COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

FACULTY RESEARCH TALKS

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Zoom talk | Friday, Sept. 15, 2023 | Noon to 1 p.m.

PRESENTER 1:
SAZADUR RAHMAN
Assistant Professor
Electrical and Computer Engineering

End-to-end Security Assurance of Microelectronics Supply Chain

The current state-of-the-art integrated circuit design industry heavily relies on the horizontal business model fueled by a globalized supply chain to access cutting-edge technologies. However, with many entities participating across the globe, the underlying security of the products are compromised due to various supply chain threats. In this talk, Dr. Rahman will explore innovative and practical solutions to ensure end-to-end security of the semiconductor supply chain with defense-in-depth technologies by obfuscation techniques, machine learning, and reconfigurable computing. He will also discuss the future direction of his research: optimizing and securing the use of ML/AI in chip design; securing chiplet-based ecosystems in post-Moore's law era; and driving cloud-based confidential computing by fully homomorphic encryption.

Dr. Rahman earned his doctorate and master's in electrical and computer engineering from the University of Florida in 2022. He researches semiconductor supply chain security using state-of-the-art logic locking, reconfigurable computing, heterogeneous systems and machine learning. Dr. Rahman has authored more than 20 peer-reviewed research papers, has three patents (one granted so far), a textbook titled CAD for Hardware Security, and authored several book chapters. His doctoral research is showcased in premier ACM/IEEE journals and conferences. Prior to joining UCF, he was a security architect at Intel Corporation, working on next-generation Xeon processors.

PRESENTER 2:
ENXIA ZHANG
Assistant Professor
Electrical and Computer Engineering

Radiation Effects and Reliability in Microelectronics

Dr. Zhang will discuss radiation effects induced reliability and failures in electronic devices and systems using examples fabricated with state of art technologies, as well as risk mitigation strategies. Examples include TID induced coupling effects in 3D FDSOI, irradiation and high-field stress effects in GaN-based HEMTs, and SEB in Ga2O3 Schottky power diodes. The importance of device architecture and defects will be emphasized.

Dr. Zhang's research interests include the reliability and radiation response of advanced microelectronic devices and ICs based on silicon, compound semiconductors, and two-dimensional materials; photonic devices; radio frequency devices and ICs; and MEMS/NEMS. Characterization of defects and their effects on the performance, reliability and radiation response of emerging materials and devices for space applications is an area of particular emphasis. Dr. Zhang has published more than 200 peer-reviewed journal articles that have been cited more than 5,000 times and recognized with numerous awards. She received the 2022 IEEE NPSS Women in Engineering leadership travel award and the 2022-2023 Vanderbilt ECE teaching award.

PRESENTER 3:
JEFFREY KAUFFMAN
Associate Professor
Mechanical and Aerospace Engineering

Adaptive Structures for Aerospace Engineering: Aeromechanics, Damping and Fatigue

Adaptive structures provide unique engineering opportunities to tailor structural design and introduce multifunction. Dr. Kauffman will discuss how adaptive structures enable new possibilities in aerospace engineering, from jet engine design and testing to space structures damping and isolation. These applications align tightly with structural dynamics, and Dr. Kauffman will address ongoing projects and related work in high-cycle fatigue testing and damping.

Dr. Kauffman earned his doctorate and master's degrees in aerospace engineering from Penn State and a bachelor's degree in engineering and applied science/aeronautics from Caltech. Dr. Kauffman conducts broad research in the areas of structural dynamics and adaptive structures, with particular focus on multifunctional and energy-efficient structures for vibration reduction, energy harvesting and structural morphing. His current research is funded by ONR, NSF, NASA and industry partners.

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