ABSTRACT: In the ever-lasting efforts of reducing emissions, improving efficiencies, and enhancing safety for ground vehicles, importance of control systems has been growing rapidly due to the substantially elevated system complexities contributed by the fast technological advances in various relevant fields. Accompanied with the quick evolution of vehicle technologies, designs of vehicle estimation and control systems have become much more challenging and critical as well. Synergistic combinations of physical insight into vehicle system characteristics with theories of estimation and control may offer effective means for tackling such challenges. This talk introduces a variety of vehicle system estimation and control research activities aiming to clean, efficient, and safe ground transportation. Innovative synthesizes of estimation and control theories with physical understanding of engine, aftertreatment, and vehicle chassis systems will be emphasized through examples. Along with the system analytical designs, experimental and simulation results will be given to demonstrate the importance and efficacy of the control systems for current and future ground vehicles.

Bio: Prof. Junmin Wang is an Associate Professor in Mechanical Engineering at Ohio State University. He received the B.E. in Automotive Engineering and his first M.S. in Power Machinery and Engineering from the Tsinghua University, Beijing, China. He received his second and third M.S. degrees in Electrical Engineering and Mechanical Engineering from the University of Minnesota, Twin Cities, and the Ph.D. degree in Mechanical Engineering from the University of Texas at Austin. Dr. Wang has 5-years of full-time industrial research experience at Southwest Research Institute (San Antonio, Texas) where he was a Senior Research Engineer and led research projects sponsored by many industrial companies and governmental agencies worldwide. In September 2008, Dr. Wang joined Ohio State University and founded the Vehicle Systems and Control Laboratory whose major research interests include control, modeling, estimation, and diagnosis of dynamical systems, specifically for engine, powertrain, aftertreatment, hybrid, flexible fuel, renewable energy, (electric) ground vehicle, transportation, sustainable mobility, energy storage, and mechatronic systems. Dr. Wang is the author or co-author of more than 200 peer-reviewed journal and conference papers and holds 11 U.S. patents. He serves as an Associate Editor for the ASME Transactions Journal of Dynamic Systems, Measurement and Control, IEEE Transactions on Vehicular Technology, IFAC Control Engineering Practice, and SAE International Journal of Engines. Prof. Wang is a recipient of the National Science Foundation CAREER Award, SAE Ralph R. Teetor Educational Award in 2012, the SAE International Vincent Bendix Automotive Electronics Engineering Award in 2009, Office of Naval Research Young Investigator Award in 2009, and ORAU Ralph E. Powe Junior Faculty Enhancement Award in 2009.