

ECE SEMINAR

BERKAY CELIK

PhD Student

Department of Computer Science and Engineering
Pennsylvania State University

Thursday, March 21, 2019 at 11:00 am

8 St. Mary's St., PHO 339

Faculty Host: Orran Krieger

Refreshments will be available at 10:45 am

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AUTOMATED IOT SAFETY AND SECURITY ANALYSIS

Abstract:

The introduction of Internet of Things (IoT) devices that integrate online processes and services with the physical world has had profound effects on society. Yet, while IoT systems have been widely embraced by consumers and industry alike, safety and security failures have raised questions about the risks of embracing IoT-augmented lives. These failures range from compromised baby monitors to vehicle crashes and monetary theft. As with traditional security problems, many of these failures are a consequence of software bugs, user error, poor configuration, or faulty design. In this talk, we will examine new classes of failures: Interactions within the physical domain that lead to unsafe or insecure environments. I will then demonstrate how to model the interactions between devices within physical spaces through source code analysis and formally verify via model checking not only the correct operation of one device, but the joint behavior of all of the devices in an environment. Using these techniques, we successfully identify threats to safety and security, and enforce the correct operation of IoT devices and environments in physical spaces. In so doing, we create a richer model of IoT safety and security, and provide consumers, developers, and industry with systems that mitigate threats to IoT in practice.

Biography:

Berkay Celik is a PhD candidate in Computer Science and Engineering at the Pennsylvania State University, where he is advised by Professor Patrick McDaniel. Berkay has researched a variety of security topics, including machine learning systems, network security, and privacy enhancing technologies. His dissertation is in the area of Internet of Things (IoT), particularly the construction of systems that ensure safety, security, and privacy in IoT implementations through program analysis. He received his B.Sc in Computer Science from Naval Academy (Istanbul) and his M.S. in Computer Science and Engineering with a minor in Computational Science from Pennsylvania State University. He expects to earn his PhD in the Spring of 2019. Berkay has had several internships in industry, including at VMware and Vencore Labs.

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