

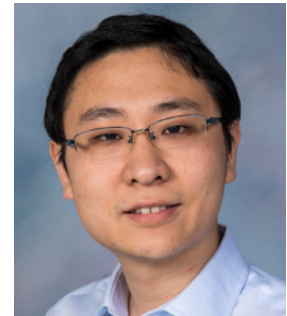
When: Friday 13:50 – 14:50

Where: ETB 1020

Speaker: Kaiyuan Yang

Assistant Professor

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Title: Silicon Security Primitives for the Internet of Things (IoT)

Date: 10-05-2018

Abstract: Security and privacy are critical challenges to the Internet of Things (IoT). Securing these distributed systems not only face new challenges at system and network levels due to drastically different applications, system constructions, and attack methods, but also face severe hardware-level constraints on computation resources, power consumption, and device cost. To solve these problems, new hardware security blocks are strongly demanded to provide a reliable, trustful, and energy-efficient foundation for building system security.

In this talk, I will show how novel hardware designs can help provide fundamental security operations such as encryption and authentication with low power and cost overhead. First, I will show our recent work on secure key generation and storage blocks, which can serve as roots of trusts for IoT devices. By exploiting novel circuit structures in both digital and analog domains, as well as emerging devices, we developed multiple true random number generators (TRNG) for key generation and physically unclonable functions (PUF) for chip fingerprinting and key storage. In addition, our work on lightweight and reconfigurable cryptographic accelerators will be presented in the talk. These accelerators significantly reduce the gap between the demands for cryptographic operations and the limited computation/energy budgets in IoT devices.

Bio: Kaiyuan Yang received his B.S. in Electronics Engineering from Tsinghua University, China, in 2012, and his Ph.D. degree in Electrical Engineering from the University of Michigan, Ann Arbor, MI, in 2017. His Ph.D. work was recognized with the 2016 IEEE Solid-State Circuits Society (SSCS) Predoctoral Achievement Award.

He is currently an Assistant Professor at Rice University, Houston, TX. His research interests include digital and mixed-signal circuits for secure, intelligent and low-power IoT devices, hardware security, and circuit/system design with emerging devices. Dr. Yang received the Distinguished Paper Award at the 2016 IEEE International Symposium on Security and Privacy (Oakland), and the Best Student Paper Award (1st place) at the 2015 IEEE International Symposium on Circuits and Systems (ISCAS).