COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

FACULTY RESEARCH TALKS

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Zoom talk | Friday, March 29, 2023 | Noon to 1 p.m.

PRESENTER 1:
JAESUNG LEE
Assistant Professor
Electrical and Computer Engineering

Acoustic Frequency Comb Generating in Nanoelectromechanical Systems

In this presentation, Dr. Lee will discuss his research on emerging mechanical systems with a focus on phononic frequency combs (PnFCs) generation through nonlinear resonances and coherent mode coupling in nanoelectromechanical systems. By combining experimental demonstrations with theoretical modeling, Dr. Lee will elucidate the intricate conditions required for PnFC generation and discuss the methods employed for tuning these combs. The PnFCs demonstrated and the findings herein will be valuable for applications such as improving the sensitivity of resonant sensors.

Dr. Lee received his doctorate in electrical engineering from Case Western Reserve University in 2017. He received bachelor's and master's degrees in electrical engineering from the University of Electro-Communications. His research interests have focused on developing micro/nanoscale devices using advanced materials towards building integrated systems for signal processing and sensing, in both classical and quantum regimes. He has published more than 40 peer-reviewed articles in high-impact and multidisciplinary journals, including *Science Advances*, *Nature Communications*, *Applied Physics Reviews*, *ACS Nano* and *Nano Letters*. He is a member of IEEE and AVS. He is the technical program chair for the MEMS/NEMS technical group at the 70th AVS International Symposium & Exhibition.

PRESENTER 2:
SHAHANA IBRAHIM
Assistant Professor
Electrical and Computer Engineering

Ensuring Robustness in Machine Learning by Combating the Real-world Data Uncertainties

Even amidst the astonishing progress in artificial intelligence (AI) that we witness today, the real-world deployment of AI systems in many critical domains is still struggling. The primary reason behind this hurdle is that most advanced machine learning models are not naturally capable of handling the uncertainties present in real-world data, such as noise, imbalance, sparsity or distribution shifts. Reliable, robust and trustworthy systems are an immediate need of our society to reap the real benefits of the advances in AI. In this talk, Dr. Ibrahim presents her research efforts on robust machine learning, using some powerful statistical and signal processing tools to address the uncertainty challenges present in the data while training machine learning systems.

Dr. Ibrahim received her doctoral and master's degrees in electrical and computer engineering from Oregon State University in 2023 and 2019, respectively. She obtained her bachelor's degree from the National Institute of Technology in 2012 and had also held positions in industry at Texas Instruments and NVIDIA. She has actively published in top AI and signal processing venues such as ICML, ICLR, NeurIPS and *IEEE Transactions of Signal Processing*. Her research interests span broadly across machine learning, signal processing, and optimization.

PRESENTER 3:
CYNTHIA WILLIAMS
Assistant Professor
School of Global Health Management and Informatics

Unveiling Health Information Technologies: Exploring Realities, Challenges and Opportunities

In this presentation, Dr. Williams will discuss her interdisciplinary research in technology: human-robot interaction and wearables. She will present her study that examines the potentials of innovation in rehabilitation science: trust, acceptance and clinical outcomes. As technology is advancing, it must do so in ways that promote end user acceptance, particularly in areas where innovations are not 'demanded' but warranted. Rehabilitation medicine is a very personable area where patients have trust and rely on the judgement of their clinicians. Thus, we should create accessible, user centered design, and support a robust technological infrastructure.

Prior to coming to UCF, Dr. Williams served as the Director of Aging Research at the University of North Florida. She is the co-chair of the Patient Research Collaborative at the University of Florida and Community Engaged Research in the Population Health Council at the UCF College of Medicine. Her areas of research are telehealth, wearables, aging, health equity, community engaged research and clinical outcomes.

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