

**Presenter:** Jun Yan

**Title:** Cyber-Physical Security of the Smart Grid

**Abstract:**

Security of cyber-physical systems is an imminent challenge in evolving critical infrastructures like the smart grid. The computerization and networking of heterogeneous, distributed, and interoperating systems bring forth unprecedented threats across the closely intertwined physical and cyber spaces. As revealed by recent incidences like Stuxnet, BlackEnergy, and Mirai botnet, cyber-physical penetrations strike at the heart of an unprepared society, placing an urgent call for significant research advancements and end-to-end engineering solutions to smart and secured cyber-physical systems.

This talk will explore cyber-physical security challenges in the smart grid through the lens of cascading blackouts. Specifically, we will review the critical vulnerabilities of blackouts under potential exploitation of the cyber-physical power grid. The talk will reveal how malicious attackers, powered by advanced and adaptive machine learning techniques, can effectively identify victims to create massive cascading blackouts with compromised control commands. We will also examine the grid vulnerability and resilience under false data injection attacks on the measurements. In closing, this talk will further discuss the challenges and opportunities on the frontier of cyber-physical security in smart grid and other emerging cyber-physical systems.

**Brief Bio:**

Jun Yan is a Ph.D. candidate in Electrical Engineering from the Department of Electrical, Computer, and Biomedical Engineering at the University of Rhode Island. He received his B.Eng. degree in Information and Communication Engineering from Zhejiang University, China in 2011, and the M.Sc. degree in Electrical Engineering from the University of Rhode Island in 2013. His research interests include smart grid security, cyber-physical system security, attack awareness and resilience, intelligent systems, and deep learning.

Jun has published 31 peer-reviewed research articles, including 16 journal publications, in the areas of information forensics and security, smart grid, and computational intelligence. He received the Best Paper Award of International Conference on Communications (2014) and the Best Student Paper Award of International Joint Conference on Neural Networks (2016). His honorable mentions include a front-cover highlighted paper in *IEEE Transactions on Information and Forensic Security* (2013), the Best Readings of IEEE Communication Society (2013), and the Best Reviewers of *IEEE Transactions on Smart Grid* (2016), among others. He has presented 14 research talks internationally and provided professional services to the research community as the Assistant to the EiC of *IEEE Transactions on Neural Networks and Learning Systems*, secretary of 2014 IEEE Symposium Series on Computational Intelligence, and the local arrangement chair of IEEE CIS Workshop on "New Frontiers in Computational Intelligence".