



UCF

UNIVERSITY OF CENTRAL FLORIDA | ORLANDO

College of Engineering and Computer Science
FACULTY RESEARCH TALKS

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Zoom talk | Friday, Jan. 15, 2021 | Noon to 1 p.m.



PRESENTER 1:
JUN WANG

Professor,
Electrical and
Computer
Engineering

Enabling High-Performance Sampling for Big-Data Processing and Big Learning in Heterogeneous Computers

In this talk, Dr. Wang will introduce active NSF-funded projects from the Computer Architecture and Storage Systems (CASS) research group. The first is a new data storage distribution aware method to facilitate online sampling. He will also cover the group's exploration of emerging deep-learning techniques that could be employed to benefit today's data-intensive computing systems. Lastly, Dr. Wang will discuss the design of novel system supports that enable hardware-aware sampling to accelerate state-of-the-art computer memory and storage systems.

Dr. Wang is director of the CASS Laboratory at UCF. He has conducted extensive research in the areas of computer systems and data-intensive computing. His specific research interests include massive storage and file systems in a local, distributed and parallel systems environment. Dr. Wang received the the DOE Early Career Research Program Award in 2005 and the NSF CAREER Award in 2009. He has authored more than 150 publications in premier journals and conferences.



PRESENTER 2:
WOO HYOUNG LEE

Associate Professor,
Civil, Environmental
and Construction
Engineering

Smart Cities: Smart Water and Wastewater Treatment and Management

This talk will overview novel technologies and their applications for sustainable wastewater treatment and management for smart cities. These include electrochemical heavy metal detection and removal in water, microscopic investigation of corrosion in plumbing systems, electricity generation using microbial fuel cells technology, the use of microalgae for bioenergy/biomass production, harmful algal bloom control technology, superhydrophobic sponge for oil spill removal and a novel per- and polyfluoroalkyl substances destruction technology.

Dr. Lee received his Ph.D. in environmental engineering from the University of Cincinnati in 2009. Prior to joining UCF in 2013, he was a post-doc at the U.S. Environmental Protection Agency's National Risk Management Research Laboratory for 3.5 years. He was an Office of Naval Research summer faculty from 2014-2018. He is a recipient of the CECS Dean's Advisory Board Faculty Fellow Award. Dr. Lee specializes in developing novel in-situ sensors for water quality monitoring and renewable energy production from wastewaters for environmental sustainability. His research has been funded by competitive grants from numerous sponsors, including the EPA, NASA, USDA, DOE and DOD.

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:

ISSA BATARSEH

Professor,
Electrical and
Computer Engineering

Emerging Integration of Solar Energy Conversion and Storage

Dr. Batarseh will discuss his research team's efforts in solar energy conversion and power electronics integration in future energy storage systems. He will cover emerging PV-plus-storage system integration technology to enable more resilient and interactive power grids. The talk will overview current research activities from the Florida Power Electronics research group at UCF, mainly focusing recent advances made in solar energy conversion and system integration including the new microinverter architecture.

Dr. Batarseh's research interests focus on power electronics and high-frequency, smart grid-tied PV energy conversion systems. His research team has been leading the design, development and commercialization of smart microinverters and EV chargers. He has co-founded three start-up companies. He is a fellow of the IEEE and AAAS, a member of the National Academy of Inventors and has been inducted into the Florida Inventors Hall of Fame. Dr. Batarseh is a registered professional engineer in the State of Florida.



PRESENTER 4:

**DEMETRIOS
CHRISTODOULIDES**

Pegasus Professor,
CREOL, The College of
Optics and Photonics

Optical Thermodynamics of Nonlinear Highly Multimode Systems

The past few years have witnessed a resurgence of interest in multimode waveguide structures, predominantly driven by the ever-increasing demand for higher information capacities. This renaissance, in turn, incited a flurry of activities in the general area of nonlinear multimode fiber optics. The sheer complexity associated with the presence of hundreds or thousands of nonlinearly interacting modes that collectively act as a many-body system, has led to new opportunities in observing a multitude of novel optical effects that would have been otherwise impossible in single-mode settings. This talk will share a thermodynamic theory capable of describing complex, highly multimoded, nonlinear optical systems. The mode occupancies in such nonlinear multimode arrangements follow a universal behavior that always tends to maximize the system's entropy at steady-state. This thermodynamic response takes place irrespective of the type of nonlinearities involved and can be utilized to either heat or cool an optical multimode system. Aspects associated with adiabatic compressions and expansions will be discussed, along with the possibility for all-optical Carnot cycles.

Dr. Christodoulides received his Ph.D. from Johns Hopkins University in 1986 and joined Bellcore as a post-doctoral fellow. Between 1988 and 2002, he was a faculty member at the Department of Electrical Engineering at Lehigh University. His research interests include linear and nonlinear optical beam interactions, synthetic optical materials, optical solitons and quantum electronics. He has authored and co-authored more than 400 papers and is a fellow of the Optical Society of America and the American Physical Society. He is the recipient of the The Optical Society's 2011 Wood Prize and 2018 Max Born Award.

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