

# Seminar in Computer and Information Science

**Title: Event Detection in Security and Safety Critical Cyber-Physical System Applications**

**Date: Tuesday, Feb 16, 2016**

**Time: 1:30 pm**

**Place: JMH 312 and will be video conferenced to LC**

**Speaker: Dr. Md Zakirul Alam Bhuiyan, Research Assistant Professor, Temple University**

**Abstract.** Cyber-physical system (CPS) is a co-engineered “smart” system that integrates computation and communication with the process of a physical system. Computing devices/sensors/actuators and networks in a CPS are used to monitor and control/observe particular events in the physical process. The CPS holds the promise as the next-generation automated and dependable event detection system for various applications. In this talk, I will introduce a class of security- and safety-critical CPS applications that require addressing ‘cyber’ and ‘physical’ concerns in conjunction, including structural health event monitoring, mobile event monitoring, and emergency rescue operation. Devices/sensors in these applications produce a lot of data (acceleration, acoustic, text, image, or video) so-called *big data*. In computing an event information (e.g., damage, crack, target, fire) from the big data, centralized or global monitoring algorithms are conventionally assumed, which faces enormous challenges, including real-time decision-making and low quality event detection, resource constraints, as well as application specific requirements. Thus, there is an increasing demand for distributed and parallel computing algorithms for data mining and decision-making in the safety-critical CPS applications. I will focus on a particular issue: event detection through big data mining in the CPS. I will present an approach called *DPminer* to deal with the issue, which attempts to mine data in parallel and distributed manner, provides event information locally, and reduces the overall communication costs in the CPS. In closing, I will show some game-changing research visions in the areas of dependable CPS research.



**Md Zakirul Alam Bhuiyan, PhD,** is currently a research assistant professor of the Department of Computer and Information Sciences at Temple University. Earlier, he worked as a post-doctoral research fellow at the Central South University, China, a research assistant at the Hong Kong PolyU, and a software engineer in industries. His research focuses on dependable cyber physical systems, emerging wireless network applications, cyber security, and sensor-cloud computing. He has 40 publications, including 10 IEEE/ACM Transactions. He received the ‘Young Scientist’ award from China and the ‘Outstanding PhD Dissertation’ award. He serves as a managing guest editor for Information Sciences, a guest editor for JNCA, a general chair (DependSys 2016) a program chair (IEEE DASC 2016, IEEE SSCC’16, and IEEE SpaCSS 2016), a publicity chair (TrustCom 2016, SustainCom 2016, and APSCC 2016). He is a member of IEEE and a member of ACM.