UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science

FACULTY RESEARCH TALKS

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Zoom talk | Friday, May 15, 2020 | Noon to 1 p.m.

PRESENTER 1:
ANDREW DICKERSON
Asst. Professor, Mechanical and Aerospace Engineering

Crack, Buzz, and Plop: The Coupled Mechanics of Jetting Citrus, Flying Insects, and Splashing Projectiles

Natural systems often inspire new methods by which to control fluids, or conversely use fluids to control systems. Three fluid mechanic systems that might come to mind include: the jetting of microdroplets when peeling an orange, the droplet ejection off of a mosquito wing, and the splash alteration by compliant free-surface solids. These phenomena at the interface of biology and fluid mechanics can provide engineers with useful, inspired information for future designs.

Dr. Dickerson is a fluid dynamicist with expertise in the mechanics of interfaces, and explores problems in which the dynamics fluids and their solid boundaries are highly coupled. His work is often inspired by problems stemming from biology, aimed at uncovering the physics of living systems from antifouling and insect flight to pine tree interactions with rainfall. Dr. Dickerson is a 2019 NSF CAREER award recipient. He is currently an Assistant Professor of Mechanical and Aerospace Engineering and obtained his Ph.D. in Mechanical Engineering from the Georgia Institute of Technology.

PRESENTER 2:
NAZANIN RAHNAVARD
Assoc. Professor, Electrical and Computer Engineering

From Big Data to Small Data: Signal Processing and Learning Approaches for Efficient Data Acquisition and Selection

With an ever-increasing proliferation of sensors and data collection devices, the amount of generated data is expanding at an astonishing rate. In this talk, Dr. Rahnavard will overview different techniques developed in her lab, based on compressive sensing and machine learning, to prune the huge volumes of data to much smaller representatives without compromising the accuracy of desired tasks. A wide-range of applications for the proposed techniques in wireless sensor networks, communication, and deep learning will be presented.

Dr. Rahnavard received her Ph.D. from the Georgia Institute of Technology in 2007. She is currently an Associate Professor in the Department of Electrical and Computer Engineering at UCF. Her primary area of research is the advancement of telecommunication, networking, sensing, and learning systems by pushing the limits of efficiency and accuracy in signal acquisition, representation, reconstruction, and inference for diverse applications. Dr. Rahnavard received an NSF CAREER award in 2011 and the UCF College of Engineering and Computer Science Excellence in Research Award in 2020.

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

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PRESENTER 3:

CHINWENDU ENYIOHA

Asst. Professor, Electrical and Computer Engineering

Resource-Aware Algorithms for Decision-Making in Large Scale Systems

A common theme in large-scale Cyber-Physical Systems such as the smart grid, robot swarms and the emerging commercial IoT is the need for fast and accurate decisions made in a decentralized way. As these systems operate in uncertain, dynamic environments, the communication resources for coordinating their operation remains scarce. This presentation will highlight some challenges in limited-communication decision-making in large systems and our efforts at addressing them. I will show some results that highlight the interplay between speed of obtaining distributed solutions, accuracy of solutions and amount of communication needed to obtain them.

Dr. Chinwendu's research interests span developing efficient, scalable distributed algorithms for coordination of large-scale autonomous systems to learning-based control. He leads the Autonomous and Intelligent Systems research group and directs the newly formed Unmanned Autonomous Systems Lab (a joint effort with L3Harris) at UCF. Prior to arriving UCF, he was a Postdoctoral Fellow at Harvard University and a Visiting Scientist at MIT. He holds a BS in Math from George Washington University and a Ph.D. in ESE from the University of Pennsylvania. Chinwendu is a Fellow of the Ford Foundation and received the SCEEE Research grant in 2018.

PRESENTER 4:

AKIHIRO KUSHIMA

Asst. Professor, Materials Science and Engineering, AMPAC

In Situ Characterization of Fundamentals and Nanoscale Dynamics for Materials Development

In situ transmission electron microscopy (TEM) enables direct observations of dynamic processes of nano- and atomic-scale phenomena in real time. For example, it is possible to observe the change in the atomic structure of the Li-ion battery electrode materials during the charge/discharge cycles. The observation provides rich information of the reaction mechanism and possible solutions to improve the device performance. In this presentation, Dr. Kushima will introduce applications of in-situ TEM techniques in his research.

Dr. Kushima is an Assistant Professor in the Department of Materials Science and Engineering and also affiliated with the Advanced Materials Processing and Analysis Center and the NanoScience Technology Center. He received Ph.D. from Kyoto University, Japan. Prior to his current position, he conducted postdoctoral studies at MIT and the University of Pennsylvania, and held a Research Scientist position at MIT. His research focuses on understanding the complex nano-scale phenomena through combination of experiment and atomistic simulation, with particular emphasis on in-situ transmission electron microscopy and energy storage devices. He has recently received NSF CAREER award on the study of electro-chemo-mechanics at the interfaces in all-solid-state lithium batteries.

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