



## Spring 2018 Seminar Series

### Towards Attack-Resilient Wireless Cyber-Physical Systems: Some Challenges and Possible Solutions

TUESDAY MARCH 6, 2018

1:00 PM – HEC 450

Wireless cyber-physical systems (CPS) are gaining importance with the increasing number of applications, such as connected/autonomous vehicles, industrial Internet, and smart grid. The growing demands on wireless CPS raise great concerns about the security issues. The history of security has taught us that a perfectly secure system never exists. Therefore, recent research about wireless CPS security takes a paradigm shift from conventional perfect security designs to attack-resilient security designs.

In this talk, we will present several attack-resilient security schemes in wireless CPS, including multi-modal continuous authentication, combined intrusion detection and authentication, bio-inspired mechanisms, and blockchain-based security schemes. Instead of using the deterministic models, which are popular in conventional perfect security design, we use stochastic models in the proposed attack-resilient security schemes. In addition, using recent advances in powerful stochastic algorithms, such as partially observable Markov decision process (POMDP), deep reinforcement learning, and blockchain-based consensus, we can derive context-aware security policies considering both security requirements and resource constraints in wireless CPS.

**F. Richard Yu**  
Carleton University



F. Richard Yu received the PhD degree in electrical engineering from the University of British Columbia (UBC) in 2003. From 2002 to 2006, he was with Ericsson (in Lund, Sweden) and a start-up (in San Diego, CA, USA). He joined Carleton University in 2007, where he is currently a Professor. His research interests include wireless cyber-physical systems, security, connected/autonomous vehicles, and deep reinforcement learning. Since 2007, over \$2.5 million CAD peer-reviewed research funding has been raised to support his research. He has authored over 440 papers in prestigious journals and conferences, 6 edited books and 27 granted patents, with over 10,000 citations and an H-index of 56 (Google Scholar). He serves on the editorial boards of several journals, including Founding Lead Series Editor for IEEE Transactions on Vehicular Technology – Connected Vehicles Series. He has served as the Technical Program Committee (TPC) Co-Chair of numerous conferences. Dr. Yu is a registered Professional Engineer, a Fellow of the IET, and a Fellow of the IEEE. He is a Distinguished Lecturer, the Vice President (Membership), and an elected member of the Board of Governors (BoG) of the IEEE Vehicular Technology Society.

He received the IEEE Outstanding Service Award in 2016, IEEE Outstanding Leadership Award in 2013, Carleton Research Achievement Award in 2012, the Ontario Early Researcher Award (formerly Premiers Research Excellence Award) in 2011, the Excellent Contribution Award at IEEE/IFIP TrustCom 2010, the Leadership Opportunity Fund Award from Canada Foundation of Innovation in 2009 and the Best Paper Awards at IEEE VTC'17S, Globecom'14, ICC'14, Globecom'12, TrustCom'09 and Networking'05.