## AI-enabled Pathways to Secure, Resilient and Reliable Transportation Cyber-Physical-Social Systems

Abstract: Big traffic data-supported Artificial Intelligence (AI) models are the key enablers of tomorrow's transportation systems, which are essentially Transportation Cyber-Physical-Social Systems (TCPSS). TCPSS will increasingly rely on the interplay of (a) physical components such as autonomous and connected vehicles, the surrounding transportation infrastructure and the technological hardware; (b) cyber systems such as classical and quantum artificial intelligence-driven computing, software applications and distributed data storage systems; and (c) human stakeholders, from developers and engineers to public agencies responsible for managing transportation infrastructure to transportation system users. Once these components are seamlessly integrated, benefits from and mainstreaming of TCPSS will depend on the cybersecure and resilient TCPSS operations and reliability of the AI-based TCPSS applications. This talk will focus on novel AI models to ensure the cybersecure and resilient TCPSS design while enhancing the reliability of TCPSS applications. Later discussion will highlight the validation of the AI models in the Clemson Smart City Testbed. This talk will also delineate the AI-enabled pathways from theoretical development to engineering pilot evaluation to the transition towards real-world deployments, which are needed for the technical acceptance by the industry and policymakers as well for the user acceptance of TCPSS in smart and connected cities.

Dr. Sakib Khan holds a joint appointment at Clemson University as the Assistant Director of the Center for Connected Multimodal Mobility (C2M2, a Tier 1 USDOT University Transportation Center), and as an Assistant Research Professor in the School of Civil and Environmental Engineering and Earth Sciences. He is also a Research Fellow in the NSF Engineering Research Center for Computer and Network RESIliency and Security for Transportation (CAN-RESIST) Planning Grant. He is the manager of the Clemson Smart City Testbed. Before joining C2M2, Dr. Khan was a postdoctoral research scholar working at the University of California, Berkeley. He received his Ph.D. and M.Sc. in Civil Engineering from Clemson University in 2019 and 2015, respectively, under the supervision of Dr. Mashrur "Ronnie" Chowdhury. Dr. Khan's research interests cover both theoretical and applied aspects of artificial intelligence, optimization, and traffic-flow theory. His research application areas include transportation cyber-physical-social systems, connected and autonomous vehicles in an Internet of Things environment, heterogeneous wireless communication, transportation cybersecurity and privacy, quantum cloud-edge collaboration, and transportation big data analytics.

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