Seminar Speaker: Dr. Robert Hampshire, University of Michigan
Industrial Engineering Distinguished Researcher Seminar Series

Time and Location: Friday, 9/1/17 from 1:25 to 2:15 p.m., Freeman Hall Auditorium

Title: Systems modeling for Shared Transportation Systems: Bike Sharing and Ride-Hailing

Abstract:
In this talk, we present a quantitative analysis of the pioneering large-scale bicycle sharing system, Ve’lib’ in Paris, France. This system involves a fleet of bicycles strategically located across the network. Users are free to check out a bicycle from close to their origin and drop it off close to their destination to complete their trip. The analysis provides key insights on the functioning of such systems and serves to inform policy makers in other urban communities wanting to explore bicycle-sharing systems. We analyze the Ve’lib’ system from several aspects, including system characteristics, utilization patterns, the connection between public transit and bicycle-sharing systems, and flow imbalances between stations. Since flow from one station to another is seldom matched by flows in the reverse direction, the bicycle fleet can become spatially imbalanced over time. This leads to lower levels of service for users who must seek alternate stations to park or check out vehicles. Using a stochastic characterization of demand and a model developed in prior work, fleet-management strategies to deal with this flow asymmetry are presented. Reliability metrics using this characterization show the performance of the system and help identify stations with capacity bottlenecks. Utilization rates also suggest that close coupling of transit and vehicle-sharing systems are beneficial.

Bio:
Robert C. Hampshire is a research assistant professor in University of Michigan Transportation Research Institute's Human Factors group and the Industrial and Operations Engineering Department. He was previously a faculty member in Operations Research and Public Policy at the H. John Heinz III College at Carnegie Mellon University. He received a PhD in Operations Research and Financial Engineering from Princeton University in 2007. His research focuses on management, modeling, and optimization of services. His work considers mobility services such as smart parking, connected vehicles,
ride sharing, bike sharing, car sharing and person-2-person car sharing. This work is supported by the National Science Foundation including a CAREER Award, Department of Transportation and several nonprofit foundations. He uses stochastic modeling, simulation and dynamic optimization to develop design and management strategies. More specifically, his methodological interests are: dynamic control of transient stochastic systems, queueing networks with time-varying rates, machine learning, data science and asymptotic approximations.