



UCF

# FACULTY RESEARCH TALKS

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Zoom talk | Friday, Feb. 7, 2025 | Noon to 1 p.m.



PRESENTER 1:

**KIMIA ZAMIRI  
AZAR**

Assistant Professor  
Electrical and  
Computer Engineering

## **In-depth Microelectronics Security: Verification, Monitoring and Measurement**

In this presentation, Kimia Zamiri Azar will discuss the current directions in her research group on microelectronics verification and validation at the earliest stage of the supply chain. The presentation focuses on automated security verification by electronic design automation tools, security monitoring techniques for better sustainability, advanced testing techniques in diverse post-CHIPS technologies, and use of emerging AI models with a particular focus on large language models for automation of security verification.

Azar completed her doctorate at George Mason University and pursued postdoctoral research at the University of Florida. Her research focuses on hardware security, formal-based platform verification and validation, and advanced IC testing and monitoring. She has authored two books, a book chapter, and holds three issued/pending patents. Her work has been extensively published in ACM/IEEE journals and conferences and has been sponsored by the NSF, SRC, DARPA, DoD (NG) and Microsemi. Throughout her career, Azar has received several awards and nominations, notably Best Paper Runner-up at DATE 2023 and Best Poster Award at HOST 2022.



PRESENTER 2:

**PAULO EDUARDO  
DE FARIA JR.**

Assistant Professor  
Electrical and  
Computer Engineering;  
Physics

## **Exciton Complexes in Semiconducting van der Waals Quantum Matter**

Electronic interactions strongly intertwine the spin, orbital and lattice degrees of freedom in van der Waals structures. Paulo Eduardo de Faria Jr. will discuss how the interplay between the spin and orbital angular momenta of electrons, holes and excitons can be used as a powerful “imaging tool” to reveal important signatures of elusive many-body phenomena in van der Waals quantum matter. These fundamental insights are a crucial step towards the implementation of novel optoelectronic and optospintronic devices in the field of quantum information technology.

Faria received his bachelor’s, master’s and doctoral degrees in computational physics from the University of São Paulo. During his doctorate, he spent one year at SUNY Buffalo as an exchange student. In 2017, he moved to the University of Regensburg as a postdoctoral fellow funded by the Alexander von Humboldt Foundation and CAPES, acquiring his habilitation degree in 2024. His research explores a diverse array of topics in theoretical condensed matter physics, emphasizing its intersection with materials science and delving into the fundamental principles and innovative applications of quantum materials.



PRESENTER 3:

**MIKE  
BOROWCZAK**

Associate Professor  
Electrical and  
Computer Engineering

## **Unlocking Resilient Computing: From Secure Hardware Design to STEM Education Integration**

This presentation bridges two critical domains: investigating information leakage in emerging technology from systems to devices through side-channel analysis and integrating advanced computing concepts and tools into STEM education. By uncovering vulnerabilities early in emerging technologies with common techniques, early feedback can be used to develop resilient building blocks for next generation computing systems. This presentation also discusses subject agnostic integrated approaches to provide pre-collegiate educators and students with computational and security knowledge and self-efficacy.

Mike Borowczak earned his doctorate in computer science and engineering from the University of Cincinnati. He worked in industry as a hardware security architect and senior data scientist before returning to academia full time. His research explores vulnerabilities in emerging computing systems. He also studies the integration of advanced computing concepts and technologies into pre-collegiate spaces in order to build long-term sustainable pathways and pipelines for students. A senior member of IEEE and ACM, he has received multiple honors, including multiple endowed professorships, more than \$8.7 million in funding with over 50% as PI, and has published in over 80 journal and conference publications.