COLLEGE OF ENGINEERING

Control Seminar

Sponsored by: Bosch, Ford, and Toyota

Safety Verification and Conflict Analysis for Connected Automated Vehicles

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and Environmental Engineering
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January 29, 2021 @ 3:30 pm - 4:30 pm
Event will take place via Zoom

ABSTRACT: We demonstrate how wireless vehicle-to-everything (V2X) communication can be utilized to improve safety and prevent conflicts between road participants in mixed traffic scenarios where connected automated vehicles (CAVs) interact with connected human-driven vehicles (CHVs). The key idea is to find boundaries in state space that allow CAVs to make safe decisions far away from the conflict zone. This way CAVs are able to maintain safety while using mild control actions that benefit both the CAVs as well as the surrounding human-dominated traffic. Requirements for the quality of V2V communications are determined to ensure the performance of the decision making and control algorithms. The results are demonstrated experimentally using real automobiles and class-8 trucks.

BIO: Gábor Orosz received the M.Sc. degree in Engineering Physics from the Budapest University of Technology, Hungary, in 2002 and the Ph.D. degree in Engineering Mathematics from University of Bristol, UK, in 2006. He held postdoctoral positions at the University of Exeter, UK, and at the University of California, Santa Barbara. In 2010, he joined the University of Michigan, Ann Arbor where he is currently an Associate Professor in Mechanical Engineering and in Civil and Environmental Engineering. During 2017-2018 he was a Visiting Professor in Control and Dynamical Systems at the California Institute of Technology. His research interests include nonlinear dynamics and control, time delay systems, and machine learning with applications to connected and automated vehicles, traffic flow, and biological networks. He served as the Program Chair of the 2015 IFAC Workshop on Time Delay Systems and served as the General Chair of the 2019 IAVSD Workshop on Dynamics of Road Vehicles: Connected and Automated Vehicles. Since 2018 he has been serving as an editor for the journal *Transportation Research Part C* and since 2021 he has been serving as an editor for the *IEEE Transactions on Control Systems Technology*.

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