**Repair and Assessment of Bridges Using Advanced Materials, Experimental Testing and Numerical Modeling**

Repair, renewal, and management of the deteriorating civil infrastructure, particularly the urban built environment in the U.S. are ongoing societal and research challenges. Solutions require novel materials and designs, optimized monitoring and maintenance and better performance assessment for asset management. In this talk, Dr. Mackie will showcase recent research using fiber-reinforced polymers and ultra-high performance concrete for repair of bridge components, and experimental and numerical assessment of seismic-resistant bridge components.

Dr. Mackie serves as associate chair of the Department of Civil, Environmental, and Construction Engineering. His primary research interests focus on using numerical, probabilistic and experimental methods to assess, design, and repair bridges. Research applying similar numerical and probabilistic tools are ongoing on buildings and foundations, lifeline systems, behavior under fire, storm surge modeling and many other interdisciplinary areas. Dr. Mackie received his Ph.D. and M.S. degrees from the University of California Berkeley in 1999 and 2004, both in structural engineering. He is the chair of several national technical committees within ASCE and ACI.

**Modeling and Optimizing for Human Decision-Making, from Air Transportation to Education**

Dr. Vela will discuss his research efforts towards improving system performance of stochastic dynamic systems using an operations research paradigm. In particular, he will provide an overview of the research being conducted in his lab in the areas of air transportation (manned and unmanned), education, human-machine teaming and homeland security. He will also share future research directions and interests.

Dr. Vela’s primary research interests involve modeling, simulating and optimizing control and decision systems and other stochastic dynamic systems, especially human-centered systems. He has worked on projects involving coupled pilot-automation-aircraft models; aircraft blunder and anomaly detection systems; next-generation conflict-resolution and collision avoidance systems; homeland security; UAS traffic management systems; predictive analytics in education; and disaster preparation and relief. Prior to UCF, Dr. Vela worked at the Massachusetts Institute of Technology Lincoln Lab, where he made significant contributions to the ACAS-X project and the Terminal Flight Data Manager program.

**PRESENTER 1:**
**ADAN VELA**
Assistant Professor, Industrial Engineering and Management Systems

**PRESENTER 2:**
**KEVIN MACKIE**
Professor, Civil, Environmental and Construction Engineering

**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
NASA FSGC Opportunities for Faculty and Students

In this talk, Dr. Mukherjee will discuss the various opportunities offered by the NASA Florida Space Grant Consortium (FSGC) for faculty and students throughout Florida. FSGF is an association of 17 public and private Florida universities and colleges led by UCF and administered by the Florida Space Institute. The Consortium also includes the Astronaut Memorial Foundation, Space Florida, Kennedy Space Center and Orlando Science Center. FSGC supports the expansion and diversification of Florida’s space industry through providing grants, scholarships and fellowships to students, faculty and educators from Florida’s public and private institutes of higher education. FSGC is a part of the National Space Grant College and Fellowship program under the NASA Office of STEM Engagement.

Dr. Mukherjee received his B.S. in physics from St. Xaviers College in Mumbai, an M.S. in physics from Mumbai University in India, and M.S. and Ph.D degrees in astronomy from the University of Florida. He serves on the Board of Directors of the National Space Grant Alliance and the National Space Grant Foundation and is on the industry advisory board for the engineering physics department at Embry Riddle Aeronautical University.

Theoretical, Analytical and Experimental Approaches to Help Understand Chemical Processes Since the Dawn of Time

Dr. Bennett will discuss his group’s research on the interaction of radiation with surfaces relevant to the interstellar medium and airless solar system bodies. He will discuss traditional and novel theoretical, analytical and experimental approaches, including traditional methodologies (FTIR spectroscopy, residual gas analysis and DFT calculations) as well as the development of novel analytical techniques, which include gated Raman, double-focusing time-of-flight mass spectrometry to help obtain unprecedented understanding of the fundamental processes.

Dr. Bennett earned an M.S. in chemistry from the University of York in 2002. He received his M.S. and Ph.D. in physical chemistry from the University of Hawaii at Mānoa in 2007 and 2009, respectively. He spent three years as a NASA Astrobiology Institute postdoctoral fellow. Dr. Bennett spent four years at Georgia Institute of Technology prior to joining UCF as an assistant professor in fall 2016. He is deputy-PI of the Center for Lunar and Asteroid Surface Science (CLASS; a NASA Solar System Exploration Research Virtual Institute, or SSERVI node). He has published more than 40 peer-reviewed manuscripts.