EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Enhancing Service Facility Reliability against the Threat of Disruptions

ABSTRACT – While planning service networks to serve spatially distributed customers, we consider the case where built facilities are subject to probabilistic failure (due to reasons such as adverse weather or disasters). If a facility fails, its customers either lose service or incur higher costs. We focus on planning facility location as well as customer service strategies in the context of logistics systems, and the goal is to minimize the expected system costs under normal and failure scenarios. We start with the case where site-specific and independent facility disruptions may occur when services are delivered via either direct visits or vehicle routing. Then we show recent extensions where facility disruptions exhibit positive and/or negative spatial correlations (e.g. when facilities are exposed to similar hazards or share the same support infrastructure). We will present compact mixed-integer program models that can be solved by customized algorithms based on relaxation and decomposition, and ways to address the challenge of correlation. We will also briefly explain continuum approximation models that not only serve as an effective way to find near-optimum solutions for large-scale systems, but also help provide managerial insights.

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SPEAKER BIO – Dr. Yanfeng Ouyang is Associate Professor, P.F. Kent Endowed Faculty Scholar of Civil and Environmental Engineering, and D.B. Willett Faculty Scholar at the University of Illinois at Urbana-Champaign (UIUC). He received his Ph.D. in civil engineering from the University of California at Berkeley in 2005. His research mainly focuses on transportation and logistics systems, infrastructure systems, and applications to energy, sensor, and agricultural systems. He currently serves as a Department Editor of IIE Transactions, an Area Editor of Networks and Spatial Economics, an Associate Editor of Transportation Science, an Associate Editor of Transportmetrica B. He received a Walter L. Huber Research Prize from the American Society of Civil Engineers in 2015, a High Impact Project Award from the Illinois Department of Transportation in 2014, an Engineering Council Outstanding Advisor Award from UIUC in 2014, a Xerox Award for Faculty Research from UIUC in 2010, a Faculty Early Career Development (CAREER) Award from the National Science Foundation in 2008, and a Gordon F. Newell Award from Berkeley in 2005, among others.

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TUESDAY, OCTOBER 20, 2015
3:30PM – 4:50PM
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