NUTC Academic Seminar Series

Northwestern University Transportation Center presents:

Planning Service Facilities Under Continuous Traffic Equilibrium

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ABSTRACT:

Many service systems are composed of interrelated facilities that jointly serve spatially distributed demand. It is well-known that establishment of such facilities could induce or alter customer traffic that exacerbates congestion in the neighborhood, as customers often choose their own service facility and access path. This talk presents models for service facility location/layout design under traffic equilibrium in a continuous space. We first discuss solution methods for a class of nonlinear partial differential equations (PDE) that describe continuous traffic equilibrium. We show that under certain conditions the PDE can be solved, either exactly or approximately, in closed analytical forms. We then develop a discrete design model in the form of a mixed-integer program, and embed the PDE solution method into a Lagrangian relaxation solution approach. Alternative models, including one under the continuum approximation scheme, will also be discussed. Numerical experiments are conducted to illustrate applicability of the proposed models and to draw managerial insights.

SPEAKER BIO:

Yanfeng Ouyang is 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. from the University of California at Berkeley in 2005. His research mainly focuses on modeling transportation, logistics, and infrastructure systems, and applications to military, energy, and agricultural industries. He currently serves as a Department/Area/Associate Editor of *IIE Transactions*, *Networks and Spatial Economics*, *Transportation Science*, *Transportation Research Part C*, and *Transportmetrica B*. He has received a few awards including an ASCE Walter L. Huber Research Prize and an NSF CAREER Award.