

Faculty Candidate Seminar Defense Innovation Search



Jesse Moody

Sandia National Laboratory

Thursday, February 13, 2025

Presentation: 9:30 A.M. – 10:30 A.M.

MSEE 112

Energy Efficient RF Systems at the Edge

Abstract: Emerging technology trends are pushing the requirements of RF devices far beyond what was considered possible even a few years ago. The Internet of Things, the Internet of Space, and the Body Sensor Networks all converge into the Internet of Everything. Many of these "edge" devices are inherently power-constrained, with drastically more burdensome requirements than traditional wireless systems. As these networks evolve, new ideas are needed to meet rapidly expanding lifetime, operational range, and robustness requirements. As these electronics become further integrated into our lives, they present new challenges and opportunities for technical innovation.

This talk explores my work enabling the connectivity and control of these devices through developing RF circuits, devices, and architectures that operate at drastically reduced power compared to the existing state of the art. First, I will present my work developing extremely low-power wake-up receivers capable of operating for decades off coin-cell batteries. Then, I will detail my work on enabling power-efficient small satellite communication and elaborate on several innovative devices developed during this work. This talk concludes by exploring several emerging research areas, including allowing next-generation cellular devices and directive beamforming to navigate obstacles in real-world environments.

Bio: Dr. Jesse Moody is a Principal Member of the Technical Staff at Sandia National Laboratory. Jesse graduated with his BSEE degree in 2014 from the University of South Florida and his Ph.D. in ECE from the University of Virginia in 2019. Since 2019, Jesse has worked at Sandia National Labs, leading various efforts in RFIC devices. His work spans a broad gamut of technologies and applications ranging from energy-efficient RF communications and high-output power millimeter-wave devices to radiation-hardened RF and mixed-signal devices to RF and mixed-signal devices for precision metrology. Jesse's work has been nominated for best industry paper at the RFIC symposium in 2022 and 2023. He serves on the technical paper review committee for the International Microwave Symposium on Microwave and Millimeter-wave receivers, LNA and VGAs, and the MTTS Texas Wireless and Microwave Symposium TPC and organizing committee.

Hosts

Shreyas Sundaram ~ sundara2@purdue.edu

Jason McKinney ~ mckinnjd@purdue.edu