

# Future Urban Transportation with Connected and Automated Vehicles

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**Abstract:** Connected and Automated Vehicles (CAVs) have the potential to transform future urban transportation. In this talk, we first summarize the brief history of CAV developments. We then study future urban multimodal transportation system with CAVs serving single rides or shared rides between homes and worksites, or homes and major transit hubs. We present a generalized Nash equilibrium model to characterize the behaviors and interactions of major players in such a system including service providers, customers (travelers), and network congestion. We illustrate the model via a notional network and a case study in Seattle.

**Bio:** Dr. Xuegang (Jeff) Ban is the William and Marilyn Conner Endowed Professor with the Department of Civil and Environmental Engineering of the University of Washington. He received his B.S. and M.S. in Automotive Engineering from Tsinghua University, and his M.S. in Computer Sciences and Ph.D. in Civil Engineering (Transportation) from the University of Wisconsin at Madison. His research interests are in Transportation Network System Modeling and Simulation, and Urban Traffic Modeling and Control. His recent work focuses on applying optimization, control, and AI methods to the understanding and modeling of emerging technologies/systems in transportation such as Connected and Automated Vehicles and New Mobility Services. His research in these areas has produced about 90 refereed journal papers and 60 conference papers. Dr. Ban is an Associate Editor of *Transportation Research Part C*, *IEEE Transactions on Intelligent Transportation Systems*, and *Journal of Intelligent Transportation Systems*, and serves on the editorial board of *Transportation Research Part B*, and *Networks and Spatial Economics*. He is a member of the Network Modeling Standing Committee (AEP40) and the Vehicle-Highway Automation Standing Committee (ACP30) of the Transportation Research Board (TRB). He received the 2011 *CAREER Award* from the National Science Foundation (NSF), and the *New Faculty Award* from the Council of University Transportation Centers (CUTC) and the American Road & Transportation Builders Association (ARTBA) in 2012.