

Title of the special session: Traffic Control and Transportation Network Flow Modeling in the Era of Connected and Automated Vehicles

How many proposers does this proposal have? 5

Abstract (At most 2250 characters are allowed. Excess text is truncated):

Connectivity and automation technologies have presented unique opportunities to revolutionize transportation systems. They have the potential to improve traffic operations, safety, and reliability in different highway facilities. Much research is devoted to characterizing and quantifying the effects of connected vehicles (CVs), automated vehicles (AVs), and connected automated vehicles (CAVs) on traffic operations and safety in freeway facilities and intersections using simulation, artificial intelligence, and operations research techniques. Having said that, more research is needed to study CVs, AVs, and CAVs, plan for their arrival to transportation networks, control them efficiently, and control traffic stream more effectively. Mass use of CAVs can introduce changes to route choice behaviors, trip planning, parking behavior.

This session is centered around identifying the challenges and opportunities that CAVs present, how different transportation systems should plan for them, and how they change traffic operations and control and network modeling activities.

In particular, the session is interested in topics on CAV trajectory and lane change control, CAV interactions with humans, the role of artificial intelligence and operations research in CAV control, effects of CAVs on traffic control and network modeling, and effects of CAVs on different transportation systems such as transit systems, shared mobility systems, and micro transit systems. A list of topics of interest follows.

Keywords:

1. Connected and Automated Vehicles
2. Traffic control
3. Network modeling

List of specific topics of interest:

- Trajectory optimization and lane change of CAVs
- Interactions of CAVs with human-driven vehicles, pedestrians, and bicyclists
- Role of artificial intelligence and operations research in CAV control
- Effects of CAVs on traffic operations in different highway facilities
- Traffic control with CAVs in different highway facilities
- Parking management with CAVs
- Effects of CAVs on different transportation systems
- Effects of CAVs on transportation network modeling
- Role of CAVs in shared mobility systems
- Automated transit services: optimal design and operation
- Route choice behavior for CAV users

A history of the special session, if not being offered for the first time: N/A

Expected number of manuscripts submitted for consideration and, if available, list of prospective authors and contributions: 10

Dissemination plan (upon approval, organizers are encouraged to disseminate CFPs if the special session is opened to the community and is not organized within the scope of a specific project):

A call for papers will be generated for the proposed session that will be disseminated via Transportation Research Board (TRB)'s Transportation Network Modeling Committee (ADB30) and the Committee on Artificial Intelligent and Advanced Computing Applications (ABJ70). It will also be advertised through the Transportation Science and Logistics (TSL) Society of Institute For Operations Research and Management Sciences (INFORMS).

Contact details (institutional address, phone, e-mail) and a short bio of organizers:

- **Ali Hajbabaie**, ahajbab@ncsu.edu. Dr. Ali Hajbabaie is an assistant professor in the Civil, Construction, and Environmental Engineering Department at North Carolina State University. Prior to this position, he was an assistant professor at Washington State University for five years. He received his Ph.D. in Civil Engineering from the University of Illinois at Urbana Champaign in 2012. His research focuses on distributed control of traffic networks in the presence of connected and automated vehicles. Dr. Hajbabaie is a member of Traffic Signal Systems and Traffic Control Devices Committees of the Transportation Research Board and Chairs the Asset Management and Performance Management Subcommittee. He is an associate editor of the IEEE Transactions on Intelligent Transportation Systems and an IEEE member.
- **Xiaopeng (Shaw) Li**, xiaopengli@usf.edu. Dr. Li is an associate professor and Susan A. Bracken Faculty Fellow (first holder) in the Department of Civil and Environmental Engineering at the University of South Florida (USF). He is also the director for one USDOT national university transportation center, National Institute for Congestion Reduction (NICR). His research interests include automated connected, electric and shared (ACES) vehicles, interdependent infrastructure systems, operations research & artificial intelligence. He is an IEEE Member. He is an Associate Editor for IIE Transactions and also serves on the editorial boards for Transportation Research Part B, Part C, Part E, the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, etc.
- **Xuegang (Jeff) Ban**, banx@uw.edu. Dr. Xuegang (Jeff) Ban is a 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/Simulation, Urban Traffic Modeling/Control, and Transportation Big Data Analytics, with focuses on emerging technologies/systems such as Connected/Automated Vehicles (CAVs), New Mobility Services, and Electric Vehicles/Buses. 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, Networks and Spatial Economics, and Transportmetrica B. 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).
- **George List**, gflist@ncsu.edu. Dr. List is a professor in the Department of Civil, Construction and Environmental Engineering at NC State University. He is a graduate of Carnegie Mellon University (BSEE, 1971), the University of Delaware (MEE, 1976), and the University of Pennsylvania (Ph.D., CE, 1984). Dr. List's research interests include system operation and control, travel time reliability, system performance enhancement using connected and autonomous vehicles, development of guidelines for simulation-based transportation system modeling, prediction of performance for mixed traffic on freeways, and more recently the ethics of AI-based control. He has served as

both a department head and a center director. In 2007 he was a co-recipient of the ITS-America “Best of ITS” award in Research and Innovation; he was a recipient of the project of the year award from ITS-New York three times, and in 1999 he was a Finalist in the Edelman Prize Competition (INFORMS). He is presently co-chair of the research committee for the newly formed TRB committee focused on traffic simulation (ACP80). He is a past chair of the TRB Joint Traffic Simulation Subcommittee (SimSub), past member of the TRB Traffic Flow Theory Committee, the Highway Capacity and Quality of Service Committee, and a former member and chair of the Intermodal Freight Transportation Committee. Dr. List is a Fellow of ASCE, a senior member of IEEE, and a member of ITE and INFORMS.

- **Jiaqi Ma, jiaqim@ucla.edu.** Dr. Jiaqi Ma is an Associate Professor at the UCLA Samueli School of Engineering and faculty lead in New Mobility at UCLA Institute of Transportation Studies. He has led and managed many research projects funded by U.S. DOT, NSF, state DOTs, and other federal/state/local programs covering areas of smart transportation systems, such as vehicle-highway automation, Intelligent Transportation Systems (ITS), connected vehicles, shared mobility, and large-scale smart system modeling and simulation, and artificial intelligence and advanced computing applications in automated transportation. He is an Associate Editor of the IEEE Open Journal of Intelligent Transportation Systems and Journal of Intelligent Transportation Systems. He is Member of the Transportation Research Board (TRB) Standing Committee on Vehicle-Highway Automation, Member of TRB Standing Committee on Artificial Intelligence and Advanced Computing Applications, Member of American Society of Civil Engineers (ASCE) Connected & Autonomous Vehicles Impacts Committee, Co-Chair of the IEEE ITS Society Technical Committee on Smart Mobility and Transportation 5.0.