DEPARTMENT OF MECHANICAL ENGINEERING
WILLIAM MAXWELL REED SEMINAR SERIES

"Spinning Digital Threads in Aerospace"

Eric Ruggiero, Ph.D.
GE Aviation

Abstract: In the past 5 years, the intersection of high speed microprocessors, inexpensive data storage, and wireless communication technology has led to a paradigm shift in how physical assets are operated and monitored. While the use of Prognostic Health Monitoring has been commonplace in military aircraft products over the past two decades or more, this paradigm shift has now bridged and expanded into the commercial aviation marketspace. Leveraging GE's deep domain knowledge with data streams from engine assets is at the heart of the Digital Industrial revolution. Digital Industrial is more than just data. It's maximizing value for customer fleets in several ways, including: Asset Monitoring, to help reduce unplanned maintenance and inspection burden; Fleet Optimization, to ensure flight paths and fuel burn are as efficient as possible; and Improved Reliability, to understand changes in operation severity that may adversely affect the performance of the product. Advanced manufacturing, including the advent of large-scale 3D printing, encompasses the intersection of digital and manufacturing technologies. The initial performance and geometry of aircraft engine components is the beginning of the Digital Twin life of every asset deployed in the field. Digital Twin asset models thereby demand integration of sensor and inspection technology on the manufacturing shop floor, at levels never before demanded of supply chain. This presentation will illustrate the framework that makes the Digital Industrial possible in the aircraft engine industry, connecting the dots between sensors, digital twin models, and analytics to provide additional value to the customer. Examples will be provided to illustrate how analytics are used to help the customer and product. The presentation will also discuss some of the challenges facing industry today, providing context for future research directions.

Bio: Dr. Eric J. Ruggiero received his Ph.D. from Virginia Tech in Mechanical Engineering in 2005 from the Center for Intelligent Material Systems and Structures as a National Science Foundation graduate research fellow. Upon graduation, Dr. Ruggiero started his industrial research career at GE Global Research in Niskayuna, New York. From 2011 through 2014, he served as Lab Manager for the Turbine Heat Transfer Technologies Laboratory, where he led global research teams on the innovation, design, test, and validation of advanced cooling schemes for gas turbines. In total at GE Global Research, he led over $25MM in R&D efforts in the field of gas turbines for GE. In 2014, Dr. Ruggiero was promoted to Engineering Leader for the Sustaining Commercial Thermal Systems Design team at GE Aviation in West Chester, Ohio. In this role, he had responsibility for the hot gas path thermal design for GE's commercial aviation fleet. Most recently, Dr. Ruggiero was promoted to lead the Aero & Thermal Technologies organization within Advanced Military Engineering at GE Aviation. He has published over 30 peer-reviewed manuscripts, issued over 20 patents, and has received numerous awards from AIAA and ASME, including the 2013 AIAA Lawrence Sperry Award and an invitation to the 2013 and 2017 NAE EU-US Frontiers of Engineering Forums. Most recently, Dr. Ruggiero was honored with the 2018 ASME IGTI Best Paper Award in Turbomachinery. He is an Associate Fellow of the AIAA, and a Lifetime Member of the ASME.

Date: Friday, Aug. 30th
Time: 3PM
Place: CB 106
Contact: Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments
Attendance open to all interested persons

College of Engineering

DEPARTMENT OF MECHANICAL ENGINEERING
UNIVERSITY OF KENTUCKY
LEXINGTON, KENTUCKY