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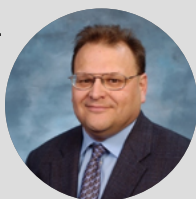
SCHOOL OF
**MATERIALS, MECHATRONICS AND
MANUFACTURING ENGINEERING**
College of Engineering, Architecture and Technology

MMME SEMINAR SERIES

Absorbing Impact Energy in Occupant Protection Systems Using Cellular Materials and Structures

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Dr. Wereley's research interests focus on vibration and shock mitigation (especially occupant protection systems) using cellular and magnetorheological materials, as well as soft robotics and actuators (pneumatic artificial muscles). He has published over 275 journal articles, 275 conference articles, 20 book chapters, and 22 patents. Dr. Wereley is the Editor-in-Chief of SAMPE Journal and Actuators (MDPI). He also serves as an associate editor of Smart Materials and Structures and MDPI Aerospace. Dr. Wereley is the recipient of the ASME Adaptive Structures and Material Systems Prize (2012) and the SPIE Smart Structures and Materials Lifetime Achievement Award (2013). Dr. Wereley is a Fellow of AIAA, RAeS, VFS, ASME, SPIE, and the Institute of Physics. Dr. Wereley has a B.Eng. (1982) from McGill University and M.S. (1987) and Ph.D. (1990) from the Massachusetts Institute of Technology.

**ABSTRACT****PIZZA LUNCH PROVIDED**

Dissipating energy in vehicle systems, especially with the goal of protecting vehicle occupants from potentially injurious impact loads, is a critical issue. The objective of this talk is to discuss optimal characteristics for energy absorbing (EA) cellular materials used to mitigate impact loads. EA characteristics such as load vs. stroke profile, rebound, peak stress, plateau stress, and crush efficiency are discussed in relation to injury criteria as the critical constraint. Additive manufacturing (AM) can effectively realize tailored load-stroke profiles under crush for crashworthiness applications. Passive materials such as hollow glass microsphere (HGM) based sintered glass foams and elastomeric matrix composite foam materials, as well as cellular structures will be discussed. Semi-active magnetorheological elastomers (MREs), having the capability to control energy absorption using applied magnetic field, will be discussed including obstacles to their AM fabrication. Approaches to overcome remaining technical challenges to field systems based on these materials will be articulated.

ZOOM MEETING