EPSTEIN DEPARTMENT SEMINAR

Architectured Meso-Scale Cellular Materials and Structures: Topology Optimization for Additive Manufacturing

ABSTRACT – Additive manufacturing (AM) today affords complete freedom in controlling geometric details and material composition in three-dimensional fabrication. They provide new routes for manufacturing parts with structural properties in high-strength, light-weight, and exceptional performance. To further the adoption of the AM technologies, there is a need for "Design for Additive Manufacturing" methodologies and computer tools that empower designers to realize products that can fully capitalize on the AM capabilities.

In this presentation, we describe a novel method for optimal design of architectured meso-scale cellular materials and structures to be fabricated using additive manufacturing. The underlying framework is an implicit representation model, called variable cutting level set model, or simply "VCUT level set", and it provides flexibility for optimal distribution of spatially-varying meso-scale cells within the macro-domain of the structure, while inherently guaranteeing full geometric connectivity between any neighboring cells. These unprecedented capabilities unleash the full potentials of metallic additive manufacturing for making architectured meso-scale cellular structures, especially multi-functional or light-weight structures for aerospace and bio-medical applications.

Dr. Michael Yu Wang
Professor
Dept of Mechanical & Aerospace Engineering; Dept of Electronic & Computer Engineering
Hong Kong University of Science and Technology

SPEAKER BIO – Michael Yu Wang is a Professor and the Founding Director of Robotics Institute at Hong Kong University of Science and Technology. He earned his PhD from Carnegie Mellon University and previously taught at University of Maryland, Chinese University of Hong Kong, and National University of Singapore. He has numerous professional honors–including Ralph R. Teetor Educational Award from Society of Automotive Engineers, 1994; LaRoux K. Gillespie Outstanding Young Manufacturing Engineer Award from Society of Manufacturing Engineers, 1995; Boeing–A.D. Welliver Faculty Summer Fellow, 1998; China State Natural Science Prize (Second Class) from the Ministry of Science & Technology of China (2012), and ASME Design Automation Award (2013) from ASME. He is a Fellow of ASME, HKIE, and IEEE.

USC Viterbi
School of Engineering
Daniel J. Epstein Department of Industrial and Systems Engineering

THURSDAY, APRIL 12, 2018
2:00PM – 3:30PM
USC ANDRUS GERONTOLOGY CENTER (GER), ROOM 206