

“Modeling Complex Infrastructure Networks as Differential Games”

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3:30-4:30, HAMP 1252
4:30-5:00 Reception in HAMP 1129 (Interaction Room)

ABSTRACT

In this talk, we review some recent developments in network science and social network theory and raise the question of whether those disciplines provide a foundation for the engineering design of modern complex infrastructure networks. In particular, we consider whether such phenomena as scale-free network topology, the emergence of dominant hubs, small worldness, resilience and sustainability are essential considerations for infrastructure network design. In particular, we ask whether traditional optimization and game theory are suitable decision support tools in such a context. We also explore the multilayer infrastructure paradigm and describe, in detail, the use of differential game theory to design the urban transport layer. We close with recommendations about the preferred tools for designing the remaining infrastructure layers.



Dr. Terry L. Friesz is the Harold and Inge Marcus Chaired Professor of Industrial Engineering at Penn State. He received his Ph.D. from Johns Hopkins University where he studied operations research, spatial economics and environmental engineering. His research interests include vehicular traffic, theoretical and computational network economics, production and service systems, and differential games. He has been a faculty member at George Mason University, MIT, and the University of Pennsylvania, where he held the UPS Foundation Chair in Transportation. His work has appeared in *Mathematical Programming*, *Operations Research*, *Transportation Science*, *EJOR*, *J. Regional Science*, *Regional Science and Urban Economics*, *Environment and Planning A*, and *Transportation Research B*. His book *Dynamic Optimization and Differential Games* was recently published by Springer.