

学术报告会

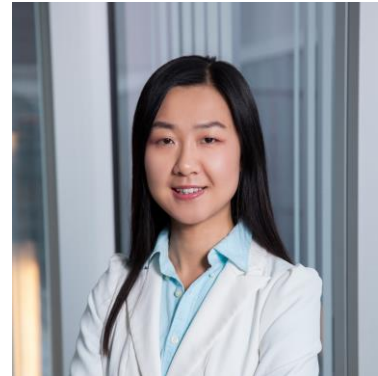
时间: 2018年1月4日(周四) 10:30-11:30

地点: 电院群楼2-410会议室

Attack Detection and Secure Control of Cyber-Physical Systems

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Abstract:

Cyber-Physical Systems (CPSs) form a ubiquitous, networked, computing substrate that underlies much of modern technological society. Researchers and hackers have shown that these kinds of networked embedded systems are vulnerable to remote security attacks, which can cause damage to physical infrastructure such as vehicles, power grids, manufacturing systems and so on, while hiding the effects from monitors. The requirement of designing secure CPSs introduces new challenges. We will provide an overview of research that uses the knowledge of the system dynamics to guarantee security and resiliency properties of CPSs, capable of dealing with attacks on the environment of the controller, including attacks on sensors, actuators, and communication media. From the perspective of detection, the trade-off between control system performance and the detection rate for attacks highlights the need to provide an optimal control policy that balances the security overhead with control cost. We employ a hybrid state, zero-sum, stochastic game approach to obtain an optimal switching policy between subsystems in presence of different types of attacks. We also design low cost, time-varying coding techniques with respect to sensor outputs for detecting stealthy data injection attacks to the communication channels. Lastly, I will provide an overview of my research about data-driven optimization and efficient resource allocation algorithms, with application to intelligent transportation systems.

Biography:

Fei Miao is an Assistant Professor of the Department of Computer Science & Engineering, and she is also affiliated to the Department of Electrical & Computer Engineering, UTC Institute for Advanced Systems Engineering, University of Connecticut. She received a Ph.D. degree, and the “Charles Hallac and Sarah Keil Wolf Award for Best Doctoral Dissertation” in Electrical and Systems Engineering in August 2016, with a dual Master degree of Statistics from Wharton School in August 2015, both from University of Pennsylvania, Philadelphia, USA. She received a B.S. degree with a major in Automation and a minor in Finance, from Shanghai Jiao Tong University (SJTU), Shanghai, China in

June 2010. Before joining Uconn, she was a postdoc researcher at the GRASP Lab and the PRECISE Lab of University of Pennsylvania, from September 2016 to August 2017. She was a Best Paper Award Finalist at the 6th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) in 2015.