UNIVERSITY OF CHICAGO
DEPARTMENT OF COMPUTER SCIENCE
PRESENTS:

"Securing IoT platforms through systematic analysis and design"

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Abstract:
Our homes, hospitals, cities, and industries are being enhanced with devices that have computational and networking capabilities. This emerging network of connected devices, or Internet of Things (IoT), promises better safety, enhanced management of patients, improved energy efficiency, and optimized manufacturing processes. Although there are many such benefits, security vulnerabilities in these systems can lead to user dissatisfaction (e.g., from random bugs), privacy violation (e.g., from stolen information), monetary loss (e.g., denial-of-service attacks or "ransomware"), or even loss of life (e.g., from malicious actors manipulating critical processes in a hospital).

In this talk, I will show that the study of IoT platforms, which are software systems that unify disparate IoT devices and connectivity protocols, is key to understanding security design flaws. Furthermore, I will show how security mechanisms can be designed for these platforms to achieve security from the ground up. I will first discuss results from an empirical analysis of the Samsung SmartThings platform. Then, motivated by lessons extracted from this analysis, I will present the design of FlowFence, an IoT platform that constrains privilege using information flow tracking as a first-class primitive. I will also briefly discuss results from our recent security analysis of If-This-Then-That, a trigger-action platform for end-users, and touch upon areas of current and future investigation---global security/safety properties, tamper-proof audit, and security of large-scale IoT systems.

Bio:
Earlence Fernandes is a Ph.D. candidate at the University of Michigan, advised by Prof. Atul Prakash. Earlence is a systems security researcher with current interests in IoT security and OS/Mobile security. He approaches computer security from multiple perspectives including measurements, attacks, and system building. His recent work, a security analysis of the popular SmartThings platform, received the Distinguished Practical Paper Award at IEEE Security and Privacy in 2016, received widespread media coverage, and has led to security-oriented improvements in SmartThings platform design. His web site is:
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