



UCF

FACULTY RESEARCH TALKS

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



PRESENTER 1:

MEHDI RAZAVI

Associate Professor
College of Medicine;
Bionix Cluster

Engineering Bioactive Materials for Targeted Osteoporotic Bone Regeneration

Osteoporosis disrupts bone remodeling, leading to fractures in one in three women and one in five men over 50. In this presentation, Mehdi Razavi will discuss his research on osteoporotic bone healing, focusing on siRNA nanobubbles and magnesium nanocomposites (MNCs). He will present the fabrication of ultrasound-responsive nanobubbles and their safety and efficacy in an osteoporotic mouse model for reducing bone resorption. Additionally, he will highlight the development of MNCs with controlled degradation to promote new bone formation in rat femoral defects.

Razavi directs the Biomaterials and Nanomedicine Lab. He holds secondary joint appointments in the Department of Materials Science and Engineering and the biomedical engineering program within the Department of Mechanical and Aerospace Engineering. Since joining UCF as an assistant professor in 2019, his research has focused on musculoskeletal tissue engineering, regenerative medicine and gene delivery systems.



PRESENTER 2:

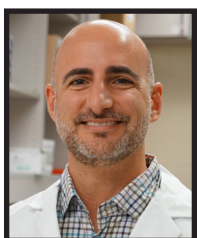
SIDONG LEI

Associate Professor
Materials Science
and Engineering;
Nanoscience
Technnology Center

2D Material Engineering for Future Microelectronics

Future microelectronics will fuse diverse materials and structures for enhanced integration density, speed and functionality. Two-dimensional (2D) materials stand out as attractive candidates in this trend with their outstanding electronic performance, ultra-thinness and rich physical interactions. Despite that, the heterogeneous integration between 2D materials and other platforms remains challenging due to weak interfacial interactions. In this talk, Sidong Lei will discuss the fundamental challenges and present his recent progress in bridging this gap, including the establishment of reliable electric contacts for future 3D integration and the construction of organic-inorganic frameworks for 2D-based flexible devices.

Lei received his Ph.D. in applied physics and materials science from Rice University in 2016. Before joining UCF, he was an assistant professor of physics at Georgia State University. In 2023, Dr. Lei received the NSF CAREER award. His research interests include the synthesis of low-dimensional semiconductors and quantum materials, the surface/interfacial physics of reduced-dimensional systems, and the principles and solutions for 2D integrated circuits and biomedical devices.



PRESENTER 3:

TAJ AZARIAN

Assistant Professor
Burnett School of
Biomedical Sciences

Genomic Epidemiology and Evolution: The Crossroads of Antimicrobial Resistance, Vaccine Development and Public Health

Genomic epidemiology is pivotal in modern public health, offering insights into antimicrobial resistance (AMR), vaccine development and disease control. Analyzing pathogen genomes enables monitoring AMR emergence, guiding effective treatments. This approach has been crucial in tracking resistant pathogens, informing public health responses. In vaccine development, genomic data identify candidates and elucidate pathogen variability, as seen with a number of vaccines. Integrating genomic and epidemiological data enhances surveillance and outbreak prediction, exemplified during the COVID-19 pandemic. Taj Azarian will detail how genomic epidemiology connects disease monitoring, vaccine development, and public health strategies, advocating for multidisciplinary collaboration to improve disease research, prevention and control.

Azarian is the lead of the newly established Pathogen Genomic Surveillance Core Laboratory. Prior to establishing his lab at UCF, he completed a postdoctoral fellowship at the Harvard School of Public Health, and previously worked as an infectious disease epidemiologist for the Florida Department of Health. His lab uses genomics to study the emergence and spread of pathogens. This work has spanned several bacteria and viruses including *Vibrio cholerae*, *Streptococcus pneumoniae*, *Staphylococcus aureus*, and most recently, SARS-CoV-2.