Karen Li '17 Publishes Honors Thesis in Operations Research for Health Care

By: Hannah Depin

Karen Li, a Commonwealth Honors College student, has published an honors thesis titled "Novelities of the Hospital Competition Model." Her research focuses on developing a mathematical model to represent the competition among hospitals for patients planning to undergo medical procedures. The model takes into account various factors such as the quality of care, cost, and patient preferences. Li's work aims to provide insights into how hospitals can optimize their services to attract more patients and improve overall healthcare outcomes.

In her thesis, Li constructs a novel mathematical framework that incorporates the Nash Equilibrium concept to analyze the strategic behavior of hospitals. The model uses a combination of game theory and operations research techniques to evaluate the profitability and competitive strategies of hospitals. By addressing the challenges faced by healthcare providers, Li's work contributes to the broader field of operations research and health economics.

Li's research highlights the importance of considering patient choice and satisfaction in healthcare decision-making. Through her modeling approach, she demonstrates how hospitals can adapt their strategies to better meet the needs of patients, thereby enhancing the overall healthcare experience. This work is particularly relevant in today's healthcare landscape, where patient-centered care is increasingly emphasized.

In conclusion, Karen Li's honors thesis is a significant contribution to the field of operations research in healthcare. Her research not only provides valuable insights into hospital competition but also offers practical recommendations for improving healthcare delivery. As she prepares to graduate, her achievements reflect the high standards of Commonwealth Honors College and the potential for students to make meaningful contributions to their fields.
What's the key to a successful Honors thesis or project?

“No matter what you pursue, you have to be passionate about what you’re doing,” said CHC and Isenberg School of Management alumna Karen Li ’17. A pre-med and operations and information management student, Li studied healthcare efficiency, quality, and accessibility for her Honors thesis with Professor Anna Nagurney, the John F. Smith Memorial Professor of Operations Management. Following months of hard work and revisions, their research paper was recently accepted for publication by the journal *Operations Research for Health Care*.

Li began writing this thesis as a second-semester senior in the Honors College, after three and a half years working in a biochemistry lab. Inspired by operations healthcare, Li pursued another thesis outside the lab in operations and information management. “I picked a topic that would keep me up at night—a buzzing thought that wouldn’t leave,” she explained.

Li said she had always been interested in the efficacy of healthcare. She traveled to Haiti several times for public health and service work. As a junior, she enrolled in Professor Nagurney’s course, Humanitarian Logistics and Healthcare, where she completed the project *Preventing Disease After Disaster: How the Infrastructure of Haiti Affected the Outbreak of Cholera*. Nagurney took note of Li’s outstanding performance in the course.

“I just loved her passion and work ethic,” said Nagurney, who would become Li’s thesis advisor and the co-author of the research paper. “We did a lot of ‘brainstorming.’ We would talk for hours and it would feel like minutes.”

Nagurney and Li investigated the larger forces that affect hospitals, and the quality of healthcare that patients receive in turn. In April 2017, they submitted their paper to *Operations Research for Health Care*. After feedback and revisions, the paper was accepted for publication in early October.

Nagurney said that Li is an exemplar of the caliber of CHC students. While she was constructing a case study, gathering data and conducting interviews for her research, Li was also working as a Resident Assistant in the Honors College, teaching as a UMass Supplemental Instructor, and volunteering. She was also enrolled in Nagurney’s graduate-level seminar, in which she met with PhD students each week to discuss ideas and concepts related to her thesis.

“As an aspiring physician, I have always wanted to contribute to healthcare beyond the patient level, in a meaningful way,” said Li. She is now a research coordinator at Brigham and Women’s Hospital for Neurology and Neurocritical Care, and she says she’s already been able to use knowledge from her thesis process in the workforce.

Li expressed gratitude for Nagurney’s support and mentorship. “My advice for students who are interested in writing a thesis or publishing a paper is: find something you’re interested in. The professors at UMass are more than happy to support you in your endeavors and passions.”