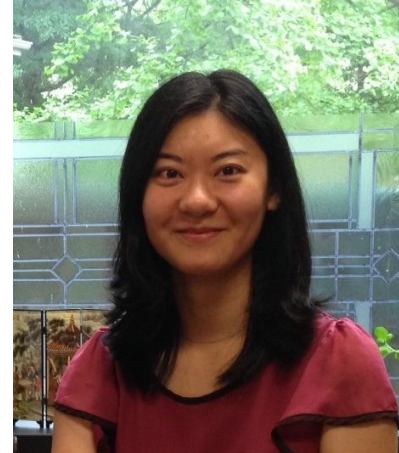


Geospatial Healthcare Resource Allocation Problems with Fairness Considerations

BIOGRAPHY

Shan Liu is an associate professor of Industrial & Systems Engineering at the University of Washington. She received her Ph.D. in Management Science & Engineering from Stanford University, a S.M. in Technology and Policy from MIT, and a B.S. in Electrical Engineering from The University of Texas at Austin. Her research focuses on the design and evaluation of healthcare interventions to improve patients' health and enable cost-effective care delivery. She develops methods in sequential decision making, decision analytics, and systems modeling to optimize healthcare systems. She has received multiple grants from the National Science Foundation, National Institutes of Health, and a range of private foundations and industry partners, supporting her work in hepatitis C, mental health, pandemic response, HIV, trauma care, and the logistics and capacity planning of healthcare systems.



ABSTRACT

Many healthcare resource allocation problems can be framed as geospatial network design problems facing equity-efficiency tradeoffs. This talk will feature two research projects at the UW Healthcare Analytics Lab using advanced analytics and optimization models to allocate scarce healthcare resources to a population at the county or state level.

In the first research, we minimized the turnaround time for HIV viral load testing by placing point-of-care testing machines in a hub-and-spoke network in Kenya. We designed a user-friendly decision-support tool for Kenyan health administrators, and a queueing-location-allocation model under stochastic demand, formulated as an integer program and incorporating Conditional Value at Risk. In the second research, we focused on assessing disparities in access to high-quality trauma care among sociodemographic groups in Washington state. We developed a set of geospatial and non-geospatial quality metrics and proposed an optimization model that reconfigures hospital functions to improve trauma care quality while addressing fairness concerns. The overarching goal is to ensure timely and location-appropriate access to critical services by leveraging health data and advanced analytics to inform more effective, system-level decision-making.