Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

The Science of Transportation Analysis and Simulation

JOHN GLEIBE, Portland State University

Transportation Science focuses on methods developed to model and analyze the interaction between human behavior and transportation systems. From the human behavioral, or demand, perspective, we are interested in how person and households organize their activities across space and time, with travel viewed as an enabling activity. We have a particular interest in how to model the range of responses to public policy and transportation system changes, which leads to the consideration of both short- and long-term decision-making, interpersonal dependencies, and non-transportation-related opportunities and constraints, including household budgets, land use systems and economic systems. This has led to the development of complex structural econometric modeling systems as well as agent-based simulations. From the transportation systems, or supply, perspective we are interested in the level of service provide by transportation facilities, be it auto, transit or multi-modal systems. This has led to the development of network models and equilibrium concepts as well as hybrid simulation systems based on concepts borrowed from physics, such as fluid flow models, and cellular automata-type models. In this presentation, we review a representative sample of these methods and their use in transportation planning and public policy analysis.