



UCF

FACULTY RESEARCH TALKS

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Zoom talk | Friday, July 22, 2022 | Noon to 1 p.m.



PRESENTER 1:
NI-BIN CHANG
Professor,
Civil, Environmental
and Construction
Engineering

Improving Synergistic Infrastructure Performance and Efficiency in Urban Food-Energy-Water Nexuses

There are emerging challenges arising from interdependent food, water and energy sectors that are locally or regionally tightly interconnected. In this talk, Dr. Chang will discuss his group's efforts to improve sustainability, performance and efficiency of infrastructure system for emerging urban food-energy-water nexus through the ongoing NSF and FDEP projects. His talk will emphasize the smooth integration of emerging urban farming, low impact development and renewable energy with microgrid technologies optimized to echo UNEP Sustainable Development Goals.

Dr. Chang received his Ph.D. in environmental systems engineering at Cornell University. His primary research area lies at the intersection between sustainable technology invention, integration and process optimization with the aid of planning, monitoring, modeling and laboratory analyses. Dr. Chang chaired the 9th International Conference on Water Resources and Environment Research in 2022. He is the editor-in-chief of the *SPIE Journal of Applied Remote Sensing* and *IWA/IAHR Journal of Hydroinformatics*. He has served as program director in the Hydrologic Sciences Program and the Cyber-Enabled Sustainability Science and Engineering Program at the NSF.



PRESENTER 2:
RANAJAY GHOSH
Assistant Professor,
Mechanical and
Aerospace Engineering

Meta-Materials for Mechanical and Structural Applications

In this talk, Dr. Ghosh will discuss his group's efforts to develop new topology-based strategies for materials development. Such strategies can lead to lightweight materials with high strength, elasticity and multifunctional advantages. These materials require advanced and custom manufacturing, and hence a front-loaded, model-driven predictive approach is necessary to avoid insurmountable development times. Dr. Ghosh will provide a broad overview of the work in his lab, including research directions and potential for collaborations across robotics, energy and extra-terrestrial or space manufacturing such as in-situ resource utilization.

Dr. Ghosh's 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 the NSF CAREER award from the mechanics of materials and solids program. Dr. Ghosh has authored and co-authored more than 60 journal papers. His work has been featured on the cover of more than six high impact journals and in *New Scientist*, *Discovery*, *Newsweek* and *The New York Times*.



PRESENTER 3:
MELISSA DAGLEY
Executive Director,
Center for Initiatives in
STEM (iSTEM)

EXCEL/COMPASS: Institutionalization of NSF Student Success Programs

The EXCEL/COMPASS program is an innovative learning community for STEM students, centered on strengthening skills in the STEM pathway courses and creating a supportive environment for success in the STEM major. EXCEL/COMPASS uses a holistic approach to provide enhanced educational experiences to students, such as curricular cohorts, tutoring, mentoring and undergraduate research experiences. The program has consistently shown 92 percent FTIC first-year retention to university, 81 percent FTIC first-year retention in STEM, a 52 percent increase in STEM graduation over the control, and 76 percent graduation from the university.

Dr. Dagley has served as PI and co-PI on numerous NSF projects, facilitates the women's mentoring network at UCF and was recently awarded funding to create a STEM learning community model for transfer students. In addition to guiding undergraduates towards a successful path in STEM, Dr. Dagley directs the STEM K-12 outreach and teacher training initiatives for the Colleges of Sciences and Engineering and Computer Science and works with faculty interested in STEM education and education research.