**Title:** Safety Assessment of Highly Automated Driving Systems – A New Framework

**Abstract:** Safety assessment is a critical step in the development and deployment of highly automated driving systems (ADS). Among the three major safety assessment methods (i.e., simulation, test track, and public road), test tracks provide a full fidelity, safe, and cost-effective testing environment. However, test tracks usually suffer from lacking background traffic and a limited number of pre-designed testing scenarios. In this presentation, we will talk about a new safety assessment framework to address those limitations in test tracks. First, an augmented reality (AR) testing platform is constructed to create simulated traffic in test tracks and interact with real ADS under test. Second, a testing scenario library generation (TSLG) method is developed to systematically generate sets of critical scenarios under different operational design domains (ODDs). A new definition of scenario criticality is proposed and justified by theoretical analysis regarding accuracy and efficiency. The proposed framework is implemented in the University of Michigan’s Mcity test track with an SAE Level 4 vehicle. Field test results show that the proposed method is able to generate unbiased performance indexes and greatly accelerate the evaluation process, comparing to the public road test approach.