

## **Seminar Talk**

**Dr. Bin Hu**

**Lecturer**

**Department of Engineering Technology  
Old Dominion University**

**Friday, April 26, 2019**

**3:00 p.m. KH 224**

**Title:** Resilient Vehicular Networked Systems: Theories and Applications

**Abstract:**

Vehicular Networked Systems (VNS) are cyber-physical systems consisting of multiple autonomous vehicles exchanging information over wireless communication networks. A resilient VNS is a system that is capable of maintaining active situational awareness of surrounding threats and recovering operational normalcy (safety) from system failures with performance guarantee (efficiency). Building a resilient VNS, however, is challenging due to the unreliable and state-dependent nature of these vehicular networks, in which the communication channels (1) exhibit burstiness in information loss, and (2) stochastically change as a function of the vehicle's physical states. To address these challenges, this talk will present a novel channel model that explicitly captures the burstiness and state-dependency property of vehicular communications. Based on this channel model, the first part of this talk will show how to develop a distributed switched control strategy to address the safety issues in intelligent transportation systems. In the second part of this talk, a novel event-based adaptive power control scheme will be introduced to ensure an efficient use of communication bandwidth and transmission power while preserving system safety. Future research directions will be discussed at the end of this talk.

**Bio:**

Dr. Bin Hu will start as an assistant professor in the Department of Engineering Technology at the Old Dominion University in Fall 2019. He received his Ph.D. degree in the Department of Electrical Engineering at The University of Notre Dame in 2016, and was a research intern at Mitsubishi Electric Research Lab (MERL) from May 2015 to August 2015. Dr. Hu has been PI of one grant awarded by ONR. His research interests include both theoretical and practical contributions in the areas of stochastic networked control system, cybersecurity, distributed control and optimization, and human-machine interaction. Dr. Hu has published 25+ peer reviewed papers in IEEE, ACM and ASME journals and conferences, including top ranked journals of IEEE Transactions on Automatic Control, Automatica, IEEE Transactions on Circuits and Systems, and IEEE Transactions on Vehicular Technology.