The Hong Kong University of Science and Technology
Department of Information Systems,
Business Statistics and Operations Management/
Department of Industrial Engineering & Logistics Management

Joint Seminar Announcement

Information and Pricing in Service Systems with Congestion-Based Staffing Policy

by

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Date: Monday, 23 March 2009
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Venue: Room 5583 (L29/30)

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Abstract
Motivated by border-crossing stations between the USA and Canada, we study the effects of pricing and information service in a stochastic service system consisting of a free sub-system and a toll sub-system. In the free sub-system, a congestion-based staffing policy is adopted to keep the queue length within a certain range with a high probability. Customers' equilibrium routing behaviors are obtained under three information-disclosure cases: no information where customers know the expected waiting time only; partial information where customers are informed the real-time delay; and full information where customers learn both real-time congestion and service-staffing-policy. The stationary performance measures are obtained by combining the fluid limit approximation with the birth-and-death process analysis. We then study static pricing of the toll lane under the three information scenarios. We discover that charging a low price may not benefit customers and providing no information generates a higher social welfare than providing partial or full information. Moreover, we study the congestion-based dynamic pricing and develop an algorithm for computing the major performance measures. We numerically find that such a pricing strategy can further improve the performance of the system and can be approximately implemented with two linear pricing functions. However, we observe that the static pricing with no information can generate the social cost very close to what the dynamic pricing policy can do.
*This talk is based on the joint work with Pengfei Guo of Hong Kong Polytechnic University.

Biography
Zhe George Zhang is a Professor of Operations Research in the Department of Decision Sciences at Western Washington University and a Professor of Management Science in SFU Business School at Simon Fraser University. He holds a B.S. degree from Nankai University, an MBA from the Schulich School of Business at York University, and a Ph.D. from the University of Waterloo.
Professor Zhang's research interests include queueing theory, stochastic dynamic programming, probability models in reliability, and supply chain management in manufacturing and service organizations. His works have been published in journals such as *Management Science, Operations Research, Queueing Systems, Journal of Applied Probability, IEEE Transactions*, and several other journals in operations research and applied probability. He is the co-author of the research monograph entitled "*Vacation Queueing Models - Theory and Applications*", the first book on both single and multiple server queueing systems with server vacations.