

College of Engineering and Computer Science  
**FACULTY RESEARCH TALKS**

**LISTEN. LEARN. COLLABORATE.**

**Zoom talk | Friday, July 24, 2020 | Noon to 1 p.m.**



PRESENTER 1:  
**ROBERT STEWARD, JR.**  
Assistant Professor,  
Mechanical  
and Aerospace  
Engineering

**Biomechanical Mechanisms That Govern Cellular Behavior**

Cellular biomechanics involves the ability of cells to sense and respond to mechanical forces. Such mechanical forces include shear and stretch, for example. However, cells also exert their own endogenous mechanical forces. In this talk, Dr. Steward will present his most recent work in the field of cell mechanics as it relates to the cardiovascular and neuroscience fields.

Dr. Steward has a courtesy appointment in the College of Medicine at the University of Central Florida. He received his Ph.D. at Carnegie Mellon University and completed a postdoc at the T.H. Chan Harvard School of Public Health. He is a National Institutes of Health career development awardee. Dr. Steward's research has primarily been in the field of cell mechanics. Projects he has worked on include probing the effects of mechanical forces on cell behavior including proliferation, polarization, and structural reorganization; and probing the effects of mechanical forces on cell-substrate interactions and cell-cell interactions, specifically tractions and intercellular stresses.



PRESENTER 2:  
**SHARMA VALLIYIL THANKACHAN**  
Assistant Professor,  
Computer Science

**Theoretical Foundations of Compression, Indexing, and Processing of (String) Data**

String (or sequence or text) data is everywhere, from the most popular webpages to DNA sequences containing our genetic makeup to the very text in front of you right now. Based on its applicability and generality, being able to efficiently store, search, and manipulate this data is one of the most important challenges today. In this talk, Dr. Thankachan will present his group's NSF-supported research on designing provably efficient algorithms and data structure, along with some complexity theory results on why certain tasks are beyond the reach of any algorithms.

Dr. Thankachan was a postdoc/research scientist at the School of Computational Science and Engineering at Georgia Institute of Technology before joining UCF in 2017. He received his Ph.D. in computer science from Louisiana State University in 2014. His research interests include provably efficient string algorithms and compressed/succinct data structures with application to computational biology. He is co-chair of SPIRE 2020, the 27th International Symposium on String Processing and Information Retrieval.



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PRESENTER 3:

**RICKARD  
EWETZ**

Assistant Professor,  
Electrical and  
Computer Engineering

**Secure and Efficient Computing in the Post-Moore Era**

The exponential growth and availability of digital data has powered the emergence of computer vision, data analytics, and deep learning applications. As a result, the demand for data to be analyzed and processed has rapidly increased to exascale. Unfortunately, these computing needs cannot be met through further technology scaling due to the slowdown of Moore's law and the breakdown of Dennard scaling. The combination of these two trends has created a computing efficiency gap, leading to an urgent need for cross-layer innovations to the computing stack. In this talk, Dr. Ewetz will discuss his research group's work on developing next-generation computing systems optimized for performance, energy efficiency and security.

Dr. Ewetz' research interests are in the broad area of computer-aided design for conventional and emerging technologies. Specifically, his research has been focused on in-memory computing for artificial intelligence and big data applications, the physical synthesis of VLSI circuits, and architecting secure non-volatile memory systems. He received his Ph.D. in electrical and computer engineering from Purdue University in 2016 and his MS in applied physics and electrical engineering from Linkoping University in 2012. He has one best paper nomination from ASP-DAC in 2019.



PRESENTER 4:

**STEVE  
DURANCEAU,  
P.E.**

Professor,  
Civil, Environmental  
and Construction  
Engineering

**328,239,523 Reasons to Research Drinking Water**

Although water quality is impacted by natural processes, ecosystem characteristics and anthropogenic activities, such as industry, domestic and agricultural impacts, source supplies must be treated for consumption. Studying the varying treatment processes and associated operations required to produce safe drinking water is a dynamic area within Dr. Duranceau's research group. His group studies many chemistry-related subjects regarding drinking water quality and treatment engineering applications. This presentation will highlight some recent headlines related to drinking water and discuss some of the research being conducted at UCF.

Dr. Duranceau is the Gerry and Ruth Hartman Professor of Environmental Engineering and director of the Environmental Systems Engineering Institute at UCF. He is a recognized authority in potable water quality engineering and advanced treatment operations. Prior to joining UCF in 2007, he served as an executive of a national design engineering consultancy and was engineer of record for several water plant designs. He is associate editor of *Desalination & Water Treatment* and a licensed professional engineer in Florida. Dr. Duranceau holds a BS in chemistry, an MS in industrial chemistry, and a Ph.D. in environmental engineering materials (spintronics).

ZOOM LINK: <https://bit.ly/35unuVe> | QUESTIONS? Email [Jennifer.Sutton@ucf.edu](mailto:Jennifer.Sutton@ucf.edu)

For more information, and to see previous talks, visit [www.cecs.ucf.edu/faculty-research-talks](http://www.cecs.ucf.edu/faculty-research-talks)