

# Spring 2015 Seminar Series

Presented by the CS Division

## ATTACK-RESILIENT MECHANISMS FOR SCALABLE MONITORING AND SDN-BASED APPROACHES FOR DDoS ATTACK MITIGATION AND DETECTION IN CLOUD COMPUTING

WEDNESDAY APRIL 1, 2015

1:30 PM – HEC 113

As IDC predicted, IT spending will reach \$5 billion by 2020 - \$1.7 billion larger than today - driven by the 3rd infrastructure consisting of cloud, mobile, social, and big data technologies. Scalable monitoring plays an important role in cloud computing and it is used to understand the status of a cloud based on readings of computing nodes collected at the important locations of the cloud. Current monitoring approaches are highly vulnerable to malicious attacks; an attacker can compromise one or a few computing nodes to mislead the status of a cloud and thus the cloud computing control algorithms, leading to catastrophic consequences in the cloud. In this talk, I will present a series of attack-resilient cloud status algorithms for cloud computing. These algorithms use the intrinsic relationship among the cloud metrics and the computing node readings to effectively tolerate a large portion of malicious measurements. I will further discuss my investigation for the properties of these algorithms through theoretical analysis and experiments. These studies have demonstrated the effectiveness of the proposed approaches. Moreover, the control center of a cloud is highly vulnerable to Distributed Denial of Service (DDoS) Attacks. I will briefly discuss my Software Defined Networking (SDN)-based approaches for DDoS attack mitigation and detection as well. To the end, I will give an overview of my other research including the risk assessment of a cloud and physical security, and outline my future work.

**DR. KAIQI XIONG**  
Rochester Institute of Technology

Kaiqi Xiong received his Ph.D. degree in Computer Science from the Department of Computer Sciences and his M.S. degree in Computer Engineering from the Department of Electrical and Computer Engineering at North Carolina State University, respectively. He started his career at IBM after receiving his Ph.D. degree in Mathematics from Claremont Graduate University. He has published more than six dozens of referred papers in leading journals and conferences and held two U.S. patents. One of his papers has over 835 citations in Google Scholar. As one of two faculty members in the college, he has been recently nominated for a 2014-2015 outstanding research award at his current institution (under review). He received the Best Demo Award at the US Ignite Application Summit and GEC22 in March 2015, the Best Paper Award in DASC2014, IBM Invention Achievement Award, the IBM Publication Award, and two teaching awards from the Texas A&M University System. He has also received six NSF and NSF/BBN grants since 2010. His current research lies in the development of algorithms and tools for computer and network security in cloud computing, smart grids, emergency response communications, sensor networks, smart cities, big data computing, and smartphone computing. He has co-organized ICA3PP2013, FGRE2014, CNERT2014, CNERT2015, and a series of Global Environment for Networking Innovations (GENI) events. He is a senior member of the IEEE.

*Hosted by: Dr. Lotzi Boloni*

