



UCF

UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science
FACULTY RESEARCH TALKS

LISTEN. LEARN. COLLABORATE.

Zoom talk | Friday, Oct. 30, 2020 | Noon to 1 p.m.



PRESENTER 1:
YONGHO SOHN

Professor,
Materials Science and
Engineering

Advancing Additive Manufacturing of Metallic Alloys

Additive manufacturing (also known as 3D printing) of metallic alloys is a disruptive technology that can produce components with unlimited geometrical complexity and customization. It also brings an opportunity to design new and modified alloys so that the process variables are desensitized and thermo-kinetic environments of additive manufacturing are utilized. In this talk, Dr. Sohn will introduce in-laboratory, hands-on, closed-loop experimental research capabilities established at UCF for gas atomization and laser powder bed fusion, along with research efforts in microstructural analysis and control to develop new and modified alloys for a variety of engineering applications.

Dr. Sohn's research interests include microstructural analysis and control, multicomponent intrinsic and interdiffusion in multiphase alloys, metallic nuclear fuels-cladding and protective metallic/ceramic coatings for high temperature applications. He received a B.S. and M.S. from Worcester Polytechnic Institute in mechanical and materials engineering. His Ph.D. is in materials engineering from Purdue University and he was a post-doctoral research scholar at the University of Connecticut. Dr. Sohn is a Fellow of ASM International and received the NSF CAREER Award, Purdue University's Outstanding Materials Engineer Award and the Korean-American Scientists and Engineers Association's Engineer of the Year Award.



PRESENTER 2:
**HAITHAM
AL-DEEK**

Professor,
Civil, Environmental
and Construction
Engineering

UCF Innovative Research on Wrong-Way Driving

Wrong-way driving (WWD) often results in fatalities and/or incapacitating injuries. In this talk, Dr. Al-Deek will share his team's innovative approach to studying and developing a transportation network wrong-way hotspot identification methodology and optimal deployment algorithm for new innovative countermeasures (some of which he invented) to combat WWD. He will also share real-life results of implementing his innovative research methodology, optimization algorithms and countermeasures for Florida transportation networks.

Dr. Al-Deek has 34 years of experience in intelligent transportation systems and traffic operations. In addition to WWD, he is also interested in multi-disciplinary research on connected and autonomous vehicles, intelligent transportation systems and clean energy. Dr. Al-Deek has received national and international recognitions, and has given numerous media interviews. He holds three U.S. patents, two registered trademarks and eight copyrights. He received 14 best paper awards from the Transportation Research Board and has 380 peer-reviewed publications and presentations. He serves as technical editor of the *Transportation Research Board Journal* and associate editor of the *Intelligent Transportation Systems Journal*. Dr. Al-Deek holds Ph.D. and M.S. degrees in civil engineering from the University of California at Berkeley.

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:

WEI SUN

Associate Professor,
Electrical and Computer
Engineering,
RISES Cluster

Toward a Self-Healing Smart Grid

How can we make a power grid, “the largest and most complex machine ever built by man,” become self-healing? In this talk, Dr. Sun will introduce his group’s efforts to develop intelligent power system restoration from blackouts and cascading failures caused by natural disasters or cyber attacks. Several projects on developing distributed control and optimization methods and data-driven and learning-enabled models to build a self-healing smart grid will be presented. He will also discuss challenges and opportunities for multidisciplinary research on enhancing power system security and resilience.

Dr. Sun is the director of the Siemens Digital Grid Lab. He received his Ph.D. from Iowa State University in 2011. His research interests include power system restoration, self-healing smart grids, renewable integration and cyber-physical system security and resilience. His research is funded by the National Science Foundation, the U.S. Department of Energy, the Florida Center for Cybersecurity, the Electric Power Research Institute and Microsoft. He received the Microsoft Research Software Engineering Innovations Award in 2014.



PRESENTER 4:

KAREEM AHMED

Associate Professor,
Mechanical and
Aerospace Engineering,
Center for Advanced
Turbomachinery and
Energy Research

High-Speed Compressible Turbulent Reactions from Power Generations and Hypersonic Jet Engines to Exploding Stars and COVID-19

Turbulent compressible reacting flows power our everyday life on Earth through the heart of many energy generation and propulsion systems, such as gas turbines, internal combustion, and jet engines. They also power the universe through energy produced in stars, such as in the sun, and in the most powerful explosions known in the universe, supernovae explosions. The presentation will overview of a range of phenomena recently discovered in experimental studies of high-speed, compressible, turbulent-reacting flows.

Dr. Ahmed’s research portfolio explores creative and technologically crucial research in propulsion and energy focusing on high-speed compressible turbulent-reacting flows, deflagrations and detonations, and hypersonic and supersonic compressible flows using advanced optical laser diagnostics with more than \$9.2 million in research funding. The research has a broad impact in terms of applications for power generation and gas turbine engines, propulsion jet engines, hypersonics and fire safety, and extends to COVID-19 and supernova science, such as exploding stars. Dr. Ahmed has received multiple awards, including the ACS-Doctoral New Investigator Award, the Combustion Institute Distinguished Paper Award and UCF’s Reach for the Stars Award. He is an AIAA Associate Fellow, an Air Force Office of Scientific Research Fellow and Office of Naval Research Fellow.

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