



Adaptive Intelligent Materials and Systems Center

*School for Engineering of Matter, Transport, & Energy,
ASU cordially invites you to attend a seminar presented by*

Dr. Asha Hall

**Materials Science Engineer and Research Scientist
Prognostics and Diagnostic Team**

U.S. Army Research Laboratory, Aberdeen Proving Ground

“Embedded Sensing of Composite System”

Wednesday, April 19, 2017 at 10:00 AM in GWC 487

Abstract: The integrity of composite structures gradually degrades due to the onset of damage such as matrix cracking, fiber/matrix debonding, and delamination. Over the last two decades, great strides have been made in structural health monitoring (SHM) community using various sensing techniques such as acoustic emission, eddy current, strain gages, etc., to diagnose damage in aerospace, mechanical and civil infrastructures. Embedded sensing offers the prospects of proving for real-time, in-service monitoring of damage where weight savings is a major factor in Aerospace Industry. In this present work, magnetostrictive particles such as Terfenol-D were embedded in a composite structure, along with multiple SHM techniques, to capture the damage in an IM7-carbon fiber reinforced polymer composite system undergoing fatigue loading. As the internal stress state increases, the change in the magnetization flux intensity was captured using a non-contact magnetic field sensor. A damage diagnosis system was established along with an acoustic emissions technique to further validate the damage captured by the embedded system.

Bio: **Dr. Asha Hall** is a materials science engineer at U.S. Army Research Laboratory under the Vehicle Technology Directorate. She is currently an acting team lead for the Prognostics and Diagnostics Team in the Mechanics Division. She received her Ph.D. on the study of the electromechanical behavior of piezoelectric and electrostrictive actuators from the Materials Science and Engineering Department at Rutgers University in 2006. From November 2006 thru July 2008, she worked as a Patent Examiner for the United States Patent and Trademark Office (USPTO) in the chemical engineering technology unit. In July 2008, Dr. Hall was employed as a contractor to the United States Army Research Laboratory, under the Vehicle Technology Directorate and was hired as a civilian employee in November 2011. While on a developmental assignment from APR 2015 thru APR 2016, she served as a technical assistant to the Weapons and Materials Research Director. Dr. Hall has co-authored 25 scientific publications. In 2014, Dr. Hall received the Department of the Army Achievement Medal of Civilian Service, and in 2012, Dr. Hall was a recipient of the Federally Employed Outstanding Woman of the Year Award. She has authored over 25 technical reports, journal articles, and technical papers in the area of ferroelectrics, rapid prototyping, micro-air vehicles, and damage precursors. Dr. Hall has served as a Sigma Xi inducted member for the past 10 years and has volunteered for numerous STEM outreach events.

Refreshments will be served