



COLLEGE OF ENGINEERING

Seminar announcement

“Automated Formal Analytics for Smart Grid Security and Resiliency”

Presenter **Mohammad Ashiqur Rahman**

Abstract

A smart grid exhibits complex configurations due to the coexistence of legacy power systems with the modern technologies and the interdependency between different cyber and physical components. In a critical infrastructure like smart grid, a security breach can cause devastating damages. Thus, there is a need for formal security analytics to automatically verify smart grid security, provably identify potential attacks, and devise cost-effective mitigation plans in a proactive manner. In this dissertation, we achieve these goals through the following three research thrusts. First, we develop formal models to formally verify the compliance of the advanced metering infrastructure (AMI), as well as the supervisory control and data acquisition (SCADA), configurations with the security requirements, and generate remediation plans for potential security violations. Second, we formally model a framework to automatically synthesize cost-effective, network isolation-based resiliency architecture for the cyber systems in smart grids. We provide another framework to synthesize redundancy-based resilient configurations for AMI, considering operational integrity and robustness requirements. Third, we develop a formal model for analyzing novel attack evasions on state estimation, a core control module of SCADA. The model identifies attack vectors for compromising state estimation, as well as finds corresponding mitigation plans, considering a comprehensive set of attack attributes, evasion techniques, and the interdependency between state estimation and other control modules.

About the Speaker

Mohammad Ashiqur Rahman received the BSc and MSc degrees in computer science and engineering from Bangladesh University of Engineering and Technology (BUET), Dhaka, in 2004 and 2007, respectively, and the PhD degree in computing and information systems from the University of North Carolina at Charlotte (UNC Charlotte), in 2015. His primary research interests include cyber infrastructure security analytics and automation, policy verification and threat analytics, risk assessment and security hardening. His research area also covers dependable resource allocation and optimal management. His research area focuses both general networks as well as cyber physical systems.

Date: Thursday, Nov. 10, 2015

Time: 12 P.M. – 1 P.M.

Drink and dessert to be provided.

Location: Prescott 225