

NATIONAL UNIVERSITY OF SINGAPORE

School of Computing

C S S E M I N A R

Title: Smart Energy Cyber-Physical System Security: Threat Analysis and Defense Technologies

Speaker: Professor Shiyang Hu
Director of Center for Cyber-Physical Systems
Michigan Technological University

Date/Time: 4 November 2016, Friday, 04:00 PM to 05:00 PM

Venue: Executive Classroom, COM2-04-02

Chaired by: Dr Roychoudhury, Abhik, Professor, School of Computing
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Abstract:

The massive deployment of advanced metering infrastructure (AMI) and home energy management system has mandated a transformative shift of the classical grid into a more reliable smart grid. Despite its importance, the AMI is vulnerable to various cyberattacks such as energy theft and pricing hack. In this talk, I will describe recent advances in cyberthreat analysis and defense technology development in AMI security. I will first show that due to the interdependence between utility pricing and customer energy load, an attacker could tamper smart meters for electricity bill manipulation and energy load unbalancing. I will then discuss several data analytics techniques to defend against those attacks, including partially observable Markov decision process (POMDP) based detection and stochastic cross entropy optimization based Feeder Remote Terminal Unit (FRTU) deployment. I will conclude the talk with some of the ongoing research in this direction.

Biodata:

Professor Shiyang Hu is the Director of Center for Cyber-Physical Systems at Michigan Tech., and he also held Visiting Professorship at Stanford University from 2015 to 2016. His research interests include Cyber-Physical Systems, Cybersecurity, and VLSI CAD, where he has published more than 100 refereed papers, including 30+ in IEEE Transactions. He is an ACM Distinguished Speaker and a recipient of National Science Foundation (NSF) CAREER Award. Prof. Hu is the Chair for IEEE Technical Committee on Cyber-Physical Systems. He is the Editor-In-Chief of IET Cyber-Physical Systems: Theory & Applications. He is an Associate Editor for IEEE Transactions on Computer-Aided Design, IEEE Transactions on Industrial Informatics, and IEEE Transactions on Circuits and Systems. He is also a Guest Editor for 7 IEEE/ACM Transactions such as IEEE Transactions on

Computers and IEEE Transactions on Big Data. He has served as the TPC Subcommittee Chairs for DAC and ICCAD. He is a Fellow of IET.