells, whereas dsRED can get into neither cell type. We will present our assay and the results of our current tests of the effectiveness of various nanocapsules in particle delivery in vivo to otherwise influx resistant stem cells and their daughters. There are many parallels between the molecular biology of stem cells in the Drosophila gut and mammalian gut, making our results likely to be translatable to overcoming drug resistance in humans.
It is estimated that nearly 250,000 people in the United States are affected by anterior cruciate ligament injuries each year (CDC, 2010). The anterior cruciate ligament (ACL) is one of the four major ligaments of the knee connecting the femur to the tibia that helps to stabilize the knee joint. ACL injuries can be particularly devastating for athletes due to the affect it can have on individual performance and also the recovery time, which depending on the severity of the injury can span from 6-9 months. This study was conducted to determine if any physiological correlations existed between individuals who had previously sustained an ACL injury, which could be used as an indicator of injury risk. In this study 30 college athletes (15 previously injured and 15 non-injured) were sampled. Participants had their navicular drop, quadriceps angle and femoric anteversion and retroversion measured and cataloged. The data collected was analyzed and compared to determine if any physiological correlations existed between previously injured athletes compared to the non-injured athletes. The identification of trends and the verifying of this screening program would enable athletes to take preventative measures in order to reduce their risk for ACL injury. It is anticipated that physiological trends will be observed in the data, which could be used as a future indicator of potential ACL injury risk in athletes.
Less than 5% of the world’s ocean has been studied and explored. Recently, researchers are interested in tapping into this unexplored resource—especially for its potential to provide medicinal capital. The ocean has the potential to cure major diseases currently affecting the human race, and there have been some major discoveries involving medicines from the sea. For example, Secosteroid, an enzyme used by coral, is now used to treat asthma and arthritis. Bryozoan Bugula neritina, a barnacle-like organism, is a source for an anti-cancer compound. Other research is centered on enhancing longevity and anti-aging treatments. My research will synthesize this new cutting-edge field by answering the following questions: What technologies are being used to discovery new medicines? What resources offer the greatest potential? Who is conducting the research? What part of the ocean are new medicines found? Who owns the rights to these resources? What will the environmental impacts be from harvesting these resources? What are some recent discoveries? How are they tested? How are they marketed? What does the future hold? My research will look at the most promising new medicines sourced from the ocean and their potential impact on society.
Vernalization is the process by which prolonged exposure to cold causes many plants to flower in the spring. The cold memory of these plant species is mitotically stable, and is caused by an epigenetic switch. Proper flowering time is important for higher agricultural crop yields, which is caused by vernalization, thus it is important to study the cold-induced epigenetic switches of vernalization. In the model organism, Arabidopsis thaliana, FLOWERING LOCUS C (FLC) is a floral expressor that is epigenetically repressed by exposure to the cold. VERNALIZATION INSENSITIVE 3 (VIN3), and two long noncoding RNAs, COOLAIR and COLDAIR, are currently the only known components upregulated by cold exposure. It is not fully understood how plants sense prolonged cold or measure it, so the project aims to determine if upregulation of COOLAIR and COLDAIR, and VIN3 are sufficient for epigenetic silencing in a cold-induced epigenetic switch. Therefore, to accomplish this, overexpressor lines VIN3-COOLAIR, VIN3-COLDAIR, VIN3-COOLAIR-COLDAIR will be created, and the vernalization sufficiency will be checked by monitoring flowering time without cold exposure.
Distribution and Function of a Novel Bacterial Microcompartment May Provide Insights into Gut Health

Bacterial Microcompartments (BMCs) are selectively permeable organelles consisting of a proteinaceous shell enclosing a suite of metabolic enzymes and functional proteins. BMCs are highly efficient metabolic systems, enabling the direct transfer of intermediate substrates into product, and are described in 358 bacterial species including various gut microbes. Four distinct bacterial Microcompartments have been characterized, several of which produce metabolites associated with immune development and maintenance as well as diet-related diseases such as atherosclerosis. Understanding the environmental distribution and functional context of BMCs in different microbial environments, such as the human gut, may be a significant component in efforts for treating diet-related diseases. We examined the phylogenetic and environmental distribution of a novel, uncharacterized BMC (the CoAT BMC) with a bioinformatics centered approach. Using local BLAST software alongside a number of scripts generated in Python, we cross-referenced the metagenomic data with CoAT BMC structural and enzymatic protein sequence data in order to construct a phylogeny of CoAT containing microbes. When compared to a 16S ribosomal RNA phylogeny, it is apparent that the distribution of genes associated with CoAT, like many other BMCs, is the result of lateral gene transfer. In light of these findings, further investigation of environment-specific functional signatures from the genomic data of this phylogeny is needed in order to discern the specific functional and adaptive significance of this novel BMC.
Astrocytes are glial cells in the brain that provide structure and support for developing and mature neuronal cells. During development, migrating immature neurons rely on astrocyte precursor cells for guidance to their final destinations in the brain. These precursors, called radial glial cells, express high levels of brain lipid binding protein (BLBP) while providing a physical scaffold for neurons. Previous studies have shown that BLBP positive cells are supportive to neurons but it is not known if BLBP is causing the support to occur. C6 astrocytes were transfected with either an empty control plasmid or a plasmid containing the BLBP gene. Two days after transfection, N2A neurons previously transfected with the red fluorescent Td Tomato plasmid were added to the astrocyte cultures and fixed with methanol three days later. A fluorescence microscope was used to visualize the cultures, and the length of neurites, number of neurons, and number of neurons with neurites was quantified using the ImageJ analysis program. Coculture with BLBP-overexpressing astrocytes does not increase the number of neurons or number of neurons with neurites, but does increase the length of the neurites. In cases like spinal cord injuries or neuronal diseases, the length of the neurites help to potentially reclaim lost connections. Future studies will focus on the mechanisms by which BLBP increases neurite length.
Neonicotinoids are the fastest growing class of insecticides globally. They are a systemic, agricultural insecticide that provide farmers with valuable effective tools against some of the most destructive pests and are relatively safe for vertebrates. The use of this insecticide has recently become controversial due to concerns about their consequential impacts on pollinators. Because neonicotinoids are systemic, they are absorbed into plant tissue and can be present in the pollen and nectar, making them toxic to pollinators. This poster provides a summary of current literature regarding impact of neonicotinoids on pollinators. It also highlights the results from surveys at nurseries aimed to evaluate attitudes towards pollinators and level of awareness of neonicotinoids versus pollinator friendly products. The surveys were conducted at retailers of two different size classes: smaller, local nurseries versus large national chain nurseries. It was predicted that the larger national chains would have less knowledge about pollinators and a lower awareness of neonicotinoids than smaller, local retailers.
Ayla Christine Sheridan  
Daniel Welsh (Faculty Sponsor)  
Department of Biology, Fitchburg State University  
Effects of Leaf Litter on Eastern Red-Backed Salamander Movement

Leaf litter is an important aspect of a forested environment, creating microhabitats on the forest floor which provide food, cover, and moisture for organisms. Therefore, woodland salamanders are typically more abundant in zones of dense cover. However, human disturbance often depletes areas of leaf litter coverage, thereby impacting these microhabitats and the salamanders that rely on them. Understanding the patterns of microhabitat use by terrestrial salamanders may help predict how salamanders respond to anthropogenic disruptions. The purpose of this experiment is to compare the movement of Eastern red-backed salamanders (Plethodon cinereus) in microhabitats both containing and devoid of leaf litter. It is hypothesized that the salamanders exposed to bare plots will display more movement compared to those in plots containing leaf litter because the lack of litter may increase risks (predation, desiccation) or impede foraging. Plots were established in a forested location; one type was cleared of leaf litter (“Bare”) while the other had litter (“Litter”). Length, weight and total distance moved for 33 red-backed salamanders (18 in Bare and 17 in Litter) was measured. Results supported the hypothesis: salamanders tested in the Bare plot exhibited on average about twice as much movement as those in the Litter plot. The specific factors driving these movement patterns is not known, as this experiment was not designed to determine the particular reasons that salamanders use leaf litter. However, these findings are important in understanding the habitat selection of salamanders, which in turn provides insights into how anthropogenic disturbances may effect forested environments.
Acinetobacter baumannii is a human pathogen that causes infections in almost every bodily system. These infections often occur in patients who have prolonged hospital stays. Additionally, they tend to be comorbid with other life-threatening illnesses or injuries, and negatively impact survival rates and recovery time. Moreover, this species has a high incidence of resistance to almost all major classes of antibiotics, making it very difficult to treat. This combination of factors makes it imperative that novel treatments are developed in order to combat this pathogen. One viable alternative is the use of bacteriocins. Bacteriocins are proteins produced by many species of bacteria that are used to kill competing bacteria of the same or closely related species. Bacteriocins of other clinically relevant species, such as Pseudomonas aeruginosa or Escherichia coli, have been extensively studied and characterized. However, despite the clinical significance of A. baumannii, almost no research has been done on their bacteriocins. The objective of this study was to begin characterization of bacteriocin production in clinically relevant strains of A. baumannii. Strains from various clinical sources were screened using an all-by-all antagonism assay. The results of this study determined an approximate percentage of bacteriocin producer strains within a clinical population. It also gave insight into the nature of production within this species- specifically, how broad or narrow-spectrum the proteins are, and if strains have immunity to the bacteriocin they express. This study lays the groundwork for which more thorough characterization of these bacteriocins can occur.
Previous studies in this laboratory had found that Salicornia bigelovii’s plants grown under different salt conditions showed differences in δC13‰. Preliminary results have shown that δC13‰ for greenhouse grown plants watered with fresh water was -32 δC13‰ while that of plants collected from Savin Hill Cove of Boston Harbor was -28 δC13. This indicated a modified C-3 carbon dioxide fixation procedure when the plant grew under higher salt concentrations. This halophyte plant from the Amaranthaceae family grows normally at salt marshes and mangroves of North America, South Asia, South Africa, and Europe. This study is focused on the effect that different salinities have on the plant’s growth rate and photosynthetic rate. Stable isotope measurements will be made on plant tissue at the end of the study. The S. bigelovii seeds were planted in 50:50 ratios of sand and Fafard Germinating Mix, and placed in a growth chamber with 13 hours of light and 11 hours of dark as a daily cycle. The plants are separated into three groups that were watered once a day with either 0 ppt, 15 ppt or 30 ppt Oceanic Salt water. During the growth period samples are taken for photosynthetic measurements and for weight and chlorophyll content. The photosynthetic rates are measured using Vernier Technology CO2 and O2 electrodes and chamber. The results of this study with respect to environmental conditions and carbon fixation will be discussed.
The Role of the Shh Binding Protein BOC in Modulating Post Embryonic Shh Functions

Brother of CDO (BOC) is a transmembrane protein involved in Sonic Hedgehog (Shh) mediated cell-cell signaling required for normal vertebrate development. BOC acts as a positive regulator of Shh signaling early in embryogenesis, being required for maximal Shh activation to help pattern the central nervous system (CNS) (Bergeron et al, 2011). As a Class I Shh target gene, BOC is transcriptionally repressed by Shh, and BOC expression becomes restricted to tissues distant from the source of Shh where BOC may assume a role as a repressor of Shh signaling. How BOC functions as a Shh-repressor, and the tissues which are regulated by BOC post-embryonically, are poorly understood. Given the role of Shh in CNS growth and adult neural stem cell division, we hypothesize that BOC may negatively regulate the proliferation of neural progenitor cells. Using zebrafish as our genetic model system, we are determining whether loss of BOC function affects cell proliferation in the post-embryonic CNS by quantifying proliferating cells in BOC mutant larvae. We are also using a newly developed BOC antibody to more precisely define BOC protein expression relative to Shh-producing and proliferative cells in larval and adult zebrafish. Finally, we are examining how Shh regulates BOC expression in different tissues in larvae and adults. The Shh pathway has been implicated in numerous cancers including glioblastoma and medulloblastoma. We hope to shed light on how BOC acts as a negative regulator of Shh-mediated neural stem cell proliferation, and thus how BOC may act as a CNS tumor suppressor.
Methyl Mercury Level in Fish Tissues

Mercury is a very toxic chemical that is introduced into the ecosystem in an organic form by bacteria in water systems. When mercury gets into aquatic systems, it reacts and forms monomethyl mercury. The level of methyl mercury initially found in bacteria is very low, but it becomes concentrated in the food web and is found in higher levels in fish tissues. The purpose of this experimental protocol was to develop a method whereby local facilities could measure the amount of methyl mercury found in fish tissue. Mohammadi et al. measured Methyl Mercury levels in fish tissue using inhibition of the enzyme Invertase. They layered toluene extracted methyl mercury from fish tissue over a solution of Invertase in acetate buffer and measure the hydrolysis of sucrose into glucose and fructose. They measured the amount of glucose and fructose released by the reaction with dinitrosalicylic acid (DNS). We have adapted the system to use additional enzymes to measure the amount of glucose released by hydrolysis of sucrose. The two paired enzymes used for glucose detection are hexokinase and glucose 6-phosphate dehydrogenase. The reaction is followed by monitoring the increase in absorption at 340 nm of the now reduced NADP. This enzyme-based detection system works well at lower mercury concentrations, but the paired detection enzymes are themselves inhibited at higher levels of Mercury. We will discuss the results of these experimental methods and how this system may be used to measure levels of methyl mercury.
Conflict between the sexes is well known, but morphological evidence from many taxa is still scarce. Males of many species bear harmful genitalia that may drastically impact female fitness. In several species of bats, males have spines on their genitalia. While we are not sure about the function of these spines, we know that they may harm females during mating. Because the spiny male genitalia appear harmful to the females, I hypothesized that in species where the males have spines, females will have counter adaptations to prevent damage. I predicted that they would have two main counter adaptations: thicker reproductive tracts to protect themselves or specialized types of tissues. To test these predictions, I examined the female reproductive tracts of 24 species of bats from representative species both with and without male spines. The reproductive tract samples were fixed, embedded in paraffin, sectioned, and stained with a trichrome stain. I then examined the type of tissue that made up the reproductive tract and measured the thickness from the lumen to the outside of the vaginal wall as well as the thickness of the innermost layer of tissue. I compared the thickness and tissue type of each individual. I found that the tissue type did not vary in relation to whether or not the species had spines. In my poster I discuss the exciting implications of morphological co-evolution between male and female bats.
Toepad Area, Body Size, and Microhabitat Usage in Arboreal, Torrential, Terrestrial, and Aquatic Frogs

Many species of frogs, whether they inhabit a torrential, arboreal, terrestrial, or aquatic microhabitat, possess large pads on the digits of their hind and forefeet that function to promote efficient adhesion. Frogs use a wet adhesive mechanism that is affected by toepad area. Furthermore, theory predicts that larger frogs should have poorer adhesion for their body mass due to scaling relationships between area (affecting adhesive force) and mass (affecting the force pulling a frog off a surface). This study investigates the correlation between toepad size and body size, as well as toepad size and the frogs’ microhabitats. Data were collected from 189 museum specimens of frogs belonging to 46 species, and from terrestrial, arboreal, aquatic, or torrential microhabitats. We measured body mass, length (snout-to-vent length; SVL), and took photographs of each frog’s hands and feet, measuring the individual areas of hind and forefoot toepads and webbing using ImageJ. Frog mass spanned 0.2 to 55.8 grams (almost 2.5 orders of magnitude) and snout-vent length ranged from 18 to 80 millimeters. We expected to observe that as the frogs’ masses increased, their toepad sizes would also increase but at a lower rate. Also, because torrential frogs use different behavior for adhesion (i.e. relying less on their toepads), we expected them to have smaller toepads relative to their body size than arboreal frogs. The results from this study will contribute to our understanding of scaling in adhesion across a large range of body sizes within a major vertebrate group.
Sustainable Model for the Freshwater Aquarium Trade

The freshwater aquarium trade has been a controversial topic among conservationists and is typically viewed by the public in a negative light. The Piaba Project, based out of the New England Aquarium in Boston, is focused on changing the public’s perception of this trade by highlighting the rural fishermen who keep this trade alive. The project also further explains possible outcomes if this trade was limited or stopped altogether. By implementing displays in zoos and aquariums around the world, it is hoped that more people will want to participate in the home aquarium hobby in a healthy, sustainable way. For my own project, I will be taking data collected from the Piaba Project and working with the New England Aquarium, the Buttonwood Park Zoo, and UMass Dartmouth to spread awareness to the local communities and explain the best way to help the cause.
Analysis of Uncharged tRNA-Dependent Riboswitches in Bacillus anthracis and Bacillus cereus

tRNA-dependent antitermination is an essential transcriptional regulatory mechanism contained within numerous Gram-positive bacteria, including pathogenic Staphylococcal and Streptococcal species. More than 40 of these tRNA-dependent riboswitches have been identified within Bacillus anthracis and Bacillus cereus, double the number found within other Gram-positive organisms. The tRNA-dependent riboswitches (T box) appear upstream of aminoacyl-tRNA synthetase (AARS), amino acid biosynthesis, transporters and hypothetical genes. AARS proteins charge tRNA with their cognate amino acid and are an essential component of the translational machinery. T-box family genes respond to specific amino acid limitation, such as the expression of the tyrosyl-tRNA synthetase gene responds to specific starvation for tyrosine. All T-box family genes contain an untranslated leader mRNA (upstream of the structural gene), which includes a transcriptional terminator that can prematurely abort transcription before the structural gene is expressed. Uncharged tRNA is capable of stabilizing an alternative antiterminator structure and allowing transcription of the downstream coding sequence. These tRNA-dependent riboswitches were studied in B. anthracis and B. cereus, analyzing the primary sequence and secondary structural elements to identify the putative amino acid specificity. RNA was purified from cells grown in nutrient rich media and nutrient limiting media, then mRNA expression for genes were quantified. Amino acid analogs and specific amino acid starvation were also utilized to access predicted amino acid specificity.
Creating a New Animal Model of Autism with Epilepsy in Zebrafish

Autism affects 1 in 68 children in America, and 25% also suffer from epilepsy. Mutations in the gene encoding Branched-chain Ketoacid Dehydrogenase Kinase (BCKDK) cause a disorder that features autism, epilepsy and also mental retardation. Although precise mutations that cause this disorder have been identified, it is not clear what effect BCKDK mutations have on the brain at the single cell and neuronal network levels. Better understanding the effect at these levels could help establish new therapies. Developing zebrafish are an excellent model system to study the cellular and neuronal network effects of BCKDK mutations. The embryos have a small, accessible nervous system to more easily examine brain function compared to mammals. Zebrafish also have a fully sequenced genome with extensive gene targeting options, and a version of the BCKDK gene that is very similar to that found in humans has been identified. This project is focused on creating mutations in the zebrafish BCKDK gene and assessing the effects on swimming behavior. We are using the Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)/Cas9 system to create insertions, deletions, and/or frameshift mutations in the BCKDK gene. Next, CRISPR/Cas9 injected embryos are being genotyped to confirm the mutation efficiency using a fluorescent PCR approach. Finally, we are using quantitative movement analysis to examine mutant swimming behavior. Taken together, our work will establish a new model system of Autism with Epilepsy, to better understand this disorder at the cellular and neuronal network levels and provide a new tool to develop new therapies to combat this disease.
22nd Annual Massachusetts Statewide Undergraduate Research Conference

**124 Concourse 1:30-2:15 Board C89**

Joseph Zottoli
Kurvin Li
Ken OLIVEIRA (Faculty Sponsor)
Department of Biology, UMass Dartmouth
Evaluation of Maturation Hormones and Techniques for the American Eel

The American Eel (Anguilla rostrata) is a panmictic species found in inshore and near inshore habitats in along the western North Atlantic. The species is considered in decline due to a number of natural and anthropogenic factors (over fishing, habitat modification, etc). The artificial propagation of anguillid eels has been a long sought after solution to the decline but there has been limited success in inducing captive maturation and fertilization of the American eel. Our goal was to reduce maturation time and increase fertilization success using alternative hormones and slow release administration to help bring feasible aquaculture within reach.

After acclimation, eels were maintained in flow through seawater tanks for 20 weeks and given weekly hormone injections or administration via osmotic pump insertions every six weeks (SPE, OvaRH, OvaRH + domperidone, LHRH, LHRH + domperidone), or administered hormones combined in a cholesterol tablet (OvaRH) inserted every three weeks. Full maturation in the American eel is achieved when ovulation occurs. Results showed that traditional Salmon Pituitary Extract (SPE) injections induced maturation. The alternative hormones and utilization of osmotic pumps and cholesterol tablets failed to induce maturation. Proximate composition analysis of ovaries indicated that matured (SPE injected) eels showed higher egg protein content and lower water and lipid content compared to other treatments. This is likely a result of egg hydration and vitellogenin accumulation. SPE pump treated eels also had higher ovary lipid content than 5 of the 11 other treatments. Further investigation into dosage concentration has potential to yield improved results.
CHEMICAL ENGINEERING

157  Concourse  3:30-4:15  Board C68
Steven Ryan Ayotte
Maureen E. Lynch (Faculty Sponsor)
Department of Mechanical Engineering, UMass Amherst
Paracrine Signaling between Bone Metastatic Breast Cancer and Mesenchymal Stem Cells

Approximately 70% of advanced breast cancer patients develop bone metastasis, and bone metastasis is a leading worldwide cause of breast cancer related death. Bone is highly sensitive to physical forces and the application or absence of mechanical stress stimulates bone proliferation or resorption respectively. Mesenchymal stem cells (MSC) are isolated from bone marrow, and act as mediators of tissue repair when they arrive at the site of an injury. They are multipotent, and are capable of differentiating into bone cells such as osteoblasts, which facilitate bone proliferation. In this experiment we will attempt to characterize the effects of tumor-derived soluble factors on the mechano-response of MSC. This will be accomplished by collecting media conditioned by metastatic breast cancer cells, and using this media to culture MSC differentiating along an osteoblast lineage in-vitro in the presence or absence of mechanical loading. The mechano-response and differentiation of the MSCs will be assessed using three assays: an alkaline phosphatase assay to identify osteoblast differentiation, alizarin red staining to assess mineralization, and a DNA content assay to assess cell growth. Mechanical loading is applied to samples in this experiment to more accurately simulate the in-vivo bone environment, since bone tissues are highly responsive to mechanical stimuli. Two types of breast cancer cells will be used: a parental metastatic breast cancer line (MDA-MB-231), and a bone metastatic breast cancer line (MDA-GFP-bone C2). The use of these two cancer lines will demonstrate the effects of breast cancer cells on MSC before and after bone colonization.
For decades, batteries have been an ever growing importance in everyday life, powering technology like cell phones to talk across countries, as well as the cars to drive across them. However, as the applications for batteries grow, so do the needs to supply a higher energy demand. If cars are going to complete their evolution from gasoline based vehicles to electric, then batteries will need to evolve as well, and in a number of ways. One of these changes is the need for a safer battery, particularly one that is immune from undergoing explosive failure, even when malfunctioning thermally, mechanically, or chemically. One of the most promising set of materials, and the focus of this thesis proposal, is solid polymer electrolytes (SPE’s), specifically multiblock copolymers. By removing the potentially hazardous organic electrolyte solvent and replacing it with an inert polymer electrolyte, the problem of battery explosions could be remedied. However, this is not simple, and has many of its own shortcomings, including a lower conductivity compared to current battery standards. The aim proposal is to incorporate semi-fluorinated components to the copolymer used for the membrane, making it a semi-fluorinated copolymer. By doing this, the polymer will ideally become more able to tightly confine the lithium counter-ion, in turn allowing it to deliver higher and longer lasting conductivities. This would be due to the anion-counteranion sequestration which would cause improved ion movement and thus greater conductivity and steady-state current in the end product electrolyte.
Nicholas Louis Barberio  
Wei Fan (Faculty Sponsor)  
Department of Chemical Engineering, UMass Amherst  
iCons: Low Energy Separations Using Zeolites

Separations are crucial for the quality and safety of many manufactured products, especially in the chemical industry. However, most separations require a great amount of energy and use fuels that emit greenhouse gases and other pollutants. This research evaluates an alternative low-energy gas separation process that uses zeolites. Zeolites are naturally occurring silicon based materials with cage-like structures that allow some molecules to move inside them. Today, zeolites are synthesized with structures designed for specific applications. The relative size and shape between the diffusing molecule and zeolite pore determine the speed that the molecule moves inside the zeolite. Small structural differences between different compounds should lead to a large difference in diffusion rates within the zeolite and create an opportunity for separation. In this research, the diffusion rate of different molecules will be measured for a few zeolites and the prospect of a new separation process will be assessed.
Complex coacervation is a type of polyelectrolyte complex that manifests as a liquid-liquid phase separation between a dense polymer-rich coacervate phase and a watery, polymer-poor supernatant. This complexation process is driven by the electrostatic interaction between oppositely-charged polymers and the resultant entropy gained by the release of small bound counterions. As a result, coacervation is sensitive to the presence of added salt. However, the behavior and partitioning of salt ions between the dense coacervate phase and the aqueous supernatant has not been well characterized. While simple theoretical treatments of this phenomenon predict that salt should partition into the coacervate phase, more recent studies by our collaborator Prof. Charles Sing from the University of Illinois at Urbana-Champaign have suggested the opposite. Here, we present a systematic experimental investigation of the partitioning of various salt ions in coacervates formed from the anionic polymer poly (styrene sulfonate) (pSSNa) and the cationic polymer poly (diallyldimethylammonium chloride) (pDADMAC). We first examined the effect of the different salts on the phase behavior of this system, comparing the critical salt concentrations at which coacervation is inhibited. The partitioning of salt between the coacervate and supernatant phases can be quantified using conductivity measurements via comparison to calibration curves. This research will help verify the theoretical treatment developed by our collaborator, and will help to enable the intelligent design of these materials for applications such as the encapsulation proteins such as vaccines to enhance thermal stability, shelf life, and efficacy.
Jonathan M. Gigas
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iCons: Microfluidics Tumor Model as a Predictor of Chemotherapy Drug Efficacy

In vitro testing has been the first step in the drug development pathway for over two decades. This method is used to screen drugs for activity before they are approved for animal studies in order to improve testing efficiency. It has become clear in the past decade that flat cell layers are not accurate models of physiological tissues for a number of reasons, and this discrepancy impacts the ability of the screen to predict how well a drug will fare in the next stages of testing. The Forbes lab has produced a microfluidics device that uses cancer cell spheroids to mimic the physiological microenvironment of a tumor. It is hypothesized that the 3D nature of the device and the more accurate modeling of a real tissue will allow the device to predict more closely the efficacy of chemotherapy drugs in a mouse study when compared to a simple monolayer experiment. A large list of drugs is screened for differences in effectiveness between monolayer and animal studies, producing a short list of candidate drugs with significant efficacy differences. The monolayer effectiveness of each drug is verified in lab and then the device is used to determine how well the drug kills tumor spheroids. It is predicted that the drugs will perform in a fashion more similar to an in vivo test than the in vitro test. These results would support the hypothesis that the microfluidics device is more accurate than a monolayer in predicting a drug’s success in the development pathway.
Hydrogen fuel cells are a promising alternative for transportation: unlike fossil fuel combustion engines, hydrogen fuel cells offer 40% greater efficiency and the only emission is water. However, because proton exchange membrane fuel cells typically utilize water to conduct protons, operation is restricted to non-optimal temperatures of 60 to 80° C. Operating at such relatively low temperatures requires the use of an expensive catalyst. By replacing water with less volatile compounds, we can increase operating temperature, increasing efficiency and decreasing cost of hydrogen fuel cells. There are many alternatives that can be implemented. One such alternative are azoles, which contain nitrogen and hydrogen atoms that form hydrogen bonds to conduct protons. Through molecular dynamics simulations, we can model these molecules and compare their performance with water. In the first portion of my thesis, I focus on liquid pyrazole. I evaluate the potential of pyrazole for use in fuel cells by studying hydrogen bonding properties, which should correlate to its ability to conduct protons through the fuel cell membrane. The second portion of my thesis focuses on modeling large scale systems. Atomistic simulations are on the order of nanometers, or 10-9 meters. Actual fuel cell dimensions, however, are on the order of millimeters (10-3 meters). To accurately evaluate performance of materials, we must expand simulations. I coarse-grain simulations of tethered azole species and compare the results with atomic simulations. We compare results of atomistic and coarse-grain simulations, assessing whether coarse-grain models are viable tool to understand fuel cell operation.
Universal blood substitution has been stumping scientists globally for many years. Currently, the only clinically approved method in replacing lost blood is a red blood cell (RBC) transfusion from a human donor, which requires matching blood types. Located within each RBC is the protein, hemoglobin. Hemoglobin is a tetrameric protein that consists of two α and two β polypeptide chain subunits and a prosthetic functional heme group whose function is to reversibly bind oxygen molecules. Most research for oxygen carrying alternatives have been based on this hemoglobin molecule and are known as hemoglobin-based oxygen carriers (HBOCs). HBOCs are universally compatible for all blood types. All of the past attempts at producing a clinically acceptable HBOC have fallen short due to stabilization techniques that impeded normal physiological functionality and led to major toxic side reactions. The goal for this Honors Thesis is to load cell-free hemoglobin into polyelectrolyte complexes, known as coacervates, in order to promote protein stability and keep cell-free hemoglobin in its tetrameric form. Upon optimizing the stoichiometry of these polyelectrolyte complexes to maximize the loading volume of hemoglobin, tests on overall protein stability, shelf-life, and oxygen transport will be performed. With these results, the efficacy of hemoglobin encapsulation via complex coacervation will be determined. Although in vitro oxygen transport tests in physiologically equivalent solutions need to be completed in order to conclude the efficacy of this method, any advancement in this field of oxygen carrying alternatives is critical for accentuating the most feasible solution.
Microfluidic Large Intestine to Stimulate Transformation of the Luminal Content into Feces

The large intestine is a vital tissue responsible for recovering water from digested foods, as well as the timely excretion of feces out of the body. During this daily process, the luminal content undergoes substantial physical transformation that could implicate clinical significance. Yet, the subject remains largely unknown due to the lack of relevant models to study. Here we introduce a biomimetic design of the large intestinal tissue model that can simulate this luminal-dehydrating physiological process. The large intestinal tissue was emulated using a synthetic hydrogel tube. In order to dehydrate the inner-tubule contents, the tube was externally perfused by flowing sucrose of various concentrations using a multi-channel peristaltic pump. The pump controllers were fabricated using 3D printing and laser-cutter techniques. Controller components, including potentiometers, voltmeters, and power components were then fitted and soldered onto circuit boards. This process allowed low-powered (0.1 W), portable (10x6x3.2 cm, 126 grams), and precise peristaltic pump systems (flowrates up to 27 mL/hr) to be manufactured in-lab without outsourcing. Our current study focuses on dehydrating artificial feces by applying the established multi-channel pumping system to generate and maintain osmotic gradients along the hydrogel tube. We expect that dehydrated luminal content could cause significant friction on the surface of the tube while undergoing peristalsis. Our ultimate goal is to develop a microfluidic colon tissue model that can serve as an invaluable model to capture complex and dynamic processes in health and disease.
Complex coacervation is an associative liquid-liquid phase separation resulting in a dense, polymer-rich phase. Formed in aqueous solutions of oppositely charged polyelectrolytes, coacervates have properties that can be altered through changes in polycation-to-polyanion ratio, temperature, pH, and polymer concentration. While coacervation has long been studied, much of this work has been done with naturally-derived polymers with poorly defined chemical and physical structure. Thus, while branched polymers have been examined previously, a precise understanding of the effect of polymer architecture in coacervation has not been determined.

We use polypeptides as a model system to compare the effects of polymer architecture on coacervation in systems of linear vs. comb polymers. The addition of the comb architecture broadened the range of polycation-to-polyanion ratios over which complexes formed. Interestingly, while linear polypeptide-based materials display chirality-induced beta-sheet formation, the use of short polypeptide combs circumvented this type of hydrogen-bond driven precipitation. We also examined the effect of incorporating zwitterions, (i.e., linked positive and negative charges in close proximity) into our polymers. These net-neutral zwitterions are incorporated as random copolymers into our comb polymer. The incorporation of increasing numbers of zwitterions decreases the salt stability of the resulting coacervates. This decrease could be the result of both an increase in polymer solubility and a decrease in the overall charge density of the polymer. By expanding our understanding of the design parameters affecting coacervation, we hope to enable the use of designer materials for applications related to the encapsulation, stabilization, and delivery of vaccines and other therapeutics.
Graphene is a promising material for electronic and mechanical applications due to its excellent mobility, two-dimensional structure and tensile strength, which is ten times higher than steel for the same thickness. Although graphene exhibits ballistic transport, its lack of a band gap limits its applicability to digital circuits; furthermore, its mechanical strength does not scale linearly with the number of stacked graphene sheets. It is proposed here that thermally annealing multilayer, chemical-vapor-deposited (CVD) graphene may produce covalent bonds between graphene layers and/or residual PMMA molecules, which may enhance the mechanical and electronic properties. In this study, large area, monolayer CVD graphene is grown on copper foil and transferred to doped SiO2/Si wafers via a PMMA-based, wet-etching transfer procedure. These mono- and multilayer graphene samples are thermally annealed in various atmospheres to determine if such processes generate interlayer bonds. Additionally, back-gate graphene field-effect transistors (GFETs) are fabricated to test the electrical properties of bilayer graphene before and after annealing, and Raman spectroscopy is used for chemical bonding characterization. We found that annealing causes a D-peak to appear at ~1330 cm⁻¹ as well as a broad shoulder in the 1250 cm⁻¹ to 1590 cm⁻¹ region of the Raman spectra. These Raman features are present even after subsequent high-temperature HV treatment, indicating a robust structural change in graphene. Next steps include investigating the final structure and testing the mechanical properties of this material to evaluate its potential for future applications. Acknowledgement: This work was performed in collaboration with Yuxi Wang.
Engineering a Nanofiber-Hydrogel Platform to Study Mammalian Cell Behavior

The synthesis of versatile biomaterials is crucial in the field of tissue engineering, in order to promote wound healing. Many scaffolds lack tunability and do not accurately mimic the fibrous nature of certain tissue such as cartilage. Creating a system in which engineers can parse out specific matrix parameters would improve our ability to design scaffolds that increase tissue healing and proper regeneration. This research aims to create a platform to analyze cell interactions combining both electrospun fibers and a 3D polyethylene glycol (PEG) hydrogel. Here, cellulose acetate fibers were electrospun into nanofiber mats. Electrospinning time was manipulated in order to control the density of each mat, and density was analyzed using ImageJ software. After converting the mats to cellulose, a cell binding peptide (RGD) was added to the fibers in order to solicit adhesion response from the cells. Fiber mats were then encapsulated in a PEG hydrogel formed with PEG-maleimide crosslinked at a 1:2:2 ratio with PEG-dithiol and a degradable peptide crosslinker so cells could move throughout the scaffold. To date, we have shown that the density of the cellular study platform can be manipulated, making this an effective 3D platform to study how the mechanosensitivity of mammalian cells to electrospun fibers may induce wound healing in scaffolds. Next steps for this research include analyzing the fiber morphology’s role in tissue regeneration as well analyzing cellular aspect ratio and velocity within these systems.
173 Room 803 4:30-5:15 Panel 7
Jun-Goo Kwak
Jungwoo Lee (Faculty Sponsor)
Department of Chemical Engineering, UMass Amherst
Synthetic Intestinal Mucosal Barrier Using a Hydrogel Integrated Microfluidic Chip

The mucosal barrier lining the intestinal tract plays a critical role in protecting and maintaining metabolic and immunological homeostasis. Disruption of the mucosal barrier has been suspected to contribute towards inflammatory bowel diseases and colorectal cancer, however, the exact mechanism remains largely unknown due to the lack of relevant model systems. Existing techniques such as transwell and other microfluidic devices attempt to capture the physical function of the mucosal barrier in a static environment centered on a vertical axis, limiting investigation. Here, we introduce a biomaterials engineering approach to manufacture a synthetic mucosal barrier in a transverse manner for direct observation of cellular processes. A type I collagen hybridized polyacrylamide hydrogel supporting small molecular transport and epithelial cell adhesion was used as a framework and subsequently anchored covalently to a glass slide via silanization chemistry. Villous microstructures were manufactured by casting the hydrogel precursor solution in a pre-designed, removable PDMS micropattern. After sealing the device with another PDMS layer, we increased the cellular and extracellular complexity of this microfluidic chip by sequentially introducing (i) HT-29 colon epithelial cells, (ii) mucin extracted from pig intestine, (iii) bacteria, and (iv) human peripheral blood-derived mononuclear cells. Our current study focuses on demonstrating molecular and cellular transport across the mucosal barrier as a function of the integrity of the mucosal barrier through time-lapse fluorescent microscopy. We envision that a modular in vitro microphysiological intestinal tissue model can serve as a translational platform to discover the biophysical etiology of disruption of the mucosal barrier.
Cell Encapsulation in Core-Shell Hydrogel Microcarriers

Miniaturization of in-vitro 3D cell culture is imperative to capture subtle cellular processes that are often lost in large-scale cultures for obtaining statistically meaningful outcomes. One powerful approach to realize miniaturized 3D cell culture is encapsulating cells in biocompatible and well-defined hydrogel microcapsules. The use of encapsulated cells allows for fundamental understanding cell biology and for applications such as drug delivery, immunotherapy, and tissue engineering. Alginate has been used for cell encapsulating applications due to its abundance and biodegradability. However, there are some limitations with alginate such as limited long-term stability and a variance in mechanical properties. This study introduces a new biomaterials engineering strategy to improve core-shell hydrogel microcarrier preparation by hybridizing silk-fibroin protein in alginate. Silk extracted from Bombyx mori cocoons is mechanically strong and biocompatible. Our underlying hypothesis is that by doping silk in a hydrogel system, mechanical stability and biocompatibility of microcarriers would be significantly improved. The microcarriers are produced using an electro-jetting platform consisting of a high voltage power source, a vertical syringe pump, and a grounded collecting surface. This technique exhibited higher control over diameter of core-shell carriers and also higher microparticle output than other methods. Our current study focuses on incorporating human mesenchymal stem cells in a core to determine the role of defined biophysical and biochemical milieu in directing stem cell behavior. We envision that the silk-alginate hybridized core-shell cell encapsulation system will be an enabling tool for in depth biological studies and in vitro 3D cell based drug screening.
A well-known phenomenon of cancer progression is that the tumor microenvironment stiffens over time. This stiffening is known to facilitate cancer cell dissemination from the primary tumor, initiating the process of metastasis. Stiffening occurs when local cells deposit matrix or secrete enzymes to crosslink preexisting proteins such as collagen. The only platforms that provide an avenue for cell-mediated stiffening are naturally derived hydrogels, but these systems lack physiological relevancy with respect to protein makeup and modulus of solid tumors. Inspired by the natural pathways that cells stiffen their environment, we are developing a synthetic hydrogel system that crosslinks in response of the amine oxidizing enzyme lysyl oxidase (LOX). Our first step in making a LOX responsive gel was incorporating polylysine into polyethylene-glycol (PEG) gels to mimic collagen crosslinking. While this system was able to crosslink in the presence of an amine oxidizer, the positive charge on the amines can be cytotoxic at high densities. Thus, we incorporated a linear polymer to minimize amine content and keep cells viable. However, cell-mediated crosslinking was not observed in the presence of the conditioned media of a high LOX expressing breast cancer cell line, BT549, nor an oxidizing agent. To this end, we are working on developing a hydrogel that minimizes cell toxicity, while maximizing amine density. By integrating a stiffening avenue into the gel system, we are creating a platform able to probe the mechanisms that lead to tissue stiffening, which will reveal critical steps in cancer progression.
170  Room 165  3:30-4:15  Panel 6
Brandon Daniel Morgan
Peter Monson (Faculty Sponsor)
Department of Chemical Engineering, UMass Amherst
Modeling Thermodynamics of Fluid Mixtures Confined in Pore Networks Using Dynamic Mean Field Theory

Porous materials are increasingly relevant in the chemical industry, for instance in catalysis and adsorption or membrane separations. A model that can calculate the thermodynamic behavior of a fluid confined in porous materials and represent it visually will provide insight into a system that is otherwise hard to imagine. This will make the prediction of thermodynamic behavior in pores easier without undergoing tedious experimentation. A well-functioning model that can easily be manipulated will also provide a way to educate academics on the behavior inside porous materials. This work will be carried out using mean field theory and dynamic mean field theory to model the thermodynamic and dynamic behavior of the fluid inside a porous material. The first component of this work is to implement these theories using MATLAB to replicate existing pore structures, with potential for applications in teaching. MATLAB has been chosen in place of Fortran due to its simpler interface and its ability to display images without the use of another program. The second component is to extend these models to study mixtures in pore networks. The thermodynamic behavior of mixtures has been modeled in a simplified pore; we are looking to extend this model to a network of pores – a more realistic system.
I will examine the process and reasons that lead to the Flint, Michigan water crisis and contrast that with Fall River’s water management. In this research, I will focus on health impacts in Flint, water purification technology (chemistry & engineering), the administrative/political reasons why it failed in Flint and develop recommendations so a similar crisis doesn’t happen again in Flint or other major municipal water systems. Furthermore, I will combine research or primary and secondary scientific literature with current news sources and personal interviews with experts in the field to develop my analysis and recommendations. My interested in this issue is because citizens pay taxes to the government to have a clean environment and safe drinking water. I am interested in learning how lead poisoning got into the water of Flint, what the health impacts are to local citizens of Flint, who is responsible for the problem, and how this tragic situation can be prevented in other cities with similar outdated infrastructure and financial constraints. Further, I want to learn whether class and socioeconomic status affect the decisions that were made that resulted in the Flint water crisis. In addition, I will develop a comprehensive understanding of the various aspects of this crisis, also, I will provide a critical analysis of the whole situation and develop my own conclusions and recommendations about a very complex issue that many municipalities may face.
When using Salmonella typhimurium as a proposed drug delivery device for tumor cells, it was found that roughly 70% of bacteria invaded the mammalian tissue. In order to use S. typhimurium as an extracellular drug delivery device, cellular invasion must be reduced to provide a safer alternative for healthy tissue surrounding the tumor cells. The SipB gene is one of the key components of the type III secretion system for protein translocation into host cells via an arm-like structure that is able to latch onto cells. It is hypothesized that a SipB knock-out will reduce cellular invasion to provide a safer drug delivery environment for the healthy cells surrounding the cancerous tissue. The SipB gene does not contribute to the secretion of proteins, allowing the bacteria to still function as an extracellular delivery device via protein secretion into the extracellular matrix. The effect of the SipB knock-out was quantified by transforming green fluorescent protein (GFP) into S. typhimurium to measure cellular invasion in monolayer cultures of human breast adenocarcinoma cell line under a fluorescent microscope during videos of two to ten hours to track the bacterial movements. Further trials included bacteria that contained DsRed and SseJ with GFP which constantly produced red fluorescent proteins (RFP), while GFP was only expressed in bacteria that invaded cells. This allowed confirmation that the reduction of tissue invasion was due to the SipB knock-out therefore providing means for a safer extracellular drug delivery device.
Filtration is a separation process commonly used for the separation of solids from fluid phases. The solids are removed through the use of a filter medium, which separates the phases through size exclusion principles. The solid particles are left behind at the filter medium, while the fluid phase passes through. One such process is called cake filtration because of the solids accumulating to form a “cake” on the filter surface layer. It is assumed that the cake layer is porous, and that subsequent solids are deposited at the top of the cake layer, while the fluid passes through both the growing cake and the filter. However, as the cake height increases, so does the resistance to the fluid passing through the barrier. Therefore, cake filtration methods must be stopped at a certain cake height in order to remove the accumulated solid. Moreover, other factors also affect the resistance of a cake layer. The size, shape, and compressibility of the solids being filtered are all important considerations. Modeling such processes are important, especially in the pharmaceutical industry, in understanding and optimizing time and energy requirements. Previous research has been done to model the filtrate volume, pressure drop, and cake height as a function of time, but only for the simplest case of a uniform distribution of incompressible spheres. In reality, products of pharmaceutical processes are non-uniform, needle shaped, and are somewhat compressible. Incorporation of such factors into the model would lead to more accurate simulations, and a better process understanding.
Bioinspired Dopamine Coatings: The Effect of Patterning on Antifouling and Antimicrobial Properties

Biofilm formation, the undesirable accumulation of microbes on surfaces, greatly impacts a wide range of applications, specifically, medical devices, water purification membranes, and marine coatings. On medical devices, biofilm formation is a grave health concern. For example, annually in the United States, biofilms formed on intravascular catheters have been linked to 250,000 blood stream infections, with an associated mortality rate of 12-25%. Current approaches to prevent biofouling are exceedingly costly and time intensive. Here, we suggest an inexpensive, bioinspired, materials approach to prevent the initial onset of bacteria attachment. Mussel-inspired dopamine self-polymerizes into surface-adherent films, offering a one-step approach to coat a broad range of surfaces. Simultaneous incorporation of poly (dopamine) and poly (methacryloyloxyethyl phosphorylcholine) (polyMPC) has shown substantial antifouling properties, while incorporation of poly (dopamine) with cetrimonium bromide (CTAB) has displayed antimicrobial effects. Alternating antimicrobial and antifouling stripes will provide the biocidal agents as bacteria “slip” across antifouling strips and come in contact with the antibacterial strips, under hydrodynamic flow. Antimicrobial plate testing quantified Staphylococcus aureus viability on coated silicon surfaces. Dynamic and static attachment assays were performed by observing GFP fluorescent bacteria. Our dual-functional antifouling and antimicrobial coatings offer a novel, bio-inspired approach to the prevention of biofilm formation.
Benjamin Abel Rizkin  
T. J. Mountziaris (Faculty Sponsor)  
Department of Chemical Engineering, UMass Amherst  

**Abstract:**  
Concourse: High-Efficiency Tandem Perovskite Quantum Dot Solar Cells  

Current solar cell technologies increase in price steeply in relation to their efficiency, with typical residential panels lying in the 15-25 percent efficiency range while panels used by NASA exceeding 40 percent. The problem with most commercialized technologies is that they are based on silicon wafers much like the ones the processors in computers are made of. Manufacturing these wafers and chemically modifying (doping) them is an expensive process, requiring clean rooms and precision equipment. The goal to producing more cost-effective solar panels lies in developing solution-processable panels that utilize liquid-phase precursors in place of billion-dollar manufacturing plants. In recent years perovskite and quantum dot cells have shown promise in delivering very high efficiencies without requiring a silicon substrate. By combining both of these technologies in what is known as a two-junction solar cell we hope to exceed the maximum efficiency of commercial panels of 25 percent. The quantum dot portion of the cell consists of zinc-selenide nanocrystals semiconductors synthesized by the hot injection method in a coordinating solvent. The perovskite portion of the cell is a methylammonium lead iodide (MAPbI3) layer produced by spincoating a precursor solution. The general structure of the cell is a fluorine-doped tin oxide glass substrate followed by compact, mesoporous and scattering layers of titanium dioxide, the quantum dot layer, the perovskite layer, a PCBM layer and an calcium/aluminum electrode. The perovskite was tuned to absorb incident radiation with a bandgap of roughly 1.8 eV while the quantum dots were tuned to roughly 3 eV.
Some ionic liquids have been shown to be capable of stabilizing proteins for an extended period of time, sometimes spanning years. For comparison, proteins in water only last a matter of days at room temperature and weeks if refrigerated. The Bermudez lab is researching systems containing both ionic liquids and water because any potential application of this research dictates that the protein of interest be recovered from the system. In order for a protein to be active, it must be folded in its native state in an aqueous environment. Therefore, the phase behavior of the system is invaluable knowledge for determining how to recover the protein into pure water while keeping its structure and function intact. The proteins used for this research were model proteins, such as lysozyme and albumin from bovine serum (BSA). A phase diagram was constructed showing the insoluble regions of protein and ionic liquid concentrations. Temperature studies were conducted to investigate whether or not this insoluble region can be diminished with increasing temperature, as is commonly observed in other systems. The potential applications for enhanced protein stability could be very impactful to the medical community. Vaccines must be refrigerated and stored in specific conditions in order for them to be effective when administered to patients. A shelf-stable vaccine would enable easier transport (no refrigeration required) and widespread accessibility. In addition, any medicines involving proteins, such as biologics, would be shelf stable. This development would greatly simplify and add flexibility to both the distribution and storage of medicine.
Matrix metalloproteinases (MMPs) are a group of cell-secreted enzymes responsible for degrading most extracellular matrix proteins during growth, normal tissue turnover, and organogenesis. Normally MMP expression is low; however, during certain pathological conditions, such as cancer, expression is significantly increased, leading to tissue remodeling that can support the progression of disease. In cancer, MMP facilitates in the invasion of cancer cells to secondary tissues, or metastasis. Targeting MMP overexpression in cancer has seen limited clinical success, because of significant, off-target toxicity. Here, I hypothesize that the collagen-dense extracellular matrix (ECM) of the tumor stroma regulates MMP expression in cancer progression. I propose that understanding how these ECM features driving MMP expression will facilitate in finding better drug inhibitors, limiting systematic toxicity. To study this, I am using a combination of biomaterial platforms to isolate the extracellular matrix proteins in tumors that cells bind to using surface receptors called integrins. The biomaterial platforms used in the study vary based on the ECM protein desired to be isolated in the tumors for the given trial. First, I have used a novel 2D biomaterial to isolate integrin binding so that internal breast cancer gene expressions of MMPs could be studied. Though it is established that integrins are capable of upregulating MMP expression, it is unknown whether integrins are directly or indirectly causing this significant increase of MMP expression. The tunable nature of our biomaterial platform allows us to directly test integrin binding sequences and gene regulation, providing an avenue to explore this important question. Results from using experimental proteins collagen I, collagen IX, and Thrombospondin as surfaces for integrin binding have shown strong gene expression post-qPCR from primary integrin Beta 1 for the both collagen surfaces and integrin Alpha V for Thrombospondin. However, Thrombospondin had much smaller expression from all other integrins used than the collagen proteins surfaces. These results offer evidence that the collagen dense biomaterial surface prepared may be involved with regulating MMP expression, but more trials are needed to be conducted. Future experimentation will need to be done to replicate the experiment for more experimental data and its validity as well as changing the surface of the 2D biomaterial for the sake of comparison.
Inexpensive Synthesis of Copper SSZ-13 Type Zeolite

As world industries shift to accommodate tighter regulation, new and more efficient methods for controlling emissions need to be developed. One potential solution in reducing the amount of NOx in exhaust fumes is selective catalytic reduction with the zeolite copper SSZ13. Currently, the most widely used synthesis procedure for preparing Cu-SSZ13 involves expensive reagents and several post processing steps. However, research suggests that there are much more cost efficient ways to prepare this extremely useful compound. This talk will discuss the various synthesis procedures investigated as well as their potential industrial benefits. Through alteration of the structure directing agent, silica and alumina sources, seed crystals, and water content it is possible to significantly reduce the high cost of production the SSZ13 framework. It will also be demonstrated how scale affects zeolite synthesis and if proposed changes to reaction procedures will be viable closer to industrial scales. Finally, the scalability of processes used to introduce a copper counter ion, the necessary component for catalytic activity, will be evaluated.
Bioreactor Design for Creating Dynamic Culture Environment in Standard Multi-well Plates

Multi-well plates are the pinnacle standard for in vitro cell culture experiments due to their highly standardized dimensions and surface chemistry, optical transparency, and cost efficiency. These are all critical factors when observing regenerative cellular processes in order to obtain quantitative and reproducible results. The fundamentally static nature of plate culture does not accurately mimic the dynamic physical microenvironment in the body, and may cause profound disparities with in vivo studies. To address this issue, a plethora of bioreactors have been introduced, each with its specific operating characteristic to suit a conditional requirement. While these bioreactor systems have clearly demonstrated the significance of mechanical and shear stimulus in promoting and directing cellular behaviors, broader implementations in research fields has not been realized. The surge in tissue engineering research have had profound ramifications in fabricating a viable design for coordinating biomedical research. We introduce a new bioreactor design that can incorporate the mechanical and shear stimulus in each individual cell in the well plate. Critical parts of our design include magnetically responsive floating discs and a pneumatically-operated actuator that can cause significant motion when in conjunction with a magnetic field. By applying a magnet field array at the bottom, we can manipulate the floating disk up and down in a one-dimensional manner to generate the shear and mechanical force. We are characterizing generated mechanical forces and fluidic pattern as well as determining the biological significance in how responsive the cellular properties are with these stimuli compared to those in unstimulated wells.
Phosphorene is a relatively new 2-D material with astonishing mechanical, chemical, and electrical properties. The research in Professor Dimitrakopoulos’ lab aims to create a phosphorene sensor through mechanical exfoliation that is able to detect water vapor. The binding of gas molecules will change the conductivity, the carrier mobility, or other electronic device parameters of the sensor. Such changes allow the sensor to be used as a detector. This sensor has the potential to be used for general gas sensing for research in biomedicine. Previous research has already studied biocompatible phosphorene to be used in photothermal therapy and drug delivery. We are focused on the next step: creating a mechanism to detect the problem so treatment can be localized to the affected area. In diseases or conditions where gas is released, this phosphorene sensor can be used to trigger such localized treatment. Other potential applications include sensors for safety, like carbon monoxide sensors, and for research purposes, to detect previously undetectable changes in gas concentrations. Our sensor is nothing more than a proof of concept to showcase phosphorene’s potential in gas sensing, and this first step will hopefully open the door for impactful research.
Thin films synthesized using polyelectrolyte complexes are promising biomaterials that could support cell growth, drug release, and act as biocompatible coatings. These properties stem from the charge densities on the polymer backbone and benign solvents. Unfortunately, polyelectrolyte complexes are brittle, and difficult to mold into thin films; fully dissolved polyelectrolytes are simply solutions. However, when polyelectrolytes are in coacervate form, they maintain mechanical properties while becoming malleable. In this study, a poly(styrene sulfonate) (PSS) and poly (diallyldimethylammonium chloride) (PDADMAC) coacervates were spin coated onto glass substrates. The goal of this study was to create thin films with uniform height profiles in less time than the previously demonstrated layer-by-layer deposition method. The effects of spin-coating spin speed and spin time were studied, as well as substrate treatment with ozone and sodium hydroxide. In addition, post-spin coated coacervates underwent treatment, such as, salt removal to observe changes in height profiles. The results presented here suggest that there are many substrate properties and coating techniques that affect the synthesis of coacervate thin films.
Recently, the rediscovery of monolayer phosphorene has indicated that there is high potential for the use of black phosphorus (BP) as a thermoelectric material. Due to the material’s large electrical to thermal conductivity ratio where $S$ is the Seebeck coefficient and $ZT$ is known as the figure of merit that determines the overall ability of the material for thermoelectric conversion. In addition, recent first principles calculations and other methods of computational analysis have indicated that even the most basic of black phosphorus conformations have the ability to compete with conventional thermoelectric material on the market. J. Zhang et al. reported that phosphorene nanoribbons can have a $ZT$ figure of merit upwards of 6.4. Current conventional bismuth telluride materials have a $ZT$ value of around 1 and more competitive processes start at around 3 according to J. Zhang. Thus the primary goal of the study is to establish a method to directly compute the thermoelectric properties of black phosphorus while a secondary mission is to discover methods to increase the $ZT$ figure of merit value. This study involves directly obtaining the thermoelectric properties of bulk black phosphorus and other conformations such as monolayer BP and nanoribbon BP.
Computational Investigation of the Reaction Mechanism of HNO with Thiols

Nitroxyl (HNO) is a highly reactive nitrogen-based species. In the past few decades, it has become a molecule of interest due to its functionality and application in pharmacological settings. The high reactivity and its electrophilic nature makes it a strong candidate for oxidizing nucleophilic thiols. The thiophilic nature of HNO has the potential for protein modification leading to enzymatic inactivation. Given the strong affinity of HNO towards nucleophilic thiols, it is expected that the more polarizable selenothiols will have a faster reaction rate compared to the sulfur-containing thiols. Transition state conformations were first determined at the HF/6-31G (d,p) level of theory and then further refined at the B3LYP/6-31G (d,p) level of theory for more accurate results. Intrinsic reaction coordinate calculations confirmed the reaction mechanism leading to the desired N-hydrozysulfenamide product and its reversibility. Activation energies and rate constants showed that selenothiols have a lower energetic barrier and a faster rate constant. To determine the kinetics under physiological conditions, molecular mechanics calculations regarding the reactivity of selenothiols and thiols reacting with nitroxyl are currently being carried out and interpreted, however these results are in their early stages.
Parabens (such as methyl, ethyl, propyl, and butyl paraben) are a class of widely used preservatives in cosmetic and pharmaceutical products. Although they are useful as preservatives, studies published in 2004 detected parabens in breast tumors. Parabens exhibit weak estrogen-like properties that could contribute to the development of breast cancer. In 2014, the European Union banned a large range of parabens in cosmetics because of uncertainty about their impact on the human endocrine system. In the United States, the Cosmetic Ingredient Review (CIR) reviewed the safety of methylparaben, propylparaben, and butylparaben and concluded they were safe to use in cosmetic products at levels up to 25%. Typically, parabens are used at levels ranging from 0.01-0.3%. There is still consumer concern regarding the cumulative paraben exposure from widespread use in a variety of consumer products. In this study, a method for extracting and quantifying parabens in cosmetics and pharmaceutical products will be tested using solid supported liquid extraction followed by separation and quantification with high performance liquid chromatography.
199  Concourse  3:30-4:15  Board C88
Neil Chapin
Joseph Quattrucci (Faculty Sponsor)
Department of Chemistry, Worcester State University
Hydrogen Storage in Metal Decorated Graphene Systems

Studies for alternative energy other than fossil fuels have been a pressing objective. Hydrogen storage as a renewable and high yielding energy source has become a well-studied problem in recent years. Ways to store hydrogen have presented problems and several options have been explored. It is important to understand the dynamics of the hydrogen dissociative chemisorption process. To do this a potential energy surface is required. In this investigation, we examine the two body interactions of atomic hydrogen with a Ni-decorated graphene surface. In addition, results from our 3-body interaction of two hydrogens with the Ni-graphene surface are presented. Density function theory calculations were performed to study these interactions. Preliminary results of atomic hydrogens interaction with graphene yield an adsorbed bond length of 1.567 Å and dissociation energy of 3.109 eV.
Abortive cycling and strand jumping, processes that create too-short and too-long RNA products, respectively, are thought to be highly sequence dependent. To test mechanistic models, we are using a deep-sequencing approach to determine statistically the sequence-dependence of these processes. By synthesizing DNA templates with randomized bases at specific positions, we created a combinatorial pool of all possible sequences in the target region. These sequences are transcribed in vitro, and then deep sequenced to provide quantitative assessments of abortive or strand jumping probabilities. Both phases initially involve the creation of templates with randomized bases at strategic points: eight bases at the beginning of the transcription start site for the potentially-abortive constructs, and four bases at the 3’ end of the template for the strand jumping experiment. Next, those transcription reactions are optimized regarding the concentration of the template and non-template strand(s), and T7 RNA polymerase. Known adaptors are ligated to one or both ends, effectively “bar coding” the sequences and providing targets for reverse transcription, PCR, and sequencing. For the sequence dependence of initial transcription (abortive cycling), known adaptors are ligated to both ends of the transcript. For the strand jumping experiment, only one adaptor is necessary, since the 5’ sequence of the RNA is constant. Using reverse transcription and PCR, the RNA is converted to DNA. Prior to deep sequencing, the products are cloned into a plasmid and sequenced conventionally. Finally, these products are amplified and sent out for sequencing.
202  Concourse  4:30-5:15  Board C71
Jeffrey Dewey
Todd Emrick (Faculty Sponsor)
Department of Polymer Science and Engineering, UMass Amherst
Efficient Synthesis of Tetrathiafulvalene-Containing Polymers and Their Non-covalent
Electronic Interactions with MoS2 Nanomaterials

Transition metal dichalcogenides (TMDCs) such as MoS2 comprise an important class of 2D semiconductors with numerous interesting electronic and mechanical features. However, full utilization of TMDCs in processable materials and devices necessitates the discovery of robust functionalization methods. We report well-defined tetrathiafulvalene (TTF)-based polymers, exploiting a synthetic route that overcomes challenges previously associated with these systems. These platforms enable basal plane coordinative interactions with MoS2, conceptually in parallel with pyrene-containing platforms for graphene and carbon nanotube modification. Not yet reported for TMDCs, these non-covalent interactions are effective for MoS2 irrespective of the lattice structure, affording significantly enhanced solution stabilization of the nanosheets. Additionally, the TTF-functionalized polymers offer electronic structure modulation of MoS2 by ground state charge transfer and work function reduction, demonstrated using Kelvin probe force microscopy (KPFM). Notably, coordination and electronic effects are amplified for the TTF-polymers over TTF itself. Experiments are supported by first-principles density functional theory (DFT) calculations that probe polymer-TTF surface interactions with MoS2 and the resultant impact on electronic properties.
Calculation of molecular properties is often necessary when the property is not directly measurable, or the measurement of the property is prohibitively difficult or expensive. Within the field of theoretical chemistry there is a specific subset of methods that are concerned with the calculation of the electronic structure of the molecules. This information can be used to calculate properties such as the molecular geometry, dipole moments, absorption spectra and molecular orbitals. The first of these methods was Hartree-Fock, first practically implemented in the 1950’s. Since then there have been many improvements that have taken into account electronic correlation; the most recent of these are the explicitly correlated electronic structure methods. These methods explicitly take into account the inter-electronic distance. These methods require the computation of the following integral \( I = \langle \varphi_1 \varphi_2 | e^{-\alpha \cdot r_{12}}/r_{12} | \varphi_3 \varphi_4 \rangle \) where \( \varphi_n \) are the traditional gaussian basis functions. The kernel of the integral is expressed as a linear combination of \( n \) gaussian type kernels \( I \approx \langle \varphi_1 \varphi_2 | e^{-\beta_1 \cdot r_{12}}/r_{12} | \varphi_3 \varphi_4 \rangle + \ldots + \langle \varphi_1 \varphi_2 | e^{-\beta_2 \cdot r_{12}}/r_{12} | \varphi_3 \varphi_4 \rangle \) With this form of the integral an exact quadrature is developed using a similar method to the Rys quadrature algorithm for the computation of electronic repulsion integrals. Rys quadrature will be shown to be more efficient for a certain subset of integrals using modern computer architecture.
Lipogels (i.e. a crosslinked, polymeric nanogel network encapsulated within a liposome) have recently shown promise as drug delivery vehicles. In combining aspects of both liposomes and nanogels, they exhibit biocompatibility, biodegradability, stimuli-sensitivity and extended, targeted release. Nevertheless, the fact that research on lipogels is relatively scarce in comparison to either liposomes or nanogels is a primary motivation behind the further investigation of such systems. The purpose of this study was to develop a biologically relevant and versatile delivery method using a lipogel system, particularly with regards to the controlled, intravenous delivery of hydrophilic biomolecules such as peptides and proteins. The encapsulation of these polymeric aggregates within a liposome and their selective degradation were corroborated through dynamic light scattering (DLS) size measurements, crosslinking density was monitored via UV-Vis analysis and leakage dynamics were investigated through fluorimetry studies. It was determined that a particular copolymer ratio was optimal for liposomal templating and that the size of this lipogel system could be reliably tuned. Additionally, extensive characterization of the polymeric aggregate and ensuing nanogel shed light on certain structure-property relationships that underlie them. Ultimately, these relationships were utilized for the loading of dyes as model small molecule drugs and GFP as a model protein, demonstrating this lipogel system’s promise as an effective biomolecular delivery vehicle.
Ashley Kate Fairweather
Jesse C. Marcum (Faculty Sponsor)
Department of Chemistry, Framingham State University
Formation of Gold Nanoparticles with Alcohol Co-solvents and Tetrachloroaurate

Tetrachloroaurate consists of a gold atom with a 3+ oxidation state surrounded by four chloride ligands. Tetrachloroaurate has a number of important uses including as a synthetic precursor for gold nanoparticles. One common route in forming gold nanoparticles is by photoreduction of tetrachloroaurate; however, the mechanism by which this occurs is poorly understood. In our experiments, potassium tetrachloroaurate is reduced to gold nanoparticles using ultraviolet light in the presence of water and alcohol co-solvents. The presence of alcohol co-solvents has a drastic effect on the kinetics of tetrachloroaurate photo-decomposition. It is still unclear why the alcohol co-solvent affects the reaction kinetics, but we do observe trends related to solution viscosity.
Plant-based biofuels provide a possible solution to the global reliance on fossil fuels. However, the cellular structure of plant material, primarily lignin, hinders the possibility of commercial production of biomass as fuel. Currently available chemical procedures for breaking down lignin suffer limitations such as harsh reaction conditions and high costs that greatly reduce the likelihood of production on a commercial scale. Metalloporphyrins have been shown to have good catalytic properties in regards to the oxidation of lignin models. This research seeks to find a scalable method for the production of metalloporphyrins and the application of such porphyrins for the catalytic oxidation of lignin material. Meso-tetraphenylporphyrin (H2TPP) is a known compound with a published synthesis. The scale of the reaction, addition sequence, and isolation procedures were varied in this research in order to probe for process efficiency and scalability and limit the use of expensive purification techniques, such as column chromatography. It was determined that an increased benzaldehyde to pyrrole ratio improved purity of the product. Metalloporphyrins were synthesized using Mn(III) acetate, Mn(II) acetate, and Fe(II) acetate by adjusting reaction conditions for scalability, cost effectiveness, and toxicity. Based on these findings, metallated meso-tetraphenylporphyrins show promise based on their stability and relatively efficient and inexpensive synthesis, to act as a commercial method for the catalytic oxidation of lignin.
Sunscreens often contain mixtures of organic and inorganic compounds referred to as UV filters. The inorganic UV compounds, such as zinc oxide and titanium dioxide, work by reflecting or scattering UV radiation while the organic compounds absorb UV radiation. Most of the organic UV filters currently being used throughout the world can be classified as derivatives of PABA (p-aminobenzoic acid), p-aminobenzoates, salicylates, cinnamates, benzophenones, anthranilates, dibenzoylmethanes, and camphors. In this research, UV spectroscopy and chromatography were used to analyze extracts of several commercially available sunscreen products composed of organic UV filters. UV spectroscopy was used to analyze the spectrum of each sunscreen formulation, while the composition of each sunscreen was analyzed through chromatography.
Since the beginning of the industrial revolution, the concentration of carbon dioxide in the atmosphere has increased substantially with current levels over 390ppm - a forty percent increase in the past 150 years. The resulting (and accelerating) accumulation of carbon dioxide in the troposphere is increasingly linked to global climate change. One promising method to mitigate the impacts of greenhouse gas emission is Carbon Capture and Sequestration (CCS). An effective material for CCS must selectively bind carbon dioxide while not interacting with other gases that are present. It must be easy to regenerate, requiring a small energy input to release the pure carbon dioxide so that it can be isolated from the environment. My research focuses on the development of Metal-Organic Frameworks, or MOFs, for this purpose. MOFs are compounds consisting of metal ions or clusters coordinated to organic molecules to form one-, two-, or three-dimensional structures that can be porous. My strategy involves the inclusion of Lewis Basic sites within the pores of MOFs in order to increase selective for the adsorption of carbon dioxide relative to other atmospheric gases. I will present my efforts to this end, including the synthesis and structure of linkers and materials featuring 4-aminopyridyl functionalities.
BPA is a slightly toxic substance that is commonly used in the manufacturing of plastics. Long term low level exposure of BPA has been connected to mammary and prostate cancer, genital defects in males, early onset of puberty in females, and behavioral problems such as attention-deficit hyperactivity disorder. Lake water samples collected from the Mealy Mountains (53.6° N, 58.6° W) of Southeastern Labrador, Canada were analyzed for the presence of Bisphenol-A (BPA) (Figure 1) using published Liquid Chromatography/ Mass Spectrometry techniques and Elisa assay techniques. Figure 1: Structure of Bisphenol A The study area is uninhabited and removed from direct human impact and the presence of BPA in water samples would indicate large scale atmospheric transport of industrial pollutants and demonstrate the pervasiveness of the impact of plastics in modern society.
Ever taken a science class and wondered, “Why do I need to know this?” Despite the relevancy of scientific concepts and principles to real-world problems, students are still feeling disengaged in their science studies. While traditional STEM teaching through lecture is effective with certain populations of students, reaching all students is important for recruiting underrepresented minorities to these fields and for preparing future citizens to solve ongoing social issues. The primary intent of my project is to incorporate evidence-based approaches for teaching STEM into the design of an interdisciplinary general education science course implementable at UMass. Because this is a general education course, the target audience is first-year non-science majors. The curriculum will address fundamental concepts in chemistry like molecular vibrations and thermodynamics through the lens of climate change. This topic will be broken down into four units: energy, greenhouse gases and molecular chemistry, carbon dioxide and the carbon cycle, and the warming of the earth. The final unit will introduce students to scientific literature and primary research. The learning objectives for this class focus less on memorization of facts and more on scientific communication and application of scientific principles to social contexts. Students who meet the course objectives will show a high level of skill in working in teams, connecting their energy consumption to upstream and downstream consequences, using mathematical skills and scientific methods of analysis to understand and describe complex relationships, evaluating scientific arguments for validity and reliability, and using the scientific method to fill gaps in their understanding. This course may increase enrollment of underrepresented minorities in STEM by engaging students in scientific thinking rather than scientific knowledge. Students in non-STEM majors will be able to apply the science skills learned in this class to non-STEM fields, future careers, and to informed citizenship.
Nutrient pollution from phosphorus (P) is a major problem effecting the security and safety of fresh water supplies around the globe. Nutrient pollution is extremely dangerous because it reduces the amount of oxygen in water, which kills aquatic life and makes the water unfit for human consumption and recreation. Biochar is a charcoal-like co-product of the pyrolysis of organic materials. Pyrolysis is the heating organic materials in an oxygen free environment resulting in the production of gas, liquid fuel and biochar. Biochar is known to increase the health and fertility of soil, adsorb organic and some inorganic contaminants, however it is not able to adsorb phosphate. This research focuses on the sorption of phosphate by four novel biochars altered with either Mg or Ca pyrolyzed at 350°C and 550°C along with unaltered biochars pyrolyzed at the same temperatures. Altering the biochar is done to create nano-sized oxide flakes on the surface of the biochar that are known to have an affinity for phosphate. This research investigates the phosphate sorption properties of the biochars by first finding the ideal phosphate sorption ratio for each biochar, which is then used for kinetic sorption experiments over the course of two weeks. Isotherm experiments were allowed to equilibrate for two weeks, as determined by kinetics, and the data was fit to known isotherm models, which were used to examine the sorption capacity of each biochar. The findings of this research suggest that the biochar altered with Mg at 550°C best adsorbs phosphate from solution.
In the past 100 years, atmospheric carbon dioxide levels have spiked tremendously due to human consumption and industrialization. Our current forms of harvesting energy are producing large amounts of greenhouse gases that are creating climate change. In order to combat our current damaging forms of energy production, a race for new environmentally friendly forms of producing energy are under research. Currently only approximately 2.5% of energy consumption is produced by renewable energy sources. A recent solution is inorganic semiconductor nanocrystals paired with organic molecule ligands, also known as quantum dots. These materials essentially absorb two photons and combine the energies to release one higher energy photon. My research primarily focuses on triplet triplet annihilation of CdSe quantum dots (TTA). TTA is promising due to power density requirements (solar energy is sufficient), high upconversion quantum yield, tunable excitation/wavelength, and strong absorption of excitation light. My research project regards increasing the efficiency of wurtzite and zinc blende CdSe quantum dots by improving the annihilator (ligand) which overall improves energy conversion. I synthesized various sized quantum dots of wurtzite and zinc blende crystal structure (2-5nm) and carried out ligand exchanges with the organic molecule 9-anthracenecarboxylic acid (9-ACA). The results displayed that zinc blende CdSe quantum dots were able to carry approximately 220 9-ACA ligands whereas the wurtzite obtained around 10 9-ACA ligands in the exchange. This result gives insight into higher energy conversion efficiencies in zinc blende quantum dots than wurtzite quantum dots.
Determination of Arsenic in Individual Rice Grains with Hydride Generation-Atomic Fluorescence Spectrometry

The arsenic contamination in rice and drinking water is a serious environmental and public health issue. As a result, the study of arsenic in both water and food sources has become a significant research area that needs the support of reliable information about the arsenic content in these substances. Currently, it is proving difficult to obtain dependable results for the arsenic content of rice; scientists have even contradicted each other’s results. One possible reason for these discrepancies is the variation in concentration of arsenic in individual rice grains. The overall purpose of this research is to measure the concentration of arsenic in single grains of different types of rice. Our approach is to apply a method with hydride generation-atomic fluorescence spectrometry for measuring the concentration of total arsenic in a single grain of rice dissolved in dilute nitric acid. The effects of instrument operating parameters have been investigated, and a detection limit of 0.25 μg/L in solution has been achieved. A study of the dissolution conditions showed that a single grain can be dissolved in 1 mL of 2.5 M nitric acid with heating. Preliminary results indicate that a small proportion of grains contain concentrations up to a few thousand μg/kg of arsenic, whereas the majority of grains contain only a few tens or hundreds of μg/kg of arsenic. After validation, by the analysis of reference materials, the method will be used to determine if there is a variation in the concentration of rice grains from different brands of rice, and grains within the same bag. Thirty grains of five different brands of rice will be analyzed. This study will allow us to determine which rice brands are safest for human consumption. Future studies will lead to further development of the method to determine the concentrations of the different arsenic species in single rice grains.
Understanding Cellulose Pyrolysis with Simulated Vibrational Spectra

Liquid fuels and plastics are generally made from environmentally unfriendly and nonrenewable sources such as petroleum. These fossil fuels are a major source of carbon dioxide emissions, and their use is the likely cause of phenomena such as acid rain and anthropogenic global warming. Biofuels, made from plants that remove carbon dioxide from the air during their growth, have the potential to replace fossil fuels as a sustainable and carbon-neutral energy source. Attempts at large-scale biofuel production have been made, primarily focusing on bioethanol made from corn and other grains. However, researchers believe that biofuel made from cellulose has the potential to be more efficient and effective. Cellulose is a polymer that is the main component of plant matter, and it can be broken down by heat into a variety of precursor chemicals that serve as feedstocks for clean fuel synthesis. However, this pyrolytic process is currently poorly understood and hard to control precisely. In this study, we use classical models of cellulose to simulate changes in its structure as it heats, and quantum techniques to calculate the Raman and infrared spectra associated with these high-temperature geometries. The data obtained can be searched for evidence of early steps in the pyrolysis process as well as revised assignments for peaks in the vibrational spectra. Ultimately, we hope to suggest exploitable pathways for more effective cellulose pyrolysis, as well as probe the limits of a classical model of cellulose heating.
212 Annual Massachusetts Statewide Undergraduate Research Conference

195 Concourse  2:30-3:15  Board C63
Bailey Jo McLernon
Shelli Waetzig (Faculty Sponsor)
Department of Chemistry, Framingham State University
Reaction Development of Pd-Catalyzed Allylation of Aromatic Imidates

The efficient synthesis of allylated aromatic imidates is being studied. Employing palladium catalysis, assorted N-heterocycles will be used as the nucleophiles on various allyl electrophiles. Reaction conditions will be tested and optimized for product yield and purity.
Creating an efficient and greener method to create hydrogen gas is an important area of study in chemistry as hydrogen offers a cleaner alternative to burning fossil fuels. Strontium titanate (SrTiO₃) is a material that has been shown to act as a photocatalyst for the production of hydrogen gas generated from the splitting of water. We will present the synthesis of this material as colloidal nanocrystals using a simple hydrothermal method. By changing the reaction conditions slightly we can control the presence and nature of surface-related oxygen defects that are detected by electron paramagnetic resonance (EPR) spectroscopy. The goal of this study is to understand the underlying formation mechanism and defect chemistry of these surface defects on colloidal SrTiO₃ as a function of a reducing agent, namely hydrazine.
Evidence of Fe$^{2+}$ and Cr$^{2+}$ Incorporation into CdS Molecular Clusters

The molecular clusters $[\text{M}_4(\text{SPh})_{10}]\text{A}_2$, $[\text{M}_{10}\text{S}_4(\text{SPh})_{16}]\text{A}_4$, and $[\text{M}_{17}\text{S}_4(\text{SPh})_{28}]\text{A}_2$ ($\text{M} = \text{Cd, Zn}; \text{A} = \text{Me}_4\text{N}^+, \text{Li}^+$) have long been used to prepare and model the growth of semiconductor nanocrystals (quantum dots). Doping first-row transition metal ions (TM$^{2+}$) into the crystal lattice of these clusters produces the general formulae $[(\text{M}_{1-x}\text{TM}_x)_4(\text{SPh})_{10}]\text{A}_2$, $[(\text{M}_{1-x}\text{TM}_x)_{10}\text{S}_4(\text{SPh})_{16}]\text{A}_4$, and $[(\text{M}_{1-x}\text{TM}_x)_{17}\text{S}_4(\text{SPh})_{28}]\text{A}_2$ ($\text{M} = \text{Cd, Zn}; \text{A} = \text{Me}_4\text{N}^+, \text{Li}^+; \text{TM} = \text{Co}^{2+}, \text{Cr}^{2+}, \text{Fe}^{2+}; x =$ nominal mole fraction of Co$^{2+}, \text{Cr}^{2+}, \text{Fe}^{2+}$). Logically, the TM$^{2+}$ doped molecular clusters can act as precursors to and analogs of colloidal TM$^{2+}$ doped semiconductor nanocrystals, inorganic materials that have broad applications ranging from spintronic devices to photovoltaic cells. Understanding these facets of dopant incorporation provides novel insight about controlling the dopant during the process of nucleation. Control over the dopant is important because precise doping will help to specify the location of the dopant within the nanocrystal, and can be utilized to achieve a desired physical result. More specifically, control over the dopant will lend to maximization of the mixing between the p-d wavefunctions to produce an optimal sp-d interaction. The magnitude of the p-d exchange is commonly explained through the exchange constant, $N_0\beta$. When $N_0\beta$ is negative, the p-d interaction is characterized by an antiferromagnetic coupling. Conversely, when $N_0\beta$ is positive the p-d interaction is characterized by a ferromagnetic coupling. Doping Cr$^{2+}$ and Fe$^{2+}$ into the crystal lattice of CdS quantum dots would both be novel and desirable as both ions have ferromagnetic superexchange pathways.
Raman Spectroscopic Study of TiO2 Electrodes and Dye-Sensitized Solar Cells

In the effort to establish alternative energy sources for the future, dye-sensitized solar cells (DSSCs) have attracted attention as an alternative to first-generation crystalline silicon solar cells, with the possibilities of low-cost production and high-power conversion efficiency. Along with an anode and cathode, the key components to a DSSC’s function are nanoparticles of titanium dioxide coated with light-sensitive dye. When subjected to light, electrons are injected from the photoexcited dye into the TiO2 network and will eventually arrive at the anode. Despite significant recent developments in the research of TiO2 dye-sensitized solar cells, it continues to be a challenging subject for several reasons, including a limited understanding of the TiO2 interface and the influence of dye adsorption. Raman spectroscopy can be a powerful tool in evaluating the TiO2/dye interface and the adsorption mechanism. This project uses a confocal Raman spectrometer to elucidate the reactions between dye and titanium dioxide for some of the more well-known, high efficiency DSSC systems.
Optimization of Lipophilic Drug Loading Capacity in Nanogels: A Study of the Effects of Variation in Crosslink Density

In this study, the loading efficiency of the cancer drug Doxorubicin in several samples of a nanogel formed from a copolymer aggregate precursor is explored. Crosslink density is varied between samples to determine optimal crosslink density for encapsulation stability of a lipophilic guest molecule. Use of nanogels is a promising, versatile, method for delivery of lipophilic therapeutics. This technique of targeted drug delivery, however, is not new. Methods of controlling size and specificity of these particles have been well established making them ideal for targeted delivery either using passive targeting or biological stimuli, however drug loading efficiency as well as encapsulation stability in vivo is poor. Optimization of drug loading will improve drug loading in systems already optimized with respect to other parameters. Absorption spectroscopy, NMR, GPC and DLS were used in polymer synthesis, monitoring extent of crosslinking and drug loading.
In the past few decades, there has been an interest in the synthesis of tridentate ligands containing phosphorus, nitrogen and oxygen due to their ability to coordinate with a variety of metals. Research on complexes that contain P, N, O have been shown to have potential for use as catalysts, antibacterial, antiviral and antitumor agents. The focus of this research is to synthesize and characterize novel tridentate P, N, O ligands. These ligands will be generated via a condensation reaction between a diketone and a primary amine that contains a pendant phosphine group. Variations of this PNO ligand will be explored by varying the starting materials. Once characterized, it is the goal to test the reactivity of the ligand toward nickel and platinum.
Use of Natural Substances in Microwave Assisted Friedel Crafts Reactions

A standard second year undergraduate organic chemistry procedure on microwave assisted Friedel-Crafts acylation of toluene was tried by using natural substances as catalysts. Instead of using aluminum chloride, both acidified Montmorillonite K10 Clay and pure Montmorillonite K10 Clay were used as a substitute catalysts due to the clay’s naturally occurring aluminum content in the form of layered alumiosilicate smectite. The substitution was made to help reduce the environmental and economic impact, as well as increase the safety of the undergraduate laboratory. The synthesis was carried out by using Microwave (Single Mode MW System –CEM Discover), and to reduce the sample handling time and minimize the production of by-products; simple extraction and separation techniques, such as centrifugation and rotary evaporation were also used. In this ongoing project the expected products will be identified using TLC, NMR and GCMS.
Tetrachloroaurate is a commonly used precursor for synthesizing gold nanoparticles; however, the mechanistic details of such syntheses are not well understood. In particular, it is unclear how the presence of different solvents affects the formation of these nanoparticles. In order to study the effects of solvent, we carried out quantum chemical calculations using density functional theory. Bond energies were calculated for tetrachloroaurate both in the gas phase and using several solvation models. Solvation models included the Polarizable Continuum Model (PCM) to account for bulk solvation, using a single discrete water molecule to account for hydrogen bonding, and a combination of the two. Current data suggest that solvent affects the reaction by deferentially stabilizing the products of tetrachloroaurate decomposition.
185 Concourse  8:30-9:15  Board C81
Tristan Tay
Kanae Esther Sasaki
Vincent Rotello (Faculty Sponsor)
Department of Chemistry, UMass Amherst
Engineering Cas9 Protein and Nanoparticles for Highly Efficient Intracellular Delivery

The CRISPR/Cas9 system is a gene editing technology that has the potential to cure many genetic disorders. CRISPR/Cas9 system is composed of a protein (Cas9) and a guide RNA molecule (sgRNA). This Cas9:sgRNA complex can be directed to any faulty gene in a host genome to correct it. However, therapeutic application of CRISPR/Cas9 system requires efficient delivery of the components into a cell’s nucleus. Here, we engineered Cas9 proteins to enable efficient cytoplasmic and nuclear delivery. In our strategy, Cas9 protein was engineered to carry a negatively charged peptide tag (E-tag) that facilitated the nanoassembly formation with functionalized gold nanoparticles. By appropriately tuning the E-tag length, we fabricated nanoassemblies that delivered Cas9 protein into cell cytoplasm with an efficiency as high as 90%. Further, we delivered engineered Cas9 protein alongside the sgRNA for targeted gene editing. Thus, our co-engineering strategy of Cas9 protein and nanoparticles provided an approach for highly efficient gene editing, expanding the opportunities for therapeutic application.
Innovation requires not only a strong understanding of fundamental scientific and engineering principles but also an aptitude for creative problem solving. In order to prepare students to take on future innovative challenges, a new approach to education in science, technology, engineering, and mathematics (STEM) must be explored. We assert that STEM education with an explicit focus on creative cognitive development through purposeful integration of the arts will both inspire students to explore how fundamental STEM concepts can be applied in creative problem-solving challenges. To test this hypothesis, we created BioInspire!, an educational outreach unit piloted at Fort River Elementary School in Amherst, MA. BioInspire! integrates bioinspiration and the engineering design process into project-based learning in the art classroom, thereby employing art as both an entry point and educational link to a deeper understanding of several traditional STEM fields. In this unit, students learn about the philosophy of bioinspiration, interact with bioinspired materials such as GeckSkinTM, and use portfolios of animals with different adaptations in order to create unique inventions through a design process akin to that used in academic research. In accordance with the Understanding by Design Framework, BioInspire! addresses several key Enduring Understandings which were developed based on naturally-aligned Core Standards from Science, Engineering, and Visual Arts curricula. We will present results on the extent to which the unit has fulfilled the desired Enduring Understandings based on findings from pre- and post-unit surveys, interviews with students, and classroom observations.
201  Concourse  3:30-4:15  Board C91
Alexander Joseph Zielinski
Joseph Quattrucci (Faculty Sponsor)
Department of Chemistry, Worcester State University
DFT Study of the Dissociation of Molecular Hydrogen over Nickel Decorated Graphene

The everyday use of hydrogen as a green source of energy is restricted by available hydrogen storage methods. The storage of hydrogen on graphitic materials, such as carbon-nanotubes, has been proposed as a safe and efficient improvement over other hydrogen storage methods being explored. In this study, we have investigated the minimum energy path for the dissociation of molecular hydrogen over a nickel decorated graphene sheet. Our preliminary calculations show that there is an attractive interaction between the hydrogen molecule and the Ni/graphene surface as hydrogen approaches over the Ni. The dissociative chemisorption process was determined to be endothermic by approximately 0.5 eV, with an activation energy of approximately 3 eV. Our findings are comparable to those performed by other researchers.
CIVIL ENGINEERING

208  Concourse  4:30-5:15  Board C80
Andrew James Rock
Sanjay Arwade (Faculty Sponsor)
Department of Civil Engineering, UMass Amherst
Open-Cell Aluminum Foam Subjected to Dynamic Strain Rates

Highly porous aluminum, termed aluminum foam, has been studied extensively under quasi-static load conditions for the past few decades. In order for it to be used in engineering applications subjected to impact loads, the mechanical properties of the material must be measured at dynamic strain rates. This work builds upon the quasi-static research conducted by one of the collaborators in order to include and compare the strain-rate behavior of the material properties. An open-cell aluminum foam of varying pore size has been tested using an Instron Dynatup impact tester in order to obtain strain-rates commensurate with blast rates. Material properties such as the elastic modulus and yield stress were measured from the data acquired from the impact tester. High speed, 4500 frames-per-second, video recordings allow for a visual assessment of deformation mechanisms and for the measurement of incremental deformation values. The highly deformable form of this type of material lends itself directly to its most promising application: Energy absorption. The development of the dynamic mechanical properties and the energy absorption characteristics will further bolster the future viability of metallic foams for use in impact and crash mitigation of critical members in infrastructure.
Driving Behavior in the Real World: Speed Selection

We seek to investigate how a speed selection varies between drivers on a shared route, within an individual driver on the same route, and within individual drivers on different routes. Through this task, we hope to gain a deeper understanding of human behavior within the driving task as it relates to speed selection. The goal of this task is to continue the investigation from the driving simulator experiment as to the causes of speeding. To accomplish these goals, a small group of participants will be equipped with Ubipix, a smartphone app that captures speed and position every second and combines that with video captured from a dash camera or smart phone. The participants recruited will be those that live in a common area and work in a common area. These commonalities will allow for a similar commute so specific road segments can be analyzed for all participants. The participants will be asked to install a RoadHawk dash camera that is compatible with Ubipix that can capture forward video. Before each drive, the participants will need to press record. Ten of their daily commutes (round-trip) along their normal route will be recorded and asked to be uploaded daily. These data will be supplemented by a journal that participants will use each day to log their desired arrival time to/from work. This will provide insight as to the driver’s perception of time and allow us to investigate how extra delay from traffic signals, or slow drivers, impacts a driver’s speed selection.
International development is a field that craves engineers of all kinds, yet often it is a very difficult career path for engineers to pursue. With pressing global issues such as water contamination, food scarcity, and resource insecurity on the rise, engineers are in high demand for development jobs more than ever before. The purpose of this research is to explore the opportunities for engineers that make a global and positive impact, whether it is within a company, volunteer work, the United Nations, or an NGO. By looking into and telling the stories of those who have already seen success, a better understanding of how to achieve a global development job as an engineer can be gained. Through extensive interviewing and networking, documentations are made of where local engineers have worked in global development, how their paths have led them to their current careers, and how they are looking towards the future of the field. Different employment options are compared, career paths are explored, and development is displayed with encouragement to consider it as an interesting possibility for young engineers. By telling the stories of past generations of engineers that were catalysts for positive change globally, the next generation can have resources and a guide to learn from their predecessors. Ideally, the findings of this project will be used for this purpose and will be a tool for achieving many of the new Sustainable Development Goals in the future.
With the ever increasing demand to add roadway capacity in a safe and efficient manner, the application of auxiliary through lanes (ATLs) at intersections has increased in recent years. Auxiliary through lane intersections exist when there is an added through lane introduced upstream of a traffic signal that is removed downstream of the intersection via a gradually tapered merge. In theory, these lanes increase the capacity of signalized intersections with minimal, if any, impact on safety; however, the intersection geometry presents several unique challenges for drivers. Furthermore, the benefits of the increased capacity are only realized if the drivers are making decisions that maximize the utilization of the introduced auxiliary through lane and safety is not compromised. The current research effort employed driving simulation, microsimulation and field study to evaluate both the operational efficiency of auxiliary through lanes as well as the driver performance elements related to their operation. The initial hypothesis evaluated the extent to which current field operations are reflective of modeled or predicted operations. This was evaluated in microsimulation and considers traditional intersection performance measures amongst others. Subsequent to that initial analysis, the remaining hypotheses evaluated are primarily related to auxiliary through lane utilization. More specifically, the focus is on what factors contribute to drivers’ decision making regarding use in these intersections and further analyzing these factors in our driving simulation models. Our improved understanding of driver performance will directly translate into improved design practices for introducing auxiliary through lanes at signalized intersections.
This research focuses on designing a device that will reduce the overall costs of point absorber wave energy converters by orders of magnitude. The available wave energy along the coasts of the United States is enough to power roughly 119 million households. According to the 2000 census there are approximately 105 million households in the United States, proving that wave energy can singlehandedly provide for the needs of the country. Waves are everywhere and on the global scale waves could provide a stable form of electricity when solar and wind technologies are unavailable. The main problem with the existing point absorber technology is a rigid steel spar used for stabilization. This spar is heavy, hard to deploy, and extraordinarily expensive. This research explores replacing the spar by using a device tethered to the wave energy converter that can stabilize the device just as efficiently without all the steel and weight. Design parameters used to evaluate the prototypes include maximum drag while ascending the water column, minimum drag while descending the water column, and minimal phase lag when switching between. The proposed devices are responding as hypothesized and provisional patents have been applied for. The future goal is to provide stable electrical power on a global scale at a fraction of the cost using existing wave energy converter technology.
Progressive collapse of structures, collapse of one structural element caused by an initial, localized failure that spreads throughout the structure, is often the result of unpredictable accidents. The consequences of progressive collapse are often devastating since there is very little warning and the initial damage area is hard to predict. Progressive collapse originating from a failure of a column is one of the most common forms of progressive collapse. The best way to prevent these progressive collapses is to design alternative load paths into structures so that if a column fails during an accident the loads on the building can redistribute to the other beams and columns without collapsing more elements. The challenge when designing buildings is identifying where weak areas of a building are and how much the strength of elements should be increased to be able to support the building if columns were to fail. Large-scale models of the complete structure of a building best predict the behavior of collapses but are very time consuming to create and run multiple scenarios on. This research will explore if less detailed computer models of reinforced concrete frames can still accurately predict the behavior of progressive collapse due to sudden column removals.
CLASSICAL LANGUAGE AND LITERATURE

210 Room 803 1:30-2:15 Panel 4
Brinna Aidan Michael
Teresa Ramsby (Faculty Sponsor)
Department of Classical Language and Literature, UMass Amherst
Superman vs. Hercules: A Study of the Hero-Archetype Then and Now

Why are superheroes like Batman and Captain America so appealing? The recent resurgence of interest in the superhero genre reflects a deep-seated cultural interest in the idea of a better, faster, and stronger human, one which traces its roots all the way back to Babylonia and the hero, Gilgamesh. This archetype of the super-human hero connects characters across time and space, revealing a curious pattern in human thought: that the hero-archetype exists as a manifestation of the human desire for semi-attainable perfection. This research paper presents the connection between two such characters, DC Entertainment's Superman and the Greco-Roman demigod, Hercules, as an in-depth case study of the way in which antique character archetypes are received and refigured in modern popular culture. By analyzing the social, economic, and political atmospheres that shaped each character, as well as the textual and visual traits which define them, this paper constructs an analysis of the role of Superman and Hercules as an idealized human in their respective societies.
COMMUNICATION

241  Room 908  3:30-4:15  Panel 6

Tara N. Benson
Michael Morgan (Faculty Sponsor)
Department of Communication, UMass Amherst
We Are What We See: The Relationship between Materialism and Family-Based Reality Television Shows

This study examines the relationship between television viewing and materialism. Specifically, it addresses whether or not those who are heavier viewers of family-based reality television shows are more materialistic. Previous research has shown that there is a positive correlation between television viewing in general and materialism. However, there is no research on whether or not specific genres have more materialistic viewers. Due to the fact that similar research has found a positive correlation between television viewing and materialism, it can be hypothesized that those who spend more time watching family-based reality television shows will be more materialistic. In order to collect data on this topic, a survey has been distributed with various questions about respondents’ backgrounds and viewing habits, along with a Richins Materialism Test. From participants’ responses, it will be determined whether or not there is a relationship between materialism and family-based reality television shows. Findings in this study will lead to further discussion about materialism amongst different age groups, genders, socioeconomic classes, etc. Furthermore, it will provide insight into current trends in American television, and how materialism may be embedded into our everyday lives through the programming we watch.
Teenage motherhood is a divisive topic in the United States, with many studies pointing to its negative emotional and socioeconomic repercussions. Recent pop culture trends, however, have spurred a more cinematized series of glimpses into the narratives of teen mothers and their experiences. Shows like 16 and Pregnant, Teen Mom, and others have portrayed the lives of teen mothers in a reality-show style, and multiple studies have examined the nature of these portrayals and their effects on teen viewers. With the rise of new media and self-created content, however, teen mom narratives that are self-created by the teen mothers themselves have appeared on popular new media sites. This project examines blogs and video-blogs created by teen mothers and posted onto the websites YouTube and WordPress in particular. I use previously researched socioeconomic beliefs and statistics about teen mothers to compare the narratives expressed in the blogs and video-blogs to existing expectations. Through the use of content analysis based on the expected and prevalent themes, I examine the similarities and differences between the self-created content of teen mothers and the existing socioeconomic and emotional beliefs about them established by previous research. The study also compares vlogging and blogging to discern whether or not these two different platforms—one textual, one visual—correlate with the expression of differing themes or emotions.
Presentations Details

22nd Annual Massachusetts Statewide Undergraduate Research Conference

224 Room 163 11:45-12:30 Panel 3
Melissa Ann Burke
Robert I. Carr (Faculty Sponsor)
Department of Communication, Fitchburg State University
The YouTube Civilization

This presentation reveals the misunderstandings of simply perceiving YouTube as a one-way, video-sharing delivery system, and then reveals the new, corrective model of YouTube as a virtual continent containing a vast array of civilizations. Each YouTube channel is its own civilization that includes all of the essential dimensions of such, including a communitarian social structure, autonomous government system, interactive and unique means of communication, boundless content production, and virtual cultural phenomenon. To study the essential dimensions of YouTube civilizations, this presentation contains a in-depth study of 35 different YouTuber channels, such as Jenna Marbles, Smosh, and Markiplier. Accompanying this study, this presentation incorporates numerous interviews and surveys of YouTubers, subscribers, and general internet users. Also, this presentation examines and corrects pre-existing academic perceptions of YouTube (gathered from scholarly material accessed through the Fitchburg State University library database). The new model presented not only helps us to better understand YouTube, but also helps us to gain an understanding in a wide range of new and emerging social media, including how they shape our increasingly virtual daily life and how they relate to and can be integrated with existing traditional media. This knowledge therefore provides insight to our immersive, totalizing media experiences. Thus, this new model of YouTube containing a vast array of civilizations is immensely important because it affects how we live our lives.
Photography has always been a way to tell a story. Portraits or any photos taken showing homelessness always have an amazing story to tell. Looking at the history of street photography highlighting this topic, I have seen what approaches have already been taken in this side of photography. After seeing some examples, it made sense to direct my focus on three different photographers Jill Freedman, Martin Schoeller and Steve Huff. After seeing their work in this category and seeing what techniques and atmospheres were used and captured, as well as composition in certain photos I have seen the prior ways of shooting this type of photography. I then shot a series of portraits and other photographs of homelessness from my perspective, keeping in mind what has already been done in the past. After seeing the previous work shot in this topic of photography it’s apparent that the photos are usually sad and depict true atmospheres. Although this is necessary to do, my photos shine a different light on this topic. Photos showing a slice of happiness in these people’s lives is just as important as documenting homelessness photography in the first place. Although there have been photos that have covered issues similar to this, I believe that this issue will always benefit from projects like this and people always deserve to have their story told.
Presented at 22nd Annual Massachusetts Statewide Undergraduate Research Conference

Lauren Connolly
Robert I. Carr (Faculty Sponsor)
Department of Communication, Fitchburg State University

Selfie Culture: Social Media's Role in Women's Perception of Beauty

Women use social media as a place to portray a version of themselves that they want others to see. It is nothing new for women to obsess over the presentation of their appearance to the outside world, however when that image now demands to be presented 24/7 online women become consumed with these narcissistic ideas. It is clear for women who grew up before the creation of social media to recognize their real life value in comparison to their status online. However, the difference is not as distinguishable for younger girls who are growing up and know nothing but this online world. Today’s youth are left to constantly compare their beauty to what they see in their peers and role models online. If used correctly social media has the power to educate young girls on their self-worth in a larger way than has ever been done before but, it also has the power to create a more narcissistic, self-absorbed and artificial generation of women than we have ever seen before. Through examining the demands of maintaining social media accounts, women’s self-objectification, and the repercussions of one’s image constantly being scrutinized, this research will challenge the current everyday uses of social media.
Images of Ideal Media Homes in the Family Context

This exploratory study investigates the relationship between environment and behavior within the most intimate realm of a family’s existence – the home. The study is based on a survey that examines how people design spaces that enhance or diminish the likelihood of various kinds of family interactions inside the home, with a specific focus on family interactions with media. The survey asks approximately six hundred college students to imagine they are fifteen years into the future, with a family and children of their own. The participants are asked to construct an ideal future home for their family by responding to a series of survey questions about architecture styles and interior design, along with questions about the location and types of media within the home. The conceptual framework for the study is how the structure of the home may influence family interaction. A cornerstone of contemporary domesticity is the family’s collective and private uses of both traditional and new media in the home. The results of my survey will reveal the ways in which our idealization of the physical home mediates the family’s interaction with media.
Alexander J. Crea
Niall P. Stephens (Faculty Sponsor)
Department of Communication, Framingham State University
Visual and Textual Discourse on Gun Control

This paper analyzes textual and visual discourse about guns and gun rights, drawing on a sample of tweets and images from Instagram, originating in early 2016. On the premise that linguistic discourse is broadly rational and visual discourse is non-rational, the analysis explores the interplay of rational and non-rational modes of political communication. The paper is a contribution to our understanding of the implications of digital media for American politics and the public sphere, but it is also concerned with a longer-term move away from print-based, rational discourse and the implications for ideas of the public sphere as constituted by “rational-critical” debate. The public sphere has been transformed by the emergence of social media, in ways that seem to have both positive and negative potential for democracy and democratic discourse. On one hand, social media broaden the possibilities for public participation in debate. On the other hand, they fragment discussion and have the potential to isolate different opinion groups in “filter bubbles”, and ultimately to polarize politics. On one hand, social media facilitate grassroots movements. On the other hand, they enable new forms of state surveillance and control. On one hand, they allow new voices to be heard. On the other hand, they enable a breakdown of civility as face-to-face discourse gives way to a semi-anonymous, virtual forum. These and other concerns are addressed by an analysis that is ultimately concerned with how the “visualization” of debate influences the (ir)rationality of political discourse, the public sphere, and public opinion.
Boston Fashion Week is a weeklong luxury-clothing event that allows for international and local designers to showcase their creations to the general public, buyers, celebrities, and fashion experts. Unlike other global fashion events, Boston Fashion Week is a non-profit event with a low budget that focuses on showcasing mainly local designers. It is evident that Boston Fashion Week needs a strategic communication program in order to address and correct an inaccurate perception. There is a negative perception that Boston Fashion Week is superficial and vain. However, highlighting the philanthropic and charitable events that occur at Boston Fashion Week can rectify this perception. I have conducted research by using framing theory, a public relations technique to evaluate and purpose a solution. The framing theory was completed by collecting previous news articles, as well as contacting media outlets. I have furthered this study by interviewing those who are involved with the nonprofit. This research is needed in order to maintain the organization’s reputation and attract the general public.
The Story behind Animation and Film

Cinema has been around since the late 1800s. It has made its way into today's culture and has improved tremendously throughout the years. There are many different types of film such as storytelling, animation, live action, etc. Film is for everyone and continues to grow with every new techniques and technology, but how is it created? A film needs a lot of work, time, money, and a lot of research to get the effects for each picture.
In Brazilian society today there are two intersecting phenomena happening: homoparental families being broadcast on national television and mass Internet use. They are coming together in that people are using online media platforms to discuss and react to what they are seeing. The topic of homoparental families is a very controversial issue in Brazil and therefore there are various conflicting discourses about the topic. This study looks at these discourses surrounding family in Brazilian society. I am analyzing how people debate the concept of family by looking at the comment section of an online blog (Patricia Kogut) concerning a secondary storyline in the telenovela Em Família (In Family - 2014) that involves the characters of a homoparental family. By doing a systematic analysis of a large number of posts, the study will show how this online population is thinking in regards to these issues as they can shed a light on what kinds of ideas some people in Brazilian society have. This is not an attempt to generalize but to look at a small fragment of a population of telenovela-watchers and online users and see how they are discussing the topics at hand. However, it will be interesting to see how these compare with national studies measuring discrimination and opinions about homosexuality in regards to family.
The purpose of my study is to find out what are the aspects of great sports writing that separates the aesthetics of its style apart from traditional sports writing. I took an in depth look at various sports stories and dissected their unique style and approach followed by a much deeper look at those of which were already considered “great” by the sports and writing community. I had also received face to face feedback from today’s most popular sports writers at a sports writing conference I had attended in Nashville, Tennessee. Storytelling, humanizing athletes, details, unique angles, access, and tenacity are some of which I have explored and defined. I learned that many of these features are what can really draw a reader into the story, keep them interested, and gain an emotional connection; as well as broaden your audience to readers outside of the sports realm. This presentation is to help writers and readers understand the key aspects of these great sports writings and future writings in hopes to shape the future of sports writing in a positive notion.
In film audio and visual aspects are co-dependent. These two characteristics work in unison in order to assist an audience understand a film. This study investigates how visuals impact the way sound is used in filmmaking and why creative sound choices are chosen for certain visuals. My method was to shoot and edit a short silent film and create a wide range of audio tracks that could be potentially used by the participants. Twenty participants watched the silent film then added audio tracks to create a sound mix for this film based on what they saw fit. They answered the question, “Why did you make the choices you did for this original piece of media?” The projects and answers were compared and contrasted in order to see how visual and audio affects each other when making creative decisions. What arose were distinctive patterns within the use and placements of certain sounds as well as the common need for outside assistance. Many of the participants felt confident adding music and sound connected to what they were seeing, such as footsteps, but once there was not a clear connection the individuals struggled to create a connection. This reveals that individuals see a link between audio and visuals and if the two do not match then the film may not make sense. Most of the answers to why they chose what they did revealed that they attached a meaning to what they were viewing and gave an emotion to both the audio and visual. This project gives insight on how visuals and sound cannot work without one another and each is needed to create a connection.
Digital Naturalism

Virtual technology, accompanied with visual effects, have been advancing rapidly over the last decade due to increased efforts in computer engineering and scientific breakthroughs. Our brains’ can tell an alien spacecraft has not touched down in a downtown intersection, but can we tell that the intersection itself is not actually there? In a way our minds make the ship seem plausible because it is interacting with a realistic space. Visual effects are not always as obvious as most people point them out to be. If we have no anchor to reality and are thrust into a given scenario, how could one explain their environment as artificial? While experiencing closure, we miraculously fill in missing fragments, such as a character running between frames in a comic; we fill in the steps the artist did not draw. By studying people to discover the moment they let go of reality and give themselves fully to a seemingly fictional world through the use of video recordings and “reaction videos” from social media sites such as YouTube, I believe visually there is a cue. My theory is that we instinctively lust for a natural world to interact with and if one is not present we will fill in the gaps to make it seem real. We subconsciously seek to preserve a natural world in a digital space when the physical one is being degraded by us in a paradoxical irony. My presentation will encompass this point using naturalistic sound and visual cues along with speaking.
Virtual Communities promote interaction on a globalized level, whether those connections grow from personalities, culture, or interests. My research project focuses on bringing a virtual community to the local level, combining the benefits of a global community with the geographical location a user exists in. The project is based on primary analysis of online examples; such as subreddits based on location, local Facebook groups, and geo-tagged oriented applications such as Yik-Yak and Twitter. After researching the present examples of my topic, I created and managed my own communities online with a focus on local and virtual synergy in the user experience. Through that process I have discovered methods of creating a breeding ground for meaningful conversation in the context of the subject the community has gathered around, and bringing those connections to fruition in a physical sense. By tying a person's identity to their online persona and grounding that identity in physical location and a sense of real world connectivity, discussion and interaction becomes more reputable and productive when aimed toward specific goals. My experimentation focused on hobbies of college students, particularly the most popular multiplayer video game in America; League of Legends.
234  Room 809  1:30-2:15  Panel 4
Victoria Marie George
Peter Laytin (Faculty Sponsor)
Department of Communications Media, Fitchburg State University
War Photographers and the "Truth" Responsibility: The Manipulation, Staging, Fakery, and Editing of War Photography

War has always been one of the most striking photographic subjects since the medium’s invention and though photographs are often considered evidentiary, skilled photographers have always been able to manipulate their images. This paper examines the manipulation or fakery of war photographs, how they shaped viewers perception of news reporting, and the repercussions faced by photographers known to have falsified their images. The researcher gathered examples of photo staging and editing from various time periods and analyzed their significance, impact, public reaction, and historical relevance. In this paper, manipulation is defined as the photographer presenting his/her image as factual proof of an event while exerting an inappropriate amount of biased control or altering the photo in some way. Manipulation in war is examined chronologically from the days of early photography through the digital age referencing various scholarly articles, interviews, documentaries, news articles, and photographer testimonials. Many photojournalists remain strict in their adherence to unedited and unbiased coverage of war. When portraying war, photographs convey seriously grave themes and events that viewers are especially attached too. If a photographer’s personal artistic vision impedes on reporting the truth, then they failed to be an objective observer. This paper argues that with manipulation, these records may not accurately portray these events but they represent viewpoints of photographers involved. While faked war images may seem like an affront to the memories of those involved, studying them allow viewers to see what journalists decided the public needed to know.
Performing arts are a beneficial method of therapy for people suffering from mental illness such as anxiety, depression, eating disorders, Post-Traumatic Stress Disorder, and schizophrenia. Performing arts become a medium of creative communication for those who seek artistic expression and involvement. Using databases from the Framingham State University library, a survey of students from Framingham State University participating in performing arts, and scholarly journals and articles, this thesis seeks to demonstrate how performing arts can help people with mental illness communicate. From this research participants and previous studies have voiced the positive effects of performing arts ranging from feeling like an ambassador for their illness to providing a network of support through common interests. Any mental illness can make one feel alienated from society, yet performing arts is inclusionary and individually focused. Although performing arts therapy has yielded much positive feedback, it is often an active benefit, needing revisiting in order to have long-term effects. The participatory nature and the “team-player” aspect may not be ideal for all peoples suffering from all mental illnesses. However, the overall findings suggest that those suffering from a mental illness, that have a desire to communicate through the arts would mentally profit from actively engaging in theater, dance, chorus, and other expressive arts.
“Let’s Talk About (Safe) Sex”: An Analysis of College Students’ Contraception Communication

Designing health campaigns that more effectively spread information and resources regarding “safe sex” requires knowledge of how students are currently communicating about contraception. This study investigates if, how, and when students at a mid-size university in the Northeast communicate about contraception with their partners. Additionally, identity, relationship, and gender concerns are examined. These analyses take place through the lenses of social desirability and impression management, communication theories that posit that certain behaviors are motivated by a person’s need to be seen in a positive light. Preliminary results indicate that these undergraduate students are communicating with their partners about contraception. The methods or strategies students use to communicate about contraception are varied, with many students citing multiple techniques. Almost all of the students reported discussing contraception face-to-face, and approximately 81% of students report discussing contraception before sex. Finally, students’ answers indicate that gender and identity concerns do not influence their contraception communication.
239  Room 911  2:30-3:15  Panel 5
Luke Herbert Jackson
Robert I. Carr (Faculty Sponsor)
Department of Communication, Fitchburg State University
Applying Elements of Historical Graphic Systems to Modern Graphic Design

Much of graphic design used in modern logos and brand identities heavily rely on literal illustrations of the objects and ideas they represent, much to the detriment of quality of their message. Through exploration of graphic marks throughout history and the anthropological data that accompany them, it became apparent that these symbols convey meaning in a very different way that contrasts with much of the common practices used today in creating and analyzing graphic forms. Graphic systems like the African Adinkra used in Southern regions of Ghana elegantly demonstrate this idea of the use of form. Using abstract form to imply meaning through action and movement can have such a greater impact compared to the literal representation of objects that are often used today. Some especially successful modern graphic logos use this “action in form” approach as well, resulting in strong impact and lasting meaning. This presentation will highlight examples of these historical and modern symbols to analyze how they work to communicate their ideas using this new way of thinking. This approach to graphic messaging through abstract form can have a great effect on how logos and brand identities are received by modern media consumers and how messaging is conceptualized by the makers of media.
In this paper I will explore and discuss the different ways in which I use the internet in my daily life. I will also analyze each of the categories my internet usage falls into. The categories I identified are as follows, entertainment, communication, research and education, general information, and health and wellbeing enhancement. I will identify and describe the way in which these categories define me as an internet user. I will use various resources to support my thoughts about different internet users as well as to help position myself within the mass network of internet media and communication.
Theater is one of the more valuable education options that individuals can easily overlook and the values to a strong understanding of theater and performance are endless regardless of career choice. Theater can effortlessly fall into the distant peripherals of many personalities in modern day who believe that theater is just another skill that can be tacked on but when you look about the psychological effects that the performing arts provide, you begin to recognize the significance. Theater is not primarily grounded in the idea that it is a decoration to add to your already developed skill set but rather it is clarity of body and mind, a support beam to our beings not typically provided by other mediums. This clarity can be translated to success in careers heavily founded in communication as the person with the ability to identify with their own and other individual’s bodies and minds will see more triumphs. We are able to judge a performer’s success in any theatrical production by their ability to transform physically and emotionally. Instances of an ethically good person performing as a villainous character and their chemical makeup changing to fit that character can be seen all over the theater world. On a surface value, these successful actors alter their verbal and nonverbal cues to accomplish their goals but the truly successful actors alter their psychology. What happens to an actor during a performance is the same thing that happens to everyone daily and that is theater’s best kept secret.
229   Auditorium   1:30-2:15   Board A42
Alessandra Francesca Lombardo
Amy Smith (Faculty Sponsor)
Department of Communication, Salem State University
Bold Choices, Fair Pay and Getting a Date: An Analysis of Vogue

In this research project I analyze the Dec 2015 issue of Vogue magazine using a feminist lens, with a particular emphasis on SEARCH (sex, education, age, race, class, and handicap) terminology to guide the project. We walk by these types of magazines everyday but don’t usually think about how much impact they have on our lives or how women are perceived in society. Magazines like Vogue do the exact opposite of what women have been making strides towards; economic, social, legal and political equality. The analysis presented here demonstrates the dangers of allowing media to portray women as objects and dictate societal beauty standards.
248 Room 811  4:30-5:15  Panel 7
Stefanie Marques Jordao
Michael Morgan (Faculty Sponsor)
Department of Communication, UMass Amherst
The Influence of Homosexual Representation in Telenovelas and the Brazilian Modern Family

Telenovelas are the most popular television programs in Brazil and they have a significant impact on culture, society, and family since they portray many different topics and issues that are relatable to the country and to Brazilians’ lives. Telenovelas are portrayed in very realistic ways and the family unit daily gathers to watch them together and bond over the television. Brazil is also a country that has been strongly fighting against homophobia and recently started to use media in an intentional way as a tool to promote awareness and incentivize acceptance as well as inclusion of homosexuals in society. Due to its strong Catholic background, but a substantial open-minded population, Brazil is living in a constant paradox and is using media, more specifically telenovelas, to contribute to the fight for a less homophobic and more accepting country. The main purpose of this research is to analyze how the modern Brazilian family is discussing the topic of homosexuality that is being portrayed on telenovelas. The data come from interviews with about ten Brazilian families, based on questions about television, family, homosexuality, and how they discuss such topics within their home environment. Family is seen as a powerful unit that has a strong contribution to humans’ basic formation into respectful and mindful citizens. According to that, interviewing families and understanding how they specifically discuss the portrayal of homosexuality currently shown in telenovelas is essential to a country that has been strongly fighting for equal human rights.
A sports team defines its success through winning and profit margin. The Major League Baseball team the Chicago White Sox exist outside of that reality due to poor attendance and a failing marketing plan despite having relative success over the past ten years. This project details the shortcomings of the Chicago White Sox’ marketing, public relations, and branding plans that have resulted inconsistent fandom despite consistency in competitive play. This project examines the history of the franchise’s metrics and media presence since their last remarkable success; the 2005 World Series title. The exhibition dissects the media plan and public relations strategy while using the club’s social media history, trends in the club’s metrics and primary and secondary research to outline the White Sox’ struggles in the past decade and offers solutions to fix the holes in the plan through a rebranding and rework of the existing public relations plan. Those troubles originate in deficient marketing and public relations as well as reduced presence in Chicago, the team’s stigma as “the other Chicago baseball team”, and the team’s history of faulty event management skills. This study will interest any person who is a fan of professional sports and those who work in the field of brand management and public relations. The conclusions and results drawn serve as a guide to how to fix and maintain the public perception of a professional sports team.
Etana Matatia  
Michael Morgan (Faculty Sponsor)  
Department of Communication, UMass Amherst  
The Effect of Television on Family Eating Habits

This study examines whether eating dinner as a family and watching television during dinner affects students' nutrition status and perceived body image. This is a cross-sectional study that uses a survey, distributed online, which has been completed by currently enrolled college students. They are asked to answer questions based on the home they spent the majority of their time in over their 2015-2016 winter break. The results of the survey are analyzed based on specific variables. The variables measured are the amount of television watched, whether the television was on during dinner, the family dinner atmosphere, and the foods typically consumed. Consumption of red meat, vegetables, fruit, dairy, fish, grains, meatless protein, legumes, soft drinks, and snack foods have been noted. BMI (body mass index) and body image have been assessed as well. Participants are divided into one of four categories to see which has the best nutrition status. Hypotheses have been made prior to administering the surveys and analyzing the results. The categories are as follows: 1) Eat with family, TV on; 2) Eat with family, no TV on; 3) Eat alone, TV on; 4) Eat alone, no TV on. The results will show how eating dinner as a family affects nutrition and body image depending on whether or not the family watches television during dinner.
For years I have notice a decrease in good comedy films as the years go by, especially when it comes to parody films. I feel that’s bad because a lot of people use to like parody movies because it makes fun of something that everyone either likes or dislikes by using some clever jokes that makes fun of the subject. But now there are many parody films that try to advertise themselves as funny but when people see them they feel like they wasted their time as it was not funny, annoying, or very forgettable and you know what I can’t blame them because it’s the writers fault for not putting effort into them. What I want to do for this project is make a report on parody films I have watched and analyzed and do a demonstration on Parody in movies. I am analyzing what made some parody old and new good and how did it succeed and then talk about the old and new bad parody films that failed hard at trying to make fun of something. I want to find out why people love parodies and by doing this I see what makes people drawn to them. I hope by doing this I could help people understand why we liked parody films back then and why is the film industry failing recently with trying to make good parody movies. I could use film clips to show how parody can be done right and how it’s done wrong.
Our society has changed drastically over the years. We have become very dependent on technology to satisfy our needs. More specifically, we have become dependent on using social and digital media to document and share important events and memories with the world rather than keeping them to ourselves. We have made the switch from analog to digital and also the switch from private to public. This study examines parents’ use of social media in today’s society. The goal is to see if parents have made the switch to documenting their memories digitally and publicly on social media rather than following older traditions that keep memories personal, such as scrapbooking, creating home videos, or developing (or printing out) vast amounts of photographs. This study expands on previous research by conducting an online survey of a large sample of parents. Variables being considered include the age of the parents, the age of the parents in relation to their children’s age, the gender of the parents, which websites are most popularly used, what exactly it is that parents share, how often they share, and with whom they share. One idea of this study is to see if the memories we share help us remember the memories, or whether the images become the memories themselves. The main goal is to determine if parents have become dependent on technology and social media to save and share their photos, transforming the way in which families document their lives and construct their memories.
The media has become one of the most pervasive and unavoidable aspects of culture in the United States. Television, in particular, is a source of daily entertainment for millions of Americans. Cultivation Analysis theorizes about the long term effects that television viewing has on the viewer. Its belief is that the more television one watches, the more likely they are to believe the social reality that is displayed on screen is true to actual reality. Using that as a framework for this study, it is extremely important to know what messages are being dispersed to the public. Gender roles and norms are one of the most socially constructed aspect of our daily culture, and I believe that television plays an influential role in their creation. Erica Scharrer conducted a study “From Wise to Foolish: The Portrayal of the Sitcom Father” which is an inspiration for my own. She found that from the 1950s to the 1990s, sitcom fathers were portrayed as more foolish over time. The aim of my own study is to analyze and discover how both fathers and mothers are being portrayed in United States sitcoms that have aired since 2000. With the completion of this study we will have important information that better equips us to understand the messages that TV sitcoms transmit about typical roles/personalities mothers and fathers are expected to possess.
Some of the most memorable and beloved fiction characters of all time are those of Pixar animation films, and most of those characters are non-human creatures or inanimate objects brought to life. This presentation looks at how Pixar anthropomorphizes non-human characters by analyzing these objects and characters in the Pixar films Inside Out, Wall-e, Cars, Finding Nemo, and Toy Story through a wide range of animation devices that are used to heighten what makes us human that are displayed in these characters and allows them to come to life. Pixar animators use different devices, such as the fluidity or lack of fluidity in movement, accentuated physical features, and little idiosyncrasies, that capitalize on particular characteristics of a character’s personality that creates memorable, relatable characters that have a lasting impact on audiences everywhere. The research for this project was conducted by examining different animation techniques, including the odd moments of anthropomorphizing when they take something such as a fish and have it do non-fish things to make it more human. The significance of this presentation is to showcase the devices that are used to anthropomorphize both inanimate objects and non-human characters in order to learn about these techniques as a means of understanding how this humanization is accomplished. This presentation is not only interesting for fans of Pixar films, but also serves as educational for individuals interested in becoming animators in order to learn the principles of anthropomorphizing, as well as presenting new possibilities of how to anthropomorphize.
Timothy Murphy  
Robert I. Carr (Faculty Sponsor)  
Department of Communication, Fitchburg State University  
Realty's Future is Augmented

As technology develops throughout society, its innovations have always effected and developed the media world. Augmented Reality will be the next great shift in media; this research project articulates all of the prevalent advances in the technology that surrounds and is considered Augmented Reality and seeks to prove the merit of this emerging technological innovation. Through a plethora of ventures into secondary research, and researching the current developments of technology in the field, spanning from project: Google Tango, and Microsoft’s Hololens among other developments I look to see the current application of the technology, and the development of complementary technology. Within this research project I attempt to prove that Augmented Reality is theoretically the next great spike in media development, on a path to be on par with the advent of the radio, television, and the Internet in terms of their effect on how we as a people experience media.
Asians and Asian Americans are extremely underrepresented in American media, and the representations that do exist are often either stereotyped or depict the character(s) as highly “Americanized.” In 2015, two new sitcoms premiered on ABC that each featured an Asian American family - the first shows to do so since 1994. The shows are Fresh off the Boat and Dr. Ken, and they each provide an excellent opportunity to examine how Asian Americans are being depicted in current American media. The current study begins with a qualitative content analysis of both shows to examine how race plays a role (or doesn’t) in the life of the main central family, both in terms of the internal conflicts within the family as well as external conflicts between the family and other characters on the show. Focus groups conducted with Asian, White, and Black college students examine how the depictions of the race of the main central family of each show are interpreted by diverse audiences and to get a sense of the discourses surrounding the depictions on each show. I expect that Fresh off the Boat will have more direct dealings with the ethnicity of the main family than Dr. Ken. However I expect that the discussions of both shows will be equally focused on the race of the main central family in different ways.
216 Auditorium  10:45-11:30  Board A30
David H. Nott
Robert I. Carr (Faculty Sponsor)
Department of Communication, Fitchburg State University
Portraiture Ink Illustration

Illustration being one of the biggest sub categories of art has hundreds of thousands of artist that work in different mediums; my project has focused on 3 successful ink illustrators. This project is based on three conceptual ink illustrators that all implicate techniques that have been beneficial to incorporate into a portrait composition. This piece is the most intricate and advanced portrait I have done thus far while incorporating the three styles I’ve analyzed from the selected illustrators. This project has brought my own style of stippling into the piece along with the conceptual style of Henn Kim, the pen style of Paul Jackson, and the portrait style of Simon Prades. The concept of the project is not to copy their styles but to recreate them in my own way while still keeping the influence present. The portrait composition has been created using Copic multi-liners on 11x14 Bristol board, which is significantly larger than anything I’ve ever done before. One of the key goals of this project was to incorporate a face that is being distorted yet still recognized as the same person. This project has helped to create a conceptual original piece of work that can still be rooted back to the influences. The key component of this project was to dig deeply into these illustrators’ styles and pull out the admired techniques to integrate into my composition while still having a conceptual underlay to the piece.
Since the time of William Shakespeare and the Globe Theatre, minorities have been sidelined and marginalized in popular entertainment. Whether it is because of institutional racism or lack of opportunity, there has, historically, been a lack of ethnic minorities on television, and of Asian and Latin characters in particular. Actors like Aziz Ansari, from Parks and Recreation, and Ken Jeong, from Community, make up a very small percentage of Hollywood, though their racial populations make up a relatively larger percentage of the national population. Coupled with the implicit biases that people develop throughout life, this discrepancy creates a unique viewing experience for television viewers. This experiment aims to understand the relationship between implicit biases held towards particular racial groups and their impact on the overall enjoyment, relatability, and perceived reality for TV shows with ethnic families as the main protagonists. It is expected that the results will show that viewers have a greater preference for ethnically oriented television shows if they have an implicit positive bias to the ethnic group that the TV show is about and a negative one if there is an implicit negative bias. Using the Harvard Implicit Association Test, episodes of two TV shows, and questions and surveys, this study is collecting and analyzing data to provide in-depth examination of the potential relationships between implicit biases and perceptions of ethnic TV shows.
The use of black and white filmmaking is not common in the modern cinema. However, the deliberate artistic use of black and white has flourished in the last few years, implemented in several films including animated features such as Persepolis (2007) and Frankenweenie (2012). Recent notable films that were shot in or converted to monochrome recently include Frances Ha (2012), A Field in England (2012), Joss Whedon’s Much Ado about Nothing (2012), Ida (2013), Inside Llewyn Davis (2013) and Nebraska (2013). Black and white presents strong images, emphasizes form without distractions, enhances texture and uses contrasts to its advantage. In addition, black and white cinematography is capable of transporting the audience to different time, making a particular mood possible to feel, presenting and emphasizing a contrast while being subtle about it, enhancing the focus patterns and textures, or minimizing objectionable content such as gore, suffering or violence. The black and white format has put down deep cultural roots in certain genres and forms of film. To explore the significant reasons as to why people would still choose black and white cinematography, it is useful to review the history of black and white films and the techniques that were developed during the evolution of the media. Technology, economics, human biology and schools of social thought influenced the decision between producing a film color or black and white. This background will help establish the logic as to why notable black and white films are still created when color film dominates the industry.
Is the display of certain nonverbal communication skills essential within the process of obtaining a job and, if so, how much does one actually acknowledge or adjust their own forms of nonverbal communication when interviewing for a professional position? Within this study, the significance of nonverbal communication in regards to interviewing for a job will be closely assessed and is inclusive of all interviewees - no matter the gender, race, age or ethnicity of the individuals. However, as college graduates make up much of today’s work force, this research is mainly focused towards college seniors or recent college graduates who are seeking career employment potentially for the first time in their adult lives. I presume that nonverbal cues do hold certain significance in this process and I believe that women may experience more scrutiny than men do by their interviewers. Questions pertaining to appearance, body language, and time management will be asked of these millennials as well as those who perform the interviewing. Hiring managers and members of Human Resources will be surveyed in order to fully understand whether or not there is a clear set of guidelines one must follow while conducting interviews. Do they consider factors of age, experience, and ethnicity or is every interviewee meant to possess the same amount of nonverbal communication skills? The results of these surveys will then be compared to results from scholarly articles in which favorable and non-favorable communication behaviors in an interview setting are discussed.
While reading Sherry Turkle’s “Reclaiming Conversation, The Power of Talk in a Digital Age” I came across a quote that challenged the way I had previously thought about social media; “We have convinced ourselves that surfing the web is the same as daydreaming. That it provides the same space for self-reflection. It doesn’t” (Page 25). With this quote in mind, I began to understand that there is a gap between online representation of the self, and authentic self-identity, and those who turn towards social media for self-reflection are in the wrong place. These understandings lead me to ask myself “How do we gain insight of the discrepancy between online representation and authentic self-identity (that isn’t an online-self representation).” In order to answer this question, I researched the relationship between individuals and their choice of media. Through my analysis of online and face-to-face surveys, media representation on Instagram, and articles dealing with misinterpretations of media, I have been able to learn about the relationship between individuals and their selection of media for self-representation. My data works together to answer the question “How do we gain insight of the discrepancy between online representation and authentic self-identity (that isn’t an online-self representation).” My data supports my initial hypothesis, which was that representation is not the reality. I now am able to understand the gap, and the thought processes of those who create it. My findings work together to point out the dangers of turning towards social media for self-reflection.
This project defines sports branding within a purely digital space by examining the Esports industry through primary and secondary research, expanding on successful and unsuccessful branding within the space and how to maximize results. The research is based on online surveys, interviewing members of the community, and also personal analysis of each brand’s message, purpose, and style. The study shows that despite lack of physical location, history remains as strong as ever in supporting an online branded team. With the increased access given to Esports players the amount of power individual personalities have to create a brand is largely increased over traditional sports. One of the most important aspects of popularity within this scene, however, is accessibility: by opening up fans to watch their players in limited practice on sites like Twitch, and social media access it provides a sense of socialization that no other sport allows for. The conclusion is that the key to branding within a purely digital sports marketplace is to engage the viewers directly, by getting them involved a sense of a caring community is created that causes increased support. This involvement allows the audience to meet their heroes in ways that traditional sports do not allow and gives a tangibility to the digital world this market exists in. In conclusion the primary way to grow an Esports team is through acquisition of both old and fresh promising talent that is relatable on a personal level.
Colleen Marie Schroth  
Laura E. Osterweis (Faculty Sponsor)  
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**Sweatshop Labor, Mega-suppliers, and Human Trafficking: Empowering Consumer Action through Knowledge, Persuasive Technology, and Pending Legislation**

This thesis discusses sweatshops and their existence in the large-scale apparel industry. Two primary factors are explored as contributing to the use of sweatshop labor: 1) Mega suppliers, manufacturing conglomerates who make it impossible to track the actual factory source of any given item of clothing; 2) Human Trafficking, which allows sweatshop labor to thrive by supplying factories with workers. In search of a solution against sweatshop labor beyond the boycott, this paper proposes the development of a new mobile device application (app) that will empower consumers. Utilizing research from the new field of “persuasive technology,” Manufacture Justice is envisioned as an app that will educate consumers about issues in the apparel manufacturing supply chain and guide them towards legislation that can bring the world closer to the end of sweatshops.
Purpose: Autism Spectrum Disorder (ASD) is a complex neurological and developmental disorder that begins early in life and affects how a person behaves and interacts with others. A notable diagnostic feature of ASD is qualitative impairment in communication. While much research has investigated the social communication abnormalities of children with autism, there is a scarcity of research pertaining to their acoustic-perceptual and motor speech-related abilities. Because oral motor skills are closely linked to speech production, fluency, and clarity, it is vital to determine if speech-related motor impairments exist in individuals with ASD and, if such impairments exist, how they affect the prosodic and vocal qualities of their speech. This study investigated whether children between the ages of 4 to 8 years with ASD exhibit: 1) differences in the prosody and vocal quality of their speech compared to their age- and gender-matched typically developing peers; 2) signs and symptoms consistent with a motor speech impairment; and 3) if a motor impairment is present, how it affects the vocal and prosodic qualities of their speech. Methods: In the first part of the study, spontaneous and elicited speech samples of 8 children with ASD and 8 age- and gender-matched typically developing peers were collected and analyzed using acoustic analysis and motor assessment software. In the second part of the study, a two minute segment of these acoustic samples were randomized and presented for perceptual analysis to 20 trained human listeners (Speech, Language Pathology graduate students) and 20 untrained human listeners (non-SLP graduate students).
COMMUNITY OR PUBLIC SERVICE

253    Concourse  3:30-4:15    Board C98
Anna Pratt Campetti
Kenneth Magarian (Faculty Sponsor)
Department of Advancement & University Relations, Westfield State University
Westfield State Circle K Club

Circle K brings together a diverse group of students and community members who share a passion for service. Through service projects and fellowship events, lifelong relationships are created and sustained. The Westfield State University Circle K club welcomes new ideas and works collaboratively and creatively with students, faculty, and multiple branches of the Kiwanis family to enrich their experiences and their communities. As one of the largest Circle K clubs in the New England District, Westfield State University Circle K welcomes students from the university campus and organizes a vast array of projects in which students can become involved in. The service projects benefit club members, campus members, and the community. The Westfield State University Circle K Club was founded in 1970 by the Kiwanis Club of Westfield, Massachusetts. This club upholds the ideals of service, fellowship, and leadership. Since its origin, the Westfield State University Circle K Club has implemented and sustained service projects locally and throughout the New England District. Some recent projects include the Fifth Annual Westfield City-wide Spelling Bee, Jail and Bail- an event that benefits the terminally ill children and their families of Camp Sunshine in Casco, Maine, and Breakfast with Santa- which benefits local Shriner’s Children’s Hospital. The Westfield State Circle K club also supports the Autism Speaks Organization and the Kiwanis Pediatric Trauma Institute in Boston on an annual basis. Another big event within the Westfield Community is HOOT Day. In this event, Circle K members and other volunteers create small teams and provide services for local businesses. Groups take part in activities like landscaping, organization and filing, painting, and other various tasks. Students of Circle K of Westfield State University stand for their motto: “live to serve, love to serve”.
Reyes House Access to Healthcare began as a City of Worcester Community Health Improvement Plan WSU summer internship. The purpose was to collect data on what is truly available to those who struggle with substance abuse or mental health. Once the information was gathered, the next step was to take our findings and create a comprehensive listing that could be shared with social service agencies of Worcester and turned into learning materials for the men in recovery at the Hector Reyes House. Over summer 2015, phone calls and visits were made to various locations that offer mental health and substance abuse services. What they claim to offer and what they truly offer differed, sometimes dramatically. Waitlists were months out, there were no Spanish-speaking clinicians; even a doctor calling to make a referral was waitlisted. The results speak for themselves; some in dire need found frustrations, hassles and roadblocks while desperately looking for help. The most important deliverable of this study is the construction and delivery of a health care module for Reyes House. The men are reintegrating into society and need this information to be self-sufficient and remain sober. They will learn how to choose a primary care physician, where they can go for different types of care, and basic insurance information. Due to language constraints, the workshop was created with ESL adult learners in mind. With the completion of these modules, the men will be empowered as the next chapters of their lives begin.
Police body cameras have been a widely debated topic brought to light by the many lives lost in officers’ hands in recent years. Currently, many places around the United States and other countries have implemented body camera usage on police officers, or have started the process of obtaining this technological tool. However, it has yet to be made a federal law, so people can opt out of wearing them. Police should wear body cameras because the footage can be used as evidence, it can strengthen the relationship between police and civilians, it causes the use of force used by officers to decrease, and more. Through the use of survey(s), newspaper articles, magazine articles, scholarly journals, and more, this paper will examine more in depth why police should wear body cameras. Statistics, examples, and facts will be pulled from these sources to strengthen the main point. Statistics will show most people support the use of police body cameras. This paper expects to find that the use of police body cameras help court cases be more transparent. It also builds trust and respect between police officers and civilians. In addition, force used by police officers decreases and civilian complaints go down. The expected results are significant because it could open up a pathway for people to realize the importance of body cameras on officers, and encourage more police departments to implement body camera use by their police officers. In addition, it will improve the relationship between civilians and police officers.
Human trafficking is a form of forced migration that is ignored by the media, and by political pundits. The FBI task force in charge of handling cases of human trafficking is underfunded and inundated with cases, causing many criminals, such as pimps and dealers, to flourish within the United States. The sex industry is the largest consumer of modern day slaves, contributing up to 80% of the human trafficking market. This $32-billion industry of sex trafficking mostly targets girls, the majority of whom are forced into a life of slavery from the ages of 12 to 14. This paper examines the behemoth sex-slave trafficking industry that is prevalent within the United States, while in plain sight, to most people.
Shaken Baby Syndrome is the most deadly form of child abuse and is preventable with education. Shaken Baby Syndrome, sometimes referred to as abusive head trauma, is the term used to describe the intentional injuries to an infant or toddlers brain after shaking the victim back and forth. This trauma usually occurs when a parent or caregiver who has becomes frustrated and angry with a crying baby shakes and infant in violent back and forth motion in an attempt to stop the crying. Encephalopathy, subdural hematomas, and retinal hemorrhage in combination is referred to as the triad of Shaken Baby Syndrome. There is no treatment for Shaken Baby Syndrome. Treatment is often symptomatic. If the infant does survive, lifelong treatment is often necessary. Often times the victims are left with physical and mental impairment that leaves them unable to live a quality life. It has been found that the best way to prevent Shaken Baby Syndrome is by educating the at risk population. The first and most important thing to remember in preventing Shaken Baby Syndrome is babies cry and that’s ok. It is in no way a reflection of you or your care, so don't take it personal. As a conclusion to my research, I have created a public service announcement that will be used local high schools to educated potential at risk young parents. It has also been given to several state agencies in Connecticut to use as they see fit.
The University of Massachusetts Amherst spends millions of dollars on water and electricity utilities annually. For students who live in on-campus dorms, payment for utilities is not contingent upon their individual usage. Thus, there is no inherent incentive to conserve water or electricity. Wastefulness of water and electricity contributes to issues locally as well as globally, such as increasing costs for the University, adding to pollution, and water shortages. The goal of this project is to contribute a solution to energy and water wastefulness by designing a program that promotes conservation in student dorms. By administering a survey to on-campus students, a preliminary assessment of attitudes and behaviors with regard to conservation will be conducted and opportunity areas will be identified. We will then propose and evaluate three distinct programs that promote conservation in student dorms. The programs will be informed by behavioral theory about methods that have proven to be effective in encouraging conservation. Programs will be evaluated on the following criteria: economic benefits, enforceability, simplicity, and compliance. Tools, including cost-benefit analysis, a survey to gather student reactions, and meetings with school administrative bodies will provide information to evaluate our targeted criteria. After evaluating the merits of each program, we will make a recommendation as to which option is the most promising for the University of Massachusetts Amherst to pursue.
Community Policing is an ideological shift of how police departments carry out their policing and structure their ranks. Ever since the philosophy of community oriented policing became widespread in the 1980’s and 1990’s, public opinion and police opinion has been of top importance. A change like this affects every citizen in the United States since the police oversee the general public which only brings more importance to the research. Numerous sources of public opinion reviews, departmental reviews, and articles on why the public may view community policing as positive or negative will be used. Also, benefits to both police and community by operating a police department under community oriented guidelines will be discussed. Using scholarly references from the top journals on police studies, the presentation will clearly demonstrate how both the public and police overwhelmingly view community policing as a major benefit to both sides. These results are important because they provide evidence that switching to a community oriented policing system improves police/ community relations, reduces fear of crime, improves job satisfaction, improves departmental efficiency, and more.
COMPUTER SCIENCE

265   Auditorium   1:30-2:15   Board A15
Ayman G. Alotaibi
David Souksomphang
Bo Jin Hatfield (Faculty Sponsor)
Department of Computer Science, Salem State University
CIE Event Task Tracking System

A database-driven web application that allows an administrator in the CIE (Center for International Education) of Salem State University to post event jobs and allows students to sign up volunteering for the posted jobs. This application helps the personnels of CIE to get their jobs done more efficiently during the course of the year. This application will eliminate all the inefficient work that is currently conducted manually. Most up-to-date web application development techniques were used during the development of this application.
Secure Orbital Detection Array (SODA): A Case Study to Secure the Internet of Things

Connected smart devices are projected to surpass the 50-billion mark by 2020. The emerging Internet of Things (IoT) will network these miniature, and often low-cost, devices to perform large tasks. This research evaluates security vulnerabilities to the IoT or Cyber-Physical Systems and devises mitigation solutions. It focuses on securing a specific IoT that monitors “space junk”. Having high orbital velocities, “space junk” poses a risk to astronauts and satellites. The system under design is referred as the Secure Orbital Detection Array (SODA). An IoT of orbital sensors to detect, model, and predict trajectories of space debris could be targeted by an enemy government, terrorism network, or politically-motivated hacktivists. At the frontline of defending such an IoT, devices will need to authenticate with one another. While current PKI authentication methods such as SSL/TLS have been proven effective in traditional client-server networking implementations, emerging Zero-Knowledge methods like Goldreich-Micali-Wigderson (GMW) may be a better solution for this form of machine-to-machine communication. Additionally, data communicated among the sensors/processors should be encrypted to prevent interception and/or manipulation. Existing encryption algorithms (like RSA and AES) can provide adequate protection with sufficient computational resources, although Elliptic Curve Cryptography (ECC) might eventually do so more efficiently. In this study, SODA has been designed from the initial phase with security as a primary design concern. Through this study, networking defense options for the IoT have been tested and evaluated. This knowledge can be applied to future IoT designs. Further analysis will be conducted on IoT performance-security tradeoffs.
Inventory Control System for Small Businesses

If a business requires maintaining an inventory, it might sometimes feel like the business is walking a tightrope. Not having enough inventory means the business run the risk of losing sales and having to turn away some customers. On the other hand, having too much inventory is costly in more ways than one. The longer an item sits unsold in your inventory, the greater the chance it will never sell at all, or, at least, the business will have to discount it deeply. That is why having an efficient inventory control system is so crucial for businesses. As a result, I am presenting an Inventory Control System that will assist small businesses in tracking and managing their inventory across a single or multiple locations. The system will allow its administrators to define multiple user accounts and restrict user access so that no user has more rights than their job requires. Moreover, the system’s administrators will be giving the ability to define specific reordering thresholds for specific products and generate purchase orders to replenish the stock. Finally, the system will allow its user to generate meaningful reports based on a predefined set of criteria and will also supported multiple languages.
Effective October 1st 2015 the transition from magnetic strip credit cards to chip enabled credit cards, called EMV cards, began. The EMV system is designed to reduce credit card fraud. This payment system is relatively new to the American consumer with many credit card companies still issuing credit cards equipped with this new technology. The way in which College Students would react to this new EMV technology and the level of confidence they have in EMV technology is the purpose of this study. To assist in answering this question a survey was conducted asking Framingham State students what they thought of the new EMV system. The participant will first be asked a series of questions in order to establish a knowledge baseline. The following section gives the participant a brief overview of this technology. The respondent would further be asked an additional set of questions to assess their level of comfort shopping with this new technology. The survey is designed to measure the students’ perception in terms of safety, versatility, and usability with the EMV system. Since the transition has only been in place since October 2015, this research should act as a stepping stone for future studies about consumer transition to EMV technologies in the United States.
Rachel Pacheco da Silva
Mark Hone
Karen Druffel (Faculty Sponsor)
Department of Business, Framingham State University
Two-Factor Authenticators: Understanding and Describing Authentication Methods

As technological advances alter the way data is accessed and transferred, the potential for unwanted data exposure by third-parties increase. As the market is intensifying the demand for network, personal computers, mobile devices and internet security, businesses have started to adopt two-factor authenticators to ensure that data exchanged between customers is secure. This research will focus on internet security by understanding how two-factor authenticators operate and how well they are accepted by today’s Internet users. We will describe the function of the most popular two-factor authenticators and survey diverse Internet users to understand how these authenticators affect them. This research will consist of both primary and secondary resources, with the former (first-hand) being data coming from above mentioned surveys and the latter from peer reviewed scholarly journals. The above methods will support this paper’s empirical description of two-factor authenticators, as well as their economic impact, functionality and efficiency to prevent breaches that may result in data loss with the objective to present results that identify the cause of two-factor authenticators’ increase in the market trend.
Artificial Intelligence has already begun to take a large place in our daily lives from text messages to loved ones to self-driving cars. Nor can modern college students avoid utilizing search engines and spell check. However, we cannot escape the quantum effects associated with Moore's Law: electron leakage through quantum tunneling will potentially put an end to our current growth rate of computing density. Quantum computers are shaping up to be the next big advancement in computation enabling once impossible calculations to be efficiently handled. This research will show the merging of two developing fields: quantum computing and machine learning. Together, they form a new field called Quantum Machine Learning. The quantum computer’s qubit provides many benefits over its classical bit counterpart and may be harnessed for machine learning. This research will show the utility of machine learning and the potential benefits that quantum hardware will provide.
In some countries, the government censors the Internet so that they can control the content that can be accessed. Reasons for such Internet censorship may vary from trying to achieve a political agenda to ensuring that an oppressive regime is upheld. Despite this, people who live under these conditions may choose to use a Censorship Circumvention System so that they can access the Internet more freely. A Censorship Circumvention System will only have meaningful impact against censorship if it is readily available to users. The availability of a Censorship Circumvention System partly depends on how deployable it is; the easier it is to deploy, the easier it is to make it more available. This paper provides proof-of-concept work that it is possible to implement a SWEET server in Node.js so that it can be deployed on a microcontroller board to function as a relatively cheap, easily deployable censorship circumvention system.
Many people in the modern world have smartphones. Smartphones can store valuable personal information such as, social security numbers, medical information, passwords to bank accounts, etc. With the possibility to have this kind of personality information stored on a phone the phone developers have put in numerous security features to protect your phone. Many people are aware of the password protection and swipe pattern locks. However there are other security options with more functionality built into them. Examples of what smartphone manufacturers have recently begun doing is add new security features such as finger print scanning and facial recognition. Now instead of entering in a number or drawing a pattern you can actually scan your finger to unlock your phone. You can even use the finger print scanning to access other secure accounts such as signing into bank accounts. The purpose of this study is to find out how aware people are of the various capabilities of security on their smartphones. We used a survey to measure the number of smartphone owners who are aware of their smartphones security features. Finally we administered surveys to about 120 people and have presented our analysis with the results.
Learning a programming language can be a daunting process for students in introductory Computer Science courses. To increase the efficiency of the programming process and reduce the learning curve, we developed a tool that displays a palette of code-snippets of the most commonly used statements in programming languages. The code-snippets can be dragged from a palette and dropped into a source code editor. After the code-snippet is dropped, a window with an intuitive interface is displayed onto the screen, which provides options to apply any customizations to the code-snippet. This tool was presented to two Computer Science classes, Computer Science I and II, which utilize the Java programming language. To measure the effectiveness of the tool, surveys were conducted both prior and subsequent to the student’s exposure to the tool. The first class, Computer Science I, does not require any prior programming experience; therefore, the initial surveys checked for any prior programming experience, their interest in programming, and their willingness to use the tool. The surveys for the second class were very similar to the first. However, prior programming experience is a requirement in Computer Science II; so in addition, we conducted a closed-book, paper test on programming syntax. The purpose of the test was to determine how much the student’s knew without utilizing any references. Finally, the follow-up surveys for both classes measured the effectiveness of the tool based on the user's experience.
266  Auditorium  1:30-2:15  Board A16  
Joseph Frederick Harris  
Bo Jin Hatfield (Faculty Sponsor)  
Department of Computer Science, Salem State University  
Patch Panel Mapper  

A database-driven web application is proposed to help an Information Technology department to better manage network wiring closets. The proposed major functionality of this application covers (1) creating new patch panel maps; (2) retrieving existing patch panel maps; (3) editing existing patch panel maps; (4) deleting obsolete patch panel maps. The benefits to be gained by the proposed application includes streamlining the documentation of connection paths and reducing related human errors.
Over the past 20 years, password requirements have become more and more demanding, leaving the average consumer in a tough situation. Users are finding it more difficult keeping up with the requirements, so much so, that they tend to have a negative effect on user behavior; most users end up reusing passwords, or simply have passwords that are not strong enough. Password managers seek to eliminate the problems left with these increasing demands by taking the problem of memorization out of the user, and putting it into the software. Instead of memorizing 25+ unique passwords, users only need to remember 1 password to open a "vault" with the rest of their passwords. This type of software does a great job of managing passwords, however, usability and adoption of password management software is still low. Our research seeks to find out why users resist adopting such software. We plan to survey UMass Boston students during classroom time to figure out their beliefs in regards to trust, necessity, usability, and security of password managers. The questions will have been formulated and slightly edited from questionnaires from prior papers related to these topics. On the basis of the outcomes of our research we seek to provide recommendations to companies and users that would facilitate adoption of password managers.
User Interface Action Buttons Tested: Avoid the Floating Action Button?

The Floating Action Button (FAB) was popularized by the release of Google’s Material Design principles in 2014. Since this release, the prominent FAB user interface component has been widely adopted in web and mobile user interface design. However, the effectiveness of the FAB has been a controversial topic in the user experience design community. Albeit, there is no research based evidence validating user experience implications of the FAB. This study addresses the user experience implications of the FAB. This is done by building two nearly identical native iOS applications. The only difference is that one application implements the FAB to achieve an action, whereas the other implements a classic user interface component to achieve this same action. Usability data is generated by employing industry standard user experience testing methods based on Nielsen Norman Group quantitative usability testing approaches. In order to get a tight confidence interval on quantitative metrics such as success rates, time on task, as well as satisfaction scores, 20 user tests are performed on each application. Comparison analysis of this data generated from each application exhibits the user experience implications of the FAB component.
262    Room 162    11:45-12:30    Panel 3
Parker Kahn
Bo Jin Hatfield (Faculty Sponsor)
Department of Computer Science, Salem State University
2 Down Defender

An anti-theft motorcycle system has been developed. The system consists of three components: an embedded system on the bike, a mobile app, and software on a remote server. Once the system is locked intentionally for the protection, any moving motion of the motorcycle will trigger an on-board camera mounted on the embedded subsystem to initiate a sequence activities, such as pictures get sent to a remote server, a notification gets sent to mobile phone(s), etc. Tracking the path of where the motorcycle is being taken is also part of the desired features.
In the last few years, cloud computing has moved from being a concept for convenient information storing to being one of the most requested services in the IT industry. Many businesses have adopted the practice of storing large quantities of data in the cloud as it can conveniently be accessed from any location through any internet capable device. This ease of access attracted the attention not only of large businesses but also that of individuals. Apple Inc. for example, offers free cloud storage for individuals who purchase and use their iPhone, allowing them to store and access their pictures and other information from any other device and in the event their phone is lost or stolen, the information stored on the cloud remains intact and available to its owner. This increase in the practice of personal information being stored using cloud technology, naturally, raises the question of how secure the data and information stored in the cloud really are. The cloud service providers are persistently working on ways to insure the safety and security of the data their client’s store, but nevertheless security issues and the possibility of a security breach still persist. In this research paper we focus on the individual user. We gathered information from academic articles and surveyed thirty people at random who use cloud services to determine how secure people believe their personal information is while stored in the cloud and why they trust their information is being kept safe.
Using Flexible Open-Source Programs to Estimate Future Projections of Urban Tree Benefits: A Case Study in Amherst, MA

Inventories of urban tree populations and affiliated analysis software are valuable, contemporary tools in use by municipalities across the globe. While software that allows users to explore the values and benefits of discrete urban tree populations may be readily available, capacity to model and project tree growth is limited. Using existing urban street tree inventory data from Amherst, MA (USA), a generic platform for tree growth modeling was developed to be implemented by the user at the source code level, called ‘Xylem’. Small (i.e., Agile) programmes like this provide a fast-working, extensible platform to generate tree growth projection data that can be delivered efficiently to the end-user. The Amherst case study offers an example of how programs written in Python 2.7 have application and can be readily customizable, to add value to existing tree inventory data.
Accessible Transit for the Visually Impaired

The goal of this project is to improve the quality of life of blind and visually impaired (BVI) users. Specifically we designed an application that helps the BVI community plan a trip using public transportation. 3.8 million working-age adults in the US have some visual disability. For those people, employment is only at 40%. BVI users only means of independent travel may be public transportation such as buses. Therefore, it is imperative that BVI users have access to this environment. An easy to navigate transit system can increase someone’s independence and quality of life by providing them the ability to work, study, and play. Several smartphone applications already exist to make public transportation accessible. All of these apps, however, have one thing in common: they handle the trip in real-time. There is no tool that enables BVI users to plan a journey. My objective is to implement an Android app that provides the BVI user the ability to plan a trip using a non-visual interface. Using Google Maps API and PVTA Bus Tracking interface the application will determine the best path from the user’s location to their destination. For example, it will determine the route to the nearest bus stop, the bus to board and how many stops to ride, and will offer multiple route options based on user inputs, including arrival time. The application design follows the principles of universal design. The interface relies on text, rather than imagery, so it is operable with low or no vision.
269  Concourse  2:30-3:15  Board C95
Julian P. Nanton
Taylor J. Cahill
Jillianna Southard
Karen Druffel (Faculty Sponsor)
Department of Business, Framingham State University
Cyberterrorism and College Student Awareness

Cyberterrorism has become a noticeable threat to national security in today’s interconnected world. With a platform that enables communication, recruitment, and exchange of information, the Internet has become a reliable tool for terrorist groups. Cyber-attacks also known as cyberterrorism, are politically driven use of computers and information technology to cause severe disruption and instill fear into society. Today, college students in the United States frequently use the Internet in their daily lives. Due to their heavy presence on the Internet, college students have the potential to be affected by cyberterrorism. For our research, we will be studying if college students are aware of what cyberterrorism is and the potential risks they can face. In order to conduct this research we will first point out the risks college students face from cyberterrorism. We will then pass out surveys to 50 randomly picked students at Framingham State University in order to collect data on student awareness of cyberterrorism.
Lazy State Estimation

Robots are constantly (re)assessing their state within the world around them in order to plan actions. This process is subject to uncertainty from noise on the sensors, suboptimal sensor geometries, unexpected environmental dynamics, etc. Typically, planned actions must satisfy multiple objectives at the same time, but the sensitivity of these objectives to uncertainty changes continuously over the course of a task. For example, the sensitivity of performance to precise position information is relatively low when traversing a large open field, but is relatively high when moving down a crowded sidewalk. Inefficient schedules for updating state information can waste computational resources and starve critical control objectives of the information they need to operate safely. Traditional techniques rely on estimating the state at a fixed interval. For my research, I am exploring a concept called Lazy State Estimation—a framework for allocating resources to state updates by reasoning about how CPU cycles yield the biggest impact on the overall performance of the robot. Lazy State Estimation looks at the requirements of the task, uncertainty, and the sensitivity of system performance to imprecision to make decisions about situational awareness. We hope that the result will lead to higher-level performance in resource bounded systems.
Software is complex and difficult to understand, yet it is pervasive in our lives. Software testing is an industry standard for improving software quality. Software bugs are common, and the current industry standard for finding bugs require arduous labor as developers have to manually inspect the system or write tests to find the bugs. Ponzu is a tool that takes a System Under Test’s (SUT) observed execution and generate behaviorally novel executable test cases. Ponzu uses the approach of model-based testing, where test cases are generated from an abstract representation of the SUT, created by a combination of model-inference and dynamic-invariant-mining techniques.
My research concentrates on the types of features that users would like to see in the software for a device that provides quantitative data of head-on collisions in contact sports. The prospective users of this particular implement are athletes, coaches, parents of athletes and medical professionals. The essential problem is that pre-existing comparable products are not accurate enough and are often programmed to detect only the most severe collisions, therefore, users have communicated their dissatisfaction with these products. The Pressure Analysis Company, a proprietorship in Albuquerque, New Mexico is creating a product called the SmackCAP, which will combat the incompetent products in the current market. The SmackCAP is a sensor patented, skull shaped, net-like apparatus that is stitched into durable, breathable fabric that provides objective data recording both the intensity and exact location of impact. My research will investigate which software commodities are not providing the most coherent data, the likes and dislikes of competitors’ software, and which features users crave given the data the SmackCAP provides (number and intensity of hits to the head). The comprehensive objective of this product is to eliminate the substantial percentage of athletes globally who suffer from Chronic Traumatic Encephalopathy (CTE), a chronic brain disease. CTE results from repeated or sub-concussive hits to the head. Contrary to conventional wisdom, each and every hit to the head inflicts harm on the athlete’s skull and brain. This disease can not only terminate an athlete’s career, but it is also fatal in most extreme cases.
Johnny Tian-Zheng Wei
Varan S. Culanathan
Andrew McCallum (Faculty Sponsor)
Department of Computer Science, UMass Amherst
Automated Domain Specific Knowledge Base Construction via Crowdsourcing

Extracting domain specific knowledge poses a set of unique challenges to current information extraction methodology. While some have explored information extraction through crowdsourcing, practices and guidelines for accurate and efficient systems remain inadequate. No solutions to the extraction of free text or documents has been offered. Our work focuses on extracting researcher’s CVs to populate a knowledge base of researchers with their gender, relevant work experience, and their advisors. We accomplished this through the design and implementation of a system utilizing Amazon Mechanical Turk. Using the iterative paradigm, we divide an expert task into a two stage pipeline. This paper outlines and analyzes the workflow design of two specific tasks in each stage of iteration. The first stage involves tasks identifying relevant documents of researchers that provide rich, structured information. The second stage involves tasks extracting lists of work experiences from these relevant documents. Our results contribute an open dataset of 5000 researchers in 20 computer science schools to enable other researchers to possibly model for expertise and answer important questions in social science. With ground-truth labels from our collaborators, we were able to show that each stage of our iterative pipeline had accuracies exceeding 90%, with an expected 80% accuracy for the full system and resulting dataset. The observations and insights gathered from our development process can be generalized to other list extraction tasks as well as information extraction tasks of key documents, ultimately to construct knowledge bases in other domains.
263 Auditorium  1:30-2:15  Board A13
Alexander Winnett
Jason Roush (Faculty Sponsor)
Honors College, UMass Boston
Designing a Robust Prediction Pipeline for the Identification of Phenotype-Controlling Single Nucleotide Polymorphisms

Current methods of determining which genes affect an organism’s phenotype require extensive physical experimentation. We develop an efficient computational-genomics based pipeline for the prediction of phenotype-controlling genes by exploiting the effect of non-synonymous single nucleotide polymorphisms (SNPs) within different ecotypes of an organism of interest. The pipeline first identifies protein-coding features within a region of interest on the genome of the organism of interest, then performs a Position Specific Iterative Basic Local Alignment Search against a local database of all annotated plant genomes. The PSIBLAST hits are then aligned using the Probabilistic Consistency-based Multiple Sequence Aligner (ProbCons), followed by the Structural EM Phylogeny Reconstruction Tool (SEMPHY) to map the relatedness of the hits. Finally, Multivariate Analysis of Protein Polymorphisms (MAPP) is employed to predict, based on sequence conservation, phylogeny, and physiochemical properties of the amino acid sequences, the functional impact of a mutation at each position within the amino acid sequence of that protein coding feature. The sequence of the original ecotype is then parsed to identify SNPs that are predicted to significantly impact the function of the protein. Using empirical sequence data two variants of the model organism Arabidopsis thaliana, the pipeline was designed, validated with a test case, and then used to identify a phenotype controlling genetic feature within a broad Qualitative Trait Loci (QTLs) observed through previous experiments. Following design and validation with Arabidopsis, a package was developed for Lactuca, which was then used to identify candidate QTLs to aid in the annotation of the Lactuca genome.
Storytelling is one of the most ancient and commonly used contexts of communication through language. Stories are often used to convey information about a series of events, while stressing a central theme. In particular they have the potential to engagingly portray an experience through exaggeration and embellishment. This gives stories their descriptive quality to compensate for the lack of visual aids. Just as humans use stories to illustratively communicate with each other, so too should computer systems. Practical applications of this could be used in education and/or entertainment just as a fable can teach and entertain. This project aims at developing an application to create interactive stories. By thinking of stories as graphical structures we can consider their attributes and properties. The vertices of the graph will represent sets of related keywords, while the edges define their sequential order. For example a chapter about climbing a mountain may contain the set “Boulder, Tree” followed by the set “Peak, Snow.” Natural language generation techniques are used to construct a sentence that conveys the information within the vertex, in the latter case “the PEAK was SNOWY.” User input can be considered to navigate through the graph, which changes the outcome. The story will end with a coherent and satisfying conclusion once the graph is traversed. Through this technique the system can present the user with all the information within the graph, while holding their attention throughout the process.
Why study the relationship between economics and language? In the context of globalization, this question takes on greater relevance given the increase in interaction between peoples that speak disparate languages. Conventional wisdom holds that a positive link exists between English language capability and the strength of an economy, typically measured by total factor productivity. The objective of this paper is to build a model in the spirit of the Nelson-Phelps (1966) treatment, which proposes that productivity is a function of human capital and distance to the ‘technology frontier’. The adaptation of this model will be used to assess whether or not there is a positive relationship between a country’s aggregate English language ability and its adoption of technology. In order to test the model, this study will regress total factor productivity, which is widely taken to reflect a country’s level of technology, against TOEFL scores in selected countries. The empirical analysis will control for other factors that could influence total factor productivity, including location, population, overall level of education, and foreign direct investment. Preliminary evidence suggests that TOEFL scores will be a statistically significant factor. This would confirm the hypothesis that aggregate English language ability positively affects technology diffusion.
289  Room 917  2:30-3:15  Panel 5
Vaughn Christian Bradstreet
Dorothy R. Siden (Faculty Sponsor)
Department of Economics, Salem State University
Myanmar's Rise to Economic Power in Asia

This focal point of this work is to survey what events fostered the environment that enabled Myanmar to effectively break out from its former turmoil and stagnation toward genuine economic stability and growth. Research from IDE (the Institute of Developing Economies) a functional branch in association with JETRO (the Japan External Trade Organization) is a superb source for this topic. Without bias, this organization is close to the regional issues and has the potential to provide a more comprehensive analysis. Also valuable is their commitment to provide greater insights into specific regions by integrating a local perspective with their findings. The Wall Street Journal is another source for quality analysis regarding this subject, currently there are a few articles but I expect the number to grow rapidly as investors and corporations find renewed interest in Myanmar. No doubt much of the analysis will hinge upon discussion of the political reform in Myanmar of late, which in fact is critical and should not go without mention. A recurring theme is Myanmar’s GPD growth (organic and via foreign interest) measured at its current level and its projected level compared to its Asian neighbors, ultimately showing potential to outpace China’s GDP in the future.
This study investigates the relationship between presidential political parties and stock market performance in a panel data set consisting of two major indexes (the S&P 500 and Dow Jones Industrial Average) over the period 1965-2012. As the current year (2016) represents a presidential election year, much interest has been garnered on a global scale as to what effects a potential party shift (from Democrat to Republican, or vice versa) or extension will have on the economy and society. Will previously mandated policies be altered or extended? Or will radical change ensue? It is the potential that such changes, or a lack thereof, will have beneficial or adverse consequences on a nation’s economic health and stability that concerns investors. Previous research has observed that stock market returns seem to be affected by economic policy originating in Washington. As such, the goal of this study is to examine whether market performance is greater or less robust under different party tenures. Several political, macroeconomic, and financial independent variables were utilized in regression analysis, with the dependent variable being the difference in each index’s overall return when compared to the previous tenure, represented in percentage terms and adjusted for inflation using 2012 dollars. The analysis revealed that higher stock returns are typically concomitant with Democratic tenures, while performance may be hindered under a Republican administration. This does not mean that the market will be negative under a conservative president, just that index overall returns won’t be as significant.
This paper analyzes the relationship between crime rates and several socioeconomic factors including poverty, unemployment, education, and demographics using data from the fifty largest United States cities. With data gathered from multiple sources including the U.S. Census Bureau and Federal Bureau of Investigation, the authors will estimate the relationships between the variables via regression methodology and conclusions will be drawn about each of these factors and their influence on crime in United States cities. First we undertake a literature review and investigate previous research by economists such as Jesse Brush, Lance Lochner, and Enrico Moretti, to determine which variables should be included in our empirical model and then we will run the regressions to try to find statistically significant determinants of crime rates.
After three decades of unprecedented growth, the People’s Republic of China finds itself in a position to engage emerging-market countries in substantial programs of foreign economic assistance. Vast increases in China’s annual foreign-aid expenditures from 2001 ($1.7 billion) to 2011 ($189.3 billion) may indicate a change in China’s overall economic strategy. In recent years, Chinese leadership has increased both the number of and public promotion of aid agreements, which culminate in their larger One Belt, One Road (OBOR) Initiative—an ambitious plan that involves 55 percent of world GNP and 70 percent of global population. Using scholarly literature on Chinese economic assistance programs in various countries, reports from U.S. Congressional Commissions, and White Papers from the Chinese government, this paper reviews the evidence to establish a clear model of how the Chinese approach differs from traditional Western foreign aid models. This paper then analyzes recent news articles about OBOR programs to conclude that China, especially in the context of OBOR, pursues programs of foreign economic assistance to grow its own economy. Therefore, China now ties part of its future economic success on its ability to export development projects through OBOR, and these projects will likely have important regional and global consequences worthy of future critical analysis.
Recently the stock price for Solar City, one of America’s largest solar providers, fell significantly from a 3-Month high of $57.26 to $21.62 due in large part to guidance not foreseeing a cut in Nevada’s subsidy rates. This legislation has rendered solar usage in Nevada unprofitable, causing the Elon Musk funded company to lay off 550 workers in the state. With the recent UN COP21 Paris Agreement in mind, seeking a way to maximize sustainability by 2050 is of the utmost importance. These rates, obtained from the public utility companies, act as a sort-of supply for the Solar Industry; the goal being to either raise or lower the use of solar energy. On the other side, solar usage as provided by the Solar Energy Industry Association is a clear indicator of demand. Solar subsidies not only affect our wallets through government intervention on the market, but also aid in slowing a case of the tragedy of the commons. By comparing and analyzing this data, I seek to answer what the state of the Solar Industry is today and how we can maximize it for tomorrow.
Robert George Flanagan  
Diane Patricia Flaherty (Faculty Sponsor)  
Department of Economics, UMass Amherst  
An Analysis of the Environmental Impact of Foreign Direct Investment in Developing Countries: Halo, Haven, or Static?

This thesis examines the impact of Foreign Direct Investment (FDI) on the air quality of developing countries of varying income levels. The pollution halo theory proposes “spill-over benefits” to the FDI-receiving country’s environment from improved technology. The conflicting pollution haven theory is defined by a “race-to-the-bottom” in which FDI-receiving countries with the weakest environmental regulations attract FDI, resulting in environmental degradation. The research is based on two strategies: (1) an empirical analysis of data from 2004 to 2008 for approximately 80 countries to assess the presence of halos and havens and (2) a detailed analysis of trends identified in the literature. The empirical analysis employs a pooled OLS regression to identify the impact of FDI on SO2 and CO2 emissions. Both the FDI and emissions data are collected from international databases. The FDI data are unique in that they are disaggregated by sector and span countries across a broad income range. This allows the analysis to capture relationships that are hidden in past studies focusing on either aggregated FDI data or countries of a homogenous income level. This thesis contributes to the literature by highlighting the specific role of the sector receiving FDI, as well as the income level of the FDI-receiving country, in assessing the impacts of FDI on air quality. The results are expected to reveal a pollution haven in lower income countries receiving FDI from “dirty” sectors, while a pollution halo is expected in higher income countries receiving FDI from “clean” sectors.
Evaluation of Currency Devaluation through Trade Networks

This paper aims to examine currency devaluations with a primary focus on trade networks. The paper compares trade partners and trade antagonist’s economic structures, before and after the occurrence of a currency devaluation, and evaluates whether a devaluation is expansionary or contractionary in nature. The paper attempts to provide empirical justification as to whether a devaluation’s contingent impact on output may be influenced by the trading relationship of the affecting parties.
285 Auditorium  1:30-2:15  Board A17
Sangyoun Han
Dorothy R. Siden (Faculty Sponsor)
Department of Economics, Salem State University
Unsolved Problem: Approaching Economic Crisis Triggered by the Older Population

As people in the United States of the America age, many serious economic problems can occur. These include a fall in labor participation rate, diminishing corporate earnings, increased number of people living under the poverty line and a surge in the cost of Medicare and healthcare. The research released by U.S. Census Bureau concluded that the number of people who were 65 and older in the United States on July 1, 2013 were 44.7 million accounting for 14.1 percent of the total population. This research paper examines how the older population affects the U.S economy. Topics include personal finances of older population, costs of living, side effects of a low labor force participation rate and the ways to handle economic difficulties caused by an ageing population.
A Comparative Study of European Memoranda

This paper compares the bailout packages for the five European countries: Greece, Ireland, Portugal, Spain, and Cyprus. The terms of the bailout packages were different for each country and now, a few years later, the countries are in different stages of their respective recovery. The study examines differences and similarities between bailout packages and attempts to identify the factors associated with the success and failure of the bailout programs.
The purpose of this paper is to analyze through case study evidence the effectiveness of current cybersecurity initiatives. The Internet has revolutionized modern life across the globe, enabling dramatic advancements in technology and communications. Furthermore, the Internet has triggered a dramatic improvement in the efficiency and capabilities of people, organizations, and governments around the world. Regretfully, the Internet also exposes its users to new risks and vulnerabilities. These risks affect organizations and individuals across the planet, but they also pose unique threats to nations. Coupled with the architecture of the Internet itself, these risks demonstrate why international involvement is required for effective cybersecurity. Cyber-attacks in the form of botnets pose unique and complex challenges to a wide range of international relations issues and activities, most notably law enforcement and data protection. Increasingly, international bodies have begun to recognize the importance of cybersecurity and their efforts, though in many cases nascent and as yet unproven, represent an important step. Using security reports from a case study of a significant attack and secondary literature to provide a framework for the case study, the thesis documents the vulnerabilities and varied approaches to this important facet of being in business in the the Internet age.
Heterogeneous Effects on Group Performance

Team performance in the classroom setting may be affected by the level of heterogeneity present in production based tasks. While past literature suggests team performance in classroom experiments is positively affected by having heterogeneous team members, field studies in the corporate team setting have in fact found an opposite effect. While it is known that teams with members who do not all speak the same language suffer from miscommunication and misunderstanding of team goals and objectives, the question remains as to why diverse classroom teams perform much better than their non-diverse peers. We hypothesize that the discrepancy between results from the classroom vs field experiments is due to insufficient time allotted to diverse groups to overcome their miscommunication to ultimately achieve higher productivity than their non-diverse groups. Using close analysis of time crunched and non-time crunched teams in the classroom setting, we test our hypotheses that time relief leads to diverse groups surpassing performance of homogeneous groups and that heterogeneous groups have a higher creative output. Specifically, we offer a piecewise based payment system that rewards groups based on their productive output in a production game. We find that diverse groups indeed benefitted from time relief and perform on average 15% better than non-diverse groups. Additionally we find that diverse groups produce more unique and varied answers in a secondary creative task. In all surveyed subjects we find that the conflict arising from having heterogeneous team members is mitigated by increasing time allotted to produce valid answers.
Anh Nguyen  
Kim Frashure (Faculty Sponsor)  
Department of Science & Engineering, Bunker Hill Community College  
A Business Plan for Opening a Vietnamese Seafood Restaurant  

Vietnamese seafood cuisine is considered to be one of the healthiest foods in the world. It is especially nutritious as it includes fresh herbs, spices, and vegetables, a perfect blend of heat, sweetness, and sourness, fish sauce, and freshly caught fish or shellfish. More people are beginning to recognize the health benefits of Vietnamese food --mainly from cooking shows on television. For example, in the U.S., Vietnamese food such as banh mi and pho are now becoming very popular. Yet, there are many other delicious Vietnamese foods such as snails that are not familiar to most Americans. Vietnamese restaurants can be found in the U.S. where there are large Vietnamese populations such as San Jose, San Diego, Los Angeles, Houston, and Portland, but very few are found in Boston. My research involves writing a business plan for opening a Vietnamese seafood restaurant in Boston, Massachusetts. My business plan will address the following questions: What will be the name of my restaurant? What marketing strategy should I use to persuade Americans to try Vietnamese food? What will my product, price, place, and promotion be? What is the supply chain for fresh seafood? Who is my competition? How much financing will I need? Will I have any management partners? How many people will I need to hire? My research will addresses all of these questions and more in order to determine how to open a Vietnamese seafood restaurant. Ultimately, more people will recognize and benefit from eating healthy Vietnamese seafood cuisine.
Civic engagement comprises the knowledge, skills, and values associated with promoting a higher quality of life in a community through both political and non-political processes. (Musil 2009) Economics education often falls short of fostering critical analysis of neoclassical theories and the limitations of its assumptions, analyses, and conclusions in application to real-world problems. Therefore, civic engagement pedagogy provides opportunity to introduce multicultural perspectives on the economic, environmental, and social consequences of globalization in the International Economics classroom. Research suggests that “community-based research-education-service” teaching can help improve the quality of student learning by providing opportunities for real-world interaction. (Brooks and Schramm 2008) Service learning approaches have been found to prompt deeper participation with value priorities while connecting concrete problems with academic concepts. (Kohls 1996) Educators find that experiential learning can help economics students become more efficient and compassionate leaders by exposing them to diverse perspectives (Sabbaghi 2013). This study evaluates the role of a study abroad experiential learning component in an International Economics course. This course examined traditional economic topics through the lens of China’s growth, development and transformation. Students traveled to Beijing and Shanghai for two weeks at the conclusion of the semester. Using a mixed-methods approach, data were collected from pre- and post-surveys, reflective writing assignments, and semi-structured exit interviews to inform this analysis. Nine civic engagement learning objectives are used to measure student progress before and after travel as it relates to the knowledge, skills, and values associated with the mission of civic engagement in higher education.
Health is an integral element of sustainable economic and human development. Although Official Development Assistance (ODA) has increased over the last decade, health outcomes have not improved to the extent that they should, begging inquiry as to the factors limiting the effectiveness of foreign aid. This thesis investigates the impact of health infrastructure, as measured by access to sanitation facilities, clean water, essential drugs, and more, on the effectiveness of foreign aid to the health sector through a holistic case study comparing Ethiopia, with poor health infrastructure, and Ghana, with relatively high infrastructure. The case study will include both a quantitative and a qualitative component. The quantitative element aims to illustrate (1) trends in poverty, inequality and ODA, (2) level of health infrastructure, and (3) health outcomes in the target countries. The method of qualitative analysis centers on a thick description of the organization and institutions of the health sector and efforts to revitalize the health sector so far. Ultimately, the thesis will investigate the route of foreign aid through the health system and identify areas of weakness. Preliminary results indicate that increased access to sanitation facilities and water, markers of strong health infrastructure, correlate with improved health outcomes, suggesting increased effectiveness of foreign aid through stronger infrastructure. The hope is that through this study, the relationship between foreign aid and health infrastructure can be better understood to inform strategies to increase the effectiveness of foreign aid.
After the close of the financial crisis in 2008, the Economy had crashed because of the bursting of the housing bubble. The United States fell into a deep recession, and the Federal Reserve acted quickly by targeting a close-to zero percent interest rate in order to spur aggregate demand. I am interested in looking at how much aggregate demand was increased because of actions taken by the Federal Reserve, such as instating a Quantitative Easing program. I will be looking chiefly at investment, because this is the only piece of Aggregate Demand that the Federal Reserve is able to influence via an interest rate target. Increase in investments should in theory drive down the unemployment rate. I will be looking at models of the Beveridge curve to understand if investment had a larger impact on new hiring, or if employer’s feelings for the future had a larger impact on hiring/layoffs. Looking at employment is essential in understanding how an Economy is able to grow, thrive, and prosper.
Early childhood education has been proven to foster success in school and in many areas of life, and seems to have the largest impact on disadvantaged children. Health, dropout rates, poverty, crime and even IQ scores can be affected by a child’s cognitive engagement at an early age. While it has been shown that pre-school programs can have positive effects, and in many cases have a huge return on investment, there are arguments about how to implement these programs most efficiently. The cases that have the most positive results are small, highly involved programs, such as the Abecedarian and Perry Preschool Programs. Such studies are expensive but produce outstanding benefits. Unfortunately, studies show that the benefits of Headstart, a universal preschool program, are not as large. Since Headstart is a nationally funded program and is so widespread, the amount of money and attention spent per child is much less. Finding a way to mimic the results that came from small studies like the Abecedarian Project and Perry Preschool Program in a universal preschool program would be ideal. I will research local early childhood education programs quantitatively and qualitatively to determine the effectiveness of different programs and explore the most efficient methods that yield economic and educational benefits.
Feminization of Labor and Profit Rates: Evidence from OECD Countries

The paper examines the effect of the feminization of employment on the profit rates by employing a two-stage least squares (2SLS) model. The paper provides evidence on 21 OECD countries for the 1970-2008 period. Findings show that as women joined the workforce from the 1970's to 2010, profits in that country increased. We also considered factors that affect women from joining the workforce, such as fertility, the wage gap and other variables.
As behavioral economic models become more mainstreamed in economics, a growing literature continues to address the design, implementation and evaluation of experimental auctions for application to non-market valuation. According to economic models of rational choice behavior, preferences should be independent of the method used to elicit them. Thus, in theory, all incentive compatible auction mechanisms should result in statistically equivalent preference measurements. This research compares bidding behavior across four frequently used experimental auction mechanisms: the Becker-Degroot-Marschak (BDM), Vickrey, Random Nth Price, and English auctions, and assesses the extent to which people with certain personality profiles over or under-bid. Data were collected from a series of induced-value experimental auctions and personality traits were measured in pre- and post-surveys, aligning with the Midlife Development Inventory Analysis. Although the literature has evolved rapidly in the last few years, many investigating best practices when it comes to auction procedures, questions of auction validity continue to arise around which method is best. This work addresses the predictive power of personality, potentially responsible for a degree of procedural invariance present across incentive compatible auction mechanisms popular in the experimental literature.
Consumers are often uninformed about the dangers posed by toxic chemicals in their food, furniture, personal care products, and electronics. These risks include cancer, neurological disorders, and reproductive problems. The goal of this study is to influence purchasing behavior away from dangerous products and towards healthier and more sustainable options. We examine the University of Massachusetts Amherst community’s level of awareness of toxics in their environments and consumption of products with toxic ingredients. We implemented a product-use survey in February 2016 to gain information on different products that students and faculty use. The results of this survey will inform an educational campaign targeted at food items and products that are consumed most frequently by students and faculty. The campaign will be conducted across campus during spring semester 2016 and will be followed by a second product-use survey that will be used to measure changes in awareness and consumption. We believe that the results of our educational campaign can be applied beyond UMass. We expect to find that people will favor safer products after being informed of the dangers posed by consuming products containing toxics. We hope our project will have a positive impact so that students and faculty live longer and healthier lives with decreased health care costs, and will help protect the environment surrounding all of us.
Investigation of Toxic Flame Retardants and Safer Alternative Dormitory Furniture at UMass Amherst

Over the past few decades, there has been growing concern surrounding the effectiveness of and health risks associated with flame retardants; chemicals added to common household and commercial furniture for the purpose of inhibiting or delaying the production of flames. Flame retardants are linked to a broad range of health concerns, including cancer, reduced fertility, developmental problems, thyroid disruption, etc. In 2015, fire safety standard TB117 was revised so that furniture is able to meet the fire safety requirements without the use of flame retardant chemicals. The goal of this project is to encourage UMass Administrators to consider the potentially harmful impacts of flame retardants when making future purchasing decisions. Using scholarly literature accessed through the University of Massachusetts Amherst library database, scientific journals, and research from the Green Science Policy Institute, we intend to research health impacts of the most commonly used flame retardant chemicals in furniture, specifically furniture used in UMass dormitories. Further, we plan to conduct a cost-benefit analysis to compare financial, environmental, and social impacts of conventional dormitory furniture containing flame retardant chemicals to chemical-free and/or safer alternative dormitory furniture. Lastly, we will communicate our research findings to Residential Life and the Dean of Students at UMass Amherst, and the Division of Fire Safety of Amherst on the adverse effects of flame retardants and the potential safer alternative dormitory furniture available. Our results are meant to incentivize UMass administrators to purchase dormitory furniture free of flame retardants.
302  Concourse  4:30-5:15  Board C77
Mitchell Robert Williams
Christine L. Crago (Faculty Sponsor)
Department of Resource Economics, UMass Amherst
Review of the Equity and Performance of NOAA Catch Share Programs in the Northeast Multispecies Fishery

The purpose of this research is to identify instances of economic inequality and market failure within the Northeast Multispecies Fishery. Stretching from New Jersey to Maine, the Northeast Multispecies Fishery is the nation’s oldest Federal fishery, but it has been mired by over harvest and fish stock depletion. Regulated by the National Oceanic and Atmospheric Administration (NOAA) through the Magnuson-Stevens Act, the current catch share program in the Northeast fishery centers around the use of individually transferred quotas (ITQ) for harvest. This research explores fish stocks, permit trading systems, and the government regulations that create the basis for ITQ implementation. By looking into market regulation and economic indicators such as crew positions, days at sea, and gross revenues, we hope to gain an accurate understanding of the current state of the fishery and the extent that market regulation has affected the industry. With this understanding, we will propose a policy solution meant to promote the growth and equity of the fishery, and to encourage sustainable fishing. Our proposed plan involves modifying the existing permit-based regulations to include economic incentives for market participants to harvest underutilized species.
The Threat of Deflation

This paper examines the phenomenon of deflation and its effects on economic activity. Using proposed models in the past literature, I estimate the short-term probability of deflation occurring in the U.S. and Eurozone. I discuss factors that may make deflation more probable in each setting, examine the expected effects on these economies, and evaluate the availability and effectiveness of policy instruments to prevent or combat deflation.
Evaluation of the Efficacy of the Dominant Theories on Factors Underlying the Democratic Republic of Congo Civil Conflict

This paper analyzes the longevity and intensity of the civil war in the Democratic Republic of Congo (DRC) by evaluating existing theories on factors underlying the conflict. The DRC has a long history of violence, beginning with European imperialism in the late 19th century. Since gaining independence from Belgian colonizers in 1960, the DRC has dealt with regime changes, erratic resource distribution, civil unrest, and a number of other social disruptions. Though many regions in Africa face similar issues, the case of the DRC is notable due to the conflict’s longevity and intensity. Research on the conflict attempts to understand the mechanisms of war particular to the region but either does not focus on or does not explain well the aggregate factors leading to protracted and very intense conflict. This paper identifies the major theoretical frameworks and their weaknesses in explaining the case of the DRC. The first step in evaluation of current theories involves creating a typology to organize and categorize the prevailing frameworks. The second provides a critical analysis of the major theories and subsequent identification of the gaps in each framework with respect to the experience in the DRC. The conclusion from systematically reviewing the research is that the main factors not considered in the existing literature but important for understanding the unique longevity and intensity of the civil war in the DRC are the internal and external impact of proximal conflicts, including regional destabilization and relative indifference of the international community.
EDUCATION

305 Auditorium  10:45-11:30  Board A60
Adessa Batts
Jeanie M. Tietjen (Faculty Sponsor)
Department of English, Massachusetts Bay Community College
Can Unschooling Better Prepare Current Students for 21st Century Education?

High school dropout rates have decreased over the past ten years, however ratings from professors regarding academic preparedness of their students for college have decreased dramatically. The increasingly ineffective nature of the traditional schooling system is important for parents with children of schooling age to understand, so that they may explore alternative options. Unschooling is an approach meant to foster a child's natural curiosity and creativity by allowing the child to take control of their education. Educational professionals who are advocates of Unschooling believe that this method can better prepare children for the future, as well as decrease the prevalence of mental health problems in school aged children. My research focuses on Unschooling and its effects on child and adolescent development in comparison to the development of school aged children in traditional schools.
This project places two different educational styles into a conversation—namely homeschooling and public schooling, and investigates the strengths and weaknesses of each within the context of high school education. The research questions how educators and students alike can benefit from exploring these two different venues of education in order to develop new approaches aimed at higher levels of student success during high school. Particular attention is invested in exploring how certain aspects of these two distinct schooling camps can affect—both positively and negatively—the later success of students in their college education. Using inquisitive interviews, the research project will draw insights from students, teachers and administrators—who are working in public and home school educational settings, respectively—as well as the researcher’s own experiences in both settings. These methods will allow the project to infuse the researched scholarly literature on public and home school education with the voices of individuals’ experiences from the two separate contexts. The results are sought to aid in early mapping of possible emerging trends in learning, thereby allowing educators to improve upon successful approaches in education and college readiness.
Learning Styles

There are three main types of learning styles, however only one is most commonly used in classroom settings. A greater number of students would be significantly more successful if a combination of learning styles were presented in the classroom. Traditionally one style is used in classrooms, by tailoring lesson plans to multiple types of learners there is a better chance more students will be positively impacted. The purpose of this study is to identify how the majority of students learn and contrast the results with the single learning style used in traditional classrooms. The data collected will be utilized to identify what percent of learners respond better to other learning styles than the one implemented in the common curriculum. This research will be conducted by use of an anonymous survey. The information will be used to prove or disprove the original hypothesis. This study will be done on children in a classroom and also online by students at Salem State University, the results of both demographics will be taken and compared to evaluate if and how learning styles mature and change. Biological sex will also be taken into account to determine if sex has any indication of what type of learner one is. The survey consists of thirty multiple choice questions tailored in a way as to indicate what type of learner you are without asking direct questions pertaining to your preferred learning in a classroom. The goal of this study is to help improve learning for many students.
This thesis aims to not only explore Waldorf, Montessori, and Public school models, but also to use the educational theories of Rudolf Steiner, Maria Montessori, Horace Mann and John Dewey to investigate teaching methods in order to create the ideal school model for a utopian classroom. Through observational research, the visits to three different classroom settings specifically portrayed the methods being practiced from Waldorf, Montessori, and Public school theories. The observations at the Great Barrington Rudolf Steiner School in Great Barrington, Massachusetts represented research on the Waldorf model and the Country Village Montessori School in Amherst, New Hampshire represented the research on the Montessori model. The observations and experiences from required pre-practicums in various Massachusetts public schools, for my education degree, are used as research for the Public School model. These visits provided insight on how these philosophies are implemented, and further allowed reflection on which characteristics I believe the ideal school model should be based on.
Emily Paige Crocker  
James Cressey (Faculty Sponsor)  
Department of Education, Framingham State University  
Elementary and Early Childhood Pre-service Teachers’ Self-Reported Mathematics Confidence in Relation to Mathematics Skill, Knowledge, and Concepts

The value of mathematics education for students in the classroom is readily influenced by the role of their teacher. A teacher’s mathematics confidence and beliefs can have a high impact on their students’ achievement in this vital subject. The focus of this study is to address how elementary and early childhood pre-service teachers rate their mathematics confidence based on their past experiences and attitudes towards mathematics. The author hypothesized that pre-service teachers’ ratings in mathematics understanding positively correlated with their rating in confidence of the subject. By examining data from five semesters of survey distribution to pre-service teachers at a small state university, the author was able to study how mathematics confidence is correlated to several different categories of mathematics understanding, including mathematics skill, knowledge and concepts using multiple means of data analysis. The majority of participants rated their levels of mathematics understanding depending on how high or low they rated their mathematics confidence. The author found that pre-service teachers with higher mathematics confidence levels believed that their confidence in mathematics is more correlated with their levels of skill, knowledge, and concepts in mathematics, compared to low confidence participants whose ratings tended to be more isolated. Pre-service teachers also indicated that their level of mathematics confidence was commonly associated with their past mathematics experiences, whether positively or negatively impacting. By reflecting on teaching practices and implementing confidence-inducing strategies in the mathematics classroom, pre-service teachers can make a world of difference in both their mathematics confidence and that of future generations.
TeachHER: A Historical Look into the Educational Movement and the Women Behind It

This project is focusing on the movement towards an equal and fair education for women. The main focus of this research is the first graduating class of women at Fitchburg State University. Using the theses that they wrote, this paper will take a firsthand look into the reform happening in not only the education field for women but in a social and political context as well. The work done by the graduating class of girls will be used to showcase the ideals and rights that women all over the country were and still today are fighting for. This project analyzes the ideas and goals achieved for the educational movement for women by taking a deeper look into the history as well as using a social and cultural view of women to give an even larger perspective to the inequality and injustice. By using the theses from these girls in the college the research will connect to bigger ideas and theories of more influential women of this time period.
315 Auditorium 11:45-12:30 Board A30
Laura Madeline Davidson
David M. Kalivas (Faculty Sponsor)
Honors Program, Middlesex Community College
Comparative Analysis of Early Childhood Education

The United States is lagging behind countries of similar economic status in the realm of education. The American government gives tremendous focus to passing bills to improve elementary and secondary education resulting in little improvement. This project suggests the problem rests with early childhood education. The much overlooked sector of early childhood education is closely examined in this project to show, when compared to Japan and France, the United States measures up to other educational systems. Using evidence from anthropology, pedagogy, and sociology, it can be concluded the United States differs greatly from many countries in their early childhood educational practices. The early childhood programs in Japan, France, and the United States, have a focus on overall attendance, student to teacher ratio, teaching style and the use of standardized testing to gauge quality and effectiveness of each country's practices. The research shows negative rates in U.S. results compared to those of Japan and France, which suggests something is lacking in the U.S. approach to early childhood education. This research project will examine educational systems in Japan, France, and the United States to determine the optimum process for improving the U.S. system of early childhood education.
Diarny O. Fernandes  
Alex Fowler (Faculty Sponsor)  
Department of Mechanical Engineering, UMass Dartmouth  
Development and Implementation of a Supplementary Career Prep Program for Vocational Engineering Students

As time has passed, the United States has found itself at a disadvantage in the technical fields. In an attempt to reestablish our standing near the top of the most competitive scientific nations, we have implemented thousands of STEM (Science, Technology, Engineering and Mathematics) programs in high schools all over the country. In doing this, we have found that trying to stimulate interest in difficult and often demanding scientific and mathematical courses is very taxing. We have been forced to look at our education system and constantly rethink how we captivate our students. We must also aim to reduce the misconceptions about non-traditional forms of high school education, such as the vocational-technical model. Vocational-technical students show the potential to reform our nation. They enter college with new perspectives and diversified skillsets. Based on my experience in college, I have been able to identify both the advantages and disadvantages of having attended a vocational engineering program. For my Honors project, I wanted to address a few of those disadvantages, and make an active contribution to improving the education of high school engineering students. I successfully developed and implemented an integrated career development program at Aerovox Corp, New Bedford MA. It was specifically designed to supplement the Engineering Technology program at Greater New Bedford Voc-Tech. The program is offered free of cost to the students, and directly involves instruction and guidance from myself and engineers at Aerovox. In this presentation, I will reflect on the various challenges and triumphs of the project.
Concourse 11:45-12:30 Board C05

Angela Marilyn Georger
Stacey L. Parker (Faculty Sponsor)
Department of Visual and Performing Arts, Worcester State University

Creative Dramatics

As an early childhood educator there are certain standards we have to meet for each age group; but as a theater activist I strive to find engaging, riveting methods for meeting those standards. Since merging my two passions I have become fascinated in the concept of creative dramatics: a method of teaching in which students are guided to enact, imagine, or role play to reach a deeper understanding of the material. The focus of my research is the educational benefit of using creative dramatics tactics in an early childhood classroom setting. Creative Dramatics is comprehensible across the board with Dual Language Learners, those with developmental and physical delays, and with children of all ages. Journals such as The Harvard Educational Review and The Journal of Educational Research have shown that creative dramatics increases content knowledge of the subject, confidence among the students, and general classroom harmony. However, I believe we as educators are underestimating the educational power of theater. Creative dramatics is, despite all research, still not used regularly in classroom settings due to the controversial amount of stress on educators to teach by pre-planned, monotonous programs. It is my hope that with this research I can begin to change the new “norm” for teaching.
For decades, Near Death Experiences (NDE’s) have been reported all around the world. However, it wasn’t until Dr. Raymond Moody published his book Life After Life (1975) that more interest developed to study this phenomenon. Over the past 40 years, a considerable amount of data has been gathered and many quantitative and qualitative studies have provided an ample amount of information to compare NDE characteristics across cultures. A qualitative approached is used to better understand the phenomenological aspects of NDEs and a quantitative approach to measure shared characteristics of NDEs across cultures. A religious scholar, Dr. Gregory Shushan, researched evidence of the afterlife as depicted in various ancient texts (Old and Middle Kingdom Egypt, Sumerian and Old Babylonian Mesopotamia, Vedic India, Pre-Buddhist China, and Pre-Columbian Mesoamerica) comparing them to contemporary NDE accounts. This research showed a commonality among NDEs that cross cultures and time. By comparing the data of modern accounts of NDEs to accounts recorded in ancient texts, remarkable similarities and common traits emerged. The commonalities range from encountering brilliant light, out of body experiences, meeting deceased loved ones, encounters with divine beings, and some form of eternal judgment. This research project offers a comparative examination of cultural expressions in the literature of afterlife journeys in the fields of anthropology and history.
303  Auditorium  8:30-9:15  Board A09
Erin Kathleen Haley
Rebecca Woodland (Faculty Sponsor)
Department of Education, UMass Amherst
iCons: The Application of Constructivist Learning Theory in College Mathematics Classrooms

The global energy crisis is forcing people from all over the world to make decisions about renewable solutions. Science, technology, and math (STEM) education is becoming a necessity in order for citizens to make informed decisions about our changing world. This study focuses on improving mathematical literacy. If professors of aspiring high school mathematics teachers utilize CLT in college classrooms, it is more likely that future high school teachers will implement best teaching practices. In turn, if more constructivist-based teaching is present in secondary education, high school students will experience more meaningful learning and higher levels of mathematical literacy. Citizens will then be able to make informed decisions about our ever changing world. In this study, I aimed to determine the extent to which Constructivist Learning Theory (CLT) was present in the teaching of mathematics in three sections of Math 300 at the University of Massachusetts Amherst. I surveyed professors and students, and observed 15 class lectures. Study findings revealed that professors are not necessarily enacting CLT in their classrooms, and that they needed to engage in a large amount of constructivist-based practices to make an impression on students. College students who wish to become mathematics teachers are enrolled in math courses where professors have an extensive knowledge on the subject area, but may not have an understanding of best teaching practices. If we want to increase mathematical literacy of our citizenry, it is important to consider how mathematics is taught at the college level to aspiring high school teachers.
Over the last two decades many small colleges and universities have closed due to financial distress. In order to address this issue, the goal of this study is to develop a market segmentation model of the higher education industry. This model will include small, private, nonprofit colleges and universities and classify schools based on their financial strength. This study will determine whether specific combinations of variables can predict the probability of institutional failures. Specifically, we hypothesize that many of these schools utilize a tuition dependent business model that is unsustainable. It is our hope that the proposed model can be used as a predictive stress test to assess the relative strength of these institutions. Large quantities of data will be gathered from the Integrated Postsecondary Education Data System. Then the Carnegie classification size and setting matrix will be applied to the data in order to segment the schools into discrete categories. From there analyses will be performed such as regression analysis to view correlations in the data.
Devin Lyn Hildick  
Felicia Farron-Davis (Faculty Sponsor)  
Department of Education, Fitchburg State University  
A Comprehensive Guide to the Implications of the RETELL Initiative in Massachusetts Public Schools

The result of this semester’s thesis writing, “A Comprehensive Guide to the Implications of the RETELL Initiative in Massachusetts Public Schools”, will provide a resource for administrators, teacher candidates, and core curriculum teachers, outlining the effects of new education legislation. This legislation is in response to a rapidly changing student demographic, a prominent achievement gap, and the failure of Massachusetts public schools to provide equal educational opportunities to all students. New programs, implemented by the Massachusetts Department of Elementary and Secondary Education (MADESE), have transformed the teaching and learning of English language learners. State-wide changes are evident in professional training programs and teaching strategies. The final product of this semester will be a linear breakdown of the Rethinking Equity and Teaching and Teaching for English Language Learners (RETELL) initiative and the events leading up to its enactment. Content for this guide will also include an introduction of the English Language Learner (ELL) population, a brief history of ELL legislation, an overview of the 2011 federal mandate, a description of the RETELL initiative, and a summary of the implications.
Gender segregated institutions provide a greater disadvantage towards students when it comes to academic success versus co-educational institutions. In addition to the segregated learning environment, stereotypes and biased research offer negative effects to academic achievement. Negative effects can range from low-test scores, poor social skills and the growth of beliefs in common stereotypes. All students will learn differently, but this difference does not solely rely on gender differences. This topic will be discussed using psychological and sociological academic research as well as Meta-analysis, which evaluates what causes and what inhibits children’s potential success. Proposed questions that will be answered will include what affects children’s learning, do all boys and girls learn differently and are stereotypes holding students back? In addition, is there a chance that there are more biased attitudes towards female teachers than male teachers? In conclusion, educating ourselves about how we typically learn will help educate more effectively in the future. We live in a co-gendered society, so we should prepare our students to be active, well-rounded members of this society. Gender segregated institutions disadvantage students from learning and achieving to the best of their ability.
This project is going to explore the importance of play, in early childhood education. For a young child, playing is more than just a fun way to waste some time, it’s an essential part of their life and vital for proper development. There is an array of different kinds of play and each kind has a different benefit for children. With that in mind, it’s not only important that young children are given the opportunity to play, but that their play experience is differentiated. This project is going to discuss different types of play and explain how it helps children grow and develop by analyzing theorists such Piaget, Montessori and Dewey. In addition to that, it will explore books like The Hurried Child by David Elkind and Last Child in the Woods by Richard Louv that discuss different types of play and why it is such a crucial aspect of childhood and development. This project takes on a unique format; the research and information found is explained through a compilation of original lessons, activities, quizzes, tests, power points and discussion questions that come together to provide the bases for a one credit, five week college course on the importance of play in early childhood education.
Each year, thousands of students travel to the United States to pursue higher education *1. According to the Institute of International Education, approximately 880,000 international students are studying in the U.S. during the year of 2015. Students come to the US from many countries including China, India, South Korea, and Saudi Arabia *1. Of these international students in the US, 42% are studying in the Science, Technology, Engineering, and Mathematics program (STEM) at the undergraduate and graduate level *2. The majority of the R1 or Ivy league universities do offer financial support which allows qualified candidates financial assistance to support their education. However, many universities who are well ranked on the STEM fields do not fund international students' undergraduate education. This makes it very hard for international students to study in the US. This paper will explore the current situation and propose strategies to address this dilemma and bring more international students to the US to complete undergraduate programs in STEM fields.
A growing number of people in the United States assert that college should be free to everyone seeking an education. While making college more financially accessible is a valid proposal, free college does not mean that it would come without a price. This study was conducted to determine the potential consequences of free state college education. The U.S. higher education system was compared with education systems from countries like Germany that offer free tuition fees to all students. Emphasis was placed on an examination of the different social and educational structures that allow free college education to succeed and what problems education models like this one face. For this research articles and periodicals were used from sources like Education Next, European Journal of Education, Dissent, National Review, The New York Times, and The Washington Post. These sources were used to present the challenges of free college education models in other countries, to show the current tuition, fee and living costs and the financial deficit that free tuition would cause. Free college means the student does not pay for it, but the burden would have to fall on the taxpayer. It might also, like it is the case in Germany, lead to higher admission requirements, and wait lists denying student’s access to their desired major. This research contributes to the ongoing debate whether college should be free by raising awareness of the consequences that free college would bring.
In the field of education standardized tests have recently been under much scrutiny. While professionals and experts have looked at these tests and how they affect students and even teachers, almost nothing has been done to examine how pre-service teachers are affected by the standardized tests that are required to obtain their initial teaching license. This study examined the role that licensure exams play on the self-efficacy of pre-service teachers and how those levels can be impacted by hands on classroom experience. Researchers predicted that failure on tests would lead to decreased levels of self-efficacy, while success would increase ones level of self-efficacy. Research methods included interviews with five participants before and during the student teaching experience. Interviews included questions on topics including self-efficacy, educational background, licensure exam experience, classroom experience, and university course work. Completed research supported the hypothesis that failure on these exams can decrease one's level of self-efficacy and that success can lead to an increased level of self-efficacy. Regardless of one's success or failure with the tests, all participants felt as if hands on classroom experience helped prepare them far more than any test that they may have taken.
Not everyone learns best through lecture driven or note driven classes. Place-Based Education immerses students into the community to foster stewardship while integrating academic learning (Promise of Place). As first year students we participated in a PBE class incorporating English composition and Physical Geography, with the use of Stanley Park. PBE is particularly beneficial to freshman because it provides the opportunity to get off campus and learn fundamental life skills. It also promotes civic engagement allowing students to develop applicable skills through partnership with the community. One activity was a physical geography lab where we analyzed the correlation of soil types with different elevations of the slope of a hill in Stanley Park. Through this hand on experience we were able see the variation of different soil catena’s and differences in the landscape. This broadened our experiences and gave us a sense of pride for the park and our school community. Transitioning to a PBE model is necessary because students need to be excited and invested in what they’re learning to ensure success and achievement. John Burroughs, a notable naturalist, once said, “Knowledge without love will not stick. But if love comes first, knowledge is sure to follow.” More schools should incorporate this style of teaching since it provides a unique way of learning for those who struggle, or dislike the standard classroom style.
This project examines the fitness industry to determine if an Associate Degree in Exercise Science would be beneficial to one’s regional college offerings. By focusing on Bristol Community College and the community it serves, this program proposal will address questions such as: Is there empirical data to show there is a regional crisis when it comes to fitness, health and wellness, particularly obesity? Would such an Associate's Degree lead to meaningful employment? Career pathways? Transfer opportunities? What would be the specific criteria for the Associate's Degree? What current certifications exist for personal trainers, and how does that compare with an Associate’s Degree in Exercise Training? Is there government legislation aimed at certifying personal trainers, and where would this degree align?
ELECTRICAL ENGINEERING

324 Auditorium  1:30-2:15  Board A19
Liam Daly
Filip Cuckov (Faculty Sponsor)
Department of Engineering, UMass Boston
Development of Low-Cost Devices for Image-Guided Photodynamic Therapy Treatment of Oral Cancer in Global Health Settings

Previous studies have shown that Photodynamic therapy (PDT), a light-based cancer treatment technology, can be adapted to meet the treatment criteria needed to treat oral cancers in a resource-limited setting. Our collaborators initial work demonstrated a battery-powered PDT device that was able to achieve tumoricidal effects in ALA-induced cancer cells via PpIX activation with 635nm light both in vitro and in vivo. This report describes a new battery-powered prototype device which exceeds the performance of previous devices and addresses numerous requirements needed for translation to a clinic setting. Such requirements include high, stable optical power output as well as a modular applicator system for comfortable delivery of 635nm light to a wide range of intraoral positions. In vitro ALA-PDT treatment of monolayer cancer cell proves the effectiveness of the prototype device.
Graphene Power Pack

The evolution of technology in mankind’s recent history has been rapid and expansive. A major bottleneck for technological advancements is energy storage, mainly characterized by the drastic trade-off between power density and energy density. This project is an exploration of energy storage capabilities and power delivery of capacitors made from a material called graphene. The product resulting from this work will be an array of graphene capacitors arranged in series and parallel for optimally sustained voltage and current output. The benchmark for which I aim is a source capable of producing 4V and 20mA to drive an LED for a half hour off of a flash charge. In recent years, groups from around the world have emerged with publications on advancements in solving this energy storage problem, with the El-Kady group of UCLA at the forefront. I hypothesis that if the samples that I fabricated based on the work of the El-Kady group using the laser-scribed graphene method prove to be comparable, I can develop an integrated device with higher output voltage, output current, energy density and power density. Using the measurement equipment provided by the ECE department, I will be able to characterize the individual capacitors with regards to parameter such as capacitance, power density, energy density, ESR, and maximum output voltage and current. Once characteristics for single devices are analyzed, I will configure an integrated topology of series and parallel connections so as to scale up these parameters to approach the aforementioned voltage, current and run-time specifications.
Intelligent Human-in-the-Loop Gesture Based Control System for 6 DOF Robotic Manipulator

The presented research focuses on the development of a control method that aims to simplify the problem of programming and real-time control of a multiple degree-of-freedom robotic manipulator. Current robot control platforms such as joysticks and RC-style controllers require users to translate the desired 3D motion of the robot onto these 2D platforms. Our proposed control system obtains 3D orientation and gesture data from users’ natural hand motions through the use of a Leap Motion gesture recognition device. This gesture-based control method will be paired with an intelligent computer vision system designed to detect objects within the robot’s work envelope and alter the trajectory of the robot according to any observed obstructions. The combination of these two control methods will allow users to program the robot using natural motions in 3 dimensions while providing an intelligent obstacle avoidance system.

The data collection and analysis phase of the research will focus on confirming the accuracy of the trajectory calculations when the system is presented with an obstacle. To facilitate the data collection, smart servos will transmit joint angle values. These values will then be used to compute the forward kinematics matrix derived from Denavit-Hartenberg parameters. The position and orientation information for the robot can then be extracted from the forward kinematics and compared to the desired position and orientation. The optimization phase will work to minimize this observed error. The resulting human-in-the-loop control system hopes to provide an intuitive, yet environmentally sensitive method of control for robotic manipulators.
How could the process of choosing classes be facilitated and improved in order to better fit ones schedule? CSG, for short, is a web tool designed by students for students with one main purpose in mind. The goal of the class schedule generator is to make class selection easy and fast. It will enable you to visualize your schedule time frame and to fully see all your options for class sections that will better fit your preferences and lifestyle. This project was broken down in four parts: course search, database, visuals, and website. Each component has its main function but they all work simultaneously to bring the best possible results.
ENGLISH

337  Hadley Room  2:30-3:15  Panel 5
Amy E. Angell
Elizabeth Bidinger (Faculty Sponsor)
Department of English, Worcester State University
"The Goodbye Moon - A Memoir of Loss"

This story covers the last six days of my husband’s life. Ray, my husband, was a Vietnam veteran who had been exposed to Agent Orange in 1968, which caused him to develop diabetes and then cancer in his fifties. After a two year battle, he succumbed. His final days were spent in the Veteran’s Hospital in Roxbury, and I spent those days with him, in residence. I found in that time that we finally had the leisure to remember and reflect on the happenings of what had been a very eventful life together. In that time we managed to raise eleven children, and to become grandparents many times over. He was a remarkable man who left a great impact on all of our lives, mine especially, and the six-day period in the hospital functioned as something that I have called our Goodbyemoon; the reverse experience to the Honeymoon that is the time we spend at the beginning of a new marriage.
335 Hadley Room 1:30-2:15 Panel 4
Robert Francis Auld
Keja Lys Valens (Faculty Sponsor)
Department of English, Salem State University
"Cleopatra" and Other Poems

This selection of poems explores the consequences, implications, and intersections of identity, lust, and loss. Seeking to understand sexuality, personality, and desire, the poems cope with, and through, experience. Inspired by poets such as Anne Sexton and Sharon Olds, the pieces focus on individuals. One poem, "Cleopatra," about a dog, is both sentimental and resisting excess. Through image, sound, and voice, the poems work to render a series of moments, real and tangible, accessible to any listener. Moving toward a place of acceptance, of self and selves, time and history, in the form of another narrative, the poems seek to make room for all.
Through the analysis of Alison Bechdel's graphic novel Fun Home, I looked at the importance of LGBT representation in modern media and how sex and sexuality allow for people of the queer community to be accepted by society. I researched this topic because representation and acceptance of different groups of people are important steps towards equality and personal freedom. Literature and the arts are ways for queer people to make their voices heard, and Fun Home exemplifies the desire to reveal the history of queer culture and work towards equal rights. As part of my research, I attended the Broadway musical in New York City that is based on Bechdel's graphic novel, which is also titled Fun Home. I compared the graphic novel and the musical by showing the popularity of both works of art and how they both paved the way for future members of the queer community. Through analysis of both works, the dangers of conforming to a heteronormative society became evident. A focus on the human body in both works showed that the way towards a free life for LGBT individuals is through the freedom to express their sexuality on their own bodies and through sexual activity. The ability to openly talk about sexual activity and gender identity means that people can discuss and learn more about the queer community. Describing sexuality through literature and the arts brings the queer community into popular culture and allows for a more accepting attitude from the public.
338  Hadley Room   2:30-3:15   Panel 5
Lisa Ashley Danca
Regina Robbins Flynn (Faculty Sponsor)
Department of English, Salem State University
Memoirs of a College Student

For many students, college is one of the most defining times in a person's life. With the overarching theme of coming-of-age, this collection of creative non-fiction essays details the author's personal development throughout her college years. The pieces will be centered on experiences, including when she served as an orientation leader and attended her first political rally, and travels, both local and international. In the presentation, the author will read a piece and answer questions about her essays and her creative process.
Like every character, Lucy Snowe and Jane Eyre, respective protagonists of Charlotte Brontë’s Villette and Jane Eyre, grapple with pursuing pleasure and avoiding pain. Pleasure and pain are unavoidable universals, of course, but everyone treats their own pleasure and pain differently. Furthermore, pleasure and pain do not exist in a vacuum; there are other considerations—such as morality, self-respect, and lack of absolute control—that affect how each person treats and prioritizes them. Lucy and Jane, in particular, are not hedonists, so when looking at how they pursue pleasure and avoid pain, it is also important to account for the things that they care about more than either. Examining how Brontë’s heroines approach pleasure and pain in relation to other facets of their lives reveals their priorities, an understanding of which is essential to understanding their choices and burgeoning selfhood.
A Feminist Critique of Presidential Stump Speeches

Close analysis of the 2016 presidential candidates’ announcement speeches (the first iteration of their stump speech) reveals that the historical exclusion of women from participation in the genre is reflected in the gendered narrative tropes and framing devices most frequently used by the candidates, as well as in the inclusion of women in these speeches in exclusively stereotypically feminine roles. This reflects a latent sexism that pervades social and government institutions rather than an express intention to keep women from executive office. It is not that all the candidates are conspiring to give speeches in such a way that will prevent a woman from ever becoming president; rather, it is that the history of the presidency, the way it was originally defined in the United States Constitution, and the fact that a female candidate has never won the nomination of a major political party, coupled with common stereotypes about women being less agentic than men, make it easier for men to reach the office than it is for women. The stump speech is just one such (important) obstacle female presidential candidates face when campaigning for the office, as they are forced to perform in a genre they have had no hand in developing and are ill-equipped to engage. This means that the act of announcing a presidential candidacy is more complicated for female candidates, and the genre of stump speech actually functions as an obstacle to women hoping to become president.
This piece of literature is a chapter taken out of my memoir Places. It brings into light the shattering realities of the country’s broken mental health care system and the devastating conditions experienced in modern psychiatric hospitals. This specific chapter is a true story from my own experience at Arbour Hospital in Jamaica Plain, Massachusetts. It contains subject matter such as violence, sexual abuse, and intimidation. It goes into depth about a few of the horrific situations that I was put in as a patient there. It also explores a specific case of sexual assault that was never brought to justice and the consequences of the event. Another aspect covered by this chapter will be a story about a case of violence within hospital walls. Between the stories and throughout the chapter there will be descriptions about some of the deplorable living conditions such as the uncleanliness of the facility, rigid rules that make no sense, lack of accessible fresh air, and the prison-like atmosphere. The goal of this chapter is to raise awareness and educate people in a way that will create change in the future.
Megan Kingsbury Horn  
J.D. Scrimgeour (Faculty Sponsor)  
Department of English, Salem State University  
Writing a Modernized "Thumbelina" Novel

The Hans Christian Anderson story “Thumbelina” is a short fictional work which follows a tiny girl’s adventures in the outside world. I read the story and thought there was so much left out of it, and I had a gnawing desire to fill the blank space. I saw the opportunity to do this during my creative writing class. Afterward, I realized this short story was actually the beginning of a novel for children. While researching, I found that stories about a girl or boy the size of a thumb exist within multiple cultures and have delighted children and adults throughout time. However, some aspects of the story simply are not as relevant today for young readers. With a changing world, stories can always be modernized to connect with children, and this is precisely the goal of this project. I want my novel to represent the diversity and important topics in the U.S. today. Sexual orientation, family structure, and discrimination are only a few ideas that I plan on weaving into the story. After discussing the process of creating this novel, I will read a selection from it and take questions.
The Dr. Seuss Project

In the field of public humanities and museum studies, recent trends have put great emphasis on community engagement and museum accessibility. Our team is working with the upcoming new section of the Dr. Seuss Museum in Springfield to perform research about literacy in Springfield, reach out to local children’s book authors, and create interactive exhibits for multilingual non-English speaking children. Our research team focuses on investigating demographic and literacy information about Springfield, investigating the best methods of teaching literacy to children, and researching the learning tools used by similar organizations. We will combine this research with historical information about Dr. Seuss and the town of Springfield to create a research guide for the museum’s educator staff, and will also offer our own sample interactive activities to accompany the information. Our team is also be finding multilingual students across campus to read selected Dr. Seuss books in languages other than English as part of a future exhibition within the Museum that will read these selected to books to young children. The goal of this project is to create where young children whose primary language is not English can still be a part of the Seuss community and grow as readers. Part of this project also entails designing a conference to celebrate Dr. Seuss’ work and the innovation within children’s literature today. The conference will bring together scholars, authors, and community members.
334 Auditorium  11:45-12:30  Board A09
Ira Moll
David M. Kalivas (Faculty Sponsor)
Honors Program, Middlesex Community College
9/11 and the Cultural History of New York

This research was conducted to explore the connection between the rise of post-apocalyptic media and what it reveals about the current cultural state of America. What was revealed suggests that post-apocalyptic media is not merely a release of cultural anxieties but also an active agent in shaping and selecting future cultural fears. In the wake of 9/11 this issue has taken on new importance. This paper's research is based upon works of social commentary through art history, in particular Max Page's in The City's End and Mick Broderick and Robert Jacob's Nuke York, New York. Both works are used as lenses through which to examine firsthand accounts of 9/11, the media's coverage of the tragedy, and the 2008 film Cloverfield. By looking at all those things as part of a whole trends emerge that suggest that America's reaction to 9/11 was heavily influenced by the previous imaginings of New York's destruction, specifically nuclear destruction. Because of this many American's processed the trauma of 9/11 in much the same way as the Japanese dealt with Hiroshima, Nagasaki, and the feelings of impotence that those bombings caused. Evidence of this can be seen in Cloverfield, which draws parallels between itself and 9/11, as well as 9/11 and Hiroshima. These parallels suggest that anxiety manifested through film will influence how a culture will interpret, react, and resolve future crises.
This thesis is an exploration of films based on young adult literature, which bring to visual and auditory life the characters and worlds of beloved novels. Audiences with strong attachments to the novels have high expectations for film translations, and this presents complex challenges to filmmakers. Consequently, filmmakers are tasked with creating a successful film that satisfies devoted readers and also viewers who have not read the book. Directors can meet the challenge by creatively depicting the thematic opposition at the heart of a young adult novel. After discovering the novel's central themes, filmmakers have the freedom to explore and expand on the source narrative. While there are these expectations to contend with, filmmakers have liberty in their execution of the mise-en-scène, cinematography, editing, and sound. Their choices not only add an organizational principle for translations but also justification for the film’s narrative choices. This thesis focuses on four films and their cinematic handling of thematic oppositions: good and evil in Harry Potter and the Goblet of Fire, autonomy against oppression in The Hunger Games, private versus public spheres in The Perks of Being a Wallflower, and life and death in The Fault in Our Stars.
Making objective judgments about literary texts—that is, judgments that are open to public discussion—is in ostensible conflict with the interpretive freedom the act of reading affords the reader. This project explores this conflict, and demonstrates the ways in which a phenomenological approach to reading can reveal reconcile these two components of the reading experience. As the critical community learned from the New Critics of the 1940s and 50s, literary texts are composed of objective features and are thus capable of being subject to objective scrutiny. What devices are operative within a text, what the text does, are present absent any superimposition by the reader. And yet, one of the most liberating facts about the act of reading is the ability of the reader to make associative leaps, imagine connections, to engage in the reading act as a creative process. My project uses the phenomenological approach—deliberately called an approach, rather than a methodology—proposed by Edmund Husserl, by which we suspend presuppositions as a way of observing and reporting the data of consciousness directly, to construct an experiential model of literary appreciation. Given that literary texts each inhabit their own universes, within which readers can observe unique phenomena, this work proposes an approach for reporting the data of readerly consciousness and its relationship with the imaginational universe of a literary text. This paper employs the proposed approach as a framework for performing a reading of Marilynne Robinson’s 1980 novel Housekeeping.
Ono Rhetoric

Yoko Ono has been a powerful force in the arts and an important voice in feminism for decades. Love her or hate her, she remains vigilant in the quest for world peace and equality. I will focus my discussion on Yoko Ono's influence as an artist utilizing the three rhetorical appeals of ethos (integrity), logos (logic), and pathos (passion) to address that influence. In my discussion, I plan to use these appeals to illustrate the importance of Ms. Ono's work and her impact on art and music, particularly focusing on such peace campaigns as baggism and artistic works such as Shattered Glass, the album she released after John's death. Although this short presentation will only scratch the surface of the life and work of Yoko and utilize the rhetorical appeals in a very general sense, it will nevertheless prove how influential Yoko Ono has been in the arts and humanity.
Fears of 'turning Turk', 'turning Moor', and 'turning Jew' were more common as an imagined reality than a statistical one in Early Modern England, though their repeated expression through English drama of the time suggests a very real paranoia. In my research, I suggest this phenomenon occurs as a reflex to England’s emergence as a pre-imperial power. The Mediterranean, I argue, takes on a particular English significance as the outer ring of an ever-growing, ever-contested semiosphere of Englishness. It is here that the plays of William Shakespeare and Christopher Marlowe—Jew of Malta, Tamburlaine I and II, Merchant of Venice, and Othello, in particular—take place, and it is here that questions of Englishness and Otherness are rehearsed with the most astute emphasis. For dramatists and merchants alike, the Mediterranean—as a discursive and physical place—signifies an abstracted English identity. I argue that it is simultaneously a real place ‘over there’, an imagined playground for alterity, and a closet playground for Englishness. My research focuses specifically on Shakespeare and Marlowe and their treatment of Moors, Jews, and Turks in the plays above. I conclude that the figures of the Jew, the Moor, and the Turk—far from real life characters—emerged in the Early Modern consciousness as responses to alterity’s resistance to stable English categorization. In the works listed above, I argue that Shakespeare presents a closed circuit of alterity’s containment, while Marlowe aestheticizes an open one—Otherness continually at large.
330  Room 174  8:30-9:15  Panel 1
Woody Ryan Woodger
Leah Nielsen (Faculty Sponsor)
Department of English, Westfield State University
Chatterbox

A partial sampling of four persona pieces, Chatterbox explores—through a variety of forms and styles—how the reader’s conceptualization of the events and images is continuously formed and reformed through exposure to other voices and perspectives. Accents are commonly used to foster a sense of regionalism. The pantoum “Through the Spring” describes a spinning car crash in the speaker’s southern drawl. The down-home twang is later contrasted with the poem “Imagining How You’d Look through My Dorm’s Payphone.” In this piece, the sonnet form is lengthened and reflects the compact and rushed clatter of the Northeast. “A Voyeur Folds His Laundry” illustrates a speaker from California lyrically describing an observed relationship. The selections culminate with “Brief Interviews Collected on 5th Avenue,” an experimental collection of interconnected soliloquies pulled from multiple dialects, so as to model the common urban culture clash.
Elizabeth Bishop (1911-1979), born in Worcester, Massachusetts, became one of the most influential poets of the twentieth century. As a local author of significance, Bishop’s writing and life story has the potential to impact central Massachusetts students, especially since her letters of correspondence, prose, and poetry all aided in her transcendence from material reality and confinement of place. We present manuscript drafts of “One Art,” “In the Waiting Room,” and “The Country Mouse” alongside their published versions, in order to engage advanced high school or collegiate students in an investigation of this famous writer’s process from archive to anthology. From our research, we designed a teaching module that aligns Bishop’s work and archives with the Massachusetts Common Core standards, integrating larger themes such as making poetry accessible and the act of writing as a fluid process. Often, reading canonical works and writing formulaic research papers in English courses overshadow the creative process of writing poetry and prose; thus, our unit demonstrates how the standards can be met in innovative ways. This research project extends our critical perspectives on Bishop’s life and work, and allows us to formulate a new pedagogical approach rooted in the study of a writer’s process and not just her or his published texts.
ENGLISH LITERATURE

345    Room 917    10:45-11:30    Panel 2

Emily Sarah Boyd
Avak Hasratian (Faculty Sponsor)
Department of English, UMass Boston

The Wedding Paradox: Bankrupting the Corrupt Ideology of the Sexual-Economic Marketplace

Carson McCullers' novel, Member of the Wedding, is traditionally taught as a coming of age novel that invokes the notion that a young, tomboy girl is simply an incomplete woman. The coming of age genre paints female adolescence as the problem, ultimately making the purpose of this genre to cure the symptoms of difference in order to access adulthood. I will argue that women are denied access to adulthood and womanhood if they do not marry, yet even if they do, most definitions of marriage involve the subsumation of the female identity within that of the male partner’s, leaving women as—if not more—oppressed than they were to begin with. Thus, the paradox remains. In order to overcome this difficulty, Frankie imagines a solution that is socially impossible and stigmatized in adult life, but this solution is ingenious nonetheless. Namely, she wishes to marry her brother and his fiancé and therefore to break both the taboo against incest and polygamy. I will elaborate on what Sigmund Freud refers to as the Oedipal Catastrophe to articulate the function of incest in the novel, introducing a fourth paradigm of my own to his existing theory. Freud considers incest to be the end of the trade of women through marriage, thus leading to the collapse of culture and society. I will expose the ritualistic and performative nature of the marriage ceremony as it breeds harmful delusions in young women. I will explore Frankie's polyamorous, incestuous, and lesbian desires that challenge the sexual-economic hierarchy. Frankie’s failure to assimilate into society is actually a success against compulsory heterosexuality, normativity, and hetero-marital supremacy. Ultimately, this dynamic enables her to exist outside the realm of objectification and commodification, which assists in bankrupting the corrupt ideology of the sexual-economic marketplace.
Inspired by the #WeNeedDiverseBooks movement, this paper is an examination of the importance and power characters and their lives in books have for people of all ages, adding to the growing conversation about representation and identity. Diversity in Young Adult Literature should be considered integral to interpreting Young Adult texts. I investigate Young Adult Literature’s use of diversity in its characters and try to prove that it is possible to have appropriate representation of all walks of life without stereotypical characters and struggles that are associated with a particular group of people. The texts used in this paper include what are considered to be classic Young Adult books, such as S.E. Hinton’s The Outsiders or J.D. Salinger’s The Catcher in the Rye, and contemporary Young Adult books such as Sherman Alexie’s The Absolute True Diary of a Part-Time Indian and Walter Dean Myer’s Monster. How the characters in each Young Adult text are able to cope and understand their own conflicts in the world is the focus of my analysis. Ultimately, how does diversity, or the absence of, shape the way readers of all ages interpret Young Adult texts and their characters? Diversity in Young Adult Literature is not simply a mode for teaching understanding and tolerance of people who are different, but a way for readers to also see the world, in the text and outside of it, and people that are different from themselves as complex.
The purpose of my Senior Honors Thesis is to reveal the benefits of incorporating Young Adult literature into the secondary-level classroom. Through a review of the literature, I plan to highlight the advantages of using Young Adult literature in the classroom that have already been thoroughly researched, such as motivation and engagement benefits. My thesis will advocate for the benefits of implementing Young Adult literature in the secondary-level classroom for the sake of conveying social issues to the students. The presentation of this topic will include the use of primary and secondary sources, my individual analysis, and the presentation of multiple literary theories, specifically the reader response and reception theories. In addition, my thesis will compare Young Adult texts to canonical texts that are typically used in the secondary-level classroom. I will argue that Young Adult literature should be used as a bridge to canonical literature in order to make these texts more relevant and accessible. Young Adult texts that will be addressed for their literary merits, as well as for their conveyance of social issues, are The Giver by Lois Lowry and Monster by Walter Dean Myers. Canonical texts that will be addressed are Lord of the Flies by William Golding and To Kill a Mockingbird by Harper Lee. I will argue that the incorporation of Young Adult literature in the secondary-level classroom is not only beneficial for the students, but extremely valuable and advantageous for the shaping of life-long readers and well-rounded, informed citizens.
For my presentation, I intend to deliver an exploration of William Butler Yeats’ poem “Lapis Lazuli,” viewing the piece with an eye towards sublime imagery and the use of Yeats’ concept of “gyres” in illustrating this imagery. The major focus of my presentation will be a paper that I wrote on the topic, entitled “Yeats: Gyres and the Sublime in Lapis Lazuli.” This essay will serve as the main feature of my presentation, as it contains all of the research that I have done into the subject. In particular, I will be focusing on such issues as how the frantic and tragic imagery of the first half of the poem contrasts with the much more serene and peaceful second half of the piece, and how this both adds the aforementioned sense of the sublime to the poem and brings Yeats’ concept of “gyres” into play. In order to fully understand these “gyres”, I will first touch upon Yeats’ explanations of such a construction, and how he uses such abstract entities as a way to illustrate such themes as varied as the breadth of history and the intrinsic relationship between such dualistic opposites as the contrast between life and death. From that point, I shall embark upon explaining how such a concept creates a sense of the sublime in the poem by creating a sense of dualistic tension between the frenetic and chaotic first half of the piece and the peaceful, serene second half of the poem.
Isabella Christmas Guyton
Lynn Parker (Faculty Sponsor)
Department of English, Framingham State University
Isolation and the Victorian Female Artist: The Double Edge of Necessary Solitude

This project is an examination of the woman artist in Victorian era literature. In both poetry and fiction, the Victorian woman artist is often alone, existing in a physical and social separateness from society. The Victorian woman artist’s isolation is often necessary for her professional success, as in The Tenant of Wildfell Hall by Anne Brontë; however, as detailed in works like Charlotte Brontë’s Jane Eyre and Christina Rossetti’s “Goblin Market”, being alone leaves women vulnerable to forces that may deal them harm. This connection in many Victorian texts between the solitary woman and the artist characterizes gender roles of the time. By revealing the role of isolation in the experience of women artists, these Victorian texts serve to highlight the ways that going against the hegemonic ideals of the time can both empower and disenfranchise women. This investigation of gender roles and isolation can even be seen today, as isolated women continue to feel the same pressures that existed for the women within these Victorian texts.
In my thesis, I argue that Disability Theory needed to emerge as a literary lens because it acts as an umbrella term for the preexisting Queer, Feminist, and Critical Race theories. Traditionally, these theories use the concept of Othering to assert what society perceives (and therefore, demands) to be “typical” standards, and distinguish these concepts from anything that challenges the norms. Characters and concepts deviating from these realms are labeled as “Other,” and are subsequently unable to function within a society that works to reject them; in this way, language constructs a reality that directly encourages heteronormativity, patriarchy, and white privilege. By looking at these theories as subcategories of Disability Studies, rather than seeing them as singular constructs, it becomes clear that these lenses rely upon Othering to define what is “typical” and what is not, thereby identifying those who are not "typical" as, in some capacity, "disabled." When characters are examined by the ways in which they are, and are not, “able” to function within societal constraints, literary theorists can then begin to understand how these theories are inextricable from one another. My work analyzes David Wroblewski’s novel The Story of Edgar Sawtelle with this combined lens to demonstrate how Queer, Feminist, and Critical Race theories interact with one another. Reading the text through this notion of Disability Theory not only defines the “typical” and the “Other,” but ultimately reveals that language creates and reinforces socially constructed perceptions of all markers of identity.
Often, throughout both literature and performance, women have been marginalized to such a degree that they have become reduced to mere archetypes. But William Shakespeare is able to make room for multiple interpretations of female characters through both the ambiguity of his writing and the complexities of a few of his plot-driving women. Katherina of The Taming of the Shrew and Isabella of Measure for Measure are prime examples of challenges to the traditional roles of women under the Madonna-Whore Complex, a dichotomy stereotyping women as either sexually depraved or virginal. Examining these women characters through a modern day lens allows us to see beyond such a one-dimensional view. The film Syrup (2013) provides a structure through which we may understand the personas men can sometimes subject women to: mother, virgin, slut, and bitch. The lead female character in the film challenges these archetypes by mixing her own cocktail of traits—much like Shakespeare’s complex female characters. Looking at both Isabella and Katherina in this modern context highlights the problematic nature of trying to categorize a person in an attempt to oppress.
Feminine Strength: Hilda Doolittle and Adrienne Rich Rebel against the Masculine Stereotype through Twentieth-Century Poetry

The growing need to progressively alter American social issues, like gender inequality, during the twentieth century allows poets to work toward advocating for female strength and acceptance of a strong feminine identity. This issue stems from the longstanding belief in masculine dominance and female passivity in relation to the gender roles that each sex must fulfill, and ignites a feminine rebellion through poetry during the twentieth century. In particular, Adrienne Rich and Hilda Doolittle (H. D) are two poets who aim to write poetry in order to rebel against the gender inequalities between masculine dominance and feminine passiveness. While Hilda Doolittle writes this feminist poetry in the beginning of the century, Rich is able to continue this thread of rebellion in the second half of the century. For this paper, I was able to analyze both the poetry of Doolittle and Rich, and secondary criticism that explain the period of feminine rebellion within the nineteenth century. Within this thesis, I compare the poets’ similar childhoods and their poetry, while contextualizing these similarities over the span of the nineteenth century. I concluded that while Doolittle initiates this rebellion, Rich continues against masculine control more outwardly in the second half of the century. This illustrates the importance of feminine rebellion, and the need for females to harness their inner strength to control their own lives, despite the masculine control of society.
Acts of Idiot Praise

The beguiling fiction of Flannery O’Connor stands apart within the subgenre of Southern Gothic. The spiritual insights and sacramental worldview she wove into her grotesque prose ought to be numbered among the great works of Catholic Letters. Having fallen into relative obscurity outside of the South, O’Connor’s style has seldom been emulated. In my paper, “Acts of Idiot Praise,” I argue that Sundance TV’s Rectify, created by Ray McKinnon, is a piece of Catholic fiction in the style of Flannery O’Connor. Rectify is a drama set in Georgia about a man's readjustment to life out of prison after two decades on death row. My paper compares the themes present in both Rectify and in O’Connor’s novel The Violent Bear it Away, especially themes of Baptism and redemptive violence. I also employ O’Connor’s letters and occasional prose to answer the key questions: “what is Catholic fiction?” and “who can write it?”
In all time periods of literature, and across all genres of literary work, one prominently overarching theme is that of communication. Interpersonal communication is still so prevalent a theme in literature because it mimics the struggle people face in attempting to reach out to one another: the challenge of achieving interconnection and communicating their true self to others. In many stories and plays, the audience is privy to a character’s innermost thoughts and judgments, which may not correspond to the way they communicate to other characters. The insincere nature of these interactions has driven many a plot, or led to miscommunication between characters, generally resulting in negative consequences for those who employ such two-faced discourse. Characters in works of literature reveal much about themselves through the way they communicate to others. They are prideful, judgmental, and outright duplicitous in their communication to others. Many works of short fiction, poetry, and drama tend to reflect society’s overall lack of genuine interpersonal connection and communication, especially by demonstrating the oftentimes insincere nature of our interactions and the disastrous consequences of miscommunication. This poster board aims to explore both the psychological and sociological motivations behind various character’s methods of communication in multiple works of literature.
Integrating critical genre literacy into compulsory education will help prepare future citizens to engage in a world increasingly understood through representation rather than experience. Critical, I say, because what is missing from the classroom is not an understanding of how texts may be arranged through categories, but how these categories themselves are first formed by, and later form, ideological patterns. Genres incorporate individual texts into larger historical, political, and aesthetic narratives, forming movements out of individuals' unique utterances. In binding texts together this way, societies create discourses of similarity and differences. Such discourses, French philosopher Michel Foucault noted, frequently serve to legitimize both the exaltation of the powerful and the oppression of the different. All manner of scholars, from Spivak to Freud, have recorded the danger in allowing such discourses to stand unexamined, yet many will never read their treatises. Those texts are reserved for post-secondary studies. If society wishes to effectively struggle against its sexist, racist, heteronormative, and imperial tendencies, this information should be introduced much earlier. This can be done through the integration of literary analytical concepts throughout primary and secondary school, from basic ideas of prejudice to the fundamentals of more formal schools of criticism. Through this, schools can assist students as they develop their understanding of the ideological underpinnings of the world around them.
Sharrisse Viltus  
Emily D. Field (Faculty Sponsor)  
Department of English, Bridgewater State University  
Race and the Gothic in Hannah Crafts’ and Charles Chesnutt’s Fiction

The Gothic literary genre is the result of evolving creative expression originating from eighteenth-century Europe—a literary category that captures society’s abuse against the weak in fiction. It contains elements of the supernatural, decay of societal values, and an authoritative presence that represents evil. Thus, the genre is distinctive in how it depicts the weak overcoming oppressive authority. I will demonstrate ways Gothic literature is utilized by two nineteenth-century black American authors and the purpose it serves in post and antebellum American literature. The authors, Hannah Crafts and Charles Chesnutt, explore what it means to be human when being human is systematically denied and the consequences of that denial in their fiction. I argue that Hannah Crafts’ novel, The Bondwoman’s Narrative (1858), uses the Gothic genre to unveil the horror of dehumanization in antebellum America, whereas Charles Chesnutt’s “The Goophered Grapevine” (1899) and “The Dumb Witness” (1899) reveal how the genre can also revive the pain of the forgotten for post-bellum multiracial audiences. The Bondwoman’s Narrative fuses the slave narrative and conventional Gothic fiction to follow the protagonist’s journey to freedom and the price she must pay. “The Goophered Grapevine” and “The Dumb Witness” merge Gothic features with the conjure tale genre to recover forgotten stories of suffering as told after the abolition of slavery in the South. In analyzing these works, I will uncover the importance of the Gothic presence in fictional narratives written by black American authors and what is to be gained by the examination.
ENVIRONMENTAL STUDIES

362 Concourse 3:30-4:15 Board C06
Nasya Renae Al-Saidy
David Timmons (Faculty Sponsor)
Department of Economics, UMass Amherst
Plants against Pollution: Phytoremediation of Boston's Brownfields

Throughout the United States, there is an abundance of brownfields in low-income, non-white communities, and relative lack of them in wealthy neighborhoods. The U.S. Environmental Protection Agency (EPA) defines brownfields as locations that are “abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.” The prevalence of brownfields in at-risk communities is a severe case of environmental injustice which must be addressed. Where brownfields exist, there cannot be extensive economic development. This detracts from the opportunities and general well-being of individuals living in the vicinity. After exploring this correlation between at-risk populations and brownfields, I determine which pollutants are contaminating select brownfields within the greater Boston area. I then investigate which plants are best suited to absorbing these pollutants. This phytoremediation approach is often cheaper than other pollution-absorbing technologies, and can be used alongside them. By employing a benefits-transfer approach, I describe the effectiveness of using plants to clean the selected brownfields. To provide an accurate analysis, I integrate phytoremediation studies from areas in the same climate zone as Massachusetts. For example, a thorough phytoremediation study has been conducted in Chicago on behalf of the USDA Forest Service. In demonstrating the viability of phytoremediation in Boston’s brownfields, this project hopes to combat environmental injustice in the political arena.
Sarah Gabrielle Ayton  
Bethany A. Bradley (Faculty Sponsor)  
Department of Environmental Conservation, UMass Amherst  
Dengue Hemorrhagic Fever and Dengue Virus: Forecasting a Growing Threat to Human Health

Dengue is a destructive, vector-borne virus, transmitted predominantly by the female Aedes aegypti and Aedes albopictus mosquitoes in blood feeding. Both diseases predominate in poor areas of the tropical world and pose a threat to human health as a “fast emerging pandemic-prone viral disease” (WHO “Dengue”, 2015). We hypothesized that dengue outbreaks would be correlated with periods of high precipitation and temperature, areas of high population density, and areas of agricultural land use and sources of standing water. The Taiwan CDC’s national surveillance system was used to construct a timeline of dengue incidence from 2012-2015 on a county level. We obtained climate information from Taiwan’s Central Weather Bureau and downloaded WorldClim satellite data. We used spatial data mapping to examine the temporal and climatic trends related to dengue outbreaks, and we used linear regression to test for correlation between climatic variables (temperature, precipitation, humidity, etc.) and outbreaks. Initial analysis revealed modest relationships between these climatic variables (R < .35), which indicate that climate may account for up to 12% of outbreak variability in certain regions. However, slightly more significant climate correlations were found in regions with lower incidence of dengue. Dengue incidence was most highly concentrated in the densely populated southeastern region of Taiwan. Incidence was not elevated in regions with regular flooding and agricultural land use. It appears that dengue incidence is predominantly driven by population density, and is not strongly correlated with climatic variables.
368  Auditorium  3:30-4:15  Board A57
Samuel Joseph Butler
Michael Vorwerk (Faculty Sponsor)
Department of Environmental Science, Westfield State University
Cost-Benefit Analysis of Reforestation in Tropical Moist Forest and Temperate Deciduous Forest

Reforestation efforts are taking place in diverse ecosystems all over the world. Environmentalist and liberals would argue that the forest themselves are worth the cost of reforestation. Others require studies to show that the monetary benefits of reforestation exceed the cost. Reforestation is needed to provide habitat to a multitude of organisms. Reforestation is also an effective way of sequestering carbon, which slows down climate change. The purpose of this project is to carry out a cost-benefit analysis of reforestation in a tropical montane forest in Costa Rica. The costs of reforestation included are the cost of seedlings, forest planting, and maintenance. The benefits of reforestation examined include carbon sequestration, which can be found by examining the biomass of an average forest. Finding the amount of carbon sequestered also reveals the amount of oxygen produced, which can be valued using its current market value. Recreation and tourism are large producers of income for forest communities. Other benefits not included in this analysis are flood control, watershed protection (to keep water supplies clean), nutrient cycling, and recreation. Having a quantifiable benefit to having more forest allows for green organizations to push for reforestation efforts elsewhere in the nation and the world.
Camelina sativa is a non-food oilseed crop that has received a lot of attention for its potential as a biofuel. Current biofuel crops compete with land use for food production, creating a need for non-food biofuel crops that are able to grow on marginal land. Camelina has a short growing season, high oil content, and is suited to grow on nutrient poor low-grade soil, all traits that make it ideal for biofuel use. By bioengineering metabolic pathways involved in lipid biosynthesis, the goal is to create a carbon sink for the production of more triacylglycerol’s (TAG) in seeds. This research involves engineering Camelina with three TAG genes, individually and stacked, that control the rate-limiting steps for TAG biosynthesis. Through seed, oil, and gene expression analysis it can be determined if the genetically modified lines differ from wild type in their ability to produce higher levels of TAG and total oil accumulation in seeds. By increasing the amount of TAG and total oil produced in seeds Camelina can produce more biofuel. Preliminary results are highly encouraging; overexpression of TAG1 and TAG2 genes showed a significant increase in seed yield, seed size, and oil content. Evaluation of TAG1+TAG2+TAG3 stacked lines are in progress and results will be shared in the future.
GIS Spatial Analysis of a Proposed Conservation Corridor in Becket, Massachusetts

The National Wild & Scenic River is a federal designation that strives to preserve rivers that have outstanding scenic, recreational, geologic, historical, or cultural features. One of those rivers is the Westfield River located in western MA. Over 78 miles of the Westfield River’s headwater tributaries and three major branches are designated as a “National Wild & Scenic River,” but only a small amount of surrounding land is currently protected within that jurisdiction. Our research involves a spatial analysis of protected land parcels within ten towns located in the upper part of the Westfield River Watershed. Our study area includes the towns of Becket, Chester, Chesterfield, Cummington, Huntington, Middlefield, Savoy, Washington, Windsor, and Worthington. Through our assessment, we propose a corridor that provides suitable conditions for the conservation efforts of the Westfield River Wild & Scenic Advisory Committee. The mission of the committee is to protect and improve the natural resources of the Westfield River Watershed alongside the community. It is important to note that the designation neither prohibits development nor gives the federal government control over private property. Our research will provide the committee with GIS databases, layers, and quantified analysis of land suitable for conservation. These tools will be beneficial to the committee as they develop management plans.
Samantha Kay Hutchins
Tyler John Schofield
Michael Vorwerk (Faculty Sponsor)
Department of Environmental Science, Westfield State University
A Comparative Study of Academic Majors’ Recycling Efficiencies at Westfield State University

Waste management solutions are only effective if participants utilize appropriate refuse containers. Misuse of refuse receptacles leads to unnecessary additions to landfills. In this research, we determine if students and faculty in different majors recycle at different rates. To do this, we calculate the percent of recyclable items in trash receptacles. We are interested to see if as Environmental Science majors, our department’s students and faculty will care enough to recycle more than other majors. To assess the effectiveness of waste disposal by academic departments at Westfield State University, we monitor the trash in major-specific classrooms over a period of two academic weeks, totaling 5 observations for each of these classrooms. The results of the recycling efficiency rankings are displayed above each trash bin, challenging each major to decrease the number of recyclable items found in their trash. We repeat this study the week after, informing the student body of their major’s recycling standing. We hope departmental pride will cause a competitive atmosphere where students in each major will compete and strive to out recycle the others. Our purpose is two-fold, first to determine the correlation between majors and recycling, and second to see if we may be able to make an impact in reducing Westfield State’s contribution to landfills.
In this research, we analyzed the winter population trends in white-footed mice (Peromyscus leucopus). We used two study areas, one located at Westfield State University (WSU) and the other on a piece of rural land about 20 miles north of campus. We used a mark-recapture technique to monitor the trends in abundance. We set Sherman live-traps indoors at two locations: an active greenhouse on the WSU campus, and an unheated and uninsulated barn on the rural property. We determined the population dynamics. The populations are assumed to only be affected by certain factors; including births, deaths, immigration, and emigration. The traps were set for an initial 3 night marking period in late February at both locations and followed up with recapture bouts at two week intervals. Captured mice were fitted with numbered, aluminum ear tags to facilitate identification. We repeated this 3 separate bouts and assumed the marking procedure did not affect the trends. After collecting the data over the 5 week period, we estimated abundance after each bout by using the Lincoln-Petersen Method and compared them to estimate the trend. This was done for each location. The data for each location were then compared.
River restoration is a growing industry that uses expertise in hydrology, geomorphology, and ecology. However, its practices vary in objectives and guidelines. River restoration is often performed in response to floods, as was the case in New England following Hurricane Irene. The Chickley River in the Deerfield River Watershed, MA underwent 5.1 miles of channelization in 2011 and restoration in 2012. Channelization was found by MassDEP to have caused extensive habitat destruction and simplification. In 2012, the Chickley River underwent restoration with focus on natural river design, tree planting, filling channelized locations, and large woody debris (LWD). This study examines the Chickley River’s geomorphic and habitat at post-Irene (2011), post-channelization (2011), post-restoration (2012), and 2015 conditions. Channel stability was computed at three cross-sections. After channelization, Shields parameter exceeded 0.05, indicating channel instability. After restoration, Shields parameter was approximately 0.05 at all cross-sections, suggesting channel stability. GIS analysis of vegetation indicated average width of canopy opening above channel was 5.8 m in 2009, 12.3 m in 2011 and 17.5 m in 2014, demonstrating notable reductions in riparian cover from Irene and channelization. GIS analysis shows LWD increased post-Irene (log jams of >50 logs, ~1 per km) but was removed during channelization. Restoration replaced LWD with jams of 3-5 logs. Observations show channelization reduced channel stability, riparian cover, and LWD. Restoration improved channel stability, but did not restore LWD or riparian vegetation to pre-channelization conditions. This study illustrates how consideration of ecological and geomorphic conditions may affect river management decisions.
Tributaries of the Merrimack River will be analyzed for Escherichia coli bacteria and nitrate in order to test for any possible fecal pollution from sewage. Human and animal feces contain E.coli, which the EPA recommends as the best indicator of fecal pollution. There is a toxic strain of E.coli that can cause severe illness in humans. Fecal pollution can also introduce excess phosphorus and nitrogen into aquatic ecosystems that then cause algal blooms. The decay of algae uses all of the oxygen in the water causing dead zones and loss of biological diversity. According to the Merrimack River Watershed Council fecal pollution, particularly from combined sewage overflows, is the major source of pollution to the watershed today. There are sites along tributaries of the Merrimack River from Lawrence to West Newbury that will be used as sampling locations which have shown high levels of E.coli during past sampling by the Merrimack River Watershed Council. Samples will be analyzed for E.coli using EPA approved methods for membrane filtration and bacterial incubation on modified mTEC media. Nitrate analysis will be conducted using the green chemistry technique of nitrate reductase to convert nitrate to nitrite prior to spectrophotometric analysis. This will eliminate the need for the heavy metal cadmium used in current EPA methods for nitrate analysis.
Using Cyanobacteria as an Alternative Energy Source to Impede the Effects of Global Warming

According to scientists, if the Earth’s temperature increases by two degrees, sea levels will begin to rise. While this may not be a problem for the human population living on the mainland, coastal islands that are barely above the sea level will slowly disappear like the Solomon Islands, Maldives, the Marshall Islands and Seychelles. There is no clear-cut solution to slow the effects of global warming, but using alternative energy sources will not add to coastal erosion. Biologists have learned that cyanobacteria may be used as an alternative energy source and is healthy to the environment if it is cultivated and producing properly. With every potential energy source, there is usually a dilemma before the expected results are met. Biologists would have to create a container for the energy and environmentalists would want to see the potential benefits of using this bacterium as an energy source. In conclusion, cyanobacteria can be used as an alternative source of energy and help with the effects of global warming to the environment.
Benzene, toluene, ethyl-benzene, and xylene (BTEX) are a set of volatile organic compounds that can be both hazardous to humans and the environment. While their sources are numerous, one of the more common avenues for human and environmental exposure is fuel vapor. This carcinogenic vapor is far from innocuous, and has been linked to the production of air pollutants like photochemical smog. Our research investigates this connection between BTEX chemicals and anthropogenic air pollution. By testing the ratios of BTEX chemicals in the vapor of varying octanes of fuel, our research demonstrates that a common ratio of BTEX chemical concentrations exists for all consumer fuels. This ratio can be used to determine the age of atmospheric pollutants derived from fuel vapor. Our research will analyze four different fuel products for BTEX concentrations through gas chromatography. The hypothesis is that commercial fuels contain a common ratio of BTEX chemicals in their vapor. 87 octane, 93 octane, racing octane, and diesel fuel will be the selected gasoline types for our study. Headspace sampling will be used to compare the concentrations of BTEX chemicals in each fuel analyte against a standard concentration curve. Part of research will involve fine-tuning this concentration curve to be consistent and reproducible for each fuel type.
Students of Westfield State University have complained about hair color change, murky water, and evident distaste commonly associated with chlorine. We are conducting an experiment analyzing the varying concentrations of chlorine in Westfield State University’s potable water. At Westfield State University we plan on sampling the water in all the dorms, academic buildings, and dining commons. To perform this experiment we will be using chlorine test strips to detect chlorine concentrations between 0 ppm - 6 ppm. We expect to find varying high concentrations of chlorine between each location. Chlorine is chemically regulated under the Safe Water Drinking Act by EPA standards. We expect concentrations to vary from building to building, but the EPA is supposed to ensure concentrations fall between 0 and 4.0 mg/L. The data collected will be used to compare concentrations of chlorine between the different sample areas. Depending on compiled results, we plan on further analyzing what we can do manage this toxin.
377  Room 809  4:30-5:15  Panel 7
Jennifer Raichel
Paul Musgrave (Faculty Sponsor)
Department of Political Science, UMass Amherst
International Cooperation on Climate Change Mitigation

Can we fix climate change? Collective action theory, as elaborated by Mancur Olson, says “no,” and so far history and scholarship has shown him to be correct. Though based off of past successful efforts of collective action, the United Nations Framework Convention on Climate Change has ultimately failed in its task to reduce greenhouse gas emissions and stabilize the climate. Why? Olson would argue that this failure is due to the very nature of the climate change issue; a problem of collective action is not likely to be solved unless under circumstances involving motivated groups and specific incentives. The current international climate regime does not effectively employ the incentives and circumstances necessary to overcome the limitations of the large, disparate group of nations that have a collective interest in mitigating climate change. Yet despite Olson and others’ global pessimism, local actors have been able to make progress on tangential issues. So should we take a record of failure as evidence that Olson is right, or is there still hope for international cooperation? Using the work of Olson, Elinor Ostrom, and Peter Haas, I look at what conditions would facilitate a successful effort to mitigate climate change and further, if that is possible under the current international regime.
Examining the Toxicity of Heavy Metal and Rare Earth Element Nanoparticles to Symbiotic Nitrogen-Fixing Bradyrhizobium Bacteria

Nanoparticles are increasingly found in many novel pharmaceutical, cosmetic, electronic, and agricultural technologies to name a few. However, the interactions of engineered nanoparticles (ENPs) with biological systems is largely not yet understood. Rhizobia are a class of bacteria possessing the ability to symbiose with legume plants by fixing and supplying nitrogen in exchange for the host’s carbon. This feature makes rhizobia key players in global nitrogen cycling, and crucial to the overall health and productivity of the agroecosystem. They lower the demand for synthetic fertilizer, the extensive fossil fuel use accompanying its production, farmers' expenses, while helping mitigate the risk of excess fertilizer leaching into the environment and eutrophying local aquatic ecosystems. Therefore, this interaction is important to protect in the interest of sustainable agricultural practices, and the toxicity of ENPs to rhizobia should be characterized in order to safeguard these resources. There are numerous studies demonstrating the toxicity of ENPs to plants, animals, and bacteria, but few involving rhizobia or rare earth element ENPs. Therefore, the aim of my experiments is to begin characterizing the toxicity of Neodymium (Nd) and Ytterbium (Yb) oxide nanoparticles from the Lanthanide series of the periodic table, as well as add to current knowledge base on the toxicity of copper oxide and silver nanoparticles, in regards specifically to Bradyrhizobium bacteria. To do so, I am using both in vitro and in vivo scenarios, and methods including growth and viability tests, and ICP-MS to examine uptake into the bacteria.
Salting of roads in New England is a common means of road treatment to mitigate dangerous and icy road conditions. Sodium chloride is the most commonly used deicing agent used to treat Massachusetts roadways. Run-off contaminated with sodium chloride has been shown to have negative effects on native vegetation, and may promote the proliferation of invasives. We suspect the conductivity of stormwater runoff to be markedly higher in densely settled areas with many roads than in less densely settled areas with few roads. Salts contain divalent cations and their concentration in aqueous solutions can be gauged by measuring the solutions conductivity. The purpose of this study is to quantify the conductivity of stormwater runoff in various areas throughout Westfield and Holyoke Massachusetts. From the conductivity concentrations we will back calculate the salt concentration of stormwater runoff in catch basins of large commercial parking lots, along roadways, and in residential neighborhoods. We seek to discover whether a correlation exists between runoff conductivity and: impervious surface area, elevation, or surrounding development (i.e. commercial versus residential areas).
Rapid urbanization has significantly altered landscape use by wildlife around the world and this has led to increased rates of human-wildlife interactions. To assess relative species occurrence in forested (n=53) versus altered (n=18) sites within the Connecticut River Valley of central Massachusetts we deployed camera trap stations (n=2,367 total trap nights) from May to September 2012 and 2015. Photo rates of 20 mammal and 7 bird species suggested notable variation in distribution related to anthropogenic landscape change; e.g., striped skunks (Mephitis mephitis), raccoons (Procyon lotor), gray squirrels (Sciurus carolinensis), eastern cottontail rabbits (Sylvilagus floridanus), coyotes (Canis latrans) and Virginia opossums (Didelphis virginiana) were photographed more often at altered sites compared to forested sites. Overall photo rates (No./100-trap-nights) suggest gray foxes (Urocyon cinereoargenteus), white-tailed deer (Odocoileus virginianus), crows (Corvus brachyrhynchos), and American robins (Turdus migratorius) also were more common at altered sights. Five bird species and 12 mammal species did not exhibit a statistically significant (P<0.01) differences between site types. Further analysis including more specific measures of urbanization levels at sample sites could yield valuable insights into species specific tolerances along the urbanization gradient.
An Analysis of Japanese Knotweed Distribution on the Westfield River

The Westfield River, in western MA is home to many species of riparian vegetation along its banks. Some of these plants are considered to be invasive species, which pose a threat to the native ecosystem by out competing the indigenous vegetation. In this research, Japanese knotweed will be observed to determine if the Westfield River acts as a transport mechanism for the colonization of the plant along the riverbed. The dams along the East Branch of the river will also be observed to determine if they act as a barrier for the distribution of the invasive. The research will take place on three sections of the river: the free flowing West Branch, the East Branch containing multiple dams, and the Main Branch, downstream of the confluence of the other branches. The presence or absence of Japanese knotweed will be visually determined along each branch of the river. Based on these observations, the distribution patterns will be determined. The data collected are used to evaluate if the river flow and dams have an impact on the transportation of the Japanese knotweed. With this information, future management plans can be created to help prevent the spread of this invasive species.
Use of Camera Traps to Assess Activity-Specific Habitat Use of Mega-mammals in the Forests of Massachusetts

Camera trapping has become a valuable tool for noninvasively capturing animals in their natural habitats and is now a method used by many researchers to assess wildlife population density, occupancy, and habitat selection. To assess habitats most commonly used by American black bear (Ursus americanus), moose (Alces alces), and white-tailed deer (Odocoileus virginianus), we distributed 36 cameras in various forest cover types on the Prescott Peninsula of the Quabbin Reservoir in western Massachusetts. The trapping season ran from mid-August through mid-November, and accounting for failed and disturbed cameras resulted in a total of 2,694 trap nights (TN). Bears were most likely to be photographed in Non-Oak Hardwoods (5.4 events/100 TN), followed by Wetlands (4.9 events/100 TN) and Oak Mix (4.5 events/100 TN). They were never photographed in any 11-21 old Conifer cuts, and rarely present at Conifer Hardwood sites (0.7 events/100 TN). Moose were most likely photographed at Oak Mix sites (4.2 events/100TN) and were absent from sites in 0-10 and 11-21 old Conifer cuts. White-tailed deer were photographed most frequently overall (219 total events), and were photographed most often in grasslands (34.1 events/100 TN) and 0-10 Hardwood cuts (17.4 events/100 TN). They were absent from 0-10 Conifer Hardwood cuts and were rarely captured in 11-21 Conifer cuts (0.8 events/100 TN). With further analysis, we will hopefully be able to better understand how these and other species interact with the environment and select for various available habitats, and will be able to explore the potential of using camera trapping to assess habitat selection.
Evaluating the Efficacy and Applications of Trail Cameras to Monitor Climate: Are They Accurate and Who Needs the Data?

Ecologists often rely on coarse-scale snow and temperature data to evaluate recent habitat trends and to predict their effect on wildlife populations. However, complex landscapes influence climate in ways that vary beyond those captured by local weather stations. We established 91 remote cameras – programmed to collect daily climate data – along elevational (335 m–1,917 m) and latitudinal (43.9° N–45.3° N) gradients to evaluate the influence of snowpack and temperature on species’ distributions and demography. We were interested in exploring the accuracy of these units at the site-level to test whether trends were similar to broad-scale data. We compared temperature between cameras and data loggers (site-level) and temperature and snowpack data between cameras and remotely sensed climate data (broad-scale). We also explored applications for the climate data, including carnivore distribution modeling and snowshoe hare coat-color phenology relative to seasonal and annual changes. Preliminary data suggests that boreal forest carnivores (Canada lynx and American marten) are associated with a deep snowpack and long snow season and the coat color of snowshoe hares is better matched at high elevations and latitudes. However, as snowpack receded in spring there was a general trend for competing carnivores to also be detected at high elevation sites. We suggest increasing the number of dataloggers at camera sites to determine whether there is bias among camera brands and habitat types and if seasonal shifts in snowpack levels remain consistent.
Marketing Offshore Wind Energy

Eighty-five percent of America’s energy comes from nonrenewable fossil fuels--coal, oil, and natural gas. Wind power is now the world’s fastest growing green energy source and one of the most rapidly expanding industries. From 2013 to 2014, the wind energy sector became job-creating force, nearly tripling jobs from 22,500 to 73,000. Despite the rapid growth, state and federal legislators thwart its growth. Homeowners and small business owners continue to support grid-connected conventional sources of fuel. My research will provide wind energy companies with unique 21st century marketing tools and strategies such as: one on one social media networking, clienteling, and email marketing. This research aims to provide guidance to wind companies about how to convince a larger percentage of homeowners and small businesses to invest in wind energy. Power producers are currently tied into our antiquated grid systems, rather than embracing renewable energy options. My research will present the case and provide strategies for our state utilities to update their power grid systems so that our energy infrastructure is more sustainable.
Our poster will present research on how the invasive Phragmites grass has started to take over the wetland area behind Westfield State University in Westfield, Massachusetts. This plant outcompetes the native cattails and is possibly harming other animal and plant species. Phragmites was introduced into the wetland in approximately the year 2000, possibly through surface runoff. Since then, Phragmites has become the dominant species in an area of the wetland. While the cattails only grow 3-10 feet tall, Phragmites can grow up to 18 feet tall. The Phragmites population density provides a harsh habitat for many of the native species, causing those native species to relocate or die out. Through the use of historical aerial photographs, we hope to determine the temporal changes in the distribution of the Phragmites. Using these data, we will determine its colonization rate, and develop a mathematical model to describe the expansion of the Phragmites colony. This model could become a management tool for locations that become infested by Phragmites. By learning about its rate of growth and colonization, we can estimate how quickly the Phragmites can take over an entire wetland. Through the regression model, managers could possibly develop methods to control the Phragmites in a safe and efficient way. The model could aid managers to effectively control and prevent the expansion of Phragmites.
The state of Massachusetts contains approximately 3,000 dams, which were built for flood control, hydropower, water for citizen use, and to power mills. With about 90% of these dams no longer functioning in their intended capacity, focus has recently been turned to their removal. Dam removal is beneficial for human safety and aquatic ecosystem health. Many dam removal efforts highlight the potential for restoring connectivity for fishes, particularly diadromous fish that require long movements along river corridors to complete their life cycle. In contrast, few studies have focused on benefits of dam removal on movement of non-anadromous fish, despite the importance of small-scale movements for population persistence. This study examines the impact of a dam and dam removal movement patterns of slimy sculpin, a non-anadromous, cold water fish. I use a genetic approach, the sib-split method, to identify the presence of full siblings on either side of the barrier and make inferences about movement patterns. I expect to find increased movement following dam removal, with more full siblings in locations closer to the old dam site than farther away. Understanding the effects of barriers on the movement patterns of non-anadromous fish may influence management decisions regarding dam removal, and will also help to understand the impacts of barriers on population connectivity.
Eric Francis Wuesthoff  
Todd K. Fuller (Faculty Sponsor)  
Department of Environmental Conservation, UMass Amherst  
Saving the Almiquí: Development of a Comprehensive Conservation Plan for the Cuban Solenodon (Solenodon cubanus)

The Cuban solenodon (Solenodon cubanus) is a venomous, 1-kg mammal nearly unchanged since the extinction of the dinosaurs and classified as endangered by the IUCN (International Union for the Conservation of Nature). One of the only mammalian species endemic to the Caribbean to survive human colonization, the solenodon currently lacks significant conservation attention due to a lack of biological and ecological data and the strained diplomatic relations between Cuba and prominent Western nations, particularly the United States. With U.S.-Cuban political ties improving, now is a crucial time to formulate and implement substantial and complete conservation measures to save this unique species from extinction. I developed a substantial conservation plan based on research and analysis of a wide range of primary and secondary sources. Through international cooperation combined with local efforts to conserve vital habitat and counter the negative effects of invasive predators, it seems feasible that the Cuban solenodon population can be stabilized and kept from spiraling into extinction. Protection for this species should be prioritized due to its unique evolutionary history, endangered status, and niche as the native apex predator in its ecosystem.
Israel’s economy weathered the 2008 financial crisis and recession better than any other OECD nation, largely as a result of prudent fiscal and monetary policy. In contrast to its robust economy, developed financial system, and liberal democracy, Israel is subject to constant security threats and political turmoil. Israel’s geopolitical position necessitates its economic success: the longevity of the country, and with it Western ideals in the Middle East, rely on Israel’s small, innovative economy. This study examines areas of concern for Israel's economy, as well as areas in which there is potential for improvement. In particular, I focus on the cost of housing and the price level, inequality in income, productivity, and educational attainment, and the shadow economy.
The purpose of this research is to determine the impact of pharmaceutical clinical trials’ outcomes on fluctuations of stock market value. With the recent ascent of new biotechnology venture capital, post-IPO stock price swing associated with FDA Phase III clinical trial results often serves as the critical point generating great financial returns or losses for investors. To determine the impact of these trial outcomes, stock price returns alongside their firm-specific attribute significance are calculated in three separate time frames surrounding Phase III announcement: before, immediately following, and after initial stock price reaction. Firm-specific attributes include stock market capitalization, R&D expenditure-to-market value ratio, and the drug’s patient market size. The relationship between stock returns and their determinants will be investigated using regression analysis. This study seeks to prove that biotechnology stock price movements surrounding Phase III trials results are inversely proportional to their market capitalization size, directly proportional to their R&D expenditure-to-market value ratio, and directly proportional to the Phase III drug’s patient market size. Further relationships like pre-announcement insider trading or post-negative-announcement stock drift will be investigated as they provide evidence of soft variables like investor sentiment and information uncertainty echoed by previous studies. This research aims to offer investors a risk analysis of biotechnology investment strategies and provide CEOs an insight into where their share price may end up based on FDA outcomes. CEOs may attempt, by using results of this research, to adopt new business strategies in order to reduce stock price volatility of their company’s shares.
Our world’s dependence on oil has led to many issues, including pollution, supply constraints, and even international conflicts. As our society advances, alternative forms of energy are being developed and explored. However, in order to become a new standard, the profitability of these alternative energy sources must be proven. This paper conducts a case study of the profitability of publicly traded solar electricity companies in the U.S. The key hypothesis is that quantifying positive externalities and considering them as a positive cash flow will yield a higher imputed value of solar companies than what is currently perceived by the market. EPA dataset will be used to estimate the cost of emissions and it will be combined with EIA data on energy output by source in order to estimate the dollar cost of “emissions prevented” per one solar-generated kilowatt-hour. This dollar value will be applied to the annual energy generated by each company, which will be considered a positive cash flow in the company valuation. Finally, an externality-adjusted value of each company will be calculated using this new cash flow, and compared to the company’s current market value. Research is currently underway. The study is expected to yield the following conclusions: solar electricity companies are currently undervalued by the market, which does not take into account the large environmental benefit of carbon emissions prevented by use of electricity generated by solar-powered energy sources. A confirmed hypothesis would suggest that even when oil prices are low, solar electricity is a worthwhile investment.
This paper reviews the existence of populism and its occurrences worldwide with primary focus on its current state in the European Union. I examine the effects of financial crisis and distress on a nation’s propensity to support populist ideals and I attempt to identify the factors that explain the rise of both left-wing extreme and right-wing extreme populist parties in the European Union.
The Influence of Urban Green Space on the Urban Heat Island Effect in New England Cities

It has been long known that urban areas are warmer than rural areas, this phenomenon is known as the Urban Heat Island (UHI). Through remote sensing (satellite imagery), previous studies have shown a correlation between urban sprawl and thermal heat where increasing sprawl produces hotter urban temperatures. This heat island effect has been shown to contribute to rising global temperatures and negatively affect the health of its residents. Green spaces, such as parks and trees, have shown to reduce the heat island effect and improve various factors of the city’s health and welfare. Utilizing data from Landsat and other sensors, our research establishes a correlation between the change in green space and the urban heat island effect found in the cities of New England.
This study aims to analyze the areas in Massachusetts that could serve as habitats to support the potential reintroduction of mountain lions back into the state. Mountain lions, which have not maintained a major presence in the state of Massachusetts since 1858 (Massachusetts Department of Fish and Game n.d.) have been documented to be slowly repopulating previously uninhabited states from west to east. (LaRue 2012) With two confirmed cases of mountain lions in Massachusetts since 1997, both being found in the Quabbin Reservoir Reservation, (Massachusetts Department of Fish and Game n.d.) this study aims to complete a Geographic Information Systems (GIS) analysis of areas in Massachusetts and bordering areas in adjacent states that have similar road densities, land cover type, and proximity to water as the Quabbin Reservoir Reservation. GIS datalayers for the study include the NOAA C-CAP landcover data for 1996, 2000, 2006, and 2010, as well as the datalayers for hydrography, human population density, and road density. In conclusion, if enough area is found to be suitable to sustain mountain lion population, this study proposes that efforts be made to reintroduce mountain lions as an apex predator to the state.
After banishment from both Norway and Iceland, Erik “the Red” Thorvaldsson established the first Norse settlement in Greenland; however, by the 15th-century these colonies were abandoned. The principal narrative is one of “climate as executioner,” (McGovern, 1991) but this conclusion is based upon evidence limited by space and resolution. Geochemical reconstructions have only recently correlated human occupancy with paleoenvironmental conditions (D’Anjou et al., 2012). Here we present analyses of organic biomarkers from a lacustrine sediment core in Eriksvatnet (SW Greenland), the alleged site of Thorvaldsson’s estate in Brattahlíð. A multi-proxy approach is applied to examine climate variability during the past thousand years using brGDGTs, plant leaf waxes, deuterium isotopes (δD), and fecal sterols. These data are used to elucidate the potential role of temperature and hydrology on the demise of the Norse Settlement in Østerbygden. They form a high-resolution record of human impact and paleoclimate, addressing the nature of climate change on the boom and bust of Norse Greenland. More broadly, it serves as a model for future investigations into the role of climate on human migration.
Hurricanes and tropical storms can cause devastating fatalities and expensive structural damage within coastal communities. In our warming climate, we do not yet understand how climate change will affect hurricane frequency or intensity, making accurate climate and storm proxies necessary to protect against hazardous storms. This study aims to better understand tropical Atlantic hurricane frequency and relative intensity by studying historic storm event sedimentation in a blue hole basin off the southern coast of South Andros, Bahamas. We determined coarse fraction every centimeter of our core, which preserves a 600 year record of tropical cyclone activity, and indicates a period of frequent storm events. To further assess relative hurricane flood intensity, we ran coarse fraction samples >15 percent coarse on the Camsizer for grain size analysis. We ran settling tube velocity tests for different grain size increments to produce a relationship between grain size and settling velocity. This relationship allowed our team to approximate the settling velocity of our storm deposited grain sizes. Our grain size data provides a relationship between grain size and settling velocity for South Andros storm deposits. By setting shear velocity equal to settling velocity, we calculated the minimum bottom shear stress needed to transport the coarse storm deposits found in the core. Our minimum bottom shear stress analysis creates a basis for assessing relative flow intensities during historical hurricanes.
Reconstructing Pleistocene Climate Variability in the Terrestrial Arctic: An Organic Geochemical Paleoclimate Record from Lake El’gygytgyn, Russia

Lake El’gygytgyn, Chukotka, NE Russia is a meteorite impact crater located 100 km north of the Arctic Circle. The crater was created 3.6 million years ago (Ma) and has remained unglaciated since its formation, thus providing the longest and most continuous record of Arctic paleoclimate. The Pleistocene is a period of Earth’s history, which lasted from 2.58 Ma to 11.7 ka, which is characterized by strong fluctuations between cold glacial periods and warm interglacial periods. This study utilizes organic biomarkers in Lake El’gygytgyn sediments from 200- 800 thousand years ago (ka) to reconstruct climate variability in the terrestrial Arctic across the mid- to late-Pleistocene. Branched glycerol dialkyl glycerol tetraethers (brGDGTs) are used to reconstruct temperature variability and plant leaf waxes (n-alkanes) are examined to determine vegetation and hydrologic changes throughout the study interval. BrGDGT temperature reconstructions indicate the terrestrial Arctic experienced both warm interglacials and mild glacial periods during the mid- Pleistocene, and transitioned to more extreme temperature fluctuations later in the study interval. The average chain length of n- alkanes indicates that glacial intervals were especially arid, while interglacial periods were wetter at Lake El’gygytgyn.
Orion Mitchell Hatch  
David Francis Boutt (Faculty Sponsor)  
Department of Geology, UMass Amherst  

**Borehole Temperature Profiles Constrain Groundwater Flow, Evaporation Rates, and Discharge to the Salar de Atacama, Chile**

The Salar de Atacama (SdA) in northern Chile provides a unique opportunity to study regional hydrogeologic processes in a hyperarid environment. The endorheic basin has been receiving groundwater discharge since ~ 7 Ma resulting in the accumulation of massive evaporite deposits in the halite nucleus (>1500 km³). Modern discharge of water along a 90km long flowpath evolves from freshwater to brine over an 8 km long transition zone. This study uses groundwater temperature profiles to constrain rates and hydrogeochemical processes impacting groundwater discharge in the southern transition zone of SdA. Temperature profiles are analyzed for 13 wells along a 31 km hydrogeologic transect. The wells range in depth from 30m to 100 m with land surface elevations of 2450m at the most upgradient well and 2300m for wells in the halite nucleus. We use a two dimensional adaptation coupled model of ground water flow and heat transport in a fully saturated aquifer system to interpret the temperature profiles. A general cooling trend along the discharge zone has been observed in the vicinity of ephemeral lagoons. Temperature profiles generated from boreholes spanning the hydrologic transition zone reveal a drop of approximately 10oC within the geothermal, discharge zone. Local volcanism, noble gas signatures, and upward flow of warm water seen in upgradient boreholes suggest a shallow magma body impacts available heat within the aquifer. We hypothesize that the enthalpy of vaporization of the brackish water found in the aquifer is one mechanism responsible for heat loss across the transect.
389  Auditorium  4:30-5:15  Board A28
Jessica McDaniel
Jeff Salacup (Faculty Sponsor)
Department of Geology, UMass Amherst
A Comparison of Holocene Land and Sea Temperatures from the Gulf of Maine based on GDGTs and Alkenones

The Gulf of Maine is located on the eastern North American shelf, encompassing the Bay of Fundy, Nova Scotia, Cape Cod and Massachusetts. Its size suggests that its sediment record represents the majority of the Northeastern United States. Commercially, it is relied upon as a productive fishery and summering ground for whales. However, the Gulf of Maine is warming 99% faster than Earth’s oceans in response to global climate change, resulting in northward shifts of some fish populations and high mortality rates in others. This encourages an understanding of the Gulf’s long-term environmental history through paleoceanographic investigation. Organic biomarkers called GDGTs, (from the terrestrial realm), and alkenones (from the marine realm), were extracted from sediment core CH-10-90 PC-3 (Jordan Basin, northeastern Gulf) to create ~8,000 yearlong terrestrial and marine paleo-temperature records. Alkenone sea surface temperature estimates, suggest the Gulf of Maine has cooled ~5°C over the past 8 kyr, paced by insolation. Alkenone and GDGT-based temperature estimates indicate land-sea temperature gradients also changed over the past 8,000 years. This would have implications for regional atmospheric dynamics.
Kevin Quoc Nguyen
Isla S. Castaneda (Faculty Sponsor)
Department of Geology, UMass Amherst
Reconstructing Early Holocene Decadal-Resolution Temperature Using brGDGTs from Lake Sediments, Western Greenland

The western margin of the Greenland Ice Sheet advanced and retreated rapidly during the early Holocene, likely in response to the 9.3 and 8.2 ka abrupt cooling events. These cooling events are documented in records from Greenland ice cores, however we know little about early Holocene decadal-scale temperature change near the margins of the Greenland Ice Sheet. This study located on Nuussuaq on the western coast of Greenland investigates early Holocene abrupt temperature change using the MBT-CBT proxy based on branched glycerol dialkyl glycerol tetraethers (brGDGTs). We derive an age depth model for our sediment core from Sikuiui Lake using 12 radiocarbon-dated terrestrial macrofossils. Multiple sedimentological and inorganic geochemical records have also been generated from this core. We analyze GDGTs at decadal-resolution, using high performance liquid chromatography-mass spectrometry, to determine GDGT concentrations and ratios. Our findings indicate that most of the samples do not contain isoprenoid GDGTs. However, brGDGTs are present in most of the samples, with particularly abundant signals of the major ions, similar to other small lakes on western Greenland. We will present our decadal-scale br-GDGT-inferred temperature record in combination with the multi-proxy records already generated from this lake.
The Nankai Trough in southwestern Japan causes great intraplate earthquakes every 100-150 years. Although historical documents are unreliable regarding the magnitude of the resulting tsunamis, sediments preserved in back-barrier lakes allow past storm events to be reconstructed. In these sediments tsunamis are characterized by anomalously coarse deposits with elemental signatures similar to those observed along the site's barrier beach, with chronologies obtained from Cesium-137, heavy metal and Carbon-14 ages. The event of record is believed to be the 1707 Hoei tsunami which has been observed in several back-barrier lakes in Shikoku. Lake Sunokawa which is also located on Shikoku, as well as Lake Ryujin, a lake across the Bungo Channel in Kyushu, both exhibit the 1707 event in their sediments, providing a lateral extent of the tsunami. In addition, lithological changes at other sites in the Bungo Channel at around 1000 years ago suggest that they were caused by a tsunami derived from the Median Tectonic Line. Lagoonal sediments and in turn the barrier beach at Lake Sunokawa in its current form date to 1000 years BP and show a major environmental change at this time. However, Lake Sunokawa is closer to the mouth of the Bungo Channel and to the Nankai Trough, indicating that the event at 1000 years BP was less regional than earlier thought.
384 Auditorium  10:45-11:30  Board A53
Mark Anthony Settembrino
David Francis Boutt (Faculty Sponsor)
Department of Geology, UMass Amherst
iCons: Controls on the Geochemical Evolution of Groundwater on Tobago

This study investigates the geochemical evolution of surface and ground waters of Tobago to understand timing of recharge, nature flow paths, and rates of solute flux. Tobago is a developing island in the Caribbean, whose aquifers are highly heterogeneous and anisotropic, composed of metamorphic and crystalline rock with structural controls on permeability. Understanding the hydrogeology of small islands is critical to evaluating groundwater resources, especially in the Caribbean which experiences strong seasonality in precipitation. In March and December 2014, we sampled 32 groundwater wells, 36 surface water sites, 5 springs, and ocean water. Eight months of precipitation data (June 2014 – January 2015) from 16 meteoric stations on the island were also collected. All samples are analyzed for stable isotopes of oxygen and hydrogen of the water molecule, major and minor elements, and 87Sr/86Sr isotopes. Initial findings constrain temporal controls on recharge and seawater signatures in groundwater wells. Stable isotope data supports conceptualization that wet season precipitation dominates recharge and groundwater chemistry, despite the fact that dry season precipitation contributes significantly to total precipitation amounts. Interpretation of major elements and 87Sr/86Sr isotopes indicate seawater mixing in groundwater wells, some of which are screened below a brackish water bearing confining unit. We distinguish the source of the seawater signature from saltwater intrusion, or from downward leaching of brackish water. The location of significant fresh potable groundwater less than 1km to the coast with screens below sea-level confounds the interpretation of the fresh water/salt water interface in aquifers dominated by fracture flow.
Style and Timing of Folding and Metamorphism in the Eastern Adirondack Whitehall Quadrangle: Regional Differences in Deformation

Large NW-oriented folds and later E-plunging folds have been recognized in the Eastern Adirondack Mountains, but the nature, timing and P-T conditions of folding events are not yet constrained. At least four tectono-metamorphic events are recognized in the region: the 1.2-1.16 Ga Shawinigan Orogeny, 1.16-1.14 Ga emplacement of the AMCG igneous suite, the 1-1.05 Ga Ottawan Orogeny and post-Ottawan tectonism. Field mapping and structural/petrographic analysis has been carried out in the western portion of the Whitehall quadrangle, where a kilometer-scale southeast-plunging synform has been hypothesized. Major rock units include: quartzofeldspathic gneisses with varying amounts of pyroxene, hornblende and/or mica, massive to weakly foliated gabbro, and local khondalite (Grt-Sil-Qtz-Fspar, interpreted to be restite), especially near gabbro. It is unclear whether the sequence contains multiple gabbro units or one unit repeated by isoclinal folding. The region can be separated into a western domain that displays a dominant NNE-striking foliation and continuous layering, and an eastern structural domain characterized by complex folding on several scales. Outcrop-scale folds are isoclinal and recumbent with gently East-plunging axes (10°->105°). The presence of folded gabbro layers that cut an earlier gneiss foliation, folded inclusion trails in garnet that is wrapped by a strong foliation, and recumbent style isoclinal folding of khondalite, indicate that the region underwent at least two periods of deformation. Structures and fabrics in both domains suggest that the second deformation event involved intense east-west-directed shearing. Current work involves detailed microstructural analysis, petrologic analysis, geothermobarometry and timing of folding and metamorphism using monazite geochronology.
GERONTOLOGY

393 Auditorium  11:45-12:30  Board A42
Nicole Hutcheon
Kathleen DiLorenzo
Nancy Stuart
Nina Silverstein (Faculty Sponsor)
Department of Gerontology, UMass Boston
Sharing Healthy Aging Data to Promote Community Action

The purpose of this study is to explore healthy aging in Massachusetts communities through a case study approach. Secondary data were extracted from the 2014 and 2015 community profiles of 351 cities and towns and 16 Boston neighborhoods. The community profiles were created by the Gerontology Institute, UMass Boston and are in the public domain on the Massachusetts Healthy Aging Collaborative website supported by the Tufts Health Plan Foundation. Each profile contains over 100 indicators of healthy aging and compares the community level estimates to state rates. For this investigation, five communities across four counties were selected due to their mix of rural, suburban, and urban environments and geographic convenience to the student researchers. The communities were: Milton, Rutland, Tewskbury, Weymouth, and Yarmouth. Four of the five communities had indicators of healthy aging that were worse that the state prevalence rate. Primary data were collected via key informant interviews. Interviews were designed to facilitate an examination of the community profiles, help identify any challenges and/or strengths, and highlight what community resources are available and needed. Recommendations were shared to help stakeholders build on strengths and address challenges observed in the selected communities. An outcome of this study is a healthy aging strategic planning worksheet to assist community stakeholders in their short and long term efforts to address the challenges identified through this research.
HISTORY

412  Room 809  11:45-12:30  Panel 3
Kimberly Fern Andolina
Aldo Garcia-Guevara (Faculty Sponsor)
Department of History, Worcester State University
The War on Drugs and Immigrants: A Status on Suffering

Since the official declaration of the War on Drugs by the Nixon Administration in 1973, people in much of Central America have endured constant violence. Honduras and El Salvador are at the epicenter of The War on Drugs. Among the poorest countries in the western hemisphere, they are not officially "at war," but endure the highest murder rates per capita in the world. However, because this violence is waged between drug cartels, paramilitaries, and undercover DEA agents, these are not considered war-zones. This translates into a lose-lose situation for people caught in-between and desperate to escape it. With no end in sight to the "War on Drugs," and very few legal ways of immigrating to another country, taking a dangerous and unauthorized journey across the US border is often the only solution for many people. This paper will connect how laws and policies of US and Central American governments lead to mass violence, displacement, and migration. However, because US Immigration and Customs Agency guidelines for refugee and asylum status seekers does not apply to these victims, they are imprisoned, and then returned to their homes, often to be killed. This paper will argue that because the US has helped create a war zone, the victims should be refugees or granted asylum. Building from first-hand accounts, and data drawn from government reports and NGOs, this paper will highlighting the lived reality for people in these countries and underscore the gravity of the situation. The ultimate hope is that the laws will change for those caught in the middle of war, so they can escape to safety.
The first Spaniards who arrived on America’s shores in the early sixteenth century drew upon their past experience conquering Moors as they struggled to make sense of a new alien people – the native inhabitants of America. The Spanish began the century fearing the Natives and damning their practices. It is during this period that many of the Spanish who came into contact with Natives drew parallels either intentionally or by instinct between the Natives and the Moors, whom the Spanish had only three decades before defeated in Iberia. This period during which the Spanish drew parallels between Natives and Moors coincided with the period during which the Spanish subjected Natives to an extreme level of violence, slavery and cultural separation. Beginning in the 1540s, critics of the brutality of Spanish colonization like Bartolome de las Casas inspired a period of reassessment of Spanish colonial practices. Interestingly, during this later period the Spanish seemingly ceased comparing Natives to the Moors. The Spanish came to perceive Natives not as infidels but instead as misguided Christians whose sins could be blamed on their susceptibility to the influences of the devil. Whereas the first Spaniards to encounter them had consistently compared Natives to the former enemies of Spain and of Catholicism, commentators after the 1540s seemed to stress Native artifacts and practices that resembled Christianity, even if only remotely.
Social and behavioral scientists have rarely focused on gloves as a symbolic social construct, preferring instead to categorize them as clothing. My research focuses on the socio-cultural significance of gloves in different cultures and historical contexts. Humans have worn gloves for a variety of reasons throughout history, from supplying warmth to ascribing status. Gloves can provide important information about a certain culture’s social hierarchy and values. By discovering not only who wears certain gloves but also why, my research will elucidate the ways that gloves demonstrate one’s physical location, job, gender, and/or socio-economic class in different societies throughout human history. This question is of particular interest to those in the social and behavioral sciences, including sociologists, and also to those in the humanities, such as historians. The question of gloves’ socio-cultural significance is an important and often-overlooked facet of human expression and human categorization. Humans look for ways to differentiate or conform, and the use of gloves serves an important purpose in this decision-making process.
This research project examines the consequences of United States political and economic policies in Guatemala during the 20th century and the effects those policies had on the Guatemalan people. Beginning with the establishment of the United Fruit Company (1904), Guatemala became a major exporter of fruit products to the United States. United Fruit exports from Guatemala were dependent on brutal labor practices leaving many Guatemalans impoverished. In 1944, Guatemalans revolted against these policies, installing a democratically elected government. The government of Guatemala began taking significant steps to reduce the power of the United Fruit Company, soon drawing the attention of the U.S. In 1954, the U.S. government backed a coup, overthrowing the government of Jacobo Arbenz and installing in its place a dictatorship. The United States bankrolled a succession of brutal regimes throughout the latter half of the 20th century. In the 1980's, the Reagan administration provided hundreds of millions of dollars to financially support the regime of Efrain Rios Montt. The U.S. support came with the knowledge of the Guatemalan government's campaign to eliminate indigenous populations within the country. Lasting scars remain from U.S. intervention in support of United Fruit and a succession of brutal regimes in Guatemala, which remains one of the poorest and politically unstable nations in Latin America while continuing to be a major source of agricultural imports to the United States.
The city of Fall River, Massachusetts was once known as the “Manchester of America” and the “Queen City of the Cotton Industry in the United States.” Today, its rich history has fallen into obscurity—an all too common story amongst New England’s many once proud textile communities. In this presentation, I will argue that the experience of Fall River reflects the collective experience of the rise and fall of the textile industry in New England. Although the financing and development of Fall River was different than some nearby mill cities such as Lowell, Lawrence, and Holyoke, Fall River is representative of how the textile industry generated tremendous growth and prosperity throughout the region. Its decline caused equally dramatic impoverishment and devastation in many New England cities. Using primary sources, historical accounts, and secondary sources from the Fall River public library collections and other repositories, I chart the expansion of the New England textile industry, the unique case of Fall River, and the widespread downturn of the textile manufacturing in New England. Ultimately the fall of the industry was connected to mill owners’ failure to capitalize on advancing technology, along with overproduction and competition from the south. The city of Fall River is a prime example of how, for better or worse, the textile revolution changed New England forever.
Unfinished and Untold: The Story of Bolling V. Sharpe, and Elementary and Secondary Education in Washington DC for African-Americans

While the Brown V. Board of Education case is constantly referenced when discussing equality and desegregation, Bolling v. Sharpe stands as another important civil rights case, and is perhaps more telling of the story of education in the United States. Bolling V. Sharpe was argued, and decided, in the U.S. Supreme Court between 1952 and 1954. Similar to Brown, in terms of intent, Bolling v. Sharpe aimed to desegregate public schools in Washington, D.C. in order to give African-American students equal access to a high quality public education on par with their white peers. However litigators had to advocate for equality using different legal arguments in order to accomplish the same goals. While Brown argued for equal protections under the 14th Amendment, Bolling had to argue for legal protections under the 5th Amendment. These differences stemmed from the fact that Washington, D.C. is a district not under any state jurisdiction. This presentation will focus on the perspective of the NAACP litigators, analyzing why civil rights leaders took on the case, the strategies they used, and the case’s eventual outcome. I argue that Bolling acknowledged the territorial limits of the 14th Amendment in a way that had never been before.
As a Psychology and History major, I am interested in analyzing historical events where the two concentrations intersect. This independent research paper focuses on “the Rape of Berlin”, the mass rape of German women that occurred immediately following the end of World War II and the psychological trauma they endured as a result of their experiences. It considers the anonymous diary A Woman in Berlin as a primary source and the research is composed of three parts. The first of these sections details the postwar environment of Berlin and seeks to understand “how” mass rape occurs. This section focuses mainly on how traditional gender roles shifted as a result of modern war. It considers the political tension and perceptions between Russia and Germany. The second section analyzes the psychological consequences of rape through the personal testimony provided by A Woman in Berlin. This section focuses on how German women were affected by trauma and how they coped with their experiences. The last of these sections discusses postwar memory and how the Red Army rapes were remembered in Germany. The film version of A Woman in Berlin (2008) is considered here to address the stigma of rape and to address how sexual assault should be discussed in public venues.
In my presentation I will explore how radical Islam played a role in Egypt as a social and political force throughout the 1960’s, 70’s, and 80’s. This research analyzes the geopolitical and cultural factors which contributed to the rise of religious extremism, and puts the movement in historical context. This is done by identifying other relevant movements which shaped radical Islam, such as socialism, Pan-Arab Nationalism, and Zionism. The presentation also provides insight into the lives of key members of the jihadi movement such as Sayyid Qutb and Ayman al-Zawahiri, who have had great influence on international extremists. This research demonstrates how socioeconomic and geopolitical conditions affect extreme ideologies through extensive analysis of the various factors which radicalize people.
Why has the United States government refused to officially acknowledge the Armenian Genocide? How is it that scholars and historians alike almost unanimously condemn the events as genocide yet American officials consistently avoid using the term? This research seeks to answer these questions by understanding how the memory of the history of the Armenian Genocide has become a political problem in the U.S. The creation, use, and implications of using the word “genocide” is a politicized issue, inherently intertwining how the U.S. remembers history with current political issues. The history of the Armenian Genocide raises areas of contention for denial arguments that historians have continued to disprove. Since there remains no factual basis to support denial of the genocide, the reasoning must thus lie elsewhere. The U.S. has carved out a place for itself on the global stage as the “policeman” of the world, arguing that the American government will always be the moral superior. This research examines a layer of the hypocrisy of American Exceptionalism, which is the belief that the U.S. will always be on the right side of history no matter the cost. The U.S. was given an opportunity to recognize the genocide on its 100th Anniversary in 2015, yet again fell silent on the matter. This research is significant in today’s world as genocides continue to occur and the U.S. continues to violate its promise for these mass atrocities to “never happen again.”
The Origins of Scientific Racism

Despite the fact that race and racism are social constructs and not grounded in real biological differences between people, they remain insidious factors in the United States, as well as across the world. This research project examines the origins of ideas that led to the social construction of “scientific racism,” and the ways race and racism have developed into a significant factor in today’s society. I used Middlesex Community College’s library databases to conduct my research, which helped me to discover how race has evolved from a deep religious belief into modern racism. The databases also helped me analyze the ways scientific research was falsified and used to justify biological differences between peoples of different ethnicities on the basis of ideology not science. From my research I can conclude that racism is a pseudo-scientific justification that is perpetuated by fear and ignorance.
At the turn of the century the Canadian Arctic bustled with imperialistic Euro-Americans for a variety of reasons. The dying whaling industry had made its way north and discovered fresh stocks of whales, fur traders moved north as animals in the south became overhunted and scarce, explorers sought to find a new trade route through the North. The invasion of the Arctic brought about an increase in interactions between the native people of the Arctic, the Inuit, and Euro-Americans. Outsiders quickly recognized the significance of Inuit culture and anthropologic study of Inuit became popular. Whalers and traders may have also seen the Inuit as a possible source of profit, selling off artifacts to museums. Overtime other industries in the Arctic, such as whaling and fur trading became less profitable, while the study of anthropology became more profitable as more organizations desired artifacts from the “Stone Age.” During the early twentieth century, contact with Euro-Americans disrupted traditional Inuit culture introducing them to foreign western ideals and technology, even as those westerners sought out the Inuit because they believed the natives to be pre-civilized. In the end, even though Europeans, Canadians, and American entered the Arctic in search for economic resources such as whales and furs, it was cultural interests, both in the wilderness environment and the desire to study a perceived “Stone Age” people that generated prolonged and continuous contact between westerners and native people.
This research project is centered on the killing of women in the name of family honor. Honor killings happen for a variety of reasons, primarily within regions where the Islamic religion is prevalent, but they have also spread to different countries and cultures throughout the globe. This project will cover the emergence of honor killings in history, the estimated frequency of them today, and why they go largely unpunished and undocumented. What will also be explored is the ethical dilemma these honor killings bring about, which is that they are seen as wrong by the majority of people in the world, but at the same time not punishable because they are a religious and cultural tradition. In Islamic culture, for example, women are seen as property of the males in their family irrespective of their social standing. The lack of laws against domestic abuse in countries where Islamic culture is predominant allows men to murder the women of their family without the threat of prosecution. The women in these circumstances have no voice. Many online academic publications will be consulted for this project.
On August 18, 1920, the 19th amendment to the United States Constitution was ratified. This granted women the right to vote. However, women had to fight for this right. The women’s suffrage movement began decades earlier. The passage of the 15th amendment granted voting rights to all citizens of the United States, regardless of race or color. Women however, were excluded from this right. To challenge this silencing of women to have a voice in their government, Susan B Anthony voted for Ulysses S Grant in 1872. Two weeks later, she was arrested and convicted of illegal voting. Anthony’s vote helped spark a movement that would last nearly a century. The women’s suffrage movement began July 19-20 1848 at the Seneca Falls New York conference. Issues brought up at the conference included property rights for married women, equal standing for women in the legal system, and improved access to quality education. Their fight would last over seventy years. The women’s suffrage movement, is a true display of perseverance, strength, and fierce determination in the face of a seemingly unbeatable force. This paper will examine the obstacles that women had to overcome in order to win their right to vote. The research will show that voting is more than casting a ballot. It's a voice that contributes to their identity and sense of self.
Charity as Coercion: The Ladies’ Branch of the New Bedford Port Society, 1833-1880

The Ladies’ Branch of the New Bedford Port Society, formed in 1833, sought to complement its male counterpart by providing a social good through the moral improvement of the transient seamen that came to their city. Using scholarly literature about reformers in maritime culture as well as the original documents of the New Bedford Port Society, census city records, and newspaper clippings, this paper explores the nature of nineteenth-century maritime missionary work to examine the agency of the wealthy wives and daughters who participated in this spiritual reform as an element of the class and culture wars of antebellum New Bedford. Working with the Mariner’s Home and the Seamen’s Bethel chapel, the women utilized the social reform movements of the period to mold virtuous and productive citizens. They sought to relieve New Bedford of alcoholism and prostitution, as well as other activities they considered morally dubious. The counterpart to their wealthy and powerful husbands, the women of the Ladies’ Branch implemented a more aggressive form of paternalism, creating a charity to establish a level of decorum. This charity gave them what I argue is a coercive form of control, an opportunity to shape a changing urban landscape that they felt was leaving them behind. Understanding their role in New Bedford allows historians to analyze contemporary views of the working-class waterfront through a socioeconomic and racial lens.
Wives of the American men who traveled for work in the era of the American Revolution, particularly for politics, were usually left at home to tend to the family business or farm and raise the children. In many of the letters sent to husbands before, during, and after the Revolutionary War, absence and a longing for their companions to return occurred throughout their correspondence. Historians have argued both that women enjoyed the roles they were given and that they saw them as a burden. I argue that women viewed these new roles as strenuous, particularly on their emotions, more so than anything else. In the letters of Deborah Franklin, Abigail Adams, Rebecca Faulkner Foster, and their respective husbands, women were distraught that their husbands were consistently away from the household and that the Revolution did not benefit women’s roles as wives. Most of the time women did not know when they would be reunited with their husbands and the uncertainty led them to show this longing in their letters. The extra roles women were forced to take on – with little to no guidance from their husbands – overwhelmed these three women during the second half of the eighteenth century. However, when a woman did not need to take on her husband’s duties while he was away, it led her to be more eager for his return home, due to loneliness, not because she needed help with the excess tasks.
Joint Defense between the United States and Canada from 1949 to 1963

My research will focus on the role that U.S. Defense Policy had in Canada during the Cold War from 1949-1963. The time period focuses specifically on the administrations of President Eisenhower and Kennedy in the United States, and Prime Minister Diefenbaker in Canada. During the Cold War, Canada and the United States worked closely together to create a mutual defense program in order to protect the North American continent from a potential Soviet attack. Despite shared interests in mutual defense of the continent, Canadians had different perspective on the Cold War from Americans and played a distinctly different role in the war. The Canadian Arctic became the central focus of these converging yet distinct ideas of North American defense. The quickest route for a Soviet assault upon the United States would have been over the Canadian Arctic. Inevitably, this placed Canada in the middle of a potential nuclear holocaust as tensions continued to ramp up between 1949 and 1963. Like all nations in the emerging bipolar world constructed by US and Soviet policies, Canada had to make important and difficult geopolitical decisions. Due to the fact that the two nations shared a border and a similar political perspective the US and Canada were natural allies. The joint defense between these two North American countries was historically significant because despite the weakness of personal diplomacy between the nations leaders, the state diplomacy was remarkably successful in not only protecting the continent, but in also defusing the tensions of the Cold War.
409 Auditorium  11:45-12:30  Board A36
Jordan Anthony Hill
David M. Kalivas (Faculty Sponsor)
Honors Program, Middlesex Community College
Legacies of the Atlantic Slave Trade: Race, Racism, and Society

This research project examines the legacies of the Atlantic Slave Trade and its connection to the development of race and racism. To this end, two questions framed my research: 1. How did racism come to exist in Western Culture? 2. Why does it remain ingrained in U.S. Culture? Science has clearly established there is no evidence to support the existence of more than one human race, which in turn means there is no evidence to support ideas of racial inferiority. In spite of this evidence, racism persists with deep roots in the United States. To answer the questions and examine the legacies of the Atlantic Slave Trade, this project analyzes the origins and influence of justifications for slavery and the slave trade and their relationship to the creation of a culture of race/racism in the West with particular attention to the United States.
"The Rescuers": Shining Light on the Unsung Heroes of the Holocaust

In the final weeks of the European Theater of World War II, the world was exposed to the horrors of the Nazi concentration camps. Since early 1942, the Nazis had systematically been murdering persons deemed to be of Jewish descent. When victory over the Nazis was finally declared on May 8th, 1945, over 6 million Jews had been put to death. That number would have been much higher if not for those brave people that chose to defy the Nazis and the Final Solution. In doing so, these people faced the risk of themselves and their entire families being arrested, sent to the concentration camps or being killed on the spot. What was it that motivated these people, in the face of great personal risk, to rescue on average, only one or two people? The simple answer is, it’s what they were raised to do. No matter the circumstances, these heroes stood their moral ground and refused to let the Nazis win. Instead of looking at the Holocaust from the eyes of the Jews, this research looks at the Holocaust from the eyes of the people putting their lives on the line to save the Jews.
421 Auditorium  1:30-2:15  Board A34
Richard Anthony Imprescia
Robert Pontbriand (Faculty Sponsor)
Department of History, UMass Dartmouth
The Soldier's Experience of World War I: From Optimism to Radicalization

An anonymous World War I soldier is remembered as saying that “hell could not be worse than living and fighting in the trenches.” My paper will track the changes in the mindset of the soldiers fighting in World War I from the declaration of war, the battles that were fought, and lastly the signing of the Treaty of Versailles. The paper will also use war poster art to demonstrate how the war was propagated to the home fronts of the belligerent nations. World War I was unlike any war that was fought in history in terms of the globalization of war, the total war effort on the home front, new technology, and lastly, and perhaps most importantly, the amount of casualties that were inflicted on all sides. New weaponry created a new form of violence that was unprecedented, and not properly understood at the proclamation of war, which caused more causalities than generals could have imagined. My paper will track the psyche of soldiers from the German and American armies to see how their perspectives changed as the war forged went on. The paper will employ the use of primary sources such as Storm of Steel by Ernst Junger and looking at American soldiers Allen Peck’s letters home for to his parents. Soldier testimonies from the National World War I museum exhibits will be used as well. A strong distinction can be made from the soldier’s testimonies from the beginning of the war to the end of the war.
Matthew Steven LaJeunesse
Joseph Preston Baratta (Faculty Sponsor)
Department of History & Political Science, Worcester State University
The Process of Diplomatic Normalization between the United States of America and the Socialist Republic of Vietnam

This research paper serves to examine the process of diplomatic normalization between the United States of America and the Socialist Republic of Vietnam and the effects of such normalization. This research was conducted at an exciting time after Vietnam and the United States have celebrated twenty years of diplomatic relations. I undertook this research in the hopes to better understand a different narrative of US-Vietnam relations than the narrative of the war that today is still the predominant thought that comes to the minds of many Americans when they hear “Vietnam.” The normalization process reflects this in so much as public opinion regarding normalization was one of mistrust. The history between the two countries slowed the normalization process, along with many outside forces. Normalization in its early stages was shaped not only by the public opinion regarding accounting for the remaining missing troops in Southeast Asia, but also by opening relations with China. As the years continued, the United States exercised its economic leverage to get Vietnam to agree with many of their terms without having to give Vietnam much in return. Ultimately, it was pressure from the business community as Vietnam began to liberalize its economy that pushed normalization forward in spite of all else. Through the administrations of George H.W. Bush and Bill Clinton, The United States opened diplomatic relations and began a partnership that continues to develop into today.
In a previous research assignment, I looked at how the social expectations, roles, and duties of women changed between the 1880s and 1920s on the basis of articles in the Ladies Home Journal. I came to the conclusion that even though the early 1900s brought new trends, influences, and opportunities for women, such as the idea of the “New Woman” or the right to vote, social expectations kept them restricted to the domestic sphere. Building on this work, as part of a project for a History Research and Writing Class at Framingham State University, I want to look at how teacher colleges such as Framingham Normal School around the end of the 19th and the beginning of the 20th century contributed to these ideas. How were women educated to become teachers? What social expectations were they taught? Were they expected to leave the school and/or their job as a teacher once they were married? How did the new trends influence the school and its students? Since the class deals with material culture, I plan to look at material objects such as syllabi, year books, club journals, personal letters and other primary sources that can be found at the school’s archives, in order to see how and if the new trends arrived on college campuses and what expectations schools had for their students.
The United Fruit Company (UFC) was a damaging force in Guatemala during the Cold War era. The UFC helped the CIA overthrow the democratically elected government of Jacobo Arbenz in 1954. How did this happen? The Cold War (1946-1991) was characterized by constant fear and paranoia expressed by both the governments of the Soviet Union and the USA. The military and foreign policy of the United States during this period of time was the containment policy, which advocated military action against governments infiltrated by Communists. The US State Department committed itself to this policy, sometimes at high military, financial or, human costs. From the early twentieth century, the UFC became an economic powerhouse and monopoly, through trade and transportation within Latin America. It soon became the motivation for action in Guatemala that culminated in the 1954 CIA-sponsored coup titled Operation PBSUCCESS. Official American rhetoric asserted that the coup was to resist Communist infiltration. However, in reality, the intervention in Guatemala was motivated primarily secure American economic interests and the UFC. This is demonstrated by an analysis of U.S. State Department records, first-hand accounts of officials involved in the company and the coup, and secondary sources. The UFC and the 1954 coup demonstrate the vast difference between false American rhetoric and the reality of these events, and this was unfortunately true for the Cold War overall.
418 Auditorium  1:30-2:15  Board A31

Steven David Mott
Kate Martin (Faculty Sponsor)
Department of History, Cape Cod Community College
Comfort Women: Sex Slavery in Imperial Japan

The purpose of this research project is to discover more about the enslavement of women by the Imperial Japanese Army in the years preceding and during the second World War. Dubbed "comfort women," these girls and women were frequently abducted and brought to Japanese comfort camps. The practice of military brothels did not begin with abduction, but in time hiring prostitutes was numerically insufficient to serve the Empire's troops. The goal for the camps was, interestingly, to prevent rape by soldiers in occupied territories. Most comfort women were taken from Japanese-occupied Korea and China, and were used as sex objects for dozens of soldiers every day. Since the conclusion of World War II, the Japanese government has been in a difficult situation because of their heinous crimes against the comfort women. During their time in sexual slavery, these women were voiceless, and even following the war some Japanese conservatives refused to accept their stories of abuse. Even in 2016, following an agreement between Japan and South Korea, many believe Japan has yet to rectify their past. Creating further social conflict is the Japanese reluctance to include their own war crimes in their history textbooks and school curricula. Indeed, the established system of sex slavery created by the Empire of Japan is a little known element of World War II in the West as well as in Japan.
Stability in the nations of Latin America has been an issue of constant debate. The comparison of stability of the Western Hemisphere provides both historians and political scientist with an understanding of the current situation facing these nations, as well as the relationship between the past and the present. My research focuses on the question that if term limits were implemented throughout the Latin American nations, and they were viewed as secured parts of their constitutions, Latin America would leave the dictatorial cycle that has plagued the region since the times of Columbian discovery. While the implementation of such term limits would create a system geared toward peace and stability on paper, history has proven that such tactics do not prove to be fruitful over a period of time. Latin America has entered a state where it is almost impossible to escape the dictatorial cycle, due to the many conflicting ideologies that have risen from the multitude of revolts and rebellions over the years. Another question addressed by my research is whether the actions by the United States to maintain its hegemonic status in the West. The study of the comparison of constitutional stability in the United States compared to Latin America bears importance in the fact that it allows for the past to be bridged with the present.
The "Mill Girls" of Lowell, Massachusetts, stepped into the workforce at a time when the shift from an agrarian economy to an urban, industrial one presented new challenges to the family economy model. The Yankee farming families from which the female operatives came had operated under this model for decades, and both the young women and their families were impacted by the shift to wage labor outside the home. Literature about the operatives has tended to focus most heavily on their role in women’s labor movements, which they were among the first to organize. Their ability to strike is certainly a critical component of their historical importance. However, a more complete picture of these young women includes an understanding of the rural New England backgrounds they came from, how that background informed the development of paternalism in the mills, and how the operatives responded to those paternalistic structures. Their lives inspired a great deal of discussion and criticism, and analyzing their contemporaries' responses to their lives also helps expand our understanding of the operatives. To develop this picture of the operatives, I have consulted the works of historian Thomas Dublin and other scholars. I have also analyzed letters written from the mill girls to their families. By utilizing both primary sources and scholarly publications, I explore the mill girls' understanding of their continued place in the family economy, and the implications of the shift from farm to factory on Yankee families whose daughters sought employment in the mills.
Since the 18th century, the small isolated island of Diego Garcia, located 1,000 miles from any major coastline, has been utilized by western powers as a resource. Initially uninhabited, the island was utilized by the French as a plantation to meet the European demand of coconut oil in the 1790’s. In doing so, the French utilized slave labor, importing individuals against their will from Madagascar, India, and other surrounding areas. Following the Slavery Abolition Act of 1833, Diego Garcia and its inhabitants developed a distinct cultural identity. These people would become known as the Chagossians. Although Diego Garcia lacked sovereignty in its entirety, they maintained the illusion of independence through their affiliation with the nearby British Colony of Mauritius. The Chagossian economy was able to subsist independently through the exchange of Coconut oil with the Mauritians. In 1968 Mauritius was granted its independence, however in doing so the British informally excluded their sister island Diego Garcia. This lead to the British maintaining control of Diego Garcia, which they promptly leased to the United States. The United States, in the interest of maintaining a global presence, leased the island and promptly expelled the Chagossian population from the island. This expulsion has been contested in international courts and remains a point of contention to this day. The purpose of this research project will be to explore globalization’s influence over colonialism, its imperial influence, and its effect on Diego Garcia and its Chagossian population between the 18th and 21st century.
Inclusion of LGBTQ United States History in Massachusetts 8-12 Curriculum

Queer history has emerged as a field worthy of academic study since the 1980s. While it has increasingly entered college curricula, much work still has to be done for it to be integrated into public K-12 curricula. Currently, the Massachusetts 8-12 United States History Curriculum operates without this history. My work aims to amend the current curriculum in such a way that integrates and emphasizes LGBTQ and gender histories within the pre-existing US History Standards. The areas of study are taken directly from the Massachusetts learning standards, specifically focusing on the curriculum framework of U.S. History II, Reconstruction to the present, 1877 to 2001. I amend two key sections: Age of Reform: Progressivism and the New Deal, 1900 to 1940 and Cold War America at Home: Economic Growth and Optimism, Anticommunism, and Reform, 1945-1980. My work provides the necessary historical background for teachers to familiarize themselves with important figures, events, ideas, and movements within these time periods. It also provides a selection of recommended readings for teachers. The curriculum also includes a collection of primary sources and questions for classroom use. The purpose is not to correct the current curriculum frameworks, but to add additional information that will help fill educational holes and provide students with a more inclusive and multicultural American history.
My culminating honors project will focus on the industrial revolution and its effects on the environment; more specifically, a phenomenon known as industrial melanism, and how it pertains to natural selection. There is a sufficient amount of research as to why this phenomenon took place, including skepticism in regards to its relation to Charles Darwin’s Theory of Natural Selection. My intention is to present both sides of the argument, finalizing with a personal hypothesis as to why this environmental metamorphosis may or may not have taken place. My plans are to present a detailed poster board presentation of both the Biston betularia f. typica, the white-bodied peppered moth, as well as the Biston betularia f. carbonaria, the black-bodied peppered moth. My intention is to reveal how pollution brought forth by the industrial revolution may, or may not have caused the color variations in this particular species. I will be presenting facts representing both sides of the argument, allowing the audience to draw their own conclusions.
Is a picture really worth a thousand words? Although Europe was not a part of the American Civil War, the views and perspectives of the Europeans towards the war were conveyed in print; not only through the written word in articles and newspapers but through political cartoons that were distributed to the masses. The goal of the project is to examine and determine if major European powers used political cartoons to show support for either the Union or the Confederacy that were produced by the media during the Civil War. Do the cartoons instead reflect a bottom-up view of history towards the war, showing the opinion of the people living in Europe? Required for this research is an understanding of the power held within a political cartoon, but also a knowledge of Europe’s diplomatic stance towards the war. To research these questions, I will be doing a historical analysis by using journal articles, periodicals from that time period and monograph literature. An examination of the cartoon images will provide a more critical and thoughtful insight into the European views and will offer an appreciation of the significance of the images used during the Civil War.
Ronald Reagan is remembered as being "the great communicator" who had the ability to connect with the American people and the media. However, contrary to, Reagan was not as persuasive as people are taught to believe. In fact, Reagan was unable to sway public opinion to support his war against the supposedly Communist Sandinista government in Nicaragua. An investigation of newspaper articles, speeches, polls, and secondary sources reveals that Reagan was not able to effectively convince or manipulate the public. Opinion polls demonstrate that the public objected strongly to US involvement in Nicaragua. Unable to convince the public or Congress that Nicaragua was a threat, the administration resorted to secret and illegal operations. When the media revealed the scandal in 1986, it became known as the Iran-Contra Affair. Once the scandal leaked, however, the media, the public, and even congressional leaders, both Democrat and Republican, went easy on Reagan. This paper argues that they wanted to believe in and support Reagan's vision of "morning in America" after two decades of mayhem, both domestically and internationally. Despite the fact that the administration violated international law, critics found no direct link to Ronald Reagan. It was these events and the fall of the USSR that cemented the myth of Reagan as "the great communicator." Justice has never been served, and today the myth of Reagan continues to grow. Only a proper understanding of the reality of the Reagan years will enable us to find answers about this period, and see its mistakes.
In Guatemala, during the Cold War, the United States committed itself to the policy of containment at any military, financial or human cost. Their fear of communist penetration justified a great deal of foolish actions and decisions through the use of government propaganda. The United Fruit Company became an economic powerhouse and monopoly, through the concentration of trade and transportation within its hands. Guatemala’s democratically-elected president, Jacobo Arbenz, sought to curb the power and influence of this company through the expropriation of its land and redistribution to the poor and indigenous peoples. This action spurred the 1954 CIA-sponsored coup that overthrew Arbenz and replaced him with a ruthless dictator. Official American rhetoric asserted that the coup itself acted as a method of fulfilling the policy of containment. However, in reality, the intervention in Guatemala was motivated primarily by the need to secure American economic interests and, to that extent, the United Fruit Company. The United States was reluctant to limit the hegemony of the United Fruit Company as it acted as an extension of U.S. imperialism that had existed for a great amount of time. These arguments are validated through the use of U.S. State Department records, first-hand accounts of officials involved in the company and the coup and secondary sources. This paper ultimately demonstrates the vast difference between false American rhetoric and the reality of these events and the Cold War as a whole.
Matthew Alexander Smith  
Jason Moralee (Faculty Sponsor)  
Department of History, UMass Amherst  
Early Roman and American Stories of Peoplehood

Rogers Smith and Eric Hobsbawn have analyzed the “stories of peoplehood” and “invented traditions” that define a nation’s identity. According to Smith, such stories and traditions can be categorized as one of three types: political power, economic, and ethically constitutive stories of peoplehood. Similarly Hobsbawn argues that invented traditions are meant to inculcate certain values and imply continuity with the past. He identifies three types of invented traditions: those establishing cohesion into a group, those legitimizing authority, and those meant to indoctrinate beliefs and values. Stories of peoplehood necessitate invented traditions within them to project peoplehood from the past to the present. My project investigates stories of peoplehood for early Rome their reception in early America. By reading Roman authors through the lens of Smith’s and Hobsbawn’s theories, we find that Roman stories of peoplehood are mainly ethically constitutive. Ethically constitutive stories imply that the constituents of a group identify themselves by intrinsic values found in the group. Roman authors attempted to reflect values they wanted to demonstrate to their contemporary empire. While the Founding Fathers attempted to incorporate Roman values in their new country, Roman stories of peoplehood were insufficient for the new republic. Contemporary authors, reflecting on the nation, wished to break away from a strict reliance on European traditions and sought instead create values that were uniquely American. From an analysis of early American authors through the lens of Smith and Hobsbawn, we can see that American stories of peoplehood are focused on economic and political power stories. The values found in stories of peoplehood define the culture they come from by what that culture sees as positive and negative. Americans can understand themselves better through an understanding of our stories of peoplehood, and we can understand Western Culture better through an understanding of early Roman stories of peoplehood.
403 Auditorium  11:45-12:30  Board A10  
Deborah Jean Taylor  
Ronald D. Weisberger (Faculty Sponsor)  
Department of History, Bristol Community College  
Integration of Judaic and Christian Observances of Passover  

The study of Judaic and Christian traditions that surround this observance and an integration of the two, culminating with the production of a Christian Haggadah.
423    Room 174    1:30-2:15    Panel 4
Angela Clara Vieira
Brian Williams (Faculty Sponsor)
Department of History, UMass Dartmouth
Victims to Victimizers: A History of Female Palestinian Terrorists

My research chronicles a history of female Palestinian terrorists and suicide bombers. The 1948 displacement of Palestinians to create the nation of Israel has caused strife and tensions between the two groups. Al Naqba, translated “the disaster” was the effort to ethnically cleanse and expel the Palestinians out of what is now Israel. Almost three quarters of a million Palestinians fled from their homes. Palestinians who did not flee completely are now living in two small territories within Israel: the West Bank and the Gaza Strip. Being squeezed into less and less land, some Palestinians resort to acts of terrorism to fight back. The Palestine Liberation Organization (PLO) was formed in 1964 in an effort to free the Palestine people via armed struggle. Multiple terrorist attacks were carried out in the 1970s including the Munich Massacre at the 1972 Olympic Games. Hamas and the Palestinian Islamic Jihad (PIJ) were both formed in 1987 with the same overarching goal of liberating Palestinians. The latter two organizations began a trend in the liberation movement that is most associated with this struggle: suicide bombing. The first instance of a suicide bombing with PIJ ties occurred in 1981. However, one of the most well-known strikes was in 2002 when a sixteen-year-old Palestinian girl entered a supermarket near Jerusalem and blew herself up, killing two civilians. One of the civilians was a seventeen-year-old Israeli girl. Through books, journals, and news articles, the research will illustrate why female Palestinians fall into such drastic roles.
Robert J. Waeglein
Kate Martin (Faculty Sponsor)
Department of History, Cape Cod Community College
How Advertising Silenced Women in the 1950s and 1960s

For decades, advertisements in America have told people of all races, genders, nationalities, ages, and subcultures what and how to think, feel, and act. By reviewing the popular advertisements of the 1950s and 1960s directed at specific audiences (housewives, husbands, single individuals, children, teens, elders, etc.), one can get an idea of what the popular culture of the time dictated was the correct way to live and think. Furthermore, by reviewing alternate sources of opinions, such as newspapers, music, or popular lifestyle choices of the times, one can see just how different the advertised ideal point-of-view was from the real thoughts and opinions of actual people, and how the thoughts and opinions of people changed via advertisements. For example, the De Beers Group, from 1888 to 2010, essentially the single sole distributor of diamonds, convinced American men and women alike that diamonds, an intrinsically valueless item, are not only worth a great deal of money, but are also a necessary accessory which symbolizes love between a man and a woman. This is only one example of an advertisement campaign which was successful enough to change the way not just a single generation of people thought, but the way an entire culture proceeded to think from that point on. While not every advertisement is as successful or pervasive as the De Beers Diamonds ads, it is an undeniable fact that advertisements not only censor “unpopular” thoughts, but influence, shape, and mold the way that people look at the world around them.
HOSPITALITY AND TOURISM MANAGEMENT

429 Hadley Room  10:45-11:30  Panel 2
Alexandra Asselta
Jon Johnston
KC Bloom (Faculty Sponsor)
Department of Sport Management, Salem State University
40 Years after Jaws: The Great White Shark Returns to New England and With It Come…the Tourists??

Despite great whites having negative perceptions, shark tourism has been a developing ecotourism activity. The lack of great white sharks was a response to a change in their environment as food source, the gray seals, were culled by regional fishermen as they believed that seals were taking their catch. This ended when the Marine Mammal Protection Act of 1972 (MMPA) was passed, which prohibited the killing of seals. Since then their population has increased to traditional numbers (Tech Times, 2014). Given the increase in the seal population in New England, and especially Cape Cod, there has been a similar increase in the numbers of great white sharks. Over the last ten years (2004 – 2014), the number of sightings increased from an average of two per year to more than 20 (NY Post, 7/21/14). A number of questions need to be addressed due to the great whites now being embraced as shark tourism at the Cape: What is the actual tourism demand for shark-based excursions? How do tourists on Cape Cod really view the increase in the number of sharks spotted off Cape beaches? How many people are already running businesses impacted by the increase in sharks? What is the need for more shark-related businesses? A survey of tourists and business operators have been conducted to develop a baseline understanding of Cape Cod tourist attitudes towards sharks and shark-based experiences and to develop an understanding of opportunities for potential shark tourism operators in the outer Cape Cod region.
Lucas M. D'Angelo
Renee M. Scapparone (Faculty Sponsor)
Department of Business, Fitchburg State University
Development of a Comprehensive Employee Handbook and Training Process

Since early 2012, Lucas D’Angelo has worked at the local hardware store, R. W. Shattuck & Co. Inc. in Arlington, MA. Over the past several years, the business has grown from being a “mom & pop” small business with a single location and 15 employees to 3 stores and more than 50 employees. The time has come for the company to have a formal Employee Handbook and Training Process. The primary purpose of this capstone experience to develop a comprehensive employee handbook and training program to convey this information to new hires (and current employees). Research will be conducted throughout the spring semester as the L. D’Angelo works with the proprietors of R.W. Shattuck & Co., Inc. as well as understanding the application of business knowledge. L. D’Angelo will conduct and collect research on the following concepts for use in the company’s employee handbook: legal issues relating to the workplace, employment rights, safety regulations, specific company policies, a general overview of the company along with company expectations, and lastly the most effective way to communicate this information and train the employee. In order to gain information on the aforementioned topics, L. D’Angelo will use textbooks, subject-specific books, competitor handbooks, off-campus on-site research, and interviews. Throughout the research process, many more sources may be identified and used in the development of the employee handbook and training program. Any and all sources used will be catalogued in an annotated works cited to be included with the final product.
Nüshu is the world’s only known female-specific language. Created by illiterate peasant women and handed down through the generations, this unique script allowed women from a small area of Hunan Province, China to communicate with one another, despite geographical separation from friends and family, and bans on formal female education. This paper is a literature review drawing from scholarly research that began in 1982, when Nüshu was first discovered by outsiders, through the death of the last proficient user in 2004, to its attempted revival today. We examine ethnic make-up and customs of the region, the structure, appearance and sound of Nüshu, how it was taught and learned, why and how these remarkable rural women used it, and how it almost disappeared without the wider world ever knowing about its existence.
American Sign Language (ASL) is a non-verbal language that is utilized primarily by the deaf and hard of hearing community. This language contains grammar, morphology and syntax, similar to other spoken languages and is estimated to be the 3rd most commonly used non-English language in the United States (ASL 2004). Some people do not realize how many people in their community use ASL to communicate, and at times, those who are deaf or hard of hearing have difficulty interacting with hearing people due to a lack of knowledge regarding the culture. Many liberal art higher education institutions require students to enroll in a World Language course as a part of their curriculum. Some language offerings may include languages such as Spanish, French, Arabic or Chinese. However, few universities offer American Sign Language courses. Why is it that even though this is a common language used in the United States, it is not a commonly offered language? By conducting a survey, data was gathered regarding Salem State University students’ interest and demand for ASL courses on campus. Information regarding enrollment and accessibility of ASL classes at local Universities and organizations in the Boston area was also collected to further support the initiative to bring ASL to campus. The goal of this thesis project was to obtain support from the Salem State University World Language and Cultures Department to submit a formal proposal to the University to create an American Sign Language course curriculum in the coming academic years.
433 Auditorium  2:30-3:15  Board A51
Damian Lamie
Susan McPherson (Faculty Sponsor)
Department of English, Quinsigamond Community College
Dynamic Business Adaptation

Business as we know it has changed. The exponential rise in the Internet of Things and big data is getting bigger. To compete in today's market, businesses will need a learning organizational culture. Such a culture will be able to utilize the latest developments in technology and research to create competitive advantages that will allow them to outperform laggards in innovation. The presentation will highlight infrastructural development, the Internet of Things, data mining, cognitive computing, and the development of workplace culture.
Pioneer-Develop Springfield Collaboration

This project is a collaboration between Worcester Polytechnic Institute (WPI) and the Honors Program at STCC to work on the North and South end business districts improvement that is one of WPI's project based community service learning experiences. Students from STCC will work with WPI students, both graduate and undergraduate to study the potential alternatives to increasing the number and quality of businesses in the two Springfield business districts adjacent to the downtown Springfield Business Improvement District. The Goal is to develop an improvement plan for commercial areas that would allow us to identify specific strategies to be implemented in the short-term to strengthen and better integrate these areas into the City's broader economy, the better leverage key economic drivers such as Union Station, MGM, proximity to the City business District core, the hospitals, etc., and to better serve the needs of area residents.
Nanoparticles (NPs) are being increasingly used in medical applications. There is an increasing interest in understanding the various interactions that occur between NPs and the cell membranes, in terms of drug delivery and cytotoxicity. Cell membranes are composed of a complex mixture of proteins, carbohydrates and lipids, which account for approximately 42% of the dry weight of human cell membranes. Because of the complexity of the cell membrane, supported lipid bilayers (SLB), which mimic the natural phospholipid bilayer, are being used to study and predict these interactions between NPs and cell membranes in vitro. Our study examined the deposition of polyvinylpyrrolidone (PVP) coated silver nanoparticles (AgNPs) on model SLB under neutral pH. We used the 1,2-dioleoyl-sn-glycero-3-phosphocholine (DOPC), a zwitterionic lipid to construct the SLB on a silica sensor substrate. Dynamic Light Scattering (DLS) was used to characterize the size of DOPC vesicles and AgNPs. Deposition rate and extent of AgNPs were determined using Quartz Crystal Microbalance with Dissipation (QCM-D). Van der Waals attractions might be responsible for the deposition of AgNPs on SLB, possibly by overcoming electrosteric repulsion. Quantification of NP deposition on SLB provides useful information on the cellular uptake of NPs. This information could be used to inform the design of future drug carriers and determine the cytotoxicity of NPs.
436  Hadley Room  3:30-4:15  Panel 6
Brianna Novicki
Thomas E. Conroy (Faculty Sponsor)
Department of Urban Studies, Worcester State University
Stress, Stigma, Shame, and Support: The Abortion Experience for Women in the US

The main focus of this research is to look at stress before and after having an abortion, stigma surrounding abortion, and support for women before, during, and after. Stress before an abortion, or lack of stress, includes seeing the ultrasound, effects of protesters, pre-abortion counseling and waiting period laws, paying for the abortion, and abortion stigma. Despite abortion being legal and a normal experience, it is still highly stigmatized in the United States. Overall, there is a lack of support for women, especially post-abortion. This is partly due to the fact that stigma can shame women so deeply that they feel they need to be silent about their experience and do not seek out support.
435  Auditorium  3:30-4:15  Board A07
Maeve Pages
Timothy Lang (Faculty Sponsor)
Commonwealth Honors College, UMass Amherst
Happy Danes: A Documentary Film Exploration of Danish Happiness and the Welfare State

This documentary film explores how the welfare state of Denmark affects the happiness of the Danish people. While there is considerable quantifiable research in this field of Positive Psychology and economics, there is currently little qualitative material. “Happy Danes” fills this gap by compiling filmed interviews with Danish nationals which illustrate the human component of the issue. It concludes that whereas the welfare system makes a key contribution to Danish happiness, it is not the only factor behind the Danes contentment.
The Hashtag

This project investigates the influence of the hashtag through an exploration of its use in business, such as celebrity branding, and through the politics of activism and reactivity. How can hashtags govern users’ attitudes and understandings? While the history and evolution of the hashtag position this symbol as an instrument through which one seeks and gains social currency and relevance, is there empirical evidence to support these claims? Alternatively, how are hashtags hijacked, and how effective is this practice in subverting their purpose? What is “hashtag activism,” and is it really activism?
The commercial sexual exploitation of children is a prevalent, dark underbelly of American society. The concepts of autonomy and personal agency are not always upheld in North America. Women and girls in modern society are particularly vulnerable when it comes to protection of these concepts. Childhoods are stolen through the actions of pimps and “johns” as demand perpetuates (the) need. Who is it that is being targeted by the pimps and traffickers and what is being done to save the lives of victims? It is imperative that we as a society educate ourselves on the truth of this dark reality. Many victims of commercial sexual exploitation find themselves incarcerated once found, even though this life is not one of their choosing. Language plays a key role in effectively addressing this situation, as too often the term teen prostitute is used in reference to victims, thereby undermining the full extent of what has taken place. Understanding the current dynamics of the situation and the effects of language is essential in order for societal change to unfold. The purpose of this research is to challenge perceptions and highlight the effects that language can have on the perception and reaction to victims of commercial sexual exploitation, thereby highlighting the need for serious research in the areas of personal autonomy and agency, specifically in relation to women and girls. This research is interdisciplinary in its approach as it draws from the disciplines of psychology, urban studies, and women’s studies.
INTERNATIONAL STUDIES

441   Room 174   1:30-2:15   Panel 4
Junghoon Song
Brian Williams (Faculty Sponsor)
Department of History, UMass Dartmouth
The Islamic State and Its Logic for Foreign Fighters

The 9/11 attacks in 2001 significantly changed the tactics and strategies of U.S. military, and even of law enforcement agencies, which led to an effective and successful counter-terrorism policy by the United States. For over a decade, although the policy has effectively confronted vicious terrorist adversaries such as al Qaeda and Taliban, it has not been quite successful against the newly emerging terrorist group, the Islamic State of Iraq and al-Sham (ISIS). The study identifies several significant differences between ISIS and other terrorist organizations. Unlike others of its kind, ISIS holds territory with a self-declared state, or caliphate. Furthermore, the group carries out direct and full-scale military attacks with about 31,500 fighters, according to Central Intelligence Agency (CIA). CIA estimates that 30,000 foreign fighters have traveled to Syria and Iraq to join ISIS. The project identifies social media propaganda as a major factor that has led the organization to become, on their terms, extremely successful in recruiting foreign fighters. The project will investigate how ISIS has utilized its social media propaganda to recruit foreign fighters, going over individual cases in which foreigners with no Islamic backgrounds either joined or plotted to join ISIS. Eventually, it is hoped that this study will inform anyone affected or concerned by ISIS, that more foreign fighters will join the terrorist group as long as its social media propaganda stays active. The study will use secondary literature to explore several possible solutions such as ground invasion and facilitation of local forces.
This thesis identifies the ways in which culture affects sustainability and how cultural considerations can be included in policy planning to improve efficiency in sustainability efforts. Whereas previous researchers have tended to treat culture and sustainability as distinct entities, I have emphasized the relationship between culture, sustainability, and policy. My understanding of culture draws on the work of Dutch social psychologist Geert Hofstede and his theory of cultural dimensions, which I use to suggest that policies must be formulated with specific cultures in mind if they are to achieve their goals. I review sustainability studies and include relevant natural resource economics topics that support my proposed improvements to policy. In my assessment of COP21 Paris Agreement, an international effort to improve global sustainability, I highlight the decision to allow countries to approach the goals individually according to their own cultural norms. I add hypothetical policy suggestions based on my research to better develop the conversation around policy in practice. Using my own interpretation of culture, and looking at sustainability primarily in terms of the environment, I use two case studies, one concerning food trends in Ireland and the second examining the current water situation in South Africa, to suggest that the effectiveness of policies can be maximized if they take into account cultural considerations. The purpose of his thesis is to reveal the strong connection between culture and sustainability, and to demonstrate that policy can be more economically, environmentally, and socially effective if it includes culture in its design.
Long Journeys to Freedom: What It Is Like to Be an Eritrean Refugee

In October 2013, 366 Eritreans drowned at the cost of Lampedusa, an Italian island in the Mediterranean Sea. Many of them were children under 12. Although such incidents happen more than a dozen times each year, it was the first time that it drew international media attention and brought Eritrean refugees to the spotlight. Eritrea has a population of 6 million people. From 2012 to now, 1 in 50 Eritreans sought asylum in Europe; nearly twice the ratio of Syrians. In recent years, around 10 percent of the population has fled Eritrea. Eritrea is run by one of the most brutal dictatorships in the world and it is one of the countries with the lowest human rights rate. Every citizen is forcibly conscripted after high school to serve the dictatorship for an indefinite amount of time under harsh conditions. Eritrean citizens are not allowed to leave the country and there is a "shoot to kill" policy enforced by the border patrols. My research provides insight into the lived experience of Eritrean refugees. It illuminates the journeys of many Eritreans and will give a better understanding of why refugees embark on such dangerous journeys and what those journeys are like. The research will cover the conditions in Eritrea that induce Eritreans to flee, how they escape the dictatorship, their perilous journeys to the Mediterranean Sea in the hopes of making it to Europe, and the long route through South America that many Eritreans take to reach the US. This research principally draws on direct interviews with Eritrean refugees, and contextualizes these interviews in relation to existing research.
JAPANESE

443 Room 908 8:30-9:15 Panel 1
Amanda Nicole Jew
David K. Schneider (Faculty Sponsor)
Department of Languages, Literatures and Cultures, UMass Amherst
Clash over the Uninhabited: How Sino-Japanese Relations Have Suffered from the Senkaku Island Dispute

This thesis looks at how the dispute between China and Japan over the Senkaku Islands have escalated into an international issue over the island’s resources for the last forty years. This dispute is causing tensions in bilateral relations that have hurt interactions between the two countries and could potentially lead to war between the US-Japan and China. This thesis draws upon scholarly articles from historians, legal specialists and political scientists concerning the dispute and different perspectives of both countries. Most research already done on the dispute has focused on who has sovereignty over the islands and analyzes the claims of both countries. Rather than choosing sides, my thesis is focused on how certain factors have exacerbated the dispute to continue unresolved. The main factors I will be analyzing are how treaty ambiguity, government inaction, and the rise in nationalism have contributed to the difficulty in resolving this dispute. First, treaty ambiguity has made it difficult to have concrete evidence without various interpretations from both sides. Second, the government’s inactivity has shelved and attempted to deescalate the issue without any means to resolving it. Finally, the rise in nationalism has driven the public and the media to heighten bilateral tensions further. Analyzing these factors will reveal how the dispute has continued without a solution and how these factors have imperiled Sino-Japanese relations. This dispute can be used as an example of what components can escalate disputes and analyzing those components gives a better understanding on the multifaceted perspective to the dispute.
In the late 18th century, Negishi Yasumori, a low ranking Japanese civil servant with some time on his hands, started a writing project which he called Mimibukuro. The text itself contains nearly 1000 entries in ten volumes compiled over a thirty year window, and its legacy is still alive today. Academia has mined Mimibukuro for data but has yet to actually thoroughly examine the work as an independent unit on its own terms. Some reasons for this include the limited circulation of the original text, inconsistencies across the extant manuscript copies, its sheer volume, and the highly selective skimming and culling of the text by modern readers, translators, and editors. Only select tales from Mimibukuro have been translated or more often adapted into Modern Japanese. The direct result of this practice has been two-fold: a public misconception about the true identity of the work and an even greater misconception about its contents. Currently, the text is most famous as a source of kaidan, “ghost stories,” a genre of storytelling only covered by a small percentage of Negishi’s project. For this reason I have chosen to more closely examine the text in its original form. My project includes new translations of the introduction and the first eleven stories of Book I. I will also review the existing translations and works created in homage, as well as suggest some alternative genres to its traditional classification.
Michelle Edith Wilkinson
Amanda Seaman (Faculty Sponsor)
Department of Japanese, UMass Amherst
Gender Abstraction in Japan’s Takarazuka Theatre and Beyond

This research addresses the complex gender identities represented through the stage of Japan’s all female theatre troupe, the Takarazuka Revue. Takarazuka recently celebrated 100 years of performance in 2014 and holds a unique identity in modern Japanese theatre for its initial shock value towards its formation and extravagantly romantic performances, as well as a devoted and largely female fan base. English language histories, reviews, and critical analysis as well as on-site experience viewing Takarazuka in Japan with original language promotional material were all utilized to answer the questions of what makes an all-women theater such an appealing genre to Japanese women and how are the separate ideas of gender and sexuality expressed through the stage. Many scholars who have interest in Takarazuka choose to focus on the actresses’ sexual identities, relationships, and fan dynamics. My research addresses instead what the popularity of Takarazuka says about its audience’s attitude towards staged androgyny and how it might cater to female fantasy. By contrasting Takarazuka with another medium of homosexual narrative, namely “boy’s love” manga that aims to satiate erotic appetite in young women, this research proves the trend for women-centric entertainment in Japan to create homosexual-homogender spaces that distance male and female bodies in order to grant women what limited forms of sexual agency that are available to them within the bounds of Japanese society.
JOURNALISM

446 Auditorium  11:45-12:30  Board A14
Stevie Ann LaBelle
Susan Ruth Goldstein (Faculty Sponsor)
Department of English, Mount Wachusett Community College
Confidentiality of Journalists' Sources

In order to have an informed nation, journalists need to be able to provide U.S. citizens with newsworthy information without the fear of being persecuted for the names of their sources. Sequentially to not limit the types of stories pursued, a journalist must have the freedom to ensure confidentiality to those who come forth to provide information without reparation. Supreme Court decisions and constitutional rights command the right to freedom of speech and the protection of those in the journalism field. This research uses law articles and case studies from sources such as Yale Law Journal, Georgetown University Law Center, American Criminal Law Review, Michigan Law Review, and St. Thomas Law Review for justification of the right for journalists to keep the identity of their sources confidential. These sources will be used to present historical precedence, outcomes of past legal cases, and statistics on the occurrences of cases in which a journalist's right to confidentiality is assessed. Research resulted in the overall consensus that a journalist’s confidentiality should be upheld in order to allow U.S. citizens to be provided with insight that should be public knowledge, with only a few exceptions. This topic is one that has been debated for decades and has come to the forefront repeatedly during high profile cases that have rested on journalists refusing to name their sources. This research appeals to the need for a Federal Shield Law in order allow protection of sources and continuity of freedom of press.
KINESIOLOGY

464    Concourse  2:30-3:15    Board C93
Ellen Esme Chow
Jane A. Kent (Faculty Sponsor)
Department of Kinesiology, UMass Amherst
Correlation of a 10-s Foot Tap Test to Physical Functioning in Individuals with MS

Multiple sclerosis (MS) involves central nervous system (CNS) impairment which can negatively affect function. The Six-Spot Step Test (SSST) and 25-ft brisk walk (25FWT) are used to evaluate lower-extremity function in individuals with MS and a 10-s foot tap test (FTT) has been helpful in quantifying central motor drive in persons with CNS disorders. Purpose: To compare foot tap count in individuals with and without MS, and determine whether tap count is associated with the SSST and 25FWT in MS. Methods: Six participants with (mean±SD, 53.8±10.0 yrs) and 7 controls without (44.5±13.1 yrs) MS were instructed to tap their foot as rapidly as possible for 10s; ten trials were conducted on each foot and the highest count was used for analysis. The SSST involved a brisk 5m walk while kicking 5 pucks out of marked circles, 1m apart; the test was performed twice per leg. Finally, participants performed 2 trials of brisk walking for 25 feet. The best trial for each test was analyzed. Results: FTT count was lower, and 25FWT and SSST speed were slower in MS than controls (p≤0.05, all). In MS, there was a high correlation between FTT count and SSST (r=0.87, p=0.02) but no significant correlation between count and 25FWT time (r=0.62, p=0.19). Conclusion: The FTT may be a useful metric for evaluating motor function in persons with MS. Two advantages of the FTT are that it is easily administered and does not require the capacity for ambulation. Funded by the National Multiple Sclerosis Society
The Effect of Acute Exercise on the Inflammatory Response in Menopausal Women

During the menopausal transition, endothelial dysfunction and risk factors for cardiovascular disease (CVD) increase dramatically. Tumor necrosis factor-alpha (TNFa) is a proinflammatory cytokine associated with endothelial dysfunction and atherosclerosis. Acute exercise has been shown to have an effect on inflammatory markers, such as TNFa, as well as endothelial function, but the response in a menopausal population is currently unknown. Purpose: To investigate the effects of acute exercise on circulating TNFa and to examine the relationship between TNFa and endothelial function in perimenopausal (PERI) and late postmenopausal women (POST). Methods: Fifteen participants (7 PERI, 8 POST) underwent a brachial artery flow-mediated dilation study (FMD%) to assess endothelial function and a blood draw to assess TNFa before and after exercise. Exercise consisted of a 30-minute bout on a treadmill at 60-64% VO2peak. Post-exercise assessment occurred 30 minutes following exercise. Blood samples (5 PERI, 7 POST) were analyzed for TNFa with a customized V-PLEX Plus Immunoassay Kit and MESO QuickPlex SQ 120. FMD was analyzed with version 2.8.0 of FMD Studio Software (Quipu, Pisa). The effect of exercise on circulating TNFa was evaluated with 2-way repeated measures ANOVA. Pearson correlations were used to evaluate the relationship between FMD% and TNFa. Results: Pre-exercise, TNFa did not differ between groups (PERI: 2.306±0.157 pg/mL; POST: 2.481±0.342 pg/mL, p=0.164). There was an overall effect of exercise on TNFa (Pre-ex: 2.394±0.078 pg/mL; Post-ex: 2.171±0.229 pg/mL, p=0.014). After exercise, PERI significantly decreased TNFa (Post-ex: 1.932±0.247 pg/mL, p=0.029), while POST had no change (Pre-ex: 2.481±0.342 pg/mL; Post-ex: 2.409±0.353 pg/mL, p=0.142). No significant relationship was found between the change in FMD% and change in TNFa with exercise. However, there was a trend for significance in the relationship between post-exercise TNFa and post-exercise FMD% in the POST group only (POST: r= -0.668, p= 0.0705; PERI r= 0.494 p-value= .397; combined groups: r=−0.446, p= 0.127). Conclusion: Acute exercise decreases circulating TNFa in perimenopausal but not late postmenopausal women suggesting that perimenopausal women are more responsive to acute exercise. Additionally, the trend between post-exercise TNFa and post-exercise FMD% in the late postmenopausal group may suggest that exercise mediates this relationship in the late postmenopausal population, but has less of an impact in the perimenopausal population.
Midori A. Dowdie  
Jason Gillis (Faculty Sponsor)  
Department of Exercise Science, Salem State University  

Acute and Chronic Effects of Exercising with Increased Breathing Resistance

The purpose of this experiment is to assess the acute and chronic effects of exercising with a commercially available training mask that increases breathing resistance. Twenty male participants aged 18-35yrs will first randomly complete a VO2max test with and without the training mask, and a self-paced 5-km time-trial (TT) with and without the training mask. Participants will then be randomly assigned to either a mask (M, n=10) or no mask (C, n=10) training condition whereby they will complete two weeks of high-intensity interval training with or without the training mask. Participants will immediately thereafter complete the same four tests previously described. The normality of the data will be assessed using the Kolmogorov-Smirnoff test. The acute influence of increased breathing resistance on VO2max and TT performance will be determined by comparing pre/post VO2max and TT scores between C and M using a dependent T-test. The chronic influence of training with increased breathing resistance will be determined by calculating the change in performance from pre to post-testing within each condition, and drawing comparisons between C and M using an independent T-test. The alpha level will be set at 0.05. It is hypothesized that VO2max and TT performance will be acutely impaired when the training mask is worn, and undertaking a high intensity interval training program with increased breathing resistance will cause no change in VO2max and TT performance compared to a control condition. Pilot testing for this study is presently underway, with data collection following in March, and data analysis/dissemination in mid-April.
Currently, there is no consensus regarding the effect of age on skeletal muscle oxidative capacity. Therefore, the purpose of this study was to conduct a systematic review and meta-analysis of the effects of age on in vivo oxidative capacity in human muscle. A secondary aim was to examine the effects of moderators suggested to contribute to differences across studies, including muscle group, physical activity, and sex. Methods: Searches were conducted in PubMed and returned articles (n=3,561) were excluded if they were not: i) written in English, ii) original research articles, iii) a direct comparison of young and older humans, iv) measuring oxidative capacity by PCr recovery kinetics using 31-phosphorus magnetic resonance spectroscopy, v) inclusive of data for calculating standardized effects (effects). A total of 22 studies were included in the present analysis, with 28 standardized effects. Effects were coded as positive when older adults (≥55 yrs) had higher oxidative capacity than younger adults (19-45 yrs). Results: The overall effect of old age on skeletal muscle oxidative capacity was positive (Hedges’ $g=0.171$, $p<0.05$), indicating slightly greater oxidative capacity in older muscle. However, there was significant heterogeneity in this finding ($Q=245.8$, $I^2=89\%$, $p<0.001$). Muscle group, sex and physical activity were all significant moderators of oxidative capacity ($p<0.05$). Conclusion: The reviewed literature supports a slight increase in muscle oxidative capacity with age. The present study clarifies the effect of old age on in vivo oxidative capacity, and has quantified significant moderators of this relationship.
Analysis of Foot Tap Speed in Individuals with and without Multiple Sclerosis

A rapid, 10-s foot-tap-test (FTT) is a manually-obtained clinical measure of motor drive in persons with central nervous system (CNS) disorders, including Multiple Sclerosis (MS). The number of counts is the main FTT outcome variable, but it is not known whether other FTT features might provide additional insight about CNS changes, and whether instrumented or manual measures are equally accurate. Our primary aim was to investigate the difference in tap count (#taps) and the coefficient of variation of the intertap interval (CoV-ITI) between affected leg in MS group and non-dominant leg in healthy control group. Our secondary aim was to compare instrumented and manual counts. Healthy participants (n=7, age 44.6±13.2 years) and individuals with MS (n=6, 53.8±10 years) completed 10 FTTs with each leg, using a force plate. The #taps and CoV-ITI were calculated from the fastest trials for each leg. MS had lower #taps than controls (37.2±9.0, 50.5±5.1, respectively; p<0.01); CoV-ITI was not different between the two groups (p>0.05). The #taps identified by instrument and manual counting were not significantly different across all trials (44.4±9.7, 41.4±10.0, respectively; p=0.08). Our preliminary results using the FTT indicate that #taps was a more sensitive metric than CoV-ITI in distinguishing MS from controls. Moreover, it appears that visual counting may be a reliable method for quantifying #taps, but additional research with a larger sample size is required to confirm these initial findings. Funded by the National Multiple Sclerosis Society
The purpose of this study was to examine the acute effects of a popular ergogenic aid (5-Hour Energy) on psychological and physiological outcomes in young, active adults. Methods: A total of 14 participants (7 males, 7 females; age 20.7 ± 1.9 years) completed this single-blinded, cross-over design study, consisting of three trials (no-treatment, placebo, 5-Hour Energy). All physiological measures (blood pressure, heart rate), and psychological outcomes (Profile of Mood States (POMS) questionnaire) were completed pre- and post-run for each trial. An overall global mood disturbance score was calculated from the POMS questionnaire. For each trial, participants completed a test of aerobic capacity (1.5 mile run). Repeated measures ANOVA was used to examine differences in outcome measures. Results: There was a trend towards a lower mood disturbance score during the 5-Hour Energy condition, as compared to the placebo condition and the no-treatment condition (p=0.09). Participants were found to be in a poorer mood post-exercise as compared to pre-exercise (p=0.0085), regardless of treatment condition. Both systolic blood pressure (SBP) and diastolic blood pressure (DBP) were elevated post-exercise as compared to pre-exercise (p<0.05), but neither SBP nor DBP differed by treatment condition. Time to complete the 1.5 mile run did not differ by treatment condition. Conclusion: The 5-Hour Energy trial was associated with better mood compared to the placebo and no-treatment condition. However, time to completion and blood pressure did not change by treatment, suggesting that, while 5-Hour Energy may not improve aerobic performance, it may safely improve mood.
Effect of Static Stretching on Muscle Recovery after Exercise Induced Muscle Damage

The purpose of this experiment is to test the hypothesis that static stretching (SS) improves perception of muscle soreness and physical performance more quickly than doing nothing (control) following exercise-induced muscle damage. Methods: 18 trained males aged 18 to 35 years will complete two weeks of testing. During week one participants will be familiarized three times with a testing battery including, hip abduction and hip flexion range of motion, vertical jump assessing leg power, agility (T-test), perception of muscle soreness, heart rate variability, and mood. On Monday of week two participants will induce muscle damage with a repeated sprinting protocol and complete the testing battery immediately after. Participants assigned to SS will then undergo a series of static stretches whilst the control group (CON) will do nothing. From Tuesday to Friday participants in both groups will complete the testing battery daily. Data analysis: All data will be assessed for normality using the Kolmogorov Smirnov test. Dependent variables will be compared to how they change from baseline measurement within each condition. The area under the curve will then be calculated by summing the scores from Monday to Friday, and an independent T-test will compare SS vs. CON with an alpha level of 0.05. Results: Data collection will run through February and March. Data analysis and interpretation will be completed in March and April. Data will be available for dissemination by late April.
Purpose: Direct observation (DO) is often used to collect data on an individual engaged in free-play. Traditional DO methods of children’s free-play physical activity (PA) are inaccurate due to time spent recording, as well as the potential for inaccurate recordings of real-time data and the inability to review the behavior in question. Using video recording may be able to provide more accurate estimates of PA intensity during children’s free-play. The purpose of this project was to compare estimates of time spent in PA intensity categories between traditional real-time DO data collection and coded digital videos, using indirect calorimetry as the criterion measure.

Methods: Indirect calorimetry (Oxycon Mobile) was collected while participants engaged in 30-minutes of video-recorded free-play activity using games and equipment that corresponded to varying levels of intensity. During the session, the traditional DO (Children’s Activity Rating Scale) was utilized; child was observed for 15 seconds, and data was recorded the following 15 seconds throughout the duration of each session. The video recordings of the sessions were coded using a similar protocol; the highest intensity level during each 15-second time interval was recorded. These DO measures will provide estimates of time spent in sedentary, light, moderate, and vigorous intensity PA.

Results: This study will validate a novel DO method for estimating PA intensity in children during free-play activity.

Conclusion: These results will inform a larger study that will use this new video-based DO method for calibrating and validating motion sensors to improve estimates of PA in youth.
Low-flow mediated constriction (L-FMC) is the vascular response to reduced blood flow (BF) and has been proposed as a new measure to evaluate endothelial function and vascular health. Purpose: To evaluate L-FMC in perimenopausal and late postmenopausal women before and after an acute bout of exercise. METHODS: L-FMC was measured via brachial artery ultrasound in perimenopausal (PERI: n=8, 47.8±2 yr) and late postmenopausal (POST: n=7, 59±2 yr) women. Arterial diameter was continuously measured using standard FMD protocols with a VO2 max test in between. L-FMC was calculated as [(diameteroccluded – diameterbaseline)/diameterbaseline] x100. Data was analyzed using a 2-way repeated measures ANOVA to evaluate differences between groups (PERI vs. POST) by condition (pre-exercise vs. post-exercise) and is presented as mean SEM. Results: We observed no L-FMC response in either group before or after exercise and there was no statistically significant effect of group or condition for diameterbaseline (group: p=0.98 and condition: p=0.71) or diameteroccluded (group: p=0.44 and condition: p=0.19). Interestingly, before exercise both groups had positive L-FMC values (PERI: 2.38%±1.80%; POST: 4.00%±2.13), indicating a dilatory response to reduced flow. Compared to pre-exercise, after acute exercise L-FMC was lower in PERI (1.00%±3.24%), but remained similar to pre-exercise L-FMC in POST, although not significant (3.00%±0.88%, p=0.56). Conclusion: Our preliminary data suggests the brachial artery of PERI and POST women dilates in response to reduced BF; a response which could be due to high basal tone. Furthermore, in response to acute exercise, PERI and POST have different L-FMC responses, despite similar baseline diameters. Collectively, this data suggests that more research is needed to understand L-FMC responses at different menopausal stages.
Recent research supports the hypothesis that both single and repeated skin applications of menthol, a cold receptor TRPM8 agonist, may influence non-shivering thermogenesis and energy balance in humans through the activation of brown adipose tissue; however, this requires confirmation. To test this hypothesis, 18 participants will be recruited and divided into one of two groups; placebo control (CON; n=9) or Menthol (M; n=9). From Monday to Friday participants will undergo eight 60-minute menthol or placebo applications consisting of one resting exposure per day on Monday (R1) and Friday (R8), and two exposures per day Tuesday to Thursday (R2-R7). During each exposure participants will rest supine in a temperature-controlled tent (30°C, 50% rh) for 30-minutes before their intervention is applied, and 30-minutes thereafter. Measurements will be taken during R1 and R8. Perceptual measures include thermal sensation, thermal comfort, perceived exertion, and irritation. Thermoregulatory measures include skin blood flow (Laser Doppler Flowmetry at index finger), rectal temperature, and skin temperature (chest, forearm, thigh, calf). Brown adipose tissue activation will be measured indirectly using supraclavicular skin temperature, oxygen consumption and carbon dioxide production. A two-way ANOVA (alpha=0.05) will compare dependent variables between CON and M in R1 and R8 to identify acute and chronic effects of menthol on thermoregulation and energy expenditure. Data collection for this project will run through February and March. Data analysis and interpretation will be completed in March and April. Data will be available for dissemination by late April.
Kendra Dawn Lastowka  
Julia T. Choi (Faculty Sponsor)  
Department of Kinesiology, UMass Amherst  
Sleep-Dependent Consolidation of Locomotor Sequence Learning

Ftprompts readers to experience each one through critically disparate eyes. Indeed, there are evident differences between cultures that appear in their respective philosophies, but to label in this way dismisses equally complimentary characteristics of all philosophy in conjunction. Using translations of philosophical theories as well as scholarly studies on them accessed through the Boston Public Library and the Bunker Hill College Library database, this paper compares and contrasts a variety of philosophical theories both within unique cultural contexts as well as cross culturally. Touched upon are the Analects of Confucius, the Dao De jing, Buddhism, Plato, Descartes, Leibniz, religious theories including Christianity, and the possibility that “Eastern philosophy” may have heavily influenced some Enlightenment Era thought. Further, this paper analyzes archetypes found in literature impacted by philosophical theory that support links between beliefs and values cross culturally. This research examines unique characteristics of historically grouped together philosophical theories as well as similarities between historically divided ones.
JoHannah will conduct independent clinical intervention on one client to determine the necessity of massage therapy for a musician, an “upper body athlete,” by conducting research and completing a formal scholarly case report. This case report will include critique and comparison of the impact of Swedish massage, myofascial release, kinesiotape, and aromatherapy benefits for the client. A minimum of five supervised and documented treatments will be performed on the client. The overarching goal of this research is to understand if these “upper body athletes” should receive massage therapy and if it will benefit their performance and overall posture. This research will be limited to one client and thus the limitation and generalizability of this research is evident. A crucial aspect of this case report is the ability of JoHannah to be able to clearly articulate her clinical rationale behind the massage/bodywork and complementary techniques used. JoHannah will enter her formal case report for publication in the Massage Therapy Journal and with the Massage Therapy Foundation. Protection of Client’s Privacy: To maintain the anonymity of the participant’s diagnostic and treatment information JoHannah will be using a secured online documentation program called Clinic Sense. The client’s intake form, treatment notes, and any other pertinent information will be stored and secured using this software program. The location of the password protected computer is located at Bristol Community College on the New Bedford Campus.
Measuring Regulatory Light Chain Phosphorylation in Human Skeletal Muscle Fibers

Whole muscle power output is reduced with age, especially in women, and leads to a reduced ability to perform everyday tasks. This age-related power loss is linked to deficits in molecular contractile function, specifically a slower interaction between the skeletal muscle proteins myosin and actin, which may be caused by a decrease in myosin regulatory light chain (RLC) phosphorylation. The purpose of this study was to measure RLC phosphorylation in single human skeletal muscle fibers as current techniques only allow measurements from larger pieces of tissue, reducing our ability to link RLC phosphorylation to myosin and actin interactions. To optimize the technique, initial experiments utilized a small sample of mouse skeletal muscle tissue. After homogenization, proteins were precipitated using TCA/acetone and resolubilized using SDS sample buffer and urea. The remaining soluble myofibrillar proteins were separated using polyacrylamide gel electrophoresis (PAGE), transferred to a PDVF (polyvinylidene fluoride) membrane and treated with antibodies to RLC. Phosphorylated variants of RLC appeared as two separate bands, indicating their different charges, and can be quantified for amount. This tissue sample procedure was successfully repeated multiple times in mouse muscle with similar results. Currently, the procedures are being modified as the reduced amount of protein available in single fibers compared to tissue samples has decreased our ability to detect RLC phosphorylation. We are attempting to increase antibody sensitivity and/or increase the protein extraction efficiency from mouse fibers. Once successful, the protocol will be tested on human skeletal muscle samples.
Concourse 2:30-3:15 Board C89
Leanne Ondreicka
Edward Debold (Faculty Sponsor)
Department of Kinesiology, UMass Amherst
Examination of Cardiomyopathy Related Mutation R146G, in Troponin I, Using In Vitro Motility Assay

Some genetic mutations in cardiac troponin I are linked to cardiomyopathy. The R146G mutation, found in this subunit of troponin, is hypertrophic in nature. In the presence of high concentrations of calcium, filaments with the R146G mutation show lower velocities than wild type however, in low calcium concentrations, filaments with the R146G mutation show higher velocities than wild type. Unfortunately, the molecular mechanism of the R146G mutation is not fully understood. Therefore, the goal of this research was to gain novel insight, through the use of an in vitro motility assay, as to why there is a change in velocity in the presence of the mutation by first comparing the duty cycles. Both R146G and wild type troponin isoforms used were expressed in mice. Interestingly enough, although the velocity at pCa4 is reduced by almost 50%, the duty cycles were not significantly different. This lead to the hypothesis that cross bridge kinetics may be altered by the mutation. Further research of manipulating ATP concentration was performed to study the specific step of the cross bridge cycle that may be affected most by this mutation (ADP release). These results may provide insight into the molecular basis of the change in velocity caused by the presence of the R146G mutation and its impairment of the function of troponin I, which ultimately leads to hypertrophic cardiomyopathy.
Despite the popularity of the Cybex Arc Trainer (AT) little is known about the validity of the AT console display of energy expenditure (EE). The purpose of this study was to examine the accuracy of AT estimation of EE during a 30-minute moderate intensity workout. Thirteen participants (5 normal-weight, 8 overweight) were fitted with the Oxycon Mobile (OXY), an indirect calorimeter. Heart rate reserve (HRR) was used as an individual characterization of intensity. To maintain a moderate intensity throughout the 30-minute bout, participants were instructed to change the resistance level to yield a rating of perceived exertion of 12-13, while maintaining stride rate at 114 ± 5 strides/min. Criterion EE measured via OXY was compared to EE values of AT console display at the end of the workout. Linear mixed effects models and correlations were used to examine differences and relationships in EE between the AT and OXY. The AT significantly overestimated EE compared to the OXY (NW: 12.4%; OW: 18.0%) Correlations between OXY and AT EE ranged from $r = 0.96$ to 0.97 for NW and OW groups, respectively. No differences were observed in % HRR between groups. Although correlations between OXY and AT EE were high, AT consistently overestimated EE. EE overestimation was larger for the overweight group. These results indicate that the AT EE display is inaccurate. Therefore, users do not receive correct EE feedback. This will affect user ability to achieve desired EE goals, and over-time this discrepancy may have a substantial impact on weight-loss management.
INTRODUCTION: The purpose of this investigation is to assess the effects of foam rolling (FR) on recovery following exercise induced muscle damage compared to a control condition (CON). METHODS: 18 trained males aged 18 to 35 years will complete two weeks of testing. During week one participants will be familiarized three times with a testing battery including hip abduction and hip flexion range of motion, vertical jump assessing leg power, agility (T-test), perception of muscle soreness, heart rate variability, and mood. On Monday of week two participants will complete a repeated sprinting protocol (40 x 15 m sprints) to induce muscle damage and complete the aforementioned testing battery immediately after. Participants assigned to FR will then undergo the FR protocol that targets six muscles of the lower body while the control group (CON) that does not undergo a recovery intervention. From Tuesday to Friday both groups will complete the testing battery once daily. DATA ANALYSIS: All data will be assessed for normality using the Kolmogorov Smirnov test. Dependent variables will be compared to how they change from baseline measurement within each condition. The area under the curve will then be calculated by summing the scores from Monday to Friday, and an independent T-test will compare FR vs. CON with an alpha level of 0.05. RESULTS: Data collection will run through February and March. Data analysis and interpretation will be completed in March and April. Data will be available for dissemination by late April.
Older adults are generally weaker and less powerful than their younger counterparts. This diminished muscular performance can impair physical function and increase fall risk, particularly in women. Knee angular velocity (KAV), which reflects the speed of muscle contraction, decreases in old age and thus may contribute to falls by limiting the size of the base of support. To test the hypothesis that KAV may influence fall risk, maximal KAV of 8 healthy older women (aged 68 ± 2.5 years) were measured during knee extension using a Biodex dynamometer. At a separate visit, participants were released from a forward lean (angle that produced a load of 25% body weight mass) and instructed to regain balance by taking a single step forward. Ten trials were performed, and kinematic data were used to calculate peak KAV (deg·s⁻¹) and a measure of dynamic stability (margin of stability, MoS; m) following the release. Maximal KAV from the Biodex (398 ± 23.0 deg·s⁻¹) and peak KAV during the forward fall (136 ± 66.8 deg·s⁻¹) differed ~3-fold (p<0.001); linear regression analyses indicated no association between these variables (r²=0.12; p=0.40). Additionally, no association was found between MoS and maximal KAV (r²=0.08; p=0.51) or MoS and peak KAV (r²=0.06; p=0.55). In this study, maximal KAV measured by dynamometry was greater than the KAV attained during recovery from the forward fall. Thus, the participants appear to have an adequate “velocity reserve.” These results suggest that KAV is not the limiting factor in older women’s ability to prevent a forward fall.
457  Concourse  2:30-3:15  Board C86
Ross Joseph Tanner
Ethan James Steiner
Katherine Boyer (Faculty Sponsor)
Department of Kinesiology, UMass Amherst
Differences in Gait Mechanics during Running in Older and Younger Individuals

Introduction: Running is a popular physical activity that can lead to numerous health benefits including an increase in life expectancy and protection against cardiovascular disease. While running can be beneficial, older runners have shown to have a high risk of injury that may result in changes from their gait mechanics (Devita et al., 2015). Quantifying the most prominent changes in running gait mechanics with age could lead to improved prevention and intervention physical therapy treatment methods. The purpose of this study was to quantify the changes in running gait mechanics with age. Methods: Data was collected from subjects ages 18-70 using 3D motion cameras and force platforms. Data was then processed and analyzed using custom MatLab and BioMove programs as well as a series of linear regressions. The primary outcome variables for this study were: hip, knee, and ankle joint kinematics and moments, as well as ground reaction forces (GRF) (McGibbon & Krebs, 2004). Results: The hip and knee moments are predicted to not be affected by age. However, ground reaction forces and ankle plantarflexion moments are both inversely correlated with age. With the most significant change between younger and older runners being in their ankle plantarflexion moments (Devita et al., 2015). Conclusion: Understanding how running gait mechanics change with age, specifically the decrease in ankle moment and power, will allow for training and physical therapy programs to design and implement new techniques to improve ankle strength and prevent injuries.
Muscle contraction allows humans to move and generate large forces, enabling the heart to pump blood. These properties are ultimately driven by the nanoscale motions of muscle’s tiny molecular motor, myosin, as it cyclically interacts with its binding partner actin. Each muscle has billions or even trillions of myosin molecules, and while the force-generating capacity of muscle is well characterized, we know less about myosin’s mechanical capabilities. Therefore we set out to determine how much force a single myosin head generates. Previously we directly determined the force-generating capacity of a handful of myosin molecules using a laser trap assay. However, we did not know exactly how many myosin molecules were involved in generating that force, making it impossible to determine the force per molecule. Therefore we used super-resolution microscopy on fluorescently-labeled myosin molecules to directly determine the number of molecules in our force measuring assay. This enabled us to visualize single myosin molecules and localize them with nanometer accuracy. Our findings suggest that in our laser trap assay 3-4 myosin molecules are available to interact with a single actin filament. Based on the peak force generated of 6picoNewtons this suggests that each myosin can generate up to 2picoNewtons of force. This is consistent with earlier predictions from muscle fiber data, but is the first direct estimate of the force generated by a single muscle myosin molecule. This will provide important insight into the basic mechanisms of contraction but also to our understanding of striated muscle diseases including heart failure.
Validation of Directly Observed Physical Activity in Children

Measurement of physical activity and energy expenditure in young children is a prominent topic. Low physical activity in children is linked to increased risk for unhealthy weight gain and an increased risk for developing preventable diseases. Purpose: Validate estimates of physical activity intensity based on coded videos of directly observed free-play activities in young children, using indirect calorimetry as the criterion measure of physical activity intensity. Methods: Assent and consent were obtained. Each session was sixty minutes long, with the initial 30 minutes consisting of consent, height, weight, demographics, and outfitting the participant. The last 30 minutes was the data collection. The child had free reign in a large room with different activities and games. Each session was recorded on a GoPro™ camera. The videos were coded using previously developed descriptors to categorize the child’s movement into intensity of movement. Indirect calorimetry (ml O2/kg/min) was used as the criterion measure of intensity category based on multiples of the child’s resting metabolic rate. Results: Data collection is ongoing and will be completed by March 14th, 2016. We expect the direct observation (DO) system to accurately represent the minutes spent in intensity categories across the session, using indirect calorimetry system as the criterion measure. Conclusion: The results of this project will provide validation of the DO system to correctly estimate intensity of physical activity during free play in youths. These findings will guide future research on the calibration of motion sensors to produce valid measurement of activity intensity in young children.
LANDSCAPE ARCHITECTURE

467 Auditorium  3:30-4:15  Board A08
Haiyi Huang
Carey Rose Clouse (Faculty Sponsor)
Department of Architecture, UMass Amherst

Rethink Olympic Stadium

Olympic stadium, the iconic architectural symbol of Olympic's long lasting legacy, has been a huge concern for hosting cities. Many of the past Olympic venues have become the "white elephants" in their cities. Not only do they consume large amount of finances for their construction and maintenance, they also require enormous amount of resources and energy. Because of the financial and environmental burdens, many cities are reluctant to take over the responsibility of hosting Olympic Games despite of the seemly advantages the Games may bring. In order to carry on the legacy of Olympic Games while following the path of sustainability, innovative solutions needed to be encouraged. Perhaps we can rethink about the tradition of constructing a permanent stadium but rather a temporary or demountable one.
LEGAL STUDIES

468 Auditorium 10:45-11:30 Board A46
Alexandra Aker
Deon Brock (Faculty Sponsor)
Department of Criminal Justice, Fitchburg State University
The Relationship between Gender, Legalization of Drugs, and Subsequent Drug Use

The rationale of this study is to revisit the idea of legalizing drugs now that some states have begun to legalize recreational drugs. The purpose of this study is to address any significant difference between males and females as related to current drug use and after potential drug legalization. That data for this research was obtained through a random sample of students from a state university in New England. It was hypothesized that neither males nor females will use drugs post legalization if they have not used them before legalization. It may be that the result of legalization will be no worse than the use patterns already prominent in the United States. Nevertheless the researchers wish to determine whether or not there are any significant differences between the use of males and females should our hypothesis be in error. The researchers hope to determine the more at risk population should our hypothesis be wrong. By revisiting the legalization of drugs debate, this research will enhance our knowledge on whether there will be an increase in drugs if they become legalized.
Conflict and Refugee Populations: Syrians and Palestinians in the Middle East

The Middle East is now host to an estimated five million Palestinian refugees, the largest refugee population in the world. After the start of the Syrian conflict in 2011, the region has seen a dramatic increase in refugees, with more than three million fleeing Syria to surrounding countries. This research focuses on Palestinian and Syrian refugees spread across the Middle East (living in Lebanon, Syria, Jordan, and Turkey). It examines the relationship between conflict and refugee populations, and make the case that refugees are not a threat to society, nor are they harbingers of conflict. Refugees can exert influence both on their host countries, and their countries of origin. I also touch on refugee militarism, and that when refugee/host violence occurs, it is often the direct result of brutal and discriminatory state practices. Much of the existing literature in this field views refugee populations as inherently dangerous. This perspective undermines attempts to examine state policy. In focusing on Syria and Palestine in tandem, my project was able to discuss refugees twice, three times displaced; meaning, for example, refugees who have fled Palestine to Syria, only to flee to Lebanon. This research is important to the field of refugee studies not only due to its double-pronged approach, but also in its attempt to complicate the standard narrative of refugees as corrosive, and make the case that, in addition to other factors, destructive state policy plays a role in the relationship between conflict and refugee populations.
Familial Structure and Crime

There has been much discussion about the structure of families and its relationship to juvenile criminal activity. This research project investigates the correlation that exists between familial structure and crime. Multiple variables were explored in this research including factors such as one-parent v. two-parent households, levels of parental involvement, levels of parental supervision, parental education levels, parental engagement in crime, and quality of life provided by parent(s). In addition, this research project made several connections between the aforementioned factors and behavior, including a child’s engagement in risk taking, a child’s impulsivity, poor decision making, and delinquent behavior. All of these factors combined demonstrated a clear link to a higher probability of a child engaging in crime at some point in their lifetime. Implications for policies on families and juvenile delinquency will be discussed.
One of the main overarching questions is how grammatical gender is determined across languages. The idea of gendered language is not intuitive in languages that do not possess it such as English and thus gender acquisition is a foreign concept. German, the language of interest in this thesis, has three labels: masculine, feminine, and neuter—der, die, and das. As one of the more fickle languages to determine gender classification, some researchers have examined regularities while others have deemed it an arbitrary process. Considering the many loan words that exist in the German language, this brings up the question of how gender is classified especially from languages that do not possess it such as English. It is generally agreed that morphology, semantics, and phonology influence classification in German. This thesis aims to find similarities between “typically German” nouns and loan nouns from English, deriving from previous psycholinguistic experiments and literature. My experiment aims to find a correlation between a German word and English loan noun’s meaning. Most native speakers would conveniently use an analogical account to relate the gender of the closest relative German word and apply it to the English loan noun. I hypothesize that this is seen in my study, and that the semantic representations of the word influence the conceptualization of an animate object’s gender. After all, a speaker of German would get peculiar looks for using “die Hund” instead of the proper “der Hund”.
In semantically unbiased cases, the syntactic analysis of linguistic input happens immediately, favoring smaller syntactic structures (Frazier, 1978, Frazier & Rayner, 1982). The present study examines the case of the syntactic and semantic processing of both, which can act as either a floated quantifier modifying a dual subject (e.g. John and Mary both sing) or as an adverb modifying a conjoined predicate (e.g. I both sing and dance). Current understanding of syntactic processing suggests that, in a sentence in which both interpretations are possible, the processor should prefer a predicate reading rather than a subject interpretation, as the predicate interpretation corresponds to a smaller syntactic structure (\([\text{DP The children]} [\text{VP both} [\text{VP sing and dance}]]\) (Fitzpatrick, 2006)) than the subject interpretation (\([\text{DP The children]}1 [\text{VP[both pro1]} [\text{VP sing and dance}]]\)). An acceptability rating study tests this prediction using the structure plural subject – both – conjoined predicate. Contrary to the presented prediction, the data suggest that participants prefer the subject interpretation over the predicate interpretation, despite the larger structure of the former. However, the subject interpretation does allow for an immediate semantic interpretation. I will argue for an account in which the need to assign a semantic interpretation to a structure as soon as possible outweighs the preference for smaller syntactic structures, such that the processor will favor a larger syntactic structure if it allows for a more immediate semantic commitment.
A common phenomenon in human language is subject-verb agreement; a system in which grammatical features of a sentence’s subject (person, number, and gender information) determine which verb forms are used. Psycholinguistic literature tends to describe this verbal agreement system as being systematic and following strict syntactic rules. The present study investigates how non-systematic information, mainly information that relies on conceptual/world knowledge, can affect subject-verb agreement processes while reading. Specifically, the study manipulates predictability, a form of conceptual information, by creating contexts that heavily suggest a specific verb, e.g., “The lone wolf on the mountain loudly...” which strongly predicts the verb “howls”. To contrast these highly predictive conditions, sentences with low predictive contexts were constructed, e.g., “The lone hiker on the mountain loudly...howls”, where “howls” isn’t easily predicted. This high/low predictability manipulation is tested in both grammatical and ungrammatical constructions by changing the subject’s number, e.g., “The lone wolf/wolves/hiker/hikers...howls.” Currently running, this study is collecting reading times by tracking eye-movements while reading. Analyses of reading times reveal difficulties in reading comprehension, with more difficult sentences being read longer. If the data reveal a reliable interaction between factors of grammaticality and predictability, i.e., “The wolves...howls” being read faster and easier than “The hikers...howls”, it would suggest that conceptual information could influence syntactically-based processes. If no interaction is found, the data would support claims of conceptual/syntactic dissociation, which say that conceptual information cannot modulate verbal agreement. Investigating the interface, or lack thereof, between conceptual and syntactic information during verbal agreement is the primary goal.
For centuries, people have appreciated fairytales for their didactic and escapist purposes. Because they are moral and fantastic, people see these tales as universal. However, in order to understand the tale, it is imperative to understand that each version of each story is an outcome of a carefully crafted combination of historical, social, political and cultural contexts. Fairytales, although maintaining the same general characteristics, have been reshaped time after time as products of their surroundings. The foregrounding of where a story came from and how it came to be is crucial in understanding why a tale matters. Through a careful study of the history of fairytales in all their forms (texts, films, plays, and others) from scholars such as Marina Warner and Jack Zipes, a sense of the historical continuum of these influences makes it clear that these tales are multi-layered wonders of their times. With this timeline readily available, it is important to see the application of its use. Keeping the idea of a socio-cultural, historical, and political study of tales in mind, a case-study on various iterations of the story of “Cinderella” in various forms of media exemplifies these influences and concludes that fairytales are omnipresent. Whether it be in the classic Disney Cinderella romance, Kenneth Branagh’s re-imagined Cinderella, or in the horror of Stephen King’s Carrie, the “Cinderella” figure stands as both a universal relation and a product of his or her time.
The objectives of this research were to analyze the behavior of the protagonist in a Latin American short story, "Su ausencia" by Horacio Quiroga; to consider the history of the author; and to determine the nature and effect of this work in the genre that literary critic Tzvetan Todorov studies as “fantastic.” Quiroga depicts a character who cannot remember the last six years of his life nor how he acquired world fame during that period, making the reader question with him the nature of his circumstances within the reality the tale establishes. Researching potential functional disorders that could assist in a naturalization of the character’s condition was carried out to determine if the nature of the protagonist’s condition was “supernatural”, or if verisimilitude was maintained, revealing his condition as uncanny but possible. The tale maintains a structure similar to Todorov’s theory, including a fantastic moment when the reader and protagonist both hesitate due to its perplexing nature. Sources in this research were studies of memory repression in journals of psychology and neuroscience, studies of attempted memory retrieval, and the emotional and environmental precursors and medical history of the protagonist, who is told he suffers from "epilepsy." This research supported a finding of verisimilitude in the story, due to the diagnostic determination of a dissociative state; however, since dissociative disorders had not yet been identified at the time of the tale’s production, the epilepsy ascribed to the protagonist was found to be inaccurate, and now stands corrected in line with contemporary medical considerations.
Anyone familiar with the Sherlock Holmes literature will agree that Holmes is an interesting character who compels further discussion. I believe that Arthur Conan Doyle, the author and creator of Holmes who was also a medical physician, portrayed Holmes with what would be labeled Asperger Syndrome nearly a century after Holmes first appeared in 1887. While this is a theory often discussed in Holmes online discussion groups, it has not expanded beyond a neat classification. My research on the symptoms of Asperger Syndrome, mainly through Harvard Medical School’s publications and through my personal observations of Asperger patients, suggests that Sherlock Holmes clearly shares several symptoms with documented Asperger patients. This in turn suggests that Conan Doyle was well aware of the behavior that he was portraying in what would become an enduring literary character. As all successful literary authors strive to create characters that readers can relate to, on some level, Conan Doyle fashioned his character with behavioral traits that he knew readers would understand and even recognize. We know today that Asperger cases are very prevalent and the symptoms, in various forms, are part of our shared and universal human experience. In creating a literary character, Conan Doyle created a character who not only captures our attention, but also represents a documentation of the Syndrome decades before the medical community labeled it. As such, Conan Doyle created a character who reads as a real and believable person.
Christopher B. Ferraz
Jeanie M. Tietjen (Faculty Sponsor)
Department of English, Massachusetts Bay Community College
The Traditional and Contemporary Hero

Literary scholars and cultural historians have long written about the construction of the heroic in poetry and prose. This research focuses on new versions of the heroic structure in popular media, along with traditional, but relevant, constructions. For example, heroic attributes of Odysseus from ancient Greece can also be found in the red, white and blue stripes of the comic book superhero Captain America. And while heroes have been used to teach children morals and values of the so-called upstanding citizen, this research investigates whether classical heroic characteristics merit such high esteem.
Global Theories Alike: An Examination of Similarities between Predominant Eastern and Western Philosophy Linked to Archetypes in Eastern and Western Literature

There lies an arbitrary division between “Eastern philosophy” and “Western philosophy” which prompts readers to experience each one through critically disparate eyes. Indeed, there are evident differences between cultures that appear in their respective philosophies, but to label in this way dismisses equally complimentary characteristics of all philosophy in conjunction. Using translations of philosophical theories as well as scholarly studies on them accessed through the Boston Public Library and the Bunker Hill College Library database, this paper compares and contrasts a variety of philosophical theories both within unique cultural contexts as well as cross culturally. Touched upon are the Analects of Confucius, the Dao De jing, Buddhism, Plato, Descartes, Leibniz, religious theories including Christianity, and the possibility that “Eastern philosophy” may have heavily influenced some Enlightenment Era thought. Further, this paper analyzes archetypes found in literature impacted by philosophical theory that support links between beliefs and values cross culturally. This research examines unique characteristics of historically grouped together philosophical theories as well as similarities between historically divided ones.
As mortal human beings, one will have to give up the fight to live someday. The major question that most Americans ask is that if it is one’s time to go, should it be one’s way to? In choosing a healthcare proxy, people should put into consideration their finances, lifestyle, their diagnosis, and importantly, the mode through which these decisions will be carried out by the proposed proxy and not just choose their spouses as proxies. Using direct interviews from professionals in Hospice care as primary sources, sources from government agencies, and scholarly articles, this paper examines why people should not choose their spouse as a healthcare proxy if they want their life to end as comfortable as they want. During the study, it was found that the percentage of people who were not accorded their end life wishes were those who made their significant others their healthcare proxy. This happened due to vast reasons, including funding for end of life care, which is the biggest issue that most families are facing in America, property acquisition, life insurance and proposed proxy’s health conditions. When it is time to go, the proposed and planned way of going peacefully and comfortably should be the way to go irrespective of the circumstances pertaining at that particular time. This study contributes to the debate about properly managing end of life care and why considerable amount of thought should be put into choosing a spouse as a healthcare proxy.
Optimizing Non-governmental Organizations’ Operations and Fundraising: A Game-Theoretical Supply Chain Approach

This paper provides a game-theoretical model of the interaction between Non-Governmental Organizations (NGOs) providing humanitarian aid. Research suggests that NGOs compete amongst themselves for funds, but also have incentives to cooperate. In this paper, we develop a model that includes the incentives for NGOs to collaborate in order to increase the total available funds and humanitarian aid provided, while competing for the available funds. Accordingly, we analyze their interaction as coopetition, addressing both the cooperative and competitive dimensions in financial-flow models. Starting with a network of NGOs, we model their decisions, as determined by these conflicting incentives, to choose the paths that will maximize their total utility gained from fundraising and providing humanitarian aid. We then develop conditions for a Bargaining Nash equilibrium for the financial-flow model. Finally, we provide a qualitative analysis and managerial insights for Non-Governmental Organizations.
Managing Organizational Change: A Case Study of the University of Massachusetts Boston during the Master Plan

The University of Massachusetts Boston is in the midst of a total overhaul of the campus. With change on a scale this massive, there is often disruption of normal activities, frustration of those involved, and situations that need to be managed effectively and efficiently. By looking at UMass Boston as a case study for change management, this study will examine several areas of disruption through three distinct organizational change lenses as an analytical framework: Strategic Design, Political, and Cultural. With these lenses in mind, this study will use individual interviews with staff, student focus groups, and related methods to discuss how this institutional change will have an impact on: (1) UMass Boston’s mission and values as a university, (2) enrollment and retention of students on campus and their demographics, (3) developmental, research, and learning environments of students, staff, and faculty as they go through this transition time, among others. This study will explore what UMass has done and is planning to do on these fronts, as well as in other areas of the university, to successfully and thoughtfully go through this change. This study will compare UMass Boston’s change management tactics with a model of best practice for managing change, and by doing so, ultimately will provide a set of recommendations for the UMass Boston community on how to successfully manage the campus and the members of the community during this time.
Rebecca Rose Dunlop  
Krista Hill Cummings (Faculty Sponsor)  
Department of Management, Bridgewater State University  
Service Recovery in Higher Education: Should Professors Apologize to Students?

Studies suggest that apologies are beneficial (e.g., Darby & Schlenker, 1982) and lead to positive outcomes such as forgiveness (e.g., Fehr, Gelfand, & Nag, 2010), positive feelings toward the transgressor (e.g., DeCremer, van Dijk, & Pillutla, 2010), and reduced sentencing in legal cases (e.g., Robbennolt, 2003). These findings have been supported within close relationships, business-consumer relationships, and employer-employee relationships, but have not yet been explored within professor-student relationships. This investigation will explore the students’ perceptions of professors who apologize for their mistakes compared to those who do not apologize after a mistake is made. The aftermath of a mistake is a critical moment and carries particular weight in students’ overall perceptions of their professors (e.g., Tucker, 2006).

The purpose of the current study is to compare the students’ perceptions of professors who apologize to those who don’t. I will conduct a vignette study to analyze the students’ perceptions of professors who apologize or not. I will analyze if the students’ reaction to the scenario differs based off the students being randomly assigned to read the non-apologetic condition or the apologetic condition. Results from this study will help us to better understand what factors influence students’ perceptions of their professors. More specifically, I am interested in how professors who apologize are perceived by students.
How Student Veterans at Salem State University Cope with College Challenges: An Exploratory Study

This is a study on how student veterans at Salem State University have been able to overcome challenges they have faced in college using the leadership skills they acquired during their service in the military. I conducted a qualitative inquiry by interviewing 4 student veterans who are currently attending Salem State University. These interviews were between 15 and 25 minutes in length and were composed of semi-structured, open ended questions involving military experience, college experience, challenges faced in college, and leadership. After conducting these interviews and analyzing the data, I found that this group of student veterans do in fact use leadership skills acquired in the military to cope with challenges. I conducted this study, because it is important that the university and community at large be aware of what positive skills student veterans have, as well as the leadership skills they are equipped with. From this study, I was able to find that this group of student veterans use several leadership skills to help them succeed in college and overcome challenges: self-discipline, self-confidence, endurance, determination, drive, respect, and positivity. Understanding what leadership skills these students have can help with improving services for veterans on campus, by supporting them in using these skills in beneficial and productive ways, as in coming up with methods to get more veterans involved and to be overall successful. As the group of participants was small, further research should be done in order to have a more conclusive understanding of veterans at Salem State University.
Trew Friends is a chapter-based, student-run community of young people across the nation. They are dedicated to spreading awareness of the importance of organ, eye and tissue donation. Currently, Worcester State University is the only college campus in the Northeast that has a Trew Friends chapter. Our goal is to increase the number to Trew Friends chapters among colleges in the Northeast. To promote this organization we designed a series of educational and instructional materials to facilitate the inception for new campus chapters. We then developed a targeted list of regional colleges and universities and contacted them through their student activities office. In addition to the pamphlets, we also designed a follow-up with step by step instructions on how to start a Trew Friends chapter, along with other useful information to implement the chapter. Our team reached out to 84 colleges. Within a week of our initial contact, 10 of these colleges responded and we will continue to follow through by providing additional information and encouragement towards the next step. We will also launch a second wave of inquiries to the non-responding sites. We will present metrics to tracking the efficacy of our efforts.
MARKETING

486  Auditorium  11:45-12:30  Board A56

Michael John Crowley
Zaur Rzakhanov (Faculty Sponsor)
Department of Accounting and Finance, UMass Boston

Live-Streaming on Twitch: How Live-Streaming is Changing the Marketing of Video Games

People watching other people play video games has become huge on sites like YouTube and TwitchTV. Live-streaming of video games on sites like Twitch is becoming more popular, from streaming of major e-sports events and major speed running charity events to people with smaller audiences simply streaming themselves playing games. Video game marketers, developers, and publishers have only just started utilizing Twitch and other live-streaming services and the content creators therein to help market and even develop their games. By using interviews and analysis of industry practices this study aims to provide a set of recommendations on how companies, primarily video game companies, can make use of Twitch and live-streamers to help market their products and determine strategies that may or may not be effective in a live-streaming, community driven environment.
Managing Cultural Segments

The purpose of this study is to identify the effects of culture in marketing of beer in the English-speaking countries. Being able to properly pinpoint how significant the influence of culture is in this market can facilitate accurate evaluation of the current marketing paradigm. In order to conduct this study a select group of companies’ advertisements will be examined from certain English speaking countries. Proper measures will be put into practice to ensure comparability between different companies and cultures. Measurements will be evaluated using Hofstede’s dimensions and related methods. The study is expected to demonstrate that culture is extremely significant to advertising. Furthermore, the national culture is most often referenced in marketing. Thus, the current marketing paradigm in the beer industry is rooted in the national culture of the English speaking countries. The outcome of this study would provide important information for marketers to consider when formulating new advertisements or attempting to bring their products into new countries and markets.
Café Reyes Marketing Venture

Café Reyes is a social-entrepreneurial venture launched by the Latin American Health Alliance (LAHA) in conjunction with their substance abuse rehabilitation program for Latino men. The Café provides a structured work environment where individuals without work experience can begin to build their skills. Open for the public on March 10, 2015, the Café’s goal is to reach profitability by the end of 2016. Our project was designed to create additional revenue streams for the Café and to educate the community on the existence and mission of LAHA. We designed “Fiesta Fridays” to be biweekly events from February to April. The events cater to a specific market population, with a generalized appeal across a wider market. Trivia Night was geared towards the college-aged market, Paint Night towards people in their 20s and up, Cuban Night for the Hispanic population, and Karaoke Night to tap into a large and active niche market in our area. Working closely with the Café Management, we designed specific marketing campaigns for each of these markets, priced out an attractive food-inclusive entry price, and secured professional services. We designed metrics to compare pre-and post-revenues, attendance numbers, satisfaction/intent to return surveys and LAHA awareness information. This data will be available and presented at the conference.
MATHEMATICS & STATISTICS

491    Room 162    2:30-3:15    Panel 5
Abdel Kader Geraldo
Matthew Daniel Dobson (Faculty Sponsor)
Department of Mathematics & Statistics, UMass Amherst
Periodic Boundary Conditions for Defective Incompressible Flow

Studying the nanoscale behaviors of particles is very important to the wide scientific community and has seen great technological impact. Computer simulation compliments and augments the capabilities of laboratory experiment, and these simulations can be carried out at the atomistic scale using molecular dynamics techniques. The project studies algorithms in molecular dynamics, particularly the geometry of dynamic periodic boundary conditions. This method involves a mix of Linear Algebra, Number theory, and scientific computation. We are interested in extending existing algorithms to a class of defective incompressible flows.
Meditation and Math Anxiety

Many students feel terrified when they hear the word “mathematics”. Math can create a lot of anxiety for students at various grade levels including college level. This fear may cause students to avoid any career related to STEM (science, technology, engineering, mathematics). Consequently, enrollment in STEM careers may see reductions. Anxiety toward math and the gender stereotype that women cannot be successful at math may significantly decrease women’s enrollment in STEM related careers. One of the most useful, modern, and calming solutions is meditation practice. Meditation practice will impact the students’ mental, emotional, and physical health in a way that may transform their lives completely. Meditation will help improve performance in math classes in a variety of ways such as reducing math test taking anxiety, enhancing self-esteem and self-confidence, freeing the mind from the poisons of worry, helping students focus on their skills, and eliminating distractions and improving memory. Through meditation students will be able to have strong and fundamental coping skills that will help them to deal with anxiety toward mathematics in a healthy and successful manner. This research will explore why people are anxious toward math, how meditation will help to alleviate and ease this anxiety, other benefits of meditation, and why meditation is a useful and effective method to enhance academic performance in mathematics, gender stereotypes, and math performance. The paper will reflect on current research on meditation, its implication and its challenges.
With every passing day, the volume of digital communication within our society grows larger and larger. Therefore the need for finding effective ways to send a message and ensure its reception is growing just as rapidly. One way to do this is by using error correcting codes; the mathematics behind one such code is the focus of this project. Let $v$ be some vector in $\mathbb{R}^n$ and let $D_{2n}$ be a matrix representation of the dihedral group of order $2n$. We denote $D_{2n} * v$ to be the set of vectors resulting from every matrix in $D_{2n}$ being multiplied by $v$ on the right. We say that $v$ has the Haar property if and only if all subsets of order $n$ of $D_{2n} * v$ are linearly independent. It has been shown that vectors with the Haar property exist in all $\mathbb{R}^n$ where $n$ is odd. Here we give the characteristics of vectors in $\mathbb{R}^3$ that have the Haar property. We also provide some conjectures about vectors in $\mathbb{R}^5$. It has also been shown that when $n$ is even, vectors in $\mathbb{R}^n$ do not have the Haar property. Thus for even $n$, we will redefine the Haar property so that if every $n - 1$ subset of $D_{2n} * v$ is linearly independent, then $v$ has the modified Haar property. Under this definition, we provide more conjectures about what vectors in $\mathbb{R}^4$ with the modified Haar property cannot be.
Healthcare, business, particle physics, biology—each of these fields stand to be revolutionized by big data, but the scale and complexity of these enormous datasets demand novel analysis techniques. Bioinformatics, which uses computer science techniques to analyze high throughput biology experiments, provides a useful case study of the challenges facing big data, and it shows the value of methods like topological data analysis that break away from traditional analysis techniques. As datasets continue to grow exponentially in size, time and processing power considerations become increasingly important. Another challenge for bioinformaticians is standardization of terminology used to represent the information. Ontologies arrange standardized terms in a relationship hierarchy based on descriptive annotations, which is crucial to ensuring interoperability of information across databases. With these challenges in mind, two primary families of analysis methods emerge in bioinformatics: annotation-based approaches that compare annotated terms to each other, and topological approaches that derive meaning from the shape, or the topology, of the data. While the annotation-based approaches yield useful results, current literature from expert sources shows that the topological approach is far more scalable than that annotation-based approach, and for that reason it shows great promise. Furthermore, organizations like Ayasdi are combining topological analysis and data visualization to produce revolutionary three-dimensional images of underlying data patterns. The size and complexity of big data demand new approaches, and the success of topological data analysis in bioinformatics shows promise across fields of study.
Knight Cubed: A Graphical Perspective of the Knight’s Tour on a Multi-Layered Chess Board

The Knight’s Tour is an interesting question related to the game of chess. In chess, the knight must move two spaces in one direction (forward, backward, left, right) followed by one space in a perpendicular direction. The question of the Knight’s Tour follows: Does there exist a tour for the knight that encompasses every single space on the chess board without any repeated spaces? The existence of Knight’s Tours has been proven for the standard 8x8 chessboard. Furthermore, the Knight’s Tour can also exist on boards with different sizes and shapes. However, though the board can be extended beyond the normal dimensions, the knight is restricted to movement in the two dimensional plane. Could there be a way to move beyond the two dimensional borders? Thus, the question of the Knight’s tour can be pushed further: Would the existence of Knight’s Tours be affected by the introduction of multi-layered chessboards? In other words, would it still be possible for a Knight’s Tour to exist on a chess board if there was a third dimension of movement that the knight could take? This poster presentation will look at the different aspects of the Knight’s Tour in terms of a two dimensional board, both standard and rectangular, and will then explore the factors that influence the existence of Knight’s Tours on a multi-layered chessboard. The poster presentation will also explore how these factors can be connected to concepts within Graph Theory.
493  Concourse  4:30-5:15  Board C78
Andrew Wang
Robin Koytcheff (Faculty Sponsor)
Department of Mathematics & Statistics, UMass Amherst
A Statistical Analysis of Saltshaker Output

The consumption of salt is a phenomenon that has significant ramifications on the health of human populations. In order to better understand how certain factors affect the quantity of salt consumed, we analyze their effect on the amount of salt dispensed from the salt-shaker. We mechanically standardize the action of shaking a salt-shaker and measure the output of salt based on the number of holes and the area of holes. We then use techniques from statistics to describe this relationship.
MECHANICAL ENGINEERING

509  Auditorium  4:30-5:15  Board A49
Saad Ishtiaq Ahmed
Sundar Krishnamurty (Faculty Sponsor)
Department of Mechanical Engineering, UMass Amherst
Retrofit Seat Belt Design for Motor Coaches

A ruling in 2013 by the National Highway Traffic Safety Administration (NHTSA) requires motor coaches manufactured after 2016 to have safety seat belts installed for driver and passenger seats. However, this ruling does not apply to existing motor coaches that did not leave the factory with seat belts. Each year in the United States, there are about 270 severe motor coach crashes, resulting in a total of 209 passenger fatalities over the past ten years. According to NHTSA data, over one-half of these fatalities occurred during rollover crashes, and it is estimated that 3-point seat belts are approximately 77% effective in preventing these rollover fatalities by reducing passenger ejection from seats, thereby making the use of seat belts an effective solution for reducing motor coach related fatalities. The replacement of existing seats with seat belt equipped seats is estimated to cost approximately $40,000 per motor coach, which renders the replacement procedure a cost-prohibitive operation. Identifying the opportunity, the University of Massachusetts Amherst has developed a novel bolt-on retrofit seatbelt assembly that does not require the removal of existing seats from the motor coach. Prior simulation studies conducted on the assembly provided insights into design changes that would improve seatbelt restraint performance. The current focus of the research is to implement these design changes and verify them for head-on and angled crash impact scenarios using FEA software. The assembly is designed to comply with federal motor vehicle safety standards, and offers a cost-effective alternative for seat belt implementation that can make motor coaches a safer mode of highway transport.
Progression in the capabilities of additive manufacturing (AM) have increased its usage as a conventional manufacturing process. Its uses are particularly advantageous when the number of parts in an assembly can be significantly reduced, production volumes are low, or geometric constraints prevent traditional subtractive processes from being used. However, there are also many reasons why a designer would not design a part based on AM technology. The choice of conventional versus AM manufacturing must occur as early as possible in the design process, as this choice can substantially affect how the product is designed. Incorrectly choosing a process will lead to wasted design time, increased time to market the product, a functionally inferior design, and/or a costlier product. To address this critical manufacturing decision, a support system for an integrated approach to design was developed to incorporate both AM and conventional considerations early in the design process (ID-PrAM). This approach improves early design efficiency and effectiveness by methodically focusing on the key design process elements to optimally compare alternatives earlier in a design process. The benefits and potential cost savings of using the ID-PrAM approach are demonstrated by a pair of case studies, and the results are discussed.
Alexander Filippi  
Soumitra Basu (Faculty Sponsor)  
Department of Industrial Technology, Fitchburg State University  
Use of a 3D-Printed, Microprocessor-Controlled Prototype Robot in a Study of Line Following Algorithms

Modern technology has resulted in an increased use of robots to perform tasks once done by humans in many industries and fields including but not limited to: materials handling, manufacturing, medicine, research, education and emergency response. A robot is a machine designed and programmed to perform a task or variety of tasks autonomously with precision and efficiency. In order to execute tasks robots use sensors to gather information about their environment and then perform actions based on that information. The objective of this project is to design, construct and program a line following robot. The design of this robot is done with the intent of implementing methods of rapid prototyping, particularly 3D printing. Considerations for the design of the robot include a chassis that uses minimal resources while maintaining structural integrity, selection of components to use (i.e. motors, sensors, controller, power supply and circuitry) and positioning of each component. The chassis of the robot is 3D printed and allows either continuous rotation servos or NEMA-17 stepper motors to be mounted. This robot uses an Arduino microcontroller board to execute a line following algorithm along with a QTR-8RC digital sensor array to read the line position. The primary aim of this project is to create and program an algorithm to control the robot’s movements in order to follow a black line on a white surface. Our secondary objective is to expand on these capabilities and algorithms to further investigate the impact they can have on automated manufacturing today.
Polyhydroxyalkanoates (PHAs) are a family of natural bioabsorbable polymers that have potentially favorable characteristics when used as sutures, scaffolds, or in other medical applications. Because PHA’s are bioabsorbable when used as tissue engineering material, the human body can break them down into non-toxic compounds that can be expelled through the natural metabolic processes. In this study, PHA material was subjected to degradation in vitro (cell culture in media) and in vivo (inside living zebrafish) for varying spans of time. As a control, the samples were also treated purely in the media used in the in vivo trials, but without the cells. After each time increment, material properties such as the Young’s modulus and toughness of the samples were found through microindentation and microtensile testing. Because the mechanical tests were done periodically, their data provided insight into how the PHA samples degraded over time in different conditions. The results gathered through these tests show that the Young’s modulus of P (HB-co-17mol%Hx) while in vitro decreased from 3.26 GPa to 2.42 GPa within 4 weeks. Samples exposed in vivo experienced a decrease from 3.26 MPa to 0.51 MPa within 7 weeks. Tensile testing conducted on samples incubated in vitro from 0 days to 4 weeks revealed a constant initial slope and strain softening after reaching a peak on the stress-strain curve, regardless of exposure time. The ultimate strength of the samples decrease after 7 days of exposure in vitro and remains constant for up to 4 weeks, while the percentage elongation at break increased during the first week, then gradually decreased over time.
504  Room 168  2:30-3:15  Panel 5
Gregory Andrew Forbes
Roderic Grupen (Faculty Sponsor)
Department of Computer Science, UMass Amherst
Design of an Autonomous Robot Recharge Docking Station for uBot Series Robots

The proposed project includes an Autonomous Robot Recharge Docking Station that has been designed and implemented for the uBot series of robots in the Laboratory of Perceptual Robotics in the College of Computer Science. These robots were programmed to dock autonomously at two contacts points in their chassis’ where the recharging operation is simultaneously conducted. This project consists of the design and implementation of a ratcheted-docking mechanism, a robot-release mechanism, and the packaged assembly for the docking station. Modifications to the control system of the robots were also implemented in order for the robot to properly dock itself for recharging when under a certain battery level. Once the implementation of the project was complete trials of docking were performed in order to determine how successfully the robot could dock itself.
The demand for renewable energy technology is constantly increasing as climate change gains more attention. Ocean Wave Energy is a mostly untapped source of renewable energy, yet it has the highest energy density of any renewable resource. Wave Energy is mainly untapped because the research and development has been hindered by expensive experiments, and the poor capability of common analytical and numerical methods. For instance, common analytical and numerical methods must make assumptions that ignore significant effects in the fluid flow, which significantly reduces the accuracy of the results. However, through massively parallel computational fluid dynamics (CFD) simulations which directly solve the governing Navier-Stokes equations, critical questions about these devices can be answered accurately, through computational simulations. The purpose of this work, which is funded by the National Science Foundation, is to develop a computational framework for analysis and design of Ocean Wave Energy converters (WECs) using CFD simulations. The accuracy of the computational tool has been validated through comparisons with experiments. Specifically, the simulations predicted the motion of flap-type and vertical pitching cylinder-type WECs, which agree well with experiments. The results show that the computational tool is reliable for simulations of WECs. The design of a WEC involves selection of key parameters such as the WEC geometry, inertial characteristics and natural frequency of the WEC, as well as the damping associated with the power take-off system. An example of the computational framework is demonstrated through application to a specific wave energy converter geometry, subjected to controlled wave conditions.
Engineering Considerations for a Submerged International Oceanic Science Station

Humankind is perpetually intrigued by the sea, from The Challenger’s first global circumnavigation to Jules Verne’s Nautilus, we strive to gain a better understanding of her. Through advancements in science and technology, our knowledge about the world around us is steadily increasing. Today, there is much desire, effort and support to study our cosmos including a proposed journey to Mars. One would expect us to have the same extended effort to learn about Earth. Yet, that is not the case, as our oceans remain largely unexplored, despite the significant benefits it could bring us. Imagine, a Submerged International Oceanic Scientific Station (SIOSS), this being a multi-disciplinary collaboration with a common goal; the extensive exploration of our oceans. My research will be aimed at assessing the feasibility of such a station, with a focus on engineering. This research will investigate the following questions: How could SIOSS withstand the extreme environments, especially corrosion and pressure? What design and structural components are most suitable? How can it safely and comfortably maintain human life? How will it be deployed across several locations? How can it be powered? Additional benefits will also be considered, such as the scientific and academic advances SIOSS could bring to society. SIOSS aims to inspire and serve future generations by compiling data and sharing it worldwide. Ultimately, SIOSS will contribute to a better understanding of our planet and ourselves, and support our future survival on Earth.
Vertical sleeve gastrectomy is a weight loss surgery in which around 75% of the patient’s stomach is removed and the remainder sealed into a narrow sleeve using surgical staples laparoscopically. The procedure is an effective surgical weight loss intervention, but suffers from a small percentage of potentially fatal complications due to leak formation in the new sleeve. While the etiology of leaks is poorly understood, a common leak formation site is at the ends of the staple line. Because the current laparoscopic staple technology used in this procedure is only able to cut in straight lines, the ends of the staple line are sharp corners that act as stress concentrators. The goal of this project is to develop a laparoscopic stapler with a bendable end effector, allowing the creation of nonlinear staple lines. This involves assessment of customer and technical requirements for a laparoscopic stapler, and subsequent refinement and detailed design of an existing design concept that is able to create unique stapling geometries via the use of interlocking, modular segments. The final design will be modelled using CAD and finite element analysis software.
500  Auditorium  2:30-3:15  Board A07
Pavel S. Grigorash
Matthew Lackner (Faculty Sponsor)
Department of Mechanical Engineering, UMass Amherst
UMass Rocket - Altitude Control System

As part of the NASA Student Launch Initiative (SLI) a high power rocket was built and equipped with an altitude control system. The results of the NASA SLI competition are implemented by NASA in their research for the new SLS flight vehicle. The altitude control system was designed to ensure that an exact altitude of 5280 ft. above ground level is achieved. This is accomplished using three airbrakes actuated simultaneously to change the drag force acting on the flight vehicle during ascent which are controlled by an onboard micro-controller and a barometric pressure sensor to determine the altitude. Simulated flights of a controller utilizing a predictive algorithm for calculating altitude based on the equations of motion have proved to coincide with actual and simulated flight profiles of the initial small scale flight vehicle. This proves that the implemented control structure can be used reliably to predict the final altitude of the vehicle in real time and compensate for altitude overshoot using the airbrake system. The altitude control system will be implemented and tested on the full scale competition rocket.
Graphene’s two-dimensional nature endows it with several unique properties, in particular, a high thermal conductivity. The high thermal conductivity while useful in many applications is a hindrance for use in photovoltaic or thermoelectric applications. Graphene nanomeshes which are engineered for optimal thermal performance could potentially serve as excellent next-generation materials for such purposes. An appealing aspect of graphene nanomeshes is that they preserve the excellent electronic properties of graphene while allowing for control over thermal conductivity. This research studied the effect of changing the size and density of the hole defects in the graphene nanomeshes on thermal conductivity. The research was performed using computational molecular dynamics simulations, which provide an inexpensive but accurate way of determining the properties of defective graphene sheets. These calculations revealed a systematic decrease in the thermal conductivity of graphene nanomeshes as the size of the defect was increased. An increase in the density of the defects also resulted in a decrease of the thermal conductivity. The results of the research can help guide progress in several applications from microelectronic devices to photovoltaic cells, wherever the thermal conductivity of graphene needs to be controlled.
The objective of this research is to evaluate the feasibility of developing nonlinear models for economic forecasting. Specifically, this research aims to improve the accuracy of modelling Macroeconomic Policy decisions. Two novel methods within engineering System Identification have been selected for non-linear model generation. The first, Model Structure Adaptation Method (MSAM), modifies the structure of a supplied model to improve the fit of recorded inputs to a recorded output. This method computes the structural sensitivity of the model so that an improved model may be chosen through gradient-based optimization. The second method, Epigenetic Linear Genetic Programming (ELGP), employs genetic algorithms to infer the underlying dynamics of observed data. It generates hundreds of randomly-constructed models, and utilizes epigenetic hill-climbing techniques to optimize the models. Both methods have proven to successfully improve the fit between recorded inputs and outputs in both laboratory demonstrations and engineering applications. The non-linear results of both methods hold promise for system identification needs within macroeconomics.
Within the emerging field of Mechanobiology, it has been demonstrated that producing dynamic culture environments including mechanical and shear stimuli in-vitro is vital to replicating and maintaining intrinsic biological function of cells/tissue. In an effort to replicate this in-vivo dynamic environment, several bioreactor systems have been developed to generate shear in individual wells. However, these systems are either unstandardized or are highly prone to airborne contaminants due to open-lead operation. In addition, they are costly, labor intensive, time consuming, and do not have the capability to run multiple concurrent experiments. Here, we introduce a new bioreactor system that enables multiple well plates to replicate dynamic environments with stem cell cultures in a closed-lead operation. This system utilizes an assembly of gears affixed with magnets, and pellet inserts for each well plate to create rotational shear stimuli. Use of potentiometer, voltmeter, and other electronic components allows precise control of the shear stimuli onto stem cell cultures. In order to create the prototype and minimize cost, in-house fabrication methods such as laser cutting and 3D printing were utilized. In our current study, the system will be used to determine the biological significance of shear force on mesenchymal stem cell functions as compared to static control cultures. It is expected that the cells will react to the stimuli as if within the body. We envision that this bioreactor system will provide an engineering solution to implementing mechanical and shear stimuli within a standard well plate and will contribute to the field of Mechanobiology.
Robotic manipulation and locomotion are typically approached as separate problems. However, a hybrid function hand-foot manipulator has significant advantages over two single purpose designs by reducing the energy costs associated with performing both tasks. The goal of this thesis is to develop and assess a robotic hand morphology for both locomotion and grasping. A successful design for manipulation is achieved by demonstrating the basic grasps defined in this project to be cylindrical, sphere, pinch, and hook. Locomotion is defined by specific loading conditions during quadrupedal motion, which are knuckle walking, falling, and rising from a prone position. These functions are realized through a novel series elastic wrist with one flexible finger and a rigid finger structure. The design is optimized using finite element analysis and verified through experimental data. Specifications for the manipulator design are derived from the requirements of the uBot-7 located in the Laboratory for Perceptual Robotics at the University of Massachusetts Amherst.
Bone metastasis is a devastating condition which contributes to at least 70% of breast cancer related deaths worldwide. Bone metastases degrade the bone matrix leading to increased skeletal fragility, patient discomfort, and often fracture. The regulation of the bone matrix in the healthy body is controlled by osteocytes, the most common type of bone cell. Osteocytes sense mechanical signals in the body and respond by regulating osteoblast and osteoclast behavior to maintain consistent bone strength. However, it is not fully understood how osteocyte activity is affected by bone metastatic breast cancer. In order to develop therapies which target the key factors controlling metastatic cancer progression, it is necessary to better understand how osteocytes interact with cancer cells. In this study, a 3D in vitro model will be developed which accurately recapitulates normal osteocyte histology and behavior. Scaffolds for this model will be constructed from poly (lactic co-glycolide) and hydroxyapatite using a previously established gas foaming/particulate leaching method. Osteocytes (IDG-SW3) will be seeded into these scaffolds and be subjected to a cyclic mechanical loading regimen (1 Hz, 10% strain, 1 hour per day, 3 days per week, for 3 weeks) to facilitate the development of normal cell architecture. Following the establishment of this model, tumor derived growth factors (from MDA-MB231 breast cancer cells) will be applied to these scaffolds and changes to osteocyte behavior will be evaluated. Each of these models will be assessed using histology, gene expression through RT-qPCR, live/dead staining, histology, scanning electron microscopy, and DNA analysis.
502 Auditorium  2:30-3:15  Board A09
Tom Nilsson
James Rinderle (Faculty Sponsor)
Department of Mechanical and Industrial Engineering, UMass Amherst
UMass Rocket - Atmospheric Measurement Payload

Accurate readings of atmospheric data and efficient wireless data communication are essential to many modern fields such as weather forecasting and aviation. Completed in conjunction with the UMass Rocket Team this project focuses on the development of an atmospheric measurement payload for the NASA Student Launch Initiative (SLI). The designed payload must be ejected from the teams’ rocket vehicle at an altitude of 5280 ft and record atmospheric data, take images with a horizontal orientation, and wirelessly transmit all data to a ground station. The motivation behind this project is to encourage innovation in the design of complex systems solving real world problems that could potentially be applied to future Space Launch Systems (SLS). The design process involved breaking down the requirements to the fundamental constraints and developing iterative solutions that were then discussed with peer engineers on the team. All sensors and cameras are integrated together and are collecting data as expected with continued development of the image stabilization continuing. Implementation of the wireless data transmission has also been successfully completed using a modified open source protocol called MAVLink but the final test of the system requires a full scale test with the payload being launched in early March. The development and implementation of a compact camera stabilization and wireless data communication system discussed in this project can be readily modified to be applied to many fields outside of Rocketry.
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505    Room 168    2:30-3:15    Panel 5
Namkha Yeshey Norsang
Yahya Modarres-Sadeghi (Faculty Sponsor)
Department of Mechanical Engineering, UMass Amherst
Role of Caudal Fin Stiffness in the Fast Start Acceleratory Motion of a Fish

Certain species of fish have the inherent ability to perform movements involving a very high acceleration in a short period of time, referred to as fast-starts. These fast-starts greatly enhance the ability of some species of fish to hunt for prey, while others employ it to prevent themselves from becoming prey. Peak instantaneous accelerations of up to 245 m/s² (around 25 times the acceleration due to gravity!) have been experimentally observed in the Northern Pike, which is a fast-start specialist. The primary hypothesis that fueled my research is that a variability in caudal fin stiffness over the course of a fast-start maneuver can improve acceleratory performance. To be more specific, the ability of the fin to be relatively flexible when the fish bends its body inwards during the preparatory stage, and regain rigidity during the propulsive stage when the fish straightens out again, can improve the swimming efficiency of the fish. By varying designs, materials and other parameters, I fabricated and tested prototype fins in order to understand the relationship between variable fin stiffness and the fin forces that affect the fish’s acceleratory performance. By understanding the basic mechanisms behind the fast start maneuvers, steps can be made in the direction of building bio-inspired mechanical devices that can achieve such accelerations and velocities in water. This will enable the construction of manned or un-manned vehicles that can efficiently traverse through turbulent aquatic environments, thereby enabling exploration of vastly undiscovered expanses of oceans around the world.
This thesis will research, design and develop a human powered grass cutting machine that improves the conversion of human energy to mechanical cutting power. Motivation for this thesis stems from the desire to replace power equipment where applicable with sustainable alternatives. The principal method employed by reel mowers for harnessing power from the user has not evolved since the advent of the technology in 1830, and is not optimum. Pushing while walking is an inefficient movement pattern for the body. In contrast, the pedaling motion of a bicycle is one of the most efficient modes of mechanical power generation for the human body. With similar effort compared to walking and pushing more power can be produced through pedaling with less fatigue. By coupling the conventional reel mower with a chassis that the user pedals, cutting performance, speed and effort of the machine is superior to that of conventional reel mowers. The design process for this machine was driven by a variety of specifications determined from product needs. Tradeoffs were objectively made to best meet the specifications. Chassis design was driven by specifications regarding terrain and body positioning. Drive train design was driven by power requirements and efficiency losses. Subjective aspects of the design such as aesthetics and perceived effort were determined with a user test group. The resulting new design has been prototyped and performance tested against the benchmark specifications and compared to prior art.
Balancing Aerodynamics and Complexity in Small Wind Turbines

Although wind energy research and development has typically focused on large wind turbines, there are some applications, such as remote sites and sailboats, in which a smaller turbine that produces far less power is appropriate. This research is focused on understanding the relationship between the complexity of the turbine blade shape and the aerodynamic efficiency in small wind turbines. The balance between these two aspects is critical when designing the blades because it dictates how much energy can be created by the turbine versus the cost of materials and difficulty in manufacturing the blades. In this project, a custom Matlab code was made to be able to study different blade geometries and their corresponding power outputs. The impact of designing the rotors using different airfoils, blade twists and blade thicknesses could then be predicted using this code. A variety of different rotors were examined, ranging from the simplest possible blade to the theoretically ideal blade, which would supposedly generate the most power. The tests were done for different wind speeds to assess the impact of the environment on the results. The technology used to create the blade will differ based on the blade complexity, which is indicative of the impact that the design has on the manufacturing process. The actual power generation of the turbines will be measured in the wind tunnel. The results will quantify the tradeoffs between aerodynamic efficiency, and thus energy production, and the complexity of the blade shape, and thus the materials and manufacturing processes.
Implications of Offshore Wind Farm Wake Modelling

This paper considers the wakes created by offshore wind farms, and explores the implications of how they are modeled. This is part of a larger project aimed at helping policy makers plan where to site offshore wind farms. Wake modelling provides a method for predicting how much power is lost from neighboring wind farms; wind farms reduce the velocity of the wind around them, meaning nearby farms produce less power than they would otherwise. The decision-support model being developed in the larger project uses a simplified wake model in order to estimate how much power is lost from neighboring wind farms. I compare the estimated amount of power loss in this model with another, more detailed model that is used within the wind industry. I compare the two models in a range of scenarios, varying a number of parameters, including wind speed, farm size, and turbulence intensity. The results of the sensitivity analysis suggest a strong disparity between the two models. The simplified model shows a much more severe power loss with increasing number of wind farms than the industry model. This may be because the industry model was intended for individual windfarms and neglects what are called ‘deep-array’ effects. The industry model shows large variations in power loss based on initial wind speed and other parameters while the simplified model shows no changes or negligible changes. The collected data suggests current wake models need to be revised to accurately predict power losses between large offshore wind farms.
A Remote Sensing Study of the Impact of Monsoon Rainfall on Sea Surface Salinity in the Bay of Bengal

The agriculture, economy and all aspects of life in the Indian continent around the Bay of Bengal are governed by the summer and winter monsoons in the region. Their intra-seasonal variability and predictability is poorly understood. These ocean-atmosphere effects are globally interconnected and impact weekly-monthly predictability of our weather in the USA. The surface salt content (herein known as sea surface salinity or SSS) is an important part of the interaction between the atmosphere and the ocean in the Bay of Bengal (BoB). The climate in the Asian subcontinent is dominated by rainy periods (monsoons) and dry periods. Rainfall during the summer and winter monsoons can vary greatly from year to year, with above and below average seasons affecting the livelihoods of more than one billion people that live in the region. In order for the communities affected by the monsoons to properly prepare for possible hazards, an understanding of the underlying mechanisms that influence the monsoons is necessary for high quality predictions. This undergraduate project will use two remote sensing products from NASA: the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI) and the Aquarius mission (sea surface salinity from space) to determine the timing of rain events and their impact on the SSS. In conjunction with these two remote sensing products, a re-analysis of satellite data, NASA’s Modern Era-Retrospective Analysis for Research and Applications (MERRA), will be used to further understand the relationship between rainfall and SSS in the BoB.
MERCHANDISING & TEXTILES

516  Room 177  10:45-11:30  Panel 2
Caroline Elizabeth DiGirolamo
Amanda Rivera
Cassandra Marie Tedeschi
Ruirui Zhang (Faculty Sponsor)
Department of Fashion Design and Retailing, Framingham State University
Observation of the Effects of Celebrity Endorsements on Instagram and How Celebrity Attachment Influences Purchase Intentions and Increases Sales

In recent years, with the use of Instagram, celebrities have become a huge marketing tool through connecting with their fan base on a more personal level to endorse products. Brands take advantage of celebrity endorsements due to the famous person’s huge follower base which then leads to their fans then purchasing the product. Therefore, celebrity endorsements on Instagram are evolving as a strategy to increase brand revenue. The purpose of the study is to understand how celebrity endorsements displayed on Instagram affect the purchase intentions of consumers and how that correlates to an increase in revenue for companies. An online survey was conducted with a sample consisting of 100 participants from four generations who had an Instagram account. The five variables: Instagram performance, generation cohorts, celebrity endorsements, celebrity attachment, and purchase intention were measured in this study. The researchers found that celebrity attachment and celebrity endorsements are highly correlated with purchase intentions. Generation cohorts responded to celebrity endorsements differently. Based on the findings, strategic information can be used as an advantage for marketers in the fashion industry. Fashion advertisers should try to select celebrities that have a large number of followers and a positive attitude who would buy the product and view the brand in a positive way. To attract consumers who are not highly influenced by celebrities, companies need a product with outstanding quality. Overall, emerging celebrity endorsements on Instagram can be used as an effective marketing tool towards younger generations because of their regular activity on Instagram.
Rachel Jade Mullins
Sabine Tasha Adrasse
Andrea Rose DeMeo
Asha Suleiman
Ruirui Zhang (Faculty Sponsor)
Department of Fashion Design and Retailing, Framingham State University
The Comparison of Social Media Marketing Strategies for the Lingerie Brands of Victoria’s Secret, Soma, and Aerie through Facebook

As Facebook and other social media sites have grown in popularity with the number of users, fashion retailers have taken to these sites as means to market to consumers and social media followers. Retailers use a variety of social media marketing strategies in hopes of influencing people to “like”, comment, or share their posts, and even persuading people to buy products. The purpose of this study is to compare the social media marketing strategies for the lingerie brands of Victoria’s Secret, Soma, and Aerie. In this research, the researchers surveyed the first 100 female students available and willing to participate in the study in Framingham, Massachusetts to collect and analyze data. This study was conducted with accidental sampling by using a survey consisting of 53 questions that were Likert scale, multiple choice, and open-ended. Variables including brand familiarity, consumer interactions, social media activity frequency, Facebook pictures, Facebook videos, promotional posts, branded entertainment type strategies, subjective norm, attitude, and demographics were measured in this study. The data shows that most participants were familiar to Victoria’s Secret and Aerie much more than Soma, therefore a large percentage of the sample were willing to engage with Facebook posts from Victoria’s Secret and Aerie rather than Soma. These results also showed that video posts were the most popular form of marketing strategy with engagement amongst the sample. These results can be used fashion brands which use Facebook to potentially help improve consumer attitudes, brand familiarity and increase activity on social media.
This study will focus on the theory of ballroom dance costumes and how each style of dance has its own unique characteristics represented in the costume, and how this theory is then adapted in the construction of the costumes. When choreographing a dance, the performance tells a story. This story is told through several different aspects including the movements of the dancers, the music selection, and the costumes. This study will look at what makes the dance costumes different from everyday fashion. Dance costumes need to allow for the large range of movements the dancer will need when performing. Yet, have it still be flattering to the dance and style and, when in a competition setting, capture the attention of the judges. It will then investigate how the costumes have evolved over time, and the relationship the traditional costume has to the style of the time period for when the dance itself was introduced. It will also look at how the rhythm and sound of the music influences the designs. The music could influence the colors, the drape, or the shape of the costume while still having to represent the style of dance it is intended for. From all the different styles of ballroom dances, the study will then focus on two or three specific dances and physical costumes will be constructed. The dances will include a Latin dance such as the Tango, a swing dance such as the Jive, and a standard dance such as the Waltz.
515 Auditorium  10:45-11:30  Board A27
Emily Nicole Whittier  
Virginia May Noon (Faculty Sponsor) 
Department of Fashion Design and Retailing, Framingham State University
The Effect of Different Visual Merchandising Strategies on Shopping and Purchasing Behaviors of Generation Y Consumers

The purpose of this study was to determine the effect of different visual merchandising strategies on shopping and purchasing behaviors of generation Y consumers. A variety of visual merchandising strategies used by department and specialty stores were observed along with product placement and levels of customer service. A pretest was given to 60 generation Y female fashion students to determine department and specialty stores most often shopped at. In depth store observation and comparison of visual merchandising strategies of five department stores and five specialty stores was conducted to determine the different visual merchandising strategies used. Data was collected using case study methodology and survey research.
MICROBIOLOGY

533  Room 811  3:30-4:15  Panel 6
Thanh Thuy Bui
Michele Klingbeil (Faculty Sponsor)
Department of Microbiology, UMass Amherst
RNAi Complementation of Mitochondrial DNA Polymerases in Trypanosoma Brucei

Trypanosoma brucei is a parasitic protozoan that causes fatal Human African Trypanosomiasis. Inside the cell’s single mitochondrion is the unique kinetoplast DNA (kDNA) composed of a topologically catenated network consisting of a few dozen maxicircles (23 kb) and a few thousand minicircles (1 kb). Unlike other eukaryotes that have just one mitochondrial DNA polymerase, pol gamma (γ), trypanosomes have at least 3 DNA polymerases (POLIB, -IC, and -ID) that are essential for mitochondrial DNA replication and maintenance. Previous RNAi experiments have demonstrated that single gene knockdown of either POLIB or POLID resulted in loss of the kDNA network. Endogenous proteins levels of one could not compensate for the loss of the other. We are using an inducible RNAi/complementation approach to ask if overexpression of POLID can rescue the POLIB RNAi phenotype followed by a corresponding experiment in which POLIB is overexpressed and POLID is silenced. Growth curve kinetics, specific mRNA transcript levels, and overexpressed protein levels are assayed in both cell lines. POLIB mRNA transcripts levels were depleted while POLID transcripts were increased above uninduced control levels. However, POLID overexpression could not rescue POLIB loss of fitness and kDNA. Standard induction conditions (1 ug/ml tetracycline) did not produce significantly higher levels of POLID protein compared to the endogenous protein levels. Increasing tetracycline amounts (2-4 ug/ml) are being tested to further increase overexpression levels. Uncovering the role of the trypanosome multiple DNA polymerases may lead to potential anti-trypanosomatid drugs that can further relinquish the antiquated and toxic drugs available for treatment.
Asthma is a chronic disease of the lungs affecting over 300 million people worldwide. The Webley lab previously found Chlamydia pneumoniae in the bronchoalveolar lavage (BAL) fluid of a majority of children with corticosteroid unresponsive asthma. This project aims to determine the effect of Vitamin E isotypes, specifically delta-tocotrienols on the infectivity of C. pneumoniae, as well as the inflammatory process resulting from allergen challenge. We hypothesize that Vitamin E will reduce Chlamydia infectivity and inflammation having potential as an adjunctive treatment in corticosteroid unresponsive asthma. In evaluating the broader effect of Vitamin E on non-infectious allergens such as house dust mites, we aim to better understand the effect of tocotrienols on the inflammatory mediators of the arachidonic acid pathway. Human lung epithelial cells (A549) were grown to 80% confluence and treated with delta-tocotrienol 3 hours prior to infection with C. pneumoniae or treatment with house dust mites (D. farina and D. pteronyssinus). Thirty-six hours following infection with C. pneumoniae, infectivity was measured by immunostaining and counting inclusion forming units (IFU). The IFU was compared between treated and non-treated cells to determine the effect of Vitamin E. In a similar manner, we evaluated proinflammatory cytokine secretion and gene expression of key enzymes in the arachidonic acid pathway using qPCR, following inoculation of house dust mite antigens. Our preliminary data shows that delta-tocotrienols significantly inhibits Chlamydia infectivity, 5-LO, 12-LO, Cox-2 and cPLA2 in lung epithelial cells. We expect to confirm these results with qPCR and evaluate all enzymes in the pathway.
Alternative medicine has long been ignored as the secondary route to treating illnesses. Understandably so, because of its comparatively long length of time in taking visible effect on treatment. Today the demand for immediate results is common. However what is missing in that process is the overall quality of health in the long term, for both the individual and the population community as a whole. Research suggests that Traditional Chinese Medicine (TCM) has the potential of addressing this long term issue, first on the individual level by holistically healing the body, and second on the community level by shifting the target of treatment from preventing specific metabolic or replication pathway of the pathogen to bolstering the base immune system itself so it could continue eradicating the pathogen. Based on extensive literature review, this paper aims to synthesize the research done thus far showing the effectiveness of TCM in treating common immunological impairments - specifically influenza, asthma, and food allergies - and to propose a business plan in which TCM can be integrated into primary care.
Actinomycetes are a soil and sediment loving, spore-forming bacteria that can produce antimicrobial metabolites. About 50% of microbial antibiotics originate from this particular class of bacterium. While terrestrial specimens have been an exhausted source of antibiotics, marine actinomycetes are far less studied and therefore an ideal subject for research. Shore line and marsh samples of varying depths were collected to isolate marine actinomycete colonies. After isolation and enumeration on various selective plates, antimicrobial properties will be tested against various species of bacteria. With the number of antibiotic resistant bacteria growing, the need for new antimicrobial agents also rises. The search for new antibiotics should not be ignored, but prioritized.
Food-grade Antimicrobial ε-polylysine Transiently Alters the Gut Microbial Community and Predicted Metagenome Function in CD-1 Mice

Diet is one of the primary contributing factors on the composition of the gut microbiome. However, the effects of common bioactive food additives on microbiome stability remain largely unexplored. In this study, we sought to investigate the influence of antimicrobial ε-polylysine, on the gut microbiome of CD-1 female and male mice. The 16S rRNA phylogenetic marker was used to determine phylogenetic diversity of extracted microbial communities in fecal samples obtained from the mice. The resultant reads were analyzed within QIIME (Qualitative Insights Into Microbial Ecology). The predicted metagenome function was ascertained with PICRUSt (Phylogenetic Investigation of Communities by Reconstruction of Unobserved States). Mice were fed various diets of food grade biopolymers with samples obtained and analyzed at the beginning, middle, and end of the experiment. Results: Our data showed a significant shift in microbiome composition, caused by the addition of ε-polylysine to mouse diet. However, this change was transient, with relative abundances of taxa returning to their original values over time, while the treatment was still being administered. This change was reflected in the functional profile, predicted by PICRUSt. Our results also showed a distinct difference in microbial community composition between male and female mice. Despite this variation, only three predicted functional pathways were significantly different between males and females, suggesting functionality of the microbiome is conserved between sexes. Conclusion: ε-polylysine influences the gut microbiome of CD-1 mice, although these communities adapt to this disruption and return to their original basal states over time. In addition, variation in gut microbiome composition between the sexes does not affect the overall metagenomic functional profile.
Mycobacterium tuberculosis, a causative agent of tuberculosis, infects nearly one third of the world’s population. The highly impermeable cell envelope of this pathogen represents an important barrier against host immune responses and antibiotic treatments. Regulation of cell envelope elongation under various stress conditions is thought to be critical, but the molecular mechanisms remain largely unknown. In M. tuberculosis as well as Mycobacterium smegmatis, a non-pathogenic model organism, cell envelope elongation is spatially restricted to the cell pole. Our studies suggest the presence of a membrane domain termed the PMf specifically enriched in the polar growth region, implying that the PMf is a biogenic membrane domain crucial for cell envelope biogenesis. Here, we tested the effects on the polar localization of the PMf by various stress conditions including nutrient depletion and antibiotic treatments. To monitor the PMf, we chose two PMf-associated proteins as markers: 1) GlfT2, a galactosyltransferase involved in arabinogalactan cell wall biosynthesis, and 2) Ppm1, a polyprenol-phosphate-mannose synthetase involved in lipomannana and lipoarabinomannan biosynthesis. Using mCherry-tagged GlfT2 and mNeonGreen-tagged Ppm1, we examined stress-induced changes in the PMf distributions during growth under the microscope. Consistent with the role of the PMf in active cell envelope elongation, polar localization of the PMf became less pronounced in the stationary phase. Furthermore, incubation with a suboptimal concentration of cycloserine, a peptidoglycan biosynthesis inhibitor, resulted in the loss of the polar PMf enrichment. We are currently testing if other antibiotics have similar effects on PMf localization.
Effectors of the *Streptomyces* Coelicolor Life Cycle Transition to Aerial Hyphae

The bacterium *Streptomyces coelicolor* is known for antibiotic production and its complex developmental life cycle. We are investigating the pathways necessary for morphogenesis of this filamentous bacterium, focusing on its transition from vegetative to aerial hyphae (AH). Our work focuses on two areas: the biosynthesis of the biosurfactant SapB and the secretion of compounds that allow bypass of developmentally-defective strains. SapB allows cells to break aqueous surface tension to transition from vegetative hyphae to AH. SapB production is controlled by the response regulator, RamR, but what remains unclear is how RamR is activated. Variant RamR proteins have been generated and are being investigated in vivo to identify essential components of this response regulator. Developmentally-defective *S. coelicolor* mutants in which AH do not form absent (so-called bald, or bld, mutants) are being investigated to understand the developmental signals that are necessary for AH formation. It has been observed that some secreted extracellular signals can bypass these defects, such as has been observed by BldF secreting compounds allowing other strains to form AH. We are using chromatography methods to separate these compounds for identification. These experiments will allow us to further understand the developmental processes of *S. coelicolor*. 
In this research, I will use the polymerase chain reaction (PCR) to detect presence of Escherichia coli in beef products. The DNA extraction and the PCR protocols will be optimized to determine how many bacteria may be detected by using a specific primer set for this microorganism. The primers used for the PCR assay target the tufgene and amplify DNA from all E.coli strains, but no other species. Once developed, I will use the assay to analyze meat products for E. coli contamination.
It is estimated that one fifth of the world’s biomass is found in the Earth’s subsurface. Hydrothermal vents provide a window to the subsurface where we can study thermophiles and hyperthermophiles that conduct a significant amount of primary production by means of chemosynthesis. During the summer of 2015, the Holden lab collected samples from Axial Seamount at Juan de Fuca Ridge on an ocean expedition. This expedition was unique in two ways. First of all, samples were collected following a recent volcanic eruption in April 2015. Secondly, novel in-situ incubators that can obtain fluid samples from the diffuse vents, and incubate them at high temperatures, were utilized to grow organisms on the seafloor. From the samples collected from the new eruption site, a hyperthermophilic methanogen from the genus Methanocaldococcus, was successfully isolated and its identity was confirmed via Sanger Sequencing of its 16S rRNA gene. In order to characterize this strain, growth curves were performed at varying temperatures and methane production was measured via gas chromatography. Preliminary data suggests that the Methanocaldococcus strain has an optimum growth temperature of 85 °C. Furthermore, methane yield per cell remains constant throughout all temperatures. This is the first methanogen cultured and isolated from the new eruption site at Axial Seamount.
Helicoverpa zea nudivirus 2 (HzNV-2) is a sexually transmitted insect virus that has the capacity to serve as an insect population control agent for one of North America’s most invasive crop pests, H. zea. Analysis of the viral genome revealed a putative Juvenile Hormone Esterase gene (JHE) which is believed to contribute to viral virulence by regulating hormone levels in the insect host. It is hypothesized that the JHE gene was acquired from the host and incorporated into the viral genome, resulting in enhanced viral replication and fitness. Moreover, this JHE gene expression is hypothesized to localize in the reproductive tissues of the H. zea host through the protein’s extra transmembrane domain. In order to prove this, the viral JHE gene was isolated out from the HzNV-2 genome and translated into protein using the pFast-bac expression system. Three different JHE protein constructs were produced - one with the full JHE gene sequence taken from the virus, one with its transmembrane domain deleted, and one without a stop codon as a control for loss of function. Once the confirmed JHE bacmid constructs are transfected into insect cells for expression of the protein, the putative JHE protein will be ready for purification and injection into larvae. The larvae treated with the viral JHE will be observed for any measurable changes in development consistent with suppressed levels of JH.
Bacterial microcompartments (BMCs) are proteinaceous organelles enclosing an array of enzymes and are found in 15% of all sequenced bacterial genomes. Ongoing research using comparative genomic analysis on BMC protein structures has revealed their presence in human gut microbes, bioremediation agents, cellulosic ethanol producers and pathogens. This project focuses more specifically on studying the diversity of BMCs in Clostridium phytofermentans and a newly discovered bacterial strain (KNH). Previous analysis using bioinformatics methods have identified and classified BMCs in these strains according to a key metabolic enzyme. One of the BMCs found in Clostridium phytofermentans is hypothesized to code for a choline utilization gene cluster that converts choline to trimethylamine (TMA). This choline utilization process has found to be linked to methanogenesis and human diseases such as atherosclerosis. Our experiments involve testing the growth of BMC containing bacterial species on choline and assaying for the expression of the bacterial microcompartment locus during growth. Along with studying BMCs in choline utilization, this project will further explore the metabolic functions of other key metabolic enzymes including co-acetyltransferase (coAT) found in a newly discovered bacterial microcompartment. This research has the potential to provide insight on the diverse metabolic pathways in bacterial microcompartments as well as their links to human health.
The (Mini)Circles of Life: Mitochondrial Status is Linked to Cell Differentiation in the African Parasite Trypanosoma brucei

The kinetoplastid protozoa Trypanosoma brucei, Trypanosoma cruzi, and Leishmania spp. are the causative agents of Human African Trypanosomiasis (HAT), Chagas disease, and Leishmaniasis, respectively. With only a few antiquated toxic drugs and no preventative vaccines available for treating these diseases, identifying and studying new drug targets is vital. One biological property of this family is the unique mitochondrial genome, which is organized into a catenated structure called kinetoplast DNA. To study this potential drug target we can silence mitochondrial DNA associated proteins. Recently, by silencing mitochondrial DNA polymerases IB and ID simultaneously, we succeeded in generating cells completely lacking a mitochondrial genome (ρ0 cells). Interestingly, these cells were non-proliferative and continued to survive more than 17 days post-induction. Additionally, a sharp decline in S phase cells confirmed by flow cytometry, suggested that a change in the mitochondrial status had initiated a retrograde response that ultimately impacted the nucleus. Notably, the cells appeared to differentiate into later life cycle forms, demonstrated by changes in cell morphology and basal body positioning. Furthermore, ρ0 cells expressed RBP6, an RNA-binding protein that is essential for driving the insect-stage trypanosome to its bloodstream form. These data provide an additional tool for studying metacyclogenesis in kinetoplastids, a completely uncharted territory in the field, and pave the road for a new class of anti-kinetoplastid drugs.
The hygiene hypothesis predicts that the marked increase observed in immune disregulation, such as increased allergy and asthma rates, is due to the reduced interactions between children and the natural environment. Lack of exposure to soil microorganisms via minimal outdoor activities or the creation of essentially sterile indoor environments due to fears of germs can lead to children unable to develop a sufficient immune system and dependent upon the synthetic regulation of the immune system. Reducing the prevalence of allergic sensitization includes efforts to promote healthy habits such as outdoor play. This project is part of the WSU Community Health Internship Program (CHIP), in conjunction with the Worcester Division of Public Health, focused on primary health and wellness of the people of Worcester and Central Massachusetts. Our goal is to characterize the microbial consortia present in the soils of the popular parks in Worcester: Elm Park, Cristoforo Colombo, Green Hill Park, Crompton Park, and North Park. We will establish a library of microbes and create a metagenomic database of the microbes present in the soils and monitor the microbial population changes over time to understand the microbial composition of the soil in which the children of Worcester play.
Acne is an inflammatory disease of the skin that affects millions worldwide. It has been assumed for over 50 years that the proliferation of the bacterium Propionibacterium acnes (P. acnes) in the pore leads to acne; however, the disease is still widespread and cannot be reliably treated using current methods. Acne pathogenesis has been contested in recent literature because P. acnes has been shown to inhabit normal skin. In addition, sequencing studies have found other Propionibacterium species, Staphylococcus species, and Malassezia yeasts in acne-infected pores. To study the relationships among microbiota associated with acne, a novel in vitro pore model was developed and utilized to conduct co-culturing experiments. The model uses synthetic human sebum as a growth medium to accurately mimic the lipophilic conditions seen in vivo. An inexpensive formulation for synthetic human sebum was developed consisting of a mixture of triglycerides, free fatty acids, squalene, wax esters, cholesterol and cholesteryl esters. Determining microbial interactions among pore microbiota using the in vitro model will allow for a better understanding of the role of commensal organisms of the skin. In addition, growth conditions, including temperature, pH, moisture, and oil content can be easily modified using the model, which is not easily done in vivo. A thorough understanding of the pore microbiota will allow for the development of better acne therapeutics and skin products.
The overuse of our arsenal of antimicrobials has brought on a surge of antibiotic resistance in both nosocomial and community-acquired infections. The emergence of pan-resistant strains of bacteria has further intensified the need for novel antimicrobials whose mode of action will not drive selection towards resistance. For many organisms, antimicrobial peptides (AMPs) are an innate line of defense against infection by microbial pathogens. AMPs have strong interactions with lipid membranes as a result of their short length and cationic charge but do not compromise eukaryotic cell integrity. The focus of this research is to elucidate the structure activity relationships of series of synthetic mimics of antimicrobial peptides (SMAMPs) that are based on an abiotic polymer scaffold that allows for fast, facile synthesis. Previous biological and biophysical characterization of de novo SMAMPs has allowed for the development of polymers that have low minimum inhibitory concentration values against both Gram-negative and Gram-positive bacteria as well as minimal activity against eukaryotic cell lines. The polyguanidinium oxanorbornene family of polymers, with one positive charge per monomer and an imide backbone structure, has demonstrated the most effective activity against bacterial cell cultures in this study with minimum inhibitory concentrations comparable to current industry standards. The results of this study demonstrate these polymers’ suitability for clinical use as antimicrobials and applications in drug and protein therapies.
Climate change is drastically changing the environment around us. With soils being the largest carbon reservoir on the planet, there is concern for how soils are being affected by climate change. Soil microbial communities are a major driver of carbon cycling in soil. The Harvard Long Term Ecological Research Site has used artificially warmed plots at 5°C higher than control plots as a model for climate change for over twenty years. Soils respiration rates by microbial communities in the heated plots have been higher, the same, and then higher again than the control during this time period. A large loss in labile carbon was observed during the time heated and control plots had the same respiration rates. However, now that respiration rates are increasing in the heated plots once again, it has been hypothesized that microbial community structure is changing to adapt to the changing soil conditions. Throughout the growing season, soil samples were collected from the heated and the control plots. Community structure of these soils samples will be analyzed and compared between the heated and control plots using fatty acid methyl ester synthesis analysis (FAME). FAME uses the unique lipid structure of microbes as a marker for identity. It is predicted that differences in community structure will be the greatest between the heated and control in the spring and fall. FAME analysis will provide insight on how warming is changing the community structure throughout the growing season in temperate forests in the Northeast.
A series of guanidine-rich protein transduction domain mimics (PTDMs) was synthesized using Ring-Opening Metathesis Polymerization and tested to determine how the hydrophobic nature of these amphiphilic molecules relates to their ability to deliver antibodies into cells. The PTDMs synthesized for this project are mimics of a class of peptides known as protein transduction domains that readily translocate the cell membrane and can transport cargo into cells. Cationic homopolymers were designed based on the arginine-rich protein transduction domain of the HIV-1 protein TAT and the latter designed polyarginine, and amphiphilic block-copolymers and cholesterol-terminated polymers were designed to mimic amphiphilic peptides, such as Pep-I, which has both hydrophobic and cationic components. Cholesterol is a key structural component in cellular membranes, so this research tests whether using cholesterol as the hydrophobic component confers an advantage for protein delivery. The different hydrophobic components were compared by transduction assays that test for the delivery of FITC labeled IgG antibody and, separately, the delivery of enhanced green fluorescent protein into HeLa cells and Jurkat T-cells. While natural PTDs have shown some capability of protein delivery, they are relatively inefficient and often require covalent attachment to cargo. The Tew Group is interested in relationships between structure and activity for successful intracellular delivery. Hydrophobicity is known to impact the ability of these compounds to cross the membrane. Therefore, it is pertinent to study a variety of hydrophobic groups, especially biologically relevant compounds like cholesterol, a component of the membrane—the barrier that these polymers are designed to transverse.
When dairy cows are given antibiotics for the treatment of diseases like mastitis, the milk they produce cannot be used for dairy production, as it contains antibiotic residue. This milk is considered waste milk, and currently, there is a lack of efficient methods to properly dispose of this milk. Typically, it is fed to young calves, which is not an ideal method of disposal as it can lead to antibiotic resistance in the young animals. In the Holden Lab at UMass Amherst, the treatment of this waste milk using hyperthermophilic heterotrophic archaea, such as Thermococcus paralvinellae and Pyrococcus furiosus, has proven to be effective. These organisms can metabolize the components in the waste milk at high temperatures, and in doing so they are able to degrade any antibiotic residue and destroy harmful pathogens. This feasibility study is aimed at assessing whether it is realistic to utilize this technology in a real world scenario. Dairy farmers and milk processing plants are interviewed about their volumes of waste milk produced and their opinions regarding the use of a hypothetical reactor to treat waste milk. Additionally, the role of environmental policy in the treatment of waste milk is analyzed. The potential use of this technology is a promising method for waste milk disposal that could lead to a more sustainable future.
MUSIC

539  Room 809  3:30-4:15  Panel 6
Kimberly M. Babiec
Sonya Lawson (Faculty Sponsor)
Department of Music, Westfield State University
Broadway Musicals of the 1960s: An Outlet for Sexual Expression

The 1960s was a tumultuous time, marked by defiance and rebellion. Different generations disagreed on several issues, but one issue that was particularly disagree upon was the expression of sexuality. Broadway musicals of the 1960s played a particularly important role in drawing attention to this disagreement. Through the analysis of secondary and tertiary sources, newspaper reviews, and audio recordings, this paper examines why 1960s Broadway musicals were such a popular outlet for sexual expression. Some of the most well-known Broadway musicals of the 1960s such as Cabaret, Hair, and Oh! Calcutta! contain instances of sexual expression such as nude scenes and risqué lyrics that show how important this issue was to the younger generation of the time. As a result of the rebellion occurring during this time, rock music grew in prominence and became popular with members of the younger generation. The inclusion of rock music in Broadway musicals made them much more accessible as an art form. Since Broadway musicals began featuring rock music, and thus grabbing the attention of the younger generation, they became a popular outlet through which members of the younger generation could engage in sexual expression.
Many have listened to a song that has caused them to be confused, questioning the artist’s intentions and implications. Much of this perplexing music is highly influenced by drugs. This presentation examines the positive and negative influences drugs have had on music through the 60s and 70s, in society, on people in the music industry, and how drugs have developed a conspicuous role in today’s music culture as well. Specifically I focused on cannabis, LSD, ‘shrooms, cocaine, and heroin, elaborating on the societal effects of drug influenced music as well as drug culture in the 60s and 70s and comparing it to music today. Finally, I discussed drug use and addictions involved in bands such as The Beatles, Pink Floyd, and Fleetwood Mac. As evidence I focused on a few of their songs, analyzed cryptic lyrics, and highlighted musical devices that may have suggested drug influence. In conclusion I discussed how and why certain pieces of music may not make sense to a listener. And in addition to showing that there are undeniably negative outcomes of drug use in music and in general, I also provided evidence that displayed some of the positive and creative ideas that can come from drug use by musicians.
Reawakening: A Survey of American Bassoon Music in the Late Twentieth and Early Twenty-First Centuries

There is a revolution in bassoon music underway. There is progress being made both inside and out of the classical sphere. This is in part due to the shift in focus from a composers’ art to the performers’. Some bassoonists, such as Judith LeClair (one of America’s best bassoonist’s), are raising technical expectations for professional performers. In 1995 a concerto was written in her honor entitled The Five Sacred Trees; it explores virtuosic capabilities and incorporates a variety of influences from Celtic folklore to film score. In the world of jazz, players like Paul Hanson and Daniel Smith have recorded numerous albums featuring the bassoon; Hanson has written pedagogy on the subject. Even the popular sector does not remain unreachable for bassoonists. The bassoon quartets The Bassoon Brothers and The Breaking Winds have both released albums with arrangements of pop songs and playful original compositions. These groups not only work to spread the name of the bassoon but also have devised a marketable approach to chamber music. The popular influence is prevalent in classical music as well. Micheal Daugherty has written a piece, Dead Elvisthat features the bassoon as the star both musically and theatrically. Elements of the life and works of Elvis Presley are synthesized into a work that has already secured its place in the repertoire. All of these developments have taken place in the last 25 years, in America! If bassoonists continue to make strides such as these, the future of bassoon music has limitless potential.
Stephen Schwartz and Stephen Sondheim are two of America’s most prolific contemporary composers of musical theatre. Schwartz and Sondheim have both written a number of shows lasting several years on the Broadway stage. Despite the enormous success both composers have had over the span of their artistic career, their styles could not be more different. In this presentation I analyze one show by each composer, Wicked by Stephen Schwartz and Sweeney Todd: The Demon Barber of Fleet Street by Stephen Sondheim. Looking at the composer’s personal influences and philosophy of musical theatre in tandem with the themes and music of the musicals, I draw several conclusions in an attempt to compare what their styles are and how they are utilized throughout the musical to make both composers shows such successes. I also found two very different yet effective methods of writing. While Schwartz in more interested in examining the morals within society, Sondheim is more interested in the art of storytelling.
As a singer, performing songs that have a personal meaning to me is important. It has always been a form of expression and release for me since a young age. I have always felt confident with my ability in music and I have always had a creative mind and a knack for performing. It helps me to connect with my audience on a deeper level. After filtering through approximately 16 songs that I connect with impactful parts of my life, I have narrowed the songs down to the seven songs I found that spoke to me the most. Their messages include loss, abuse, and friendship. The songs I have chosen are both mentally/emotionally and vocally challenging for me in ways that would provide the most beneficial growth. It touches upon things I don’t often speak about, and it becomes easier to communicate through songs. This growth is to help prepare me for the professional music world. The songs vary in idea, genre, and message, thus providing the vastest representation of my life. I will construct a solo concert performance using a variety of tools, as well as work and practice on vocal technique and ability. This concert is a musical storytelling of things few people know about me.
There are many performance possibilities for percussion repertoire. For instance, in the piece *Mourning Dove Sonnet* by Christopher Deane, the performer is asked to make a mute for several keys on the vibraphone. Many performers have devised elaborate mutes that produce the sound they believe is most desirable, such as a mute of several sheets of stapled cardstock that creates a slap sound, or a mute made of a block of wood covered in felt that allows the player to hit the bars directly. Most percussion music was composed in the last century, and because of its recent history, there exists a dearth of research literature regarding performance practice issues in this field. This project considers the many performance practice issues as they relate to the following pieces: *Mourning Dove Sonnet* (1983) by Christopher Deane, *Drumming* (1971) by Steve Reich, *O Sacrum Convivium!* (1937) by Olivier Messiaen (self-transcribed for marimba), *Alborada del Gracioso* (1905) by Maurice Ravel (transcribed for marimba duo by Safri Duo), and *I Ching* (1982) by Per Nørgård. Each of these pieces requires a unique percussive technique, practice method, or instrument. This project considers the various methods by which these pieces can be performed, and the documented preparation to aid the performance of these pieces will form a larger base of knowledge that future percussionists will be able to draw upon to create their own artistic interpretations of these pieces as well as other percussion works.
The dynamic duo of Richard Rodgers and Oscar Hammerstein II has often been considered one of the most successful and influential collaborations in Broadway history. Their success and influence was not only because of the popularity of their songs, but also because of how they addressed social issues, such as racism, sexism, social class, domestic violence, and patriotism, in their musicals. Since childhood, both Rodgers and Hammerstein knew that the musical theater they grew up with lacked any substance, and saw this art form as an outlet for presenting these issues to the public through stories that were relevant to their own lives. Their ideals about musical theater can be seen in their previous collaborations with other composers and lyricists, including Jerome Kern and Lorenz Hart. These ideals are also shown through Rodgers’ and Hammerstein’s most popular works together, such as Oklahoma!, Carousel, South Pacific, The King and I, and The Sound of Music. Because of their willingness to address these social issues to the public through their shows, they are considered to be the first social activists of Broadway.
NURSING

544 Room 165 10:45-11:30 Panel 2
Emily T. Anderson
Caitlin M. Stover (Faculty Sponsor)
Department of Nursing, UMass Dartmouth
Promoting Self-Management of Type 1 Diabetes Mellitus in Children and Families Using a Simulation Teddy Bear

The purpose of this pilot study was to explore the use of a simulation stuffed bear, Jerry the Bear, on promoting the self-management of children diagnosed with Type 1 Diabetes Mellitus (T1DM) and their families. Five families were recruited for the pilot study from a summer camp designed for educating children diagnosed with T1DM. Inclusion criteria required the child to be within 4 and 8 years of age at the launch event, diagnosed with T1DM within the last two years, and live in the greater Fall River area. The combination of qualitative and quantitative data were collected over a year through bimonthly interviews and two focus groups. All results presented in this paper are from data collected from June 2015 to November 2015. Bandura’s Social Cognitive Theory was the guiding framework of this study. Jerry the Bear facilitated T1DM learning through the use of Bandura’s concepts of vicarious learning and self-efficacy. The results of the study identified Jerry the Bear as an important member of the family who teaches others T1DM self-management skills. Four sub themes also emerged: Jerry is Just Like Me, Jerry Facilitates Acceptance, Enhancing Jerry and Jerry in Other Settings. The results of this study present a novel way to educate children and families about T1DM self-management in a variety of settings.
550  Concourse  1:30-2:15  Board C66
Katelin Nicole Angel
Robin R. Leger (Faculty Sponsor)
Department of Nursing, Salem State University
Factors Affecting the Quality of Life of Residents in Nursing Homes: Knowledge and Strategies for the Novice Nurse

Quality of Life (QOL) is a major focus of practice in all areas of nursing, including promoting QOL for the elderly. New graduate Registered Nurses (RNs) have the option of working in a nursing home for their first career opportunity. The significant increase in the Baby Boomer population (nearly tripling between 1980 –2030) will cause an influx of nursing home residents as they require nursing home services. Review of the Literature: Quality of Life (QOL) is important to providing quality, holistic care. Many factors encompass QOL. It is necessary for the new graduate RN to learn about interventions that positively impact nursing home residents’ QOL. The literature review speaks only about first-hand studies focusing on nursing home residents’ own interpretations of QOL factors. Several QOL domains were identified including promoting comfort, meaningful relationships, and maintaining autonomy and dignity. Undergraduate nursing education and new graduate orientation programs offer little information on the nurse’s role in promoting QOL in the elderly. Implications for Novice Nurse Education: A table was adapted to show the QOL domains for the Elderly and possible RN Interventions to positively impact nursing home residents QOL. Provided with education focused on competencies for promoting QOL in the elderly, the new graduate RN will be able to use the interventions presented in the table to realize ways to positively impact QOL of nursing home residents during their first nursing experience as a novice nurse.
Problem: Deficits in knowledge and attitudes regarding pain treatment exists among nursing students. Education on pain management begins in school, however, no studies have explored whether years of post-baccalaureate practice and/or further training on pain management will ultimately impact student knowledge and attitude about pain treatments. Purpose: The purpose of this study is to identify knowledge and attitudes towards pain management in senior level nursing students in one baccalaureate program and compare knowledge and attitude levels with practicing nurses in one RN-BS program. Method: Data will be collected from a convenience sample of up to 100 senior level students and RN-BS students by survey using the Knowledge and Attitudes Survey Regarding Pain. Scoring of the tool varies based on participant responses to 21 true/false and 19 multiple choice questions. Scores of the senior level nursing students will be compared to those of practicing nurses. Results: Data will be analyzed using descriptive statistics and calculated using Microsoft Excel and the Statistical Package for Social Sciences, (SPSS). It is anticipated that results will show that practicing nurses will score higher on the NKASRP related to increased knowledge gained through experience. Conclusion: If practicing nurses score higher it can be inferred that nurses gain expertise in pain management through their peers and practice experience. If student nurses score lower it could be concluded that education in pain management may need to be fortified. Implications are that the nursing education curriculum may need to include more instruction on pain management.
More Than Stress? Incidence of Generalized Anxiety Disorder (GAD) in UMD Undergraduate Students: Using the GAD-7 Scale

College is a time of increased stress and responsibility on students. A negative response to stress and its effect on an individual’s life may indicate a mental health issue called generalized anxiety disorder (GAD). This study aimed to qualitatively identify the incidence of possible GAD among UMass Dartmouth (UMD) undergraduates and identify a health disparity that can be addressed on the UMD campus. The GAD-7 scale, developed by a team of mental health professionals, is a seven-point scale with a scoring system that identifies the likelihood of the user being diagnosed with GAD. The GAD-7 scale was distributed to UMD undergraduates, along with demographic data and a quantitative question asking the user to identify the major stressor in their life. The scored results of the GAD-7 reveal the incidence of likely GAD and the trends of the quantitative data identify correlations to scored GAD results. The GAD-7 results revealed the incidence of probable severe GAD to be 33 percent of the tested population. Severe anxiety is defined as a score of 15 or above. The remaining results identified 45 percent mild and 22 percent moderate anxiety. These results suggest a possible mental health problem among UMD undergraduate students. These results are important to inform student mental health, which when poor, can translate into physical manifestations. Results from this study can guide the development of health promotion tools and support further investigations into the overall health and wellness of college students.
Discrimination and stigma are related to poor health outcomes in individuals who identify as Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual and beyond (LGBTQIA+). One of the most common sources of discrimination and stigma is parental/caregiver response when individuals disclose their sexual orientation or gender identity. Negative parent/caregiver response to an individual’s disclosure is related to poorer mental and physical health outcomes, while acceptance leads to more positive mental and physical health outcomes. Thus, this “coming out” period offers healthcare professionals an ideal time to provide an educational intervention. To further the potential of intervention, a better understanding of parent/caregiver behaviors following the disclosure exchange is needed. Approximately 100 young adults who identified as LGBTQIA+ reported behaviors they perceived to be supportive and unsupportive of their identity disclosure by parents and other adults. Qualitative analysis will classify themes and sub-themes to identify relevant content to include in education provided to parents of LGBTQIA+ individuals.
The Relationship between Health Literacy, Patient Activation, and Diabetes Management in Individuals with Type 2 Diabetes

In the United States, chronic illness is the major cause of disability. Of these disabling chronic illnesses, type 2 diabetes is the most common. Individuals with diabetes must follow complex treatment regimens, constantly monitor their condition, and make necessary life-style changes. Research suggests that having adequate levels of health literacy and patient (health) activation (knowledge, skill, and confidence) may facilitate better patient management of diabetes. The purpose of this study was to assess the level of health literacy and patient activation in patients with type 2 diabetes attending a health management program in the Southcoast region of Southeastern Massachusetts, to explore the relationship between health literacy and patient activation, and to examine the relationship between health literacy, patient activation, and diabetes management. A descriptive correlational research design was used to investigate the relationship between the study variables among a sample (n=19) of participants with type 2 diabetes. Results of this study indicated that higher levels of health literacy and patient activation levels were present in participants who achieved greater success in their diabetes management. It is important for nurses to develop an awareness of the role of health literacy and patient activation in successful diabetes management. Changing our clinical approach may mean we can better support the individual needs of patients with type 2 diabetes.
Cultural Competence in Nursing

In this presentation, I will explain the impact that culture has in nursing care and the role of the nurse in providing culturally competent care. In addition, I will provide a list of resources available for nurses to improve their cultural competence. The information presented will be obtained from reputable sources, such as the ANA Scope and Standards of Practice, the ANA Code of Ethics, the Massachusetts Nurse of the Future Core Competencies (NOFCC) Patient Centered Care Standards, and the National Culturally and Linguistically Appropriate Services (CLAS) Standards. The goal of this presentation is for the audience to gain a better understanding of the significance of culture in nursing care.
You Can’t Slow My Roll

Through an integrated design approach senior nursing and engineering students collaborated to develop an assistive device to aid a member of the community by focusing on three core elements that are essential in maintaining quality of life: Instrumental Activities of Daily Living (IADLs), maintaining health, and engaging in recreation. Background: Many older adults would prefer to stay in their homes as they age. However, without the necessary support of their IADLs, many older adults lose their independence and therefore, this freedom. A review of the literature was conducted to explore the use of assistive devices by the elderly, specifically the use of walkers. Their ability to use such a device, along with the environment in which they use it, was researched in detail. Method/Interventions: The students and older adult engaged in a collaborative process to develop a device to aid mobility. The nursing student acted as the link between the elderly individual requiring assistance and the engineering students working on the device. A comprehensive nursing assessment including physical and mental challenges, along with an environmental assessment of the home, to provide a unique client-centered perspective aiding in the design and adaptation of the device was conducted. Findings/Outcomes: The client’s apartment was found to have significant environmental issues affecting the client’s use of her walker. The assistive device created altered the walker to enable its safe and effective use in the clients’ home. Conclusion: Through the unique combination of skills brought by nursing and engineering students on this project, the innovative potential of viewing the same challenge from different perspectives was exposed.
Opening Doors to Elderly Independence

In a collaborative design team of senior engineering and nursing students, efforts to create an assistive device for an elderly member of the community focused on three core elements that are essential in maintaining quality of life: Instrumental Activities of Daily Living (IADLs), maintaining their health, and engaging in recreation. The design team created an automatic door opener with the capability of attaching to Mrs. D’s walker to help her be able to open her apartment door. Background: As an individual loses their ability to complete the more complex skills required for independent living categorized as IADLs, they would require increased levels of support and accessibility in maintaining their health and avoiding barriers to engaging in social interactions and recreational activities. A literature review was conducted on current accessibility issues in the elderly population. Method/ Intervention: Performed a comprehensive nursing assessment while conducting an environmental assessment of Mrs. D’s home to bring forth a nursing perspective to the design team. Met weekly with the design team to collaborate on a structure for the automatic door opener that is both safe and effective in aiding Mrs. D open her apartment door. Finding/ Outcome: The walker attachment developed is both safe and effective in opening Mrs. D’s apartment door automatically at the press of a button. Conclusion: Through interdisciplinary collaboration and viewing the same challenge from different perspectives, a safe and effective solution was developed to a common challenge of the aging process.
Breast cancer (BC) is a disease that affects men and women of all races, socioeconomic backgrounds, and lifestyles. It is the most common cancer in women. College students engage in behaviors that impact their risk for breast cancer, such as poor diet, alcohol use, and low physical activity level. Purpose: The purpose of this study was to assess if female college students were aware of modifiable and non-modifiable risk factors that may increase risk of BC and their perception of other BC causes. Methods: A pretest posttest quantitative design examined participants’ knowledge before and after an educational intervention for N=28 participants. The educational intervention was the (c) Bright Pink online ‘Assess Your Risk Tool’, which provided information on twelve risk factors. Findings: Analysis of the data revealed an increased mean score between the pretest and posttest for eleven of the twelve risk factors. Seven of the twelve items showed a statistically significant difference (p<0.05). College students were least aware of oral contraceptive use and not breastfeeding (pretest mean less than 4.0) as risk factors. The Cronbach’s Alpha for the pretest was 0.837 and 0.821 for the posttest, demonstrating reliability and high internal consistency. Conclusions: Nurses need to educate patients, including college students, about how to reduce their risk of developing breast cancer through primary prevention and thorough risk assessments. This research helped to fill the gap concerning college students’ perceptions of breast cancer risk in the United States.
Sarah Hassan  
Lisa Kennedy Sheldon (Faculty Sponsor)  
Department of Nursing, UMass Boston  
Multidisciplinary Management of Chronic Pain: Addressing Chronic Pain as a Public Health Challenge

The management of pain, and chronic pain in particular, are areas that continue to challenge clinicians, caregivers and researchers alike. The impact of pain can be invasive on not only physical and mental health, but also on family caregivers and society as a whole. This review of the literature explores chronic pain as a prevalent public health challenge. It describes current and emerging methods of managing chronic pain and promoting comfort and functioning. It specifically outlines the nursing role on the multidisciplinary team, serving as patient advocate in the journey towards increased self-care. Various methods of pain management are explored in the literature and provide evidence for the development of a comprehensive model for chronic pain management. The purpose of this model is to provide useful strategies and interventions that can be implemented into the practice of nurses and clinicians who work with people with chronic pain. Multidisciplinary management of chronic pain can achieve better outcomes for patients by combining expertise from different professions and integrating a variety of approaches to chronic pain management to improve patient comfort, function and quality of life.
The incidence of compassion fatigue is increasing among healthcare workers. Unfamiliarity with compassion fatigue stems back to nursing school. There is limited research as to how compassion fatigue affects students or whether or not nursing school prepares students on how to combat compassion fatigue. The intended purpose of this study was to evaluate the risk factors in undergraduate nursing students and whether or not nursing school prepares students to contest the stressors of nursing. 

Methods: A quantitative study design invited undergraduate nursing students at all levels to participate. The ten question survey covered demographics, risk factors for compassion fatigue and preparedness. 

Results: Data was analyzed using SPSS. 0% of students reported having no stress while 67.7% of students reported having an above average to extreme stress. 43.2% of BSN students reported frequently or constantly being preoccupied with the stressors of others. 

73.3% of students reported no knowledge of the term compassion fatigue. 96.2% of students not taking time to wind down and reflect after a stressful situation. 

Conclusion: In conclusion, the research demonstrates that students are in need of further education regarding the risk of compassion fatigue and how to better prepare themselves. Several risk factors were reported including high stress, lack of preparation and ineffective coping.
Purpose: To identify key components of sickle cell disease (SCD) health promotion to be included in patient and family education materials provided to an adult living with SCD for the promotion of wellness and reduction in complications of the disease. Background and significance: SCD occurs in approximately one in five hundred Jamaican born people and about 0.49 out of 1000 in America and results in intense pain episodes, and multi-organ failure (Knight-Madden, 2011). The role of the nurse and other healthcare providers as well as community based organizations in patient education is critical for promotion of quality of life. Tannahill (2009) argues that “fostering of empowering attributes such as resilience, self-esteem, confidence, and life skills” also falls under the realm of education. Methods: A combination of telephone and written interviews were completed by nurse experts caring for patients with SCD in the U.S. and Jamaica, as well as executive board members of community based organizations for the support of community members living with SCD and their families. Results and Conclusions: There is a consensus that individuals with SCD are not adequately educated about the condition and its implications. Respondents recommended that those living with SCD be taught about basic physiology of the disease, family planning, early signs of complications, and exacerbating factors. Furthermore, each respondent explored barriers to effective educational interventions as well as methods of enhancing the quality and effectiveness of these interactions. This information can be used to develop effective educational materials for improving health outcomes.
Problem: Heart failure patients need to be properly educated on self-care techniques prior to hospital discharge. Cognitive levels also need to be evaluated upon diagnosis of Heart failure (HF) and considered in the plan of care for optimal results. Cognition is thought to impact self-care in heart failure patients. Purpose: The purpose of this study was to describe the cognitive abilities of HF patients and correlate cognitive status with self-care abilities. Methods: This study is an exploratory, descriptive, prospective study with a convenience sample of 79 patients. Each patient has a confirmed diagnosis of heart failure by Framingham criteria. Two valid and reliable instruments were used to assess cognition (Clock Draw Test) and self-care (Self-Care of Heart Failure Index) during hospitalization. Results: Seventy nine participants with a mean age of 74.56 years and 58.2% male completed the study. Thirty-eight percent (n=28) of participants demonstrated no cognitive impairment. The Self-Care of Heart Failure Index mean scores for the maintenance, management, and confidence subscales ranged from 41.84-58.91. There was a positive correlation between cognition and self-care maintenance (r = .13), management (r = .47), and confidence (r= .14) scores however, it was not statistically significant. Conclusions: Patient education regarding heart failure self-care needs to be individualized and directed towards the patient’s abilities. Similarly, cognitive impairment needs to be screened for earlier in the diagnosis to allow for patients to take care of their heart failure appropriately.
Unmasking COPD

Patients living with Chronic Obstructive Pulmonary Disease (COPD) often experience their disease in ways that are not fully understood by others. Specifically, a gap exists between the perspective of healthcare workers on COPD and that of patients with COPD. Patient education about COPD is necessary to help patients manage the chronic condition effectively. In order to communicate effectively to these patients, healthcare workers must be sensitive to their patients’ perspective of the disease, and must use language and images that respect the patient perspective. Many of the images found on the Internet and in publications about COPD do not accurately depict the patient perspective, and this creates a boundary between healthcare workers and patients. The goal of this project is to decrease that gap through the creation and use of more effective images. Working side-by-side with COPD patients living in the community, original paintings were created by the author, first inspired by on-line stories of individuals living with COPD. After developing the initial works, the artist obtained feedback through an online organization dedicated to COPD community members, as well as from other individuals with COPD, revisions were made, and the artwork was incorporated into an educational pamphlet. A guiding committee with both clinical and art experts assured the scientific and artistic integrity of the pamphlet. The incorporation of effective paintings depicting COPD symptoms from the patient perspective may help individuals with COPD feel less isolated and fearful while helping healthcare workers to better understand and support their patients.
Fay S. Khudairi  
Rachel K. Walker (Faculty Sponsor)  
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**Complementary and Integrative Medicine (CIM) for Adults with Cancer Receiving Hospice Care: Experienced Nurse and Nursing Student Perspectives**

Background: At the end-of-life, adults with cancer sometimes experience significant distress and other symptoms that are difficult to manage with traditional biomedical approaches. Complementary and Integrative Medicine (CIM) can help holistically manage pain, promote comfort and relaxation, and improve overall quality of life. As patient advocates, nurses are in a vital position to facilitate delivery of CIM to promote wellness and relieve suffering at the end-of-life, although nursing practice varies widely. These variations may be related to a lack of nursing knowledge and comfort using CIM therapies. Purpose: The purpose of this study is to better understand how perceptions of CIM to manage cancer pain and other end-of-life symptoms develop and evolve during preparation for nursing licensure and across a hospice nursing career. Methods: Using qualitative data gathered from interviews with hospice nurses and senior nursing students, we will explore how attitudes towards CIM at the end-of-life develop through formal education and experience, and how these attitudes shape clinical practice. Analyses will involve a combination of content and thematic approaches. Results: This study has the potential to provide important insights into the development of clinical knowledge to guide practice. Through this research, we will gain a deeper understanding of nurses’ and student nurses’ perspectives on the use of CIM in cancer care at the end-of-life. Implications: Results of this study might inform new approaches for removing barriers to the integration of CIM therapies for palliative and end-of-life care into baccalaureate nursing education, continuing professional education, and in the clinical setting.
Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States. Persistent HPV infection can cause cervical cancer in women, penile cancer in men, as well as anal and oropharyngeal cancer and genital warts in both men and women (CDC, 2014). Two vaccines against strains of HPV are currently licensed for use in the U.S., including the bivalent HPV2 and quadrivalent HPV4 vaccines. The Advisory Committee on Immunization Practices (ACIP) recommends vaccination of both males and females starting at age eleven or twelve. Despite the availability of the vaccine, an approximated 27,000 new cancers attributed to HPV are diagnosed each year in the U.S. (CDC, 2014). A systematic library database search for studies related to utilization of vaccines and barriers to HPV vaccination among university students was conducted. Studies indicate that a disconnect between actual and perceived risk of HPV infection is a significant factor in the decision made by young adults who have not been previously vaccinated on whether to receive the HPV vaccine, especially in the male population. Studies support that educational interventions increase young adults’ intent to receive this vaccination (Kester et al., 2014). College health professionals have a duty to take advantage of their access to this population and provide educational opportunities for students to learn more about their risk for HPV as well as the importance of HPV vaccination.
The Impact of Community Administered Naloxone on Opioid Overdose

There is a growing epidemic of opioid-related deaths in the United States, creating a major public health crisis. Naloxone is an opioid antagonist that has been used for many years by medical professionals to reverse opioid overdoses, however most patients arrive too late to the emergency department to receive the drug. In late 1990’s, overdose prevention programs began supplying naloxone in the community to high-risk opioid users and their families in an effort to decrease mortality rates from opioid overdose. Family members of overdose victims are often first-responders and can play a vital role in saving a life by administering Naxolone. The purpose of this systematic review is to explore the effectiveness of community administered Naxolone as related to opioid overdose and death. Current evidence supports the use of community administered Naxolone as a potentially life-saving drug for opiate overdose related deaths. Advantages associated with community administered Naloxone are presented, as well as recommendations for administration protocols, training, and public availability with all automated external defibrillator machines. Further education is proposed to reduce moral judgment by healthcare workers in an effort to treat this epidemic as a disease and not a moral deficit.
Behaviors that Increase Risk of Sexually Transmitted Infections in College Students

The purpose of the UMass Boston sexually transmitted infection (STI)/Substance misuse prevention pilot study was to collect assessment data in order to develop prevention programs to decrease substance abuse and sexual risk behaviors that place college-age young persons at risk for HIV and other STI. Of the 300 students that participated in the pilot, 48% were under 21 years of age and 68% were female. Asian American accounted for 31% of sample with 41% identifying as African American. Although 31% stated they did not know their HIV status 7.6% had been treated for an STI. The sample also reported other social risk such as domestic violence (10.7%) sexual assault (9%) and homelessness at some point in their life (10%). Only 46% reported knowing how to use a condom correctly and 26.3% reported that their sometime drug use increase their risk for HIV. Although 59.3% reported they were not in an exclusive relationship, almost half of the sample (49%) had not discussed their HIV status with their partners and 10% reported never using a condom. This pilot project supported the funding of the UMB Nursing Substance Abuse, HIV and Hepatitis C Prevention Project which focuses on a nursing student peer education program in collaborating with two community based organizations to address Substance Abuse, HIV and STI Prevention at the UMass Boston campus and surrounding community.
Healthcare systems around the world are in the midst of great changes. As society begins to adapt to the changes economically, socially, politically and environmentally around them, nurses are uniquely positioned to assume a transformative role. Nurses will have an “expanding and central role in our new (healthcare) delivery models here in the U.S and around the world” (Bastable, 2014.) Nurses not only provide care for clients but also education expansion for peers and patients alike. As populations and times change, nurses must adapt to the new population needs. Technological advances, the rise of certain chronic health conditions as well as changing demographics require that nurses currently in and soon to enter the field are well equipped to handle the new situations and challenges posed in providing health care. Therefore nursing educators play a crucial role in the personal and professional development of students across the nursing discipline. As research expands on topics such as the effects of Global Climate Change on health, nursing didactics must adapt to new literature as we educate the incoming generations of nurses. The following content of this research project focuses on an extensive literature review of the main concepts known for the impact of climate change on health as well as assessing methods of nursing pedagogy as they relate to sustainability.
Recognizing Stroke Symptoms and Risk Factors in the General Community

Problem: Time to intervention is crucial in stroke patients because of the treatments involved and the brain’s need for oxygen. If people in the community are unable to recognize and respond to a stroke, patients are more likely to suffer complications and mortality. Purpose: The purpose of this study is to identify knowledge of stroke symptoms and risk factors for stroke in seniors at separate senior centers in the Southcoast region of Massachusetts, to determine the community’s stroke knowledge. Methods: Data were collected from a sample of 30 seniors at senior centers in the Southcoast region of Massachusetts using the Stroke Recognition Questionnaire Results: The mean score for identifying stroke symptoms as actual or nonstroke symptoms was approximately 75%. The most commonly correctly identified stroke symptoms were numbness on one side of the face, loss of balance, slurred or garbled speech and trouble with coordination (n=30, 100%). Confusion (n=28, 93.3%), double vision (n=27, 90%), and sudden severe headache (n=27, 90%) were the least often identified correct stroke symptoms. The most frequently identified stroke risk factors were high blood pressure (n=30, 100%), high blood cholesterol (n=29, 96.7%), smoking cigarettes (n=28, 93.3%) and history of neck vein disease or carotid artery disease (n=27, 90%). The stroke risks least likely to be identified were alcohol use greater than 2 drinks each day (n=18, 60%), diabetes (n=20, 66.67%) and history of having a heart attack (n=23, 76.7%). Conclusions: The community’s stroke knowledge level appears to be insufficient. Further interventions to promote stroke awareness in the public are crucial to assure decreased levels of stroke morbidity and mortality.
The Effects of Pups Induced with Hypoxic-Ischemic (HI) Injury in a Closed Nest Environment

Hypoxic-ischemic (HI) injury occurs in 1-6 out of 1000 full-term newborns following complications during delivery, causing neurological and physical deficits ranging from cognitive impairment, motor abnormalities, to cerebral palsy. Presently, no intervention exists for the treatment of HI. This study aimed to investigate the mediation of symptoms created by HI in rodents following a modified pre-weaning, closed nest box (CN) environment. This environment increases stimulation for care-giving from the mother, (i.e. licking / grooming), which has been shown to influence neural proliferation and physical development. HI was produced in pups on postnatal day (PND) 7 via unilateral ligation of the common carotid artery. Two hours post-surgery, pups spent 90 min in an 8% O2 chamber mixed with 92% N. PND 8 initiated reflex testing to measure motor and physical development. Animals nurtured in the CN condition exhibited significantly earlier development of physical characteristics, exhibiting ear unfolding 2.23 days earlier (p<0.001) and left eye opening 1.8 days earlier (p<0.001). There was a statistical tendency towards earlier right eye opening in CN pups, showing opening an average of 1 day earlier (p=0.069). During reflex development testing, CN pups displayed significantly earlier left ear twitch by 1.9 days (p=0.037), and an inclination towards an earlier right ear twitch (p=1.55). Following weaning we will begin emotional, motor coordination, spatial learning and memory testing. At the termination of testing, we will sacrifice the animals to harvest the spleen, liver and brain to compare weights and histological damage. Further testing is predicted to demonstrate improved emotional, motor, and memory function. The impact of these findings may have implications for the use of an environmental condition as an intervention for HI.
560  Concourse  1:30-2:15  Board C76
Michelle Diane Whyte
Kristen Sethares (Faculty Sponsor)
Department of Nursing, UMass Dartmouth
Assessing Knowledge of and Attitudes toward Concussions in Collegiate Rugby Players

Background: Despite the risk of concussion while playing rugby (Marshall, Waller, Dick, Pugh, Loomis and Chambers, 2002), there has been little to no research done on the topic in this country. This is especially concerning considering the lack of knowledge and unsafe attitudes rugby players have towards concussions (Baker, Devitt, Green and McCarty, 2013; Miyashita, Timpson, Frye and Gloeckner, 2013). Purpose: The study’s purpose is to determine the knowledge and attitudes collegiate club rugby players have towards concussions. The study will also assess the effectiveness of a concussion education session on concussion knowledge and attitude in collegiate club rugby players. Methods: Participants completed a pre-test, which was a partial replication of Register-Mihalik et al.’s Concussion Knowledge survey and Concussion Attitude survey. Athletes then participated in a 15-minute concussion education session based off the “Heads Up” concussion education materials from the Centers For Disease Control and Prevention (CDC) and National Collegiate Athletic Association (NCAA). Results: Participants overall had a lack of concussion knowledge. While there was no significant concussion knowledge difference between the pre- and post-test, there was a significantly improved attitude. There was no significant gender difference in knowledge or attitude. Conclusion: The lack of a significant increase in the participants’ concussion knowledge may indicate that the “Heads Up” concussion education is ineffective. However, the improved attitude scores may indicate that a concussion education session taught athletes the seriousness of concussion. This study adds to a limited knowledge base of concussion in collegiate club rugby players in the United States.
NUTRITION

22nd Annual Massachusetts Statewide Undergraduate Research Conference
Auditorium  8:30-9:15  Board A42
Dominique Deslauriers
Lisa Troy (Faculty Sponsor)
Department of Nutrition, UMass Amherst
Assessing Availability of High Quality Protein Sources in Springfield, Massachusetts

Availability of healthful food on the environmental level has a large impact on diet quality and health outcomes. The purpose of the current study was to estimate access to high quality versus low quality protein sources as defined by the 2015 Dietary Guidelines for Americans, in urban neighborhoods within Springfield, MA. Access to healthful food was estimated within a half-mile radius in thirteen neighborhoods, many located within USDA food desert labeled regions. Healthful food access within food stores was assessed using the Community Nutrition Environment Evaluation Data System (C-NEEDS) coupled with an addendum, including seafood and soy-based protein availability. Data regarding protein was extracted from all C-NEEDS surveys and analyzed. Our findings indicate that of the 43 surveyed food stores: 75% sold legumes, 79% sold nuts and/or seeds, 79% sold seafood, 67.4% sold processed and/or non-lean meat, 2.3% sold lean meat, and 2.3% sold soy-based protein. Additionally, we found that protein sourced from lean meat was largely unavailable, while the access to healthful proteins including seafood and nuts and/or seeds was high. These results suggest that non-meat protein sources, especially seafood, nuts and/or seeds, may be a more available healthful protein source for those residing in urban food deserts in Springfield, MA. These findings could be utilized by registered dietitians making nutrition recommendations for low-access populations to include more healthful protein sources from seafood, nuts and/or seeds --- which may be more available than lean meats to those living in a food desert.
Sabrina Hafner  
Elena Carbone (Faculty Sponsor)  
Department of Nutrition, UMass Amherst  
A Vegetable-Focused Intervention among Fourth Grade Students in a School-Based Environment

Approximately one-third of US children are overweight or obese. Nutrition education at an early age can play a significant role in the development of future healthy eating behaviors. While many nutrition programs have been designed for children, relatively few have focused on vegetable intake specifically. However, data from the USDA indicate that 93% of children do not eat the recommended amount of vegetables. School-based nutrition programs are ideally suited to this audience because children spend most of their day at school. In keeping with this, a three-part classroom-based nutrition lesson was developed that focused on the selection of a different vegetable each month (carrots, butternut squash, and kale). Participants included fourth graders from three classrooms in Chicopee, MA. One classroom served as the intervention group and two classrooms served as the control groups. Vegetable selection in the cafeteria was measured quantitatively immediately before and one week after each session. Each session included: 1) a short, general lesson about the vegetable and how it impacts the body, 2) a tasting component, 3), and a short reading component or game to reinforce nutrition and health concepts. Fifty-nine students participated in the study, with 18 students in the intervention group and 41 in the control group. The findings indicate that vegetable selection increased for the intervention group and they selected more vegetables overall than the control groups. Although the sample size was small, this research suggests how nutrition education can impact young children’s lives and lay the foundation for future dietary choices.
Since diabetes has become more prevalent throughout the United States, there must be a way that a person with diabetes can stay on track with healthy meal choices and diabetic goals. Type I and Type II diabetics are often faced with the difficult decision of meal planning, especially when challenged with a rigorous way of life. The lifestyle of the average American can at best be chaotic in regards to time management. When people are often faced with a busy schedule, it can sometimes affect their health as a result of their choices in meals. In order to compliment the busy schedule, people often resort to fast food as it seems to be more convenient, but convenience may not always be the right deciding factor when selecting a meal. Recipes can be altered in ways that make it easier for a diabetic faced with a busy schedule to be able to eat right, even when there seems to be little time to spare. There are ways to making meals healthy enough for a diabetic diet. By looking at how to create healthy meals, a diabetic can also review fast-food menus that will accommodate their lifestyle.
Hyperthyroidism is an ailment in which the thyroid gland produces too much of the thyroxin hormone. This illness accelerates the person’s metabolism significantly. Thus, the body uses more energy than usual, and the vast nutrients absorbed are not used to its potential successfully. This research is to analyze if and what kind of nutrition derived from food plays a role in this ailment. For example, it is to analyze if food containing iodine or Vitamin D like fish, dairy, and eggs can suppress the mass production of thyroxin. The methods used for the analysis of this paper will be by consulting the peer-reviewed literature from this field of both nutrition and hyperthyroidism. Data will also be collected from interviewing specialists and patients with hyperthyroidism. The main idea is to understand what types of nutrition can help in the treatment of this ailment. Expected results are that having the right nutrition can naturally control the production of thyroxin without depending on daily medication intake.
The “Maudsley” approach, also known as Family-Based Treatment (FBT), is the treatment of choice for adolescents with anorexia nervosa, and is recommended by the Society for Adolescent Health and Medicine (SAHM), the American Academy of Pediatrics (AAP), and the Academy of Nutrition and Dietetics (AND). Much research supports its success, however, little is known about the health practitioners who utilize it. This study aimed to identify the utilization of FBT for the treatment of anorexia nervosa by members of SAHM. Both the primary methods of treatment and the demographics affecting FBT usage among SAHM members were studied using a Qualtrics survey. The utilization of the FBT Manual during the treatment process was also assessed. The 72 responses included 6 international (non-U.S.A./Canada) participants, 5 Canadian participants, and 61 participants from the U.S. Results showed that 100% of international participants (including those practicing in Canada) were familiar with FBT and utilized it in the treatment of adolescents with anorexia nervosa. American participants were less familiar with FBT with 81% of U.S. health care practitioners utilizing it. Lack of available resources may be a factor inhibiting wider use in the U.S. Further research should be conducted to better access the support needs of adolescent health care practitioners in the U.S.A.
Nicole Mangaudis
Maria Vincenza Monterotti
Jerusha Nelson-Peterman (Faculty Sponsor)
Department of Nutrition, Framingham State University
Eat Cake and Lose Weight: Reduced Saturated Fat Chocolate Cupcakes

Purpose: To reduce calories and saturated fat in chocolate cupcakes using applesauce and pureed cannellini beans as a partial oil replacer. Methods: A control chocolate cupcake containing 60 ml vegetable oil was prepared. The first variation (AS) used 15 ml of oil plus 15 g of applesauce. A second variation (CB) used 30 ml of oil plus 32.5 g of pureed cannellini beans. A semi-trained sensory panel (n=7) evaluated crust tenderness, crust color, internal tenderness, internal grain, internal color, weight, flavor, aroma, and mouthful of the variations (1-5 scale; 5=highest). Height was measured in mm. Differences in mean scores were assessed using ANOVA with LSD post-hoc comparisons. Nutrient composition was determined using Food Processor software. Results: AS had higher mean scores than control for internal tenderness (P=0.032), flavor (P=0.048), and overall product (mean control score=4.70.3, mean applesauce score=5.00.1, P=0.032). Mean height of the control was greater than AS (P=0.003), and less than CB (P<0.001). Mean height of CB was greater than AS (P<0.001). Total kcal/serving (1 cupcake) was: control=160, AS=130, CB=140. Saturated fat/serving was: control=1g, AS=0.5g, CB=0.5g. Discussion/Conclusion: Replacing oil with applesauce and cannellini beans yielded an equivalent or superior product compared with the control recipe, while reducing calories and saturated fat. This technique can help individuals reduce calories while still consuming baked goods.
Obesity and diabetes are public health concerns that have grown to a global level. Having a poor diet can place individuals at a greater risk for developing preventative diseases, such as diabetes. Access to healthy grocery stores can play a role in minimizing this outcome. By using scholarly literature, Census data and bus routes this paper will examine how accessible healthy grocery stores are for those living in lower income cities such as Fall River, Massachusetts. Corner stores, bodegas, and larger chain grocery stores will be included in this research. Measures will include store distance to bus routes, price of food staples, variety of healthy foods, quality of produce sold, and proximity to fast food restaurants. This paper aims to highlight the disadvantage residents in lower income areas face in relation to access to quality food and it will offer suggestions for those residing in such areas.
Food Addiction

In the whirlwind of daily life, food brings pleasure and comfort. However, some people suffer from craving or addiction to highly palatable foods like the ones that are full of sugar, fat, and salt, which then eating becomes a dangerous vice. The addiction to food is the irresistible tendency to repeat the act of eating and is no different from being addicted to tobacco or alcohol. The research aims to explore the reason why foods high in sugar, salt, or fat have an addictive power, which encourages consumers to eat excessively and promote obesity and numerous health problems. It seems that the feeling of pleasure derived from palatable food and drugs exemption are both produced from the same brain circuitry. The research will focus on chemistry of food and the psychological aspects that contribute to food addiction. I will be using a variety of resources from scientific research that have been approved and done by reliable sources, internet, and books from library. Also I will be doing surveys, and interviewing specialists and doctors to support my paper. Food addiction does not have to ruin people’s lives. With medical assistance, meetings with other people, sharing the same experience on nutrition, motivation, and free time management, people can overcome the habit of overeating and free themselves from the chains of addiction related to food.
Concourse  2:30-3:15  Board C77
Jessica Marie Sargo
Julia Evdokimova
Natalie Leon
Jerusha Nelson-Peterman (Faculty Sponsor)
Department of Nutrition, Framingham State University
Gluten-Free Blueberry Muffins

Purpose: To formulate gluten-free muffins by replacing all-purpose flour with green banana flour and quinoa/rice flour. Methods: A control blueberry muffin recipe was prepared using all-purpose flour. One gluten-free variation (BF) used green banana flour and xanthan gum as a flour replacer; a second (QR) used quinoa, white rice flour and xanthan gum. A 7-member panel of Framingham State University Food and Nutrition students evaluated all variations for external surface, internal grain, internal tenderness, odor and flavor (1-5 scale, 5=highest). An overall product score was calculated from these characteristics. Height was measured in mm. All mean values were compared using ANOVA with LSD post-hoc tests. Results: Compared with the control, BF had a lower overall score (P<0.001), lower score for external surface (P=0.00), and lower score for flavor (P=0.001). Compared with QR, BF had a lower overall score (P<0.001), lower external surface score (P=0.001), and lower internal grain score (P=0.027). Compared with the control, QR had a lower flavor score (P=0.032). BF height (33.9 ± 2.4mm) was less than the control (40.4 ± 3.4mm, P<0.001), and less than QR (38.0 ± 1.7mm, P=0.05). Conclusion: Banana flour was an inferior substitution for all-purpose flour for most measures. Quinoa, rice flour, and xanthan gum provide a suitable substitution for all-purpose flour in the blueberry muffins. This may be of use to individuals with celiac disease.
Rises in the occurrence of Celiac Disease, autism, and other critical maladies that coincide with increased use of genetically modified (GM) foods is a valid concern for consumers in the United States. While there is detailed international research involving GM foods and glyphosate, a widely used chemical on GM foods, the United States is far behind in such research. Shown through data extrapolation from academic journals, scholarly articles, and the use of primary sources, there is evidence of a direct correlation between increased glyphosate use and increases in various diseases. The Center for Disease Control and Prevention (CDC) has documented the toxicity of glyphosate and the United States Department of Agriculture (USDA) states the upward trend of glyphosate use in agricultural crops since the 1970s. As more unbiased researchers submit their reports, the corresponding data between the increased occurrences of autism, severe allergies (especially peanut), and other health issues in relation to the use of glyphosate on genetically modified crops becomes increasingly clear. When science proves the negative impact of GM foods and glyphosate on the health of the citizens of the United States, the FDA will have to take part in regulating or eliminating glyphosate. If glyphosate is not eliminated, United States consumers should have the choice of whether or not they want to eat potentially hazardous food. Full-disclosure GE and pesticide labeling of food is paramount to the health of this and future generations.
Leyla Filiz Dincer
Karen Elizabeth Atkinson (Faculty Sponsor)
Department of Science & Engineering, Bunker Hill Community College
Nourishing the Unborn: “The Good, the Bad and the Ugly” of Health Habits during Pregnancy

This project is an investigation of the role lifestyle habits, particularly those pertaining to physical and spiritual nourishment, play in a woman’s symptoms during pregnancy and the effect these habits have on the development of the fetus. The general areas with which I am concerned regarding lifestyle habits are diet, exercise, coping mechanisms for stress, interpersonal relationships, and the practice of meditation. To deepen my research about coping mechanisms, I plan to specifically examine the repercussions of a woman’s recreational drug use during her pregnancy. I am interested in learning about how the severity of pregnancy symptoms such as morning sickness, pain, swelling, mood swings, and postpartum depression vary as a result of health habits. Because balanced diet, adequate exercise, meditation and other positive life practices can significantly improve so many physical and mental health conditions, I suspect that these might also reduce the level of discomfort or pain some women experience during pregnancy and perhaps contribute to the development of a physically and emotionally stronger child.
Identifying Best Management Practices for Produce Brush Washer

Postharvest washing equipment can serve as a vector for cross-contamination of produce after harvest. Often, older, on-farm produce processing equipment is not designed with easy cleaning and sanitizing in mind. This study aims to understand the risks posed by a brush washer, then to identify mitigating strategies to combat these risks and offer operators best management practices moving forward. Environmental samples measuring coliforms were taken during the 2014 and 2015 growing seasons on four parts of the Student Farm brush washer. The data were analyzed for seasonal trends and for areas with the highest potential for cross contamination to produce. These trends then informed targeted cleaning strategies. Two season average of coliform count on the brush rollers was 5 log CFU/mL. Exact points varied widely based on last operation and operator. Over the summer 2015 season, coliform counts ranged from 0 to 4.5 log CFU/mL, evidence of operator inconsistencies when resetting machine for next use. The range on the brushes was the widest of all of the areas tested; hence it will be specifically targeted in the sanitation plan. Purging the machine for 5 minutes after use was shown to yield an average reduction of 3.69 Log CFU/mL on the brushes, indicating that a targeted cleaning plan can reduce the dramatic range of remaining bacteria. These data suggest that Farm owners and operators using this brush washer may want to modify their best management practices, SOPs, end-of-season decommissioning plans and employee training to account for this large variability.
Coffee is the beverage of choice for 60-75% of Americans as their primary source of caffeine. It has numerous physiological effects such as increased metabolism, elevated heart rate, as well as a stimulating effect that contributes to increased alertness. The objective of this research is to determine how time and temperature impact the quality of coffee. One sub-objective is to determine the variations in concentration of coffee’s two main phenolic compounds caffeine and chlorogenic acid with changing brew time and temperature. To see how time and temperature affected concentration; a French Press brewing method was used along with Folgers® 100% Columbian pure ground coffee. Two treatments were used to test effect of time and temperature individually. Treatment 1 entailed changing temperature in 5 degree increments from 165°F to 210°F while holding brew time constant at 5 minutes and treatment 2 entailed changing brew time in two minute increments from 6 minutes to 24 minutes while holding temperature constant at 200°F. Dry solids analysis showed that a temperature of 190°F and brew times of 6 minutes yielded the most amounts of dry solids (1.70% and 1.72% respectively). To determine the optimal time and temperature for brewing ground coffee, HPLC is used to further analyze the concentration of caffeine and chlorogenic acid of prepared samples in comparison to known standards of each phenolic compound.
582  Concourse  3:30-4:15  Board C76  
Justin Sehyun Kim  
Young-Cheul Kim (Faculty Sponsor)  
Department of Nutrition, UMass Amherst  
Effects of Tea and Tea Pomace Extract on Intestinal α-glucosidase Activity In Vitro and  
Postprandial Hyperglycemia In Vivo  

Postprandial hyperglycemia is an early defect in type 2 diabetes and has been a primary  
target for anti-diabetic drugs. One therapeutic approach is to retard the rate of glucose  
absorption by inhibiting intestinal α-glucosidase, a key enzyme for dietary carbohydrate  
digestion. Although consuming tea products has been reported to have anti-diabetic effects,  
the bioactive potential of tea pomace, the biowaste from tea processing, is not known. The  
objective of the study was to evaluate the anti-diabetic potentials of three selected (green,  
oolong, and black all derived from Camellia Sinensis) tea water extracts (TWE) and tea  
pomace extracts (TPE) by determining the relative potency of the extracts on rat intestinal  
α-glucosidase activity in vitro as well as hypoglycemic effects in vivo. Tea bags were extracted  
in hot water and the remaining pomace was dried and further extracted in 70 % ethanol.  
We found that both TWE and TPE of green tea had the highest rat α-glucosidase inhibitory  
activity and highest total phenolic content. The potential of the extracts on blood glucose-  
lowering effect was also determined in Sprague-Dawley rats. We found that blood glucose  
level after oral administration of TPE and TWE of both green and black tea was significantly  
reduced compared to control rats. Additionally, the IC50 values of all 3 tea extracts against  
α-glucosidase were lower in TPE groups than TWE groups. These data suggests that tea  
pomace-derive bioactives may have great potential for further development in nutraceutical  
products, and for reuse as valuable bioresources for the industry.
The role of the gut microbiome in mammalian health has become an increasingly important area of research. Bacteria of the family Bifidobacteriaceae are commonly present in the mammalian gut, and several species in the genus Bifidobacterium appear to play a role in promoting health. The ability of bifidobacteria to metabolize complex carbohydrates appears to play a central role in their activity in the gut, but metabolic phenotype and genotype varies considerably by species and strain. It is currently unknown if bifidobacterial strains have coevolved with their hosts to better fit their specific niche. To address mammalian-microbiome coevolution, fecal samples were taken from rhesus macaques, cows, horses, pigs, and goats. Bacteria were isolated on bifidobacteria-specific media, and colonies were confirmed as bifidobacteria using PCR and gel electrophoresis, phosphoketolase (PK) assay, and microscopy. Bifidobacterial species were then identified using Sanger sequencing. Once the species of bifidobacteria was identified, samples were grown in modified Man Rogosa Sharpe (mMRS) broth with varying sole carbon sources to characterize carbohydrate utilization phenotypes. We hypothesize that bifidobacteria isolated from the same environment (e.g. pig, cow, etc…) will exhibit similar carbohydrate metabolism. This work investigating the link between bifidobacterial metabolic phenotype and a specific mammalian environment will help characterize the hallmarks of symbiotic coevolution. This information may help inform nutritional interventions or enrichment of the gut environment for these beneficial microbes, possibly guiding practical applications in probiotic supplements, food products, or animal feeds.
Partial Egg Replacers in Yellow Cake

Objective: To reduce saturated fat of yellow cupcakes by partially replacing eggs with chia seed gel and whey protein isolate. Methods: A control yellow cupcake recipe containing two eggs was prepared. The first variation replaced 25% of the eggs with chia seed gel (CSG). A second variation replaced 60% of the eggs with whey protein isolate (WPI). A panel (n=7) evaluated appearance, mouthfeel, flavor, acceptability, and willingness-to-purchase (1-5 rating; 5=highest). Variations were compared for an overall product score and color, tenderness, and flavor. Height (mm) and weight (g) were measured. Differences in mean scores were calculated using ANOVA with Tukey’s post-hoc comparisons. Nutritional composition was determined using Food Processor software. Results: There was no difference in any sensory measure between the control and CSG. WPI had lower mean scores than the control for all characteristics (P=0.05). WPI had lower mean scores than CSG for: overall product score (P<0.001), tenderness (P<0.001), and flavor (P<0.001). The control and CSG had a taller height (P<0.001) and lower weight than WPI (P<0.01). CSG had 38% less saturated fat and 368% more polyunsaturated fat than the control; WPI had 39% less saturated fat than the control. Conclusion: In this yellow cake recipe, chia seed gel was an acceptable partial egg substitute, but whey protein isolate was not. For consumers wishing to reduce saturated fat and increase polyunsaturated fat consumption, chia seed gel may be an acceptable substitute for some baked goods.
579  Concourse  2:30-3:15  Board C79
AAliyah Jasmeen Payne
Katie Irwin
Ashley Dawn Petrie
Rebekah Wilner
Jeannette A. Kennedy (Faculty Sponsor)
Department of Nutrition & Food Science, Framingham State University
Sensory Evaluation of a Standard Chocolate Chip Brownie Using Chia Seed Gel and Flaxseed Gel As Egg Substitutes

Medical and religious dietary restrictions, along with ethical values, result in many U.S. consumers requiring egg-free products. The purpose of this study was to evaluate the acceptability and functional properties of egg substitutes in brownies using chia seed gel and flaxseed gel to increase product options for consumers avoiding eggs. Two variations of a chocolate chip brownie, produced with chia seed gel and flaxseed gel to replace 100% of the egg ingredient, were compared to a control, produced with eggs. All variations were prepared using standard household recipe preparation methods and baked in a conventional gas oven. Eight consumer panelists rated the color, texture, aroma, flavor, and tenderness of the three variations of brownies on a five-point quality scale (1 = unacceptable to 5 = optimal). No panelist rated any sensory characteristic of the chia seed gel or flaxseed gel variation as unacceptable. T-tests showed a significant difference (P < 0.01) between overall acceptability of the control brownie and each test variation. Panelists rated tenderness and internal texture of the experimental variations significantly lower than the control, but no significant difference was found for color, flavor, or aroma (P < 0.05). Results indicated overall acceptability for an egg-free brownie using chia seed gel or flaxseed gel, but a need exists for more research to determine proper ingredient ratios for an optimal texture. For consumers avoiding eggs, chia seed and flaxseed gels provide an acceptable substitute in brownies.
Previous studies have shown that (TBHQ), a synthetic antioxidant widely used in food products, has cytotoxic effects at high doses. However, the underlying mechanisms are poorly understood. In this study, we found that the biological effects of TBHQ on cell proliferation inhibition, cell cycle progression, and apoptosis are mainly mediated by its oxidative conversion to a quinone metabolite tert-butylquinone (TBQ). With co-addition of cupric ion (Cu2+), the oxidative conversion of TBHQ to TBQ was accelerated, enhancing the biological activities of TBHQ on cell proliferation, cell cycle progression, and apoptosis in MC38 mouse colon cancer cells. On the other hand, co-addition of ethylenediaminetetraacetic acid (EDTA) inhibited the biological effects of TBHQ indicating the conversion suppression of TBHQ to TBQ. We further found that TBHQ was converted to TBQ which had more potent actions on cellular responses, supporting a critical role of TBQ formation in the biological activities of TBHQ. Finally, a structure and activity relationship study showed that the fast-oxidized para-hydroquinones had potent anti-proliferative effects in MC38 cells, while the slow-oxidized para-hydroquinones had weak or little biological activities. Together, these results suggest that the biological activities of TBHQ and other para-hydroquinones are mainly mediated by their oxidative metabolism to generate more biologically active quinone metabolites.
Lactobacillus plantarum and Lactobacillus johnsonii are probiotic microorganisms known to have a beneficial effect on human gastrointestinal health. Currently, free probiotic bacterial cells are added to many food products however, by the time the ingested bacteria reach the gut of the consumer they are significantly reduced in number. This decreased viability is due to lengthy shelf storage as well as the acidic and enzymatic rich environment of the gut. Thus, the modification of these beneficial bacteria to survive long-term shelf storage, as well as transit through the gastrointestinal tract was the focus of this study. Lactobacillus plantarum and Lactobacillus johnsonii were encapsulated through the dripping of bacterial cells suspended in alginate into a calcium solution, forming microdroplets. The survivability of the two species of Lactobacillus spp. was compared during aerobic storage when encapsulated relative to free cells. Optical microscopy and scanning electron microscopy were used to confirm that the bacterial cells were encapsulated inside of the alginate microbeads. Particle size analysis was used to determine the average diameter of the alginate microbeads and to confirm that the microbeads were of uniform size. The encapsulated bacteria showed varying difference in viability relative to free cells. Lactobacillus plantarum showed significantly longer survival time than Lactobacillus johnsonii as free cells as well as when encapsulated. The extended viability of these microbes afforded by their microencapsulation can be used in functional food products to allow microbes to reach the gut of the consumer in much higher numbers than as free cells.
Enzyme immobilization is an important process that improves the stability and storage of enzymes, allowing for the potential reusability of these active compounds. Being able to use nanoscale features on a macroscale structure allows for enhanced stability in food processing environments. Native lipase is unable to perform in these environments which occur in food processing. Lipase can participate in esterification reactions to produce food ingredients but loses activity and cannot be recovered. When enzymes are immobilized in a larger complex they have the potential for recovery and reuse. Nanoflowers are synthesized by suspending lipase in a buffered copper sulfate solution, which assembles over three days at 25 °C. Scanning electron microscopy (SEM) was used to observe the hierarchical structures. Both of the nano and macro scale features of the nanoflowers can be seen. Immobilization efficiency was determined by testing the supernatant for protein concentration after synthesis. Nanoflower activity was compared to native lipase using the synthetic substrate, resorufin butyrate, to determine if the immobilization process impacts lipase activity. Nanoflowers were exposed to extreme environments such as varying pH and temperature values, to test stability of the nanoflower structure and its ability to retain lipase activity. Hierarchical structures have the potential to enhance the stability of enzymes, in unfavorable environments.
PHILOSOPHY

586  Room 174  8:30-9:15  Panel 1
Jacob Cheyette Cohen
Yehudit Heller (Faculty Sponsor)
Honors College, UMass Amherst
The Fall of Anakin Skywalker, the Birth of Darth Vader, and the Redemption of a Broken Man: Star Wars Episodes I-VI Understood as a Modern Archetype of Tragedy

My research argues that the Star Wars saga is a tragedy that examines the process in which a good man becomes wicked and how he is redeemed by his son. In order to build a theoretical framework, I begin with Aristotle’s Poetics and explore the critical concepts of the tragic flaw, moment of recognition, reversal of roles, and the role of fear and pity in the genre. For a modern perspective on Tragedy, I look at The Secret Cause: A Discussion of Tragedy by the late UMass Professor Norman Berlin, who argued that an integral part of Tragedy is the exploration of life’s most intractable mysteries, particularly those involved in human suffering. In order to provide specific examples of traditional tragedies, I examine three classic works in my literary review - the biblical tale of King Saul, the Oresteian trilogy by Aeschylus and the Scarlet Letter by Nathaniel Hawthorne. I then sequence into the Star Wars Saga, where I review the story of Anakin’s journey to the dark side in the first three episodes, and his ultimate role as the hero of the saga in Episode VI. In my presentation, I will focus specifically on the works of theory and on Star Wars, with an emphasis on Episode III: Revenge of the Sith. The overall goal of my project is to promote a new understanding of the Star Wars Saga, cultivate an appreciation and understanding for the genre of Tragedy, and to make the case that this archetype remains relevant.
Katherine Maraqa  
Monica Poole (Faculty Sponsor)  
Honors Program, Bunker Hill Community College  
The Personhood of Orcas

In May 2010, a Declaration of Rights for Cetaceans was developed in Helsinki, Finland at a conference on cetaceans’ rights. The statement lists ten rights for whales and dolphins and takes into account the scientific research on cetaceans’ minds. This declaration is a commitment to the overall betterment of whales and dolphins. Individuals are encouraged to join and sign the declaration, which will be used to demonstrate public support to politicians and other decision makers. Orcas, or, “killer whales”, as they are more popularly known, are extremely intelligent, social animals. Using a mirror test, a technique to determine whether a non-human animal possesses the ability of self-recognition, in 2001, Delfour and Marten contended that orcas demonstrated self-recognition. The Declaration of Rights for Cetaceans is based on the equal treatment of all persons, affirming that orcas (among other cetaceans) are non-human persons. By affirming that orcas are non-human persons, the Declaration contends that orcas have moral standing and are entitled to certain rights. This invites a series of questions on the matter of personhood as it relates to enhanced orca protection. What qualities define a person? How does being a person confer rights on that person? Which of these qualities of personhood do orcas have that would entitle them to their own legal rights as non-human persons? How does defining a being as a person inform our understanding of their value and shape our behavior in relation to them? By synthesizing philosophical work on personhood and scientific work on the minds of orcas, my research will contribute to a deeper and stronger argument for orca protection.
587 Room 911 11:45-12:30 Panel 3
Nicholas John Marino
Nicole L. Nemec (Faculty Sponsor)
Honors College, UMass Amherst
Discovering Reality

Do we all live and die in the same objective reality? Does it matter if we each experience the same world? Should we care? This paper attempts to construct a picture of what constitutes reality, and where we, humans and our self-perception, fit into this big picture. It also uses documentary film as a case study of our attempts to understand the nature of reality and self. First, the paper examines theories of knowledge: what humans claim to know, and what we can be sure we know about the world. Is our confidence in our beliefs about how the world works (reality) ever fully justified? Next, the paper examines the problem of the self. Selfhood is a complex, uniquely human phenomenon, inextricable from our perception of reality. This paper explore some of the many different perspectives on what constitutes the self, as it addresses the question: Does a single, unified self exist? The paper then examines the problem of sensory experience. Humans rely on the senses to learn almost everything we know about the physical world around us, but can our senses be trusted to provide a truthful depiction of what the world is really like? Finally, the paper examines an art responsible for interpreting, and regurgitating, reality: documentary cinema. Documentary film provides a window into human thought, and into how one individual or group interprets their reality. What does this genre of film tell us about how individuals experience reality differently? How does looking at documentary film help us understand how we understand reality?
Mindfulness and Language: Effects on Consciousness and Health

The following is a comparative study relating Eastern philosophy to contemporary Western philosophy and psychology. In recent years, clinical studies have continued to validate claims congruent with many Eastern holistic practices which emphasize the value of the body and environment in physical and mental health. In addition, philosophical perspectives such as embodiment and eco-phenomenology examine the effects of the relationship between the body and its environment. Both Eastern and Western methods suggest that the mind, body, and environment have an interdependent relationship through sound. This relationship is clearly evidenced in practices like chanting mantras and nada yoga. Studies show that sounds produced by the body and in nature have vital effects on organ and brain function. This philosophically grounded interdisciplinary project aims to extend consequences of the dynamic relationship between the environment, body, and sound, and the healing effects these mediums provide when they work together in harmony. Both guided meditation, which uses propositional language, and chanting meditation aid in strengthening this relationship. However, on the basis of the aforementioned cross-cultural convergence regarding the importance of sound to experiences of oneness and attunement to environment, we hypothesize that chanting offers a more radical healing experience. We also recommend mindfulness of the negative effects of habitual non-chanting speech on our environment and selves as a way to improve health and relationships.
Brahman, the Self of all beings, is permanent and directly revealing; the bondage that keeps each individual from realizing Brahman is a notional one that can only be rectified by right knowledge. Therefore, since the bondage that keeps each person from knowing Brahman, uniting with Brahman, and actually becoming Brahman is merely notional, the only thing that can solve and release this bondage is correct knowledge. In attempt to produce a coherent understanding of the single immutable Brahman (Self), and the means by which one may realize it, any investigation is immediately faced with a myriad of different theories and teachings that largely seem incompatible. In my research, I have earnestly studied the teachings, injunctions, and verbal testimonies of Ramana Maharshi, Sankara, Nisargadatta Maharaj, and many others from the longstanding Advaitin tradition. By analyzing each of these figures, it is my goal to consolidate the apparent discrepancies and contradictions concerning Brahmajnana (knowledge of Brahman) to ultimately produce a single consistent understanding of the Self that shows its ubiquity and relevance to every person’s identity.
Because of the work of process philosophers Alfred North Whitehead and Charles Hartshorne, a view of God as being in a constant state of flux has emerged. The power and knowledge of the process God are much more restricted than the power and knowledge of the classical God, but such diminutions supposedly safeguard divine goodness from tyrannical implications and provide theists with a relatively satisfying response to the perennial problem of evil. In addition, the process concept of God has allowed some philosophers and theologians to reconcile their theistic belief with scientific knowledge of the world. In my paper, I defend the classical divine attributes against process philosophers. More specifically, I argue that God’s omnipotence does not diminish divine goodness and that a deity with restricted power would not function as a proper object of worship. In the first section, there is a presentation of the historical and philosophical basis of process theology. The second section reveals the ways in which process theology has been applied to mysticism, gender equality, and environmentalism. In the third section, I demonstrate the weaknesses of the process God and argue for the superiority of the classical God.


With around 60% of all energy produced in the United States wasted in the form of heat, there has been great interest in the development of cost-effective technologies to convert heat into electricity using thermoelectric (TE) materials. However, current TE materials, lead telluride and bismuth telluride, are inefficient and optimal only at very high operating temperatures. The focus of this project is to analyze an organic material, poly(3,4-ethylenedioxythiophene) (PEDOT), in the form of a nanofilm of synthesized PEDOT nanoparticles in order to reuse waste heat as electricity at lower operating temperatures than current TE materials. Using a nanofilm on a glass substrate, three properties were measured, the Seeback coefficient, a measurement of voltage produced by a temperature difference within the sample, electrical conductivity and thermal conductivity. A four-point probe method was used to measure the Seeback coefficient and electrical conductivity, in which, current and voltage was measured in the presence of a temperature difference of 10 Kelvin around room temperature. Additionally, a three omega (3ω) method was implemented to measure the thermal conductivity by sending an alternating current voltage signal at a specific frequency to excite a heater. This, in turn, produces a 3ω voltage signal in the sample, from which the magnitude of temperature oscillations can be obtained. By employing PEDOT nanofilms, we hope to see that these measurements will help improve the current state of TE materials.
The Hunt for the Z’ Boson: Reweighting ATLAS Monte Carlo Simulations

Due to the limitations of the Standard Model, ATLAS must consider several different theories predicting new particles to help focus future searches at the Large Hadron Collider. Eight Beyond the Standard Model theories predicting the Z’ Boson are tested by exploring dilepton mass, rapidity, and angle distributions from Monte Carlo simulations of proton-proton collisions at an energy of 13 TeV. This work will help determine our ability to discriminate among the different models.
Rachel Anne Fiolek  
Timothy P. Killingback (Faculty Sponsor)  
Department of Mathematics & Statistics, UMass Boston  
Complex Network Topologies Resilient to Centrality Attack

Many complex systems can naturally be described by networks, in which the essential components are represented by vertices in the network and the connections between the components are represented by edges between the corresponding vertices. An important issue involving complex networked systems is the resilience of the overall system to the failure of its constituent parts. The degree to which a networked system continues to function as its component parts are degraded typically depends on the integrity of the underlying network, and thus the question of the robustness of the system can be studied by analyzing how the structure of complex networks change as vertices are removed. We extend previous studies on complex network structure by determining the topology of those networks which are most resilient to targeted vertex removal based on degree, betweenness, closeness, and eigenvector centrality. A base network (initially a random network) was subjected to random mutations (taken to be random rearrangements of some number of edges), which produced random variations in the network structure, and then the variant network which was most robust to a given type of centrality attack (as quantified by the R-index) was taken as the new base network. This process of producing mutant networks and selecting the most robust continued until a network topology emerged whose robustness could not be increased. This approach to determining the topologies of complex networks resilient to centrality attack made essential use of high performance computing.
Testing and Characterization of Silicon Photomultipliers for DarkSide-20K

Silicon Photomultipliers (SiPMs) are among the most sensitive technologies for the detection of single photon signals in low light environments. They are more compact and promise to be much more radio pure than previously employed high sensitivity photon detectors (i.e. PMTs, APDs, PIN Photodiodes). They have also been shown to work at cryogenic temperatures. This makes them appealing to the DarkSide Collaboration for use in the next generation direct detection dark matter experiment, DS-20k, located at the Laboratori Nazionali del Gran Sasso in Italy, which uses liquid argon as an active target for dark matter particles. At UMass we will perform cold tests at liquid argon temperature, as well as a range of characterization studies of SiPM large area assemblies, in tight collaboration with the Princeton University DarkSide group.
Characterization of Silicon Photomultipliers in Liquid Xenon

Current leading theories of the standard model indicate that neutrinos may be Majorana particles. Unlike Dirac particles, Majorana particles are their own antiparticles. Therefore research efforts are conducted to observe the neutrinoless double beta decay which would confirm the Majorana nature as well as inform on the particles mass spectrum. Using Xe-136, the Enriched Xenon Observatory (EXO) collaboration’s EXO-200 experiment uses a time projection chamber filled with liquid xenon that is used to detect the xenon scintillation from the decay. Currently, efforts are being made on nEXO, a ton-scale and more sensitive version of EXO-200. As part of the Pocar group at UMass, we study how Silicon Photomultipliers (SiPM) behave in a liquid xenon environment. This research will aid the development of nEXO’s photodetector array.
Mathematical ecologists are concerned with the dynamics of spatially-coupled, ecological oscillators due the information they may provide about the persistence and extinction of populations. The dynamics of these coupled, ecological oscillators are difficult to solve analytically. In lieu of an analytic approach, we aim to describe these dynamics at critical transitions by the Ising model, and therefore categorize them in the Ising Universality Class. In a one-dimensional system, the critical transition occurs in the absence of noise in our model and, since zero noise presents a computational intractable problem, we simulate the limiting behavior. In particular, we look at low-noise correspondences in correlation functions and thermodynamic quantities between our population model and the Ising model in an effort to place our population model in the Ising Universality Class.
We present a qualitative experimental study of the ionic conductivity of granular materials and its effects on the physical properties of the particle assembly. Here we model the application of shear stress on an assembly in an attempt to measure the changes that allow an irradiated sample to have a larger resistance to gravitational shear. Through this modeling of the force required to change the pile we find that the irradiated assemblies exhibit a greater degree of strain hardening as the assembly is given more degrees of freedom. These findings will allow future insight into the seen physical conformity with bombardment by negative ions.
601 Auditorium  1:30-2:15  Board A24
Gabriel A. Madigan
Stephane Willocq (Faculty Sponsor)
Department of Physics, UMass Amherst
Search For Non-resonant New Phenomena in Dimuon Events

A search is conducted for non-resonant new phenomena in dimuon final states originating from contact interactions. LHC proton-proton collision data recorded by the ATLAS detector are used, corresponding to an integrated luminosity of 3.2 fb-1 and at a center of mass energy of √s = 13 TeV. This dataset is compared to Monte Carlo simulated data of background processes and contact interactions at an energy scale of Λ = 20 TeV. The dimuon invariant mass spectrum and dimuon forward-backward asymmetry are used as discriminating variables in the search.
An Isentropic Phase Transition for Kerr-de Sitter Black Holes

Astronomical data suggests the universe is expanding at an accelerating rate. The de Sitter universe models this feature with a positive cosmological constant $\Lambda=3/l^2$. One distinguishing feature from flat Minkowski space is a cosmological horizon with size given by $l$, beyond which the acceleration surpasses the speed of light. This is a causality boundary - observers who are further apart today than $l$ can never communicate, even if they wait until “the end of time”. The de Sitter horizon has similar thermodynamic properties to black hole horizons, thus examining black holes in a de Sitter universe yields interesting features that do not appear for $\Lambda=0$. However, due to the complexity of the system, it is typically difficult to examine these features analytically even though the Kerr-de Sitter metric (1973), describing a rotating black hole in a de Sitter universe, is known. Using a new parameterization of this metric we are able to solve for important thermodynamic features in a simple and elegant way, furthermore we find are able to constrain these values within a physical domain. We find a phase transition between small and large black hole states that have the same entropy. Dividing these states is a maximal entropy point where isentropic compressibility diverges, which may play a role in the stability of Kerr-deSitter black holes. In this talk, I will discuss the properties of the Kerr-de Sitter metric at a non-technical level, a novel parameterization of Kerr-de Sitter thermodynamics, and provide evidence for the isentropic phase transition.
nEXO, the next Enriched Xenon Observatory, represents one of the most promising attempts to discover evidence of neutrinoless double beta decay to date. Achieving this feat is one of the principal challenges facing the nuclear physics community, and if found, neutrinoless double beta decay would have significant consequences on the Standard Model of particle physics. To find evidence of this rare decay process, which has a half-life of at least 1025 years in 136Xe, nEXO plans to utilize a time projection chamber containing 5000 kilograms of liquid xenon. Effectively designing a detector of this size and precision requires significant efforts to reduce inadvertently measured background events. Such signals could potentially trigger false positive readings, and are introduced by cosmic muons, or gamma ray emissions from external materials and contaminants within the liquid xenon. For the latter, radon progeny in the circulated xenon, namely 214Bi, threaten to contribute nontrivial backgrounds. Ongoing Monte Carlo simulations performed in Geant4 have determined the impact of these radon progeny on the nEXO measurement efficiency. This study analyzes the conclusions of those simulations and the ensuing implications on the final design of nEXO, so that problematic background signals can be identified.
598 Auditorium 10:45-11:30 Board A15
Philip Oliver Rebrovic
Tony Dinsmore (Faculty Sponsor)
Department of Physics, UMass Amherst
Stretching and Squeezing Small Plastic Particles and Measuring Their Induced Deformations of Water-Air Interfaces

Many areas of physics, engineering, and industry are interested in particle interactions on fluid interfaces. A fluid interface is any place where two different fluids. The phenomenon of adsorption is an important interaction on fluid interfaces in which particles move toward and rest on such an interface. Once they find themselves here, other forces govern their movement to a particular part of the interface. A particle that has adsorbed onto a fluid air interface will deform the interface in a way that minimizes the surface energy expended by the interface. Specifically, the height of the contact line will change in order to maintain a constant contact angle. By understanding the details of this deformation, we can predict the particle’s behavior on interfaces of various shapes, or in the presence of other particles. The synthesis of these particles is the first stage of my research. I embed small polystyrene spheres in a film composed of polyvinyl alcohol, water and glycerol. When the film has dried, I immerse it in a hot oil bath, which allows the beads to become malleable, and stretch the entire film along one axis, which elongates the spheres into ellipsoids. I examine the significance of the many variables involved in this process – film composition, oil temperature, heating duration, etc. – and how manipulation of these variables can modify particle characteristics. I expect ellipsoids to induce a quadrupolar deformation of the contact line between water and air. I verify this by analyzing still images with computer software.
597 Auditorium 10:45-11:30 Board A14
Liam Judson Scanlon
Elmer Eubanks (Faculty Sponsor)
Honors Program, Mount Wachusett Community College
Optimally Fulfilling a Demand

Renewable Energy is defined as energy from a source that is not depleted when used. The clear advantage of using renewable energy over current sources of non-renewable energy is having a source that is not depleted when used. Other factors to consider are cost efficiency and potential environmental impacts. Therefore, it is important to analyze the merits of renewable energy in relation to non-renewable in order to determine the extent to which renewable energy should be applied or improved in relation to non-renewable sources. To do this, statistical evidence and documented research was analyzed to illustrate the payoff of renewable energy in relation to requisite initial investments, cost of maintenance, and any adverse environmental effects of collecting renewable energy. Upon analyzing, it was gauged that contemporary methods of gathering renewable energy sources could be applied to the point where their production would be enough to fulfill the demands of the civil, non-commercial population. The cost of production would not outweigh the payoff, and that there would not be any environmental effects caused by the sources that were less acceptable than the effects caused by extrapolating other energy sources. Thus, provided that the energy produced by renewable sources could be stored and distributed effectively, it should be considered wholly worthwhile to invest time and money into applying contemporary methods of renewable energy until there is enough production to fulfill the civil, non-commercial demands of the nation.
This project reports on the research and design process for a cathode for the nEXO detector. nEXO is the ‘next Enriched Xenon Observatory’, an experiment designed to search for neutrinoless double beta decay of Xe-136 using a 5-tonne, enriched Xenon time projection chamber (TPC). The TPC is roughly a right cylinder, 1.3 meters in diameter and length. The motivation for this project is to create a cathode that is as light as possible and reduces radioactive impurities to a minimum, while being mechanically robust. Testing will include designing a way to appropriately stretch large, circular metal sheets to counter their flexing under their own weight and the operating electrostatic forces.
600 Auditorium 1:30-2:15 Board A23
Boris Panaiotov Stanchev
Stephane Willocq (Faculty Sponsor)
Department of Physics, UMass Amherst
Impact of Bottom-Quark Identification Schemes on Detecting Higgs-Pair Resonances

We present a study of the impact of bottom-quark identification techniques on the search for Higgs Boson pair production in the ATLAS detector at the Large Hadron Collider via simulated Higgs-pair decays into bottom anti-bottom quark bound states. Evidence for such decays would also be evidence for new physics, namely the existence of massive graviton resonances predicted by the Randall-Sundrum model. We use Monte Carlo event generators to simulate proton-proton collisions in the ATLAS detector at an energy of 14 TeV in order to conduct our analysis. Studies such as this one are meant to contribute towards studies of discovery potential in the High Luminosity Large Hadron Collider, which has a projected completion date at some time in the mid-2020s.
Assessing the Path Light Takes through a Concentration Gradient

The purpose of this study is to understand the physical behavior of light as it passes through a gradient of refraction indices. At its fundamental properties, light exhibits wave behaviors, which can be used to explain the phenomenon of refraction as a light ray travels across the boundary of two media. In our experiment, a laser will be directed through a vertical gradient of Karo syrup in water, with a mirror on the bottom to create a series of arcs. The arcs will be recorded and analyzed to formulate a mathematical description, which predicts the path a beam of light will take as it passes through a continuous gradient of indices of refraction. In theory, as light crosses each boundary, its direction of travel will change according to Snell’s law, bending either towards or away from normal as it moves to either a higher or lower index of refraction. Thus, our calculations will employ Snell’s law for predicting the change in theta as a measurement of direction as the light passes through the media boundaries.
PLANT, SOIL, AND INSECT SCIENCES

610  Concourse  3:30-4:15  Board C80
Ashley Hoffman
Kristina A. Stinson (Faculty Sponsor)
Department of Environmental Conservation, UMass Amherst
Effects of Tree Age and Tree Diameter on Subalpine Conifer Species in Fire-Prone Forests

Subalpine conifer forests experience infrequent fire disturbances, historically every one hundred to three hundred and fifty years. However, climate change is increasing the frequency and severity of fire and could lead to fires as frequent as every thirty years. To determine whether subalpine conifer trees would reach reproductive maturity before with more frequent fires, cones were surveyed based on presence or absence in seven of Thomas Veblen’s permanent plots, set up in the 1980s. All trees in each plot were tagged and aged in the 1980s and tree DBH was collected for a different study in 2013. Logistic regressions were run to compare age and cone presence and diameter at breast height (DBH) and cone presence. Then model comparison techniques were used to determine which model (DBH or age) was a better predictor of cone presence. Both DBH and age were significant factors in cone production, supporting the predictions that age and DBH have are positively correlated with cone production. However, DBH was a better indicator of cone production in all subalpine conifer species. This indicates that trees have to reach a certain age threshold to produce cones, but once they reach that age resource availability is a bigger factor in cone production. Overall, only lodgepole pine would be able to withstand more frequent fire based on this data, which could lead to a shift in species composition in fire-prone subalpine forests.
There have been consistent efforts to reduce our use of fossil fuels in the near future due to environmental and political concerns. Biofuels are plant derived hydrocarbons that have the potential to aid in this goal. In order to increase the oil yield, genetic engineering of plants has been shown as a successful methodology. This project seeks to investigate the interaction of a bicarbonate transporter (BT) gene and the TAG1 gene in the promising biofuel crop Camelina sativa. Camelina is a cool, short season crop that requires low input to be maintained and has a seed oil content ranging between 30-40%. Many genetic engineering approaches have been developed to increase the oil yield in various plants. Our genetic engineering approach is centered around a push-pull mechanism of fixed carbon within Camelina. The BT gene increases the CO2 assimilation and photosynthetic capacity of Camelina, thus providing more fixed carbon within the plant. Lipid biosynthesis metabolism has been shown to operate via the Kennedy Pathway, in which the fatty acyl coA substrates are converted through a variety of enzymatic reactions into triacylglycerols (TAGs). By increasing the functionality of an enzyme late in the Kennedy Pathway (TAG1), more oil is pulled into the seeds. By crossing a bicarbonate transporter gene and TAG1 overexpressed lines for combining both overexpressed genes into one plant, the overall seed oil yield should be augmented. Our preliminary results are promising and Camelina transgenic lines co-expressing both BT and TAG1 showed significant increase in total seed and oil yields.
The focus of this project is on determining the differences, if any, in nutritional content between hydroponically grown produce and soil-based produce. Hydroponics already surpasses conventional farming in efficient use of resources, quickness of plant growth, yield per acre, and minimal use of energy. It also provides an environment where crops will not be subjected to drought, pollutants, pests, or other external factors that would inhibit plant growth, making crop dusting, pesticides, wasteful irrigation systems, and farming machinery obsolete. Kale will be the produce being examined. I will design and build a hydroponic system, which I will then use to grow between 10-20 kale plants. I will then compare the nutritional content of those plants to plants grown in soil, and document any differences observed. The research I wish to conduct would help determine whether hydroponically grown plants have the same dietary value as conventionally grown produce. It would either support or detract from the argument in support of the transition from soil-based to hydroponic agriculture. I predict that there will be little to no nutritional difference between the hydroponically grown kale and the soil based kale.
Nicholas D. Rivelli  
John G. Stoffolano (Faculty Sponsor)  
Stockbridge School of Agriculture, UMass Amherst  
Effect of Volume and Identity of Sugar Ingested on Crop Contraction Behavior in Drosophila melanogaster.

Purpose: investigate the in vivo physiology of the dipteran crop in D. melanogaster to investigate if there is a difference in physiological response to the volume of sugar ingested. We hypothesize that there may also be differences in crop contraction rate depending on the identity of the sugar tested. Methods: To assay the effect of volume and sugar ingested on crop contraction rate we used a nano-feeding assay coupled with microscopic dissection and in-vivo observation of live dissected animals. Supporting structural images of the crop were also obtained. Results: We found that sugar ingested does not have a significant effect on the crop contraction rate of wild type drosophila. Volume does have a significant effect, increasing to a maxima and decreasing at extreme volumes. Discussion: The change of crop contraction rate as a function of volume makes logical sense. When the crop is empty, it makes no sense to contract, because there is nothing within the crop to agitate and expel into the lower GI tract. When filled to an intermediate level, the crop must churn quickly to mix digestive enzymes and ingested contents. When completely full, the crop is no longer able to contract, as doing so at such a high and forceful rate as seen at an intermediate volume would result in rupture. Conclusion: The volume of sugar ingested is the primary determinant of crop contraction rate while identity of sugar plays no significant physiological role at this level of observation.
POLITICAL ECONOMY

612 Auditorium  2:30-3:15  Board A50
Andrew Gervasi
Amy Beaudry (Faculty Sponsor)
Department of English, Quinsigamond Community College

After Tiananmen

The use of force by the Chinese government to quell the Tiananmen Square protest on June 4th, 1989 created many challenges in preserving the trade partnership and other aspects of foreign policy between the United States and China. This literature review compares and contrasts various academic articles from before and after 1989 to examine what changes in United States-Chinese foreign policy, if any, can be attributed to the massacre at Tiananmen Square. Multiple political models are examined and used to evaluate actions taken by both the executive and legislative branches of government of the United States in response to Tiananmen Square. This review examines several external factors on United States diplomatic relations including the cold war with the Soviet Union, pre 1989 immigration restrictions along with late 1980’s immigration policy, Most Favored Nation (MFN) status and China’s application to the World Trade Organization (WHO). The United States internal debate over appropriate sanctions following the Tiananmen massacre and the ethics of international trade with communist nations is also addressed. In comprising this literature review no specific perspective is championed, all the articles are simply compared and contrasted in context to each other.
The original intent of farm subsidies was to help farmers during the Great Depression, but has since come to include the wealthiest agribusinesses. While benefiting wealthy agribusiness at home, U.S. farm subsidies have in turn had negative consequences on poor farmers in developing nations that has created disparities between rich and poor. Domestically, the cut in Food Stamps is another issue related to U.S. farm subsidies. Food Stamp policies in the U.S. has provided forty-seven million low income Americans with a food safety net, but the U.S. Congress has frequently adjusted the farm bill to cut food stamps while increasing farm subsidy funding. Many experts have criticized cutting support for the poor while increasing support for wealthy interests. Though farm subsidy advocates believe subsidies help U.S. citizens by maintaining affordable food prices, it seems that such programs may actually widen the gap between the haves and have nots. Therefore, it is the purpose of this research project to examine U.S. farm subsidy policies and determine if there is a relationship between those policies and the expanding chasm between the wealthy and the poor in the United States and globally.
All governments attempt to maintain political power. Some states do so through extensive repression; others allow for democratic representation in order to legitimate state power. However, the monarchies in the Persian Gulf have chosen to implement generalistic social spending policies to pursue the same goal. It is possible that the Gulf monarchies have chosen this strategy because generalistic social spending policies have larger positive effects on political support than particularistic ones within the context of rentier states. If true, these effects would constitute an important addition to the current discussion of the resource curse/resource blessing. I will test for these positive effects using an experimental design in which subjects participate in simulated economies. Statistical analysis of an indirect measure of political support will determine if there is a benefit or cost associated with the use of generalistic social spending policies over particularistic ones. This research will add an important consideration to the current scholarship on the benefits and drawbacks associated with rentierism.
POLITICAL SCIENCE

627  Room 165    2:30-3:15    Panel 5
Megan Elizabeth Allen
Wendy Langum Wright (Faculty Sponsor)
Department of Criminal Justice, Bridgewater State University
Processes of Racialization through Media Depictions of Transracial Violence

In this research project, I explore the process of racialization in media coverage of White-on-Black violent events (both crimes and incidents not recognized by the legal system as crimes) using a critical race theory framework. The past three years have seen a series of killings of and assaults on African American people that have become newsworthy, as they have been seen, often controversially, as unjustified. The controversy has largely broken down on racial and political lines, with minority Americans and the left seeing these incidents as evidence and example of ongoing racial inequality, with whites and the right, in particular right-wing whites, denying that race is a relevant category. By using critical race theory’s understanding of race and racism as active social processes, I trace the assumptions, politics, and social consequences of media coverage across conservative, centrist, and left media outlets. For the purposes of this research over 300 articles and videos produced by national and regional media outlets were collected and analyzed.
In 2014, the U.S Border Patrol took into custody nearly 69,000 unaccompanied children (ages five to seventeen) along the border between the United States and Mexico. The majority of these children were fleeing from “gangs” (maras) that prey upon marginalized children. This project will analyze gang violence and related activities by examining specific entities such as Mara Salvatrucha (MS-13) and the 18th Street Gang. The main causes that have triggered a rise in these entities are the culture of violence, unreliable policies, and disenfranchised youth who join in an attempt to become less marginalized and more accepted into society. Due to massive deportations of gang members, the maras have spread to El Salvador and other areas in the region. Recently, Massachusetts has been alarmed by criminal actions of MS-13 members in areas with a high concentration of Central Americans. This project will provide awareness of the children seeking to escape the influence of these gangs as well as shed light on the impact of these gangs locally and throughout the hemisphere.
Climate change is arguably the most dire problem facing the human race today, and the world’s top experts agree there is a greater than 95% probability that it has been driven almost exclusively by the use of fossil fuels. Despite this, individual countries have met the global push to decrease greenhouse gas emissions, as outlined by the 2015 Paris Agreement, with differing levels of commitment. This study seeks to identify elements of countries and governments that are successfully able to transition to renewable energy sources. The quantitative analysis in this paper examines the relationship between countries’ renewable energy production and demographic indicators, accompanied by qualitative regional case studies. Factors impacting quality of life or social institutions in a country can affect a country’s propensity to increase renewable electricity usage. Understanding how elements of an area impact its ability to switch over to greener energy sources could help isolate problems present in current climate change policy and make future legislation more effective in cutting global carbon dioxide emissions.
Following the Watergate scandal in 1973, the issue of campaign finance has been a profound issue that greatly affects the political process in the United States. Subsequent efforts by congress and the states to ensure that the conduct the Nixon administration engaged in would never happen again have been chipped away by the Supreme Court over the last 30 years. States have adopted different policy prescriptions in response to these court rulings, depending on their varying emphasis on equality and personal freedom. States that give a heavier degree of attention to equality tend to favor more populist forms of campaign finance reform with greater intervention by the government. This is contrasted with states that favor individual freedom and support less regulated campaign finance systems. Through theoretical and case study analysis, this study will examine the different approaches to campaign finance that states have implemented. This will be followed by an analysis of different state policies to determine the most effective regulation that works around recent court rulings.
In the United States, there are approximately 2.7 million children under the age of 18 with a parent or guardian in prison, a huge increase from the 1.5 million 25 years ago. Using observations made at the Hampshire County Jail Parenting Program as well as a review of scholarly literature, parenting programs in jails were examined to determine their effectiveness in helping to maintain parent-child relations, as well as learning important family values. A dramatic increase in incarceration rates has had harmful effects on children and families. Research has shown the benefits of family-focused programs in prison that can help to preserve and strengthen family ties during incarceration. Parent programs have demonstrated effectiveness in increasing parenting skills, parental self-efficacy, parenting satisfaction and family relationships, and authoritative, confident parent-child communication. They have helped to maintain and sustain familial relationships through what is often long-term separation. This is of great importance because incarceration often creates a sense of loss and abandonment that is harmful to the development of children. These programs are responsible for improving parent-child relationship during parental incarceration in what could otherwise lead to permanent child displacement. This paper illustrates the significant consequences of mass incarceration and the harmful effects it has had on families. Parenting programs offer a way to strengthen familial bonds post release and improve parent-child relations.
Although scholars debate whether endowments of oil and natural gas lead to a ‘resource curse’ in undeveloped countries, the field broadly agrees that Norway’s oil and gas deposits have led to a “resource blessing.” That is, Norway appears to have benefitted from its significant oil income rather than experiencing slower development and economic growth, as supporters of the curse theorize. With ideas of “Nordic Exceptionalism” gaining traction in the United States, it is important to understand the exact effect oil income may have had in shaping the strong democracy Norway is today, and whether or not a curse, blessing, or other effect is taking place. In this study, I examine just how resource wealth impacts Norway’s development by constructing a counterfactual model of how the nation would have looked without oil. Dependent variables measured include levels of generalized trust, political trust, GDP and integration into the world community. I theorize that an oil-free Norway, while still having a GDP on par with its Scandinavian neighbors, will also see a higher level of political trust and integration in the world community. In this sense, I may show that Norway’s oil income, while not having the significant low-development effect we associate with the resource curse, still impacts various secondary measures. In order to ascertain some effect of “Nordic Exceptionalism” with respect to oil income, I also offer a qualitative comparison of Norway to Alberta and Scotland, both of which are regions with similar populations, oil income, climate and degrees of ethnic fractionalization.
Within the history of the United States, education policy has been an area of consistent development and change. The unique structure of government in the U.S. means that any changes on a national level go through a detailed process with many different actors coming together and working toward the change. In the case of education policy change is often an intensive and laborious process. When looking at these changes the question really is this: “does change in education policy represent government reacting to its own failures?” Investigation into this question is divided into 5 sections: an introduction, history of U.S. education policy, analysis of scholarly opinions about education policy and the political nature of education, the actions and the perspective of interest groups and a case study using Every Student Succeeds Act of 2015. The final chapter is a conclusion designed to bring seemingly separate sections together. These pieces come together to demonstrate that when looking at education policy, political action and decision making is indeed reactionary, often looking to rectify past missteps to ensure of brighter future.
Oil Wealth and Violence in Nigeria

Although oil production is associated with higher GDP, which is associated with greater development, stability, and democracy, a literature surrounding the “oil curse” claims that oil wealth does not lead to success. I will investigate the case of Nigeria, which despite its strong economic performance has seen high levels of intrastate violence. I propose that the processes of oil extraction and export make these conflicts more likely, despite GDP gains. I will compare Nigeria to other African countries, other oil-rich countries, and other countries of similar GDP levels on the basis of intrastate violence. These comparisons allow a study of Nigeria controlled for geography, oil wealth, and GDP. I consider ethnic fractionalization as a confounding factor of this analysis. Nigeria’s internal conflicts, which include coups, civil war, and popular and militant movements, often display remarkable ethnic and/or regional homogeneity. The high levels of ethnic diversity in Nigeria are a possible factor in conflict proliferation in Nigeria’s centralized federal system. The case of Indonesia provides a counterfactual model of how Nigeria might have progressed without ethnic fractionalization: like Nigeria, Indonesia is a moderately oil-rich state with a large population, which recovered from colonialism. Unlike Nigeria, Indonesia has a highly homogenous population. Indonesia also has experienced civil war, killings, and secessionist movements since the discovery of oil, but the economic focus of the two countries have been quite different, and the violence has declined.
Expansion of American Influence/Imperialism and Its Relationship to Natural Resources

America may be viewed as the nation with the largest sphere of influence in the world. Principles such as ‘Manifest Destiny’ and Globalization dictate our foreign policy and motivate the country in its drive to export political and economic ideas to foreign lands. The effects of expanding global influence from the U.S. are well-documented, and not always positive. What calls the nation to act abroad is more than just conflicts of ideals, whether political or economic, but also the draw of natural resources. This essay looks to examine how natural resources may play a significant role in American “imperialist” policies, and may dictate how the U.S. deals with other nations on a global level. Profiling multiple nations that have seen a heavy handed American intervention in their political or economic structure will be the primary method used for supporting this claim. In a world of ever-expanding American influence, American citizens are becoming more and more aware of a growing, global anti-American sentiment. Many may believe that this sentiment is baseless, or isolated in select countries, but in fact there are myriad grounds for this widespread anti-Americanism, some of which will be visited upon, explored, and made more clear throughout the course of this paper.
Existing scholars in American public policy have identified components in creating policies which include, public opinion, finances, and law. When studying the case of Nigeria’s higher education system, there are international bodies that attempt to strengthen the educational sector in Nigeria. The question that lingers in the minds of many is, to what extent does international development influence Nigerian higher education policies funded by organizations such as IMF, WorldBank, UNESCO, and others? Relatively do Nigerian students and teachers feel the effects of the funding? With an ailing educational system, ramifications are felt in every sector which includes, health, science, technology, agriculture, culture, economics and the environment. There have been policies put forth by every administration with the intention to fix the educational sector. But there is much more than putting forth proposals. Corruption must be rooted out, not just by the Nigerian government, but from international bodies. There are continuous large amount of funding and loans that the international community has given to improve the educational sector. To examine these questions I will be looking at the policies that the aforementioned groups have funded and the funding outcome along with interview data from the university communities.
Modern Campaign Finance Reform in the United States

The Citizens United v. FEC 2010 Supreme Court case confirmed that it was legal for individuals, corporations, unions, and other groups to make unlimited independent political expenditures. Since this ruling, super PACs have played a significant role in national elections in the United States as there are no legal limits on the size of donations they can accept or political expenditures they can make. Due to the growing influence of money in politics, campaign finance reform has become a major platform issue for 2016 presidential candidates. Conversation about the influence of money in politics has erupted from both ends of the political spectrum sparking a dialogue among Americans about the need for reform. This research explores three proposed alternatives to reforming the current political system in terms of the Citizen’s United v. FEC decision. Among the proposed alternatives are propositions for constitutional amendments, citizen funded elections, and laws to take away the lobbying power of corporations and special interest groups. This thesis will provide an analysis of the proposed alternatives to Citizens United regarding the feasibility, practicality, and sustainability of each proposed course of action towards the common goal of eliminating the corrupting force of unlimited and unrestrained money in the political system.
Edward Peter Ongweso  
Susan McPherson (Faculty Sponsor)  
Department of English, Quinsigamond Community College  
The Crooked Timber of Humanity

“For the first time in history almost all of humanity is politically activated, politically conscious and politically interactive...in a world scarred by memories of colonial or imperial domination.”
- Zbigniew Brzezinski

In an age where there exist divergent historical narratives, unprecedented destructive capabilities, a poverty of political imagination, and a convergence of potentially disruptive trends there is one question: can humanity come together around a common core of values and beliefs and thrive? At different times, in different places, human beings have constructed political orders and civilizations with idiosyncratic world views. Inconsistencies were contained to specific regions but in today’s world, contradictions emerging from these divergent perspectives are embodied by the major political actors as they interact across each region around the globe. Between powers that consider their values self-apparent and their order alone as stable, tension is mounting. Alternatively, the development of humanity poses new challenges to the institutions that have provided some measure of order. Earth’s exponential population increase and the growing share of youth, the diffusion of political and economic power, the rise of ideological extremism, and the prospects of climate change are coming together to challenge the underpinnings of today’s state of affairs. Can the nation-state manage these converging crises or is a new political vision for human affairs required? Can our modern economic and social arrangements provide for all to a degree sufficient enough to defuse rising tension? This research study will look over the past, present, and prospects that examine geopolitical and historical research but avoid prescription.
In 2014, only about 53% of the voting-age population turned out to vote in the general election, the 4th lowest turnout among OECD countries. Considering the United States’ global influence, this is highly concerning. To determine possible factors contributing to this alarming statistic, voter turnout in comparable countries was cross-referenced with national policies on three broad issues: Election Day (in the US a Tuesday, in many other countries a holiday), Voter registration, and Electoral systems (mainly of legislative bodies). Pew Research data on voter turnout in OECD countries was used to select 9 countries comparable to the US in different classes of turnout. News sources, government publications, academic papers, and relevant articles were analyzed to determine the position of each of the 9 countries on each issue, to find possible correlations with voter turnout. No clear conclusion can be drawn as to the effect the day elections are held has on turnout. The effect of automatic voter registration is similarly inconclusive, as all 9 other states examined employ automatic or compulsory registration (the US does not). Evidence was found, however, suggesting that simplifying registration in the US improves turnout. Evidence suggests that the perceived unrepresentativeness of the US electoral system hurts turnout, especially for congressional races. OECD countries with higher turnout employ proportional representation in their legislatures, whereas two of the three with lower turnout than the US have systems that result in election results more skewed than House races are by gerrymandering.
With the presidential race quickly approaching and issues of race still in the public eye, many individuals question the likelihood of citizens to cast votes for minority citizens. Using multiple treatments, I conduct an experiment using Amazon’s Mechanical TURK. Participants are randomly assigned a series of questions and images and are asked to answer questions about which candidate they would vote for in a fictitious Democratic primary election. The fictitious candidates are evenly matched in education and experience, leaving race as the sole criteria on which people will make their selection. Applying a variety of statistical analyses, I assess the probability of participants to say that they would support a minority candidate for office. Likewise, I also assess in-group favoritism from minority participants. This research contributes to a growing body of literature which suggests that race does, in fact, play a role in candidate selection. From my findings, I am able to further assess the role of race and its role on perceived electability within the American electorate.
The political landscape of the Middle East today displays a clear lack of democratization. One characteristic of the region that is often singled out as a primary reason for its impaired democratization is the overwhelming subordination of women. Gender inequality remains pervasive in the Middle East, despite the region’s rich history of secular and Islamic women’s movements. Feminism is often treated as a distinctly liberal, secular, and Westernized concept, which has caused problems when applying the term to women’s movements in the Middle East. The purpose of this paper is to examine the theoretical compatibility between “Islamic feminism” and democracy. To do this I will be doing a case study of the Muslim Women’s Association (MWA), an Egyptian women’s movement that appeared in 1935, and became the first Islamic feminist movement in the Middle East. My proposed research study will treat the MWA as paradigm movement for Islamic feminism. It will employ both primary and secondary sources, in order to examine both the specific goals of the movement, and also to look at the mechanics of Islamic feminism and relevancy more broadly. The overarching purpose of this study is to theoretically explain how compatible the goals of the MWA, and of Islamic feminism as whole, are with democratization, as well as to determine if Islamic feminism has its own distinct merits to consider in terms of emancipation for women in the Middle East.
Fashion Political Rallying: Studying Fashion of Presidential Supporters

Fashion is a form of nonverbal communication. Fashion wordlessly communicates our religious, political, socioeconomic views and status. One high-profile example: the hijabs of Muslim women. Fashion is a form of communication that we speak without talking. This election cycle can be shown to demonstrate that fashion a lot more than clothing. Its communications, politics and public relations. For the 2016 White House race, everyone is focusing on what the candidates and supporters are saying. However, no one has been focusing on what their clothing choices are saying. How do the candidates and their supporters communicate through what they wear, drive and how they act? No one has thought about that until now. Fashion’s multileveled messaging in this election cycle is the focus of my research. I have attending rallies for respective polar opposite candidates from both sides: Bernie Sanders and Donald Trump. While I’m there, I will be observing, photographing, interviewing ralliers and protesters. Prior to my observational research at a Trump rally in Lowell, I assumed Trump supporters would be dressed in camouflage and duck boots. But my observational research disproved my assumption. The Trump rally in Lowell, Mass., was full of smartly-dressed one-percenters. My research plan is to look closely into the public relations, branding and politics of fashion. My research will include interviewing Emerson College students who attended the Iowa Caucus. I will compile my notes into two blog post style summaries, and summarize them in a PowerPoint with research from the Internet.
Does income derived from oil harm countries’ democratization? This answer to this question is fundamental to the resource curse literature, implicating policy decisions in countries that exploit their oil reserves. Furthermore, the question prods at the conventional wisdom connecting development and democracy- is economic development unequivocally good for democracy? Or can the source of that development alter its societal benefit? Many have argued that oil rents do, in fact, reduce a country’s prospects for democracy. Others have criticized this conclusion, arguing that statistical biases have skewed results across the literature, and that a resource “blessing” may actually exist. I seek to adjudicate the debate as well as expand the conversation by extending Ramsay’s (2011) analysis to the present day with an updated data set. I also respond to criticisms of Ramsay’s instrument by systematically analyzing a producing country’s ability to soften international price shocks. I find Ramsay’s instrument is sound, and that oil wealth has a significant and negative effect on democracy.
The warming of the planet’s oceans due to climate change has already begun to open a new frontier to explore in the Arctic Circle; resources will become increasingly accessible as the effects of climate change become more pronounced. Territorial disputes between the five nations with rights to these resources under international law, the U.S., Canada, Russia, Norway, and Denmark, which have not taken priority for several decades, have in recent years come among the forefront of relations as leaders seek to secure the largest proportion of resources for their countries as possible. Much of the literature on the subject often cites various economic and political reasons why conflict is inevitable between the Arctic Five, while other sources claim it is not that clear. My research incorporates analysis of regional cooperative efforts, an evaluation of the potential benefits and costs of controlling the relevant resources, and network analysis using trade data and alliances to determine that military conflict is exceedingly unlikely; due to the location of the energy resources within the Arctic, the low price of oil, and the intricacies of the global fossil-fuel trade network, the costs of conflict would far outweigh any perceived benefit. Furthermore, a cooperative strategy to conserve the environment of the region will be mutually advantageous to the Five for similar reasons. Indeed, the current low price of oil provides a silver lining in the form of the decreased financial appeal of extracting fossil fuels, and thus an increased time-frame for negotiation in which to protect the Arctic environment.
Mega sport events such as the Olympics represent the coming together of nations and the fostering of better international relations. Sport is a medium through which social and political change can be implemented. Numerous studies articulate the possibility of sport acting as a legitimate space for political struggle, resistance and change. Sport and the effect of mega sport events can often indicate stages of development. Certain nations do not have the financial resources, government capability, or public support to even consider hosting an international event of this magnitude. Leading to the desire by newly able countries to pursue their endeavor as it shows the world their advancement. This thesis will look at specific developed and emerging nations and compare them in a thorough case study, specifically looking at the successful 1992 Barcelona Summer Olympic bid, the successful 2008 Beijing Summer Olympic bid, the unsuccessful 2024 Boston Summer Olympic bid, and the unsuccessful 2020 Istanbul Summer Olympic bid.
Music has the profound capability to enhance or inhibit our performance, and to even change the organic structure of our brain. Being a nonverbal language, music is capable of portraying many messages that the spoken word cannot. Researchers have determined that music helps stimulate the brain in such a way that often it may be the best prescription for patients recovering from a neurological trauma or disorder. Active musical therapy activities, such as playing a musical instrument, help to fire and use the sensory and motor cortices and create synapses, connections between neurons that help form circuits. In patients with memory loss, playing music helps to strengthen their brain cells and synapses, slowing down brain deterioration and improving quality of life. Similarly, scientists have found that giving musical training and exposing certain types of music to patients without a previous musical background is also successful in the cognitive advancement of the brain. These findings may help shed new light on the way neuroscientists study the brain and revolutionize how doctors treat specific patients. In the brain, music overlaps with language, emotion, and motor skills, and can be used to help those with conditions like autism in their cognitive advancement.
An individual with chronic disorganization experiences regular disruption of daily activities due to disorganization. It is common for these individuals to feel overwhelmed with daily tasks, and they can find it difficult to take effective action. Although there are many factors that can contribute to chronic disorganization, this project will focus on brain physiology. The method followed is to explore research on brain activity patterns, neuroplasticity, personality, cognitive bias, emotional processing, and positive psychology. The scope of this project does not allow for an exhaustive analysis of current research; however, the goal is to seek out effective strategies in these areas of inquiry that might be useful to an individual dealing with chronic disorganization.

For individuals who already have more stressors in their life than they can effectively manage, it is important to use wisely the cognitive and energetic resources they possess. Recent research offers clues to determine which strategies are more likely to be efficient use of resources, maximizing positive results while minimizing effort required. The result of this work is a set of accessible strategies, based in scientific research, that help facilitate a positive shift—moving from a state of overwhelm and inaction, to a state of goal-oriented action and increased effectiveness with daily tasks.
While young children begin to express fears as early as 6 to 7 months of age, fears in children between the ages of 2 and 4 have been less often studied than those of infants or of school aged children. The purpose of this study is to get a better understanding of the fears of young children, and how these might be related to the types of environmental stressors they have been exposed to. Parents of children two to four years of age (24 to 59 months) will fill out two questionnaires. The first questionnaire asks parents to report on their child’s experienced fears and coping strategies used to respond to the given fears. The second questionnaire asks about family background and possible environmental stressors experienced by their child. Stressors asked about include child care stressors and/or changes in child care arrangements, stressors due to television viewing, moving to a different home, and contact with illness, injury, or death. This is a replication and an extension of an earlier study. In the previous study, it was found that increased exposure to given stressors such as contact with illness, surgery, or death, family moves, or instability of child care were positively correlated with increased reports of fears in young children. We expect to at least partially replicate these earlier results, but also given the current greater awareness of the influence of stressful events on children, we may find more parents being more aware of potential stressors and therefore reporting them more.
The present experiment investigated if perceived control over events in one’s life affects feelings of optimism. Past studies have shown mostly positive correlations between perceived control and optimism. Most of these studies link perceived control and optimism with specific actions or issues, such as attitudes of college students or their relationship with physical and mental recovery after injury. These studies tested for correlation between these two variables, whereas the purpose of the current study was to find causation. It was hypothesized that when participants were asked to read hypothetical scenarios that gave them varying levels of perceived control, higher feelings of perceived control would lead to higher ratings of optimism. Participants read three scenarios and completed an online survey, which measured levels of optimism and perceived control for each scenario. Perceived control was measured as a manipulation check. The results supported the hypothesis, showing that feeling more in control when faced with a problem causes higher levels of optimism. The conclusions that one can draw from these findings, supported by past works, is that these two variables have a strong connection beyond a correlation that could have important potential implications for depression and psychological well-being.
Exercise and Stress in College Students: The Effect of Exercise on Self-esteem, Stress Management and Overall Life Satisfaction

This study further clarified the relationship between exercise, stress, self-esteem and overall life satisfaction. Participants included 120 undergrads, half being female, aged 18-25 who were randomly assigned to one of the three scenarios depicting either a character who exercised regularly indoor, outdoor or not at all. Next they completed questionnaires on their personal view of perceived stress, life satisfaction, and self-esteem. Results indicated that students perceived the character that exercised regularly with greater life satisfaction, low levels of stress, and high levels of self-esteem. Additionally, students who exercise regularly expressed having higher life satisfaction, better health habits, and low lower levels of stress, rather students who did not exercise. These results suggest that regular physical activity can help reduce stress levels, increase self-esteem, and increase life satisfaction.
Role of Lateral Hypothalamus Orexin Neurons in Saccharin Incubation

Addiction is described as partaking in compulsive reward seeking to the point where ordinary lifestyle is affected. Those suffering from a substance use disorder often associate external cues with receiving the reward. Reintroduction to these cues after forced periods of abstinence results in incubation of reward seeking. The neuropeptide orexin, produced in the lateral hypothalamus, plays a role in addictive behaviors. However, little is known about its role in reward seeking following a period of incubating abstinence. Rats were trained to associate cues with the non-caloric sweetener, saccharin, and then tested for their reward-seeking levels on either one day or 30 days post-training. Immunofluorescence was used to label the neuropeptide orexin, and an neuronal activity marker, Fos, in the lateral hypothalamus of brains post-testing. Tissue from day 1 and day 30 of testing were compared, with results giving insight to the role of orexin with cue-induced relapse.
Self-worth contingencies has been defined as an over reliance on external indicators for self-worth maintenance (Burwell & Shirk, 2006; Crocker & Wolfe, 2001). Self-worth contingencies differ from self-worth in the sense that the latter addresses the level of self-esteem and former is the process by which one attempts to secure self-worth. A possible predictor of these contingencies is an individual’s experience of stigma, more specifically self-stigma. Two possible variables that build resilience against self-stigma would be the community support for an individual, which consists of community connectedness and allies. This study sought to investigate a link between community and self-worth contingencies within individuals who identify as having a mental health condition, self-stigma being the mediating factor between the two. The proposed model predicts that self-stigma will explain the process by which community is linked with fewer contingencies. To study this, Westfield State University students, who identify as having a mental health condition(s), participated in a correlational study.
Maia Jasmine Borensztein
Jerrold Meyer (Faculty Sponsor)
Department of Psychological and Brain Sciences, UMass Amherst
Individual Differences in HPA Axis Activation in Healthy Young Adults

Chronic stress contributes to disease, therefore understanding how the healthy body responds to regular stressors, including acute physical and psychological stressors, is paramount to dissecting the formation of disease. As the widely accepted biomarker of stress, the hormone cortisol can be measured from hair as a chronic measure, and from saliva as an acute measure of stress. Previous research mainly focuses on early childhood and pubertal development and the various risk factors. This pilot study of healthy, college aged individuals explores how individual differences in environment (daily routine, perceived stress, and mood) relate to unique activation of the Hypothalamic-Pituitary-Adrenal (HPA) stress axis. In addition, this study asks how diurnal cortisol rhythms relate to individual activation of the HPA axis from various stressors. Predictions include a marked activation from both physical and psychological stress tests, evidenced by increases in salivary cortisol levels. In addition, it is predicted that individuals with higher self-reports of stress will demonstrate greater levels of cortisol in the hair, suggesting chronic elevation of the HPA axis.
Body dissatisfaction is highly prevalent among women in the United States. Researchers have suggested that exposure to mass media, which portrays thinness as ideal, may be associated with negative body image, and lead to disordered eating. The present study examined the relationship between social media use and body dissatisfaction, drive for thinness, and peer social comparisons in 263 women ages 18 and older. Participants were recruited for a study on “Social Media” and completed the Physical Appearance Comparison Scale, Drive for Thinness and Body Dissatisfaction subscales from the Eating Disorder Inventory, the Facebook Use for Social Grooming Scale and the Instagram Use for Social Grooming Scale. Multiple linear regression was used for data analysis. Results indicated that women who spent the most amount of time on social media reported higher frequency of peer social comparisons (B = 19.81, t = 5.46, p < .001). Further, women who had more than one social media account reported a higher frequency of peer social comparisons (B = .095, t = 4.32, p < .001). Findings also revealed that women who edit their Instagram photos reported a higher level of drive for thinness (B= .074, t = 2.22, p = .027). Interestingly, the relationship between total minutes spent on Facebook and body dissatisfaction was not significant (B = .012, t = 1.97, p = .050). Moreover, social media represents a powerful sociocultural influence in the lives of women. Clinical and research implications of these results will be discussed.
Scott F. Brady  
Jeanie M. Tietjen (Faculty Sponsor)  
Department of English, Massachusetts Bay Community College  
Isolation: The Thirty Year Progress of Psychology in Amputee Treatment of Anxiety and Depression

The psychological effects of limb loss can leave patients with a sense of loss similar to that of a loved one, and for many it leaves them in a deep depressive state. This is not just marked by the physical change their body has undertaken, but the psychological abilities to overcome their new lifestyle. When compared to the unaffected population, amputees feel a sense of isolation, which is attributed to feelings of inadequacy, fear, and not having a sense that they will be able to carry on normal lives. However, the significance of social support from family, friends, physicians, and mental health specialists are influential in persuading a patient’s recovery and ongoing resilience. Over the past thirty years approaches to treatment have changed, and this review will highlight specific treatments that have improved the efficacy of patient’s reduction in anxiety and depression in the United States.
Interactions between Visual Salience and Synchrony on Auditory Detectability in Adults

Background: Visual information can influence auditory detectability and increase perceptual reliability. Such multisensory interactions are most enhanced, integrated best, when occurring synchronously and when integration can benefit from the law of inverse effectiveness, as unisensory stimuli decrease in strength, multisensory integration should increase. Here we examine the interaction between temporal synchrony and visual salience. We predict enhanced auditory detectability for visual stimuli presented in-phase relative to out-of-phase and for weaker visual salience.

Method: On a given trial, a white noise sound modulating at 1 Hz at five loudness levels was presented from a speaker right or left of a central monitor. Monitor brightness modulated at 1 Hz in-phase or out-of-phase with the auditory sound at high or low salience. The visual stimulus was task irrelevant, providing no spatial information. Participants looked to the side of the screen where they judged the sound originated. A look to the correct side was followed by a short animation at that location, whereas an incorrect look was followed by the presentation of a transparent box at the correct location. Percent correct, reaction time, and eye tracking data were recorded.

Results: Percent correct data was fit to quantify threshold, where subject performed at 75% correct. We found improved auditory threshold for in-phase compared to out-of-phase stimuli for high visual salience, but decreased effects for low salience, despite using the same task and stimuli within the same subjects. These results suggest that the effect of synchrony on crossmodal integration is critically dependant on salience.
639 Auditorium  10:45-11:30  Board A16
Alecka L. Camp
Rebecca A. Burwell (Faculty Sponsor)
Department of Psychology, Westfield State University
Social Media and Student Well-Being

The current study examines links between social networking sites and social media applications and well-being. Previous research has show the effects of social media use via a personal computer, but very little information is know about the effects that social media applications accessed through a smartphone. The following research questions are proposed: Is the amount of time spent using Mobile Social Media Applications (MSMAs) linked with mood, burnout, and psychological well-being? Participants will be undergraduates from a liberal arts state university; they will complete self-report surveys of MSMA use, mood, burnout and well-being.
22nd Annual Massachusetts Statewide Undergraduate Research Conference

641 Auditorium  10:45-11:30  Board A18
Milena Christine Casamassima
Joelle D. Dumont
Ben Wood (Faculty Sponsor)
Department of Psychology, Massachusetts College of Liberal Arts
A Qualitative Study of Disclosing Mental Health in the Classroom

Although the literature is limited, prior research has examined the phenomenon of students disclosing mental health concerns in a classroom setting. Investigators have found that students exposing self-disclosures to others experienced an array of reactions ranging from an enhanced understanding to an increased stigma. Other research findings indicate that students often fear discrimination due to the societal perception of mental disorders. Reducing stigma associated with mental health disorders requires a cultural shift in the perception of what mental health disorders are. By giving students a more inclusive environment to talk about experiences with mental health, educators can help reduce stigma against mental health disorders. The current study aims to extract common themes from the experiences of students who disclose mental health concerns in a classroom setting. The study was structured within the interpretivist paradigm in order to focus on participants’ individual and in-depth descriptions of their experiences. Researchers went to various classes on the MCLA campus to recruit participants by explaining the purpose of the study and providing contact information for those who showed interest. A total of 19 undergraduate students (13 females, 6 males) with a mean age of 22.58 (SD=9.67, range= 18-59) participated. Through one-on-one interviews students described the feelings, thoughts, and behaviors they experienced before, during, and after disclosing mental health concerns in a classroom setting. Interviews were recorded and transcribed for meaning units to summarize common themes. Themes were put into the following categories: reaction, education, connecting, judgment, anxiety, help, and openness.
Contingent Self-worth and Partner Psychopathy

Much research has been done on the destructive behavior of psychopaths, but very little attention has been on the romantic partners of those psychopathic individuals. This correlational study examined the relationship between possible exploitable traits, such as contingent self-worth (general and specific domains), with scores of partner psychopathy among a sample of undergraduate college students. Specifically, three hypotheses were tested: (1) Higher relationship-contingent self-esteem is associated with higher levels of partner psychopathy, (2) Higher appearance self-worth contingencies are associated with higher levels of partner psychopathy, and (3) Higher social self-worth contingencies are associated with higher levels of partner psychopathy. Results showed support for all three hypotheses. These findings further our understanding of psychopaths as sexual predators due to the correlation between exploitable characteristics and partner psychopathy.
751 Concourse 3:30-4:15 Board C96
Miranda Chappel-Farley
Krishna Sireesha Madala
Rebecca Spencer (Faculty Sponsor)
Department of Psychological and Brain Sciences, UMass Amherst
Enhancing Memory Consolidation with Targeted Memory Reactivation during Sleep

Sleep and memory decline with age. In young adults, memories can be strengthened during sleep by presenting a sensory cue associated with prior learning. The purpose of this study is to replicate these findings in young adults and later determine whether memories can be enhanced in healthy older adults. Young adults were tested in both experimental and control conditions. They encoded picture-location pairs in the evening. Half of the pairs were presented with Odor A and the other half with Odor B. In the experimental condition, one of the odors (the cuing odor) was presented again during the night while the participant was in slow-wave sleep. In the control condition, only vehicle was delivered during slow-wave sleep. Participants were tested on recall of all picture-location pairs the next morning without any odors. In the experimental condition, preliminary results show that memory accuracy improves between encoding and recall for picture-location pairs associated with the cuing odor (p<0.06) but not the other pairs. There was no significant change in memory accuracy in the control condition. These results support that memories can be externally triggered and enhanced during sleep in young adults. Future work will determine whether this procedure can enhance memories in older adults.
This paper will discuss the various factors relating to art therapy and its positive effects on children who have experienced trauma or have special needs. Every child is different and each has their own way of coping depending on their stage of development. Most children who have experienced any form of trauma may have a hard time communicating their feelings and emotions regarding the traumatic event. Also, children with special needs require help expressing their thoughts and emotions throughout their childhood. Art therapy enables these children, who have difficulties voicing what they are feeling, to communicate their ideas in a way that makes sense to them. This allows for the development of healthy coping techniques and various forms of connection through a different form of communication so that these children can feel like they are being understood. The psychological benefits of feeling heard and understood are critical to the development of a healthy sense of self. This paper will examine how art therapy can benefit children’s development in general with particular focus on the benefits for children who have experienced trauma and/or have special needs.
Correlations between Emotions and Children’s Art

This study investigates if there are correlations between the emotions of children and the design elements of their art. Three hypotheses were tested concerning the main elements of art (shape, line, and color) in relationship to subjective emotions that children might express. Children’s artwork (n = 198, Grades Kindergarten-Grade 6) was gathered from a recent community exhibit about Woburn, MA’s history and culture. A team of three researchers coded how children expressed certain emotions through their artwork and their use of design elements. Results showed that, while children did not express discernible emotions with the use of shape or lines, they did express subjective emotions through the use of color. This study also found that the older the child is, the more likely they use the basic elements of art to convey a literal image. Another finding in this study is that positive facial features differ from negative or neutral depictions in their drawings. These results suggest that color has importance in expressing subjective emotions, as well as showing that older children are in fact aware of the different elements of art when it comes to expressing themselves through their artwork.
Casual sex is often cited as a common occurrence among college students. The current study aims to address a question raised by psychologists regarding the effects of casual sexual behavior on mental health. Given ongoing debates concerning the link between “hookups” and psychological well-being, this study will assess inconsistent findings in the literature in hopes to better understand the consequences associated with this behavior. A sample of 120 undergraduates at a small state university will complete a questionnaire containing several measures that will examine perceived self-esteem, regret, and life satisfaction based on randomly assigned scenarios depicting males or females in varying sexual relationships. It is predicted that female scenario characters in casual sexual relationships will score lower on perceived psychological wellbeing and higher on regret compared to male scenario characters. In addition, scenario characters involved in a one-night stand will score lower on perceived psychological wellbeing and higher on regret than scenario characters involved in a friends with benefits relationship. Overall, female scenario characters in a one-night stand will score the lowest on perceived psychological wellbeing and the highest on regret in comparison to all other scenario characters. A series of ANOVA’s and correlations will be computed. Findings will be addressed relating to factors that affect perceptions of scenario characters in casual sexual relationships in hopes to reveal underlying information about participants’ experiences and feelings toward these behaviors.
Introduction: Social anxiety is broadly defined as the fear of negative evaluation in social situations. Prominent models of social anxiety suggest that associated symptoms are due, in part, to biases in face perception. Work from our lab suggests individuals high in social anxiety (HSA) show weaker adaptation to angry facial expressions compared to individuals low in social anxiety (LSA), with no differences in adaptation to happy facial expressions. How do negative emotions compare? Here we investigate if HSA individuals also show weaker adaptation to sad faces compared to LSA controls. Methods: To date we have recruited 9 HSA and 3 LSA participants. Participants completed an online survey including the Brief Fear of Negative Evaluation Scale (BFNE), used to assess social anxiety status. Participants viewed face images morphed along an emotional continuum (i.e., 80%, 40%, 20%, and 10% happy to neutral with the equal steps for sad), judging each face as happy or sad. After adaptation to happy or sad faces participants judged the same morphed faces. We measured each participant’s Point of Subjective Equality (PSE), where a face is neutral, judged equally happy or sad at 50%, before and after adaptation to quantify the strength of perceptual adaptation. Results: Our preliminary data suggest HSA individuals tend to show weaker adaptation to sad faces compared to LSA individuals, with no difference between anxiety conditions for happy faces. These results suggest that anxiety may be maintained via weaker mechanisms of adaptation to negative emotional information.
22nd Annual Massachusetts Statewide Undergraduate Research Conference

722 Auditorium   2:30-3:15   Board A28
Elyse Catherine Corbett
Annastasia Vescovi
Deborah McMakin (Faculty Sponsor)
Department of Psychology, Framingham State University
Substance Misuse: How Self Worth and Self Esteem Affect the Misuse of Prescription Medications and Alcohol

Previous research has shown those who misuse prescription medications or alcohol often misuse them to gain focus on school studies, or to escape academic pressure. In addition, little research indicates the correlation of how dual substance, both alcohol and prescription medications, use may be affected by self-esteem and self-worth. The purpose of this study is to examine the perceived effects of dual substance misuse on self-worth and self-esteem. A sample of 120 undergraduates will be randomly assigned to read one of four scenarios depicting various levels of academic pressure and social support. Participants will then complete surveys on the self-esteem, self-worth and substance use of a fictional character. Questions will also examine participants’ self-esteem, self-worth, drug use, and alcohol use. It is predicted that when presented with a fictional character under academic pressure, participants will perceive the character as more likely to misuse alcohol and prescription medications in order to gain focus than those not under academic pressure. It is also predicted that students who score high on the Rosenberg Self Esteem Scale will also score high on the Contingencies of Self-Worth Scale, but score low on the AUDIT scale, and the Index of Drug Involvement Scale. A series of ANOVAS will be computed in order to examine the perception of the fictional character, as well as correlations to examine the participants’ substance misuse, self-esteem and self-worth. Results and implications for polysubstance use will be discussed.
Previous studies suggest that despite widely known health risks associated with smoking, adolescents are ambivalent towards health risks of marijuana smoking and nontraditional tobacco use. This study is designed to further examine college students’ attitudes towards marijuana and tobacco smoking given recent law changes, as well as the introduction to new nontraditional tobacco products. One hundred and eighty participants will be randomly assigned to read one of six scenarios depicting fictional male and female characters who engage in marijuana, hookah, or cigarette use. Participants will then indicate perceived health and social risk-taking behavior for the fictional characters. Participants will also complete measures indicating their own sensation seeking behavior and knowledge of marijuana related laws in Massachusetts. It is hypothesized that female scenario characters who smoke cigarettes will be seen as engaging in higher social risk taking behavior than male scenario characters who smoke cigarettes. In addition, scenario characters regardless of gender who smoke cigarettes will be seen as engaging in higher social and health risk taking behavior than scenario characters who smoke marijuana or hookah. Overall, male scenario characters will be seen as engaging in higher health and social risk taking behavior than women regardless of type of substance use. A series of ANOVA’s and correlations will be computed to examine differences between gender and type of substance used in relation to health and social risk taking. Findings will be discussed relative to strategies to bring awareness to the risks associated with marijuana and tobacco products.
This study aims to explore the relationship between household pet dogs and whether they are associated with a positive increase in the social interactions of children with ASD. We are in the process of collecting qualitative interview data from 15 mothers of children with ASD who own a household dog. Participants have been recruited from several organizations on the Southcoast of Massachusetts, including the Schwartz Center, Community Autism Resources, and other autism support groups, as well as community fliers and word of mouth. Parents are expected to complete the Social Responsiveness Scale (SRS-2), assessing social impairment and severity of ASD symptoms, as well as a detailed semi-structured one-on-one interview designed by the researchers to explore the interactions and relationship between dog and child, as perceived by the parent. Data collection will be completed by March and transcribed interviews will be coded and evaluated for themes. Focused coding of interviews will then be completed in order to cluster themes into broad categories and to identify similarities and differences across interviews and between families with high vs. low functioning children, as measured by the SRS-2. Emerging themes include unconditional love that the animals provide, an opportunity to empower children with ASD and give them added responsibilities, and helping children with ASD with language production and comprehension through teaching the dogs commands. Those are just some of the themes that have emerged from data collection to data and more themes are anticipated to become evident.
Abortion and Motherhood: The Psychological Impact of Abortion Choice in Early Adulthood on Motherhood

Over one million women in the United States choose to terminate unintended pregnancies every year. This presentation outlines the factors that influence this choice, specifically addressing the link between abortion as a non-normative life event and motherhood as a normative part of development. This presentation begins by examining whether or not the choice to terminate an unintended pregnancy creates a psychological conflict for women by looking at the reasons why women choose abortion and how they cope post-procedure. Comparing first-person interviews of women who have had abortions with existing research, it is evident that there is no link between abortion and new mental health diagnoses. Furthermore, the research shows that the most common reasons why a woman chooses to have an abortion are related to what she believes would make her a good mother, specifically: lack of stability in one or more aspects of her life or being a great mother to the child(ren) she already has. Following the presentation of the research, there will be a critique of what the existing research is missing.
How Cell Phones Impact Pro-social Behavior

In 1983, the Motorola DynaTAC 8000x was released. It was the first cell phone that had ever been available for purchase by American consumers. Within the next thirty-three years, the cell phone industry would boom into something larger than ever expected. Today, in this phone-crazed world, it is easy to get swept away by technology. Some people get so wrapped up that it affects their courteousness to others. This study aimed to show whether using a cell phone will prevent an individual from holding a door for someone else. It also examined if gender played a role in whether cell phones impacted door-holding. The data determined whether one gender was more or less susceptible to being distracted by a cell phone. The research was conducted in a purely observational manner. The research contributed to the rapidly expanding awareness of how cell phones can interrupt pro-social behavior.
Sexually deviant pornography is available across many mediums but most specifically, the internet. Use of a type of deviant pornography, “snuff porn”, or videos depicting murder for the purpose of sexual gratification, was examined. There were two groups of men, 42 control participants solicited from a college campus and 58 men who were test participants that responded to an online survey posted on snuff pornography websites. Participants completed five questionnaires assessing empathy, perceptions of love and sex, rape myth acceptance, sadistic tendencies, narcissism, psychopathy, and Machiavellism. They also reported their preferred pornography websites and genres. Results indicated that snuff porn users reported lessened empathy and viewed pornography with sexually violent themes. These results suggest that viewing snuff pornography could affect empathy overtime or that the snuff porn market is attractive to those who lack empathy in general.
640 Auditorium  10:45-11:30  Board A17
Amanda Catherine D’Aprix
Vanessa Diana (Faculty Sponsor)
Honors Program, Westfield State University
Power and Gender Dynamics Demonstrated through Zimbardo’s Prison Setting

Analyzing power dynamics reveals the way that people use their own power or the power given to them in order to control others. The field of gender studies analyzes power dynamics in order to demonstrate inequality between men and women. This presentation discusses an extreme example of power differences found in a close setting. Zimbardo’s famous all-male prison study demonstrated how the positions of power differed extremely in the small and confined setting of a prison. The men in power abused that power and forced the prisoners into doing unethical activities like physical labor and punishment; they also removed prisoners’ necessities. As a result, the prisoners lost so much power that they could no longer fight back or muster the willpower to protect themselves. Lynn Collins relates the dominant and submissive behaviors shown through Zimbardo’s study to contemporary gender expectations. Her study showed that people associate the submissive behaviors with females and associate the dominant behaviors with males. Even though it is considered to be an extreme example of human behavior, Zimbardo’s prison study and the behaviors it demonstrated can be reflected in society today. This parallel demonstrates how power dynamics associated with female and male gender stereotypes are creating an unequal distribution of power in society. These stereotypes are effectively trapping people into the assigned positions of their gender and hampering changes to their position in society.
671 Concourse  11:45-12:30  Board C68
Barbara Cristina de Souza Pinto
Jeanie M. Tietjen (Faculty Sponsor)
Department of English, Massachusetts Bay Community College
Serious Parental Illness and Its Effects on Children

My research explores current strategies for helping children better cope with a parent’s serious illness, with special attention to academic wellbeing. The educational experience is one of the most important parts of a young child’s life, not only for intellectual content and skills, but also for social development. Those years at school may determine a child’s future; yet a child may, when dealing with a parent’s serious illness, demonstrate academic, behavioral and emotional issues in response to powerlessness. It is important that the school be ready to accommodate those children, and help them to achieve effective coping strategies. Educational professionals have long believed that if a child does not demonstrate any obvious behavior due to emotional suffering the child is successfully coping. But recent research suggests that children might exhibit regular behavior, even while struggling emotionally, presenting invisible costs to a child’s academics and holistic health.
Influence of Gender and Self-Monitoring Behaviors on Empathic Emotions

Research indicates that perceived similarity influences empathy levels. Studies also suggest that high self-monitors have an easier time accessing their self-image than do low self-monitors. However, little research has explored the influence that self-monitoring behaviors have on the capacity for empathy. This study compares the effects of observing embarrassing situations in high self-monitors and low self-monitors. A sample of one hundred and twenty college students will be randomly assigned to view one of four scenarios depicting an individual experiencing a mild or extreme level of embarrassment. Prior to and after viewing the scenes, participants’ levels of discomfort, embarrassment, and self-monitoring behaviors will be measured. It is predicted that high self-monitors viewing the mildly embarrassing scenario will report greater increases in embarrassment, and discomfort than low self-monitors who view the mild scenario. Additionally, it is predicted that high self monitors will be just as uncomfortable with the extremely embarrassing scenario as low self-monitors, however high self-monitors will still report a higher level of embarrassment. Overall, high self-monitors will report greater increases of embarrassment and discomfort after viewing embarrassing scenarios than low self-monitors. A series of ANOVAs and correlations will be computed to examine differences in reactions to embarrassing stimuli for high and low self-monitors. Implications will be discussed relative to emotional wellbeing and coping with stressful social situations.
Nicole Dion
Joanna Gonsalves (Faculty Sponsor)
Department of Psychology, Salem State University
The Effect of Instagram on Self-Esteem and Life Satisfaction

This quasi experiment examined the effects of Instagram, a social media site that consists of posting pictures, on self-esteem and life satisfaction. Specifically, I looked at the effects of following celebrities on Instagram in relation to the ideas of social comparison theory. Traditionally aged college females (N = 51) were assigned to either the control group where they were asked to use Instagram as they normally would, or the experimental group where they were asked to follow 15 specific celebrities for 4-6 weeks. Participants were given a pretest and posttest which included a self-esteem and a life satisfaction survey. There were no statistically significant differences found between the experimental group and the control group, nor between the pretest and posttest scores, and there was no interaction effect between time of measure and experimental group. However, a subgroup of participants that initially followed a minimal amount of celebrities before the experiment showed a decline in their life satisfaction at posttest which approached statistical significance. Further experimental research is needed to confirm that altering one’s social comparison group on Instagram can lower life satisfaction among traditionally-aged college females.
Response monitoring is a higher order cognitive control skill that develops across childhood and involves the ability to detect errors and adjust one’s behavior. However, little is known about what factors influence response monitoring or associated executive function skills. The current study sought to examine the impact of different types of feedback on response monitoring in young children at risk for attention problems. Children aged 4-6 years old performed a flanker task with a visual feedback block, audio feedback block, and a combined visual and audio block. Using parent report questionnaires, a composite was created to assess participants for attention problem risk. Multimodal cues were hypothesized to be more effective at promoting response monitoring and higher executive function performance than either visual or auditory feedback alone for children at higher risk for attention problems. Preliminary results show that the attention problems risk composite correlated significantly with the ADHD subscale on the Child Behavior Checklist questionnaire (r=0.746, p=0.000). Attention problem risk as a covariant trended significantly with feedback type for percent of correct answers on all trials, F(2, 178)=6.843, p=0.001. The type of trial, congruent vs. incongruent, did not correlate to attention problem risk as a covariate, F(1, 89)=0.084, p=0.773. In follow up correlations, the overall percent of correct answers on trials with visual feedback had a significant negative interaction with attention problem risk (r=-0.222, p=0.035), as well as trials with multimodal feedback (r=-0.229, p=0.029). Participants that showed higher risk for attention problems had fewer percent of correct answers on visual and multimodal feedback trials than participants at lower risk.
Madison E. Dube-Adams  
Julia Bohl (Faculty Sponsor)  
Department of American Sign Language / Deaf Studies, Bristol Community College  
Yoga Basics for the Deaf and Hard of Hearing

The protocol for yoga instruction is call and response; the teacher dictates the movements, and the students respond appropriately. This approach inadvertently excludes the deaf and hard of hearing community. The student proposes that yoga can be available to everyone, regardless of ability. The purpose of this project is to design and conduct a yoga class that is accessible to the deaf and hard of hearing community. Deaf teaching methods will be explored. Personal interviews, community outreach, and feedback from participants will also be included.
Rachel Ecker
Michele C. Wolfson (Faculty Sponsor)
Department of Psychology, Cape Cod Community College
The Effects of Homelessness in Youth Aged 16-24 on Social/Emotional and Cognitive Development

Youth and young adults can be exposed to life challenges that alter their normative development and can affect them for the remainder of their life. Homelessness can be an example of such a life challenge. Adolescents and young adults aged 16-24 are among the highest risk group to become homeless and in turn suffer negative effects on emotional and cognitive development. During adolescence, autonomy and identity are major developmental milestones. Yet, when food, water and shelter are on the frontline of priorities, survival strategies can hinder development and can cause new or underlying mental problems to come forth. Youth on the street have often been abused in the family home which may have been a reason for them going to the street. They are often referred to as runaways. Some have been thrown out of their family home for behavior or parental neglect and/or abuse and are often called throwaways. Some have been raised in the foster care system and have been unable to keep up with the demands or have been abused. Many youth have been betrayed, often by adults and may reject help. The psychological impact of their experiences are unique as well as similar. This research paper will explore the many developmental challenges that adolescents and young adults aged 16 to 24 experience in homelessness as well as how resilience plays a role in helping them cope with this devastating circumstance.
Yoga practices have long been known to influence the development of mental health. Yoga’s main focus is on integrating mind, body and soul to connect with one’s self by the process of meditation, focusing on breath and correction of postures. Yoga has been used as a treatment for many psychological disorders such as: ADD, PTSD, chronic anxiety and depression. In many cases, Yoga has been viewed as a holistic medicine due to its healing processes. The focus of this paper is to examine the psychological benefits of Yoga and to discuss in particular how Yoga can influence positive thought and improve focus and mindfulness in children’s behavior, especially for those who have experienced trauma and dysfunction in their families. Yoga can also be used as a parenting approach to encourage a mindfulness lifestyle, through meditation to positively impact cognitive, physical and social well-being.
A variety of treatments have been tested to help ease the learning process of young students with many variations of learning disabilities. This study proposes to investigate college students’ perspectives of how children with learning disabilities are treated in classrooms. A total of 180 undergraduate students at a small northeastern state university will complete a survey regarding their initial thoughts of one of six scenarios involving a student in a classroom with a learning disability- three scenarios will involve a student with a hyperactive learning disability and three will involve a student with a non-disruptive learning disability. Each of the three demonstrates one of three treatments for a learning disability. The survey ends with questions about how the participant feels about the scenario, questions about how the participant views the education they have personally received, followed by a demographic survey. It is anticipated that for the non-disruptive student, in-class assistance will be viewed as more appropriate than out of classroom assistance. For disruptive students, out of classroom will better benefit them. The findings may offer insight into what future teachers, as well as students with and without learning disabilities may prefer in their classrooms.
Since the 1950’s there has been an increasingly large population of mentally ill persons within the United States criminal justice system. Many psychiatrists and psychologists attribute this rising population to deinstitutionalization, a period when psychiatric hospitals drastically reduced the number of patients they would serve. As a result, a larger amount of persons suffering from mental illness were released into society, where their symptoms are sometimes misinterpreted and criminalized, thus involving the criminal justice system. In response to this growing population the criminal justice system has begun to implement several methods for handling the mentally ill population. In this work, I will assess the benefits of the criminal justice system shifting away from a purely punitive approach towards one that is mental health aware. In order to accomplish this I will be examining the various methods the criminal justice system has begun to apply, such as mental health courts, mental illness treatment programs within the prison system, jail diversion programs, and the array treatment referral programs for post incarceration. This analysis involves the perceived success from the vantage points of the criminal justice system, the mental health experts involved, and the individual participants, as well as statistical evidence such as recidivism rates, improvement in behavior and symptoms, and improvements in quality of life. Finally, I propose a combination of the presented programs that provide the most beneficial care and outcomes, in the hopes that federal policy will make the necessary changes to beneficially serve the mentally ill population.
Recently, an emerging body of literature has found that exposure to natural environments may be associated with mental health benefits, in particular stress reduction and restoration of attentional information processing. However, less is known about the restoration potential of different types of environmental settings. Therefore, the purpose of this study was to explore the relationship between perceived restoration of nature exposure and mental health among college students. Moreover, this study examined students’ perceptions of restoration of three different types of environmental settings. Participants (n = 128) completed several scales, including the Patient Health Questionnaire (PHQ-9), a scale of perceived academic stress and the Perceived Benefits of Nature Questionnaire (PBNQ). In addition, participants were presented with three thirty-second video clips of each environmental type, including strictly natural (SN), artificially natural (AN) and human-built (HB) settings. Immediately following each video stimulus, participants completed a Perceived Restorativeness Scale (PRS). One-Way Repeated Measures ANOVA was used to analyze this data. Findings revealed two statistically significant differences in perceived restoration: 1) between HB and SN environments and 2) between HB and AN environments (p < .001). Depressed respondents perceived significantly more restoration from the SN environment compared to those who were not depressed (p = .008). Also, significantly more perceived benefits of nature were found in depressed participants compared to those who were not depressed (p = .046). Future research and clinical implications will be discussed.
Anthony William-Pimentel Flynn  
David Pantalone (Faculty Sponsor)  
Department of Psychology, UMass Boston  
‘Queerer Spaces’: A Content Analysis of Bisexual Men’s Evaluations of Sex-Seeking Venues

Published research suggests that bisexually identified men (BIM) experience less connectedness to gay-dominated communities than their gay-identified peers. This finding is important to consider in crafting effective HIV prevention interventions, which appear to require unique cultural tailoring to be effective. Nevertheless, a majority of venues-based HIV-prevention efforts that target men who have sex with men (MSM)—a larger group that includes BIM, gay-identified men, and men of any sexual orientation who engage in sex with men—are presented within primarily gay venues. Further research is needed to investigate the experiences of BIM in primarily gay venues generally and, specifically, how BIM evaluate the venues and the venue-based HIV prevention programming to which they are exposed there. In this qualitative study, we used a team-based approach to content analysis to evaluate transcripts of individual interviews with BIM (N=14) who were purposively recruited from Craigslist (n=7), sex parties (n=6), and gay bars (n=1). Initial findings suggested a range of positive and negative evaluations of their favored and unfavored venues. Preliminary themes include: (a) negative evaluations of, and general discomfort in, gay-dominated public spaces, like gay bars and clubs; (b) positive evaluations of online sex-seeking venues since they minimize ambiguity about interest in sex and facilitate straightforward conversations about HIV status and condom use preferences; and (c) difficulties navigating in vivo conversations about HIV status and condom use preferences, e.g., at sex parties. Ultimately, we hope that, when data analysis is complete, the themes uncovered will provide direction for future HIV prevention interventions with BIM.
College students who drink alcohol every week discount delayed rewards more steeply than students who do not drink every week. Impulsivity is considered an important factor underlying addictive behaviors, including gambling and substance use. Impulsivity can be operationally defined as choices for the smaller sooner rewards over larger more delayed ones, and it may be measured via delay discounting. The term discounting refers to the process by which an individual subjectively devalues a reward as a function of the delay to its occurrence. Numerous studies have demonstrated that individuals with drug use problems discount at higher rates than controls. Few studies, however, have measured discounting rates in samples with less severe addiction problems. The goal of the current study was to compare the delay discounting rates of college students who typically have one or more drinks every week, and those who do not drink every week. Participants (N=111) completed questionnaires about discounting of hypothetical money, and hyperbolic functions were used to estimate the rates of discounting across the two groups. Results showed that college weekly drinkers discounted at higher rates than their non-weekly drinkers counterparts. These results, suggest that weekly drinkers college students are more impulsive than their non-weekly drinkers counterparts—at least in terms of making intertemporal choices.
The purpose of this research is to assess the potentially evocative quality of artistic expression and its effectiveness in diagnosing depression and assessing rumination and anxiety. Depression is often diagnosed through structured interviews, semi-structured interviews, or self-report questionnaires. Rumination and anxiety are also typically assessed through self-report questionnaires. However, there are numerous limitations to these questionnaires, including trait errors, response biases and tendency towards providing socially desirable responses. The current study examines art-making as evocative of self-descriptors that may offer an alternative assessment tool to self-report questionnaires. Measures used in this study include the Beck Depression Inventory, Ruminative Response Scale, Penn State Worry Questionnaire, and Emotion Drawing Assessment. The Emotion Drawing Assessment was developed for this study and involves conveying one’s current mood and emotions through artistic expression followed by writing words or brief statements about one’s mood and emotions. Data collection is currently in progress among Psychology, Nursing, and Art majors. The current study may shed light on the associations between artistic expression and diagnosable self-statements. It may also provide alternative methods of diagnostic testing and implications for further research.
Adults automatically make rapid judgments of others based solely on their facial appearance. We investigated the developmental origins of this ability by testing whether 10-month-old infants match facial appearance to a person’s social action. In Experiment 1, infants were presented with characters possessing trustworthy or untrustworthy faces (by adults’ judgment) that completed either helping or hindering actions (i.e., helping or hindering a puppet obtain a block from a box). Infants’ looking time was recorded to measure whether they would exhibit longer looking towards incongruent vs. congruent face-action pairings. Our results suggest that infants matched trustworthy faces to positive actions, and untrustworthy faces with negative ones. Experiment 2 tested whether infants’ expectations about the character’s faces were specific to the social behavior they engaged in with another character (e.g., whether it was helpful/unhelpful). An alternative account is that infants’ looking responses were based on the visual match/mismatch to the outcome without any regard to whether the un/trustworthy-looking characters actually caused the nice or mean outcome. We tested this using a procedure that was identical to Experiment 1, except the trustworthy- and untrustworthy-looking characters never touched the box and therefore were not causally involved in the successful or unsuccessful action. Our results show that infants do not look longer at the incongruent face-outcome pairing if the character is not really causing the good/bad outcome. This research indicates that the ability to make face-trait perceptions emerges early in development, before extended periods of social exposure.
Examining Attention Allocation during a Proceduralized Visual Task

Introduction. Conventionally, attentional selection is conceived as an interplay of willful, top-down choices and stimulus-driven, bottom-up demands. We hypothesized a third mode based on learned, context-dependent heuristics; a procedural selection - akin to that which governs skilled motor behavior - that occurs without cognitive supervision, but is still flexible and dynamic. This study contrasted how eye movement patterns in well-practiced versus un-practiced, but formally identical tasks (here, reading text forward versus backwards, respectively), were affected by distraction: when top-down selection is defeated, will the eyes still get to where they need to go? Methods. Four conditions were run blocked: Forward versus Backward reading (from bottom right to top left corner) each with and without a concurrent 1-back auditory tone-matching task (i.e. Dual- versus Single-task). A Tobii eye-tracker monitored reading; in the 1-back task, observers reported matches with a key-press. Nine observers saw six ~250-word passages (excerpts from Kant) for each condition; tones were presented over headphones. Results. Our analyses focused on average fixation duration: forward, single-task: 270.2ms (SE 13.4ms); forward, dual-task: 292.8ms (SE 15.0), backward, single-task: 313.6ms (SE 10.5); and backward, dual-task: 361.1ms (SE 17.2). Reading backward or with a concurrent task lengthens fixation duration, but most importantly, the interaction - with the concurrent task disproportionately impairing unpracticed, backwards (as opposed to familiar, forwards) reading, was significant (a paired t-test of dual-task costs, for forward versus backward reading: mean difference: 24.85ms; SE: 6.74; t=3.686; p=0.0062). Performance in the 1-back task was 93% (SE 1.8) and 86% correct (SE 1.7) for forward and backward reading, respectively. Conclusions. We hypothesized that attentional selection during reading has been proceduralized, so puts diminished demands on top-down selection (cf. mind-wandering while reading) while unfamiliar backwards reading requires greater supervision, making it more susceptible to distraction. Our findings support this, suggesting the action of proceduralized attention.
672  Concourse  11:45-12:30  Board C69
Nicole Marie Harris
Jeanie M. Tietjen (Faculty Sponsor)
Department of English, Massachusetts Bay Community College
Healing from Adolescent Sexual Violence

Post-traumatic stress disorder and related psychological disabilities are common in sexually victimized adolescent females. My research focuses on alternative treatments from medication to treat trauma symptoms as a result of sexual trauma experienced as an adolescent girl. Through mindfulness-based techniques in therapy, post-traumatic stress disorder and other mental illness symptoms can dissipate. These strategies in mindfulness-based therapy are examined and the affect it has mentally, physically and emotionally. Results from research, accessed through scholarly databases, show profound improvement in mental state and life quality when mindfulness is the key component to therapy. Research also concludes mindfulness-based therapy can provide resiliency in women and lower the chance of becoming victimized again. While more studies need to be conducted on adolescent trauma, there is enough evidence supporting mindfulness-based therapy to encourage mental-health counselors to integrate it into their practice.
Vegans often report finding themselves and their diets as the subjects of ridicule and disparaging attitudes. These attitudes could be due to moral identity threat, a self-defense mechanism that preserves one’s concept of being a good person in the face of perceived moral exemplars. The present study tested this hypothesis by having participants sample the same cookie from two baskets, with one basket being labelled as “vegan” and the other being labelled as “classic.” Moral identity threat and attitudes towards vegans were measured using surveys adapted from prior moral psychology studies. The results show that those with high moral identity threat show a statistically significant preference for the cookie labelled as “classic” and no preference for the same cookie labelled as “vegan”. Furthermore, high scores of moral identity threat were correlated with negative vegan attitudes. These results suggest that negative attitudes towards vegan food and vegans may be influenced by internal self defense mechanisms rather than the actual quality of the food and people being judged.
748  Auditorium  3:30-4:15  Board A48
Owen Seamus Henry
Rebecca Spencer (Faculty Sponsor)
Department of Psychological and Brain Sciences, UMass Amherst
Long-Term Effects of Traumatic Brain Injury on Sleep-Dependent Emotional Memory Consolidation

Traumatic Brain Injury is prevalent in athletic, military, and many other vulnerable populations. Chronic complaints of individuals with a history of even mild TBI include depression, anxiety, impaired memory, and sleep disturbances. Given that sleep is important for emotional regulation, poor quality sleep after TBI might contribute to these other symptoms. Therefore, the current study examines the long-term (> 1 yr) effects of TBI on sleep and sleep-dependent emotional processes. Specifically, we will probe emotional processes in the form of valence, arousal level, and recognition accuracy across periods of sleep and wake in young adults with and without a history of TBI. Preliminary results show nonTBI subjects maintain arousal ratings across both sleep and wake while TBI subjects arousal ratings are increased across wake and decreased across sleep. These results provide early evidence for alterations in sleep-dependent emotional processing that may cause or contribute to emotional disturbances following TBI.
Test Performance as a Function of the Testing Effect and Test Expectancy

The testing effect and the role of the test expectancy were examined in this study through the use of PowerPoint lectures with interpolated quizzes and tests. The testing effect is the theory that being tested on material will increase retention of that material. The test expectancy effect is the theory that expecting a test will have a similar positive effect on retention. In this paper, the two effects were separated by the creation of four conditions. Half of all participants were quizzed at the midpoint of a lecture and half were not. Half of each group was warned about an upcoming quiz and half were not. This was done to determine if the quiz itself is responsible for the increase in retention or if the expectation of a test is enough to create the same results. The results of this study found a statistically significant effect for quizzing, such that those who were quizzed performed worse on the final test. There was not a significant result found for test expectancy and no evidence on an interaction between the two variables.
Most primates exhibit polygamous reproductive strategies. However, a few exhibit monogamous behavior. There is no single, simple explanation for why this variety of reproductive strategies exists. However, Tinbergen (1963) offered a framework through which all behavior can - and ultimately, must - be examined and explained. He proposed that full analysis of behavior consists of understanding its cause at four complementary levels. First, mechanism consists of what is causing that behavior to occur at that exact moment of its occurrence, such as physiological activity. Secondly, the behavior’s ontogeny, or what developmental experiences shaped the activity of the mechanism. Third, the function of the behavior, or how what goals it allows the organism to achieve. Finally, phylogeny refers to understanding how evolution has shaped the behavior in ancestral generations. This presentation will explore primate reproductive strategies through the lens of Tinbergen’s four questions by examining the existing literature on the hormonal and neurological processes behind primate reproduction, how the behavior develops within an individual’s lifespan, what the function of the behavior is to the individual, and how the behavior was selected for over generations.
Deborah Anne Hug
Howard Tinberg (Faculty Sponsor)
Department of English, Bristol Community College
Childhood Factors that Foster Resilience after Genocidal Trauma

The purpose of this study is to find the most important childhood developmental factor that fosters greater resilience after genocidal traumas. Although there have been many studies on resilience, this research uniquely concentrates on the one factor that may be the greatest benefit to the survivor after living through the trauma. This study will draw from interviews of people from eyewitness testimonies, memoirs, and personal interviews from European Holocaust and Cambodian killing fields. As a qualitative study, this project will call for all interviews to be coded and analyzed using key words taken from childhood development theories. Preliminary results indicate that a closeness to a family member, openness to experience or depth of faith may play a significant role in survival. This study has a broad application in defining ways to mitigate trauma in the future by guiding children toward resilience later in life.
Stacy-Ann Nicola Hylton  
Rebecca G. Mirick (Faculty Sponsor)  
Department of Social Work, Salem State University  
Issues with Lack of Adequate Transportation Options for Suburban Dwelling Older Adults: A Modern Conundrum

Although there is increased life expectancy among baby boomers, many experience physical illness and other debilitating issues that may decrease their mobility, resulting in them not being able to drive safely, which may require them to explore additional transportation supports. Suburban communities are homes to many older adults in Massachusetts. Little is known about the impact of lack of transportation supports in the suburbs on older adults. The purpose of the research was to determine the effects that a lack of adequate transportation options had on suburban-dwelling older adults. The study assessed emotional and financial effects, as well as, declined activity involvement that the lack of adequate transportation options had on older adults in suburban areas. Adults 65 years and older, were recruited from senior centers in suburban communities that had inadequate transportation access and through convenience sampling (word of mouth, social media, email and Survey Monkey). Responses from the surveys revealed that most people still owned and operated their own cars and those who didn’t drive, used town owned senior transportation. In conclusion, people in suburban areas had access to transportation to some extent, but thought that access was limited, and additional affordable transportation options would be beneficial.
Marijuana is a commonly used substance among college students. Because it is so popular among this demographic there are concerns about its effect on the ability to do well academically. We examined student attitudes towards marijuana use and perceptions of its impact on academic success. A total of 128 undergraduates completed surveys including reading scenarios about peers who used or did not use drugs. The results indicated that students rated marijuana users less favorably than nonusers. These findings suggest that marijuana users are perceived as having less academic success than nonusers by their peers.
In the study of psychopathy, forward progress is an absolute necessity. Psychopathy is a personality type characterized by manipulation, grandiose sense of self-worth, and a general lack of regard or empathy for the well-being of others. Psychopaths are capable of committing significant violent crime. While they only exist at a 1% prevalence rate, the danger they pose makes studying them a priority not only for psychology, but for general safety as well. Much research has been done, yielding a number of clinical and sub-clinical measures for evaluating psychopathy in individuals. While highly effective, these measures all suffer from a common omission; evaluation of the sexuality of psychopaths is virtually absent. Even Dr. Robert Hare’s Psychopathy Checklist Revised only contains two items measuring promiscuity and short-term marital relationships.

In the past year, a new psychopathy measure of 54 items was constructed to include items measuring the sexuality of psychopaths. This presentation will report on a senior honors project which aims to reduce that measure to less than 20 items and test it on a large sample of university students, thereby ascertaining its reliability and validity. The hypothesis is that the new measure will be both reliable and valid in assessing psychopathic traits (now including sexuality), and that the condensed size will make it applicable in the clinical assessment of psychopathy. In short, this study will constitute another step forward in the field of forensic psychology making it easier to identify psychopaths before they can become problematic.
Stigma towards those with learning disabilities persists and can have a negative impact on individuals with learning disabilities specifically, their ability to learn and socialize. For example, some research has suggested that children with learning disabilities conceal their disability to be socially accepted. However, this concealment may inhibit their ability to learn in an academic setting. Research also suggests that individuals with learning disabilities are more likely to lead lonely lives and may be less accepted by their peers. This multiple case study will describe and compare approximately three adults’ experiences with learning disabilities and their experiences. Participants will range in age from 23 to 59 so that possible differences between generations may be explored. Participants will participate in a semi-structure interview and complete self-esteem and stigma measures. The researcher will also interview participants’ non-learning disabled acquaintances. Implications of participants’ experiences with possible stigma in the areas of learning and socializing will be discussed.
Recent literature has raised important concerns about the interpretation of sexual consent. In the present study, 62 participants completed a scenario-based survey on a college campus. The questions examined interpretations of consent based on setting and participant gender. Settings consisted of a party-based scenario and a dinner-based scenario. The findings revealed that there was consistency of the interpretations among female participants who read the party-based scenario and interpreted the situation being more serious. Other findings were that the participants, regardless of gender, who read the party-based scenario, were more likely to label the situation as rape. This study can be used to spread the awareness of the ambiguity of sexual consent. Understanding the differences between male and female interpretations of consent in a party scene can lead to a more concrete idea of sexual consent and potentially decrease rates of sexual assault on college campuses.
This study examined whether the peers of school-aged children affect their moral reasoning. The hypothesis was that most children’s moral reasoning will change based on the presence of their peers. In other words, the experimenter proposed that children’s answers to each of the moral reasoning questions asked would differ if they were answering them in front of their peers. Participants, children aged 5-11 from an after-school program, were individually taken to a separate room and asked a series of questions that related to hypothetical scenarios involving moral reasoning. After about two weeks, the same questions were asked in a separate room to groups of children while peers were present. All answers from each session were recorded, though the study specifically focused on whether their answers changed from the previous individual sessions or not. These results and their implications will be discussed.
The current study examined the relationship between self-esteem and positive or negative reactions toward feminists. In order to examine this relationship 102 participants read one of two descriptions about a college student named Tori. One description described Tori as a feminist while the other described Tori as an anti-feminist. Participants then completed a Likert scale that had different statements about Tori assessing endorsement of positive and negative traits. Participants were also asked to fill out scales assessing self-esteem and narcissism. The significant findings of this study revealed that perceptions and stereotypes toward feminists may be changing. Participants responded more positively toward feminist Tori than they did toward anti-feminist Tori. This study can help lead to a better understanding of how to raise acceptance for feminism.
Vibrational Medicine is gaining popularity in alternative medicine. There is a wide variety of methods that are used to produce a healing response. The basis for most of these modules is an energetic system called the chakras. This presentation seeks to explore the cross roads between the esoteric and emerging scientific research. This poster presentation is a multi-disciplined literature review of the chakra system.
Do Infants Match an Agent’s Sound to Its Size and Social Dominance?

Adults make a range of inferences based upon how things sound. For example, they expect larger characters to have lower-pitched voices, and smaller ones to have higher-pitched voices. The present study asked whether infants possess expectations about a character’s size based on the pitch of the vocalizations the character makes. We tested this possibility in 6.5-8.5 month old infants who were shown animations of small and large characters exhibiting different pitched sounds. On Congruent Trials the smaller character produced higher-pitched sounds and the larger character produced lower-pitched sounds. On Incongruent Trials the opposite pattern was displayed. Infants’ looking time towards these displays was measured to determine whether infants would look longer when a character’s sound did not correspond to its physical size. The second study examined whether infants relate a character’s vocalizations to expectations about social dominance. Infants were introduced to 2 characters, one with a higher-pitched voice and one with a lower-pitched voice that were identical in size. During Familiarization Trials, the characters both exhibited a preference for the same territory. During the Test Trials, the 2 characters approached the territory simultaneously and competed for the space. On Incongruent Trials the higher-pitched character won the territory and on Congruent Trials the lower-pitched character won. Infants’ looking time towards these displays was measured to determine whether infants show more interest in the mismatch between a character’s vocal pitch and displays of social dominance. Together these studies will help reveal the early foundations of social reasoning.
Research shows that higher socioeconomic status is associated with greater academic achievement, but little is known about the effect of variances in degree of disadvantage amongst the low income population on young children’s achievement and beliefs about their academic potential. The current study examined the relation between parents’ income level and “felt” poverty level (e.g., difficulty paying bills), children’s academic self efficacy and school quality beliefs, and children’s scores on a standardized text of math skills (WJ III-NU). The children sampled were ages 47-108 months (M=79 months) and all participants (n=51) were living in poverty (income < 150% of the poverty line or receipt of income-based state/federal benefits). Children were interviewed using a play-based technique based on the Berkeley Puppet Interview. Preliminary analyses using a subset of the sample (n=24) for which coding was complete indicated significant correlations between parent-reported indicators of disadvantage and child-reported beliefs as well as academic scores. The findings indicate a positive correlation between children’s mathematics scores and their endorsement of the belief that the school they go to is a good one as well as between mathematics scores and parent-reported monthly income. This finding demonstrates that income differences amongst those currently living in poverty are associated with children’s academic achievement. In addition, we found a negative correlation between parent-reported difficulty in paying bills and children’s belief that poor children can succeed in school. These findings suggest that parent’s beliefs about success affect children’s personal beliefs about their own future success across the lifetime.
As technology advances in our society, smartphone ownership among young adults has grown. As such, research on the effects of cell phone use has been popular. Studies have found negative correlations between cell phone use and trust, as well as with closeness. Few studies however, have explored what effect the location of the cell phone use has on relationship satisfaction. This study will examine a sample of 180 undergraduate students, who will be randomly assigned to one of six scenario situations depicting a couple using or not using a cell phone in either a private or a public location. There will be two types of cell phone use, texting and social media browsing. After reading their scenario, participants will complete questions on their perceptions of the relationship satisfaction of their assigned couple. Participants will also complete measures on personal relationship satisfaction and cell phone use. It is predicted that the cell phone use occurring in public spaces will be perceived as resulting in lower relationship satisfaction. In addition, it is hypothesized that participants who report high personal cell phone use will view cell phone use in their scenarios as being less damaging to the relationship’s satisfaction than those who report low personal use. Lastly, it is predicted that texting will be perceived as more damaging to relationship satisfaction than social media browsing. A series of two factor ANOVAs and correlations will be conducted to analyze the data. The findings will be discussed relating to methods for preventing cell phone use from damaging relationships.
Sexual Health Awareness and Attitudes towards HIV on a College Campus

Research and the media has indicated that people have dramatic perceptions of individuals who identify as Human Immunodeficiency Virus (HIV) positive. Overwhelmingly, research findings suggest that there is a high level of homophobia towards people who are HIV positive. However, little research has considered the effects of a HIV positive male on a college campus. This study will compare the perceptions of males and females of an HIV positive male undergraduate. A sample of 120 undergraduates will be randomly assigned to read a scenario depicting a HIV negative male or a HIV positive male. After reading the scenarios, participants will complete a survey containing measures of homophobia and loneliness. A series of ANOVAs and correlations will be computed to examine differences between men and women’s perceptions. It is predicted that college students will perceive more loneliness for a HIV positive classmate than an HIV negative classmate regardless of participants’ gender. It is also predicted that males will report higher levels of homophobia than females when the classmate is HIV positive. Additionally, females will report higher scores of perceived loneliness than males when the classmate is HIV positive. Implications of perceptions of HIV in the college classroom will be discussed.
Unrecognized mental health problems in early childhood can have deleterious effects. Next to family members and caregivers, teachers arguably have the most opportunity to observe children. The goal of this study was to examine college students’ perceptions, especially psychology and education students who will be likely be working in education, of childhood depression, gender and age. A sample of 135 undergraduates and graduates were randomly assigned to read one of four scenarios depicting male or female characters, either 4-years old or 10-years old, expressing behaviors associated with depression. Participants reported their perceptions of the level of depression, need for intervention, and level of concern for the children in the scenario. Participants also completed measures for gender stereotypes and a child development quiz based on the age of the child in the assigned scenario. Perceived level of depression differed based on gender of the scenario character, but age was not a statistically significant influence on perceptions of depression, need for intervention, or level of concern. Education about depressive risk factors and intervention efforts, especially pre-service and in-service teachers, can improve the mental health outcomes of young children.
The Sounds of Feminism: An Analysis of Pop Music Lyrics by Female Artists

As both a reflection and perpetrator of our culture, music can affect the listeners’ beliefs, ideas, and even certain behaviors. Because of the feminist movement working towards the equality of women and men, women have begun to acquire more influential positions in society, which may be reflected in lyrics. For example, previous research examining female rappers’ lyrics found themes relating to violence against women, objectification, women reclaiming power, female empowerment, and agency (Oware, 2009). Past research has examined rap music lyrics, but this research project examines themes related to the feminist movement in pop music over the last 40 years. In particular, this research looks into the messages within the lyrics of female pop artists since the 1980’s up until 2015. Two coders will be coding 40 pop songs to establish interrater reliability, examining themes related to objectification, agency, female empowerment, and sexuality. We expect to find that, as the decades pass, female artists are not only more common in pop music, but that their messages to women have become more empowering and less objectifying. We expect to see an increase in messages of women’s empowerment and agency within female pop music lyrics, thus reflecting current iterations of the feminist movement.
Perceived Effects of Race, Relationship, and Sexual Orientation on Attitudes towards Sexual Assault

Research has indicated that attitudes towards sexual assault are highly influenced by perceptions of victim and perpetrator. For example, race, victim-perpetrator relationship, and sexual orientation contribute to perceptions of rape victims. However, little research has been conducted on these factors involving college students—a population whose campus communities are at-risk environments for sexual assault. This study will examine the impact of sexual orientation, in light of recent American legality of gay marriage, along with race and relationship (stranger, acquaintance) on college students’ perceptions of perpetrator culpability, empathy with the victim and gravity of the act. A sample of 240 undergraduates, of both genders, will be exposed to a sexual assault scenario in which the victim’s race, sexual orientation, and relationship role will be manipulated. Several measures investigating perceived levels of culpability, empathy, and gravity, will be utilized and examined through a series of ANOVA’s. It is predicted that participants will be more empathetic towards victims who share the same race than a different race, and that sexual assaults involving two men will be perceived as less serious than those involving a man and a woman. Finally, it is predicted that sexual assault involving acquaintances will be perceived as less serious than sexual assault involving strangers.
According to the American Psychological Association there are 38,028,000 U.S. women murdered every day by a current or former male partner. The Centers for Disease Control and Prevention state that every minute there are 20 victims of domestic partner violence. With a third of the female American population experiencing domestic violence along with many who are silenced that the statistic does not capture, relationship abuse reveals the societal perpetuation of power and control in both its obvious and nuanced nature. This mental infrastructure has been operating for centuries and although the female narrative seems to have changed, especially in the last century, the resources and responses have not kept up. In fact expectations on women have increased while social norms leave much to be changed. Childcare, economic inequality, work expectations, lack of paid maternity leave combined with the social norms of “being a woman” create situations where many women live silently oppressed with limited choices on how to leave a violent situation. Victim blaming is prevalent and creates another barrier one must overcome. Relationship abuse operates on a basis of power and control which has been used to oppress women for centuries. Physical, sexual, economical, and emotional abuses use common elements that utilize fear (survival) to maintain a position of control. This is strategic and still happening minute by minute. Domestic Violence is a microcosm that represents the societal view of women in all aspects, giving a focus to the violence, oppression, and control that have surrounded women for centuries.
Microglia are cells in the central nervous system that have an active role in neuroinflammation and repair. These cells produce and release cytokines in response to endogenous signals of damage and after exposure to toxic substances, e.g., high doses of alcohol. We hypothesize that voluntary binge drinking during adolescence activates microglia, inducing an inflammatory response that can damage myelinated axons. The goal of this pilot study in rats was to assess whether two weeks of alcohol drinking early in adolescence increases the production of signaling molecules associated with microglial activation and inflammation in the brain. The day after drinking ended, tissue dissections were collected for qPCR measurement of mRNA levels of toll-like receptor 4 (TLR4), interleukin 1 beta (IL1-beta), and interleukin-33 (IL-33). Measurement of all three genes can help delineate the cytokine signaling cascade affected by alcohol drinking and cell types involved. Over-expression of both TLR4 and IL1-beta would suggest activation of microglia and inflammation whereas over-expression of IL-33 would suggest alcohol also impacts other glia cells such as oligodendrocytes. A deeper understanding of the inflammatory response of these glial cells will give a more comprehensive understanding of how binge alcohol drinking affects the adolescent brain.
Dealing with Stress through Exercise

College students deal with different types of stressors. Whether these include assignments and exams, work or even everyday hassles, these situations do become burdensome for many students. They sometimes resort to negative practices in order to cushion or relieve the stresses in their lives, often including smoking and drinking. However, research shows that individuals should use more positive methods to relieve themselves of stress. As a result, this study focused on exercise and gym utilization as a means of dealing with stress. This is a positive coping method not only because it does in fact help with stress but also because it promotes a healthy lifestyle, by staying fit both mentally and physically. For many people, college is when weight gain begins, and students often don’t think that they have the time to work out because of their coursework and other obligations. This study aimed to make individuals knowledgeable about exercise’s benefits both for physical health and lowering stress levels. Participants were asked to fill out a survey about the effects of the gym and using it as a means of dealing with stress and related issues. The results and implications of this survey will be discussed.
Expectation bias is a phenomenon in social psychology in which a researcher’s expectation of the results influences the results of the study. This paper examines the effect that Rosenthal’s 1966 Pygmalion in the Classroom study has had on more current psychological research regarding expectation bias. As a future teacher, I am interested in seeing how my attitudes and expectations could affect my future students’ academic and intellectual growth. Because Rosenthal’s study has far-reaching implications for educators, I examine the impact several different psychological perspectives have in his work. Using these perspective as lenses, I explore how Rosenthal’s study can generalize to fields other than education, as expectation bias also presents in the medical field, parenthood, and the workplace. Additionally, I look at the ethics of this study as they would be viewed if this experiment were proposed under today’s APA ethical guidelines. I focus on Rosenthal’s original study, as well as a study from 2010 performed by de Boer, Bosker, and van der Werf. This study centers on expectation bias in secondary schools in the Netherlands, connecting it to the age group I want to teach in the future. I discuss the methods and results of these studies in an effort to fully understand the effect of teacher expectation bias. I conclude this paper with a research design for a study that could further evaluate expectation bias in American middle and high schools.
Casey James Marques  
Jane Theriault (Faculty Sponsor)  
Department of Psychology, Salem State University  
Television’s Influence on Behavior

The goal of our research is to determine if watching television shows influences behavior. The common belief about television is that it is a bad influence for people due to the fact that many programs contain a lot of negative behavior. Another less talked about belief is that positive behavior displayed on television influences people as well. The purpose of our study is to conclude if a change in the content of television shows would benefit the overall behavior of society. Our research methodology will be completed through the use of a video that will be randomly assigned to approximately 50% of the participants, and a survey on the online survey website Survey Monkey. The questions on the survey ask general questions regarding behavior and opinions on certain behaviors so that information on the subjects could be gathered. The data collected is quantitative, and it has been obtained through the use of our survey. Our hypothesis is that watching television can influence a person’s behavior but not in massive amounts. Results will be discussed.
Patrick Timothy McGonigal  
Katherine Lee Dixon-Gordon (Faculty Sponsor)  
Department of Psychological and Brain Sciences, UMass Amherst  
An Anger Management Intervention in a Correctional Facility: Preliminary Efficacy and Predictors of Response  

With the highest incarceration rates internationally (Hartney, 2006; Walmsley, 2013), the American criminal justice system is faced with the dilemma of effectively managing the mental health difficulties experienced by many inmates. Consequently, much effort has been dedicated to developing treatment programs, such as anger management, to target anger and aggressive behaviors in correctional contexts (Day, 2009). The current study is a pilot evaluation of an existing anger management intervention conducted within a county jail in Massachusetts. Preliminary analyses indicate that inmates report significant reductions in trait anger (t(8)= 2.37, p<.05), and overall expressed anger (t(8)=3.22, p=.01), as well as increases in inward and outward anger control (t(8)= -3.31, p=.01; t(8)= -2.31, ). Marginal associations were found with anger rumination and decreased anger expression (p=.12). This presentation will include final analyses on two anger management groups occurring over the course of the 2015-2016 academic year.
Imagine being taken from your home, family, friends and the entire life you once knew by a stranger. Now you are becoming the victim of constant violent and brutal assaults both physical and sexual. During this you are being denied proper sanitation, shelter, food and water by this person. Next imagine caring for this very same person to the extent that when you have an ability to escape and leave you chose not to do so. Does this sound insane? But that is the very essence of Stockholm syndrome. In this thesis I will examine the psychological phenomenon of Stockholm syndrome and how it applies to the kidnapping case of Elizabeth Smart.
Both popular and scientific literature indicates that women face discrimination in the workplace. The gender pay gap is a profound example of this discrimination. Despite its persistence there is scant research examining young women’s perception of the gender gap in relation to other forms of discrimination. This study compares perceived discrimination for fictional male and female characters experiencing stereotype threat, parenthood, or gender harassment in the workplace. A sample of 180 female college students will be randomly assigned to one of six scenarios depicting a male or female scenario character and one of the aforementioned forms of discrimination. After reading the scenario participants will complete a series of measures regarding gender perspective and questions relating to job satisfaction, perceived career harm and well-being at work. It is predicted that when the scenario character is female there will be a higher perceived level of discrimination in terms of stereotype threat, parenthood and gender harassment. Implications of discrimination sensitivity, awareness of the gender gap and gender equality will be discussed.
697  Auditorium  1:30-2:15  Board A58  
Lee Ann M. Mercurio  
Jane Theriault (Faculty Sponsor)  
Department of Psychology, Salem State University  
Sports Fans and Sports Attire  

This study examined the culture around professional sports. In general, fan studies focus on sports fan culture and behavior. The main purpose of this research study was to find out whether or not sports fans wore sports attire more on a game day or the day after a win. This research also investigated how fans acted during a game and whether or not they were influenced by sports superstitions. The study consisted of observing people in public for 2 hours a day on both game days and the days immediately after a win throughout both hockey and football season and tallying the amount of sports attire observed. Additionally, an online survey was done to ask about individuals’ attitudes toward sports fans and other things relating to fan culture. The observation results and survey results were compared to look for similarities and differences. These results will be discussed.
Are we predestined to have a particular personality? Do we come pre-programmed like the latest gadget on store shelves? As humans, do genes play a major role or does the environment determine our future path? Does nature decide or nurture? Although both concepts are both valid and true, one side cannot exist without the other, “You inherit your environment just as much as your genes.” (Johnny Rich, the Human Script). Therefore, to examine certain traits that are found among murderous psychopaths one should examine, both, environmental and genetic influences. The focus of this presentation will be on the questions, “Are we wired to kill? Are some people born with violent tendencies that cause them to kill others, or are they shaped by their environment to become the people they are?”
Postpartum depression is a serious psychiatric condition that affects around 10-15% of the women who give birth every year. Deficits in cognitive and motivational functions, including impairments in attention and cognitive flexibility, as well as reduced behavioral activation and effort-related functions, are major clinical features central to postpartum depression and can contribute to poor parenting. Previous work suggests that changes in monoamine levels in specific cortical and striatal structures can explain the pathophysiology of cognitive and motivational symptoms of depression. Many studies have characterized the symptomatology of postpartum depression; however, relatively little is known about the underlying neurobiological mechanisms by which parenting is disrupted in postpartum depression. The present work was undertaken to examine the neurochemical phenotype of the Wistar-Kyoto (WKY) rat strain, which exhibits a postpartum depression-like behavior phenotype compared to the relatively normal Sprague-Dawley (SD) control strain. This study aims to determine whether alterations in monoamine levels in discrete brain structures underlying cognitive and motivational deficits predict parenting disturbances in WKY mothers. Concentrations of the monoamines norepinephrine, dopamine and 5-hydroxytryptamine, as well as their respective precursors and metabolites, in samples collected from several relevant brain regions, including prefrontal cortex, nucleus accumbens and the medial preoptic area, are being assessed using high-performance liquid chromatography (HPLC) with electrochemical detection. Our results are so far consistent with the working hypothesis that altered monoamine levels contributes to cognitive and motivational deficits in postpartum depression leading to parenting disturbances.
College Students’ Perspectives and Attitudes towards Online Learning and Traditional Learning

Online learning provide students with unlimited flexibility and the ability to earn a degree all at the click of their fingers; its effectiveness has been investigated by researchers to find the specific circumstances in which effective learning can be achieved. Moreover, students’ learning styles, perspectives and approaches have been explored to evaluate educational attainment under an online learning environment. On the other hand, experts have also been exploring these same variables in traditional classroom settings. However, very little research has been done to directly compare college students’ perceptions of these two settings. This study aims to compare students’ perspectives of online learning and traditional classroom settings. A sample of 120 undergraduates males and females from a small public university will be completing surveys. In the surveys a fictional scenario will be presented depicting situations where participants will be read about an undergraduate scenario character registering for classes with a preference for online classes or traditional classes and either wanting to enroll in online classes or traditional classes. To evaluate participants’ perspectives on course satisfaction the Satisfaction Scale will be administered. Other scales measuring social presence, self-regulated skills, and assessment of online interaction will be administered. It is predicted that the scenario character depicted as wanting to enroll in an online course will be perceived as more satisfied than those students who don’t want to take an online course. Results and implications will be discussed.
Background: Our perceptions are biased depending on our experience. For example, constant exposure to a given emotion, happy faces, yields perceptual biases in the opposite direction. This process of adaptation confers an evolutionary advantage, allowing us to devote fewer limited resources to process information which is static and not informative. Can adaptation effects transfer across our senses? We examined if prior adaptation to auditory emotions could bias the emotion perceived in a face, a visual stimulus. Methods: We recruited 24 participants, 12 adapted to positive and 12 to negative auditory emotions. Participants watched two videos, one before and one after adaptation to a given auditory emotion. The first video measured baseline, the unique face each subject perceived as emotionally neutral. To accomplish this subjects judged morphed face images created by morphing a fully affective angry or happy face with the complementary neutral to create an emotional continuum (80, 40, 20, 10% of a given emotion). The second video measured how judgments of the emotionally neutral face changed after auditory adaptation, during which subjects were presented with 15 negative or 15 positive crowd sounds. For each subject we quantified the magnitude and rate of the perceptual change before versus after adaptation. Results: Results to date suggest that adaptation to emotional information does not transfer from an auditory emotion to bias a perceived visual emotion. We found very weak effects which were not systematic across adaptation conditions for either changes in the magnitude or changes in the rate of perceived visual emotion.
Human adults and children automatically judge the personality of an individual based solely on their facial features. For example, adults make very rapid judgments about social characteristics such as a person’s dominance and trustworthiness. Studies exploring the developmental origins of this ability suggest that infants match individuals with trustworthy- or untrustworthy-looking faces (by adults’ judgment) with ‘nice’ and ‘mean’ actions, however, many questions remain. Do infants believe a person’s facial characteristics reflect relatively stable personality traits like ‘trustworthiness’ or do they perceive facial features more like emotional states that can change from one moment to the next. To address this question we are testing 12-month-old infants using computer-generated faces that have been rated as either highly trustworthy or highly untrustworthy by adults. Each infant is presented with a puppet show involving one trustworthy and one untrustworthy-looking puppet appearing sequentially from behind a screen. After several repetitions, the screen is dropped to reveal either one or two puppets and infants’ looking time is measured. If infants perceive different facial features as reflecting distinct personalities, they should expect two individuals to be behind the screen and will therefore look longer when just one puppet is revealed. However, if infants perceive such facial differences as transient emotional states then they may be more likely to expect just one puppet behind the screen (and look longer when two puppets are revealed). The data we present will help reveal the specific nature of infants’ early face-based judgments and the early foundations of our social biases.
Postpartum depression is a serious psychiatric condition that has harmful effects on the mother, and poses a risk for the mother-infant relationship, directly affecting the infant’s development. Deficits in cognitive functions regulated by the prefrontal cortex, including impaired behavioral flexibility, are major clinical features central to postpartum depression and likely contribute to deficits in parenting. This study used the Wistar-Kyoto (WKY) genetic rat model of depressive-like behavioral symptomology to examine the therapeutic efficacy of the selective adenosine A2A receptor antagonist MSX-3, and the norepinephrine reuptake inhibitor atomoxetine, as novel treatment strategies for postpartum depression. WKY and Sprague Dawley (SD) postpartum females were examined for their ability to adapt responding based on rule changes in an operant set-shifting task, in combination with detailed analysis of maternal behavior. Consistent with clinical observations of cognitive dysfunction in depressed human mothers, WKY mothers exhibited performance deficits on the response reversal and strategy set-shifting components of the operant set-shifting task, indicative of impaired cognitive flexibility. In addition to these cognitive deficits, WKY mothers exhibited severe disturbances in maternal behavior. In WKY mothers, administration of MSX-3 attenuated deficits on strategy set-shifting, with WKY mothers requiring significantly fewer trials to shift their response between rules compared with the vehicle, and ameliorated corresponding deficits in parenting. Ongoing experiments are evaluating the ability of atomoxetine to ameliorate the cognitive and parenting disturbances characteristic of WKY mothers. Atomoxetine is particularly interesting because a nonstimulant therapeutic solution lessens the likelihood of abuse resulting from medical use of the drug.
Analyzing attitudes toward gender typical and gender atypical clothing is an essential element toward breaking down gender stereotypes. This research measures the implicit and explicit attitudes toward children’s clothing, specifically gender typical and gender atypical clothing. The current study utilized an IAT (implicit association test) computer task that tested participants on their perception of gender typical and gender atypical clothes for young children. To test hypotheses, analyses were conducted using self-reported data from a survey using the Perceived Acceptance Scale (PAS), a sample of the Sex-Role Egalitarian Scale (SRES) and demographics. Data were also collected from the computer task that recorded the reaction time it took a participant to respond to seeing a picture of a child in either gender typical or gender atypical clothing after viewing positive or negative words and needing to press a key on the keyboard to categorize it. The sample consisted of 30 participants from Framingham State University in Massachusetts. A three-factor within-subjects ANOVA test was conducted on the reaction time data. It was found that the two-way interaction of word type and clothing was significant. Specifically, categorizing positive words with gender typical clothing was faster than categorizing positive words with gender atypical clothing. Prior research suggests that college students are more accepting of one’s choice to wear whatever they’d like no matter their gender. However, the current results show that college students showed an implicit bias toward pictures of children in gender atypical clothing.
Emotion and the Framing Effect

How a situation is framed can affect choice. People tend to be risk-averse in the face of gains, that is, they tend to avoid decisions with uncertain outcomes when they may lose a “sure thing”. In the face of losses, however, people tend to be risk seeking, that is, they tend to accept the possibility of risk to avoid a perceived loss. Emotion can affect this pattern. Emotions vary along different dimensions, for example, valence, whether an emotion is perceived as positive (P) or negative (N), and certainty, whether an emotion is associated with a certain (C) or uncertain (U) outcome. Whereas positive and certainty-associated emotions tend to increase risk-seeking behavior, negative and uncertainty-associated emotions tend to increase risk aversion. To date, however, these two emotion dimensions have been studied separately. The goal of this research is to study framing in a design in which valence and certainty are fully crossed. Using previously normed videos, one of four emotions were induced (happiness-PC, anger-NC, surprise-PU, fear-NU) in 160 participants. To determine risk-seeking or risk-aversion behavior, participants were then sequentially presented with both a gain- and loss-framed choice scenario (the Asian Disease paradigm). Preliminary data analysis suggests that participants in a positive mood are more risk seeking, but only in the face of losses. There was no effect of certainty. This study is the first to consider how emotion dimensions interact to influence the framing effect.
Accumulating evidence indicates that sleep enhances cognitive functions such as attention, memory, and executive control. However, the effect of sleep on response inhibition, the ability to suppress actions that are inappropriate in a given context and interfere with a desired behavior, is understudied. The purpose of this study was to determine the effects of a midday nap on response inhibition in young adults. To assess this, 25 young adults, 18 to 30 years of age, completed a Flanker Task following a midday nap and equivalent period of time spent awake (within-subject design, conditions separated by approximately one week and counterbalanced across participants). In our iteration of the Flanker task, participants were instructed to respond to the orientation of the center target stimuli. Flanking stimuli on either side of the target were oriented in the same direction (congruent trial) or opposite direction (incongruent trial). Relative to incongruent trials, participants had greater accuracy and faster reaction time (RT) to congruent trials following both the nap and wake intervals (p’s ≥ 0.001). The congruency effect (RT Correct Incongruent – RT Correct Congruent) was not significantly different between the nap and wake sessions (F(1,21)=2.185, p=0.154). Taken together the results of this study suggest that napping may not benefit response inhibition in young adults. Future studies should explore whether or not naps and overnight sleep interact to impact response inhibition in this population.
Hysteria was the first mental health disorder associated with women exclusively and can be dated as far back as 1900 BCE in Ancient Egypt (Tasca, et al., 2012). Until the late 19th century, the term ‘hysterical’ was used to describe excessive emotions in women. It was believed that a woman’s pelvic alignment was the cause of these hysterical symptoms. Sigmund Freud, a leading medical doctor and psychologist in the early twentieth century, believed hysteria was a somatic disorder, a presentation of physical symptoms without physical cause. The Diagnostic and Statistical Manual of Mental Disorders-2 (DSM-2) describes hysterical symptoms as behaviors that begin in “emotionally charged situations” and are “always attention-seeking and often seductive” (DSM-2 pp. 39-43). Women who presented these behaviors in any situation were labeled as mentally ill, and their emotions were dismissed without further questioning. Although the latest DSM V does not include the “hysterical neurosis” or “hysterical personality” diagnosis, the description of histrionic personality disorder, associated mainly in women, includes similar symptoms. This paper will examine the ways in which physicians and psychologists participated in the oppression of women through the use of hysterical neurosis and hysterical personality disorder as diagnoses for mental illness. Those women who questioned and challenged societal norms, or acted outside the lines of desired behavior for women were especially silenced.
**753 Auditorium  4:30-5:15  Board A62**

Sean Patrick O’Connor  
Rebecca Spencer (Faculty Sponsor)  
Department of Psychological and Brain Sciences, UMass Amherst  
The Effects of a Mid-day Nap on Intertemporal Discounting

Background: When offered a choice between a smaller more immediate or larger later reward, individuals tend to favor the immediate rewards. This behavior is a result of future gains being discounted at a particular rate, such that their value is rendered less than that of the immediate gain. We examined whether a mid-day nap influences discounting behavior in short temporal time frames. Methods: Sixteen young adults (mean age = 20.111, SD = .900254; 5 males) performed a hypothetical delay discounting task, wherein they were asked to make a series of choices between an immediate reward (between $0 and $50) or a larger delayed reward ($50) after 2, 4, 8, 14 and 22 weeks. Each participant performed the task before and after a mid-day nap and an equivalent period spent awake, separated by one week. We calculated individual “Indifference Points” and the “Discounting Rates” for each delay. Results: Individual Indifference Points were significantly greater following a mid-day nap compared to wake for the 4-week delay (t(15)=-2.471, p=0.026) and at trend-level for the 2-week delay (t(15)=-1.834, p=0.087). Likewise, Discounting Rates were significantly less following a mid-day nap for the 4-week delay (t(15)=2.340, p=0.034), and at trend-level for the 2-week delay (t(15)=1.832, p=0.087) compared to wake. Indifference Points and Discounting Rates were equivalent following the nap and wake for all other delays. Conclusion: Our data suggest that sleep is beneficial for decisions related to short-term monetary consequences, but may not be so for conditions where the reward is delayed greatly.
This research is the first study to look at the decision-making skills of adults that have aged out of foster care in their transition to independent life. The struggles youth face aging out of foster care have been well documented, and their decision-making skills may be one aspect playing a role in their negative outcomes. This study used a matched-comparison design in which the results from foster alumni were compared to their cohorts who were not involved in the child welfare system. Using a previously validated quantitative survey instrument, as well as open-response questions, participants described their general decision-making skills as well as elaborated on their personal experience turning 18. For the foster alumni, this meant explaining what it was like to age out of the system, while the non-foster population elaborated on what it was like to become a legal adult. The findings indicate that participants previously in foster care had decision-making abilities in the moderate to good range, with older adults indicating worse decision-making skills at the time they aged out. As well, “Identifying Alternatives” and “Selecting Alternatives” appeared to be particularly weak domains of the decision-making process, with “Identifying Risks” and “Evaluating Decisions” being stronger areas. This study suggests further research is needed into the decision-making skills of emerging adults, as well as finding ways to improve their skills.
Our research focuses on the contribution of the two hemispheres of the brain in information processing and strategic decision-making. While the right hemisphere is known to be involved in holistic processing and sensitive to contextual effects, the left hemisphere uses analytic processing. Four experimental designs were employed to research the effects that handedness and interhemispheric communication have on decision-making processes. The first, is a multi-outcome mixed gamble task to examine whether the subjects rely on an analytic compensatory strategy or a fast and frugal heuristics. The second, is a framing task in which the participant chooses between two gamble options presented in a gain frame or a loss frame. The third task is a Poffenberger paradigm design, which measures interhemispheric transmission time (IHTT) between the two hemispheres. The fourth technique is the use of paper and pencil scales to measure everyday decision-making strategies and the participant’s handedness. There will be a significant relationship between handedness and IHTT such that the mixed-handed individuals will have faster IHTT based on findings that they have larger corpus callosums and increased interhemispheric activity (Luders et al. 2010). We expect to find that compared to strongly right-handed individuals, mixed and left-handed individuals will show greater use of decision heuristics and greater framing effect. Faster IHTT will predict a greater use of decision heuristics in right-handed individuals and a greater use of analytic decision strategy in left-handed individuals. The results will be attributed to differences in hemisphere activation.
PRESENTATION DETAILS

649  Concourse  10:45-11:30  Board C70
Karen S. Ortega
Deborah McMakin (Faculty Sponsor)
Department of Psychology, Framingham State University
Undergraduates’ Perceptions of Friendship Diversity and Racial Attitudes

The importance of diversity among college students is well known. Undergraduates’ attitudes towards people of whose race, ethnicity and/or cultural backgrounds differ from their own has implications for the classroom and workplace. Some research has suggested that college students who are part of a more diverse group of friends hold more positive attitudes towards cultural or ethnic differences. However, little research has been done comparing the perceptions of both male and female college students’ attitude towards friendships with racial, ethnic and/or cultural diversity. This study compares the perceptions of male and female students’ racial attitude towards friendship diversity. A sample of 120 undergraduates will be randomly assigned to read one or four scenarios depicting a female fictional character who has a homogenous or heterogenous group of friends relative to racial and ethnic diversity. Participants will then complete a questionnaire regarding perceptions of scenario characters’ attitudes, background information, questions about their group of friends and racial attitudes. It is predicted that male participants will perceive the female factional character having a more positive racial attitude than female participants. Overall males will report to have more positive attitudes towards friendship diversity than females. A series of ANOVAs will be computed to examine the difference of perceptions between both male and females presented to stimuli. Findings will be discussed relative to strategies to expand positive attitudes and acceptance towards diversity.
Background: Sleep enhances memory consolidation, emotional processing, abstract reasoning and rule learning. These sleep-dependent effects are important when considering the complex cognitive process of decision-making. Decision types can be categorized as “hedonic” or “utilitarian,” appealing to emotional or practical domains respectively. We examined whether decision type was influenced by a mid-day nap relative to wake. Methods: Forty-three young adults (mean age=20.88 yrs, SD=2.50; 13 males) were presented with a hedonic and a utilitarian option each across four categories: apartments, restaurants, bosses, investment banks. Participants viewed the product attributes, and were asked to make a choice after a mid-day nap (“Nap” condition) or after viewing “Planet Earth” (“Wake” condition). Nap physiology was recorded using polysomnography. Participants were also asked to recall the attributes and rate the likelihood of choosing each option. Results: There were no differences between Nap and Wake conditions with respect to number of correctly recalled attributes (t(41)=0.052, p=0.959), or likelihood of choosing the hedonic (t(41)=0.794, p=0.432) or utilitarian option (t(41)=-1.243, p=0.221). However, participants made significantly more hedonic choices following a nap compared to wake (t(41)=2.517, p=0.014). Interestingly, greater percent time spent in slow-wave sleep (SWS) resulted in less hedonic choices post-nap (Pearson r=0.589, p=0.008). Conclusion: Our data suggest that “sleeping on” a decision may influence consumer behavior by impacting the type of decisions – hedonic or utilitarian – made. We further demonstrate that a SWS-rich nap results in greater utilitarian choices; in contrast, lack of sufficient SWS-dependent processes on decision-making results in more hedonic choices.
Social media is quickly becoming an integral and pervasive phenomenon in our society. As the use of internet-based social platforms become more influential, it’s important that as a society we understand just how these socialization tools affect our mood and well-being. Current research is indecisive on the positive and negative effects of these social platforms with some researchers arguing for the utility of the social feedback people can receive (Valkenburg, 2006) while others argue that social comparison theory posits that the upward social comparison that occurs on social media might have negative effects (Chou & Edge, 2012). The aim of this study is to clarify the existing research and understand these very effects. In this study the relationship between social media use and its effect on psychological well-being and emotion regulation was examined. Participants completed an initial questionnaire with demographics questions, queries about social media use, and assessments that measured psychological well-being and emotion regulation skills. After the initial survey participants completed a 5-day ecological momentary assessment in which their social media use and in-person socialization were recorded. These data will shed light on the relationship between social media use and psychological adjustment.
Parenting practices have been widely shown to play an important role in child development. However, there is evidence that the link between specific parenting practices and child behavior may be culturally specific. The goal of the present study is to examine whether the relation between parenting practices and child behavior varies across ethnic groups. We are analyzing parents’ reports from the BASC-2 of their children’s externalizing behaviors, self-reports on the Parenting Scale, and naturalistic observations of children’s negative affect among 258 3-year-old children. Overreactivity, laxness and warmth are the focal parenting dimensions for our analyses. Families came from diverse ethnic backgrounds: 55% European American, 18% Latino (predominately Puerto Rican), 12% African American/Black, and 15% multi-ethnic. In preliminary analyses, we found that European American mothers’ reports of overreactivity and laxness were significantly related to child aggression and negative affectivity, and Multi-Ethnic mothers’ reports of overreactivity were correlated with child aggression. There were no significant relations between parenting and child functioning for African-American and Latino parents. This suggests that parenting literature and knowledge on parenting styles may pertain specifically to European American families.
The goal in the study was to explore the association between attraction and symmetry, and to determine if memory had an affect on the rating. The independent variables were the altered symmetrical pictures and the presentation order of the photos. The dependent variables were the ratings given by the participants. Each picture was exposed for four seconds per photo and the participants had five seconds to respond between photos. The photo lineup consisted of 10 models with three pictures each. The three pictures of each model were slightly different: one was unaltered, the second was left side of the face mirrored, and the third was right side of the face mirrored. The first group received the photos of the same model in consecutive order and this group was considered the, “consecutive group.” Secondly I tested how memory affected the rating. The second group saw the models in a different order. This group was considered, “the spaced group.” The pictures of each model were presented in order, so that the three pictures for a given model were divided in sequence by 9 other pictures, and it created 36 seconds intervals between different pictures of the same model. This order continued until all 30 pictures were shown. The hypothesis was that the ratings will also show a preference toward the altered pictures. Results will be discussed.
Cross-Modal Adaptation to Emotional Information: Influences on the Magnitude and Rate of Perceptual Change

Background: Faces convey a wide variety of information such as gender, ethnicity or emotion. Given that perception of emotional state is imperative for social interactions, we examined how an emotion we hear influences an emotion we see. More specifically, we tested how the valence of an auditory emotion and whether it matched the valence of a visual emotion altered the perceived emotion in a face. We hypothesize that adaptation to congruent visual and auditory emotions should yield stronger effects, larger magnitudes and faster rates of change, compared to incongruent emotions. Methods: To date, we have recruited 51 participants (18-27 year olds) from the University of Massachusetts Boston. Subjects were adapted to emotional information: visual stimuli (15 male and 15 female images, happy or angry) and auditory stimuli (15 negative and 15 positive crowd sounds). Stimuli were congruent, matched in emotional valence (happy faces and positive crowd sounds) or incongruent, of opposite valence. Test faces were created by morphing a fully affective angry or happy face with the complementary neutral to create an emotional continuum (80, 40, 20, 10 for a given emotion). For each subject, we determined the face judged as emotionally neutral before adaptation and how the magnitude and rate of making this judgment changed after adaptation. Results: Our results suggest stronger adaptation effects for congruent versus incongruent emotions in terms of the magnitude of perceptual change and the rate of perceptual change for the adapt happy condition. The trends for congruent versus incongruent emotions were less clear for the adapt angry condition.
Christopher James Prisco
Kate Martin (Faculty Sponsor)
Department of History, Cape Cod Community College

The Silencing Act

“The Silencing Act” will discuss a multitude of ways that victims of abuse specifically women (physical, mental, and even emotional) are silenced. The speech goal is to educate the audience in what silencing is, how to prevent silencing and how to help those who have been silenced to speak up. The speech will identify different aspects of oppression through history and how oppression has developed over time. By examining different sources produced by women who have been oppressed in numerous ways, the answers to how to prevent these acts can be found. Incorporated in the speech will also be ideas to help women speak up and out about these acts of oppression.
Reasonable Courtship or Reasonable Fear? Victim Attractiveness Predicts Perceived Typicality of a Stalking Scenario

Stalking myths (e.g., “certain types of women are more likely to be ‘stalked’”) negatively impact juror perceptions and hinders victim’s likeliness to seek help. To our knowledge, no previous research explores what these “types” of women are. However, research on victim stereotypicality indicates that mock jurors view atypical victims less positively and are less likely to find a defendant guilty than with a typical victim. Jurors in a stalking case must decide if the defendant engaged in romantic courtship behaviors or stalking. Although it is unclear what characteristics jurors consider typical in stalking, attractiveness plays a role in mate selection; therefore jurors may use the victim’s and defendant’s attractiveness to decide the likelihood that the defendant’s behavior was romantic courtship or stalking. Online community members (N = 298) read a fictional stalking trial summary that included pre-rated images depicting the victim and defendant as attractive or unattractive. Findings suggested that victim attractiveness was positively associated with ratings of victim credibility and victim typicality, and was negatively associated with ratings of victim blame and similarity to typical romantic courtship. Additionally, victim attractiveness had a significant indirect effect on verdict through victim credibility, victim typicality, and romantic courtship typicality. Regardless of defendant attractiveness, participants viewed a more attractive victim as more credible and more typical of a stalking victim, and viewed the scenario as less typical of romantic courtship behavior. These perceptions increased their likelihood of rendering a guilty verdict.
Laurinda Mary Ralph  
Robin A. Robinson (Faculty Sponsor)  
Department of Sociology and Anthropology, UMass Dartmouth  

Although beauty standards are defined by time, location, social norms, and cultural factors, most young women are bombarded with the “facts” of who is, and who is not, beautiful. In an attempt to increase self-compassion and body image in teenage and pre-teen girls, a four-week curriculum focused on the social perceptions of beauty was created and tested, informed by previous research in the areas of beauty norms and values. The effects and alterations caused by Photoshop and body modification, as well as a wide range of cultural definitions of beauty, are the primary focus of this curriculum. By taking a bio-psycho-social approach to examining beauty standards, and by presenting middle-aged school girls with ways they can approach concepts of beauty, this study hypothesized that a significant increase in both self-compassion and body image would occur. This hypothesis is congruent with previous research showing high correlations between self-compassion and body image, and suggests the ability to increase self-compassion using a short-term curriculum. However, this research uniquely contributes to existing literature as there has yet to be research testing the effects of indirect curriculum attempts to increase self-compassion through the deconstruction of social and self perceptions of beauty.
This study focuses on birth family (BF) contact among lesbian, gay, and heterosexual adoptive parents (APs). Questions explored include: Who is involved in the contact? What kind of contact? How do APs feel about BF members? Do the APs have written agreements about BF contact? Social media is predicted to be the most common format for contact. It is expected that most APs will feel positively about the birth mother (with whom they will have the most contact). The Contemporary Adoptive Families Study (CAFS) included 106 two-parent families (headed by lesbian, gay, and heterosexual couples) for Wave 1. For Wave 2, the same families were invited to participate. For this study, 50 families from Wave 2 were selected who had had direct contact with at least one BF member after their child’s birth. Most often, the APs were in contact with the birth mother. The most frequent type of contact was meetings. The APs had more neutral feelings toward everyone that they were in contact with. Most of the parents did have a contact agreement with the BF. The results help identify how openness arrangements work among a diverse group of adoptive families and may help elucidate ways to improve communication. Implications for policies and practices related to open adoption for an expanded population of APs will be discussed.
637  Concourse  8:30-9:15  Board C82
Emily Braden Reilly
Jennifer McDermott (Faculty Sponsor)
Department of Psychological and Brain Sciences, UMass Amherst
Early Environmental Stress and Adaptive Cognitive Outcomes in Children

Background: Although a great deal is known about the effects of maternal and economic stress on child developmental outcomes (Blair, 2010; Buss et al., 2011; Hughes et al., 2013; Raver et al., 2012), the buffering effect of maternal social support on child development remains unclear (Burchinal et al., 1996; Choi and Pyun, 2014; Durden et al., 2007; Manuel et al., 2012). The purpose of this study is to explore the potential modulating effects of social support on the relationship between maternal distress and adaptive child emotional and behavioral outcomes in an at-risk population.

Method: Low-income mothers from Western Massachusetts who participated in the Work and Family Transitions project during pregnancy into their child’s infancy were followed up in their child’s elementary school years and completed an online survey (N=58, M=8.5, SD=1.25). Using regression analyses we examined the effects of maternal mental health (characterized as low levels of depression and anxiety) and perceived social support on children’s emotional and behavioral outcomes. These outcomes were measured via the Temperament in Middle Childhood Questionnaire (TMCQ), the Child Behavior Questionnaire (CBQ), and the Behavioral Assessment System for Children (BASC-2).

Results: The interaction of high maternal mental health and high social support predicted lower levels of child negative affect (t=-2.576, p=.013). Conclusions: Perceived social support in mothers with high mental health predicts more adaptive outcomes for their children.
The purpose of the current 2X3 experimental study was to determine how the use of learning strategies and task application impacted knowledge and interest in a laboratory setting designed to replicate the classroom setting. Previous research supports the use of deep processing and metacognitive learning strategies and application for learning purposes. However, limited research has explored how the interaction of these learning techniques impact gaining new knowledge. Approximately 120 participants completed this study by listening to a presentation on an approach to relaxation through doodling, Zentangle. Using random assignment each participant was assigned to one of six possible conditions. These conditions were based on interactions between learning strategies and task application. The learning strategy conditions were surface processing, deep processing and metacognitive processing. For task application, participants were given step-by-step instructions to create a piece of Zentangle art or were placed into a no application control group. Participants’ interest was assessed by survey methodology addressing situational interest and competence in using presented information in the future. Those who completed the task application had significantly higher levels of competence compared to those who did not apply the task. No interaction effects on interest were present. A multiple-choice test was used to determine knowledge gained from the presentation. Results concluded that there was no significant interaction or main effects on task knowledge. These findings support the importance of using application as a source of learning and engagement within a classroom setting.
Observational Learning in Preschool-Age Children

This research project looked into the effect that observation and reinforcement have on a young child’s ability to learn. The purpose of the study was to give insight as to how young children learn, in order to find the most effective way to teach them. For the study, the researcher clapped upon entering the classroom every day for a week. The researcher then observed whether the students also clapped as they entered the classroom and provided reinforcement by smiling if they did. Coding was used to collect data on how many children clapped when they entered the classroom daily. The results were then compared based on gender and position in line (did the front of the line clap more often than the back of the line?). The results of the study will be discussed.
762  Room 174  4:30-5:15  Panel 7
Felicia Marie Romano
Michael James Constantino (Faculty Sponsor)
Department of Psychological and Brain Sciences, UMass Amherst
Client Autonomy as a Mediator of Long-Term Outcome in Cognitive-Behavioral Therapy Integrated with Motivational Interviewing for Generalized Anxiety

Objective: In a randomized controlled trial (RCT) on clients with severe generalized anxiety disorder (GAD; Westra, Constantino, & Antony, 2015), cognitive-behavioral therapy (CBT) integrated with motivational interviewing (MI) outperformed CBT alone across a 1-year follow-up; after the groups were equivalent at post-treatment, MI-CBT clients exhibited continued reduction in worry whereas CBT clients’ worry remained stable. This study will examine whether an increase in client in-session interpersonal behavior reflecting autonomy taking (i.e., friendly assertiveness, a theory-specific mechanism of MI) mediates the effect of treatment condition on follow-up worry reduction. Method: Data will derive from the Westra et al. RCT for which clients received 15 sessions of either the integrative MI-CBT (n = 42) or CBT alone (n = 43). Client sociodemographic and clinical characteristics were assessed at baseline, client interpersonal behavior was rated by the therapist (via the Impact Message Inventory) at five sessions throughout treatment, and patient worry severity was assessed at baseline, after every acute treatment session, and at 6- and 12- month follow-up. Results: Estimates of clients’ change in friendly assertiveness will be generated with hierarchical linear modeling to account for two sources of nesting—repeated measures over time and clients nested within therapists. The indirect effect of treatment on outcome through the putative mediator of autonomy taking will be tested using ordinary least squares regression analysis. Conclusions: The results will help determine whether MI has a theory-posited effect on interpersonal process in the psychotherapy relationship, which in turn accounts for its comparative “sleeper” effect on client improvement.
Social economic status (SES) alters sleep quality throughout development. Specifically, higher SES predicts increased sleep quality (i.e., sleep duration, latency, efficiency, and disturbances) and increased sleep duration in school-aged children and adults. Provided the accumulating evidence outlining the importance of sleep on learning and behavior during early development, we assessed relations between SES and sleep among 221 preschool-aged children. Sleep was assessed using actigraphy and sleep diaries completed by the caregiver. SES was measured by caregiver-report of total household income, financial difficulty, and need for financial assistance. Income and financial difficulty were negatively correlated ($r(222)=-0.457$, $p<0.05$), such that greater income was associated with less caregiver-reported financial difficulty. Financial difficulty and financial assistance were positively correlated ($r(231)=0.529$, $p<0.05$), such that caregivers who reported greater financial difficulty also reported greater need for financial assistance. Of interest, higher household income was associated with greater night sleep duration ($r(218)=0.323$, $p<0.05$), earlier night sleep onset ($r(218)=-0.372$, $p<0.05$), greater sleep onset latency ($r(218)=0.226$, $p=0.001$), greater wake after sleep onset ($r(218)=0.154$, $p=0.023$), and decreased sleep efficiency ($r(218)=-0.156$, $p=0.020$). Consistent with previous reports in older children, these findings indicate that sleep quality and duration are reduced among preschool-aged children of lower SES households. Interestingly, there were no significant relationships between child sleep parameters and the caregiver-reported financial difficulty or perceived need for financial assistance. Given that poor sleep is associated with behavioral problems, children in lower SES households may be at greater risk for behavioral deficits, and should be targeted with interventions to improve sleep habits.
706  Room 165  1:30-2:15  Panel 4
Briana Elizabeth Rosa
Jane Theriault (Faculty Sponsor)
Department of Psychology, Salem State University
The Effects of Media on People: How the Portrayal of Models Can Effect People’s Self-Esteem

This study explored how photos of models can effect an individual’s self-image. The objective of this study is to show that the media can have a negative impact on people because of how models are displayed in the media, and for people to be more aware of how the media portrays the “ideal” body. Participants were asked to participate in this study over the course of three days, viewing 30 photos over the course of these three days and answering surveys at the beginning and the end. At the end of the participants’ last survey, the first and last surveys were compared to examine how the answers changed over the three day period. Results will be discussed during the presentation.
Cell phone use has increased exponentially in recent years. This change is bound to impact socialization and ultimately friendship. This study was conducted among 71 undergraduate students at Framingham State University. The study was conducted by a self-reported questionnaire on the use of cell phones and perceived friendship quality. The study looks into the possible effects of cell phone use on friendship. Studies have been done on cell phone use and friendship, but one may question specifically what the impact of cell phone use on friendship quality is. More specifically the research was done to investigate a possible relationship between high cell phone use and lower friendship quality, high use of cell phones as a distraction from friends and lower friendship quality, and high cell phone use as a connector between friends and higher friendship quality. The results were non-significant finding no relationships or correlations between cell phones and friendship quality.
The Influence of Testosterone on a Calcium Binding Protein in a Sexually Dimorphic Brain Area

Brains develop differently in males and females due mainly to the influence of hormones such as testosterone (T). T spikes only in males just days before birth, but when female rodents are administered T on the day of birth their brains become organized in a male-typical fashion. This project investigates the sexually dimorphic brain area called the sexually dimorphic nucleus (SDN). Some neurons within the SDN contain a calcium binding protein, called calbindin (CALB), were shown to have neuro-protective effects. Males have a larger SDN than females, including more CALB+ neurons. Interestingly, the male SDN is larger because more neurons die off in females during the few weeks of life. CALB expression becomes robust in the male SDN just a few days after the spike in T. Although males have more CALB+ neurons in the SDN than females, the exact role played by CALB in SDN development is unknown. Because CALB can be neuro-protective, this project is interested in whether an insult in the form of kainic acid, a potent neuroexcitatory amino acid injected directly into the SDN, can stimulate the generation of more CALB+ neurons. In male and female rat pups, the SDN was injected with one of four doses of KA (low, med, high and very high) or saline vehicle. SDN size and CALB+ neuron count will be analyzed. This project may lead to future studies investigating the neurotoxic nature of T and a potential need for more CALB to be present in males as a form of protection.
Does This Feel Familiar? Repeated Exposure Strengthens Crossmodal Correspondence Associations

Background: People of all ages and language backgrounds associate abstract shapes and sounds, as established by the “Bouba-Kiki” effect. This effect is assumed to remain stable in an individual. However, with repeated exposure to stimuli, we speculate that association between a given sound and tactile shape (spikey shapes and “kiki/titi” or round shapes and “baba/gaga”) would strengthen as a function of time on task. As trials progress participants gain practice with stimuli, enabling more consistent and faster responses. Methods: 146 participants (age 3 to 89) were presented two tactile shapes when they inserted their hands into a box, into which they could not see. The shapes were 3-dimensional forms made of clay, and their geometry varied in spikiness or roundedness. Participants were then presented either an /a/ (e.g. “baba or gaga”) or /i/ (e.g. “kiki or titi”) sound and indicated which shape matched better with the sound. There were 2 pairs of shapes, 4 sounds, and 4 repeats for each combination, making up the 32 trials. Results: Our results suggest a strengthening in association strength between a tactile shape and sound pair, /a/ sounds with rounded shapes and /i/ sounds with spikey shapes, across time on task, or repeats of trials with the same shape-sound combination. There is an increase in association through the first two repeats of a given shape-sound combination, but association strength plateaus by the third repeat. This increase in association is thought to result from practice effects with repeated multisensory stimulus exposure.
700 Auditorium  1:30-2:15  Board A61
Nicholas Adam Schaefer
Jane Theriault (Faculty Sponsor)
Department of Psychology, Salem State University
The Effect of Peer Influence on Altruistic Decisions in the Digital Age

In today’s world, people are inundated by the ideas and opinions of their peers over the internet and social media. There is a large body of research showing that the social pressure to conform can be a powerful factor in making decisions. This study was designed to examine the extent that social pressure to conform can be transmitted through digital media. The online participants were assigned randomly to three groups. One group was asked to decide how they would distribute a hypothetical $1000 between five different charitable causes. The other two groups were asked to complete the same task while a pre-made bar graph titled to appear to be the averages of the other participants’ responses was displayed. One group saw a graph showing a preference for one charitable cause, while the second group saw a graph showing a preference for another. It was expected that the participants that are shown bar graphs that they believe to be the opinions of their peers will distribute a greater share of their money towards the charitable cause that was preferred in the bar graph. Results will be discussed.
The goal of this research is to study the effect of belief bias on probabilistic reasoning. Belief bias is the tendency to judge an argument’s strength on how much you agree with the conclusion (Stupple, 2008). In the current study, we examine whether a form of belief bias affects Bayesian reasoning, a type of probabilistic reasoning task in which the probability of a hypothesis is evaluated based on newly acquired data. 24 Bayesian reasoning problem sets were generated. Each set contained three problems. All three problems contained the same numeric values and answer. The text of the problems, however, were normed (108 participants) so that the correct answer was either believable or unbelievable. 54 participants, run on Mechanical Turk, were asked to solve these problems. Preliminary analysis shows that responses were closer to the correct answer when the conclusions were believable than when they were unbelievable. This result suggests that belief bias does play a role in probabilistic reasoning.
Alcohol addiction is a major public health concern, causing 88,000 deaths per year in the United States. However, not everyone who drinks alcohol becomes addicted. Initial individual preference for alcohol can be used as a predictor of future addiction. Recent studies have shown that neurons in the medial and lateral orbitofrontal cortices (mOFC and lOFC, respectively) encode relative value, however little research has been done to study the OFC’s role in individual alcohol preference. Using a rat model, we examined individual preference and OFC activity in high and low drinkers when presented with cues predicting sucrose, 10% or 20% alcohol. When presented with cues predicting 10% or 20% alcohol, we predict that low drinking rats will have increased neural activity in the mOFC and decreased neural activity in the lOFC, in comparison to high drinking rats. We predict that both high and low alcohol drinking rats will respond favorably to sucrose, with increased neural activity in the lOFC after hearing the cue predicting sucrose when compared to neural activity before the cue is presented. Neural activity in the OFC has been shown to predict behavioral responses. We predict that, animals that place a higher value on the alcohol reward will demonstrate more motivation in retrieving the reward than animals that value alcohol less. By comparing individual alcohol preference with neural activity, we hope to further describe the role the orbitofrontal cortex plays in motivation and reward retrieval. This research has direct implications for individual alcohol preference in humans.
Relation between Parents’ and Children’s Perceptions of their Economic Disadvantage

Little research has examined the relation between parents’ and children’s perceptions of their economic disadvantage. In the current study (n=92), traditional measures of disadvantage (income) were supplemented with parents’ reports of their perceived poverty as well as of material (e.g., going without heat) and social (e.g., lacking someone to talk to when feeling down) deprivation. Child age ranged from 47 to 108 months (M=79 months). Fifty-five percent of the sample lived in income poverty. Children were interviewed using a technique based on the Berkeley Puppet Interview, which uses two identical puppets that make opposing statements, and then ask for the child’s thoughts. For example: Puppet 1: “My parents don’t have enough money.” Puppet 2: “My parents have enough money. What about your parents?” Children respond verbally or by pointing to a puppet. Preliminary analyses utilizing a subset of the sample for which coding was complete indicated significant correlations between several parent-reported and child-reported indicators of disadvantage. For example, parent-reported monthly income was negatively correlated with children’s endorsement of the statement, “my parents worry about money,” (R = .43, p = .012), while parent-reported difficulty in paying monthly bills was positively correlated with this statement (R = .30, p = .045). These results suggest that young children are attuned to financial stress in their families. Findings for the full sample will be discussed in light of their implications for talking to children about financial stress and potential pathways by which perceptions of disadvantage impact child and family functioning.
Do Infants Distinguish Individuals Based upon their Socio-moral Behaviors?

Research shows that infants categorize objects based upon differences in their physical appearance. However, no prior study has shown whether infants possess categories for different types of moral actions that they might use to distinguish between different individuals. We tested whether infants use a character’s socio-moral behavior to distinguish one person from another. We showed 11-month-old infants a puppet show involving a puppet struggling to open a box to receive a block, when another character emerged from behind an adjacent screen. This character helped open the box (a ‘nice’ action) or slammed the box closed (a ‘mean’ action) before returning behind the screen. This was immediately followed by another attempt by the puppet to retrieve a second object from the box. Again, another character (identical to the first) emerged from behind a screen, helped open the box or slammed the box closed. The screen then dropped to reveal either one or two puppets behind the screen and infants’ looking-time was recorded. Our results indicate that when infants saw two different moral actions they expected to see two characters behind the screen. However, when infants saw two examples of the same moral action, they only expected one character behind the screen. We also report two additional experiments that controlled for alternative explanations (e.g. infants counting the number of actions, and perceptual differences in the movement of helpful and unhelpful actions). Together these results suggest that infants are biased to think about the identities of others based upon their socio-moral behaviors.
Contrary to the beliefs of many individuals, gender is not as plain as male and female. More and more people are coming out as identifying as a non-binary gender. And yet, many are unaware or misinformed about these lesser known identities. Now that more are coming forward, it is essential that society understands. In this study, subjects filled out an online survey which asked about how much they know about, evaluates opinions on hypothetical situations involving, and inquires about personal cases of gender identities. Results and implications will be discussed.
The Power of Subculture Groups: What It Means to Be a Geek

This research is an empirical study intended to better understand “fan culture” communities. “Fan culture” can be defined as “individuals who maintain a passionate connection to popular media, assert their identity through their engagement with and mastery over its contents, and experience social affiliation around shared tastes and preferences” (Jenkins, 2012). Fan culture groups focused on comics, science fiction literature and media, and gaming have historically consisted of primarily white men. However, these communities have recently seen greater participation by members of subordinate social groups (woman, people of color, members of GLBTA community, etc.). The goal of this research is to understand the impact of this demographic change by examining how fan culture community members conceptualize their participation, sense of belonging, and identities within these groups. The social and community psychology literature suggest that a strong sense of community is associated with psychological empowerment, positive identity development, and greater access to psychological and material resources (McMillan & Chavis, 1986; Rappaport, 1981). Nevertheless, very little psychological literature exists on whether these findings encompass the sub-cultural community of “fandoms”.

Julia Stern
Danielle Kohfeldt (Faculty Sponsor)
Department of Psychological and Brain Sciences, Bridgewater State University
Mental health stigma can be debilitating since a diagnosis labels a person in many aspects of life. Many people are currently advocating to de-stigmatize mental illness, but surprisingly, one of the most common groups to fall into the stigma trap are mental health professionals. This poster will discuss the stigma patients receive while in mental institutions through analyzing David Rosenhan’s 1973 study. In this study, Rosenhan evaluates whether staff in mental hospitals are truly able to distinguish between a person with a mental illness and a person without. All of the participants in this study were admitted to the mental institution with the same diagnosis, schizophrenia. However, none of the participants actually had a mental illness. The participants’ objective was to convince the staff that they were not mentally ill, which proved to be difficult since the staff saw the participants’ behaviors as their diagnosis. Through this presentation, the importance of prejudices in the mental health field will be addressed in terms of the stigmas mental health professionals unintentionally utilize in their careers. To conclude the paper, I propose a research design that would further Rosenhan’s study by assessing the behaviors of people who identify with a mental illness. Participants with a mental illness would be put in varying social situations in order to observe their behavior. The researcher’s goal would be to observe the participants to see if the observers expressed stigma in their assessment.
Influences on walkability have been measured (including feasibility, accessibility, safety, comfort, and pleasurableness) in urban environments, but not in natural environments (Alfonzo, 2005). Also, no research has been performed to investigate if other visual characteristics of the environment, such as brightness or terrain, have an influence on perceptions of walkability in the natural environment, as they do in the urban environment (Brunyé, Mahoney, Gardony, & Taylor, 2010). The current study investigated whether brightness or terrain contributed to perceive walkability of a nature trail. The study also investigated whether a participant’s outdoorsmanship affected their ratings of walkability for nature trails. Perceived walkability was measured as a summed score including ratings of feasibility, accessibility, safety, comfort, and pleasurableness, in order to determine if brightness or terrain contributed to the perceived walkability of a nature trail. The design for this study was a 2x3x2 mixed factorial design. The independent variables that were manipulated in this study, terrain and brightness, had a repeated measures assignment. Outdoorsmanship was a quasi-independent variable that had two naturally-existing conditions (outdoorsy and non-outdoorsy) and was measured by adding the total of an Outdoorsmanship Questionnaire. One approach to the walkability issue of nature trails is to pay attention to how people perceive/understand the environment, and how they use this information in the decision to walk. Walkability of a nature trail cannot be considered a purely random process, because it follows a psychological pattern based on visual perception and the hierarchy of needs.
A recent Frontline documentary on the sexual harassment of undocumented women, called “Rape on the Night Shift,” reported that this is “one of the most under-reported crimes in America today.” (Atlan & Ceital, 2015) Most of these women are either employed with cleaning companies that work overnight in large buildings, or in crop fields, with very few people around them. There are many forms of silencing and oppression in situations such as these, besides the obvious sexual harassment. Many women speak broken English, and are unable to communicate with others or the police. Other women are frightened of losing their job if they speak out against their attacker, who is usually a coworker, or a boss. Some women may be illegal immigrants, and are afraid of being deported for bringing attention to themselves, and some do not understand their rights despite being illegal. Some women may have all of these factors oppressing them at once. All of these, or any of these, force these women to live with their trauma in silence.

This research project will explore accounts from these women, in order to give voice to their experiences of this horrible and oppressive phenomenon, and to analyze how they are affected psychologically. Doing so will hopefully bring awareness of the violence against these women, and others in similar circumstances, who have been oppressed and frightened into staying silent.
Brand Loyalty and Company Ethics: The Impact of Responses to Consumer Complaints and Employee Needs

The establishment of brand loyalty in consumers is influenced by many factors such as brand qualities, exposure to the brand, and social influences. Few studies have assessed the extent to which a company’s ethics affects consumer loyalty. This study is proposed to examine consumer preferences and loyalty given access to information of company ethics. A total of 120 undergraduates at a small northeastern state university will complete a survey regarding their initial thoughts about a popular brand. Students will then be presented with one of four fictitious scenarios about the given brand regarding its ethical or unethical practice and will rate scales, one of which assesses their purchase intentions. Surveys will be analyzed to test hypotheses involving participants’ brand loyalty in relation to their beliefs in a just world, attitudes about shopping, and proneness to feeling shameful. It is hypothesized that purchase intentions will be lower among those exposed to a company’s controversial ethics than among those exposed to positive company ethics. The degree of brand loyalty effects is expected to vary with participants’ justice-related views, inclinations to feel guilt, and levels of shopping impulsivity. Findings of this study will yield implications to business practices that reinforce or harm customer loyalty.
680  Concourse  11:45-12:30  Board C77
Keri F. Swenson
Vivian Ciaramitaro (Faculty Sponsor)
Department of Psychology, UMass Boston
The Development of Emotional Interactions across the Senses: Interactions between Visual and Auditory Emotional Information in Children versus Adults

Background: Emotional information has been shown to bias perception. One method used to quantify such effects is adaptation; adapting to one category of information yields perceptual aftereffects in the opposite direction. For example, adaptation to happy faces biases emotionally neutral faces to be perceived as angrier (Rutherford et al., 2008) and adaptation to positive voices biases emotionally neutral voices to be heard as angrier (Skuk & Schweinberger, 2013). Here we examine how adaptation to visual and auditory emotional information biases how a face is perceived in children and adults. Method: To date we have ~30 children (8-12 years of age) and ~70 adult (18-35 years of age) participants from the Museum of Science Boston. Participants judged faces morphed along an emotional continuum from angry to happy and we determined each participant’s point of subjective equality (PSE), where a face was judged emotionally neutral. We then quantified change in PSE after adaptation to a happy or angry emotions in one of four possible conditions: (1) Congruent, matching emotional valence for concurrent visual and auditory stimuli (i.e., happy faces with positive crowd sounds); (2) Incongruent, opposite valence for concurrent visual and auditory stimuli (i.e., happy faces and negative crowd sounds); (3) Visual only or (4) Auditory only. Results: Preliminary results in adults and children, suggest the strongest adaptation effects in congruent and incongruent conditions, with weaker effects for visual alone and the weakest effects for auditory only. These results suggest that concurrent auditory emotional information is the most effective at influencing visual emotional processing.
681 Concourse  11:45-12:30  Board C78
Tracy Tam
Vivian Ciaramitaro (Faculty Sponsor)
Department of Psychology, UMass Boston
The Strength of Associations between Abstract Shapes and Sounds, Crossmodal Correspondences, Decreases for Older Compared to Younger Adults

Background: Crossmodal interactions are those that involve communication between two or more senses. Even 4 month old infants can integrate multiple sensory inputs to aid perception and this association strengthens into young adulthood. We examined whether or not this association strength diminishes in older adults.

Methods: Participants include 127 younger adults (age 18-35) and 80 older adults (age 50+). In experiment 1, two visual shapes were displayed, rounded and spiky, accompanied by a single auditory sound of either ‘baba’, ‘gaga’, ‘kiki’, or ‘titi’. In experiment 2, one visual shape was displayed, rounded or spiky, accompanied by two auditory sounds ‘baba’ or ‘gaga’ and ‘kiki’ or ‘titi’. In experiment 3, two shapes were touched without being seen, rounded and spiky, accompanied by a single auditory sound of either ‘baba’, ‘gaga’, ‘kiki’, or ‘titi’. For each experiment, participants chose the best matches for shape-sound pairings.

Results: For experiment 1, association strength for round shapes with ‘baba’/’gaga’ and spiky shapes with ‘kiki’/’titi’ remained constant between age groups. For experiment 2, association strength for round shapes with ‘baba’/’gaga’ and spiky shapes with ‘kiki’/’titi’ decreased for older adults compared to younger adults. For experiment 3, association strength for round shapes with ‘baba’/’gaga’ decreased for older adults compared to younger adults and remained constant for spiky shapes with ‘kiki’/’titi’. This decline of association strength as age increases may be due to a decrease in auditory word discriminability which might reduce the strength of crossmodal correspondence.
In 1930, a man named Harry J. Anslinger became the head of the Federal Bureau of Narcotics. Anslinger used his position to wage a ruthless campaign against the use of drugs, and thus started what is know today as “the War on Drugs.” As this “war” has raged on in the United States, society has generally come to view drugs as evil substances and drug users as inherently bad people. However, a further look into the nature of addiction proves that this is not necessarily the case. It is widely believed that a drug addiction is caused purely by the drug and its effect on the brain, but new research findings contradict this idea; addiction is actually much less physical and much more psychological. Some key sources of this information have been the results of multiple rat experiments, four of which I have explained and analyzed in my paper. This research is crucial to our understanding of addiction, as it gives us new insights into what addiction is and how it really works. These findings may one day help us all to reevaluate the way that our country thinks about the current “drug problem.” They may also help up to rethink and rework our current drug laws and policies.
My passion and interests revolve around the human minds and our emotions in how we cope, react, and behave during situations we are faced with daily. Some people have struggles and challenges that create who they are from childhood trauma but what is it about the different types of trauma and how as adults this effects our behaviors? Does someone that suffers from trauma react differently in handling and coping with the grief of divorce?
The transition into college is a major event, testing, among other things, students’ self-confidence, social skills, comfort with exploration, and ability to handle stressful emotions. Seeing that an individual’s attachment styles, or patterns, are thought to impact such factors, the present study sought to investigate whether students’ different attachment patterns in different close relationships relate to different aspects of their adjustment to college. Most of the literature on this topic has focused primarily on the contributions of one’s parental attachments. First and second-semester Salem State University undergraduates completed a three-part questionnaire covering their demographic information, experiences in close relationships, and academic and social adjustment to college. It was hypothesized that participants with secure attachments would report the best college adjustment. Parental attachments were expected to have the strongest relationship with academic adjustment, while peer and partner attachments were expected to be most related to social adjustment. Lastly, it was believed that reported stress and worry, the quality of one’s experience with a memorable high school teacher and a memorable college professor, and the quality of one’s experience with professors in general would serve as mediating factors between attachment and college adjustment. The hope of the present study is that the implications of the results will inform college counselors, professors, and other college personnel on better ways to help students smoothly transition into the college environment.
Adolescent binge drinking has been shown to have detrimental effects on the density of myelinated axons in specific areas of the male rat brain including the prefrontal cortex. The goal of our study was to test the hypothesis that alcohol consumption results in changes in transcriptional expression of myelin-related genes in the prefrontal cortex of adolescent rats. Quantitative polymerase chain reaction (qPCR) was used to measure the expression levels of four myelin-related genes: myelin proteolipid protein (PLP), myelin-associate oligodendrocyte basic protein (MOBP), myelin basic protein (MBP), and myelin-associated glycoprotein (MAG) in brain tissue dissections the day after drinking ended. The genes of interest are primarily involved in the compaction and overall maintenance of axonal myelination. Decreased expression of particular genes may be partially responsible for the observed decreases in myelin density in the prefrontal cortex. Analyses are still underway but preliminary results suggest one day after alcohol drinking ends, no changes in gene expression are detectable in males but MOBP expression may be increased in females. A larger sample size will be necessary to verify these results before further exploring the molecular mechanisms underlying the effects of adolescent binge drinking on prefrontal myelin.
The Effects of Interruptions on Cognitive Processing in a Complex Gambling Task

Interruptions, the temporary cessation of one task in favor of another, occur frequently in daily life. Previous research indicates that interruptions can adversely affect cognitive processing. For example, after an interruption, it typically takes additional time to restart the primary task (Ratwani & Trafton, 2008). It is still largely unknown, however, how interruptions affect the decision-making process itself. The present study seeks to address this gap by examining the effect of interruptions on the decision-making process in a relatively complex gambling task. Participants chose between a set of gambles, each with multiple, probabilistic outcomes. On half of the trials, participants were interrupted with a simple task (i.e., multiplication or spatial perception). Participants’ movements were recorded using mouse-clicks or eye tracking. The order in which the gamble outcomes were viewed was recorded. After an interruption, participants examined more cells, took more time, and explored more unique cells than in non-interruption trials. These preliminary results indicate that interruptions forced participants to (partially) restart the decision process, albeit with some savings. Interestingly, interruptions did not cause a qualitative shift in the decision process. These results suggest that, in this complex gambling task, although interruptions do adversely affect processing, the pattern of processing and overall processing results are not adversely affected.
The influence of water consumption on choice reaction time was evaluated to better understand short term dehydration's influence on choice reaction time. Participants were requested to withhold drinking any fluids for two hours prior to the choice reaction time experiment. Experimental conditions required participants to sit at a computer and discriminate between stimuli that appeared on screen. Participants were randomly placed into water and no water conditions. Findings included faster reaction times for participants in the water condition compared to the no water condition only if there was no video game playing history. Participants who reported playing an hour or more of video games per week had faster reaction times in the no water condition compared to the water condition potentially due to hydration status during weekly play.
The Generalized Assumptions on Suicidality and Suicide Tendencies in the General Public

There have been many studies in the past on suicidality and suicidal people. Similarly, there is even some information on how helpful suicide education is. However, there is little knowledge on the preconceptions that people have in terms on suicide tendencies and suicidality. This type of knowledge will be helpful in educating people on how to deal with suicidality and how to deal with suicidal people. A survey was constructed to assess the general population's knowledge about suicidal ideation, depression and its relevance to suicidal tendencies and generational differences in assumptions on the topic. The results of the survey allowed the study of common beliefs and misconceptions of the general population in regards to suicidal ideation and behaviors. An analysis of any patterns between generations have been studied to see if a correlation existed between assumptions about suicide and age. It was hypothesized that older generations would hold more negative presumptions about suicidal tendencies than younger generations. Results will be discussed.
An issue long-standing in the psychology community has been the effectiveness of medications like Selective Serotonin Re-uptake Inhibitors and Benzodiazepines on anxiety and depression. Are there more effective methods? Ones that do not cause any adverse reactions? The Expressive Therapies like Bibliotherapy, Music Therapy, and Psychodrama, in collaboration with Cognitive Behavioral Therapy, show reductions in symptoms of both anxiety and depression, and improves overall happiness, despite some limitations. Case studies, academic articles, interviews, and relevant non-fiction books were used in the analysis of both the effectiveness of medication in contrast to The Expressive Therapies and were used in determining overall conclusions.

The application of bibliotherapy in the case of four adults with Generalized Anxiety Disorder conducted by Gretchen Brenes, Ph.D. and associates showed both the benefits and limitations of bibliotherapy- just one of the three Expressive Therapies explored in this document. Medication will be shown to be a temporal fix when not causing outright worsened condition or biological adverse effects, i.e. exacerbated anxiety, insomnia, and addiction. Evidence supports the disuse of medication in the treatment of anxiety and depression in lieu of The Expressive Therapies.

The goal of the Expressive Therapies is to bring the patient into their healing in an active, impressionable, and long-lasting way. The world of psychology could stand benefit from a major shift from medication to the Expressive Therapies as much as those who suffer from anxiety and depression. A dramatic change in treatment is essential for world-wide mental health.
Menstruation, menstrual products, and perceptions or beliefs that surround them have long been taboo topics. The goal of this research is to determine the level of education men and women receive and their attitudes towards menstruation and menstrual products. This includes information about how women who are of menstrual age are viewed in society, health as related to menstruation and how certain menstrual products work. This research also seeks to open discussion as to why menstruation is not more widely accepted as a natural process. The research answers the question: Does age, race, gender or biological sex effect the amount of knowledge a participant has regarding menstruation or menstrual products, and is teaching of menstrual related topics effective? Participants in this study were asked to answer survey questions related to the methods by which they learned about menstruation, and about their general knowledge related to menstruation. Though this research is not yet complete, there is perceived to be a dearth of knowledge and a difference in knowledge as related to biological sex, gender, race and age. The perceived difference may be that biological males have less knowledge about menstruation when compared to biological females, and that the younger, and older participants will have less knowledge than participants of median age. The outcome of this research is intended to provide a platform on which the discussion and normalization of menstruation may be discussed, which may in turn aid in the furthering of education about this topic.
This thesis explores how Sigmund Freud’s theories of natural female inferiority and sexual identity created the backbone to the philosophy of Freudian sophistication-- which illustrated females as physiologically, mentally, and psychologically inadequate to their male counterparts. Moreover, Freudian sophistication’s alignment with traditional American cultural norms enabled it to act as a support for a patriarchal American culture that ultimately cultivated a pervasive dissatisfaction within the American female population of the 1950’s and the 1960’s. Charged with the moniker “the problem which has no name,” Friedan’s 1963 novel, The Feminine Mystique, shed light on the female dissatisfaction over the belief that females are fulfilled in achieving the natural-born role of wife and mother. This dissatisfaction created the epidemic of discontent that ravaged the American female population. Furthermore, this investigation will be juxtaposed by the current state of the American paradigm-- with a highlight on how the modern disapproval of Freud’s position of female inferiority reflects an over-arching shift towards an American paradigm that supports greater equality between the female and male sex.
Callie Wilhelmi
Pamela M. Ludemann (Faculty Sponsor)
Department of Psychology, Framingham State University
**Influence of Clothing Styles of Women on Impression Formation**

The purpose of this study was to explore perceptions of women based on clothing styles. One hundred and four college-age students (78 women) read scenarios conveying a new female student on campus accompanied by images of clothing (top, pants, and shoes) that varied on degree of sexualization. Participants rated this woman on social and academic abilities and gave opinions about the influence of clothing, personal clothing preferences, and preferred style of women’s clothing. Participant traits of self-esteem and need to achieve were also measured. Results showed that the provocatively dressed student was rated as most social. Ratings of academic ability of the provocatively dressed character were related to participants’ beliefs about the influence of clothing. Preferences for sexualized women’s clothing styles were related to high self-esteem, need to achieve, and egalitarian views. Findings imply that revealing or sexy clothing may have a strong influence on how women are perceived.
Throughout history women empowered other women through childbirth. For centuries, it was uncommon for men to assist with birth. However, in the 19th Century there was a rise in the medical practice of obstetrics resulting in women birthing in hospitals. Consequently, women were stripped of their rights and choices on how to give birth. Women were silenced and compelled to follow doctor’s orders, making them feel inadequate at an vulnerable time. Women, often against their will, were secured to tables, administered anesthesia, while doctors removed babies using forceps or vacuums. Many women have been traumatized by the lack of control faced in hospital settings. In the 1960s women became more aware of their rights and brought forth change in ways women give birth in hospitals. An essential and empowering movement is the use of a Doula, a trained and experienced professional who assists women with pregnancy, birth, and post-partum. According to DONA International (2015), research shows using a Doula during birth supports women to feel more positive about their birth experience. Research shows doula assisted labor leads to shorter labors and lowers use of medical interventions. The outcome of a positive birth experience promotes benefits such as a healthy transition to motherhood, successful breastfeeding, and lowers risks of post-partum depression. Birth is a natural and beautiful event, yet many women feel unsatisfied and troubled by the experience. Giving women power and support through birth is crucial. Maternal mental health needs to be supported by offering more support, resources and education. This research project will examine the history of birth practices, the psychological effects of silencing women’s birth choices, and the benefits of having a Doula assisted labor.
The Mind at Sea: Surviving an Ocean Voyage

Does the psychological strength that people need to draw upon to survive an ocean journey under extraordinarly circumstances resemble the mental processes of endurance athletes? There are countless stories of remarkable ocean voyages like the Coast Guard ships that perform daring rescues under terrible conditions or the trans-Atlantic ocean rowers that row across the ocean. But are there parallels between how one endures the ocean and how one deals with the never ending miles of a marathon or the treacherous climb of Mt. Everest?

What is it about these people that allow them to get through these ordeals while others don’t? To what extent does mental toughness or coping strategies determine success? And finally, what are the unique psychological factors brought upon the ocean voyagers that you don’t see in endurance athletes? In this research, we will explore the similarities and differences between the psychological processes of endurance athletes and those who endure unusually stressful ocean voyages. We will compare and contrast endurance athletes and ocean voyagers and examine their personality traits and mental characteristics that allow both groups of people to survive taxing and stressful situations.
PUBLIC HEALTH

779 Concourse  8:30-9:15  Board C03
Tracy Ann Acciavatti
Claudia Noelia Sanchez
Jennifer Whitehill (Faculty Sponsor)
Department of Public Health, UMass Amherst
Bladder Cancer in White American Males

Bladder cancer is one of the most prominent cancers in the United States. The bladder is located in the pelvis and is a vital organ of the urinary system. An estimate of about 76,000 new cases of bladder cancer is expected to occur within 2016. More than 16,000 deaths stemming from bladder cancer are anticipated in 2016. White men are affected 4 times as much as women and 2 times more than black men. About $4.1 billion was spent on bladder cancer treatment in 2014. Research using literature-based reviews of bladder cancer and risk factors will be performed using online databases such as PubMed. Smoking and exposure to certain chemicals are well-defined risk factors linked to bladder cancer. However, there are also many lifestyle factors such as physical activity, workplace exposures, and obesity that have shown to be connected with an increased risk for bladder cancer. This research of bladder cancer among white males in the United States aims to explore risk factors for this disease.
Depression is a common but serious mental illness, typically marked by sad or anxious feelings. College students occasionally feel sad, anxious, or stressed, but these emotions may pass quickly. For others, the symptoms persist and they may meet the criteria for a diagnosis of depression. Depression lasts for a long time, interferes with day-to-day activities, and tends to affect all aspects of an individual’s health. In 2011, the American College Health Association (ACHA) conducted a nationwide survey of college students at 2- and 4-year universities (National College Health Assessment). Researchers found that about 30% of college students reported feeling “so depressed that it was difficult to function” sometime in the past year. Additionally, leaving depression in college students untreated can lead to negative impacts on academic performance, productivity, and personal relationships. For our research, we reviewed literature from PubMed, American Psychological Association, and the Journal of Affective Disorders in order to assess and analyze the stigma around seeking help for depression. By researching the increasing trend of depression on college campuses, we discuss the importance of reducing barriers to mental health treatment. Using a public health approach, in this presentation, we identify strategies that can be effective in reducing the rates of depression among college students. We make recommendations about an approach to decrease the stigma around mental illness, thereby increasing students’ likeliness to seek treatment.
830  Room 903  2:30-3:15  Panel 5
Bianca Agustin
Sevan Mahdasian Dulgarian
Jennifer Whitehill (Faculty Sponsor)
Department of Public Health, UMass Amherst
Understanding the Prevalence and Assessing Intervention Techniques of Depression among College Students in the United States

Depression, an illness that negatively affects the body, mood, and thoughts, interrupts a person’s ability to both perform daily tasks and enjoy life. In the United States, 3 to 5 percent of people are suffering from major depression and the overall lifetime risk is about 17%. During the past 12 months, approximately one-third of U.S. college students have had difficulty functioning due to depression. Homesickness, changes in brain chemistry, intense workloads, and changes in environment such as newfound independence and friendships are common risk factors for depression among college students. Stress caused by financial struggles and intimate relationships can also trigger feelings of depression. Using the University of Massachusetts Amherst Library Databases, we will search keywords including depression, college students, treatment, and causes in order to identify some of the most prevalent risk factors for depression among college students. We will then examine research on the failures or successes of existing strategies for coping with these identified risk factors. Finally, we will make an informed recommendation of how to best address the issue of depression among college students based on our findings. Through our project, we seek to contribute to existing literature on depression among college students. Furthermore, we aim to highlight risk factors that could contribute to reducing the overall burden of depression for college students.
In the United States alone, roughly 1.2 million people are infected with Human immunodeficiency virus (HIV). The CDC estimates that 12.8% of this infected population is unaware of their health status. Human immunodeficiency virus (HIV) attacks an individual’s immune system, specifically the T cells, which are responsible for helping the immune system fight off infections. An effective cure for HIV currently does not exist. Once infected, the human body is unable to get rid of HIV completely. If left untreated, HIV can lead to the development of acquired immunodeficiency syndrome (AIDS). In the United States, AIDS accounted for 13,712 deaths in 2012. HIV is most common among men who have sex with men (MSM), and the primary mode of transmission is through sexual intercourse. Other risk factors include: having unprotected sex, having another sexually transmitted infection (STI) and using intravenous drugs. Our research will include using existing studies from the UMass library’s database as well as government documents. The focus of our research will be on the main risk factors that make the MSM population most vulnerable. We aim to identify and analyze prevention programs and initiatives that utilize current HIV prevention methods such as Preexposure Prophylaxis (PrEP), the use of condoms, sero-positioning (choosing a different sexual position or practice based on the HIV status of one’s partner), and actively getting tested. We hope that our recommendations for action will reduce the commonality of HIV/AIDS among the MSM population in the United States.
Understanding the Long-Term Effects of Non-medical Prescription Stimulants on Students Aged 18-22

Across the country, college students who have not been prescribed prescription stimulant medication have been using Attention Deficit Hyperactive Disorder or ADHD medication as a study aid. One study showed that 5.3% of college students are prescribed ADHD medication such as Ritalin or Adderall, and 61.7% of students that were prescribed the medication diverted the use of their prescription stimulants by means of illicit sharing, selling and trading. There are several short term and long term effects. Long term effects include organ damage and psychosis. Illicit drug use costs the health care system over 11 billion dollars and 39% of that is caused by stimulants alone. One study found that males have a higher disposition to misuse prescription stimulant aids. The study also found that college students who are involved in activities such as being in a sorority or fraternity, have a sensation seeking personalities, abuse or use alcohol, cigarettes or other drugs, and struggle academically may be at a greater risk for the misuse of stimulants. Literature-based review of this topic will be performed using the University of Massachusetts Amherst Library databases using key terms such as “prescription stimulants”, “ADHD medication” and “addiction and long-term effects”. The goal of this project is to understand and examine negative long-term effects of taking prescription stimulants. Our findings will bring awareness to the negative consequences of taking nonmedical prescription stimulants, add to the literature on nonmedical prescription stimulant abuse and seek to reduce the abuse of nonmedical prescription stimulants on college campuses.
With prevalence steadily rising in recent years, asthma has become the most widespread respiratory disease among all populations. A respiratory condition which causes moderate to severe contraction of the bronchi and obstructs normal breathing, asthma affects approximately 150 million people worldwide. A distinctive increase in the incidence of respiratory diseases in Indian children specifically has become evident as of late. With prevalence rates ranging from lows of 0.89% to 15.70%, more research is needed in order to understand why there is such a range in prevalence among one country. There are a number of risk factors associated with why asthma is so prevalent in the Indian youth population, including socioeconomic status/caste, occupation, access to healthcare, and environmental characteristics. By examining these studies we hope that our findings will help us to understand the causes of childhood asthma, possible risk factors, and how, if possible, to prevent it. We will also recommend possible approaches for slowing the rate of this increase within these affected areas. A literature based review of this topic will be conducted using the Databases provided by the University of Massachusetts Amherst Libraries website using the key terms India, childhood, asthma, and respiratory diseases.
Empowering Traditional Birth Attendants in Madagascar

According to the WHO, Madagascar has a high maternal mortality rate of 240 deaths per 100,000 live births. Reninjazas, the country’s traditional birth attendants (TBAs), can serve as potential assets in the fight against this problem. These healers, who are revered by their communities, provide affordable obstetrical services to women while respecting cultural and religious norms. They are particularly important to those who live in rural areas without access to healthcare facilities. Experts believe that they tend to around 51% of all births in Madagascar. Although Reninjazas care for a large population of women, allopathic professionals often regard them with contempt. This thesis draws on an extensive literature review and interviews with five Malagasy TBAs in order to determine the impact of integrating these healers into the allopathic system. The results show that in other countries, providing TBAs with training and medical resources has led to significantly lower infant and maternal death rates. Additionally, Reninjazas have enthusiastically indicated that they would like to work with allopathic professionals. This thesis concludes that systemic change is needed in Madagascar to alter the way that other healthcare workers perceive Reninjazas and to give Reninjazas the tools they need to lower the number of deaths occurring in childbirth.
Addressing the Role of Ethnic and Racial Disparities Related to the United States’ Infant Mortality Rate

A significant indicator of a nation’s overall health status is their infant mortality, defined by the Centers for Disease Control as the death of a child before his or her first birthday. The United States’ infant mortality rate is much higher than that of other developed nations. As of 2015, the nation’s’ infant mortality rate is 5.87 deaths per 1,000 live births, which is 167th out of 224 countries. Considerable racial and ethnic disparities exist as the rate among non-Hispanic blacks is more than double that of non-Hispanic whites. Specifically, the rate per 1,000 live births for non-Hispanic blacks is 11.11, while the rate of non-Hispanic whites is 5.06. The various risk factors, which account for 57% of infant mortality include congenital birth defects, preterm birth and low birth weight, maternal complications of pregnancy, sudden infant death syndrome, and injury. This project will feature a comprehensive literature review addressing the disparities in infant mortality among various demographics within the United States and its contribution to the nation’s relatively high rate of infant death. We will use the University of Massachusetts Amherst Library databases to research literature for this topic using the key terms: infant mortality, infant mortality rate, United States, and disparities. This project seeks to identify and evaluate practical strategies aimed at addressing the risk factors across ethnicities. Our findings will add to the literature on infant mortality in hopes of closing the racial gap and ultimately contributing to the national efforts of lowering the U.S. infant mortality rate.
Type II Diabetes (T2D) is a metabolic disease, primarily affecting the adult population, where the body’s blood glucose levels rise above normal after a meal. It stems from the body’s abnormal resistance to insulin, which helps control the rise in blood glucose. After a high-glucose meal, an individual with T2D will experience inhibited insulin secretion. Blood glucose levels rise resulting in a delayed return to normal levels. Over time, exposure to elevated blood glucose levels can cause serious health complications such as heart and blood vessel disease, hypertension, Alzheimer’s disease, nerve and kidney damage, and hearing impairment.

According to the CDC, 29.1 million people or 9.3% of the U.S population had T2D in 2012; this includes 21 million people diagnosed and 8.1 million people undiagnosed. Some risk factors include being overweight, old age, low physical activity, and poor diet. We will use literature reviews to examine associations between these risk factors and T2D, as well as identify existing interventions to address this problem. We will use the University of Massachusetts Library Databases with key terms such as diabetes, treatment, risk factors, and blood glucose levels. Our findings will support specific recommendations, which will address the increasing burden of T2D in the U.S. adult population.
Bisphenol-A (BPA) is a known endocrine disruptor used in the production of plastics and epoxy resins. More recently, BPA has been used in the photoactive dye on thermal paper. Recent studies have shown that dermal absorption of BPA can occur due to handling of these papers. One study showed that the use of personal care products containing dermal penetrants can accelerate BPA absorption. In contrast, regulatory agencies have largely dismissed thermal paper as a major source of BPA exposure. Their exposure estimates are based on assumptions about how humans interact with this material, stating that individuals only handle thermal paper once a day for no longer than 5 minutes, with only their index finger and thumb. Through IRB approved direct observation (n = 700) and the deployment of a questionnaire (n= 100) targeted to a college aged population at the UMass Amherst Blue Wall Dining Hall, our data contradict the risk assessment assumptions. We find that college-aged individuals handle receipts for an average of 11.46 minutes (+/- 0.25 SEM). We also find that less than 17% of individuals hold thermal paper with two fingers or less. Other data reveal no significant difference between male and female thermal paper handling behaviors. In addition, the location of the food purchased was related to the average time a participant was in contact with a receipt. Based on these data, we propose that the current models for estimating dermal BPA exposures are not in congruence with normal human behavior and should be reevaluated.
807  Room 808  11:45-12:30  Panel 3
Vanessa Bertrand
Gloria T. DiFulvio (Faculty Sponsor)
Department of Public Health, UMass Amherst
Flint Water Crisis: Looking toward Future Public Safety

According to the World Health Organization (WHO), no level of lead is safe especially in children. Globally, lead exposure has contributed to an estimated 600,000 new cases of childhood intellectual disabilities per year. Lead exposure is also a public health problem in the United States as the recent case in Flint, Michigan has revealed. Already, upwards of 25,000 children have been exposed to unsafe levels of lead in Flint. These levels are so significant that the president of the United States has declared a state of emergency. For this research, we reviewed literature retrieved from PubMed including epidemiologic and policy data and other articles pertinent to the current lead water crisis in Flint. Our research found that childhood lead exposure, and its contributing factors, is not an isolated issue, but rather a public health issue prevalent in countless American cities. Study of the causative factors in Flint, and identification of similar causative patterns in these other cities, has led us to suggest the adoption of a tri-level public health prevention model. This model entails providing consistently safe levels of water as primary prevention, and responding to civilian complaints in an appropriate, timely manner, actively testing water supplies and turning off water deemed to be dangerous as secondary prevention. Finally, we recommend tertiary prevention that would entail allocating resources to set up funding for special education programs for the affected children.
According to a report released by The Commonwealth Fund in 2013, the United States spends on average $9,086 per person on healthcare annually. Compared to other countries, the United States spends the most on healthcare. However, a large portion of this budget is spent inefficiently. According to the Institute of Medicine, in 2006 $91 billion was misused due to inefficient and redundant health administration practices. Since 2006, this number has continued to rise. Much of this excessive spending can be traced back to doctors over-treating patients. Overtreatment is defined as the treatment of a clinically insignificant disease. This project seeks to define the problem of inefficient health care spending, identifying the sources of these inefficiencies, and making recommendations for ways to eliminate wasteful medical practices. In order to reduce these financial inefficiencies caused by overtreatment in the United States, we recommend a dynamic public health intervention to address this multifaceted problem. We conducted our research using peer-reviewed databases, such as PubMed, accessed through the University of Massachusetts Amherst. These results will help to inform the development of a community-based intervention approach that will impact a large portion of the American population. Through our research we identified strategies to reduce the amount of inefficient medical spending in the United States, thus increasing the amount of money that could potentially be used to improve health outcomes in Americans.
Perfluorooctanesulfonic Acid (PFOS) affects pancreas length and morphology in the zebrafish embryo (Danio rerio).

Perfluorooctanesulfonic acid (PFOS) is a persistent environmental toxicant, previously used in non-stick products such as Teflon and Scotchgard. Levels of PFOS have been found in human biological samples, including in amniotic fluid. Exposure to PFOS has also been associated with increased risk for diabetes, obesity, and metabolic disease; however, how this might occur is not well understood. Some diabetes cases are associated with aberrant pancreas morphology such as truncation of the pancreas tail. This structure forms during embryonic development and may be affected by PFOS exposure. The hypothesis of this study is that PFOS exposure during embryonic development will reduce exocrine pancreas length. Embryos from the Tg (ptf1a:GFP) line were exposed to 0, 16, 32 or 64 µM PFOS beginning at 3 hpf. Exposures were maintained until 7 dpf, at which point the pancreas has structurally matured and secondary islet formation has begun. Total growth was characterized 7 dpf. The overall growth of the exocrine pancreas decreased in a dose-dependent manner at 7 dpf. This work indicates that PFOS exposure affects pancreatic development during organogenesis.
Obesity, a condition in which the body has accrued excess body fat, is a major public health burden in the United States. Over the past few decades, this concern has intensified among children, mainly ages 2-12. From 1980 to 2012, obesity increased from 7 to 18% in children ages 6-11, and according to CDC, more than one third of children were either overweight or obese in 2012. In 2014, about 23.9 million children were recorded as obese or overweight. There are several factors that contribute to the escalation of childhood obesity in the United States. Most notably, there is a lack of access to healthy food, low levels of physical activity due to a scarcity in play spaces, and an overall lack of parental education regarding diet and nutrition. Disparities, including socioeconomic status and parental education level, play a significant role as well. This project will identify key elements that contribute to the childhood obesity epidemic and analyze potential solutions. We will use databases including PubMed and Web of Science, as well as material from national public health institutes and organizations such as the (CDC), American Heart Association, and World Health Organization (WHO). Search terms will include obesity, childhood, overweight, diet, exercise, low-income, poverty, socioeconomic status and children. We will aim to develop a set of suggestions to reduce the burden of childhood obesity in the United States.
Laura Bowles  
Mikhaela Krystyna Tropp  
Gloria T. DiFulvio (Faculty Sponsor)  
Department of Public Health, UMass Amherst  
Primary Prevention for Type II Diabetes in American Indian Populations

Type II Diabetes is a chronic condition characterized by an inability to use insulin to regulate blood sugar effectively. If untreated, diabetes can have severe implications for a person’s well being. For example, people with diabetes are at an increased risk for comorbidities such as cardiovascular disease, end-stage renal disease, stroke, limb amputation and early death. According to the Centers for Disease Control and Prevention (CDC), prevalence of diabetes in the U.S. is 9.3%, and is highest among American Indians, who experience diabetes at a rate nearing 16%. Because American Indians are disproportionately affected by diabetes compared to other racial/ethnic groups, our research aimed to examine risk factors for diabetes specific to American Indians, define the implications of high diabetes rates in the American Indian population, and evaluate previous prevention efforts designed to address the health issue. Our research was compiled from articles accessed through PubMed and the CDC as well as several other data sources to examine risk factors and prevention methods to decrease the risk of diabetes in the American Indian population. Preventions of interest to the researchers were those that are known to result in improved diabetes outcomes and are culturally appropriate for American Indian communities. After reviewing current prevention efforts, we made recommendations for a culturally relevant community-level response to the prevention of diabetes among American Indian populations. Effective preventative measures can be taken on the community level by organizing efforts to promote lifestyle interventions that support weight loss, diet change and increased physical activity.
Declan Ryan Carbery
Jonathan Luis Serrano
Jennifer Whitehill (Faculty Sponsor)
Department of Public Health, UMass Amherst
Recommendations for Addressing Negative Health Outcomes in the Sex Industry of Thailand

The sex industry is a global public health problem. Sex workers ranging in age from childhood to adulthood experience severe physical and emotional distress, such as the development of post-traumatic stress disorder and depression, because of the type of work they do. The US Department of State defines prostitution as the exploitation of a person consisting of payment in exchange for sexual favors. Research on this data is limited. It is estimated worldwide that the sex industry is comprised of over 42 million workers. In Thailand, there are over 150,000 workers in the sex industry (including 5,600 men), 16,000 of which are foreign-born. This project highlights the mental and physical health outcomes of sex workers in Thailand’s sex industry. Literature reviewed so far does not define a direct link in risk factors to entering the sex industry, but poverty and previous drug abuse are thought to be gateways into this work. The University of Massachusetts Library Databases will be used to provide data by utilizing keywords such as mental health, sex industry, children/youth, adults, PTSD, prostitution, Thailand, and human trafficking to find the information and highlight the gaps in current research. This project will propose recommendations for future researchers to help improve health outcomes of sex workers. Additionally, these findings will identify prevention and recovery programs for victims in Thailand’s sex industry. Research and prevention programs are the first steps to solving this public health crisis in Thailand.
Gestational diabetes mellitus (GDM) is a form of diabetes that is specific to pregnant women. Between 2-5% of pregnant women will be affected by GDM. Complications may naturally occur during pregnancy due to insulin uptake in a woman’s body. However, when GDM is observed, complications are most likely due to a slight inefficiency of insulin that existed before pregnancy. Although GDM only occurs during a woman’s pregnancy, it can have long-term effects on her offspring. Children born to mothers with GDM show increased rates of obesity, high blood pressure, elevated risk of impaired glucose tolerance, dyslipidemia, and brain damage that may result in mild motor deficiency. Methods for obtaining information included performing keyword and phrase searches on the PubMed database, such as “effects of gestational diabetes mellitus on neonatal development” as well as performing Internet database searches for other scholarly sources using similar terminology. Results that did not prioritize fetal development and effects were excluded. Women who are older than 25, have a medical history of diabetes, high blood pressure, heart disease, or insulin related health conditions are at a higher risk for developing GDM. Early diagnosis and control of blood sugar levels throughout pregnancy can greatly reduce fetal complications. Therefore, to address this public health issue, early intervention for at risk mothers is vital to reducing the impact of GDM. Upon reviewing our research, we outlined recommendations for a public health initiative targeting at-risk populations.
Every day people are handcuffed in courtroom settings and are asked to answer questions or explain a type of narrative, e.g. a story. This paper investigates the use and importance of gestures and body language in attempting to express oneself. In this study forty-five young adults aged 18-25 participated by completing narrative and picture description tasks while shackled and unshackled. We predicted a significant difference in the use of gesture, both by the manual use of hands and postural position of the body. We observed each recorded session and categorized each body movement, creating a coding system for this task. The coding system is based upon what we see in the videos along with research drawn from several journals and experiments. Manual and postural gesture was coded from the videos. We predicted that along with the difference in body positioning, there would be a difference in speech as well. Data will be presented in tandem with a colleague who asked whether language complexity was affected in the same tasks. The poster will compare the difference in gestures with the difference in speech patterns for each task, both while shackled and unshackled. We hypothesize that body language and gestures are vital to use along with verbal language to communicate effectively.
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Stress Injury Management in Geriatric Populations Who Use Wheelchairs as Mobility Aids  

This research presentation will investigate the causes and management of stress injuries, such as pressure sores and stiffness, as well as changes with aging, such as balance and muscular strength, in geriatric patients who use wheelchairs as mobility aids. The general principles of biomechanics are centered around the study of forces and their effects on living systems. The rationale behind this research therefore is to provide specific examples of how biomechanics ties directly into physical therapy. Relevant peer-reviewed literature will be gathered, critically read, and synthesized to provide background information on balance, strength changes with age, stress injuries associated with wheelchair use, and typical treatments and interventions for the geriatric population that uses wheelchairs. A set of appropriate interview questions will be created and utilized through interviews with up to two physical therapists. The data from the interviews with the physical therapists who work with geriatric populations will be compared to the findings from the literature, in order to see commonalities in typical treatment and management practices of stress injuries in geriatric populations who use wheelchairs as mobility aids.
According to the National Institute of Health (NIH), 79 million people in the United States are currently infected with the Human Papilloma Virus (HPV). HPV is the most common sexually transmitted infection, of those affected roughly 74% are women ages 15-24 years. The Center for Disease Control and Prevention (CDC) reports this disease is so common that almost everyone that is sexually active will be infected at some point in their lives. HPV can cause genital warts, cervical cancer, and oral cancer if untreated. In the United States, HPV causes over 17,000 cases of cancer in women and over 9,000 cases of cancer in men annually. We researched academic journals through the search engine PubMed, and used the search terms human papilloma virus, HPV, and prevention. Further specific criteria included journals published in the past 10 years, articles that focused on HPV among 15-24 year olds, and women. We excluded papers that only focused on men. Data was also extracted from CDC and WHO websites. Risk factors for developing HPV include being sexually active under the age of 25, having multiple partners, or a partner who has had multiple partners. Taking preventative measures to protect oneself from developing HPV will lessen one’s risk at developing more severe health problems, including cancers. This paper examines the effects of HPV on women in the US and identifies the best practices for the prevention of HPV. After reviewing the literature, we present recommendations for the prevention of HPV among 19-24 year old women.
The Centers for Disease Control and Prevention has declared that prescription drug abuse is an epidemic. In the college-aged population, students have turned to misusing prescription stimulant aids such as Attention Deficit Disorder medications like Adderall and Ritalin. Between four and eleven percent of college students report illicitly using stimulants like Ritalin and Adderall and 61.8% of college students are offered Ritalin or Adderall. Research has shown that males have a higher tendency to abuse ADD medication. Additionally, activities such as being a member of a sorority or fraternity, abusing or using alcohol, cigarettes or other drugs, having a sensation-seeking personality or struggling academically are all risk factors that can lead to the misuse of ADD medication. When used by individuals not prescribed the medication, these drugs can be addicting. These drugs result in both short term and long term negative effects. This project seeks to examine the negative long-term effects of taking ADD medications, and the addictions that ensue. In addition, we will look at effective prevention methods for targeting college aged students since it is a prevalent issue in this population. Literature-based review of using the University of Massachussetts Amherst Library databases using key terms prescription stimulants, college students, ADD medication and addiction and long-term effects. This will add to the awareness of the negative consequences of taking nonmedical prescription stimulants that will deter college students from using these medications.
Drug Replacement Therapy: Helping or Hindering

Addiction is on the forefront of awareness in America. Drug replacement therapy is quickly becoming socially acceptable as a means for addicts to become productive members of society, but is not a good option because it is a physical attempt, drug, to solve mental symptoms, obsession and compulsion, of an emotional and spiritual complication which hinders the outcome of recovery. Findings are based on individual anecdotes of prior patients’ experiences, research into twelve-step fellowships who have been for decades and still are respected resources of recovery, medical facts showing negative impacts of the drugs, along with spiritual literature that addresses spirituality and the importance of a clear mind. Often arguments towards most commonly known resources for addiction is the interpretation of relapse as failure. However, findings indicate that when prescribed drug replacement therapy it does produce negative side effects for the individual in physical, mental, and spiritual aspects of recovery. Emotional and spiritual understanding provides individuals with potential to become more productive in society than previously considered fathomable. Therefore, it is irresponsible and unethical to try and solve a spiritual and emotional dilemma with a physical drug. Replacement therapy has physical degradations to the patient and disconnects them with an emotional and spiritual awareness that can only be obtained through complete abstinence from all drugs. In conclusion, the opiate epidemic is not a moral deficiency or physical compulsion alone, but an emotional and spiritual bankruptcy and must be addressed as such for any healthy realistic relief.
According to the CDC, in the United States, nearly 18% of children aged 6-11 were classified as obese in 2012. Obesity is associated with multiple negative health outcomes including an increased risk for cardiovascular disease, high blood pressure, and an increased risk for insulin resistance and type 2 diabetes. Recent studies have shown an increased number of pediatric diagnoses of type 2 diabetes. A decade ago, new-onset type 2 diabetes cases among youth accounted for just 3%. At present, 45% of new onset diabetes cases in this population are type 2. This study utilized PubMed, Google Scholar, and Science Direct to complete a comprehensive review of urban areas with high prevalence of diabetes in youth. The National Institute of Diabetes and Digestive and Kidney Diseases conference on behavioral science research in diabetes has identified adoption and maintenance of healthful eating, and physical activity, as priority areas for research and outreach efforts. In order to prevent obesity and the subsequent onset of diabetes, we review current policies in MA that impact food accessibility and physical activity for youth. After a review of different strategic interventions to reduce youth diabetes in other US urban areas, we will offer recommendations for interventions within Hampden County, which according to the CDC one of the only two counties in Massachusetts with obesity levels over 25%. Hampden County was chosen, as it was a pilot site for the Supplemental Nutrition Assistance Program, due to high obesity levels.
Anxiety disorders are a leading public health problem in the United States. According to the National Institute of Mental Health, anxiety disorders are the most prevalent form of mental illness throughout the United States influencing 18% of the population, about 40 million individuals over the age of 18. The Anxiety and Depression Association of America (ADAA) reveals that 54% of adult females and 46% of adult males experience some form of anxiety disorder. Based on a study commissioned by the ADAA anxiety disorders titled “The Economic Burden of Anxiety Disorders”, anxiety disorders account for almost one third of the year’s spending of 42 billion dollars towards mental health. There are four major types of anxiety including: generalized anxiety disorder (6.8 million adults), panic disorder (6 million), social anxiety disorder (15 million) and specific phobia (19 million). Within this paper, we will direct our research on generalized anxiety disorders among adult male and female young adults ages 18-24, because the scope of anxiety disorders is so broad. We will conduct our literature review based on our analysis of previous studies on the subject by searching these key terms in our UMass Amherst databases: anxiety disorder, mental illness, public health disease, intervention, prevalence. Major risk factors include everyday stress from work, school, personal relationships, finances substance abuse and genetics. We hope that our research will guide us toward uncovering an in-depth perspective of the topic as well as evidence-based strategies to combat the social and economic burdens of anxiety disorders.
Is BPA B-A-D? How Can a Consumer Tell?

An abundance of consumer advice exists in non-scientific literature regarding the danger of plastics releasing estrogen-mimicking chemicals into the human diet when heated. While questioning the potential danger of plastics leaching chemicals after dishwasher use, it was realized that little, if no, information is available from scholarly sources. Upon the discovery that valuable literature was nearly impossible to find, the focus of the investigation shifted to dangers of plastic leaching while heated by means other than a dishwasher. Numerous scholarly studies on the potential danger of heated plastics or Bisphenol A (BPA) contradict the advice given by government agencies. As consumers, it is onerous to navigate conflicting information from the Food and Drug Administration (FDA), World Health Organization (WHO), the Centers for Disease Control (CDC) and these scholarly studies. Occasionally, consumer guidelines vary within an organization itself. Many of these agencies now say BPA is safe, but to exercise a certain level of caution, especially when infants are involved. The outcome of this investigation indicates a need for more consumer-friendly, scholarly information to be available to the public.
Native American youth have disproportionately higher rates of suicide than those in the general population, and this is even worse in the Arctic regions of the United States. Alaska Native youth are twice as likely to commit suicide as their White counterparts. In order to combat the high rates of suicide in this area, a Positive Youth Development (PYD) youth leadership program was developed in Northwest Alaska. Given the extensive amount of research that demonstrates the importance of PYD—which aims to increase an adolescent’s internal and external assets—this program is an important one for this region. However, because the program is relatively new, program members have just begun to document its efficacy and consider more than antidotal evidence of its success. Using scholarly literature provided by the University of Massachusetts database, a comprehensive literature review was conducted to determine what best-practices other youth development programs are using, how they could improve, and how these practices could be applied to the Youth Leader program in Northwest Alaska. This research indicates that youth development programs—like the Youth Leadership program—lacks adequate documentation, and is therefore less sustainable and reproducible. This knowledge informed the practical work completed with the community of interest, in which the first practical guide for program participants was created to promote sustainability of key positions. The roles and responsibilities of key positions within the program are included, as well as recommendations for evaluation and activities to increase protective factors in youth.
Background: Malnutrition and vitamin deficiencies are leading global health concerns according to the World Health Organization. Inaccessibility of nutritious food is a major contributor to malnutrition. According to the United States Department of Agriculture, about one third of our diet relies on pollination from bees. Bee pollination is essential for the production of nutrients such as vitamin A, zinc, iron, folate and calcium. The recent collapse of bee colonies can be attributed to the overuse of insecticides on large farms.

Method: The authors used the database PubMed as well as Google Scholar to conduct their search. The authors used the key terms “malnutrition”, “nutrients”, and “food source” to find background information on the contributors of malnutrition. The authors reviewed articles relating to human populations in the United States. The authors found that sustainable agriculture is a vital variable in maintaining human nutrition and expanded their search to include the key terms “pollination” and “pesticides”.

Results: The authors’ search indicated that 5% to 10% of human food sources directly rely on bee pollination. Neonicotinoid, an insecticide that is widely used in developed countries, is responsible for directly impacting the health and development of honey bees and humans.

Discussion: After the research was conducted, it was concluded that sustainable agricultural practices are necessary to improve human nutrition. More research must be done to determine the most practical and effective method to achieve this. We present a public health strategy to address this urgent problem.
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Immune Responses of Human Males and Females in Association with Autoimmune Disorders

The purpose of this research is to explore the differences of immunity within genders associated with autoimmune disorders. Approximately 75% of the people affected with autoimmune diseases are women. In this study, we would like to explore the reasons why women are more likely to be affected by autoimmune diseases while their immune responses are more resistant to illnesses than men. The distinctions between the biological sexes and the behavioral genders are investigated to demonstrate how the immune responses of females and males function and how their dysregulations progress to autoimmunity. A variety of sources from primary scientific research to behavioral literature is used to support this study. Being aware of how the immune system functions allows both men and women to know the best way to take care of themselves as well as to help them understand the serious impact of autoimmune diseases on their family and community.
Since the beginning of Syria’s civil war in 2011, approximately 9 million Syrians have been displaced from their homes. Massive amounts of this population have spread out across the Middle East and into Europe. These refugees seek protection from the horrific aspects of this war, including the use of chemical weapons and airstrikes on civilians. Although the international community has given much attention to the refugee’s physical ailments, mental health needs are less often considered. Many displaced Syrians have suffered loss of family, witnessed extreme violence, and live in a state of constant uncertainty. These factors have contributed to serious psychological distress, which in turn can affect physical well-being. Based on a survey from the International Medical Corps, it is estimated that 31% of all Syrian refugees have a severe emotional disorder. Médecin Sans Frontières has called this problem a “mental health epidemic” and has indicated that there is an acute shortage of psychological care available for this population. Using a literature review composed of articles from PubMed, and Web of Science, the mental health needs of Syrian refugees are discussed in detail. Due to the escalating nature of this crisis, testimonials from refugees and media reports will also be utilized. From this analysis, we present recommendations on how to improve mental health services for this uniquely vulnerable population.
Understanding and Improving Health Outcomes among Sex Workers in Thailand

The sex industry is a global public health problem. Youth and adult sex workers suffer physical and emotional distress, including post-traumatic stress disorder and depression because of the nature of their work. There is little research available to provide reliable statistics on how many youth and adults suffer from these mental disorders. Prostitution is a debated topic due to the unknown conditions of how these workers are introduced to the sex industry. According to the US Department of State, prostitution is the exploitation of a person consisting of payment in exchange for sexual favors. The global sex industry has over 42 million workers. In Thailand, there are over 150,000 workers in the sex industry (including 5,600 men), 16,000 of which are foreign-born. Literature reviewed does not define a direct link in risk factors to entering the industry, but poverty and previous drug abuse are thought to be gateways. This project will focus on the mental and physical health outcomes, including drug addiction and abuse of workers in this industry. The research will be found by utilizing the University of Massachusetts Library Databases using keywords such as mental health, sex industry, youth, adults, PTSD, prostitution and Thailand to find the information needed. The gaps identified will be used to make recommendations for future research to improve health outcomes of sex workers. Additionally, this project will identify prevention and recovery programs for victims to reduce this public health problem in Thailand.
A current public health crisis that many industrialized countries are facing today is lung cancer induced by poor air quality. According to the World Health Organization, air pollution is a carcinogen. The most recent data from the Global Burden of Disease Project indicates that in 2010, 3.2 million deaths worldwide resulted from air pollution, including 223,000 from lung cancer. Chronic exposure to air pollution has shown a significant increase, with the biggest impact on overpopulated industrializing countries. The current air pollution crisis in Nepal will be the focal point of this literature review. Using the databases provided by the University of Massachusetts Amherst Libraries, we will conduct a systematic review of the literature using the keywords; “smog,” “air pollution,” “lung cancer,” and “Nepal.” Articles that do not directly pertain to smog induced lung cancer in Nepal will be excluded via the screening process. We plan to investigate the possible risk factors tying air pollution to respiratory diseases in Nepal, such as; home fires, poor indoor ventilation, vehicle exhaust emissions, and the poor ecosystem management. As the number of deaths caused by air pollution continue to increase, it is evident that that the air is carcinogenic. The purpose of this literature review is to highlight risk factors contributing to air pollution in Nepal, and to raise awareness regarding these factors. In turn we then plan to use that data to hypothesize public health interventions to reduce rates of smog induced lung cancer.
Pertussis, also known as whooping cough, is a highly contagious respiratory disease caused by bacterial infection. Symptoms include a severe cough that can lead to tightening of the throat muscles, heart failure, and in some cases mortality. Between 2013 and 2014, prevalence of pertussis increased by 15% in the U.S. according to the CDC. Although infants are most susceptible to pertussis, natural immunity weakens as we age, making booster vaccines an important preventative measure. We will be using the UMass Amherst databases and other databases such as PubMed to research peer reviewed journals to help us determine these specific health risks; our research will include comparing the standard vaccination rates during the years of lowest recorded cases of pertussis to current rates in the U.S. We predict the lack of vaccinations as well as the non-requirement status of booster vaccines in the U.S. are major risk factors for the increase of pertussis cases. Through our research methods we will analyze changes in disease frequency over time by comparing past and present data, and applying those findings to this issue. We hope to highlight the cause of the spike of pertussis prevalence in order to further demonstrate the importance of vaccination.
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**Long-Term Exposures to Air Pollution and Pneumonia Hospitalizations in Elderly Adults: A Cohort Study**

Rationale: Long-term exposure to air pollution can cause respiratory and cardiovascular disease. However, little is known about how chronic exposures to air pollution affects the risk for pneumonia. Objective: To investigate the long-term effects of exposure to traffic-related air pollution and the risk of new and repeated pneumonia hospitalizations in a prospective cohort study. Methods: We followed 57,053 participants from the Danish Cancer, Diet and Health cohort, aged 50-65 years, using the Danish hospital discharge registry. Annual nitrogen dioxide (NO2) levels were estimated at residential addresses since 1971 as a measure of exposure to traffic-related air pollution. We modelled the association between NO2 levels since 1971 and hospitalizations for pneumonia using Cox regression in the full cohort, for people with and without previous pneumonia hospitalizations, as well as with or without hospitalizations for co–morbib diseases, defined by the Charlson’s index. Main Results: Overall, doubling NO2 exposure increased pneumonia risk by 25%. Higher air pollution exposure exponentially affected pneumonia hospitalizations with increasing age groups. NO2 levels were significantly positively associated with risk for pneumonia hospitalization for first-time admissions after baseline. The highest risk association was observed for high exposure in people with a history of pneumonia hospitalizations before baseline, although less exposure levels are not significant. Co-morbid diseases did not affect pneumonia incidence. Conclusion: Long-term exposure to traffic–related air pollution increases the risk for new pneumonia hospitalizations. The risk seems to be highest in subjects with previous pneumonia hospitalizations.
Depression is a mood disorder that causes persistent feelings of sadness and interferes with an individual’s ability to function in everyday life. At any point in time, 3 to 5 percent of people in the United States suffer from major depression and overall lifetime risk is about 17%. Approximately one-third of U.S. College students have had difficulty functioning in the last 12 months due to depression. Common risk factors for depression among college students include homesickness, changes in brain chemistry, intense workloads, and changes in environment such as newfound independence and friendships. Additionally, financial struggles and intimate relationships can serve as sources of stress which can trigger feelings of depression. In this project, we will reference existing studies from PubMed and Web of Science using the University of Massachusetts Amherst Library Databases. We will search keywords including depression, college students, treatment, causes and improvement in order to identify some of the most prevalent risk factors within our interest population of college students. We will then work to address relevant coping strategies for these risk factors by examining research on the failure or success of existing strategies. Based on our analysis, we will make an informed recommendation of how to best address the issue of depression among college students. We also hope our project will contribute to reducing the overall burden of depression for college students.
Effects of Vitamin E on Bisphenol A Absorption and Reproductive Outcomes: A Single Blind, Randomized Clinical Trial of Efficacy and Safety.

Bisphenol A, BPA, is one of the most widely produced and distributed chemicals in the world; more than one hundred tons of BPA are released into the environment every year. Even at low doses, adverse effects on human health have been associated with BPA exposure. BPA affects human health by binding to the alpha and beta estrogen receptors, thus artificially triggering a hormonal response. Men categorized in the highest quartile of BPA exposure have been found to have decreased sperm motility count, and altered morphology. Women in this group have high rates of implantation failure, and higher recurrences of spontaneous abortions. In addition, women who seek IVF treatments have been found to have higher than average BPA concentrations than women who conceive naturally. In research designed to counter the adverse effects of BPA exposure, studies in mice have found promising results demonstrating that vitamin E may have protective effects on spermatozoa. The goal of my research is to study the potential protective effects of low, middle, and upper doses of dietary and supplemental vitamin E exposure on the harmful reproductive effects of BPA exposure in adult males. I plan to conduct a randomized controlled trial of 44 men, stratified into four random groups. Baseline measurements will be collected to determine pre-study urine BPA concentrations and sperm quality. Men assigned to the experimental arm of the investigation will be further randomized to receive one of three different levels of Vitamin E. The study will test the null hypothesis that Vitamin E has no effect on male sperm count, motility and deformity.
790 Auditorium  10:45-11:30  Board A20
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Young Women and Heroin Treatment

According to the CDC, women between the ages of 21-39 account for 63.6% of persons admitted to treatment for substance abuse and within Massachusetts 44.3% of women seeking treatment reported heroin as the primary drug abused. Drug related deaths in Massachusetts (15.6 per 100,000 population) exceeded the national rate (12.7 per 100,000). The sharp increase of heroin substance abuse and heroin overdoses within the United States, specifically Massachusetts, between the years of 2005-2015 is cause for alarm. For individuals, heroin use contributes to a higher risk of HIV, liver failure, kidney failure, Hepatitis B and C, as well as several other adverse health effects including death. Heroin use poses a significant economic burden on health care spending as well. The National Institute on Drug Abuse (NIDA) estimates that drug use costs the United States billions of dollars annually in order to address its destructive consequences, including HIV/AIDS, birth outcomes, crime, violence and disruptions to families, communities, workplaces and educational environments. Using data compiled through both state and national level Public Health agencies and scholarly articles we examined accessibility to various treatment options for young women seeking assistance for heroin addiction ages 20-40. Our aim is to identify issues that contribute to the increasing rates of heroin use by women. We will also research best practices in prevention including access to treatment and successful recovery for women. Using a public health approach to substance abuse prevention, we will identify strategies to reduce rates of heroin and increase access to treatment for women in Massachusetts.
The United States leads the world in health care spending yet remains average in health outcomes. Infant mortality is defined as the death of a baby during the first year of life and is often used as an indicator of a nation’s health. It is measured as the number of infant deaths per 1,000 live births. According to the Centers for Disease Control and Prevention over 23,000 infants died in the U.S in 2014. Within the U.S., there is a large disparity in infant mortality rates depending on geographic location, demographics, and socioeconomic status. This project compares the U.S. infant mortality rate with similarly developed countries, Japan, France, Germany, and Italy. As a developed country, the U.S. should not have significantly higher rates and needs to address these differences. The U.S. spends approximately 17.6% of its’ GDP on health care. With disproportionately high spending compared to other countries, the U.S. still has an infant mortality rate of 5.87 as compared to Japan, which has an infant mortality rate of 2.0. Data for this project was collected using databases found through the University of Massachusetts Amherst library and other databases such as PubMed. We conducted a policy analysis identifying alternative policies that could be adopted in the U.S. We made policy recommendations aimed at decreasing infant mortality rates. By making significant policy changes, the U.S. will be better able to address the factors contributing to infant mortality.
According to the CDC’s Morbidity and Mortality Weekly Report (MMWR), the United States had approximately 33,400 deaths caused by firearms in 2014 alone. The United States’ homicide by firearm rates are 25.2 times higher than that of any other high-income country. Moreover, roughly 4.5 million new firearms are sold each year in the U.S., and this number does not take into account secondhand firearm transactions or stolen firearms. Across the country, gun violence is a prominent issue that government officials, politicians, and the public have failed to address. Through scholarly articles, case studies, and peer-reviewed journals, such as PubMed, Center for Disease and Control, and County Health Rankings, we examined the various factors contributing to the accessibility of guns in the United States and the correlation between firearm access and general gun violence. Using the findings of this investigation, we used social campaigning and community-based interventions to address the problem of gun violence. In order to scale-down nationwide gun violence in the United States, inefficient policy measures need to be identified and reconstructed to ensure the safe distribution and handling of firearms. We devised policy recommendations on gun accessibility in an effort to improve current deficient laws in gun accessibility. Our goal is to reduce the amount of gun related violence in the United States by proposing a sustainable reformation in gun accessibility and by increasing public support for increased intervention for these issues through social campaigns and community outreach.
According to a 2013 report released by The Commonwealth Fund, the United States spends on average $9,086 per person on healthcare annually. Compared to other countries, the United States spends the most on healthcare. However, a large portion of this budget is spent inefficiently. According to the Institute of Medicine, in 2006, $91 billion was misused due to inefficient and redundant health administration practices. Since 2006, this number has continued to rise. Much of this excessive spending can be traced back to doctors over-treating patients. Overtreatment is defined as the treatment of a clinically insignificant disease. This project seeks to define the problem of inefficient health care spending, identifying the sources of these inefficiencies, and making recommendations for ways to eliminate wasteful medical practices. In order to reduce these financial inefficiencies caused by overtreatment in the United States, we recommend a dynamic public health intervention to address this multifaceted problem. We conducted our research using peer-reviewed databases, such as PubMed, accessed through the University of Massachusetts Amherst. These results will help to inform the development of a community-based intervention approach that will impact a large portion of the American population. Through our research we identified strategies to reduce the amount of inefficient medical spending in the United States, thus increasing the amount of money that could potentially be used to improve health outcomes in Americans.
Bisphenol A (BPA) is a chemical compound that is found in a vast amount of material goods such as water bottles, receipts, dental fillings, eyeglass lenses, and food containers. BPA acts similarly to natural hormones secreted in the body and is associated with complications in the endocrine system, immunodeficiency, reproductive issues, and long-term illnesses such as heart disease, diabetes, breast cancer, testicular cancer, and more. The purpose of this study is to examine how infants (less than one year old) are affected by prenatal exposure to BPA since infants are in the early stages of hormonal development. In a 2009 study by the Center for Disease Control and Prevention, BPA was found in 93% of children’s urine samples and 95% of adults, which indicates a very high prevalence in the bodies of most people. In order to identify relevant studies, the search terms “BPA,” “bisphenol A,” “infant,” and “health” were be used within PubMed and ScienceDirect. Research outcomes include that prenatal exposure to BPA can lead to low birth weight, low measures of emotional control, high levels of anxiety, and hyperactivity among infants. In this presentation, we will discuss the effects of BPA in detail and present recommendations for a public health strategy that will reduce the negative birth outcomes associated with exposure to BPA during pregnancy.
A Morphological Study on the Effects of BPA Replacements on Mammary Gland Development

Endocrine disrupting chemicals (EDCs) are chemicals or chemical mixtures that interfere with hormone binding, synthesis, metabolism, transport or degradation. EDCs are found in consumer products including plastics and personal care products. Chemicals such as bisphenol A (BPA), bisphenol S (BPS) and Ethinyl Estradiol (EE2) can act as estrogen receptor (ER) agonists, and ER is known to play a critical role in the development of the female mammary gland. Developmental exposures to BPA increase the appearance of alveolar buds and induce intraductal hyperplasias in mice. Animal studies have also demonstrated that exposure to EDCs could induce adverse effects on exposed progeny, as well as unexposed descendants over multiple generations via epigenetic mechanisms. To determine whether there are multi-generational effects of EDCs on the developing mammary gland, we exposed pregnant and lactating female mice to low doses of BPS and EE2. We collected mammary glands from their granddaughters (the F2 generation), who were exposed solely as germ cells. Using immunohistochemical, histological and volumetric morphometric analyses, we have determined that BPS, but not EE2, disrupts the histoarchitecture of the F2 generation mammary gland in adulthood. Our analyses of whole mount mammary glands revealed significant changes in ductal extension. We also identified significant alterations in expression of Ki67, a marker of cell proliferation, in BPS-treated females. A trend for increased expression of ERα was also observed. These results suggest that BPS may induce effects on multiple generations of female mice.
Understanding and Reducing Preterm Birth among African American Women in the US

Preterm birth is a birth that occurs before the thirty-seventh week of pregnancy. According to the Centers for Disease Control and Prevention (CDC), the preterm birth rate in the United States was 9.6% in 2014, affecting approximately 1 in every 10 infants. Since 2007, premature births in the U.S have decreased by 8%; however, it is still an issue for specific racial and ethnic groups such as African-Americans. In 2014, 50% of African-American infants were more likely to be born preterm than Caucasian, Hispanic, and Asian/Pacific Islander infants. Primary risk factors associated with preterm births are socio-economic status, medical history, pregnancy conditions, and exposure to drugs and alcohol. In order to uncover why the rate of preterm birth and its risk factors are high in racial and ethnic minorities we will conduct research by investigating peer-reviewed literature as well as non-peer reviewed literature from both government organizations, nonprofit organizations, and the University of Massachusetts Amherst library databases using the key terms preterm, birth, African-American, women, and risk factors. Our review will address the prevalence of preterm birth in the U.S. and ultimately aims to address why women are subjected to the known risk factors. As a result, we will provide information about the known risk factors that contribute to early childbirth and suggest intervention methods to reduce the risk of preterm birth.
Purpose: The aim of this study was to analyze speech characteristics in individuals with Parkinson’s disease (PD) before and after voice treatment. Speech characteristics were analyzed using acoustic measures of vowel space area (VSA) and speech intelligibility. Methods: Ten individuals with idiopathic Parkinson’s disease participated in an 11-week music group therapy program. Participants included 5 males and 5 females, with mean ages of 74.2 years (SD ± 4.15) and 71.8 years (SD ± 8.87), respectively. Acoustic measures of VSA were derived for vowel tokens (/i/, /u/, /æ/, and /a/) embedded in short sentences, reading passages, and the Star Spangled Banner. Analysis: VSA was expressed in two ways: (a) VSA of the irregular quadrilateral formed by the first and second formants of the corner vowels /i/, /æ/, /a/, and /u/; (b) VSA of the triangle formed by the first and second formants of the vowels /i/, /a/, and /u/. In addition, a validated speech intelligibility instrument was administered pre- and post-treatment. Intelligibility scores will be compared using a paired samples t-test. Results: Data collection is complete and statistical analyses are in process. Data will be characterized by parametric and descriptive analyses. It is hypothesized that the post-treatment VSA measures will more closely resemble normative data reported in the literature for healthy older adults. It is further expected that post-treatment speech intelligibility scores will be higher, reflecting improved speech communication. Conclusion: Studying the impact of voice treatment on speech production may impact how clinicians structure speech treatment programs for persons with PD.
Human trafficking is a worldwide crime that significantly affects the mental health and wellness of its women and children victims. Not only do these victims experience physical disease and illness related to these human rights violations, but they also experience negative mental health outcomes that can last their entire lives. Human trafficking is the world’s fastest growing global crime with 80 percent of its victims being women and children. Many will not have access to psychiatric professional care after being trafficked, while others will not even seek care due to feelings of shame and guilt. However, all of the victims will suffer significant emotional distress. This project examined the effects of human trafficking on the mental health status of its victims. When researching we decided to use PubMed, National Institute of Health (NIH), and Google Scholar. Additionally, we used data from other sources including: Centers for Disease Control and Prevention (CDC). We only included articles which studied female victims between the ages of five and eighteen, also articles which were published after the year 2005. In order to improve the mental health of human trafficking survivors we have proposed a public health intervention that consists of social marketing campaigns to reduce stigma for survivors and to educate physicians on supporting the survivors. By addressing this issue of mental health in human trafficking survivors with our social marketing campaign, we hope to improve survivors’ mental health by increasing public awareness to reduce stigma for survivors and to improve training for physicians.
Asthma, a respiratory condition which causes moderate to severe contraction of the bronchi and obstructs normal breathing, affects approximately 150 million people worldwide. It has also recently become the most widespread respiratory disease among all populations. A noticeable increase of incidence of asthma, specifically among Indian children, has become increasingly evident in recent years. As asthma prevalence in India continues to rise, reaching heights of approximately 15.70%, it is becoming more necessary to understand the factors contributing to such an increase in prevalence. Among the various risk factors associated with elevated asthma prevalence, socio-economic status/caste, occupation, access to healthcare, and environmental characteristics appear to play an important role. With the University of Massachusetts Amherst Database, we will conduct our literature based review using the key terms India, childhood, respiratory disease and asthma. By examining these studies we hope that our findings will help us to understand the causes of childhood asthma, possible risk factors, and how, if possible, to prevent it. Possible approaches for slowing the rate of this increase within these affected areas will also be discussed.
Visual versus Auditory Confrontation Naming in People with Aphasia

Aphasia, a language impairment commonly caused by stroke, results in deficits in language production and comprehension. People with aphasia exhibit difficulties in naming, or verbally labeling objects or concepts. Naming abilities may differ depending on whether the input is visual or auditory. Data were collected from participants with stroke aphasia as well as from age- and education-matched controls. Participants were asked to complete two tasks. The visual confrontation naming task involved naming 30 living and 30 nonliving objects following picture presentations. In the auditory confrontation naming task, participants were asked to name 9 living and 9 nonliving objects following both a visual-perceptual and a functional-associative definition. Responses are being analyzed in order to determine whether participants performed better on one task or the other. An analysis of modality-specific deficits is important in order to determine what type of input can aid in the naming process.
Type II Diabetes (T2D) is defined as a metabolic disease where the body’s blood glucose levels rise above normal after a meal. This occurs when the human body has an abnormal resistance to insulin, which helps control the rise in blood glucose. After a meal high in glucose, in an individual with T2D, insulin secretion is inhibited and blood glucose levels continue to rise and take much longer to return back to normal. Heart and blood vessel diseases, nerve, kidney, eye and foot damage, hearing impairment, skin conditions, Alzheimer’s disease, and hypertension are all serious health complications that may occur as a result of T2D. According to the CDC, in 2012, 29.1 million people or 9.3% of the U.S population have T2D; this includes 21 million people diagnosed and 8.1 million people undiagnosed. Some risk factors include being overweight, older age, low physical activity, and poor diet. We will use literature reviews to examine these associations with T2D and identify existing interventions to address this problem using the University of Massachusetts Library Databases with key terms such as diabetes, treatment, risk factors, and blood glucose levels. We will create recommendations based upon our findings that we hope will help address the great toll of diabetes.
Elizabeth Ann Jarvis  
Mary Andrianopoulos (Faculty Sponsor)  
Department of Communication Disorders, UMass Amherst  
The Efficacy of Digital Media and a Telepractice Platform to Deliver Speech-Language Pathology Services to Students with Autism

Purpose: This study investigated the efficacy of digital media and a telepractice platform to deliver speech-language pathology services to students with Autism. Introduction: Telepractice is a method of service delivery that utilizes technology, such as a computer, webcam, secure videoconferencing software, and digital media. Empirical research supports that individuals with Autism prefer visual media to human faces and respond more accurately and frequently to instruction delivered using technologies. Published research also shows that students with Autism exhibit fewer distractions, required fewer prompts and reinforcers when services were delivered using telepractice. This investigation addressed the following questions: 1) What applications are most frequently utilized by SLPs to deliver intervention to students with ASD using a Telepractice service delivery model; 2) How effective and appropriate are these applications (APPs) with respect to the theoretical bases underlying the APPs for targeting specific speech and language behaviors, including age- and grade-appropriateness, and cultural-linguistic sensitivity; and 3) What is the level of satisfaction when using these APPs for both the SLP clinicians delivering the services via Telepractice and the students with Autism receiving the intervention services. Methods: Seven graduate students delivered SLP interventions to 13 students with Autism in grades K - 12 using an alternating research design. A research instrument was used to qualitatively and quantitatively evaluate the effectiveness of the digital media (APPs) used during intervention. Student outcomes revealed that services delivered using Telepractice vs. face-to-face onsite were effective. The digital media used for each procedure were also studied for, age-appropriateness, and empirical outcomes.
775   Auditorium   8:30-9:15   Board A55
Yuliya Katsman
Kelly Richardson (Faculty Sponsor)
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Dysphagia Management in Patients with Advanced Dementia: Alternatives to Enteral Feeding

There are an estimated 46.8 million people worldwide living with dementia. Symptoms of dementia can include memory impairment, communication and language deficits, and difficulties with higher-order executive function skills, such as reasoning and judgement. In the advanced stages of the disease, patients may also begin to show impaired swallow function (dysphagia) and/or a loss of interest in oral intake, which heightens their risk for pulmonary aspiration, malnutrition, and/or dehydration. The current medical intervention for dysphagia includes dietary modifications and/or enteral (tube) feedings. Despite their prevalence, there is data to suggest that enteral feedings may not prolong life, decrease pulmonary aspiration risk, prevent pressure sores, or help alleviate existing pressure sores in this clinical population. Enteral feedings also require extensive lifestyle changes for patients and their caregivers, which is thought to facilitate a patient’s placement into a care facility. As a result of these factors, there is controversy over whether enteral feedings improve or degrade quality of life. This paper will respond to these identified risk factors and explore alternate courses of dysphagia management for patients with advanced dementia. These strategies may include sensory stimulation to enhance oral feeding as well as an examination of external factors, such as medication schedules, which may play a role in altering swallow function. Other mechanisms may include discussing advance directives regarding enteral feeding in the early stage of the disease, and later, making the decision to transition to palliative care.
776  Auditorium  8:30-9:15  Board A61
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The Effects of Choral Singing on Respiratory Muscle Strength in Patients with Parkinson’s Disease

Purpose: Parkinson’s disease is a progressive neuromuscular disorder that is estimated to affect 1 million Americans. Patients with Parkinson’s disease often exhibit difficulty with motor movement, speech and voice quality, and respiratory function. Currently, there are few behavioral treatments available to remedy these deficits. The purpose of the present study was to investigate a novel behavioral treatment program to improve respiratory control. Methods: 10 individuals with idiopathic Parkinson’s disease were studied. Participants included 5 males and 5 females, with a mean age of 74.2 years (SD ± 4.15) and 71.8 years (SD ± 8.87), respectively. All participants attended an 11-week choral singing program. Respiratory function was examined pre and post treatment using measures of maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP). Analysis: A paired t-test was used to examine group differences in MIP and MEP post-treatment. Statistical data are reported separately for males and females. Group differences in respiratory function will further be examined using descriptive measures. Results: A significant difference in MIP and MEP measures were observed post-treatment for males and females. All speakers were found to significantly increase respiratory muscle output following participation in an 11-week choral singing program. Conclusion: The present results may have implications for future directions of speech and voice treatment for patients with Parkinson’s disease.
The mammary gland undergoes different phases of development in the embryonic, pre-pubertal, pregnancy, lactation, and involution stages of a mammal’s life. During these time periods, the mammary tissue is strongly influenced by hormones; for this reason, scientists have hypothesized that synthetic chemicals with hormonal activities could disrupt gland development and contribute to diseases like breast cancer. Bisphenol S (BPS) is an organic compound that is used in many everyday consumer products and human exposure is widespread. BPS has been used to replace Bisphenol A (BPA), which is known to affect the mammary gland. Ethinyl Estradiol (EE2) is a pharmaceutical used in contraceptive pills. Our study examines the effects of early life exposure to BPS or EE2 on the mammary gland of female mice at puberty. To assess effects on the mammary gland, growth parameters in whole mount glands are quantified using volumetric morphometrics. The histological appearance of mammary glands is also assessed using standard histological methods; proliferation and protein expression is quantified using immunohistochemistry. These assessments will allow us to better understand whether environmentally relevant doses of two synthetic estrogens disrupt development of the female mammary gland. This study is especially important because although BPS exposures are widespread, this compound is poorly studied.
This project aims to model the risks of mother-to-child transmission of HIV at different periods of time in-utero and intrapartum. The purpose is to determine whether the risks of transmission at various periods in-utero and intrapartum differ by HIV subtype. This is done through the application of maximum likelihood methods, to a meta-analysis of data obtained from a combination of clinical trials and surveillance systems, including 5,662 mother-infant pairs with all mothers diagnosed as infected with HIV. This research is significant because of the large sample size and diverse data, rendering it a non-trivial statistical modeling problem. The findings are important because they should highlight differences between non-B subtypes of HIV with regards to overall risks of transmission and treatment efficacy. This findings will enable clinicians to prioritize when to give treatment to minimize economic costs and risks of resistance, particularly in countries where resources are heavily limited.
Alcohol intoxication affects many of the skills required to safely and effectively operate a motor vehicle. These include judgment, concentration, comprehension, coordination, visual acuity, and reaction time. The Centers for Disease Control and Prevention (CDC) reports that each day in the United States almost thirty people die in motor vehicle crashes that involve an alcohol-impaired driver. Current data demonstrates that alcohol-related car crashes account for approximately one third of all car crash fatalities. Experts have estimated that the total annual cost of alcohol-related car accidents in the United States exceeds $59 billion. An analysis of previously published research will be conducted to compile a literature review in which we will assess the prevalence and risk factors of alcohol related motor vehicle crashes. By approaching the research systematically, we will search the University of Massachusetts Amherst databases to gather information. Utilization of the CDC and National Highway Traffic Safety Administration, (NHTSA) websites will also attribute to the review. Our research aims to highlight the extent of this problem, and identify populations that are most at risk for driving while impaired by alcohol. The data suggest young people, compared to older populations, are the population most at risk in being in a drunk driving accident. We will examine possible measures to help prevent injuries and fatalities from alcohol impaired driving. We will use our findings to suggest preventative strategies for the future to reduce fatalities, cost, and impaired driving overall.
A Picture Is Worth a Thousand Words: The Relationship of Psycholinguistic Variables and Picture Naming in Aphasia

Aphasia is an acquired neurogenic language disorder, usually occurring secondary to stroke in the left language-rich hemisphere. The hallmark of aphasia is a disruption in the intricate process of lexical retrieval, routinely manifested in impaired word retrieval and picture naming. A vital method of assessment and treatment for individuals with aphasia, picture naming has contributed to increased understanding of how aphasia can disrupt the lexical retrieval process. Impaired picture naming affects individuals with aphasia of varying type and severity, but many are still able to correctly name some pictures some of the time. Why are certain pictures accurately named by individuals with aphasia, while others are still affected by aphasia deficits disrupting the lexical retrieval process? What is the relationship between psycholinguistic variables, such as age of acquisition and frequency, allowing the word to be less vulnerable to typical word retrieval deficits consistent with aphasia? What does this suggest about lexical storage and retrieval? In a retrospective study of an aphasia treatment study, we assessed responses to pictures presented to aphasic subjects three times at baseline, looking for patterns within and between subjects. We will compare the baseline naming results between objects and action pictures, and with each image’s associated psycholinguistic variables. We predict that pictures associated with an earlier age of acquisition, and higher frequency, will be named more often than pictures with a later age of acquisition and lower frequency in individuals with mild to moderate aphasia. Individuals with severe aphasia will be less consistent in their responses.
Endocrine disrupting chemicals (EDCs) can mimic the effects of endogenous hormones and disrupt development in animals. The objective of this study is to determine the effects of two xenoestrogens, bisphenol-S (BPS) and ethinyl estradiol (EE2) on the lactating mammary gland (MG), maternal brain, and nursing behavior in CD1 mice. We hypothesize that BPS and EE2 will act as EDCs in the lactating MG and brain, and cause changes to nursing behavior. To address our hypothesis, data were collected from the exposed adult females (F0 generation) and their daughters (F1 generation, exposed during early development). Outcomes of interest included time spent nursing and nursing posture. After weaning, lactating MGs and brains were collected from dams. Preliminary analyses revealed that EE2-treated F1 dams spent less time nursing than control dams. The lateral regions of the lactating MGs were also less developed in EE2-treated females on lactational day 2, and there were fewer lobules. Although only some of these results were statistically significant, collectively they suggest alterations in the capacity to provide maternal care after xenoestrogen exposures. Additional studies are in progress to measure estrogen and prolactin receptors in the arcuate nucleus of the brain and to further assess MG histoarchitecture, using H&E and immunohistochemical staining. Our results may be consistent with the hypothesis that estrogenic EDCs can affect the ability of animals to rear offspring, and that pregnancy and lactation represents a critical development period for the mother.
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Effects of In Utero Exposure to EE2 and BPS on Uterine Development

The tragic story of diethylstilbestrol (DES) highlighted how offspring exposed to pharmaceutical estrogens in the womb can experience disastrous health outcomes that largely manifest at and after puberty. Yet, the effects of gestational exposure to other exogenous estrogens is not fully understood or appreciated by the medical community. Epidemiological studies examining women that consumed pharmaceutical birth control pills during pregnancy have focused largely on major birth defects in exposed offspring, but few if any have examined the long term consequences that this exposure might induce. Our double blind study examined F1 female mice that were exposed to ethinyl estradiol (EE2) or bisphenol-S (BPS) during gestation and the perinatal period. We hypothesize that low dose exposure to xenoestrogens during early development will induce subtle but significant changes to the reproductive tract that become apparent as the females reach puberty. Morphometric analyses revealed surprising effects of BPS, but not EE2, on uterine epithelial height. We will continue to quantify the effects of these xenoestrogens using immunohistochemistry to characterize expression of the progesterone and estrogen receptors in the uterus. Additional analyses will also quantify cell proliferation (using immunohistochemistry for Ki67) and apoptosis (using a TUNEL assay). We believe that these results will shed light on whether EE2 can be used as a model to study the effects that other exogenous estrogens have on the developing uterus.
Reducing the Risk of HIV/AIDS through Preventative Measures among the MSM Population

Human immunodeficiency virus (HIV) is a persistent problem with roughly 1.2 million people infected in the United States. Of those people, the CDC estimates 12.8% do not know their status. HIV attacks the body’s immune system and reduces the number of T cells, which fight infections. Untreated HIV leads to acquired immunodeficiency syndrome (AIDS), which in 2012, took the lives of 13,712 people. The body is unable to get rid of HIV completely once infected and currently there is no cure. HIV is most common among men who have sex with men (MSM) with its primary mode of transmission through sexual intercourse. Other risk factors include; having unprotected sex, having another STI and use of intravenous drugs. Using existing studies from the UMass library’s databases and government documents, our group will focus on the main risk factors that make the gay and bisexual population most vulnerable. Our research aims to identify and analyze prevention programs and initiatives that utilize current HIV prevention methods such as Preexposure Prophylaxis (PrEP), the use of condoms, sero-positioning (choosing a different sexual position or practice based on the HIV status of one’s partner), and actively getting tested. We will make recommendations for action that we hope will help reduce the high burden of HIV/AIDS in the U.S. among the MSM population.
The purpose of HIV exposure and transmission laws is to criminalize behaviors in which transmission of HIV could occur. Ethnic minority, sexually marginalized, and HIV-positive communities in the United States are disproportionately impacted by HIV-specific criminalization laws (HIVCL). This study seeks to raise awareness and understanding of the effects of HIVCL on vulnerable communities. This project takes three primary methodological approaches: systematic literature review (peer-reviewed research articles and commentaries, news articles, and press releases), national state-by-state policy analysis of all United States laws regarding the criminalization of HIV exposure and transmission (legislative tracking and archival research), and case-study of the State of Missouri v. Michael Johnson (2014). Analyses revealed that due to their date of enactment and lack of modification, most HIVCL are outdated in terms of the science, social norms, and practices that transmit HIV. Overwhelming evidence suggests severe negative health and social outcomes of HIVCL; there is scant evidence to defend them. Transmission of HIV among people in states with HIVCL occurs earlier than transmission among those in states without HIVCL. Within the 50 states (including DC), nine states have not prosecuted for HIV exposure or transmission. Six states allow sentencing enhancements if a person has HIV. Language used for current measures in Rhode Island and Iowa are also examined. This study identifies who HIVCL target, what behavior HIVCL cover, the trends in HIVCL enactment, the effect that they have on health and society, and an example of what these laws can do to a person’s life.
Infant mortality, defined by the Centers for Disease Control (CDC) as the death of a child before his or her first birthday, is considered a significant indicator of the nation’s overall health status. As of 2015, the United States’ infant mortality rate is 5.87 deaths per 1,000 live births, which is 167th out of 224 countries. This rate is among the worst when compared to other developed nations. A major contribution to this poor national rate are the considerable disparities among racial and ethnic minorities. The infant mortality rate of non-Hispanic blacks is more than double that of non-Hispanic whites, with a rate of 11.11 and 5.06 per 1,000 live births respectively. The main risk factors, which together account for 57% of infant death in the United States, include congenital birth defects, preterm birth and low birth weight, maternal complications of pregnancy, sudden infant death syndrome, and injury. This project will feature a comprehensive literature review addressing the disparities in infant mortality among various demographics within the United States and its contribution to the nation’s relatively high rate of infant death. We will reference existing studies using the University of Massachusetts Amherst Library Databases using the keywords: infant mortality, disparities, United States, and infant mortality rate. This project seeks to examine the key risk factors for infant mortality as well as identify evidence-based strategies to address them. We will make recommendations for action that, if implemented, may help close the racial gap and ultimately lower the U.S. infant mortality rate.
for lifelong anti-rejection medications can disrupt the normal immune defenses and make these patients more sensitive to the adverse effects of air pollution.

Objective: Investigate whether a patient’s recovery post lung transplantation is associated with exposure to pollutants emitted from industrial sources.

Methods: We conducted a retrospective cohort study of 364 bilateral lung transplant recipients who were transplanted through the Toronto Lung Transplant Program between 2002 and 2012 and survived for longer than 12 months. Patient recovery was evaluated as the maximum forced exhaled nitric oxide (FEV1) obtained in the first year post-transplant. Patients’ home residence was used to evaluate industrial pollutant exposure. Exposure was assessed using annual emission releases from the Canadian National Pollutant Release Inventory as well as proximity to industrial facilities. Linear regression models were used to estimate the associations of maximum FEV1 obtained and air pollutant exposure, adjusting for various patient characteristics.

Results: An association was identified between proximity to industrial facilities and the maximum lung function obtained (113 mL decrease in FEV1 per km2 of industrial area in a 1.5km radius of the patients’ residence; 95% CI:-211,-15). Exposure to industrial VOC emissions was also found to decrease the maximum obtained FEV1 by 118 mL per IQR change in emitted tons of VOCs (95% CI: -207,-29.2).

Conclusion: These data suggest proximity to industrial facilities is associated with a decrease in the maximum obtained FEV1 in lung transplant recipients during their first year post transplant.
According to the National Institute of Justice, 20 to 25 percent of women on college campuses nationwide will be the victims of sexual assault. Less than 5 percent of those assaults are reported to law enforcement. The purpose of this study was to examine the relationship between the experience of sexual assault and the mental health impact it had on college-aged women. Prevention and education were a main focus of this research. Using peer-reviewed literature, information on the correlation between sexual assault experienced by college-aged women and their mental health was gathered. Research indicates that sexual assault on college campuses happens at an alarming rate and consequently has many psychological effects on victims such as high levels of depression, anxiety and PTSD. Research on the association between sexual assault and mental health should influence policymakers and college administrators in the United States to take action against the people and the culture that contribute to sexual violence. As a result of our research, we put forward recommendations based on national best practices. These recommendations are part of a comprehensive public health plan that includes an educational campaign to help reduce the incidence of this severe public health concern.
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Health and Wellness: A Study of What Motivates Behavior

With the obesity epidemic and chronic illnesses on the rise, more and more people are relying on some form of medical care costing nearly three trillion dollars annually in the United States. I will be investigating health psychology as it relates to personal understandings of health, wellness, and illness with a special focus on mechanisms of motivation and agents of change and how those relate to when or how people become proactive about health. The investigation will include how one moves from a disease treatment (or sick) model to a wellness and prevention model. With a combination of scholarly resources such as peer reviewed studies, and my own research conducted in the form of a survey given to Bristol Community College students, I will gather information regarding the knowledge of and attitudes towards health and wellness and how this is used to manage people’s own lifestyle decisions. I will be answering questions regarding beliefs, attitudes, health perception and current knowledge of preventative care, as I investigate what motivates people to make big decisions regarding their health.
Racial Inequality and Preterm Birth in Hampden County

Each year in the United States, about 450,000 preterm births occur. Of those, about 8000 deaths occur due to complications associated with preterm births. According to the World Health Organization, preterm birth is defined as babies born alive before 37 weeks of pregnancy. In addition to death, preterm births are associated with increased morbidity including lifelong disabilities such as behavioral problems, and neurological disorders. African Americans women are disproportionately affected by preterm birth at a rate of 253 deaths per 100,000 infants. In Massachusetts, rates are slightly lower than the national average, but Springfield, MA has the highest rates within the state. This project compiles existing research on preterm births. We looked at factors that contributed to preterm birth in African American women on multiple levels, including community and individual factors, as well as sociopolitical influences. We investigated interventions, preventative measures, and identified programs that have attempted to address this issue within the United States and internationally. We have used our findings to propose preventative strategies including health policy which may impact the high rates of preterm births in Springfield. For our research, we conducted a review of best practices and policies to address the issue of preterm birth in the United States. We identified solutions nationally and internationally and make recommendations based on these findings. A new strategy is needed to address preterm birth in the United States given the associated health outcomes for newborns.
According to the World Health Organization (WHO), no level of lead is safe especially in children. Globally, lead exposure has contributed to an estimated 600,000 new cases of childhood intellectual disabilities per year. Lead exposure is also a public health problem in the United States as the recent case in Flint, Michigan has revealed. Already, upwards of 25,000 children have been exposed to unsafe levels of lead in Flint. These levels are so significant that the president of the United States has declared a state of emergency. For this research, we reviewed literature retrieved from PubMed including epidemiologic and policy data and other articles pertinent to the current lead water crisis in Flint. Our research found that childhood lead exposure, and its contributing factors, is not an isolated issue, but rather a public health issue prevalent in countless American cities. Study of the causative factors in Flint, and identification of similar causative patterns in these other cities, has led us to suggest the adoption of a tri-level public health prevention model. This model entails providing consistently safe levels of water as primary prevention, and responding to civilian complaints in an appropriate, timely manner, actively testing water supplies and turning off water deemed to be dangerous as secondary prevention. Finally, we recommend tertiary prevention would entail allocating resources to set up funding for special education programs for the affected children.
Zika virus, a mosquito-borne virus which has thought to have originated in Uganda, has rapidly become a public health crisis. The current outbreak of the virus appeared in French Polynesia in 2013. Zika virus was declared a global health emergency by the World Health Organization at the beginning of February 2016. From May 2015 to the end of January 2016, Brazil has been the most affected country, with an estimated 1.5 million new cases. In adults, Zika virus causes mild flu-like symptoms and it is also thought to be associated with microcephaly in the infants of women who have been infected during pregnancy. Microcephaly is a congenital abnormality characterized by decreased head circumference. In Brazil 4,000 cases of microcephaly have been reported since the emergence of the virus in May of 2015. This number is more than 27 times higher than the number of cases in 2014. By using keywords, “Zika virus” and “microcephaly” while searching databases accessed through the University of Massachusetts Amherst, we will investigate current literature and recently published journal articles with the hope of identifying risk factors for Zika virus and means of preventing it. Understanding the risk factors for microcephaly and other birth defects related to Zika virus, in addition to modes of transmission, will allow us to identify methods of preventing incident cases.
Access to Clean Water in Haiti

Forty percent of Haitians lack access to clean water, accounting for approximately four million people. Waterborne illnesses caused by contaminated water lead to greater than half the deaths in Haiti each year and are one of the leading causes of childhood illness and infant deaths. The 2010 earthquake and cholera epidemic exacerbated the issue of poor water quality. We utilized research databases such as PubMed to investigate our topic and identify solutions to this preventable problem. We assessed feasibility of certain programs that have been previously implemented in Haiti and other underdeveloped countries. Lack of infrastructure and political unrest have contributed to the water crisis. Despite receiving substantial international aid in improving the water system, the water crisis remains a significant problem. Even though there is wide availability of water in Haiti, accessibility remains the key problem. By analyzing existing solutions, we identified best practices to improve the water system and reduce water-related health problems. Access to clean water is an essential part of human growth and development, and lack of access infringes on all areas of life, creating barriers to basic human needs. With technological advancements, improved educational systems and a wide societal collaboration the issue of unsafe water conditions in Haiti can be eliminated. We provide recommendations to improve in these areas and ways in which access to clean water can be improved in even the most rural areas of the nation.
Barriers and Solutions to the Water Problem in Haiti

Forty percent of Haitians lack access to clean water, accounting for approximately four million people. Waterborne illnesses caused by contaminated water lead to greater than half the deaths in Haiti each year and are one of the leading causes of childhood illness and infant deaths. The 2010 earthquake exacerbated the issue of water quality and added additional stress on the already fragile infrastructure. We utilized research databases such as PubMed to investigate our topic and identify solutions to this preventable problem. We will assess feasibility of certain programs that have been previously implemented in Haiti. Lack of infrastructure, in addition to environmental issues, have contributed to the water crisis. Despite receiving substantial international aid in improving the water system, Haiti still faces a state of economic water scarcity. Although there is wide availability of water in Haiti, accessibility remains the key problem. Analyzing existing solutions we identified best practices to improve the water system and reduce water-related health problems. Access to clean water is an essential part of human growth and development, and lack of access infringes on all areas of life, creating barriers to basic human needs. It is important to acknowledge that this issue is preventable. With technological advancements, improved educational systems and a wide societal collaboration the issue of unsafe water conditions in Haiti can be eliminated. We provide recommendations to improve the issues regarding access to clean water in Haiti.
Secondary and Tertiary Prevention for Type II Diabetes in American Indian Populations

Type II Diabetes is a chronic condition characterized by the body’s inability to use insulin to regulate blood sugar effectively. If left untreated, diabetes can have severe implications for a person’s wellbeing. People with diabetes are at an increased risk for comorbidities such as cardiovascular disease, end-stage renal disease, stroke, limb amputation and mortality. According to the Centers for Disease Control and Prevention (CDC), prevalence of diabetes in the U.S. population is 9.3%, but it is highest among American Indians, who experience diabetes at a rate nearing 16%. Because of this disparity, our research aimed to define the problems associated with high diabetes rates in the American Indian population, risk factors for diabetes specific to American Indians, and previous prevention efforts designed to address the health issue. Our research was compiled from articles accessed through PubMed and the CDC as well as several other data sources to examine risk factors and prevention methods to decrease the risk of diabetes complications in the American Indian population. Prevention strategies of interest to the researchers were those that are known to result in improved diabetes outcomes and are culturally relevant for American Indian communities. In addition to lifestyle changes essential for primary prevention, screening for pre-diabetes and early detection of type II diabetes are important secondary prevention methods for lessening diabetic complications. Tertiary prevention can be achieved through adherence to drug treatment regimens and dietary modifications that regulate blood sugar.
According to the National Institute of Environmental Health Sciences, bisphenol A (BPA) is an endocrine-disrupting chemical that is used mainly in the production of polycarbonate plastic and epoxy resins. BPA is found in water and infant bottles, medical equipment, dental sealants, thermal receipts as well as many other commonly used products. Maternal exposures to BPA are resulting in low-birth weight infants due to maternal exposures during pregnancy. The purpose of this study is to determine the outcomes associated with mothers who are exposed to BPA, and how it affects the health of their infants. We will conduct a systematic review of peer-reviewed journals on PubMed and ScienceDirect that focuses on outcomes in infants and children. In addition to low birth weight, BPA exposures can lead to a higher prevalence of anxiety, hyperactivity, emotional control, and behavioral inhibition in children. Many people do not realize where BPA is found and how much it can impact one’s health. We aim to promote awareness of BPA sources and the adverse effects it has on health, especially in infants. In order to decrease the effects BPA causes towards infants, we aim to promote awareness of the negative effects associated with BPA as well as exposure mechanisms. We will also make policy recommendations to reduce the availability of BPA in products.
According to the National Institute of Health (NIH), 79 million people in the United States are currently infected with the Human Papilloma Virus (HPV). HPV is the most common sexually transmitted infection, with 74% of cases affecting females aged 15-24. The Center for Disease Control and Prevention (CDC) reports this disease is so common that almost everyone that is sexually active will be infected at some point in their lives. In the United States, HPV causes over 17,000 cases of cancer in women and over 9,000 cases of cancer in men annually.

We researched academic journals through the search engine PubMed, and used the search terms human papilloma virus, HPV, and prevention. Further specific criteria included journals published in the past 10 years, articles that focused on HPV among 15-24 year olds, and women. We excluded papers that only focused on men. Data was also extracted from CDC and WHO websites. Risk factors for developing HPV include being sexually active under the age of 25, having multiple partners, or a partner who has had multiple partners. Taking preventative measures to protect oneself from developing HPV will lessen one’s risk at developing more severe health problems, including cancers. This paper examines the effects of HPV on women in the US and identifies the best practices for the prevention of HPV. After reviewing the literature, we present recommendations for the prevention of HPV among 15-24 year old women.
According to the CDC, women in the United States have had a 100% increase in heroin use from the years of 2002-2004 to 2011-2013. Heroin use among young adults ages 18 - 25 doubled in the past decade. Drug related deaths in Massachusetts (15.6 per 100,000 population) exceeded the national rate (12.7 per 100,000) in 2007. The CDC has acknowledged Massachusetts as being one of fourteen states as having a statistically significant increase in opioid overdose deaths between 2013 and 2014 with an 18.8% increase in deaths. For individuals, heroin use contributes to a higher risk of HIV, liver failure, kidney failure, Hepatitis B and C, as well as several other adverse health effects including death. The National Institute on Drug Abuse (NIDA) estimates that drug use costs the United States billions of dollars annually in order to address its destructive consequences, including HIV/AIDS, birth outcomes, crime, violence and disruptions to families, communities, workplaces and educational environments. Using data compiled through both state and national level Public Health agencies and scholarly articles we examined accessibility to various treatment options for young women seeking assistance for heroin addiction ages 20-40. Our aim is to identify issues that contribute to the increasing rates of heroin use by women. We will also research best practices in prevention including access to treatment and successful recovery for women. Using a public health approach to substance abuse prevention, we will identify strategies to reduce rates of heroin and increase access to treatment for women in Massachusetts.
The health effects induced by exposure to biodiesel combustion emissions are not well understood despite mandated industrial use by the US EPA. This review aims to compile the health effects of biodiesel combustion emissions. The biological responses induced by biodiesel emissions have been investigated using in vitro and in vivo models. No human studies have been published to date. Discrepancies exist for the results have been reported in studies testing acute toxicity with lung cell models. Several factors can influence the outcome of any toxicological study including engine design, operation, use of oxidation catalysts and particle traps. The numerous permutations of these parameters present challenges in comparing studies and could account for the variation reported in biological endpoints. Contrast, all published animal studies consistently describe adverse cardiovascular and respiratory responses induced by biodiesel exposure compared to traditional diesel. Although of these studies, emission and toxicological testing has been exclusively conducted with biodiesel from renewable feedstocks (soy, corn, rapeseed). Biodiesels produced from waste products (tallow) have decreased life cycle environmental impacts, however, the quality of the fuel is low. When defining regulations it will be necessary to specify the renewable feedstock the fuel is being derived from and use of stabilizing agents; the quality of the feedstock to produce the fuel and use of additives influence the characteristics of the emissions profile and associated health effects.
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Comparing Formal and Informal Measures of Stuttering Severity

Being a person who stutters means that a person has too many disfluencies in his speech. Using stuttering severity measures, such as the Stuttering Severity Instrument (SSI) or weighted stutter-like disfluency measure (weighted SLD), one can determine whether a person has enough disfluencies to warrant a diagnosis of being a person who stutters. Formal measures are more commonly used as they are normed and standardized. Informal measures are not as commonly used presumably because they are not normed and standardized and/or not as well known. In most clinical settings, the SSI is the measure used to diagnose stuttering and measure its severity. The SSI is a test that must be ordered and may be expensive to purchase, does not include a definition of stuttering, and does not include a category diagnosis of ‘no stuttering.’ The informal measure, weighted SLD, may be better to use as it is freely accessible to certified speech-language pathologists, is based on a definition of stuttering, and includes a category diagnosis of, ‘no stuttering.’ Clinical observation has suggested that the SSI and weighted SLD measure may result in similar diagnoses. However, formal study to determine whether this is true has not been done to date. Thus, it is the purpose of this study to compare stuttering severity measures produced by the SSI and weighted SLD using data from a relatively small (n=10) sample of young children. If both are found to yield similar results, it would suggest that speech-language pathologists could use the informal measure.
Breast Cancer Mortality among Black Women in the State of Louisiana

In the United States (US) Breast Cancer is the most common cancer found in women, with new cases diagnosed at a rate of 124.8 per 100,000 women per year. The Centers for Disease Control confirms that while African American women have lower incidence rates of breast cancer compared to white women in the US, African American women are more likely to die from breast cancer. In Louisiana, 32.9 per 100,000 African American women die from breast cancer each year, compared to 21.1 per 100,000 white women. Peer-reviewed literature was found by searching relevant terms on PubMed and Google Scholar. The keywords used included: breast cancer, women, low-income, and urban areas. In Louisiana, 17% of black women are not insured—one of the highest rates of uninsured black women in the country. Studies suggest there are many factors that contribute to racial disparities of breast cancer rates in African Americans. Risk factors for breast cancer for African Americans include access to care, stage at which cancer is identified, and timeliness of treatment. All women should have equal quality and access to proper breast cancer screenings and treatments. Providing greater access of information in low-income, urban areas on mammograms, the risk factors associated with breast cancer and focusing on primary care will decrease mortality rates. We identify best practices intervention and treatment strategies that could result in decreased mortality among black women and make recommendations to improve health outcomes related to breast cancer.
As of 2014, tobacco was the leading preventable cause of death in the U.S. Tobacco contributes to deaths due to lung cancer, heart disease, stroke, and respiratory health issues. While cigarette smoking is declining overall in the United States, tobacco use remains high among youth and young adults, especially college students. In the U.S., waterpipes, or more commonly known as hookahs, are an increasingly popular method of tobacco smoking, especially in areas with high populations of Middle Eastern descent. From 2011 to 2014, the prevalence of high school students who smoke cigarettes decreased by 4.3%, meanwhile hookah use increased by 1%. Among high school seniors in the United States, about 1 in 5 boys (17%) and 1 in 6 girls (15%) had used a hookah in the past year. Hookah use is a predictor for cigarette smoking, research found that teens who use hookah are two times more likely to be cigarette smokers and if teens have ever smoked a hookah, they are eight times more likely to be experimenting with cigarettes. We plan to do research on reducing the risk of tobacco in all forms including hookah use using online databases such as Google Scholar and PubMed. Risk factors for hookah smoking include ease of access, the lack of education about hookah, and the social, and cultural nature of it. We will make recommendations that, if implemented, may help to reduce the frequency of hookah use among young boys and girls, therefore reducing the risk for respiratory diseases.
765   Auditorium  8:30-9:15   Board A16
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Analyzing Risk Factors Associated with Preterm Birth among African-American Women in the US

Preterm or premature birth is a birth that occurs before the thirty-seventh week of pregnancy. According to the Centers for Disease Control and Prevention (CDC), preterm birth is the greatest contributor to infant death, about 1 in every 10 infants are born prematurely in the United States in 2014. Although there has been a decrease in preterm birth in the United States between 2007 and 2014, it remains an issue for specific racial and ethnic groups such as African Americans. African-American infants were 50% more likely to be born preterm than Caucasian, Hispanic, and Asian/Pacific Islander infants in 2014. Many risk factors such as socio-economic status, medical history, pregnancy conditions, and exposure to drugs and alcohol are associated with early childbirth. We will conduct the literature-based review by analyzing peer-reviewed literature and non-peer reviewed literature from government and nonprofit organizations, and will utilize the University of Massachusetts Amherst library databases using the key terms preterm, birth, African-American, women, and risk factors. Our project will attempt to determine why preterm birth and its risk factors are primarily high in racial and ethnic minorities. This project will also examine and evaluate strategies and interventions associated with preterm birth. This project’s findings will add to the literature and hopefully contribute to the reduction of preterm birth through promotion of awareness of known risk factors and suggested interventions to reduce the risk of preterm birth.
Annual rates of suicide in the United States have been steadily increasing since 2005, and is the currently the tenth leading cause of death. Suicide significantly impacts youth. According to the CDC, suicide is the second leading cause of death for people between the ages of 10 and 34, and youth are affected disproportionately depending on their ethnicity. The leading cause of death for Native American and Alaska Native (NA/AN) youth is suicide, and they consistently report higher rates of suicide than youth of any other ethnicity. Several factors contribute to these observed rates, including a high amount of historical and lived trauma, as well as increased rates of mental health disorders and drug addiction compared to the general population. Many of these risk factors contribute to and are caused by a significant lack of access to social support and healthcare resources. This project attempts to understand the most relevant risk factors associated with the high rates of youth suicide in NA/AN communities. Additionally, we will examine the strengths and weaknesses of existing programs that have sought to reduce these risks. This will be accomplished through a review of existing grey and peer-reviewed literature available through the University of Massachusetts Amherst databases. Recommendations will be developed that provide a foundation for future suicide prevention programs that are more economically efficient and effective at targeting risk factors within NA/AN communities.
In 2014, the leading cause of preventable deaths in the U.S. was tobacco. It is the major risk factor for death from respiratory health issues, as well as lung cancer, heart disease, and strokes. Although the rate of cigarette smoking among adolescents has decreased, tobacco use is increasing in alternative forms. In the U.S., the use of waterpipes, or hookahs, is gaining popularity, especially among young adults and within communities with high populations of Middle Eastern origin. Between 2011 and 2014, the prevalence of high school students smoking cigarettes decreased by 4.3% while hookah use saw a 1% increase. Additionally, a 2010 survey of high school seniors found that 1 in 5 males (17%) and 1 in 6 females (15%) had used a hookah to smoke tobacco in the past year. Hookah use can be a gateway to cigarette smoking, leading back to the original health problems presented. Teens who smoke hookah are two times more likely to be smoking cigarettes and eight times more likely to try out cigarettes than those who do not smoke. We will be researching factors that protect against the risk for tobacco use in all forms, including hookah, in databases like Google Scholar and PubMed. Risk for smoking hookah smoking increases with ease of access, lack of education, and social normalization in certain communities. Our recommendations are aimed at creating awareness about the risks of hookah smoking with the goal of reducing usage and the prevalence of respiratory disease as a result.
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Vascular Effects of Coarse, Fine, and Ultrafine PM Pollution Exposure

Particulate matter (PM) is attributed to cardiovascular (CV) mortality and other CV health effects. PM is categorized by size: ultrafine (<0.1 µm diameter), fine (<2.5 µm diameter) and coarse (2.5< diameter <10 µm) fractions. Temporal variation of CV events during air pollution episodes has not been previously examined for all three PM size fractions in parallel. To address this, we evaluated the association of longitudinal pollutant exposure and CV response in healthy adult subjects during controlled two-hour concentrated ambient particulate (CAPS) challenges. A double-blind, randomized, design was used with each subject being exposed to at least one of the coarse, fine and ultrafine CAPS exposures as well as a control exposure to HEPA-filtered air. The number of exposures conducted per subject ranged from 1 to 5 with a minimum two week washout period separating exposures. Throughout the challenges, blood pressure (BP) and heart rate measurements were collected. Brachial artery reactivity of blood vessels was also measured before and after exposure. The associations between size fractionated CAP exposures and physiologic response related to CV health were evaluated. Coarse CAPS induced a greater diastolic BP change for participants with high compared to low fasting glucose levels (p=0.02). Fine CAPS exposures were further found to increase brachial artery reactivity across all participants evaluated. In conclusion, healthy individuals demonstrated acute transient, sub-clinical CV-related responses to short-term CAPS exposures. Our findings suggest that each of the three size fractions evaluated were associated with different CV effects.
Today, more than one quarter of the United States population (79 million people) reports not getting a sufficient amount of sleep per night. The promotion of consistent and good sleep habits is known as sleep hygiene. Research shows that poor sleep hygiene is directly related to an increase in depression, anxiety and stress, when performing daily tasks. Sleep deprivation is especially prevalent among college-aged students aged 18-24. The CDC recommends 7 - 8 hours of sleep for college students in a 24-hour period. The National Institutes of Health found that U.S. college students who slept less than 8 hours a night had significantly higher rates of negative eating behaviors, poorer regulation of food, and greater binge eating compared to students who slept 8 hours or more. Similarly, the CDC recognized sleep deprivation as one of the main factors in hazardous outcomes of daily routines, such as driving. Research results will help to determine the effects of sleep deprivation, including its correlations between depression, anxiety and stress, and relationships among college students. In order to improve sleep hygiene in college students, we have proposed a comprehensive public health approach to increasing sleep among college students. By addressing these negative health effects, this project aims to educate students in sleep knowledge and encourage healthier sleep habits for better health outcomes. We recommend that campus leaders implement a public health campaign to increase awareness of sleep deprivation and its negative health effects.
In the United States (US) Breast Cancer is the most common cancer found in women, with new cases diagnosed at a rate of 124.8 per 100,000 women per year. The Centers for Disease Control confirms that while African American women have lower incidence rates of breast cancer compared to white women in the US, African American women are more likely to die from breast cancer. In Louisiana, 32.9 per 100,000 African American women die from breast cancer each year, compared to 21.1 per 100,000 white women. Peer-reviewed literature was found by searching relevant terms on PubMed and Google Scholar. The keywords used included: breast cancer, women, low-income, and urban areas. In Louisiana, 17% of black women are not insured—one of the highest rates of uninsured black women in the country. Studies suggest there are many factors that contribute to racial disparities of breast cancer rates in African Americans. Risk factors for breast cancer for African Americans include access to care, stage at which cancer is identified, and timeliness of treatment. All women should have equal quality and access to proper breast cancer screenings and treatments. Providing greater access of information in low-income, urban areas on mammograms, the risk factors associated with breast cancer and focusing on primary care will decrease mortality rates. We identify best practices intervention and treatment strategies that could result in decreased mortality among black women and make recommendations to improve health outcomes related to breast cancer.
Combating the Prevalence of Gun Violence in the United States

According to the CDC’s Morbidity and Mortality Weekly Report (MMWR), the United States had approximately 33,400 deaths caused by firearms in 2014 alone. The United States’ homicide by firearm rates are 25.2 times higher than that of any other high-income country. Moreover, roughly 4.5 million new firearms are sold each year in the U.S., and this number does not take account secondhand firearm transactions or stolen firearms. Across the country, gun violence is a major issue that government officials, politicians, and the public have failed to address. Through scholarly articles, case studies, and peer-reviewed journals, such as PubMed, Center for Disease and Control, and County Health Rankings, we examined the various factors contributing to the accessibility of guns in the United States. Through the findings of this investigation, we identified key strategies to reduce gun violence in the US. We recommend a comprehensive public health approach including community-based interventions and a social marketing campaign to address the problem of gun violence. In order to scale-down nationwide gun violence in the United States, inefficient policy measures need to be identified and reconstructed to ensure the safe distribution and handling of firearms. Our goal is to reduce the amount of gun related violence in the United States by proposing a sustainable reformation in gun accessibility and by increasing public support for increased intervention for these issues through social campaigns and community outreach.
The phonological structure of nouns and verbs is different in English. The goal of this project is to continue examining these differences by considering the effects of phonotactic probability (how common an individual sound is) and neighborhood density (phonological similarity with other words) on speaker’s ability to classify words based on their syntactic class (i.e., noun versus verb). Speakers are highly sensitive to both phonotactic probability and neighborhood density on a variety of language processing measures, but we do not know whether these variables might further inform the phonological differences between English nouns and verbs.

In the first experimental task, participants will be presented with a list of nonsense words with increasing values of phonotactic probability and neighborhood density. Participants will be asked to judge whether the nonsense word sounds more like a ‘noun’ or a ‘verb’. Using logistic regression, we will measure whether increases/decreases in phonotactic probability and/or neighborhood values are associated with a speaker’s likelihood of rating a nonsense word as a noun or a verb. In the second experimental task, the same nonsense words will be presented and participants will be asked to construct a sentence using the nonsense word. Here we will score how nonsense words are used (e.g., as a noun or verb) again measuring whether increases/decreases in phonotactic probability and/or neighborhood values are associated with the speaker’s rating. We expect our results to reveal that phonotactic probability and neighborhood density influence a listener’s classification of nonsense words as noun or verb.
Efforts to Reduce the Rates of Depression among US College Students

Depression is a common but serious mental illness, typically marked by sad or anxious feelings. College students occasionally feel sad, anxious, or stressed, but these emotions may pass quickly. For others, the symptoms persist and they may meet the criteria for a diagnosis of depression. Depression lasts for a long time, interferes with day-to-day activities, and tends to affect all aspects of an individual’s health. In 2011, the American College Health Association (ACHA) conducted a nationwide survey of college students at 2- and 4-year universities (National College Health Assessment). Researchers found that about 30% of college students reported feeling “so depressed that it was difficult to function” sometime in the past year. Additionally, leaving depression in college students untreated can lead to negative impacts on academic performance, productivity, and personal relationships. For our research, we reviewed literature from PubMed, American Psychological Association, and the Journal of Affective Disorders in order to assess and analyze the stigma around seeking help for depression. By illuminating the increasing trend of depression on college campuses, our research highlights the importance of reducing barriers to mental health treatment. Using a public health approach, in this presentation, we identify strategies that can be effective in reducing the rates of depression among college students. We make recommendations about an approach to decrease the stigma around mental illness, thereby increasing students’ likeliness to seek treatment.
Effect of Hydraulic Fracturing Chemicals on Mouse Mammary Glands

Recent work has demonstrated that chemicals used in hydraulic fracturing (fracking) can have endocrine disrupting properties, including some that act as estrogen receptor agonists and antagonists. Previous studies of endocrine disrupting chemicals have demonstrated that many compounds can disrupt development, leading to disease states that manifest in adult life, even when exposures are low. In the current study, we proposed to examine the effects of a mixture of fracking chemicals on female mouse mammary glands. Mice were exposed during early development and their mammary glands were assessed at pre-puberty and in adulthood, at postnatal day (PND) 85. Morphometric analysis was conducted to characterize the development of the glands. At pre-puberty, analyses indicated that the fracking mixtures decreased several measures of mammary gland development, although these effects were not significant. At PND85, we observed an increase in development in glands isolated from treated groups, measured by increases in both epithelial density and ductal extension, suggesting these chemicals alter the rate of development of the mammary gland. Ki67, a marker of proliferation, was also significantly increased in treated groups. Unusual terminal end bud-like structures were also seen in treated groups only. We excised and analyzed these structures for changes in histoarchitecture and cell proliferation. Preliminary analyses suggest that these are highly proliferative intraductal hyperplasias. Collectively, our results suggest that fracking chemical mixtures have endocrine disrupting abilities that may alter development of the mammary gland. Further studies are needed to fully characterize the effects of these chemicals.
Lung cancer related to air pollution in industrialized countries has become a worldwide public health crisis. The WHO states that air pollution is considered a carcinogen. Approximately 3.2 million deaths worldwide resulted from air pollution, including 223,000 from lung cancer, according to the most recent data from the Global Burden of Disease Project in 2010. Studies show chronic exposure to pollution has increased significantly, mostly in rapidly overpopulated industrializing countries. Our literature review will focus on current air pollution crisis in Nepal. We will conduct a systematic review of the literature provided by the University of Massachusetts Amherst Libraries databases, using the keywords; “smog,” “air pollution,” “lung cancer,” and “Nepal.” During the screening process, we will choose to exclude articles that do not directly pertain to smog-induced lung cancer in Nepal. We plan to delve deeper into the mechanisms that allow for outdoor air pollution to become a risk factor for various respiratory diseases, such as; home fires, poor indoor ventilation, vehicle exhaust emissions, and the poor ecosystem management increases Nepal’s risk of developing respiratory illnesses. With the rising number of deaths due to air pollution, there is no avoiding that the air we breathe is carcinogenic. We will examine interventions to reduce cancer and death from poor air quality in Nepal, and develop a set of recommendations to help alleviate this significant public health problem.
Zika virus, a mosquito-borne Flavivirus, has quickly become a public health crisis since its appearance in French Polynesia in 2013. The virus is thought to have originated in Uganda. At the beginning of February 2016 the World Health Organization declared Zika virus a global health emergency. Brazil in particular has seen a significant increase in Zika virus incidence; between May 2015 to January 30, 2016 an estimated 1.5 million new cases occurred. While Zika virus causes only mild flu-like symptoms in most adults, it is thought to be associated with microcephaly, a congenital abnormality characterized by decreased head circumference, in the infants of women who have been infected during pregnancy. In Brazil, the rates of microcephaly have increased considerably over the past year, with 4,000 cases reported since the emergence of the virus in May of 2015. This number is more than 27 times higher than the number of cases in 2014. By using databases such as PubMed, Web of Science, and University of Massachusetts Library resources and using the keywords, “Zika virus” and “microcephaly,” we hope to identify risk factors for Zika virus and means of prevention. Understanding modes of transmission as well as risk factors for microcephaly and other birth defects related to the virus will help determine how to prevent new cases of the virus.
Anxiety disorders are an increasingly prevalent public health concern throughout the United States. Based on the National Institute of Mental Health, anxiety disorders are a leading form of mental illness within the United States. They affect approximately 40 million individuals over the age of 18, which accounts for 18% of the adult population. Approximately 54% of adult females and 46% of adult males experience some form of anxiety disorder according to The Anxiety and Depression Association of America (ADAA). A research study done by the ADAA titled “The Economic Burden of Anxiety Disorders” reveals that anxiety disorders make up about one third of the yearly economic spending (42 billion dollars) to funding mental health. There are four prominent forms of anxiety, these include: generalized anxiety disorder (6.8 million adults), panic disorder (6 million), social anxiety disorder (15 million) and specific phobia (19 million). In this paper we will direct our research on generalized anxiety disorders among adult male and female college students ages 18-24, since the topic of anxiety disorders is so broad. Through a comprehensive analysis of existing studies on the subject by searching these key terms in the UMass Amherst databases: anxiety disorder, mental illness, public health disease, intervention, prevalence. Major risk factors include everyday stress from work, school, personal relationships, finances, substance abuse and genetics. We expect that our findings will provide us with an overview of the generalized anxiety disorder and empirical strategies to combat the economic impact of anxiety disorders.
The Effects of Human Trafficking: A Look at the Mental Health Needs of Women and Children Victims

Human trafficking is a worldwide crime that significantly affects the mental health and wellness of its women and children victims. Not only do these victims experience physical disease and illness as a result of numerous human rights violations, but they also experience negative mental health problems that can last their entire lives. Human trafficking is the world’s fastest growing global crime with 80 percent of its victims being women and children. Many will not have access to psychiatric professional care after being trafficked, while others will not even seek care due to feelings of shame and guilt. However, all of the victims will suffer significant emotional distress. This project examined the effects of human trafficking on the mental health status of its victims. When researching we used PubMed, National Institute of Health (NIH), and Google Scholar. Additionally, we used data from other sources such as the Centers for Disease Control and Prevention (CDC). Articles were only included which studied female victims between the ages of five and eighteen, as well as articles which were published after the year 2005. In order to improve the mental health of human trafficking survivors we have proposed a public health intervention that includes a social marketing campaign. This campaign aims to raise awareness of and reduce stigma for survivors along with educating physicians on how to support these individuals. The mental health status and the stigmatization against human trafficking survivors will improve from the implementation of this campaign.
Background: According to the World Health Organization, malnutrition and vitamin deficiencies are leading global health concerns. Inaccessibility of nutritious food is a major contributor to malnutrition. According to the United States Department of Agriculture, about one third of our diet relies on pollination from bees. Bee pollination is essential for the production of nutrients such as vitamin A, zinc, iron, folate and calcium. The recent collapse of bee colonies can be attributed to the overuse of insecticides on large farms. Method: We reviewed literature found in the databases PubMed as well as Google Scholar. We used the key terms “malnutrition”, “nutrients”, and “food source” to find background information on the contributors of malnutrition. We reviewed articles relating to human populations in the United States. We found that sustainable agriculture is a vital variable in maintaining human nutrition and expanded their search to include the key terms “pollination” and “pesticides”. Results: Our search indicated that 5% to 10% of human food sources directly rely on bee pollination. Neonicotinoid, an insecticide that is widely used in developed countries, is responsible for directly impacting the health and development of honey bees and humans. Discussion: After the research was conducted, it was concluded that sustainable agricultural practices are necessary to improve human nutrition. More research must be done to determine the most practical and effective method to achieve this. We present recommendations for a public health strategy to address this concern.
Sleep Deprivation and Its Negative Health Effects on College Students

The National Institutes of Health recommend that adults get 7-8 hours of sleep per night, yet more than one quarter of the United States population (79 million people) reported not getting sufficient sleep. Sleep deprivation is a major Public Health problem, especially among college-aged students (18-24). The National Institutes of Health found that U.S. college students who slept less than 8 hours a night had significantly higher rates of negative eating behaviors, and greater binge eating compared to students who slept 8 hours or more. Research showed that poor sleep hygiene is directly related to an increase in depression, anxiety, stress, and difficulties in performing daily tasks. Similarly, the CDC recognized sleep deprivation as one of the main factors in hazardous outcomes of daily routines, such as driving. Research results helped determine the effects of sleep deprivation, including its correlations between depression, anxiety, stress, and relationships among college students. Our sources included the CDC, NIH, and National Sleep Foundation. The key search terms used were sleep, sleep deprivation, college students, health outcomes, and sleep hygiene. In order to decrease sleep deprivation in college students, we proposed a public health campaign geared towards increasing awareness of sleep deprivation and its negative health effects. These strategies, if adopted, could lead to improved health outcomes for college students.
According to the National Institute of Justice, 20% to 25% of women on college campuses nationwide will be the victims of sexual assault. Less than 5% of those assaults are reported to law enforcement. Research indicates that sexual assault on college campuses happens at an alarming rate and consequently has many psychological effects on the victims. The purpose of this research will be to examine the relationship between the experience of sexual assault and the mental health impact it has on college-aged women. Prevention and education will be a main focus of the research. Using peer-reviewed literature, located through the University of Massachusetts Amherst Library database, information on the correlation between sexual assault experienced by college-aged women and their mental health will be gathered. These research results will help us make recommendations on the best way to reduce acts of sexual assault against women on college campuses. Some limitations may include a large amount of under-reported cases due to the widespread nature of sexual assault and the negative effects that depression has on all people. Research on the association between sexual assault and mental health should influence policymakers and college administrators in the United States to take action against the people and the culture that creates sexual violence. Through our study, best practice recommendations will be put forth towards a comprehensive public health plan that includes an educational and preventative campaign to help reduce the incidence of this severe public health concern.
When considering the relationship between dose and effect, hormones behave with both monotonic and non-monotonic responses. Because many endocrine disrupting chemicals (EDCs) mimic the actions of hormones, it has been argued that they may also display non-monotonic behavior. In fact, hundreds of non-monotonic dose response curves (NMDRCs) have been documented for EDCs. Contrarily, the common toxicology dogma “The dose makes the poison” implies only a monotonic or linear relationship between dose and effect: as the dose increases, effects are expected to worsen as well. Chemical risk assessments are based on this expectation of monotonicity, and ‘safe’ low doses are calculated based on studies of high doses; these low doses are rarely, if ever, tested. However, if EDCs display NMDRCs, the assumptions used in risk assessments may be invalid. We conducted a systematic literature review on propylparaben, an EDC used in cosmetics and as a food additive. After collecting over 800 pieces of primary literature from scientific databases including PubMed, we targeted all studies containing dose-response data. Using a revised version of decision tree, originally designed by Lagarde et. al (Environ Health 2015) to assess the quality of NMDRCs, we have analyzed more than 50 studies containing dose response data. Completion of this analysis will allow us to determine the quality of both monotonic and non-monotonic dose responses for propylparaben. These results will inform considerations regarding whether the current risk assessment for propylparaben is valid or whether it needs to be redesigned taking NMDRCs into account.
According to the CDC, in the United States, nearly 18% of children aged 6-11 were classified as obese in 2012. Obesity is associated with multiple negative health outcomes including an increased risk for cardiovascular disease, high blood pressure, and an increased risk for insulin resistance and type 2 diabetes. Recent studies have shown an increased number of pediatric diagnoses of type 2 diabetes. A decade ago, new-onset type 2 diabetes cases among youth accounted for just 3%. At present, 45% of new onset diabetes cases in this population are type 2. This study utilized PubMed, Google Scholar, and Science Direct to complete a comprehensive review of urban areas with high prevalence of diabetes in youth. The National Institute of Diabetes and Digestive and Kidney Diseases conference on behavioral science research in diabetes has identified adoption and maintenance of healthful eating, and physical activity, as priority areas for research and outreach efforts. In order to prevent obesity and the subsequent onset of diabetes, we review current policies in MA that impact food accessibility and physical activity for youth. After a review of different strategic interventions to reduce youth diabetes in other US urban areas, we will offer recommendations for interventions within Hampden County, which according to the CDC is one of two counties in Massachusetts with obesity levels over 25%. Hampden County was chosen, as it was a pilot site for the Supplemental Nutrition Assistance Program, due to high obesity levels.
Pertussis, commonly known as whooping cough, is a contagious respiratory disease caused by bacterial infection. Symptoms include a severe cough which is most commonly seen among infants that can lead to medical complications and hospitalizations. According to the CDC prevalence of pertussis increased by 15% between 2013 and 2014. Natural immunity weakens as we age, making booster vaccines an important preventative measure. We will be using the UMass Amherst library’s databases and other databases such as PubMed to research peer reviewed journals that will help us determine these specific health risks; we will compare the standard vaccination rates during the years of lowest recorded cases of pertussis to current rates. We will also be analyzing data related to the current proportion of the U.S. population who vaccinate infants with DTaP, as well as continue with TdaP booster vaccines as the infants age. We expect that the lack of vaccinations as well as the current non-requirement status of these vaccines are currently the main risk factors for the increase of pertussis cases. Our research methods will allow us analyze changes in disease frequency over time in relation to past and present vaccination data. Overall, this project will help to determine the cause of the recent increase in pertussis cases, and to highlight the importance of vaccination.
Obesity, a condition in which the body has accumulated excess body fat, is a major public health concern in the United States. Over the past few decades, this concern has intensified among children, mainly ages 2-12. From 1980 to 2012, obesity increased from 7 to 18% in children ages 6-11, and according to the Centers for Disease Control and Prevention (CDC), more than one third of children were either overweight or obese in 2012. In 2014, about 23.9 million children were recorded as obese or overweight. There are several factors that contribute to the increase in childhood obesity. Most notably, there is a lack of access to healthy food, limited physical activity due to sparsely located play spaces, and an overall lack of parental education regarding diet and nutrition. Disparities that play a role include socioeconomic status and parental education level. This project will identify factors that contribute to the childhood obesity epidemic and analyze potential solutions. We will use databases including PubMed and Web of Science, as well as information from national public health institutes and organizations such as the (CDC), American Heart Association, and World Health Organization (WHO). Search terms will include obesity, childhood, overweight, diet, exercise, low-income, poverty, socioeconomic status, and children. We will aim to develop a set of recommendations to reduce the burden of childhood obesity in the United States.
Infant Outcomes of Gestational Diabetes Mellitus (GDM)

Gestational diabetes mellitus (GDM) is a form of diabetes that is specific to pregnant women. Between 2-5% of pregnant women will be affected by GDM. Complications may naturally occur during pregnancy due to insulin uptake in a woman’s body. However, when GDM is observed, complications are most likely due to a slight inefficiency of insulin that existed before pregnancy. Although GDM only lasts during a woman’s pregnancy, it can have long-term effects on her offspring. Children born to mothers with GDM show increased rates of obesity, high blood pressure, elevated risk of impaired glucose tolerance, dyslipidemia, and brain damage that may result in mild motor deficiency. Methods for obtaining information included performing keyword and phrase searches on the PubMed database, such as “effects of gestational diabetes mellitus on neonatal development” as well as performing Internet database searches for other scholarly sources on similar terminology. Results that did not prioritize fetal development and effects were excluded. Women who are older than twenty-five and are overweight are at a higher risk of developing GDM. Furthermore, a medical history of diabetes, high blood pressure, heart disease, or insulin related health conditions place mothers at a higher risk. Early diagnosis and control of blood sugar levels throughout pregnancy can greatly reduce fetal complications. Therefore, to address this public health issue, early intervention for at risk mothers is vital to reducing the impact of GDM. Upon reviewing our research, we outlined recommendations for a public health initiative targeting at-risk populations.
Heroin is a highly addictive, analgesic drug which has a high risk of death for abusers. The Centers for Disease Control and Prevention (CDC) reported that from 2002-2013 the rate of heroin-related overdose deaths quadrupled, as there were 8,200 deaths in 2013 alone. This was a 286% increase in heroin over-dose deaths per 100,000 people from 2002 to 2013. Increased mortality rates from heroin overdose has become an important public health issue in the United States. It was reported that forty-five percent of people who used heroin were also addicted to prescription opioid painkillers. The population that is most at risk for heroin addiction is non-Hispanic white males aged 18-25 years. In order to find optimal interventions within a community, we will focus on the risk factors that affect this population. These factors include those previously addicted to opioid painkillers, cocaine, marijuana, and alcohol; and people without insurance. Information will be found using government websites and we will be analyzing peer-reviewed articles from the University of Massachusetts Amherst Library Databases. Some of the key terms we will use include “heroin”, “overdose by heroin”, “United States heroin epidemic”, and “opioid deaths.” Through our findings we will recommend community-level interventions that may positively impact those addicted to or at-risk for heroin addiction in addition to the current initiative of the Opioid Task Force of Massachusetts. We will explore preventing people from starting heroin use, reducing heroin addiction and reducing mortality rates due to heroin overdose.
Many college students or busy professionals do not understand the benefits of sleep and the harmful effects of sleep deprivation on their bodies. Even though sleep is a phenomenon that is common and essential to all human life, it is nevertheless an occurrence that people generally minimize and do not respect. Indeed, people often ignore sleep mechanisms and poorly understand the benefits of a good night of sleep on both their minds and bodies. Among the multiple occurrences that happen when we sleep, dreams are one of the most difficult to comprehend or explain. With the help of psychological studies, neurological studies, news articles and documentaries we will clarify the importance of sleep.
The United States ranks 58th in the world for infant mortality. Infant mortality is defined as the death of a baby during the first year of life. The infant mortality rate is defined as the number of infant deaths per 1,000 live births. According to the U.S. Centers for Disease Control and Prevention over 23,000 infants died in the U.S. within their first year of life in 2014. Rates vary depending on geography, race, and socioeconomic status. For this presentation, we compared infant mortality in the U.S. with economically similar countries, Japan, France, Germany, and Italy. National health expenditures are disproportionately high in comparison yet health outcomes remain similar, or worse. The U.S. spends 17.6% of its’ GDP on health care with an infant mortality rate of 5.87 deaths per 1,000 live births. In contrast, Japan’s health care spends 9.5% of its’ GDP and rank third in the world with an infant mortality rate of 2.08 deaths per 1,000 live births. For our research, we looked at social and economic policies related to infant mortality in these countries and compared it to the U.S. Data for this project was collected from the University of Massachusetts Amherst databases such as PubMed. We conducted a policy analysis identifying alternative policies that could be adopted in the U.S. Finally, we made policy recommendations aimed at decreasing infant mortality rates. By making significant policy changes, the U.S. will be better able to address the factors contributing to infant mortality.
Since the beginning of Syria’s civil war in 2011, 9 million Syrians have been displaced from their homes. Massive amounts of this population have spread out across the Middle East and into Europe. These refugees seek protection from the horrific aspects of this war, including the use of chemical weapons and airstrikes on civilians. Although the international community has given much attention to the refugee’s physical ailments, addressed less often than their mental health needs. Many displaced Syrians have suffered loss of family, witnessed extreme violence, and live in a state of constant uncertainty. These factors have contributed to serious psychological distress, which in turn can affect physical well-being. Based on a survey from the International Medical Corps, it is estimated that 31% of all Syrian refugees have a severe emotional disorder. Médecin Sans Frontières has called this problem a “mental health epidemic” and has indicated that there is an acute shortage of psychological care available for this population. Using a literature review composed of articles from PubMed, and Web of Science, the mental health needs of Syrian refugees are discussed in detail. Due to the escalating nature of this crisis, testimonials from refugees and media reports will also be utilized. From this analysis, we will make suggestions on how to improve mental health services for this uniquely vulnerable population.
Alcohol consumption impairs many of the skills required to safely operate a motor vehicle — such as judgment, concentration, comprehension, coordination, visual acuity, and reaction time. The Centers for Disease Control and Prevention (CDC) reports that each day almost thirty people die in motor vehicle crashes that involve an alcohol-impaired driver in the United States. Data show that alcohol-related car crashes account for approximately one third of all car crash fatalities. Experts have estimated that the total annual cost of alcohol-related car accidents in the United States exceeds $59 billion. A literature review will be conducted to assess the prevalence and risk factors of motor vehicle crashes due to impaired driving. Using a systematic research-based approach, we will search the University of Massachusetts Amherst databases as well as utilize the CDC and National Highway Traffic Safety Administration (NHTSA) websites to gather information. This research aims to identify the breadth of this problem, and populations that are most at risk for driving under the influence. We will examine measures to help prevent injuries and deaths from alcohol and impaired driving. We will use our findings to recommend preventative strategies for the future to reduce fatalities, cost, and impaired driving overall.
In this paper, we explore the effects of shackling on one’s ability to produce complex language. The purpose of our study is to investigate whether people can communicate and advocate for themselves more effectively with or without gestural restraints. Subordination index (SI, a measure of grammatical complexity), mean length of terminal unit (MLT-U, a measure of grammatical completeness), and maze rate (a measure of linguistic fluency) were calculated for narrative and descriptive tasks completed by participants who were shackled and unshackled. This allowed for comparison between one’s own linguistic complexity for each task in both restrained and unrestrained conditions. It is predicted that the results of this experiment will show higher subordination indices, lengthier sentences, and less mazes when gestures are not restrained. Conversely, it is predicted that individuals with gestural restraints will have lower subordination indices, less complex sentences, and more mazes. Forty-five participants completed standardized language testing (using the Test of Adolescent Language-4; Hamill et al., 2007) and an experimental protocol where they produced both narratives and descriptions both while shackled and unshackled. Subjects were shackled in a manner mimicking that of a defendant giving testimony and answering questions under the same restraints. The findings from this study can be compared to one’s inability to gesture while restrained within a legal, courtroom setting, and as a result could guide public policy on shackling during questioning or interrogative proceedings.
Suicide is the tenth leading cause of death in the United States and the annual rates have been steadily increasing since 2005. Youth are particularly impacted by suicide. According to the CDC, suicide is the second leading cause of death for young people between the ages of 10 and 34, however, youth are affected at varying rates depending on their ethnicity. The leading cause of death for Native American and Alaska Native (NA/AN) youth is suicide, and they consistently report higher rates of suicide than youth of any other ethnicity. Several factors contribute to these observed rates, including a high amount of historical and lived trauma, as well as higher rates of mental health disorders and drug addiction compared to the general population. Many of these risk factors contribute to and are caused by a significant lack of access to social support and healthcare resources. This project will seek to understand the most relevant risk factors associated with the high rates of youth suicide in NA/AN communities. Additionally, we will examine the strengths and weaknesses of existing programs that have sought to reduce these risks. This will be accomplished through a review of existing literature accessible by the University of Massachusetts Amherst databases. Recommendations will be developed to provide a foundation for future suicide prevention programs that are more economically efficient and effective at targeting risk factors that affect NA/AN communities.
An important public health issue in the United States that needs to be recognized is the recent increase in mortality rates due to heroin overdose. Heroin is a highly addictive analgesic drug that poses a high risk of death for users. According to the Centers for Disease Control and Prevention (CDC), the rate of heroin-related overdose deaths quadrupled from 2002 to 2013 and there were 8,200 deaths during 2013 alone. It has been reported that forty-five percent of heroin users also had an addiction to prescription opioid painkillers. Non-Hispanic white males between the ages of 18 and 25 years old are the most at risk population for developing an addiction to heroin. In order to find the most ideal interventions for this population, we will focus on key risk factors including an addiction to prescription opioid painkillers, cocaine, marijuana, alcohol; and people uninsured and enrolled in Medicaid. Information on the current heroin addiction epidemic will be extracted from government websites in addition to peer-reviewed articles from PubMed. The key terms we will use in research include but are not limited to, “deaths by heroin”, “heroin overdose”, “heroin epidemic,” and, “opioid addiction”. Recommendations will be made in accordance with the initiative, the Opioid Task Force of Massachusetts, to aid those currently addicted to heroin and also those at a high risk for becoming addicted. The main focus of our interventions will include preventing people from starting heroin use, reduction of heroin addictions, and decreasing mortality rates due to heroin overdose.
Preterm Births and Associated Health Consequences in the United States

Each year in the United States, about 450,000 preterm births occur. Of those, about 8000 deaths occur due to complications associated with preterm births. According to the World Health Organization, preterm birth is defined as babies born alive before 37 weeks of pregnancy. In addition to death, preterm births are associated with increased morbidity including life long disabilities such as behavioral problems, and neurological disorders. African Americans women are disproportionately affected by preterm birth; at a rate of 253 deaths per 100,000 infants, it affects them over twice the rate among all races. In Massachusetts, rates are slightly lower than the national average, but Springfield has the highest rates within the state. This project compiles existing research on preterm births. We looked at factors that contributed to preterm birth in African American women on multiple levels, including community and individual factors, as well as sociopolitical influences. We investigated interventions, preventative measures, and identified programs that have attempted to address this issue within the United States and internationally. We have used our findings to propose preventative strategies including health policy which may impact the high rates of preterm births in Springfield. For our research, we conducted a review of best practices and policies to address the issue of preterm birth in the United States. We identified solutions nationally and internationally and make recommendations based on these findings. A new strategy is needed to address preterm birth in the United States given the associated health outcomes for newborns.
RADIO-TELEVISION-FILM

870    Room 174    10:45-11:30    Panel 2
Conner John Ghiz
Robert I. Carr (Faculty Sponsor)
Department of Communication, Fitchburg State University

Caged In Pilot Episode

I performed an ethnographic study on boxers in a gym and performed research on their methods of communications and fighting as part of my project. I also watched and analyzed Rocky I-V, Rocky Balboa, Creed, and Southpaw as research for how to create a synergy between the human elements of the project with the white-knuckle action sequences in my original project: a working script for a pilot episode to a television show. I am writing these scripts because I believe that combat sport entertainment needs to be enhanced in order to stay relevant in cinema and television. Combat sports movies/shows have become fairly formulaic: character has something bad happen to him (death, bullies, environment, etc.), character turns to combat sports, character fights big bad guy and loses, character trains, character fights big bad guy and wins, roll credits. I want to craft an original and organic expanding narrative that accurately and intriguingly portrays a fighter’s world in and out of the ring/octagon because I believe that audiences are tired of seeing the same narrative tropes in fighting and want to see the next Rocky. I am confident that, given my passion for sports and cinema/television and skill in writing, I can create a project that satisfies the audience’s desires as a result of my methodology. This project has the potential to challenge society’s conception of fighters and men, as violent and tough people can be thoughtful and sensitive and that toughness is more than just someone’s ability to harm others.
Who Killed the World? The Role of Women (and Men) in Mad Max: Fury Road

This film analysis spotlights gender roles in the post-apocalyptic film Mad Max: Fury Road, and how they relate to the film’s feminist and eco-feminist themes. Through this examination a commentary on the state of our modern world can be extracted from the narrative and world of the film itself. This project draws mainly upon close viewing and analysis of the events and characters of the film, with special attention paid to visual thematic content and dialogue in order to show the film’s positive portrayal and opinion of women. The project ultimately argues that the film is a feminist text with an eco-feminist message, putting women in a position of nurturing close to nature in order to contrast it with the dominant and destructive nature of males both in the film and in the real world, championing equality as a way to unite humanity and save our world from becoming depleted and savage.
How does an artist today approach a historic event that took place several decades ago? How can they work with a trauma far removed from their own experience and upbringing? How can an artist treat the Holocaust—a subject that has been reflected in a plethora of films and works of art? Is it still possible to shed new light on this subject? These questions, which have already shaped the contemporary discourse on representation of the Holocaust, are also at the center of this paper. However, unlike previous research on the subject, dedicated to the analysis of the artists who are first- and second-generation survivors, this paper focuses on the artistic output of the third generation. Arguably, this new generation of artists is inventing new ways of approaching the specters of the Holocaust, inviting us to reevaluate the conventional representation of national traumas and personal pain. One case in point is video art by a young Israeli artist, Tamar Latzman. This paper analyses her two recent films, Awake and Mine Carp, considering them within a larger context of third-generation Holocaust survivors’ artistic production. Relying on theoretical concepts of post-memory and prosthetic memory, this analysis shows that the transmuted memories of the Holocaust still have an indelible impact on the grandchildren of the survivors. However, these traumatic memories are conveyed indirectly, often using humor, provocation, and satire, instead of relying on visual or thematic clichés.
My research focuses on how racism and racial bias influence the culture and business within the entertainment industry. This topic is not new, but it is a topic that needs to finally be comprehensively addressed, especially in terms of providing adequate means of fair and equal opportunities for minority entertainers. This paper will focus on how racism exists in the entertainment industry, discussing examples from film, television and theater. I will discuss how racial bias within the film industry impacts and sets limitations on actors, as well as its impact on aspiring thespians. I will also discuss racial bias within television through network programming and commercial advertising on niche television networks versus mainstream television networks. Understanding racism and racial bias is especially important to future generations of Black, Latino, Asian, and other minorities who aspire to become actors, artists, directors and producers. This question is important to young entertainment consumers, wanting to see a reflection of themselves on the big screen, on stage and on television. The entertainment industry needs to not only find more ways to be diverse, but to fully accept diversity that properly reflects different races and ethnicities of the real world.
SOCIAL THOUGHT & POLITICAL ECONOMY

873 Auditorium  3:30-4:15  Board A14
C. D. Lefebvre
Graciela Monteagudo (Faculty Sponsor)
Department of Social Thought & Political Economy, UMass Amherst
Reintegration of Incarcerated Masses

This research project considers the social impact of incarceration rates in the United States. Through the lens of social justice, the goal is to provide answers to provide answers to discriminative practices in the country targeting people of Latino/ Latina and African Americans. The research will consider how racial profiling and its impacts of lower socio-economic disadvantages often found among the inmate population. While considering poor resources availability in these environments, this research will also evaluate the last 10 years on the social impact resulting from these practices. This research will also consider additional factors resulting for the disproportional disproportionate number of communities of color impacted over other community’s prominently white or European origins as well. In addition to research assessing the impacts of racial profiling and resource availability in lower social economical through school to jail pipeline tract as described in the Michelle Alexanders the new Jim Crow. Another aspect of this research will evaluate programs in place to reduce incarceration rates such as Restorative Justice Alternatives. Finally research based evidence evaluating the benefits of jail programs across the country will assess the benefits of life skills and reduction of recidivism rates of inmates released from jail. Programs in Walpole Ma where inmates are train food serving skills, in addition to Garden programs at Rikers State Prison in NY and in California’s San Quintin’s population of inmates.
22nd Annual Massachusetts Statewide Undergraduate Research Conference

874 Room 174 4:30-5:15 Panel 7
Aaron McBryar
Graciela Monteagudo (Faculty Sponsor)
Department of Social Thought & Political Economy, UMass Amherst
Primitive Accumulation and the Future of Global Capitalism

Through an analysis of scholarly literature, this paper seeks to better understand the connections between modernity, primitive accumulation, neoliberalism, and global capitalism. It has been argued that conflating modernity, specifically the Enlightenment, with the development of capitalism is problematic in that it confuses two qualitatively distinct historical developments as a single homogeneous one, and in doing so erases the historical specificity of capitalism. This paper examines these claims and argues that in studying the development of capitalism, we inevitably engage with the interactions between capitalist and non-capitalist social forms. Thus, this paper argues for an analysis of the period that recognizes the material and ideological interplay among such forms, and, at the same time, maintains “...a perception of the capitalist market as a specific social form, the product of a historical rupture.” (Wood 26) For Marxists, the process of primitive accumulation lies at the heart of the ‘transition’ between feudalism and capitalism. This paper examines two traditional interpretations of primitive accumulation: ‘historical’ and ‘inherent-continuous’, and the implications that claims of their compatibility have for understanding the nature of neoliberalism. This paper concludes by arguing the immediate importance of continuing to investigate neoliberalism as an ‘inherent-continuous’ form of primitive accumulation such that the results of this project could inform the direction and strategy of various anti-capitalist struggles.
SOCIOMETRY

926  Concourse  3:30-4:15  Board C99
Amber Army
Francisco Vivoni (Faculty Sponsor)
Department of Sociology, Worcester State University
Dismantling the School-to-Prison Pipeline from within New Classroom Walls

Most recent research on graduation and dropout rates in the United States has shown that there is an 80% graduation rate and a 7% dropout rate. Nationally there are about ten thousand children in adult detention facilities. The consistent removal and exclusion of students from the classroom is driving students out of schools, onto the streets, and into prisons. This process is referred to as the school-to-prison pipeline which is fueled by a highly punitive policy adopted in United States schools, Zero Tolerance. The heightened punitive actions taken by schools to discipline children, disproportionately Black and Latino students, are beginning to create a similarity between the schools in underfunded areas and prisons. Both institutions are state funded, operated, and mandated; both are equipped with officers, guards, and metal detectors; both involve a time sentence; and both institutions help to preserve a capitalistic economy in the United States. In order to close the achievement gap in the United States there is an urgent need to abandon the current model of education that is serving the benefit of an elitist class while continuing to oppress people of color. State operated education needs to be abandoned completely because it will continue to widen the achievement gap among students, especially those of minority groups: Black and Latino boys, as well as those with special needs. Compulsory education is an outdated model that can be replaced with alternative models that would be of more benefit to children and society.
Domestic violence is a family issue that has recently surfaced as public matter effecting society’s various institutions, rather than a private matter to be addressed within the home. The victims of intimate partner violence experience significant physical injuries that can be a direct result of the violence as well as a variety of psychological, emotional, and social consequences that impact all aspects of their lives in the long term. While intimate partner violence is generally assumed to have these negative effects on the partners directly involved, children who witness violence are subjected to their own collection of negative consequences. The disruption of family functioning that intimate partner violence impacts the emotional, psychological, and cognitive health of children raised in these households. Witnessing domestic violence therefore influences the way in which children learn the roles and expectations within the family unit, how children socialize and learn within the educational sphere, and the emphasis that is later placed on violence in their own familial relationships. The emotional, cognitive, and social consequences associated with this exposure to domestic violence increases the likelihood that these individuals will be subjected to several risk factors that are associated with violent relationships which weakens the family structure by contributing to a continuous cycle of violence. Essentially, exploring micro level implications of witnessing domestic violence offers an explanation as to how domestic violence negatively impacts the development of a family in the long-term because of its direct association with the developmental process of the children who witness it.
Chinese International Undergraduate Experiences at the University of Massachusetts Amherst

This research examines the unique experiences and perspectives of Chinese international undergraduate students at the University of Massachusetts. The number of international students on U.S. campuses has been growing since the 1950s; the Great Recession of 2008 has further incentivized the American recruitment of international students. Due to a multitude of economic and cultural factors, America has emerged as the leading host country for international students, many more of whom come from China than from any other country. The transition from China to America can pose a range of problems for these students, and past research has explored the difficulties that international students face with respect to adjusting to life in America, becoming involved in college campuses, and communicating with professors, administrators, and other students. Focusing on Chinese international undergraduates at UMass Amherst, this study seeks not only to identify the most pressing difficulties that these students face, but also to illuminate those aspects of life on campus that have proven to be the most helpful. This research also examines common reasons for studying in America, expectations of study abroad, and the realities of college life. Four in-depth interviews were conducted with Chinese international students; all four interviews reveal a need for improved communication between these students and professors. The results also suggest that students need improved assistance in adjusting to life in America, especially with respect to acquiring English proficiency.
World population has increased with a furious velocity, but some studies have shown a decline in fertility rates in recent years. Japan has taken the lead ever since the mid-1970s when it experienced a decline in birthrates as early as 1957. Birth rates fell from over 2.6 million a year in 1947 to 1.5 million ten years later. Japan leads in both declining fertility and prolonged life expectancy rates, which results in one of the most of unstable dependency ratios today. Population instability leads to economic instability, and if there is no sign of improvement, it may also lead to an economic death spiral. Using scholarly literature accessed through the Middlesex Community College library databases and current Japanese policies, this research project attempts to answer why Japan has such a low and quickly declining fertility rate, which is largely due to the decrease in marriage rates. The desire for Japanese people to opt out of marriage is highly influenced by societal issues. There are factors that affect men and women respectively. A common factor which has negatively impacted marriage rates in Japan, however, is that Japanese society is centered on an aggressive corporate culture. This culture places astoundingly high standards on males and females with a disproportionate amount of that pressure on the male population.
Many questions arise on the topic of dance in the twentieth and twenty-first centuries. One of the more fundamentals questions obvious to the mundane observation could be: “what is dance?” Dancers of various disciplines find themselves confronted by similar issues on their path to creating their careers. This phenomena analyzed from a socio-cultural optic is one of the more powerful exposes on the status quo of dancers in America. I would like to present my research question of what is happening to our dancer’s careers in modern America. How has the art form been modified?
Purpose: This research studies the effects that sexual education has on adolescents’ attitudes and behaviors towards sexual activity. Due to the societal perception that teen pregnancy rates and sexually transmitted disease (STD) rates are increasing, this analysis is expected to provide information to help adolescents make lower risk sexual decisions. Methods: This research utilizes quantitative secondary data analysis using data obtained from the Sex Education in America 1999 dataset. The dataset consists of data from interviews of principals, sex education teachers and pairs of students and parents. These cross-sectional data are tested using bivariate and multivariate analyses. Expected Results: Two types of sexual education are analyzed: programs encouraging the use of contraceptives and safe sexual practices (comprehensive) and programs emphasizing abstaining from sexual activity until marriage (abstinence-only). This research expects to find that students enrolled in comprehensive sexual education programs are more apt to use methods of contraception and subsequently are more apt to engage in lower-risk sexual behaviors than students enrolled in abstinence-only sexual education programs. Conclusion: These expected results would suggest that comprehensive programs are more likely to prepare students to make lower risk decisions and therefore lead to decreased (unwanted) teenage pregnancies and lower STD rates in adolescents. Findings from this research will help to influence and shape how sexual education programs are taught in order to make adolescents more knowledgeable pertaining to the topic.
Historically, cultural expectations for teenagers were much higher and they were expected to contribute significantly to their families and communities. This changed in the twentieth century. G. Stanley Hall (d. 1924) was the first psychologist to classify adolescence as a developmental stage and believed adolescents needed to be strictly controlled. The Fair Labor Standards Act (1938), and post-World War II economic boom, meant fewer working teenagers and an increase in high school and college enrollments. Erik Erikson (d.1994) postulated that adolescence is a stage for identity discovery. The emphasis on adolescence, and the growth of the middle class, meant teenagers became a target market and companies perpetuated the concept of adolescence because it was profitable. The research supports and perpetuates the cultural stereotype that teenagers are moody, irresponsible, and impulsive. Research shows the brain is still developing well into the twenties, and lack of brain maturity in adolescence causes impulsive behavior and impaired decision making. The leading causes of death for youth between the ages of twelve and nineteen are accidents, homicide, and suicide. If teenage behavior is influenced by society, and that behavior leads to increased mortality rates among teenagers, it is imperative that people consider what society can do to influence teenagers to behave less impulsively.
Roughly sixty percent of adults in the United States work in some capacity, so the question of job satisfaction affects a large portion of society. We will use data from the Pew Work survey to better understand workers’ perceptions of their jobs with particular focus on job satisfaction. We will use four theories to explore job satisfaction. Herzberg’s motivation-hygiene theory argues that psychological and material factors work together to affect job satisfaction. We predict that the quality of the material factors of work will increase job satisfaction. Work values and job rewards theory argues that job satisfaction comes from how much workers’ expectations for a job align with what the job provides. We predict that the more a job matches workers’ expectations, the more satisfied workers will be. Dual labor market theory argues that the labor market is segmented into primary and secondary markets. Primary market jobs offer better rewards than secondary market jobs. We predict that workers in the primary market will be more satisfied than secondary. Border theory argues that working people are border-crossers who inhabit two domains (work and home) and how workers manage these roles and the borders between them. We predict that the more control workers have over their work, the more satisfied they will be. We hope to learn what influences job satisfaction so as to improve working conditions.
Probation is now the most commonly used community based correction in the criminal justice system. Over half of all adults under correctional authority are serving probation sentences. In 2014, this meant more than 3.9 million people, or nearly twice the number of adults in prison (US Department of Justice, 2015). Probation is based on the idea that in lieu of imprisonment, the offender is allowed to live in the community under the supervision of probation officers, who help them to abide by its laws. However, there are a lot of doubts about probation because of a lenient nature of the sentence. Nonetheless, high recidivism rates of probationers are a continuous concern in the field of community based corrections. The goal of this research is to evaluate recidivism rates of probationers with the follow up period of one year after completion of their probation term. The recidivism rate for probationers can be conventionally measured by new commitment of new offense and technical violations. While measuring recidivism rates among probationers, this study will also compare technical violation with new offense violations. Further, demographic factors including gender, race, and education will be analyzed in order to identify salient predictors of recidivists. It is believed that probation is for first-time offenders, but according to Bureau of Justice Statistics (2015), probation was sentenced to violent offenders as well. In order to examine the extent of use of probation for violent offenders, this study will investigate offense types of probationers. This study will be conducted by analyzing established articles on probation and published official data from various criminal justice agencies.
Gender dynamics have taken a different course in matriarchal societies, which challenges the Western perception of a universally male-dominated world. Although rare, indigenous populations present in various regions of Africa, the Americas, Asia, and the Pacific still live under a matriarchal system. This research will make use of academic literature in order to compare and contrast the roles played by men and women within these societies in regards to their cultural structures. It will determine whether women-led societies have fashioned a reverse pattern of gender discrimination, comparable to the standards that patriarchal societies have set for women in most, if not all, Western societies. The research presented here will also demonstrate why matriarchal societies are so rare and why they have difficulties sustaining themselves in an ever-increasingly patriarchal world. Finally, the research will determine whether these societies stand a chance at survival, or if they are destined to become relics of the pre-colonial world.
This study involves showing scripture to Jews, Christians, and Muslims from the Torah, New Testament, and Quran in unlabeled surveys. Each participant will respond to a series of survey questions indicating how they feel about the teaching and how moral they think it is. The scripture will come from commonly used versions of these texts in the United States and represent the same relative teaching. The results of the survey questions will determine if the participant agrees with the scripture or not when they don’t know what religious book it came from. I hypothesize that most participants will have the same response to the scripture regardless of which book it comes from.
893  Concourse  10:45-11:30  Board C01
Hannah Rochelle Davidson
Brian Kapitulik (Faculty Sponsor)
Department of Social Sciences, Greenfield Community College
Obesity as a Social Problem: A Review of Clinical Literature

The prevailing clinical attitude around obesity is steeped in pathology and epidemiology of the obese body; to be overweight or obese is to be inherently unhealthy. In recent years, however, social scientists and professionals in the areas of anthropology, sociology, food justice, and psychology have started to reexamine the westernized, socio-cultural model of obesity as disease. Using a social constructionist perspective of social problems, this research examines the pervasive dialogue around obesity within clinical contexts, such as doctors’ offices and health clinics. Through content analysis of patient-directed literature, including flyers and informational pamphlets, I identify the claims about obesity presented in health care settings. I conclude by describing the implications of my analysis for patient-provider relationships, patient autonomy, and how patients regard the broader health care system.
Religious Norms on Women’s Sexuality and Economic Empowerment

This research analyzes the interaction of women’s sexual autonomy, economic empowerment and systemic social marginalization, considering how religious beliefs rooted in traditional values negatively impact socio-economic equality. It evaluates cases such as the brutal murder of the New Delhi’s medical student Jyoti Singh as well as the attack on women’s education advocate Malala Yousafzvi, and analyzes what these women represent per influence of religious values in such violence. Religious practices extracted from the Old Testament and the Qu’ran, main sources of the largest monotheist religions in the contemporary world, support the idea that a women’s value is connected to sexual life and establish a moral code to be follow. The majority of those beliefs are applied directly or indirectly to fundamental reproductive rights, abstinence, marriage practices, female genital mutilation and others. While cultural presentations justifying such attempt to control women’s sexual autonomy vary according to religious practice, this research focuses on selected cases representing the pattern of mainstream theologies defining women’s reproductive autonomy in order to grasp the systemic nature of religious ideology and economic and physical impairment. The clash between the right to freedom of religion and gender equality has caused a great amount of tension in social dynamics that progressively intensify as women’s empowerment gains ground. Even with such tension solved in the legal realm, the strength of its remains in cultural tradition values endorses the marginalization of women. This paper analyzes how this pattern impacts the economic independence of women and therefore the path to gender equality.
Male Domestic Violence Victimization

Domestic violence against men is seldom discussed in society, with studies and discussions focusing mostly on female victims. While there is limited data on male domestic violence victimization, one study suggests that 40% of victims of severe physical abuse are men. Using the 1994-1996 Violence and Threats of Violence against Men and Women survey, we will explore what leads to male domestic violence victimization. Male-backlash theory argues that domestic violence is used to re-establish dominance and predicts that as male’s power increases, victimization increases. Reasoned action theory argues that individual’s means of reaching goals are interrupted by changes in well-being and predicts that the presence of any chronic disease or illness increases victimization. Social exchange theory argues individuals wish to maximize relationship benefits while minimizing costs and predicts that as benefits an individual receives from a relationship increases, victimization increases. Drunken-bum theory argues alcohol consumption determines the severity of abuse and predicts the more alcohol consumed the more severe the victimization. Examining male domestic violence victimization presents a new opportunity for discussion and awareness and potentially provides insight into how to prevent future abuse from occurring.
Recent media coverage of cases like those of Walter Scott, Michael Brown, Eric Garner, and the Black Lives Matter Movement have drawn attention to police brutality, which has a long history in the United States. Several instances where police used lethal force when it was not necessary involve African-Americans. The debate concerning police tactics has intensified, and centers around exactly how much of a problem police brutality is, in what areas it is most common (for example, does it mostly occur in predominantly black neighborhoods and towns), and what can be done to hold police accountable. Federal, State, and Local authorities are currently looking at and proposing multiple potential changes to police policies. This research will be looking at police brutality and some of the factors behind it.
Opportunity or Redistribution? Contrasting Hypotheses on Acquiescence to Inequality

Despite claims that we exist in an “Age of Acquiescence” (Fraser, 2015) to historically high levels of inequality, Americans across wage, gender, and political leaning all desire a more equal distribution of wealth (Norton & Ariely, 2011). However, this apparent consensus doesn’t necessarily translate into support for redistribution, at least in terms of greater taxation. Rather, according to recent findings by Northwestern University Professor Leslie McCall, Americans prefer instead to address wealth inequality through the expansion of opportunity (McCall, 2011). It may be that as individual perceptions of autonomy and the availability of opportunity increases, support for traditional redistribution decreases, since life outcomes are attributed to individual effort and responsibility as opposed to an un-level playing field (Naito, 2007). In addition, differences in individual moral priorities place certain morals intuitions above others, with liberals placing a greater emphasis on fairness and reciprocity than conservatives, potentially explaining their greater likely hood to support traditional redistribution in addition to opportunity expansion (Graham et al, 2011). This survey attempts to bring these variables into consideration and determine whether and to what degree self-selected measures of autonomy and moral intuition correlate with support for redistribution, whether traditionally conceived or through opportunity expansion.
Prisoners can be released into the community in two ways: unconditional release and conditional release. While unconditional release means direct release to the community without further supervision, conditional release is followed by community supervision. As a part of conditional release, an offender can be required to reside in a residential community center, also known as halfway houses, where resident offenders are permitted to leave for work, educational or vocational programs (Schmalleger & Smykla, 2009). Halfway houses can work as a transitional institution before returning to the community. These transitional system allows resident offenders to have the opportunity to receive rehabilitation before being released into society. A halfway house offers programs such as job search, drug programs, counseling services, and support from the team members that run the halfway houses. Parolees being released directly into society report to a parole officer, and are usually on their own when it comes to looking for jobs. The public safety is another concern when the offender were directly released into the community. Exploring the difference of effectiveness of these two different type of release would be crucial to better understand a reintegration process of offenders. Therefore, the goal of this study is to compare recidivism rates between these two groups: those who were released directly into the community vs. those who were released onto halfway houses. In order to conduct this study, established studies and government statistics on halfway houses and their effectiveness will be reviewed. Further, this research will focus on whether or not halfway houses are effective in terms of recidivism and how they work as a part of transitional institution between prison and the community.
One of the most popular new approaches to community based corrections is surveillance by electronic monitoring. Electronic monitoring is usually combined with home confinement. Thousands of offenders are monitored each day and the use of electronic monitoring will continue to increase along with technological advances. Further, it costs less than any other types of community based sanction, let alone prison. As of 2010, criminal justice systems in the United States were supervising over 500,000 criminal offenders electronically (USDOJ, 2011). Global Positioning Systems, which use satellite tracking devices to monitor offenders, have been used. More specifically, GPS ankle bracelets on offenders communicate with satellites, sending a signal to the monitoring center where supervisors can directly track their location in real time (USDOJ, 2011). Although some experts contend that EM is a great tool to prevent offenders from recidivating while reducing overcrowding in correctional institutions, others believe that it does not work and is a waste of limited corrections resources (Finn, 2002). What most experts would agree upon is that EM is a sanction that requires further study and evaluation (Renzema, 2005). This study seeks to examine the effectiveness of the use of electronic monitoring as a criminal sanction for violent, sexual, drug, and property offenders by analyzing recidivism rates. Studying the outcomes of using electronic monitoring among a variety of offender types will provide guidance for future policy involving its use in the criminal justice systems, and recommendation for further use of electronic monitoring for different types of offenders.
Private Public Spaces: The Impact of Technological Advances on People’s Comfort Levels for Conversations

Purpose: Society has moved from having physical private spaces to carrying social networks in mobile devices. Mobile phones allow people to text or call someone from any location, and now smartphones have added Internet use to provide further uses. This study looks at why people are so comfortable with the change to private public spaces where one can be in public and hold private conversations.

Methods: To address this question college aged students (18-22) who are currently attending Framingham State University were interviewed. Participants were found through snowball sampling, where participants would recommend and contact people they knew to be interviewed. The interviews were conducted one on one and lasted between fifteen to forty-five minutes.

Results: This research indicates that new social norms have developed because of the innovation of mobile technology. Some common themes appeared in the interviews including multitasking, new social norms, and convenience.

Conclusion: The major finding through this research is how much multi-tasking has become a major part of life and has created new social norms for us. Some ways are productive, such as working through email between classes, while other are harmful, such as texting and driving. As the world moves at a faster pace with information always available, the idea of efficiency has become ingrained in people. Students keep up with school, work, personal relationships, family and more using their devices to contact those they may not have time to see, or can replace spending time with someone by talking on the phone.
Substance abuse can contribute to a number of costly problems affecting one’s social, physical, and mental health. These problems may progress into significantly more serious cases such as motor vehicle accidents and even death. For example, in 2005, 7,420 teens died or were injured in DUI crashes. About 150,000 accidental drug overdoses occur each year among teens ages 13 to 24. We use data from the 2006 Monitoring the Future survey to investigate the impacts, if any, that strain, peer association, and labeling have on substance abuse among young adults. We draw on three theories to explore the relationship between substance abuse and young adults. General strain theory suggests that individuals who experience strain from frictions and pain from social structures look for ways to satisfy their need. General strain theory would predict that as the strain experienced by young adults increases, substance abuse among young adults will also increase. Differential association theory argues that deviance is a learned behavior. Differential association theory would predict that as the times a young adult experiences negative influences by their peers increases, substance abuse will also increase. Labeling theory explains how an individual is prompted to react and live with a conditioned stigma attached to their character. Labeling theory would predict that as the times a young adult is labeled ‘deviant’ increases, substance abuse among young adults will also increase. By exploring these three theories of criminology, we will attempt to identify what impacts substance abuse among young adults.
877 Auditorium  10:45-11:30  Board A35
Melanie Rachel Hain
Olivia C. DiFranco
Kim Micciche
Crayton Jon Miller
Michelle Lee Schoonover
Ke Li (Faculty Sponsor)
Department of Sociology, Framingham State University
What’s The Cost? Race, Gender, Income and Their Impacts on Intimate Partner Violence and Victim Response

Every sixty seconds, approximately twenty individuals in the United States fall victim to intimate partner violence (IPV). This equals to more than ten million victims annually or the approximate populations of New York City, NY and Philadelphia, PA combined. Moreover, it is estimated that over half of the IPV cases were not reported to the authorities in the past decade. Under the circumstances, it is critical for us to gain better understandings of the experiences of IPV victims. The rampancy of IPV made us decide to conduct a study of how IPV victims’ socioeconomic standings, race and gender impact their help-seeking efforts from the police and medical professionals. We draw on data from the National Crime Victimization Survey to address the question of to what extent victims report their experiences to the police and to what extent they approach medical professionals for treatment. Three hypotheses are tested within our research: 1) Black women with low incomes are at greater risk of suffering from IPV than those of other racial and economic backgrounds; 2) Blacks in general are more likely to report IPV and seek medical attention than those of a different racial identity; and 3) IPV victims with low incomes are less likely to seek help from police and medical professionals than those with high incomes. By testing these hypotheses, we deepen our understandings of the connections of demographic characteristics, IPV and post-victimization outreach. In so doing, we hope to facilitate law enforcement agencies, medical professionals, and social activists to better help the social groups that have been most adversely affected by this prominent social problem.
Childhood sexual abuse is an uncomfortable topic but important nonetheless. Factors such as socioeconomic status, exposure to violence, and family structure determine the likelihood of a child being sexually abused. We framed our research around the question ‘what are the predictors of child sexual abuse?’, and dug deeper into sexual violence and got an understanding of the risks, the prevention, overarching indicators of sexual abuse, and its consequences. The dimensions we focused our research on were victimization, coping mechanisms, health post-abuse, and risk factors of sexual behavior. The sample was derived from the Behavioral Risk Factor Surveillance System dataset. The survey was conducted from 29 different states; there were 15 states that continued to contribute data and the sample size for was 100,000 interviews in the year of 1993. Our goal was to determine the chances of a child being sexually abused using their socioeconomic status, family structure and exposure to violence as the basis of our research using power and control theory, routine activities theory, and attachment theory. We expect to find that if a child comes from a lower socioeconomic status, has been exposed to extreme amounts of violence, and lacks a stable familial structure, they would be more likely to be victim of child sexual abuse.
The past several decades have seen a dramatic transformation of the U.S. labor market, with increasingly more Americans finding themselves employed in some form of “service work.” A growing proportion of the literature in the sociology of work has taken aim at this burgeoning class of jobs, paying particular attention to the “worker-manager-customer triangle” and to the unique forms of labor involved. In this study I shift the empirical lens toward the coffee-shop – a peculiar and under-studied site of service work in which the workers participate in both the production and the delivery of products to their customers. Over the course of several months I conducted nine in-depth interviews with baristas at three cafés in a New England college town. In my attempt to untangle the complex web that is the café labor process, I highlight the interconnectedness of (1) the café brand, (2) the composition of the workforce, and (3) the overall quality of job for café-workers while pointing to those aspects of the labor process, which seem to serve as the glue holding these three fundamental concepts together. The picture I paint is one of a dynamic and malleable labor process, as three shops with seemingly identical products produce strikingly different experiences for their workers. Future research will be needed to explore the extent to which this model is or is not representative of service work more generally.
Throughout adolescence, children tend to engage in many risky behaviors, one of which we focus on is risky sexual behavior. This paper examines how peer relationships and substance abuse influence adolescent engagement in risky sexual behaviors. Additionally, we look into religion and the family and how these social institutions act as a deterrent to keep adolescents from engaging in risky sexual behaviors. In our research project, we conducted a quantitative secondary data analysis gathered from the National Longitudinal Study of Adolescent Health 1994-2008. This study contained a stratified random sample of high schools students in the United States from the 1994-1995 school year, along with four follow-up interviews throughout the period. We have conducted bivariate analyses as well as multivariate analyses to explore the connections to adolescent’s risky sexual behaviors. What we expect to find using reference group theory when analyzing family and religion is a positive influence that deters adolescents from engaging in risky sexual behavior. Using social learning theory, we expect to find that peers and substance abuse have a negative influence on adolescents by increasing the odds of them engaging in those behaviors. The risky behavior of adolescents requires the concern and intervention of adults because adolescents are easily influenced by the institutions they are a part of. Finally, the choices that adolescents make not only have long term effects on their individual lives, but the communities they belong to as well.
880 Auditorium  10:45-11:30  Board A38
Lauren A. Laflamme
Kayla Brice
Clifford David Brown
Stephanie Claire Scanlon
Xavier L. Guadalupe-Diaz (Faculty Sponsor)
Department of Sociology, Framingham State University
What Keeps Them Away?: A Study of Adolescent Substance Abuse

Our project is framed on the assumption that adolescents are heavily influenced by social processes. This study examines a variety of indicators related to social control and social learning theories that may affect adolescents. It will help us to determine whether adolescents would engage in or avoid substance abuse. Our research was developed using the datasets compiled by the Monitoring the Future (MTF): a Continuing Study of American Youth. We performed a secondary data analysis from this cross-sectional study that was collected in 2006 by the University of Michigan. The MTF data used a multistage area probability sample design which helps to make our prediction that family influence, educational involvement, workforce participation, and self-perception will be positively associated with 12th graders substance abuse. Our model tests social control theory and social learning theory to see what factors contribute to adolescents participation in behavior recognized as antisocial, such as abusing drugs. Drug use among teens continues to be a concern, especially considering the heroin epidemic, and also considering the recent marijuana legalization in some states. Other drugs that we believe could affect teens include drinking and LSD. Knowing how these events affect adolescents is crucial to our future since these children hold the future in their hands.
The Promising Factors of Completing Drug Courts

Drug courts are special courts that are given responsibility to handle cases involving drug-addicted offenders with a variety of dependency severities. As one of diversion programs which intend to divert offenders away from the criminal justice system, drug courts have a focus on treatment and accountability. They have been practicing over 20 years for substance users and have been considered one of the most effective programs by reducing addicted offenders, while also improving public safety (Office of National Drug Control Policy, 2011). According to the National Drug Court Resource Center, there are 2,968 drug courts in operation in the United States and its territories as of June, 2014 (n.d.). Although the operation of drug courts has continuously increased in the US since 1989 and drug courts are cost-effective, it is important to understand an appropriate target population who has high possibility of success in drug courts. There are major factors that affect the ability of an offender sentenced to drug court from successfully completing the program in drug court programs across the nation. The overall completion rates are estimated over 50% of the participants in drug courts (Matteo et al., 2009). Factors that affect success rates in general are related to the offender’s demographic factors and individual characteristics. This study intends to identify some of the major factors that led participants to successfully complete drug courts. In order to conduct this proposed study, established journal articles that evaluated the success or failure rates in drug courts will be reviewed and analyzed in terms of completion rates, recidivism, and participants’ demographic and socio-economic characteristics. By identifying promising factors for the completion of drug courts, this study would make suggestions about how to improve the current drug court programs and how to benefit participants.
925 Auditorium  3:30-4:15  Board A47
Sean Brennon Leary
Hyesun Kim (Faculty Sponsor)
Department of Criminal Justice, Worcester State University
Effectiveness of Drug Courts

Since 1989, Miami Florida started the first Drug Court to help deal with the cocaine epidemic that was rampant in the area, drug courts have been dramatically expanded nationwide (Latessa & Smith, 2015). Traditional method of dealing with drug offenders fail to reduce substance abuse and criminal behaviors. As a part of indeterminate sanctions, drug courts adopt treatment-oriented approaches by using collaboration among the criminal justice system and treatment service agencies (Alarid & Carmen, 2011). Later, based on the success of the drug court, the scope of drug court has expanded to juveniles and DUI drivers, while the problem-solving courts began to target mentally ill, families, re-entry and veterans. Drug courts offered a new idea of problem solving courts for special groups of offenders and extended the continuum of community based corrections. According to the National Institute of Justice (2015), there are 12 different types of Drug Courts practiced as of June 2014, totaling about 3,400 courts nationwide. The National Association of Drug Court Professionals claims that out of the approximately 1.2 million drug offenders eligible for these courts, only 120,000 are treated annually. It is obvious that drug courts would be a promising approach for drug offenders. Therefore, historical and theoretical understanding of drug courts is fundamental to enhance community-based corrections and support treatment oriented programs for drug offenders. Thus, this study will briefly review the history of the drug courts and underpinning theories behind them. Further, this study will also investigate the completion rates among the participants in drug courts and examine recidivism rates of Drug Court graduates by reviewing courts documents, statistics, and established studies. By finding these, this study will be able to determine the effectiveness of drug courts.
22nd Annual Massachusetts Statewide Undergraduate Research Conference

Alida Marie Lefebvre  
Donald Tomaskovic-Devey (Faculty Sponsor)  
Department of Sociology, UMass Amherst  

Police Use of Force Across the States: Where and Why Does It Happen?

Mike Brown. Walter Scott. These names, along with those of many others, tell a popular story of police use of force across the United States. In this paper, the 1,139 total deaths caused by police in the United States through the entire year of 2015, 89% of which were by gunshot, is explored using a state by state level comparison. This is achieved through data gathered from the United State Census Bureau, Federal Bureau of Investigation, and The Counted. Factors of poverty, police per capita, violent crime rates, and median income are all explored as independent variables of death caused by police. Past research suggests racial prejudice is a large factor in policing (Burton 2015). This information is reflected when looking at those killed in United States as a whole; with unarmed Black people five times, and Hispanic people two times, more likely to be shot and killed by police than unarmed white people. As use of force is brought to the forefront of national attention, along with the lack of accurate data, it is important to understand why and where police use of force happens. It is not unreasonable to call for a new system of training police across the country that focuses less on an automatic response with a gun and more on an active role in connecting with the human, no matter their race, on the other side of the barrel.
881 Auditorium  10:45-11:30  Board A39
Francis “Frank” Howard Legere
Xavier L. Guadalupe-Diaz (Faculty Sponsor)
Department of Sociology, Framingham State University
Why a Domestic Terrorist? The Driving Forces behind Domestic Terrorism

After the attacks of September 11th 2001, millions of Americans overlooked the unthinkable that unfolded right before their very eyes. While the mainstream media continues to focus on terrorist threats abroad from radical Islamic terrorism, the actions of right-wing, left-wing, and activist groups have wreaked havoc on the homeland. It is a statistical fact that these domestic groups have taken more lives in the United States since 9/11 than any other type of terrorist attack (New America). This work seeks to review, analyze, and condense the standing literature on domestic terrorism in order to reveal what the scholarly community believes to be the leading causes behind domestic terrorist attacks. Recent major events—the 2012 Sikh Temple Shooting in Oak Creek, Wisconsin; the 2015 Charleston Church Massacre in Charleston, South Carolina; and the 2015 Planned Parenthood Shooting in Colorado Springs, Colorado—clearly exemplify why much needs to be done. This work applies the major driving factors birthed by previous literature and analyzes their place in connection to these recent tragedies. In doing so, this research is able to deem whether the factors leading to domestic terror attacks can be disrupted, or if a new approach needs to be taken in addressing the always-evolving acts of terrorism. The earnest hope is that the findings guide further traditional research and offer quality policy suggestions in a more immediate nature.
Drug and Alcohol Use among US College Students: What Drives Them into Risky Behaviors?

Alcohol and drug use is a widely anticipated practice among college students. In this study, we intend to explore the question of what prompts college students to use alcohol and drugs. So far, few studies have simultaneously tested the applicability of general strain theory and social learning theory in this regard. To fill the gap in the literature, we draw on data from the Behavioral Risk Factor Surveillance System (2009) with the intention to test four hypotheses: (1) Male college students tend to experience more pressures than their female counterparts, and as a result, they use alcohol and drugs at a higher rate than women; (2) college students with peers who use drugs and alcohol are more likely to do the same than those without such peers; (3) if young adults spend enough time with a person that abuses drugs or alcohol, then they are more likely to imitate their peers and abuse drugs and alcohol themselves; (4) college students who lack social and emotional support are at greater risk of abusing drugs and alcohol than those who are well supported by their families and peers. By examining what drives college students into risky behavior such as substance abuse, we hope to achieve two goals; first, we aim to advance theory-building in criminology and sociology; second, we intend to better inform students of the healthy strategies in coping with the stress that comes along with their transition to adulthood and professional worlds. Additionally, through this study, we seek to assist educators, administrators, parents, and medical professionals in their efforts to understand risky behavior among young adults.
The Effectiveness of Juvenile Probation

Although juvenile crime has declined since the mid-1990s, juvenile arrest since the mid-1990s, law enforcement agencies in the U.S. made an estimated 1 million arrests of persons under age 18 in 2014 (Office of Justice and Delinquent Prevention, 2015). Juvenile arrests account for approximately 20% of all violent and property crime each year in the United States (Alarid & Carmen, 2011). As a court disposition for juvenile cases, probation has been widely used. More than 50% of delinquency cases were ordered to probation in 2013 (OJJDP, 2015). Therefore, juvenile probation is the disposition most often used by judges when formally adjudicating juvenile delinquency cases. Considering the wide use of probation for juvenile offenders, the effectiveness of probation is crucial to affect juvenile crimes. Therefore, this study seeks to evaluate the effectiveness of juvenile probation. In order to do so, it will examine what types of probation treatment programs are beneficial to prevent reoffending. Also, this study will identify the appropriate term of probation by offense types. By analyzing offense types, criminal history, and demographic factors of juvenile probationers, it will also identify risk factors that result in recidivism. Based on the findings, this study will discuss the possible practices to decrease the recidivism rates of juvenile offenders. This problem is worth researching because lowering recidivism through effective use of probation treatment is important for keeping the community safe.
How does romance and sexuality affect adolescents’ mental health? This question is critical, because approximately half of American adolescents will start engaging in sexual activities before their high school graduation. Despite the significance of this question, we have only limited understandings of how adolescents’ sexual relationships and activities impact on their mental health. In this regard, prior research is inconclusive as to in what ways and to what extent intimate relationships and sexual experiences influence young people’s emotional and psychological wellbeing. Some studies find that early sexual onset triggers negative effects on adolescents’ mental health, while others do not support those findings. Moreover, some studies identify significant connections between adolescents’ romantic relationships and mental health outcomes, whereas others dispute such connections. In light of the debates in the field, we use data from the National Longitudinal Study of Adolescent Health to address two research questions: (1) how does the development of a romantic relationship with a peer affect one’s mental health? (2) Whether and how does sexual onset--defined as the age when an individual starts having sex for the first time--shape her or his emotional and psychological wellbeing? Ultimately, we aim to add depth to our understandings of the linkage between young people’s sexual experiences and their mental health. In so doing, we hope to help young people, parents, educators and policymakers in their decision-making to build a healthier society over time.
When people ask me which religion I believe, I always answer “I do not believe in any religion.” This answer is very common for Japanese people unless they are priests or cult members. Japanese people conduct some religious practices even though they do not recognize these practices as religious. For example, people go to shrines on the first, second or third day of a year to pray for their good luck in the new year. This is obviously a religious practice for people from other countries, but not for the Japanese. In spite of the fact that almost all Japanese people are involved in practice of Shinto or Buddhism, many Japanese people say that they are atheists and for some of them this is because they fear religiously inspired violence. There are some other reasons for this as well. Shinto, which is the major religion in Japan, was not considered as an organized religion because it is essentially animism in which there is no doctrine, founder, or scripture.
Presentations Details

22nd Annual Massachusetts Statewide Undergraduate Research Conference

**884 Auditorium 10:45-11:30 Board A42**

Timothy McCarthy  
Marian Cohen (Faculty Sponsor)  
Department of Sociology, Framingham State University  
My Sport versus My Education

Most previous research examining the relationship between participation in athletics and students’ academic performance focuses on either how high school sports positively impacts academics, or how college sports negatively impacts academics. This study takes this research a step further by conducting in-depth interviews with collegiate athletes who participated in athletics both in high school and in college to determine their views about the effects of participation in sports on academic performance in each setting. It is hypothesized, consistent with results reported in the literature, that the student-athletes will confirm that playing a sport in high school positively affected their academics, while playing a sport in college has had a negative effect. It is also hypothesized that athletes in different NCAA divisions will have different experiences. To measure this, the study included 24 NCAA student-athletes from 3 sports (basketball, football, and baseball) at 2 different schools, University of Massachusetts Amherst (a division 1 institution), and Framingham State University (a division 3 institution). Findings from this research will extend knowledge of the effects of participation in athletics on academic performance by examining the experience from the students’ perspectives and will add the dimension of comparison between division levels.
The purpose of this study is to explore the influence of parental involvement, frequency of internet use, and school involvement on whether a teen is cyber-bullied. This study is important because cyberbullying peaks during the period of adolescence, starting around the age of 10 or 11 and declining after the age of 16 or 17, thus it is crucial to understand what might influence a peak during this time period. A review of previous literature supports the fact that cyber-bullying is a topic of great importance to the culture that currently surrounds adolescents. The data set that we are using is Pew Teens Online (Social Media), which uses the results from a cross-sectional survey that was conducted by the Growth from Knowledge (GFK) group using a probability-based sample web panel sent to 1084 parents and 1060 adolescents designed to represent the United States. Relying on Bandura’s Social Learning Theory, we expect our findings to indicate a decrease in an adolescent’s chances of being cyber-bullied if school faculty is involved in their internet use. Using Vygotsky’s Sociocultural Perspective, we expect to find a decrease in an adolescent being cyberbullied if their parents are involved. Lastly, relying on Blumer and Katz’s Uses and Gratification Theory, we expect to find an increase in adolescent cyber victimization if the adolescent’s frequency of internet use is higher. It is interesting to observe the multiple factors that could lead to a rise in teen cyberbully victimization and thus help better understand the ways to resolve it.
This research explores the ways in which the Massachusetts Department of Corrections addresses mental health and substance abuse issues among incarcerated individuals and asks what alternatives to the current practices are available. In recent years, several controversial practices used within the Massachusetts state prison system have been brought to the attention of the Department of Corrections with a demand for changes to be made. These changes focus on the usage of solitary confinement and the mental healthcare in state prison facilities. My research examines the various ways these criticized practices affect incarcerated people who suffer from mental health and/or substance abuse issues. I will then provide suggestions for alternative methods of treatment for this population within the prison system, as well as offer viable alternatives to incarcerating people with mental health and substance abuse issues.
PURPOSE: This research identifies the divide between gender roles and their potential impact on health issues in relation to victimization. It focuses on mental and physical health issues in relation to gender stereotypes, dating violence, and sexual orientation. More specifically, how does gender result in different health effects after victimization? This research includes the hypotheses of gender equality and differential response to help show gender may influence health issues and the impacts of victimization. METHODS: The National Crime Victimization Survey (NCVS) from 2010 is a dataset comprised of self-reported data from individuals who have experienced victimization. This research is cross-sectional and relies on a subset of the NCVS covering 1,747 victims from the fourth quarter of 2010, allowing bivariate and multivariate analyses of the researchers’ subject. RESULTS: The gender equality hypothesis supports situational response by showing how male dominance may impact females being the victim more often. Differential vulnerability hypothesis states males and females are victimized by scenario and females experience higher depression and stress as a result. These hypotheses explain how one’s gender and situational responses may affect their health. CONCLUSION: The differential response and gender equality hypotheses will show connections between genders, reactions, and health outcomes in relation to victimization. Psychiatric services can better understand how victimization impacts one’s health and treat these problems effectively.
Illicit Drug Use: What Prevents Juveniles from Engaging in This Behavior?

Purpose: The purpose of this study is to research whether social bonds prevent juveniles from using illicit drugs. Hirschi’s Social Bonding Theory states that there are four elements that contribute to forming strong social bonds: commitment, attachment, involvement, and belief. Previous research on Social Bonding Theory has found that these four elements prevent juveniles from engaging in delinquent behaviors.

Methods: This study uses data from Monitoring the Future (MTF 2006): a survey given to 8th, 10th, and 12th graders that asks about students’ daily behaviors and attitudes towards subjects, such as drug use. The data will be analyzed by examining student responses to specific questions relating to commitment, attachment, involvement, and belief.

Results: The researchers expect to find that juveniles with strong social bonds will be less likely to use illicit drugs. Juveniles who are committed to schoolwork, attached to positive influences, involved in school activities, and have strong moral beliefs will be less likely to participate in illicit drug use.

Conclusion: Juveniles will not use illicit drugs through social bonding based on their attachment, commitment, involvement, and belief ideologies. The expected results would provide evidence that to prevent illicit drug use, prevention programs that ensure the creation of social bonds are necessary. If the prevention program provides juveniles access to other people or activities that help them create strong bonds then they will not engage in illicit drug use.

If we wanted to influence a person’s beliefs and behaviors, how could we do it? We can look towards sociological theory and its applications for guidance. One text we can study is Berger and Luckmann’s The Social Construction of Reality, which presented a wide ranging theory explaining the social construction of roles, institutions and knowledge. However, the book is purely descriptive, and the authors do not explore the possible applications of their theory. One possible set of applications involves the influencing of beliefs and behaviors. These applications are highly relevant to social activists, who attempt to effect social change through influencing beliefs and behaviors. In this paper, I present ways in which activists, and others seeking to influence the social stock of knowledge, can apply the theory found in The Social Construction of Reality. Symbolic Universes, Universe Maintenance, the social distribution of knowledge, and deviant versions of reality are all explored in order to create a three-step practical guide for the beginner social activist. The three steps are: 1) establishing an alternative voice, 2) creating authority and 3) communicating effectively via an understanding of the sociology of knowledge. The importance of each step is established with an analysis of Berger and Luckmann’s theory.
This research examines a phenomenon that occurs in Japan called Hikikomori. This title, which means pulling inward, is given to individuals who seclude themselves in their rooms for months and possibly years at a time. The purpose of my research is to discover why millions of Japanese people are rejecting the outside world and to find if this phenomenon occurs outside of Japan. My methods of research consist of analyzing case studies of Hikikomori along with various quantitative studies. What I have found is that each case of seclusion is unique and there is no definite cure or diagnosis. Additionally Hikikomori is not limited to Japan and can be found in other countries. Overall there has not been enough research on the topic because it is fairly new; in order to discover cures for this condition more research must be done.
Probation is the most frequently used sentence in corrections. According to the Bureau of Justice Statistics (BJS, 2015), the probation population was estimated 3,864,100 offenders at yearend 2014 (BJS, 2015). Although this population has declined since 2010 (BJS, 2015), the probationers explains the majority of community corrections population. Thus, the success of community corrections is entirely relying on the effectiveness of probation, which can be measured by recidivism rates. The goal of this study is to examine the effectiveness of probation by analyzing recidivism, and offender characteristics such as gender, age, race, and type of crime committed, and contributing factors to an individual re-offending either before or after their time of probation has expired. This analysis will measure the effectiveness of probation by comparing the content of numerous established studies that examined the factors presented above. The findings of this study will locate factors that affect probation completion by presenting a collection of validating articles and studies. Furthermore, this study will attempt to explain why probation did not work on special occasions. By demonstrating what factors came into play regarding the success or failure of probation, this study will attempt to eliminate any myths in the ineffectiveness of the probation system, and acknowledge any strategies that have been proven effective at successfully reintegrating offenders back into the community, through a beneficial probation sentencing.
Purpose: Media coverage of high-profile use of force (UOF) incidents, including Walter Scott (2015), Tamir Rice (2014), and Eric Garner (2014), has increased scrutiny of police UOF tactics. Protests around the nation, including the well-publicized Black Lives Matter movement, have increased exposure of police violence against minority victims. This research tests the validity of the “Ferguson Effect,” a theory coined by law enforcement officials to explain recent spikes in crime rates, and discuss the counterargument provided by Critical Race Theory. It attempts to describe the effect of UOF incidents on both immediate region and the nation. Specifically, the impact of UOF on crime rate and perception of police will be analyzed. Methods: This research will employ multiple quantitative analyses, each addressing a unique hypothesis. Cross-sectional data from the 2015 Uniform Crime Report will be used to conduct bivariate and multivariate analyses to measure the effect of UOF incidents on crime rates. Researcher-collected survey data will be used to examine the effect of UOF on public perception of police. Expected Findings: As suggested by the “Ferguson Effect,” crime rates are expected to increase following UOF incidents. As suggested by Critical Race Theory, it is expected that general opinion of police will deteriorate following UOF incidents, though more so among racial minorities than Whites. Discussion: Results supporting these hypotheses support the notion of institutional racism in the U.S., and may prompt further research on topics including the “Ferguson Effect,” police UOF policy and training techniques, and community policing efficacy.
The purpose of this study is to examine the influence that a respondent’s socio-economic status (SES) has on their perception of social mobility. In order to better understand SES we identified four primary dimensions to help define our respondent’s social mobility: wealth, education, occupation and income. We applied Weber’s theory of social stratification to ascertain how individuals fall within specific rungs of the social strata ladder. The Dual Labor Market theory emphasizes the division of the labor markets. This theory claims that the division of workers between the two markets is decided by three aspects: race, gender and educational attainment. We recognize that both race and gender have strong ties in shaping SES, but for our research we have decided to use these two variables as controls. Our project was developed utilizing datasets found in the Pew Social Trends & Demographics Project Survey on Middle Class. These data were collected using a 10-Call Design to interview the sample size comprised of 2,413 adults eighteen years of age and older. Due to the time limitation of the cross-sectional survey we decided to focus on intragenerational mobility to analyze the patterns of social mobility throughout a lifespan. We examined this area of research to highlight the restrictions that have been created through the influence of social standing. We expect to find that respondents in the middle class will perceive upward mobility as more possible than those of the lower and upper class.
Electronic monitoring is often used in conjunction with home detention and as a part of probation or parole conditions. Home based electronic monitoring is often used by officers to monitor remotely offenders who are restricted to their homes. The number of persons monitored remotely has grown from around 12,000 in 1994 to an estimated 130,000 in 2007 (Gable & Gable, 2007). Although electronic monitoring was devised for lower level risk offenders such as lower risk probationer or those convicted of DUI, the target population of electronic monitoring has been expanded to people who are waiting trials, offenders on probation and parole, and juvenile offenders (Schmalleger & Smykla, 2009). A large NIJ-funded study of Florida offenders placed on electronic monitoring found that electronic monitoring significantly reduces the likelihood of failure of house arrest, probation or other types of community based corrections. The decline in the risk of failure is about 31 percent compared with offenders placed on other forms of community supervision (NIJ, 2011). However, research about the effectiveness of electronic monitoring is very sparse. Depending on the offender’s characteristics, the effectiveness of this sanction may be different. Thus, this study intends to compare and contrast recidivism rates by race. In particular, this study will examine the difference in recidivism between white male offenders and non-white male offenders after they successfully complete their electronic monitoring in the community. Considering the increasing use of electronic monitoring for different risk level offenders, this study will investigate recidivism differences by offense types. By conducting recidivism analysis by race and offense type, this study will explain how electronic monitoring works for different offender groups.
The maltreatment of children has been a sensitive subject in our society because children are increasingly viewed as a very vulnerable population. Children are at high risk for abuse and neglect as they are typically unable to advocate for or protect themselves. According to General Strain theory, families of lower socioeconomic status tend to experience more strain caused by a lack of income and resources to support their families. I will investigate whether this higher level of strain causes a greater likelihood of using deviant coping mechanisms in the form of child maltreatment. Another aspect of socioeconomic status that can cause a discrepancy between levels of reported maltreatment among different levels of the social strata is the power of class in our society. If this hypothesis is supported by the data, it will beg the question of data reliability. Many factors contribute to those of lower socioeconomic status being far more visible to mandatory reporters and being targeted more than wealthier families. It has been argued that results cannot be definitive and generalizable as there is not enough information on those with more wealth. I will investigate the relationship between higher socioeconomic status and the lack of reported cases of child maltreatment for this demographic. I will do so using the LONGSCAN dataset which is a longitudinal study conducted between the years 1991 and 2012. The study followed over 1,300 children from infancy to age 18 to investigate risk factors for and incidence of child maltreatment.
In recent studies it has been found that 19.8% of young adults have smoked marijuana in the past 30 days, 70% of young adults have consumed alcohol in the past year, and 16.8% have smoked cigarettes in the past 30 days. We wish to investigate the causes of these statistics because of the negative effects of early substance use. We use the 2006 Monitoring the Future Survey to discover the degree to which social control, social learning, and labeling theories have on young adults. Social control theory is a theory of deviance that utilizes four dimensions, attachment, commitment, involvement and belief to try and argues to what degree a person is controlled by factors in their life. We predict that the more social control exerted on someone, the less likely they will be to use substances. We will combine social learning theory and differential association because they both argue that people in their life have a significant influence on their behavior. Individuals subconsciously imitate behaviors of those around them in several way. We predict that those who have positive relationships with their peers and family, the less likely they will be to engage in substance use. Labeling theory argues that individuals conform to societies opinions. The prediction based on this theory is an individual who is negatively labeled will be more likely to use illegal substances. We believe this is very important to the development of young adults and by finding the causes of substance use, we hope to educate young adults on the subject.
In the United States, Black youths have consistently fallen behind their white peers in educational achievements. Over the years, we have seen persistent gaps between the former and the latter’s scores in mathematics and reading in particular. This problem is critical, because educational underachievement can negatively affect young people’s life experiences down the road. In this study, we intend to address the question of what has been holding Black youths back from achieving their full potential in academic success. More specifically, we examine how socioeconomic status, cultural influences and social bonds impact on Black youth’s academic participation. To answer this question, we use data from the National Longitudinal Study of Adolescent Health with the intention to test three hypotheses: first, we expect that high socioeconomic status will have positive effects on Black youths’ academic participation; second, we anticipate that positive cultural influences deriving from home and community will boost Black youths’ performance in schools; finally, Black youths with stronger ties with religious and communal organizations will produce better educational outcomes than those with weak or no such ties. By testing these hypotheses, we hope to facilitate youths, parents, educators and policymakers to make better decisions to close the persistent racial gaps in academic achievements in the United States.
Robert J. Sivret
Erik Nicholas Haney
Kevin Krouse
Joseph Tyler Manozzi
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**Happy Marriage, Happy Life? How Quality of Marriage Affects Life Satisfaction**

Purpose: How does an individual’s quality of marriage affect life satisfaction? Previous research has shown a correlation between quality of marriage and life satisfaction, yet there hasn’t been a solid explanation of why. The young generation today is getting married at a later age than previous generations. If quality of marriage is related to life satisfaction, then there could be reason to expect reduced life satisfaction among young people. Methods: This research utilizes the 2010 General Social Survey (GSS), a representative sample of English-speaking persons 18 years and older (n=4,901). It is conducted in randomly selected households using in-person interviews. Using the GSS, hypotheses drawn from Modernization Theory, Equity Theory and the Theory of Subjective Well-Being are tested through bivariate and multivariate analyses. Results: The researchers expect to find that those who live in a household with children while married will show a greater life satisfaction; that women who report their job as “keeping house” will be less satisfied than women who have a different labor force status. Finally, those who report happy and more positive emotions in a marriage will report a higher life satisfaction. Conclusion: If supported, these hypotheses can draw the conclusion that married people are happier than unmarried people because they have children, a fair division of labor, and positive emotions. With that information, we can attempt to answer the question of how quality of marriage affects life satisfaction.
In 2011, the FBI found that there were 33,000 gangs in the United States, District of Columbia, and Puerto Rico. These gangs were made up of approximately 1.4 million members. This is an overall increase of 40% since 2009, when there were approximately 1 million gang members. We use social learning theory to explain the role that socialization plays in whether or not a youth joins a gang. According to social learning theory, individuals learn through observing those around them, imitating the behaviors that they see, and rewards and punishments. We use survey data collected for The National Longitudinal Study of Adolescent to Adult Health that surveyed students in grades 7-12. This topic is worth studying because if we can identify even one risk factor that lead youths to join gangs, we can work towards the prevention and reduction of gang involvement. Reducing gang membership would also have a direct effect on reducing deviant behavior, which in turn, would lower the cost associated with the justice system, police, and incarceration costs. We expect to find that youths will be influenced by those around them and that the amount of time spent with an individual will influence the decisions they make.
The number of prisoners held federal and state prisons has continuously increased, and incarceration has become the preferred method of punishment over the past half century. According to the Bureau of Justice Statistics, the United States held 1.5 million prisoners in state and federal prisons at yearend 2014 (BJS, 2015). With the great expansion of incarceration during the past three decades, the number of offender now returning to the community has increased dramatically. Indeed, it is estimated that 95% of them will eventually return to the community. Every day, around 1,700 are returning to the community (BJS, 2015). Although reintegration and reentry have been emphasized to help offenders rebuild their ties to family and community, reentry appears to be not an easy mission for both returning offenders and the community. As offender leave prison, most offenders receive a new set of clothes, up to a few hundred dollars in “gate money.” Other than these, they do not have any support from community. Therefore, the purpose of this research is to explore major obstacles that returning offenders are experiencing when they leave prison and are trying to reintegrate into society. Released prisoners are struggling in terms of seeking a job, getting loans, finding the place to stay, and reinstating social welfare benefits. Along with these difficulties, about one-third of released state inmates have a physical or mental impairment. This research is to identify major obstacles and their effects on their reintegration process. This study will be conducted by reviewing journal articles on the subjects of reintegration and reentry. Further, several case studies will be introduced. By highlighting the importance of understanding these challenges, this study will suggest desirable community programs for returning offenders.
According to the Monitoring the Future survey of drug use data, use of any illicit drug among 8th, 10th, and 12th graders has continuously declined over the past two decades (Johnston et al., 2016). Past-year use of illicit drugs for all grades combined was 27.2 percent in 2014, down from its peak at 34.1 percent in 1997 (Johnston et al., 2016). However, Massachusetts was one of the top ten states for several illicit drug use among young adults (National Survey on Drug Use and Health, 2010). Many cities within Massachusetts are faced with various cases involving Juvenile drug abuse. It’s a growing concern in urban cities where Juveniles are at risk of being exposed to recreational drugs and drug related crime. According to the Department of Health and Human Services (2010), five percent of adolescents ages from twelve to seventeen did not receive treatment for illicit drug use. Within Massachusetts there are three drug courts specific to Juvenile offenders. The drug court model combines drug treatment with the legal and moral authority of the court in an effort to break the cycle of drug use and drug related crime. Juvenile drug courts are designed as a lower level punishment to rehabilitate young offenders, but also give them a second chance. This study intends to examine the availability of drug courts for juvenile offenders. This study will also evaluate juvenile drug courts in term of reducing recidivism, rehabilitation, and reintegration into society by analyzing MA juvenile drug courts data. By examining the effectiveness of juvenile drug courts, this study will be able to make recommendations for promising practices for juvenile drug courts.
924  Room 803  2:30-3:15  Panel 5
Edith C.J. Voss
Dana Michael Mayhew (Faculty Sponsor)
Department of Sociology, Bristol Community College
Hope of Home

I will be forming relationships with the community, local organizations, media and government officials to work towards a solution in obtaining affordable housing. I plan on utilizing a grassroots approach through interconnectedness among social classes, to raise awareness of the issues related to homelessness that people face in a small town.
Why Use Drugs? A Study on the Individual and Social Factors Associated with Substance Use

With a large portion of the United States population using substances that are potentially physically and mentally harmful, it prompts the question: what individual or social factors influence substance use? This research uses the National Longitudinal Study of Adolescent Health, which originally surveyed and interviewed individuals in grades 7-12 in The United States about their lifestyle and relationships. The follow-up data, being used in this study, were collected in 2008 when the respondents were between the ages of 24 and 32. This quantitative multivariate data analysis focuses on Self Control theory and Social Bonding theory as comparative explanations for using substances such as cocaine, marijuana, tobacco, or alcohol. Social Bonding theory is used to test whether an individual’s level of involvement, commitment, or attachment affect substance use. Self Control theory is used to test whether an individual’s level of impulsivity affects the likelihood of using a substance. Social bonds may intervene with self-control as an individual’s self-control could affect their social bonds and in turn affect their use of substances. The authors expect to find that the lower the level of impulsivity and the fewer bonds of involvement, commitment, and attachment an individual has, the more likely they are to use cocaine, marijuana, tobacco, or alcohol. These results will provide a deeper understanding of which factors influence an individual to use substances and assist in the creation of preventative programs for juveniles to create strong bonds and self-control to combat substance use.
**SUSTAINABLE FOOD AND FARMING**

934  Auditorium  4:30-5:15  Board A38

Leonard R. Bruso  
John M. Gerber (Faculty Sponsor)  
Stockbridge School of Agriculture, UMass Amherst  
The Ecofarm: Designing a Closed-Loop Holistic Farming System

This project will research and design a permaculture agroecosystem that enhances interrelationships and synergies among living organisms. The closed-loop holistic farming system uses ecological principles and systems thinking to design and manage many factors at play within the farm. It will be used to build soil, promote life, and create a functional business model. The farming operation is defined as a permaculture market garden that provides a whole diet and nutrient dense food for the community. The focus will be on planning how to grow, annuals, perennials, fruit and nutrients. In addition, it will illustrate how to raise and integrate animals such as chickens, pigs, goats, sheep, or cows in the farming system. Different infrastructure projects such as hexagonal bed systems, permanent bed systems, cold frames, hoop house, and rain water storage will be analyzed, and the production capacity of a specific site will be illustrated. To create this project, research will be done by interviewing people involved in small scale agriculture & permaculture design, relevant texts will be used, and models from other permaculture gardens will be used to create a site design.
Many urban communities in the United States suffer from lack of access to fresh, healthy, sustainably grown food. Urban agriculture is an important and growing field of sustainable agriculture. Many large cities have thousands of acres of farmable land in the form of vacant lots. However, one of the main obstacles to urban agricultural movements is the perception that this land is unusable because of the bad health of the soil and potential lead and other chemical contamination. The purpose of this project is to demonstrate methods that rejuvenate soil, re-establish healthy ecosystems, and clean the land of chemical pollutants. Research is done by examining literature on regenerative techniques and a case study of an ongoing land regeneration project in Amherst, MA. Promising methods include Fukuoka style no-till natural farming, rotational pasturing with small livestock, and the use of certain plants such as mustard and sunflower which can extract chemical contaminants from the soil. This project will show how “ruined” land can be brought back to a state of health, and how there is great promise within every vacant lot and abandoned park. These urban lands can be transformed into thriving, productive ecosystems which will create healthy and sustainable communities.
New England culture, dining and medicine have deep historical ties to European settlers, Native traditions, and the ecosystems of this region. Exploration of indigenous and European medicinal systems lends clues to the significant ethnobotanical relationships that exist in New England. These relationships are crucial to understanding the history of Western Massachusetts, and in protecting local flora and fauna as ecosystems change due to poor stewardship and degradation. Buffam Falls and Old Sturbridge Village provide clues to the historical, geological and ecological factors that have influenced the culture of the Pioneer Valley. This project creates maps and identifies wild edible flora at Buffam Falls to help reconnect people with common useful plants of the Pioneer Valley while enabling their protection and cultivation. In addition, the project adds to the understanding and sharing of the cultural uses of local plants, allowing for a deeper connection to this region’s history and fostering self sufficiency. This project will culminate in a guided walk of Buffam Falls, giving interested participants the opportunity to identify plants carrying cultural and historical significance in Western Massachusetts.
931 Auditorium 4:30-5:15 Board A35
Hannah Joy Hausman
John M. Gerber (Faculty Sponsor)
Stockbridge School of Agriculture, UMass Amherst
Recipes for the New England Forager

Resourceful humans can find food everywhere. However due to a lack of knowledge about the natural world, most people do not know that in every season food can be attained from the wild plants one passes by every day. Through referencing foraging guide books and consulting with experts on the topic, one can learn how to identify edible parts of wild plants, sustainably harvest them, and create delicious meals. This project will investigate and present information on how to identify, harvest, and cook with wild plants, thus lowering a reliance on unsustainable food sources. In addition, the connection with the natural world will be examined as a means of feeling a part of rather than apart from ones surroundings. This research project demonstrates this connection by offering identification clues and recipes for plants that can be foraged in New England’s late winter and early spring.
As interest in designing farms around living systems and managing resource loops increases, so does a commitment to utilizing animal power. The age of mechanization has resulted in the majority of society having little familiarity with the nature of animals. Those who still have experience working with animals are now few in number and often disconnected from the rising generations. The purpose of this project is to explore the working relationships that humans and animals have maintained for thousands of years. Sources of information will consist of historical accounts including personal memoirs, mythological accounts, artwork and educational documents. First-hand sources will include interviews with people currently working with animals, such as Team Snazzy Goat in Vermont. The results will provide an overview of ways animals have performed work throughout the world, as well as interpretations of how we can apply such traditional practices to modern society. The focus will be on working with smaller animals in order to cope with common limiting factors in New England such as limited space for housing and exercising animals, inexperience working with animals, and general high cost of animal ownership. The examples of animal power explored in the study provide accessible ways for both children and adults to begin relearning the methods of working with animals, in addition to rediscovering the spiritual and psychological benefits of these relationships.
Every year 1000’s of migrant workers come to the United States looking for a decent wage for farm work. Increasingly farmers in the United States are depending on this labor to harvest their crops so they do not rot in the fields. The purpose of this research is to impart Massachusetts farmers with information on how to recruit and work with migrant workers and to offer migrant and seasonal farm workers information on their rights as seasonal workers. Information was compiled from migrant farm worker regulations and worker programs in the United States. The agricultural recruitment system (ARS) and H-2A are two programs that allow farm employers to take proper prior steps toward accepting migrant farm work. This results in better working conditions for the workers and qualified workers for the employer. Migrant farm work provides many farmers in neighboring countries with the opportunity to find a decent income to provide for their families. It also allows employers to have access to seasonal workers. This system can benefit both parties as long as they each have access to good information regarding their rights and responsibilities. This project is designed to provide such information.
Hops are one of the four main ingredients used in the production of beer, and at one time represented a significant part of the agricultural economy of New England. Due to disease pressure and the opening of the western frontier, the majority of hop production in America moved to Washington and Oregon. In the last decade the rise of the microbrew industry and the high demand for locally grown products has once again returned the art of hop growing to New England. However, a lack of knowledge and resources available to these new growers have made it difficult to create a product that both satisfies the needs of the brewing industry, as well as leaves a positive impact on the local environment and surrounding communities. A hop research division at UMass Amherst would combine the needs of both local brewers and hop growers with a research-based curriculum that would greatly expand the current knowledge of sustainably grown hops in New England, as well as serve the increasing demand for this rather unusual crop. Research topics would include all aspects of hop growing such as; trellising systems, pruning techniques, disease and pest control, harvesting techniques, and post harvest activities such as quality testing and drying. This new knowledge would allow local hop growers to create a product highly desired by local brewers that would ultimately be distributed among local communities in the form of delicious high quality local beer.
Functions and Forms of Polycultures in Regenerative Agriculture

The purpose of this study is to show how different crops and/or plant species work symbiotically to achieve multiple functions through various pairings and formational arrangements. Depending on site analysis of the land (strengths, weaknesses, opportunities, threats, etc.), certain plant combinations can improve the health and regenerate the land while providing other functions for humans and the environment. Discussed in this study will be combinations of plant species, often called plant “guilds”, that attract native pollinators and/or predatory insects, grow food (such as in a food forest), provide biodiversity and food/habitat for local animals, remediate soil, and provide mulch and gather nutrients. Permaculture guilds are usually designed around a “centerpiece”, then add supporting plants that add value and functionality to the guild. These may be ground cover or weed suppressor, vine or climber for added food production, roots to break up soil or dynamic accumulators to circulate nutrients from deep in the soil, plants that attract beneficial insects (insectaries) or other small shrubs or dwarf trees that can serve as shelter for birds or food other animals. These polycultures also have implications for bringing back native pollinator populations and increasing food security in New England. Regenerative farming can improve the health of the soil and ecosystems, as well as the aesthetics of the land, while simultaneously creating a more resilient food system for future generations.
Increased numbers of school gardens and improved nutritional guidelines have helped perpetuate good health for students in America, but having a garden or infiltrating lunchrooms with produce is not enough to get nutritional benefits to kids. As a link between the school garden or the lunch program and the students, food education plays an integral role in translating nutritional outlines on paper to actual understanding and activity for the students to take advantage of for the entirety of their lives. By surveying elementary school students in Amherst Public Schools before and after a lesson on food sourcing and preparation, the interest in school gardens will be accessed. It is expected that students will show more interest in hands on activities to be done in the garden than lectures about nutrition. Making their own snacks is likely to be more exciting for students than picking from the cafeteria. Students generally show interest in bringing home what they learn in the garden. A stated objective of the National School Lunch Program is to “help children understand” their food. This research will investigate how giving children their own agency to interact with their food through growing in gardens and preparing food in the kitchen will result in a stronger connection with food and by extension, more mindful individuals with better understanding of the earth’s cycles and the role of humans within those cycles.
938  Auditorium  4:30-5:15  Board A43
Michelle C. Nikfarjam
John M. Gerber (Faculty Sponsor)
Stockbridge School of Agriculture, UMass Amherst
A Sacred Earth: Connecting the Self, Nature, and Divine for Regenerative Community Development

The Earth is suffering and is crying out for help. The signs of the ecological crisis are growing as humans face ecological degradation, climate change, crippling poverty, mass-extinction, and social inequality on a global scale. The ultimate cause is human forgetfulness - forgetting the sacredness of people and the Earth, and viewing nature and indigenous wisdom as things that can be objectified, commodified, and consumed. The world is not a problem to be solved, rather it is a living-breathing being to which all humans belong. Exploring the connection between the Divine, the Self, and Nature through cross-cultural, cross-generational perspectives, this project is not offering a particular solution, but rather a spiritual response to the ecological crisis and a call to action to reclaim the ancient heritage of humans as guardians of the Earth. To find reverence in the sacredness of all life, and to move forward to a society that values peace, balance, and harmony with Mother Earth is paramount to solving environmental problems. The meaning of Love is to be at One. Human evolution depends on a willingness to remember interconnection and interdependence, and assume a shared fate. This project explores the expression of the awakening journey to answer the call to re-connect, re-discover, and re-envision a conscious relationship with Mother Earth. By merging indigenous wisdom and science for innovation, working to heal the Earth and humans alike, the compost of these current societal problems may feed new solutions in the garden of the future.
Carrots for Cancer

In today’s world, with human made substances taking on the rise, rates of cancer are an ever growing problem not just in the United States, but throughout the World. Many cancer treatment facilities require patients to sign a waiver recognizing that the treatment for cancer may in fact cause cancer. When the solution to a problem create a strikingly similar problem, there is a larger dilemma at hand. There are numerous homeopathic remedies for many diseases today. These remedies, however, have little to no scientific research and may be administered by doctors that have been ignored by the medical establishment. Perhaps there is a hybrid system that includes both science and creative new solutions. The use of anthocyanins may provide such a solution. Anthocyanins are chemical compounds within many plants that have numerous roles, including the establishment of both color and taste in plants. Increasing research studies suggest that a major role this flavonoid may play in human health may be as a treatment for cancer. Ultimately, the goal of this project is to review and compile existing studies to investigate the medical benefits of utilizing plant based anthocyanins for treatment of cancer.
Since the end of the Second World War, Japan has gone through a series of unprecedented shifts in its culture, its economy, and its demographic makeup. Of its industries, these shifts have affected Japanese agriculture perhaps most deeply of all. In the past half-century, Japanese farmland has been dramatically redistributed, changing hands from the non-cultivating upper class to the workers themselves. This redistribution caused the fracturing of the land into miniature, two-acre plots. Japanese farms are now among the smallest in the world. At the same time, the mechanization of agriculture has accelerated, increasing yields but raising questions of efficiency and economy. Finally, as Japan’s overall population has aged, and as the few remaining young workers have been drawn away from farming and toward industry, concerns have mounted over whether Japanese agriculture can sustain itself. This paper reviews these changes and looks at how they affect Japan’s current agricultural climate. This paper also highlights opportunities that Japan faces to slow or reverse the declines in agriculture.
Public markets involving local farmers, crafters, and food entrepreneurs play an important role in feeding, educating, and providing services to the citizens of Amherst, MA in healthy and unique ways that promote resilience. The proposed Amherst Public Market and Makerspace will enable the local community to address key issues related to food accessibility and food education. Major concerns, such as fresh-food deserts and lack of access to food preparation and storage techniques, which increases the likelihood of malnutrition as well as many other life-altering complications, will be addressed. This project improves the current system by providing an education-based community space for communicating ideas to solve problems of food and social justice in Amherst as well as educating and facilitating food-based childhood and young adult education. The Amherst Public Market and Makerspace will be a center for sustainably-minded and community-based thinking and action directed towards food. It will provide the communities of students, children and adults of Amherst resources and a safe space to come together to celebrate food and work to grow the local food economy. The Amherst Public Market and Makerspace is an opportunity for the Five Colleges, the Amherst farmer’s markets, local cooperatives & non-profits, and the Town of Amherst to create a cooperative program that enables students and citizens to think together about food and work with the local institutions to create sustainable solutions for community resilience.
While still far from acceptance—and in many cases acknowledgement—by the mainstream engineering, ecology, and agriculture communities, the disciplines of ecological engineering, agroecology, and permaculture have fully developed from the conceptual and experimental stages to the implementation and formal-education stages. All three disciplines are primarily prescriptive, aimed at creating practical solutions to ecological and agricultural problems. By blending the distinct approaches of and accumulated knowledge from the three fields, I intend to design an “ecologization” of the Holyoke Community College campus. Many other colleges have on-campus agriculture and/or permaculture projects, but the Ecologize the HCC Campus project stands out in two respects: 1) it seeks to create diverse ecosystems on virtually all the campus’s unused permeable land rather than designate specific areas for conversion; and 2) it seeks to create ecosystems that are simultaneously agriculturally productive, ecologically restorative, and aesthetically pleasing. This paper’s sole concern is the research and design stage of the project. This stage will involve 1) research on ecological engineering, agroecology, and permaculture, with a focus on principles, data collection methods, and guidelines and case studies specifically relevant to the ecology of the HCC campus; 2) research on individual species and species combinations relevant to agricultural production and/or ecological restoration in Western Massachusetts; and 3) design of the specific ecosystems that will accomplish the goals of productivity, restoration, and beautification. If properly implemented, the Ecologize the HCC Campus project will become a precedent for radical approaches to agricultural production, ecosystem restoration, and, especially, suburban landscaping.
THEATER

942    Room 811    10:45-11:30    Panel 2
Julianne Louise Ferguson
Kim Frashure (Faculty Sponsor)
Department of Science & Engineering, Bunker Hill Community College
A Theatrical Monologue from the Perspective of a Green Sea Turtle about Climate Change

Theatre provides a valuable, creative, and fun platform for audiences to learn about our relationship with the natural world. Through theatre, we are exposed to a deeper understanding of the world around us through imagery and emotion. Long form monologues are an effective way of telling a story and stating your point clearly with limited distractions. I will create an original, long form monologue, where the storyteller is a female green sea turtle reflecting on her life in the ocean. To help bring her experiences alive, there will be a projection in the background showing short clips of specific events supporting her narrative. Green sea turtles are a keystone species and vital to maintaining healthy ocean ecosystems. Through constant grazing, they increase the productivity and nutrient content of sea grass, which provides food, habitat, and nursery areas for other numerous marine species. They also transport important nutrients from the ocean to beaches. Despite their important contribution to ocean systems, green sea turtles are currently listed as endangered under the Endangered Species Act. Human activity, mainly from pollution, fishing, hunting, and loss of habitat, have all contributed to their population decline. Recently, there is a concern about the impact of climate change on green sea turtles. Climate change is expected to result in warmer waters and rising sea levels which is likely to impact their reproduction, nesting areas, and distribution. This research will highlight the threats to green sea turtles and offer solutions by using a theatrical approach.
Devised Theatre is an exciting new medium that has become increasingly popular over the past few years because of its limitless possibilities. As an actor, it’s exciting to work on a devised piece because there is no script and everything created by the actors comes from the rehearsal process and research. As artists, we find inspiration from all different sources, but for this project in particular, our sources are interviews from people in our community. This project introduces an interesting challenge, which is not only to do justice to those interviewed, but to create characters from scratch with the source material provided through interviews. The two month rehearsal process will challenge me as an actor because I won’t have a script to reference at any point. Through my interactions with the interviews and other materials we are given for research, I’ll start to create dialogue for my character based on themes and issues I’m learning about within the community. One of the most rewarding things about an experience like this is that it really tests how far you’re willing to go as an actor and can help open you up to more tools to use in the future. I’m looking forward to working with our movement coach as another avenue to explore characters because so much of a character’s personality and history lives in their physical being. Overall, the process will be a challenge but one full of rewards as a student of the theatre.
The CitySpeak production is a collaborative project based on interviews done by students as part of the CitySpeak project. This project attempts to give a voice to underrepresented persons living in the city of Worcester and allows them to share their stories of growing up, living, and working in Worcester. The costumes I build for the production will focus on CitySpeak’s main theme of the disconnect between the powerful bureaucracy of the city and the people who live and work there. The costumes will illuminate the disconnect through fabrics and materials that are painted and distressed to show the characters’ connections to the two different sides of the world they live in. As I develop the costumes for CitySpeak, my research is mostly in images of Worcester, industrial machines, and organic forms. The transcribed interviews from the people of Worcester provide specific images of trash in the street, gang violence, and drug use. The issues discussed by the people of Worcester morph into less specific problems as they reach the ears of City Hall, causing a disconnect between the peoples’ needs and City Hall’s response. Murals, especially the ones in Worcester that have been commissioned as part of the ongoing effort to beautify the city, inspired use of bodies as art. Three-dimensional graffiti and street art have been my main focus to create costumes to make the characters pieces of art that represent both the people and the dysfunction of the city.
943    Room 811    10:45-11:30    Panel 2
Sarah Catherine Morin
Richard McElvain (Faculty Sponsor)
Department of Communications Media, Fitchburg State University
Being Evil: How Interdisciplinary Research Informs a Villainous Performance

As an actor creating a character for a stage performance, there are many different ways to prepare one’s self for a role. It is important however, for each performer to discover what works best for their craft. This project is an in-depth analysis of how interdisciplinary research informs the acting process. This project will analyze personal acting work done for the role of Anne Putnam in The Crucible by Arthur Miller, along with Evelyn in The Shape of Things by Neil LaBute. The methods used were extensive research into referenced literature, historical events and pop culture, along with psychological and behavioral issues as to the reasons why these characters act the way they do. Also key was research on the background of the authors, specifically how their personal struggles and insights were the driving force behind their works. This research allowed for the creation of extremely imaginative and well-rounded antagonists for these shows, and brought several personal discoveries about individual acting process. This project will endeavor to share personal process as an actor, and to highlight the importance of extensive background research and analysis of a play in order to bring a character to life. It will also serve to look at the stereotype of “villains” as characters, specifically on how they serve an important purpose for the playwright in moving the audience, and how important it is for an actor to justly portray this villain in a unique and non-stereotypical way.
This project is a documentation of the process of executing the lighting design for Salem State University’s production of The Grapes of Wrath, based on the novel by John Steinbeck and adapted by Frank Galati. The major focus is to demonstrate how inspirational research images were incorporated into different elements of the lighting design. Through trying to support the director’s concept of exploring the theme that hope and kindness can be found in times of crisis, my research focused on religious images that mirrored the moments in the play which were variations on different biblical stories. The concept of baptism, and its dual nature of baptism by fire or baptism by water, was especially influential. The contrasts that can be seen in the image of baptism were a major motif applied to the lighting design for this production. The color, line, texture, and composition in various inspirational image were applied to the lighting key, which is the basis of the design. Production shots of moments of different levels of realism, time of day, scale, and mood show how the motif of contrast was utilized throughout the play as a whole.
VETERINARY SCIENCE

950  Concourse  1:30-2:15  Board C80
Brianna Bramato
Juditha Burchsted (Faculty Sponsor)
Department of Biology, Salem State University
An Investigation of Intestinal Parasitic Infections in Domestic Dogs in Essex Co., MA

Intestinal parasites thrive by attaching themselves to a canine’s gut to successfully feed on the host. Microscopic examinations of fecal samples occasionally show parasitic larvae in domestic dogs that can cause symptoms such as abdominal distress and pain. Data on diagnosed intestinal parasitic infections in domestic dogs were gathered from the database of a veterinary practice in Essex Co., MA. Common intestinal parasites found in canines tested included nematodes such as roundworms (Toxocara canis and Toxascaris spp.), whipworms (Trichuris vulpis), hookworms (Ancylostoma spp.) and lungworms (Filaroides spp.) as well as cestodes like tapeworms (Dipylidium caninum and Taenia spp.), protozoans such as Giardia (Giardia spp.) and sporozoan parasites in the genus Coccidia. Investigation of zoonotic parasites helps the domestic animals and humans that can contract the infection and suffer from similar symptoms. Associations will allow veterinary practices to focus on prophylactic treatments in order to better prevent and treat parasitic infections in animals.
Gastrulation is a critical and dynamic time period in development. To gain insight into the mechanisms behind pluripotency, cell differentiation, and gastrulation in general, it is necessary to examine the expression of genes during this time period. A differentially expressed gene may indicate an important aspect of the gene’s function. In order to determine the function of genes involved in gastrulation (embryonic days 6.5-8.5 dpc), RNAseq data of the entire mouse genome was first bioinformatically examined. A list of approximately 150 candidate genes was generated in order to standardize expression values by fragments per kilobase per million (FPKM). Genes with the highest differences in expression between embryonic and extraembryonic tissues were further studied via section in situ hybridization (SISH). SISH allowed us to localize the expression of each gene via a labeled RNA probe. The gene Cxx1c was shown bioinformatically to be upregulated in embryonic tissue, and SISH data has matched that information. We expect to find more differentially expressed genes and continue further study on them.
NOTCH signaling is important for differentiation of CD4+ T cells through its activation of key downstream targets. Upon ligand binding, the NOTCH receptor is cleaved, and the intracellular component (NICD) translocates to the nucleus. In the canonical NOTCH pathway, transcription of downstream targets occurs via interaction with RBP-Jκ in the nucleus, as NOTCH does not have a DNA binding domain. However, non-canonical NOTCH signaling occurs through interaction with partners such as NFκB, AKT and mTOR, and does not require RBP-Jκ. miRNAs (miRs) are short, single stranded RNA molecules that bind to complementary regions on target mRNA to negatively regulate gene expression. It has been shown that the microRNA, miR-29, regulates the expression of MCL1, an anti-apoptotic molecule of the BCL-2 family, and which is required for the survival of T cells. NOTCH signaling has also been shown to regulate the expression of MCL-1 in different cell types, including chronic lymphocyte leukemia and bone marrow macrophages, leading to their increased survival. Furthermore, NOTCH1 has been shown to be a negative regulator of miR-29. We hypothesize that NOTCH1 regulates the expression of MCL-1 by repressing miR29. We will investigate the NOTCH1-miR-29-MCL-1 regulatory axis using Jurkat leukemia T cells. A deeper understanding of the survival mechanisms utilized in leukemic cells may reveal novel therapeutic targets.
In terms of breast cancer, estrogen presents a paradox. Increased lifetime exposure leads to an increased risk to breast cancer, yet high levels of estrogen during an early parity can result in a lifetime protective effect (Clemons 2001). This same effect can be mimicked in mice and rodents with treatment with estrogen and progesterone (Dunphy 2008). Estrogen works via two different receptors, estrogen receptor alpha (ER\textalpha) and estrogen receptor beta (ER\textbeta). The receptors will either homo- or hetero-dimerize and, depending on which, can differentially modulate transcription by recruiting different coregulatory factors (Evers 2014). ER\textalpha has a proliferative effect on cells, and is associated with breast cancer. ER\textbeta, on the other hand, is believed to have a protective surveillance effect that could be responsible for the protective effect seen with parity. Though ER\textalpha and ER\textbeta have very similar structures, their ligand binding domains are more variable (Lazennec 2007), and because of this it is possible to selectively activate one or the other. Because E2 mimics the protective effect of parity in mice, I will be using specific estrogen receptor agonists to determine which receptor mediates protection. OLAW now requires the use of pharmaceutical grade compounds in animal studies, and if non-pharmaceutical grade compounds are used they must be sterilized. The compounds we are using are non-pharmaceutical, and therefore must be sterilized, however it is possible that certain sterilization techniques may deactivate them. Due to this possibility, prior to the tumor studies, we will compare different methods of sterilization on hormone activity.
Activin and TGFβ are cytokines of the Transforming Growth Factor superfamily and are thought to have similar function. However, their temporal expression patterns and functions during pregnancy suggest otherwise. TGFβ is expressed during involution of mammary epithelium after cessation of lactation, and is responsible for cell cycle arrest and apoptosis. Activin, on the other hand, is present throughout pregnancy and peaks during lactation, and is presumed to be responsible for differentiation of mammary epithelium. Women who suffer from preeclampsia during pregnancy have higher levels of serum Activin and an increased protection against breast cancer, relative to women that have undergone a normal pregnancy. Therefore, we hypothesize that Activin promotes differentiation and maturation of the mammary gland during pregnancy and may be part of the protective effect of parity. Results from the Jerry/Dunphy lab showed that in vitro, CDβGeo cells treated with TGFβ underwent epithelial to mesenchymal transition (EMT), which is a characteristic of metastatic cancer cells, and 100% of the pre-treated cells developed into mammary tumors when transplanted into mice. In contrast, Activin-treated CDβGeo cells did not undergo EMT, but rather expressed markers of differentiated luminal cells. These differentiated Activin-treated cells had poor outgrowth potential when transplanted into mice, and tumor potential could not be defined. This problem can be overcome by creating a doxycycline-inducible Activin construct. This way, in vivo, the cells can outgrow normally before Activin expression is turned on through doxycycline treatment in drinking water. Therefore, my project was to transduce a mouse mammary epithelial cell line with a doxycycline inducible activin construct. CDβGeo cells have been successfully infected with the Activin construct: pINDUCER-14 Activin and they appropriately express Activin A in vitro when treated with doxycycline. In the future, these cells will be transplanted into cleared fat pads of host mice, and tested for the efficiency of Activin in vivo. Development of a functional inducible Activin mouse mammary model will be useful for future experiments to test the effect of Activin on tumorigenesis in the mammary gland in vivo.
Katherine Wilson  
Cynthia L. Baldwin (Faculty Sponsor)  
Department of Veterinary and Animal Sciences, UMass Amherst  
Sequencing Intra-cytoplasmic Tails of Ovine WC1 a Co-receptor on Gamma Delta T Cells

The ruminant immune system contains a significant number of infection-fighting T lymphocytes (T cells) with an antigen-specific receptor (known as the T cell receptor or TCR) composed of γ and δ chains. These cells are likely important in protective immunity and thus could be stimulated by vaccines. Work in the lab has shown that these cells have other surface molecules known as WC1 that act as co-receptors to the TCR, resulting in lymphocyte activation as a result of the activity associated with their intracytoplasmic tails. To determine the gene sequences for the intracytoplasmic tails of ovine WC1 molecules, whole blood was collected from a seven month old Dorset sheep and peripheral blood mononuclear cells (PBMC’s) that included γδ T cells were isolated after being centrifuged over ficoll-hypaque. RNA was isolated and a Reverse Transcription (RT) reaction was performed to create cDNA. Through a polymerase chain reaction (PCR), the cDNA was amplified using specific primers for Swine and Bovine tail sequences. The resulting bands were extracted, purified, and T4 Ligated into a pCR 2.1 sequencing vector. The product was transformed into competent E. coli cells. The samples underwent inoculation, mini-prep plasmid purification and were sent for commercial gene sequencing. Based on the data collected, it seems that ovine intra-cytoplasmic tails have gene variants similar to swine but which have not been found for cattle. We do not know yet whether the ovine sequences represent the transcript of different genes with different exon numbers or are splice variants or isoforms of genes.
Female characters in science fiction are often poorly characterized, objectified, sexualized, used as plot devices, and are underrepresented due to the sexism and misogyny that exists in the industry, the gender gap in STEM fields, and the continued usage of gender stereotypes and tropes perpetuated through the most famous works of science fiction literature that are revered and taught in classrooms to this day. In my research, I will be presenting catalogued evidence of the unequal male-female ratio in the field of science fiction by way of award nominations and the public declarations by both male and female authors in the industry. Tying in to the research is the lack of representation of women in STEM majors, and how societal gender norms around women in these fields translate over into fictional work. Finally, by critically analyzing major sci-fi works, such as Ender’s Game, 1984, and Stranger in a Strange Land, we can see the contrasts between the portrayals of female characters as opposed to male characters and their societal roles.
The societal standards of feminine beauty are shown in practically all popular forms of media. Mass media provides a significantly influential context for men and women to learn about body ideals and the value placed on being attractive. Females starting at a very early age start to internalize society’s portrayal of physical perfection and because of this, there is an obsession with attaining the look of a “perfect women” when in fact, there is no such thing. This act of observing and manifesting the concept of a “flawless female body” is a prime example of oppression and silencing of women. By sexualizing women, viewers focus on the outside so the importance of what’s on the inside is decreased. Not all viewers understand that being beautiful does not mean looking like the models in magazines, billboards, and commercials. Mass media’s use of such unrealistic models sends an implicit message that in order for a woman to be considered beautiful, she must reach that standard even if it means resorting to unhealthy actions and habits. This misconception can have significant consequences for women and contribute to emotional disorders such as depression and anxiety, and eating disorders such as anorexia and bulimia. Various media outlets place impossible expectations on women of all ages. Through extensive research and personal observation, this paper will discuss the specific ways in which media is a vehicle for oppression and silencing by analyzing how everyday images affect women’s body image, and their sense of self.
Vocal Women throughout History

Women have often been silenced throughout history by a male-dominated patriarchal society. Some courageous women have spoken out to advance women’s rights. Vocal women such as Malala Yousafzai and Susan B. Anthony have worked as activists and leaders to promote the movement. These women have both contributed a great deal to the fight against the oppression of women. They are shining examples of strength and courage. This research will examine how both of these women have changed lives and championed the battle against patriarchy as well as the differing cultures and time periods that affected the lives and work of these women.
Women have been oppressed for centuries. In the forms of rape, prostitution, and unequal cultural expectations, women have held an inferior position in society in comparison to men. This research paper focuses on the prostitution of women in Europe during the 1900s. Prostitution has been used as a form of social control and has contributed to the placing of women in unequal positions of power. This undertaking also gives consideration to the psychological effect prostitution has had on women. Fear, stress, and learned helplessness are only some of the many psychological wounds inflicted through prostitution. These women also lose their sense of self and their self-esteem drops. Prostitution also damages women physically. It is true that some women choose sex work, but that is very different from prostitution. One is voluntary and might be called a job or career; the other is involuntary, forced, and imprisoning. This study hopes to reveal the effects of prostitution on women as well as develop some ways for others to help them.
Danielle Lawrence
Robin A. Robinson (Faculty Sponsor)
Department of Sociology and Anthropology, UMass Dartmouth

Perspectives on (Young) Women’s Consumer Decision Making as Relates to Beauty and Agency of Self

The Dove Beauty campaign was launched by Unilever in 2004 to encourage women to feel confident about themselves. The campaign was meant to include women of all ethnicities, ages, shapes, and sizes in order to refute the monolithic beauty ideal that women need to be a certain height, weight, skin color, etc. My interest for my thesis project was sparked by the marketing techniques behind this campaign. Through my research, I wanted to study whether marketing campaigns, such as Dove Beauty, influence (young) women consumers’ decision-making when it comes to purchasing beauty products. Further, this study considers the impact of work, family, and other pulls on women’s resources as they may relate to the process of women’s decision making on consumerism. From young women’s perspective, the study questions which factors influence women’s consumer decisions. Analysis and discussion are informed by an original theoretical framework that draws on feminist theory, gender theory, and consumer theory, to consider consumer behavior at the intersections of gender, race, ethnicity, and class, as well as differential physical appearance and other characteristics.
This research paper will look at rap music as an ever-changing art, and focus on one of its more controversial aspects, which is the tendency that artists have to label and objectify the female gender. While the genre lives in infamy for its often misogynistic lyrics, the medium also has also served, and continues to serve, as a stage for female artists to empower each other and give voice to the experiences of their gender, along with male artists who share in their egalitarian goals for women and reflect it in their music by acknowledging the struggles faced by women. The research draws from the works of pronounced feminist theorists such as early pioneer Mary Wollstonecraft and 20th-century French writer Simone de Beauvoir, and will be cross-referenced with various albums and songs across the few decades the rap genre has existed. An examination of this topic will show that, after it is all said and done, the genre is at its best when equality is at the forefront. This result would imply that, while there exist problems in the depictions of women in the genre, many artists actually work towards challenging sexist notions and providing a platform to give voice to women.
Women and Low Sexual Self-Esteem: A Psychological Trend

The birth of feminism has created many new opportunities for women regarding sex and matrimony. For example, it has become socially acceptable for women to have multiple partners, and marry multiple times. Yet, despite sexual revolution and the assumed positive implications for women, research suggests that having more sexual freedom does not necessarily equate to higher sexual self-esteem. This disparity suggests a need for continued study in the area of women’s sexuality. This research paper will discuss the various causes of low sexual self-esteem in women, and explore the development of improved sexual self-esteem through psychological and social measures.
## ORAL SESSION 1: TIME 8:30 A.M. - 9:15 A.M.

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Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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## SCHEDULE OF PRESENTATIONS

22nd Annual Massachusetts Statewide Undergraduate Research Conference

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Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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**POSTER SESSION 1: TIME 8:30 A.M. - 9:15 A.M.**

Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

### Poster Session 2: Time 10:45 A.M. - 11:30 A.M.

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# 22nd Annual Massachusetts Statewide Undergraduate Research Conference

## SCHEDULE OF PRESENTATIONS

### POSTER SESSION 2: TIME 10:45 A.M. - 11:30 A.M.
Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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<th>Campus</th>
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### POSTER SESSION 3: TIME 11:45 A.M. - 12:30 P.M.
Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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**POSTER SESSION 6: TIME 3:30 P.M. - 4:15 P.M.**
Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)
**POSTER SESSION 6: TIME 3:30 P.M. - 4:15 P.M.**
Concourse (Boards C01 - C06, C63 - C101), Auditorium (Boards A07 - A62)

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**POSTER SESSION 7: TIME 4:30 P.M. - 5:15 P.M.**
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ACKNOWLEDGMENTS

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Glen Brewster                  Westfield State University
Vanessa Diana                  Westfield State University
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