ECE Department Seminar

Assuring the Root of Trust for Internet-of-Things (IoTs)

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Abstract

Internet-of-Things (IoT) security is being challenged by various threats, such as cyber attack, hardware tampering attack, and malicious tool attack. Rogue users, component/system designers, or third-party tool providers could implement those attacks to sabotage the integrity and security of IoT systems. This talk will introduce methods that assure IoT security by obfuscating hardware components, the root of trust. More specifically, a dynamic state-deflection method is proposed to obfuscate gate-level designs, thwarting reverse engineering and IP piracy attacks. Further, we exploit the principle of moving target defense (MTD) to address the stealthy hardware tampering attack from FPGA design suites. Three defense lines in the proposed FPGA-oriented (FOMTD) generate configuration uncertainty to prevent hardware Trojan insertion via malicious FPGA software.

Biography

Dr. Qiaoyan Yu is Associate Professor of Electrical and Computer Engineering at the University of New Hampshire, where she also directs the Reliable & Secure VLSI Systems Laboratory. Dr. Yu’s research expertise includes hardware Trojan detection, side-channel attack mitigation, three-dimensional integrated circuits, FPGA, and embedded system security, cybersecurity, and VLSI fault tolerance. She received her B.S. from Xidian University (2002), M.S. in Communication and Information Engineering from Zhejiang University (2005), and the Ph.D. in Electrical and Computer Engineering from the University of Rochester (2011).

Dr. Yu received the NSF CAREER Award, the Air Force Research Lab Faculty Fellowship, a Semiconductor Research Corporation grant. She received the Best Poster Award at Texas Analog Center of Excellence 2018, Best Poster Award at ISVLSI’16, Best Paper Award Finalist in MWSCAS’15, Best Paper Award Finalist in NOCS’11, and the Best ECE Ph.D. Dissertation Award at the University of Rochester in 2011. Her student teams have won three consecutive (2015-2017) Top-3 awards in the Embedded Security Challenge at Cyber Security Awareness Week. She received the Excellence in Teaching Award at UNH in 2015. Dr. Yu was the general chair for DFT’17, track-chair for ASP-DAC’17, ISVLSI’18, ISVLSI’19, and MWSCAS’18. She serves on the technical program committees of HOST, DAC, Asian HOST, ASP-DAC, GLSVLSI, ISVLSI, DFT, ISCAS, and ICCD.