UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science

FACULTY RESEARCH TALKS

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Zoom talk | Friday, June 19, 2020 | Noon to 1 p.m.

PRESENTER 1:
RANAJAY GHOSH
Asst. Professor, Mechanical and Aerospace Engineering

Mechanics of Architected Solids - Interplay of Geometry and Materials

Developing new materials has driven much of engineering enterprise. There are two ways to advance the frontier: innovating on matter itself (new materials), or space (topology/ architecture). By combining matter with space (architecture), a truly new frontier of materials development emerges. Such architected solids have traditionally proven to be difficult to manufacture due to intricate spatial geometries. However, rapid advances in additive manufacturing are making these materials increasingly viable. Still, predicting their properties and behavior is extremely challenging. Purely empirical or experiment driven enterprise is futile due to intractable complexity. This talk will show the landscape of research done focusing on the mechanics of architected solids for a variety of applications and how to use them for guiding design.

Dr. Ghosh is a core faculty member in the Center for Advanced Turbomachinery and Research. His research focuses on architected and bioinspired solids, mechanical metamaterials, and multiscale/multiphysics modeling. He earned his Ph.D. in mechanical and aerospace engineering from Cornell University and holds a B.Tech in mechanical engineering from the Indian Institute of Technology Kharagpur. He received an NSF CAREER award in 2019 and his work has been featured on the cover of more than six high-impact journals, as well as in *Discovery*, *Newsweek* and the *New York Times*.

PRESENTER 2:
PAUL GAZZILLO
Asst. Professor, Computer Science

Improving Software Reliability and Security with Automated Program Analysis

Misconfiguration is one of the most critical and common security risks. Real-world software, however, can have an enormous number of possible configurations and often lacks explicit information about what configurations are secure, leaving users to find and validate configuration settings manually. The goal of the analysis of configurable software is to automate creation and reasoning about software configuration, so that developers, users, and administrators or large-scale software will be safe from misconfiguration vulnerabilities.

Dr. Gazzillo received his Ph.D. from New York University and previously worked as a postdoc at Yale University and a research scholar at Stevens Institute. His research aims to make it easier to develop safe and secure software, and it spans programming languages, security, software engineering, and systems. Projects include analysis of configurable systems, side-channel attack detection, and concurrent smart contracts. His work has been published in venues such as PLDI, ESEC/FSE, and PODC and has been recognized with a SIGPLAN Research Highlight and an NSF CAREER award.

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

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PRESENTER 3:
ZHAOMIAO GUO
Asst. Professor, Civil, Environmental and Construction Engineering,

Smart and Resilient Interdependent Transportation and Power Systems — A Stochastic Multi-Agent Optimization Approach

Transportation and power systems' interdependency, which could be a liability or an asset in normal scenarios and extreme events, have been strengthened by emerging technologies, such as electric vehicles, connected vehicles, and demand response technologies. Dr. Guo will present ongoing efforts in his group to develop a multi-agent network-based optimization framework to not only mitigate negative impacts of increasing interdependency, but also leverage emerging technologies to improve efficiency, reliability, and resiliency for both systems.

Dr. Guo received his Ph.D., M.S. and B.S. degrees in civil engineering from the University of California (UC) at Davis, UC Berkeley, and Tsinghua University, respectively. Before joining UCF in 2018, he was a postdoctoral researcher with the Energy Systems Division at Argonne National Laboratory. Dr. Guo's research centers around network modeling and computational strategies for intelligence and resilience of critical infrastructure systems, with particular interest in transportation and energy systems. His research is supported by federal government agencies, auto manufacturers and leading power suppliers.

PRESENTER 4:
VLADIMIR BOGINSKI
Assoc. Professor, Industrial Engineering and Management Systems

Network Science and Engineering: Mathematical Modeling and Optimization Aspects

Networks are everywhere in the modern world: application areas are abundant and diverse, spanning the domains of big data and physical/virtual complex systems. Network science is an interdisciplinary field that studies complex networks from various perspectives. "Descriptive" mathematical modeling of networks may reveal interesting connectivity patterns characterizing a complex system/dataset, whereas "prescriptive" modeling deals with optimizing certain properties (e.g., resilience) of a networked system. Dr. Boginski will discuss his group's recent work in these areas.

Dr. Boginski received Ph.D. from the University of Florida (UF) and previously served as an assistant professor at UF and Florida State University. His research interests focus on mathematical modeling and optimization techniques in the context of network science and engineering. Dr. Boginski has co-authored more than 70 refereed publications and served as PI/co-PI on externally-funded projects with more than $15 million in total funding. In 2018, he was selected by the U.S. National Academy of Engineering to participate in the Japan-America Frontiers of Engineering Symposium.

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