ABSTRACT:

Instantaneous driving decisions are made by drivers to respond to changes in the surrounding environment. Specifically, drivers can either maintain speed, accelerate, or brake. They can also maintain acceleration or deceleration, or jerk the vehicle, i.e., change the marginal rate of acceleration or deceleration. These instantaneous decisions and their combinations can result in volatility, potentially degrading safety while using more energy and environmental resources. This study develops a fundamental understanding of instantaneous decisions by introducing a new idea, the driving volatility index, to measure the variance between individual drivers and typical profiles of drivers in a region. The index can identify and quantify “aggressive” driving. Empirical analysis is based on a large-scale 2011 regional travel behavior survey, containing 51,371 trips and their associated second-by-second (total 36 million seconds) speeds from Atlanta, GA. The study presents volatility in instantaneous driving decisions at various speeds and explores correlates of volatility. Initial results using analysis of variance indicate that instantaneous driving decisions vary substantially by gender, age, and trip attributes (trip purposes and trip lengths). The implications of findings will be discussed in terms of providing instantaneous feedback to drivers about their driving volatility.

BIO:

Dr. Asad J. Khattak is Beaman Professor of Civil & Environmental Engineering and Transportation Program Coordinator at University of Tennessee, Knoxville. Dr. Khattak is Editor-in-Chief of Science Citation Indexed Journal of Intelligent Transportation Systems, and Associate Editor of International Journal of Sustainable Transportation. He is special adviser to the Journal of Safety and Security and editorial advisory board Member of Transportation Research, Part C, and Analytic Methods in Accident Research. Dr. Khattak’s research focuses on various types of innovations related to 1) intelligent transportation systems, 2) transportation safety, and 3) sustainable transportation. During 2006-2013, he was Frank Batten Endowed Chair Professor of Civil Engineering at Old Dominion University where he developed and directed ODU’s transportation research initiatives and educational programs. He is an internationally recognized scholar, with 95 scholarly journal articles and has obtained more than $7.6 million in research funding. Dr. Khattak graduated from Northwestern University and he has worked at University of California at Berkeley, University of Oxford in England, and the French National Institute for Transport and Safety Research.