school of computing, informatics, & decision systems engineering

Decision Systems Engineering Spring '14 Seminar Series

"Using Chance-Constrained Programs to Improve quality of Service and Fairness in Surgery Planning"

FEATURING

Siqian Shen, Associate Professor
Department of Industrial & Operations Engineering
University of Michigan

Friday, January 31st - 1:30 PM – 2:30 PM
BYENG 210

Abstract:

We study surgery planning problems where surgery duration times are random with known or unknown distributions. Our models integrate and optimize decisions of which operating rooms (OR) to open, surgery-to-OR allocation, and the starting time of each surgery. We use joint and individual chance constraints to respectively restrict the risk of OR overtime and the risk of surgery delays. We present two types of models involving decisions of scheduling surgeries at continuous time and at discrete time blocks, respectively, tackled by methods of preprocessing, decomposition, and cutting-plane algorithms. A distributionally robust variant of the continuous-time surgery planning problem is considered under ambiguous distribution of surgery times. We test diverse instances generated from real data, compare different models, solution approaches, and derive managerial insights.

This is a joint work with Yan Deng and Brian Denton in the Department of Industrial and Operations Engineering at the University of Michigan

Bio:

Siqian Shen is an Assistant Professor in the Department of Industrial and Operations Engineering at the University of Michigan. She obtained a B.S. degree from Tsinghua University in China in 2007 and a PhD from the University of Florida in Industrial and Systems Engineering in 2011. Her research interests are in mathematical optimization, in particular stochastic programming, network optimization, and integer programming. Applications of her work include health care operations management, Cloud Computing, and critical infrastructure design. She was named one of the two runners-up of the 2010 INFORMS Computing Society Best Student Paper award, was awarded the 1st Place of the 2012 IIE Pritsker Doctoral Dissertation Award, and was a recipient of 2012 IBM Smarter Planet Innovation Faculty Award.

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