Title of the special session: Network Modeling Solutions for Connected and Automated Vehicles: Advances in Computing and Communication Technologies

Aim and Scope (up to 300 words), stating importance and novelty, and describing technical issues the special session will address: Connected/automated vehicles (CAVs) are revolutionizing existing ground transportation systems. The transformative effects of these technologies on transportation systems as we know are expected with certainty albeit an uncertain future. For example, with partial automation now widely available for consumers, the vehicle fleet in the next 20-30 years will likely comprise a mixture of human-driven and partially-automated vehicles. Research to date has focused mostly on various new traffic operation and control strategies, such as platooning leveraging CAV technologies. For example, new intersection protocols have been suggested to replace traffic signals with an individual vehicle control logic. Related behavioral studies indicate that using CAVs to promote shared mobility may have a great potential to decrease current vehicle ownership as well as the demand for parking infrastructure.

These upcoming changes to ground transportation system raise the urgent needs for innovative network modeling solutions for efficiently improving traffic mobility, safety and environmental sustainability. This proposal seeks to gather innovative methodology contributions, which transform network modeling field considering the impacts of CAV technologies. These approaches will generate new planning and traffic operation and control methods and tools for analyzing the ground transportation systems in the future. Moreover, opportunities to use time for other activities while traveling are expected to reduce the value of travel time (VOTT), and thereby induce travel demand and affect land use in the long term. Another important aspect is the effect of CAVs on transit. Different business models and incentives may increase the competitiveness or cooperativeness between the two modes. This proposal seeks to gather innovative methodology contributions, which will transform the network modeling field considering the impacts of CAV technologies. These contributions will generate new transportation planning and simulation tools for analyzing the transportation systems of the future incorporating new traffic operation and control methods and tools.

List of specific topics of interest (up to 10 topics):

- Understanding transportation networks from CAV data
- Route choice behavior for CAVs
- Network modeling and optimal control of mobility as a service
- Network equilibrium models for mixed autonomy
- Shared mobility using CAV capabilities
- Intersection control logic for CAVs
- Traffic flow models for networks with mixed traffic with CAVs
- Resilient transportation systems in an era of automation

- Emerging markets surrounding the introduction of CAVs and its effect on public transportation
- Changes in value of travel time (VOTT) and its short and long-term effects

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: 9

Dissemination plan (upon approval, organizers are encourage to disseminate CFPs if the special session is opened to the community and is not organized within the scope of a specific project): This call for papers will be advertised through the mailing lists of the Transportation Network Modeling Committee (ADB30) and the Committee on Artificial Intelligent and Advanced Computing Applications (ABJ70) of the Transportation Research Board. It will also be advertised through the Transportation Science and Logistics (TSL) Society of INFORMS.

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

- Michael W. Levin, `mlevin@umn.edu`

  Michael W. Levin is an Assistant Professor in the Department of Civil, Environmental, and Geo-Engineering at the University of Minnesota. He received a B.S. degree in Computer Science and a Ph.D. degree in Civil Engineering from The University of Texas at Austin in 2013 and 2017, respectively. He is a recipient of the Dwight D. Eisenhower Fellowship from the Federal Highway Administration and the 2016 Milton Pikarsky Award from the Council of University Transportation Centers. Dr. Levin is also a member of the Network Modeling Committee (ADB30) of the Transportation Research Board. His research focuses on traffic flow and network modeling of connected autonomous vehicles and intelligent transportation systems.

- Leila Hajibabai, `leila.hajibabaidizaji@stonybrook.edu`

  Dr. Leila Hajibabai is currently an assistant professor in the Department of Civil Engineering at the State University of New York (SUNY) at Stony Brook. She has completed her Ph.D. in Civil Engineering, Transportation Systems, at the University of Illinois at Urbana Champaign in 2014 and has received two M.Sc. degrees, one in Industrial Engineering and the other in Civil Engineering. Her research program focuses on operations research applications in transportation Systems with specific emphasis on resilient and economic city logistics concerning human-made decisions and emerging technologies. Her objective is to provide effective and practical methodologies that improve the design and operation of complex transportation systems at various spatial and temporal scales. Dr. Hajibabai is a member of Transportation Research Board (TRB)s Standing Committee on Maintenance Equipment (AHD60) and Section on Maintenance and Preservation (AHD00). She is a co-chair of the Operations and Preservation Group of the TRB Young Members Council. Dr. Hajibabai has actively participated in various professional activities of the ADB30 Transportation Network Modeling Standing Committee of TRB. She is also a member of the Institute for Operations Research and the Management Sciences (INFORMS).

- Samiul Hasan, Samiul.Hasan@ucf.edu

  Samiul Hasan is an Assistant Professor in the Department of Civil, Environmental, and Construction Engineering at the University of Central Florida. Prior to joining UCF, he worked as a Post-doctoral Research Fellow at the Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia. He received a Ph.D. in Transportation and Infrastructure Systems from Purdue University in 2013. Dr. Hasan is the recipient of the 2014 Best Dissertation Award presented by the Transportation Science and Logistics (TSL) society of the Institute for Operations Research and the Management Sciences (INFORMS). Dr. Hasans research interests include urban data science, human mobility, network modeling, infrastructure interdependencies, and disaster management.

- Sevgi Erdoğan, serdogan@umd.edu

  Sevgi Erdoğan is Faculty Research Associate at the National Center for Smart Growth Research and Education at the University of Maryland. Dr. Erdoan earned her B.S. in Geodesy and Photogrammetry Engineering, M.S. in Civil Engineering from Istanbul Technical University, and Ph.D. in Civil Engineering from the University of Maryland. She also holds an M.S. degree in Operations Research from University of Delaware.

- Lili Du, lili.du@essie.ufl.edu

  Lili Du is an associate professor in the Department of Civil and Coastal Engineering. Before joining UF, she worked as an assistant and then an associate professor at Illinois Institute of Technology from 2012-2017. She also worked as a Post-doctoral Research Associate for NEXTRANS, the USDOT Region V Regional University Transportation Center at Purdue University from 2008 to 2012.

  Dr. Du received her Ph.D. degree in Decision Sciences and Engineering Systems with a minor in Operations Research and Statistics from Rensselaer Polytechnic Institute in 2008. Dr. Du received her MS degree in Industrial Engineering from Tsinghua University in 2003 and her BS degree in Mechanical Engineering from Xi'an Jiaotong University in 1998. Du's research is characterized by applying operations research, network modeling, and statistical methods into transportation system analysis and network modeling. Her current research covers several interdisciplinary research areas in Transportation Engineering, such as Connected and Autonomous Vehicle Systems, Interdependent Infrastructure Network Modeling, Sustainable Multimodal Transportation Systems, Optimization, and Data Fusion Applications in Traffic Flow Analysis. Dr. Du's studies have been published in several major transportation journals, including Transportation Research Part B, Part C, IEEE Transactions on ITS, Networks and Spatial Economics, etc. Her research has been well funded by National Science Foundation, Illinois Department of Transpiration, and University Transportation Research Center. Dr. Du is a recipient of the NSF CAREER award in 2016. Her recent project Driverless City won the First Nayar Prize at IIT in 2015. Dr. Du currently serves on the editorial advisory board of Transportation Research Part B. She is a member of INFORMS and the Transportation Research Board Committee on Transportation Network Modeling (ADB30), for which she also serves on the committees editorial board.

- Elise Miller-Hooks, miller@gmu.edu

Dr. Elise Miller-Hooks holds the Bill and Eleanor Hazel Endowed Chair in Infrastructure Engineering in the Sid and Reva Dewberry Department of Civil, Environmental, and Infrastructure Engineering at George Mason University. Prior to this appointment, Dr. Miller-Hooks served as Program Director of the National Science Foundation (NSF) Civil Infrastructure Systems Program in the Civil, Mechanical and Manufacturing Innovation (CMMI) Division of the Engineering (ENG) Directorate, lead Program Officer for the Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP) solicitation shared by the Computer and Information Science & Engineering (CISE), ENG, and Social, Behavioral and Economic Sciences (SBE) Directorates, and a cognizant program officer on CMMI's Smart and Connected Communities (i.e. Smart Cities) initiative. She served on the faculties of the University of Maryland, Pennsylvania State University and Duke University. Dr. Miller-Hooks received her Ph.D. (1997) and M.S. (1994) degrees in Civil Engineering from the University of Texas — Austin and B.S. in Civil Engineering from Lafayette College (1992). She has expertise in: disaster planning and response, e.g. urban search and rescue, building and regional evacuation and sheltering, and crowd modeling; multi-hazard civil infrastructure resilience quantification; stochastic and dynamic network algorithms; mathematical modeling and optimization; transportation systems engineering; intermodal passenger and freight transport; real-time routing and fleet management; paratransit, ridesharing and bikeways; and collaborative and multi-objective decision-making. Her research program has been funded by numerous agencies, including, for example, NSF, European Commission, Federal Highway Administration, U.S. Department of Transportation, I–95 Corridor Coalition, Maryland State Highway Administration, Maryland Industrial Partnerships, and various agencies and companies. She received a NSF CAREER award, Charley Wootan Award for Best Ph.D. Dissertation from the Council of UTCs, and several other national awards related to her dissertation and ongoing research, including two best paper awards. Dr. Miller-Hooks has authored approximately 150 articles and reports, and over 230 conference presentations and invited or keynote lectures. She serves on the editorial boards of Transportation Science (Associate Editor), Operations Research (Associate Editor — Policy Modeling and Public Sector OR Section), Journal of Intelligent Transportation Systems and Transportation Research Part B, and is Chair of the TRB Transportation Network Modeling Committee, founding Co-Chair of the TRB Task Force on Emergency Evacuation (now a full committee), and past president of the INFORMS (Institute for Operations Research and the Management Sciences) Transportation Science and Logistics Society (TSL) and the Women in OR/MS Forum (WORMS).

- Ömer Verbas, `omer@anl.gov`

  Dr. Ömer Verbas is a Computational Transportation Engineer in the Systems Modeling and Control Group in the Center for Transportation Research at Argonne National Laboratory. His primary research areas are in transportation network modeling; multi-modal routing, assignment, and simulation; and transit network design and scheduling. He is actively working in the Transportation Network Modeling Committee (ADB30) on the Transportation Research Board of the National Research Council. He serves as a reviewer for several transportation-related academic journals. He completed his doctoral studies at Northwestern University in 2014 under the supervision of Prof. Hani S. Mahmassani with whom he also worked as a Post-Doctoral Research Fellow until the end of 2016. Prior joining the PhD program at Northwestern, he received his Master of Science degree in

Transportation Engineering from Istanbul Technical University, and his Bachelor of Science degree in Mechanical Engineering from Boazii University in Istanbul, Turkey.