Please join us for our next CPI Seminar Series talk delivered by
Professor Arash Mohammadi, Concordia University.

When: Monday, January 16, 2017 at 1.30 pm to 2.30 pm
Where: GB 244 (Galbraith Building, 35 St. George Street, Room 244)
Title: Secure Signal Processing Solutions for Attack Detection/Isolation in CPSs

Abstract: This talk is motivated by the fact that Cyber-physical systems (CPSs) are safety critical which makes identification and prevention of smart data-injection attacks on their control unit of significant practical importance. Recently there has been a surge of interest in practical and opportunistic applications of CPSs including: (i) State prediction for analyzing contingencies and taking preventive actions against possible failures in smart power grids; (ii) Optimizing the reliability of CPSs using decentralized sensor resource management techniques, and; (iii) Surveillance applications for following a reference target in decentralized camera networks. This talk will focus on secure signal processing solutions for attack detection and isolation in this context. In particular, I present different forms of attack models on the control and processing modules in CPSs and introduce a novel detection methodology by transforming the attack detection problem into the problem of comparing statistical distance measures. Then, attack and anomaly detection using graph-based signal processing solutions will be discussed. Finally, I present a secure attack isolation fusion framework obtained by using ideas form interactive multiple models (IMM) in combination with a fuzzy-based attack detection/isolation mechanism.

Bio: Arash Mohammadi (S'08-M'13) received B.Sc. degree from University of Tehran in 2005, the M.Sc. degree in from Amirkabir University of Technology (Tehran Polytechnic) in 2007, and Ph.D. from York University in 2013. He is currently an Assistant Professor with Concordia Institute for Information Systems Engineering (CIISE), Concordia University, Montreal, Canada. Prior to joining Concordia University, he was a Postdoctoral Fellow at Department of Electrical and Computer Engineering, University of Toronto, Canada. He is the Vice-Chair of IEEE Signal Processing Montreal Chapter. He serves as the leading Guest Editor in IEEE TRANSACTIONS ON SIGNAL AND INFORMATION PROCESSING OVER NETWORKS on "Distributed Signal Processing for Security and Privacy in Networked Cyber-Physical Systems". He was the Organizing Committee chair of "IEEE Signal Processing Society Winter School on Distributed Signal Processing for Secure Cyber-Physical Systems". His research interests include: cyber- physical systems; information fusion; distributed signal processing for agent networks; secure networked control systems; consensus algorithms, large-scale dynamical systems, and; smart grids. He has authored about 50 technical contributions, including invited ones, published in international journals and conference proceedings of high caliber. Dr. Mohammadi has received several distinguishing awards, including the Eshrat Arjomandi Award for outstanding Ph.D. dissertation from Electrical Engineering and Computer Science Department of York University in 2013, and one of the best student paper awards from IEEE International Conference on Information Fusion (FUSION'12).