COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

FACULTY RESEARCH TALKS

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

PRESENTER 1:
DAZHONG WU
Assistant Professor,
Mechanical and
Aerospace Engineering

Design and Additive Manufacturing of Lightweight Materials

In this talk, Dr. Wu will introduce the design and additive manufacturing of lightweight and high-performance materials such as bioinspired lattice materials, continuous carbon fiber reinforced polymer composites and engineering ceramics. These 3D printed materials have many applications in automotive, energy, sports equipment and healthcare industries. Compared to conventional manufacturing techniques, additive manufacturing can fabricate parts with complex geometries and tunable mechanical properties.

Dr. Wu's research is focused on additive manufacturing, data-driven smart manufacturing, prognostics and health monitoring. Prior to joining UCF, he was a senior research associate at Pennsylvania State University. He earned his Ph.D. in mechanical engineering at Georgia Tech. He won the Best Paper Award of *Journal of Manufacturing Systems* and the Most Accessed Paper Award of *Journal of Manufacturing Science and Engineering* in 2019.

PRESENTER 2:
MICHAEL KINZEL
Assistant Professor,
Mechanical and
Aerospace Engineering

Computational Modeling of Fluids at the Speed Extremums: From Hypersonic Flight to Porous Media

Dr. Kinzel will discuss preliminary work associated with a new project funded through AFOSR that aims to quantify the physics and loading on hypersonic vehicles when flying through rain. At these speeds it could be equivalent to flight through a cloud of elephants and emphasizes the importance of cavitation physics. The second project, funded by the USSF, focuses on the delivery of cargo across the globe in an hour, strategizing the logistical timeframe to make this happen with one emphasis associated with aerodynamic design of cargo. He will also explore very low-speed flows associated with weak oscillations in the porous regions of bones. This work, funded through NASA and FHTC, is studied in relation to osteoporosis with a focus on microgravity and will be tested in an upcoming microgravity flight (Blue Origin New Shepard).

Dr. Kinzel's research interests include computational fluid dynamics (CFD), fluid dynamics, multiphase flows and aerodynamics. His research is centered around utilizing and developing CFD algorithms in a variety of fields and towards some of the most challenging fluids problems. He received his Ph.D. and M.S. in aerospace engineering from Pennsylvania State University. Prior to joining UCF in 2018, he was a research associate at Penn State's Applied Research Laboratory working on advanced weapons designs for the U.S. Navy.

PRESENTER 3:
NECATI CATBAS
Professor,
Civil, Environmental
and Construction
Engineering,
Civil Infrastructure for
Resilience and Safety

Structural Health Monitoring of Infrastructure: Permanent-Continuous vs. Mobile-Intermittent

Civil infrastructure systems include major, landmark structures such as long-span bridges and high-rises, energy transmission towers and long roadways. Structural health monitoring and non-destructive evaluation can be utilized with novel technologies, methodologies and indicators to track behavior, assess condition, and predict future performance for informed decision making. In this talk, these strategies will be discussed along with some recent work utilizing novel sensing, monitoring, visualization, and evaluation. He will present applications from permanent monitoring of long-span bridges and mobile applications to populations of structures using mixed reality headsets, portable wireless sensing, computer vision, etc.

Dr. Catbas' research interests include structural identification, structural health monitoring, non-destructive evaluation, condition assessment of structural systems and earthquake engineering. He is on the editorial board of several top-level journals, served on the executive board of the Society for Experimental Mechanics, and served as the chair of the ASCE Structural Identification Technical Committee, among others. Dr. Catbas received the Aftab Mufti Medal from the International Society for Structural Health Monitoring of Intelligent Infrastructure and the Kikuchi-Karlaftis Award from the Transportation Research Board.

ZOOM LINK: https://bit.ly/3ILqC1I | PREVIOUS TALKS: www.cecs.ucf.edu/faculty-research-talks