

MCEN GRADUATE SEMINAR

Ryan S. Justice

Materials Engineer
Materials and Manufacturing Directorate
Air Force Research Laboratory, Dayton, OH

An overview of the Air Force Research Laboratory's Adaptive Active Multifunctional Materials Research Program

November 5, 2009, 3:30-4:45 PM, ECCR-200

Abstract:

Future Air Force mission requirements dictate multiple mission capability on a single air vehicle platform applicable to both manned and unmanned systems. Unmanned air vehicles (UAV) have become extremely efficient for constant intelligent, surveillance and reconnaissance (ISR) missions. The Air Force strategic goals are to develop bird-sized UAVs by 2015 and bug sized UAVs by 2030 primarily for ISR missions. To meet these UAV challenges new material systems are needed to morph wings, fuselages and provide multifunctional features to these platforms. The AFRL Composites and Hybrids Branch is progressively researching the material systems necessary to achieve these capabilities for the warfighter under the Adaptive, Active Multifunctional Program. An overview of this program will be given outlining the projects for developing a morphing wing skin material system for UAV applications.

Biography:

Dr. Justice is a Materials Research Engineer with the Composites and Hybrid Materials Branch of the Air Force Research Laboratory, Materials and Manufacturing Directorate. He is currently the acting Technology Lead for the Adaptive, Active, and Multifunctional Composite and Hybrid Materials Program. His research includes the development of shape memory polymer aircraft skins, incorporation of shape-memory alloys into shape-memory polymers, incorporation of nanomaterials into shape-modulating systems for triggering and actuation optimization, and self-healing interfaces including adaptive adhesion. In 2007, Dr. Justice received his Ph.D. in Chemical and Materials Engineering from the University of Cincinnati, Cincinnati, OH. Dr. Justice obtained his B. S. in Biomedical Engineering from Wright State University, Dayton, OH, and his M. S. in Chemical and Materials Engineering from the University of Cincinnati.