UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science

FACULTY RESEARCH TALKS

LISTEN. LEARN. COLLABORATE.

Zoom talk | Friday, Sept. 18, 2020 | Noon to 1 p.m.

PRESENTER 1:
BRIAN KIM
Assistant Professor, Electrical and Computer Engineering

High-Density Neurochemical Sensors

High-density neural interfaces can aid our understanding of biological neural networks, neurological disorders and treatments, and the decision-making of our brains. In this talk, Dr. Kim will discuss his team's efforts in developing high-density neurochemical sensors to measure neurotransmitter secretion directly. He will also discuss a National Institutes of Health project to provide low-cost portable medical diagnostic devices.

Dr. Kim's research areas include next-generation neural interfaces, neurochemical sensors, single-cell electrophysiology and medical diagnostics. His research has been funded by competitive grants from sponsors, including the National Institutes of Health and National Science Foundation. Before joining UCF, Dr. Kim was a senior electrical engineer at Stratos Genomics (now Roche Diagnostics). He completed his Ph.D. in biophysics at Cornell University and received his postdoctoral training in bioengineering at the University of California, Berkeley.

PRESENTER 2:
WEN SHEN
Assistant Professor, Mechanical and Aerospace Engineering, NanoScience Technology Center

Biomimetic Sensors and Applications

Implantable and wearable devices must be both biologically and mechanically compatible with host environments to overcome foreign body reactions. In this talk, Dr. Shen will introduce how she achieves this goal with natural materials-based devices for neural interfacing and transcutaneous sensing. Moreover, wireless interrogation is desirable to minimize sensor footprints for many healthcare and environmental applications. Towards this goal, Dr. Shen will introduce microsensors featuring magnetoelastic sensing modality to support in-situ and wireless sensing.

Prior to joining UCF, Dr. Shen was an assistant professor at the University of Texas at Arlington (UTA). Her research interests are in the development of functional materials-based microelectronics for biomedical interfacing, agricultural sensing and structural health monitoring. Dr. Shen's research at UTA was funded by the USDA and the University of Texas Systems. She has authored more than 17 peer-reviewed journal articles and more than 16 conference proceedings. Her work has been featured in *Microsystem and Nanoengineering*, and has been reported by several media outlets including Science Daily, Medical News Today, MedicalXpress, Nanowerk and Health Medicinet.

ZOOM LINK: https://bit.ly/35unuVe | QUESTIONS? Email Jennifer.Sutton@ucf.edu

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PRESENTER 3:

ARVIND SINGH

Associate Professor, Civil, Environmental and Construction Engineering

Structural and Functional Complexity of River Networks

Watersheds are complex natural landscape systems that contain hillslopes and channel networks. Understanding and quantifying features and processes that result in watersheds' complexity is important for predicting their response to changing human and climatic conditions. In this talk, Dr. Singh will present his research group's recent efforts in exploring the role of channel-networks and hillslopes in watershed complexity using an entropy-based approach. The results will be discussed based on several watersheds across the U.S. in different climatic and geologic conditions.

Dr. Singh received his Ph.D. in civil engineering from the University of Minnesota in 2011. His major research interests are in hydrology and geomorphology. Dr. Singh is a sediment transport expert whose contributions to the study of statistical mechanics of sediment transport and its interaction with flow turbulence have been widely recognized by the hydro-geomorphologist community. His research focuses on linking and modeling interacting processes (such as fluid flow, topography and material flux transport) over a range of spatio-temporal scales that will help us make quantitative predictions of how geomorphically and societally relevant variables will change under scenarios of future climatic and land-use changes.

PRESENTER 4:

PARAG BANARJEE

Associate Professor, Materials Science and Engineering, REACT Cluster, NSTC, FSEC

Few Monolayer Atomic Layer Deposition to Engineer New Surfaces and Interfaces

This talk will highlight the use of atomic layer deposition (ALD), a thin film deposition technique to precisely engineer new surfaces and interfaces. A quick primer on ALD will be followed by examples where few monolayer (usually less than 2 nanometers) films have enabled unprecedented improvements in the performance, stability and/or reliability of heterogenous materials and devices. Examples include solar cells, photochromic windows, catalysts and batteries. The unique ALD-based lab capabilities will be described, in addition to thoughts on topics that are ripe for fostering ALD-based collaboration within the CECS community.

Dr. Banerjee joined UCF in Fall 2018. Prior to this, he was a Process R&D Engineer at Micron Technology Inc. and a faculty member at Washington University in St. Louis. His research focus is on understanding the science and engineering of complex ALD processes using a variety of in situ probes and creatively pushing the applications of ALD into new realms. He has more than 50 publications and eight U.S. and international patents. Dr. Banerjee holds an undergraduate degree in metallurgical engineering from Indian Institute of Technology Roorkee, and a Ph.D. in materials science and engineering from the University of Maryland.

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