UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science

FACULTY RESEARCH TALKS

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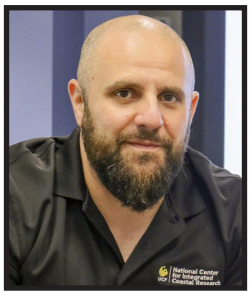
Zoom talk | Friday, June 5, 2020 | Noon to 1 p.m.



PRESENTER 1:
THOMAS WAHL
Asst. Professor, Civil, Environmental and Construction Engineering, Sustainable Coastal Systems Cluster

Compound and Correlated Extremes in the Context of Coastal Flood Risk Analysis

When two or more coastal flooding drivers coincide, the impacts are often worse as compared to when they occur in isolation. Incorporating such compound events and associated climate change effects into risk assessments requires more complex numerical and statistical models. Dr. Wahl will present results from a number of projects his group is working on to assess compound flood risk, and more broadly correlated climate extremes, at various spatial scales.

Dr. Wahl received his Ph.D. in civil engineering in 2012 from the University of Siegen in Germany. Before joining UCF in 2017, he was a postdoc at the University of South Florida and EU Marie Sklodowska-Curie Fellow at the University of Southampton in the UK. His research focuses on the vulnerability of coastal societies, built infrastructure, and fragile ecosystems. He studies changes in sea level, tides, storm surges, ocean waves, freshwater flows, and the interactions between them, as well as the associated impacts to explore possible adaptation strategies. At UCF, he received a NASA Early Career award and grants from various federal and state agencies.

PRESENTER 2:
TANIA ROY
Asst. Professor, Materials Science and Engineering, NanoScience Technology Center

Devices for Artificial Intelligence Using Two-Dimensional Materials

Advances in machine learning and artificial intelligence have been mainly from the architecture and software levels, with the basic building blocks still being CMOS transistors. This causes the hardware to be bulky and power-hungry. Dr. Roy and her team are developing neuromorphic devices functioning similar to the neurons and synapses of the human brain, which can serve as the basic building blocks of neural network hardware, making the systems energy-efficient, scalable and compact. In this talk, Dr. Roy will discuss her use of novel two-dimensional materials to make artificial neurons and synapses that can perform pattern recognition. She will also discuss her efforts in developing an all-dielectric light trapping scheme for improving light absorption in ultra-thin solar cells.

Dr. Roy's research interests lie in developing hardware for artificial intelligence applications using novel functional materials, including two-dimensional materials. She also works on energy-harvesting devices, particularly advanced photon management systems in ultra-thin solar cells. She won the NSF CAREER award in 2019. Prior to joining UCF in 2016, Dr. Roy was a postdoctoral researcher at the University of California, Berkeley. She obtained her Ph.D. in electrical engineering from Vanderbilt University.

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

For more information, and to see previous talks, visit www.cecs.ucf.edu/faculty-research-talks

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PRESENTER 3:
MICHAEL KINZEL
Asst. Professor, Mechanical and Aerospace Engineering

Computational Fluid Dynamics Applied to Aerodynamics, Multiphase Flows Such as Cavitation

Computational fluid dynamics (CFD) is a modern approach to simulate flow physics. These simulations can be utilized to drive deeper insight, design, and understand performance. The talk will discuss how Dr. Kinzel's group is using CFD on some projects to support modern engineering for a variety of applications. The first topic to be explored is CFD's application to aerodynamics, which includes design, understanding, and virtual testing. The second broad topic to be discussed involves utilizing CFD to model atmospheric conditions to better understand wind loads as well as flight operations. Thirdly, he will discuss CFD and its application to various multiphase flows that include understanding the dynamics of sneeze, designing quieter sandblast nozzles, and better understanding interfacial flows. These various topics will be summarized and discussed with respect to potential collaborations.

Dr. Kinzel holds Ph.D. and M.S. degrees in aerospace engineering from Penn State University and a B.S. in mechanical engineering from Northern Arizona University. His research spans basic and applied research for multiphase fluid flows and aero/hydrodynamics using CFD. His experience spans a wide range of applications including: aircraft (rotorcraft, ice accretion), wind turbines, high speed marine vehicles (supercavitation, cavitation), atmospheric flows, chemical reactors, nuclear waste processing, food processing, biomedical, and acoustics.

PRESENTER 4:
REZA ABDOLVAND
Assoc. Professor, Electrical and Computer Engineering

Thin-Film Piezoelectric Microsystems: Enabling the Smart Future

The imminent smart machines can't be imagined without the proper means of interacting with their surrounding environment through low-power, high-performance, and miniaturized sensors and actuators. In this talk, Dr. Abdolvand will describe a versatile platform based on thin films of piezoelectric material that offer a great deal of promise for implementation of such microsystems. He will then discuss his contribution in this domain and overview some of his past and current projects on the topic.

Dr. Abdolvand received his Ph.D. in 2008 from the School of Electrical and Computer Engineering at Georgia Tech, then joined Oklahoma State University as an assistant professor before joining UCF in 2014. His area of research lies in the general field of micro-electro-mechanical systems with a focus on piezoelectric microsystems. Dr. Abdolvand is credited worldwide to have developed a class of micro-devices that he has coined as thin-film piezoelectric-on-substrate resonators and he holds 12 issued U.S. patents (plus two pending applications) on this and other relevant technologies.

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