

The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Stochastic Modelling and Decision Analysis in Healthcare Operations

by

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Time: 10:30am - 11:30am
Venue: M714, Li Ka Shing Tower
The Hong Kong Polytechnic University

(Conducted in English)

Abstract:

In this presentation, we illustrate how stochastic modelling applied to healthcare operations management. We first present a health care resource allocation problem. We study a stylized, discrete-time model for an Intensive Care Unit (ICU) in which patients' health conditions change over time with Markovian probabilities. The ICU has limited bed availability and therefore when a patient arrives at a full ICU, a decision needs to be made as to which patients should be kept in the ICU and which ones should be transferred to general care. Our objective is to make that decision so that the long-run average rate with which patients survive is maximized. We identify mathematical conditions under which the ICU is always more preferable than general care. Then, under these conditions, which one can assume to hold in practice, we give an almost complete characterization of the optimal patient admission/discharge policy. We find that the optimal policy, in general, depends on the composition of the patients currently in the ICU but our numerical study suggests that even simple policies that do not take such dependence into account, perform quite well. In the end, we demonstrate how data analytics methods applied in simulation models for dynamic prediction.

Bio:

Huiyin Ouyang is an assistant professor in the School of Business and Economics, the University of Hong Kong. She received her Ph.D. degree in Statistics and Operations Research from the University of North Carolina Chapel Hill, and obtained her master and bachelor degree from Tsinghua University. Before joining the University of Hong Kong, she was a postdoctoral fellow in the Department of Industrial Engineering and Management Sciences, Northwestern University. Dr. Ouyang is interested in the stochastic modeling, data-driven decision making and simulation analytics with applications in service and health care operations. She is a recipient of George E. Nicholson Award from Department of Statistics and Operations Research at UNC.

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All are welcome!