EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

4.5D Printing: The Science of Producing Parts with Location-Specific Properties

ABSTRACT - While the capabilities of additive manufacturing (AM) technologies in producing complex geometries and customization are well understood by now, other attractive capabilities continue to emerge. One attractive feature of AM technologies is the ability to produce parts with location-specific properties (that is, different properties within different locations within the same monolithic structure). In this presentation, I will start by presenting some of our findings on tailoring active location-specific stimulus response in nickel titanium shape memory alloys using AM. Next, I will present the overall framework needed to achieve this objective, and then take a deep dive into one key building block of this framework: conducting uncertainty quantification analysis through a network of coupled computer simulation models. The presentation will combine elements of physics-based and data-driven modeling to address fundamental research questions in advanced manufacturing.

Dr. Alaa Elwany
Associate Professor
Dept. of Industrial & Systems Engineering
Texas A&M University

SPEAKER BIO - Dr. Alaa Elwany is as associate professor at the department of industrial and systems engineering, Texas A&M University. He acquired his PhD in 2009 from Georgia Institute of Technology and his M.Sc. and B.Sc. in production engineering from Alexandria University, Egypt, in 2004 and 2002, respectively. Prior to joining Texas A&M, he has served as research scientist at General Motors' Manufacturing Systems Research laboratory (GM R&D) and also held a faculty member position at Eindhoven University of Technology (the Netherlands) where he was also senior fellow at the European Institute for Statistics, Probability and Operations Research. His broad research interests are in the modeling, analysis, and control of advanced manufacturing processes with particular emphasis on additive manufacturing (3D print) processes for metals. In his research, Dr. Elwany integrates physics-based simulation models, data-driven predictive methods, process monitoring, and experimental characterization. He is recipient of the Society of Manufacturing Engineers' (SME) Outstanding Young Manufacturing Engineer award 2016, David Dornfeld Manufacturing Vision award 2018, and the National Science Foundation (NSF) CAREER award 2019 from the advanced manufacturing program.

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

TUESDAY, SEPTEMBER 10, 2019
3:30PM – 4:50PM
USC ANDRUS GERONTOLOGY CENTER (GER), ROOM 206