DANIEL J. EPSTEIN DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

EPSTEIN INSTITUTE SEMINAR   • ISE 651 SEMINAR

Controlling Localized Photopolymerization: Research in Stereolithography Manufacturing Processes

David W. Rosen

**Professor and Associate Chair for Administration
The George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology**

ABSTRACT

Stereolithography (SL) is a type of additive manufacturing process that fabricates parts layer-by-layer in an additive manner. In conventional SL, a laser scans across the top of a vat of liquid photopolymer to form part cross-sections; the photopolymer polymerizes and solidifies when the laser energy received exceeds a threshold value. In this talk, I will introduce my research program in SL and SL-like processes. Research issues will be highlighted and results presented that demonstrate some unique capabilities enabled by novel UV energy delivery methods. New SL process models of these energy delivery methods form the basis for the "inverse design" based process planning methods that my group has developed. Smooth surfaces that avoid the "stair stepping" typical of layer-based additive manufacturing has been achieved. SL can be reconfigured to a mask-projection process; some unique aspects of mask-projection configurations will be highlighted. Again, new simulation models, of mask-projection SL, enable novel process planning methods.   A new real-time sensing and control technology has been demonstrated to significantly improve accuracy and repeatability. Examples of micro-optics devices (e.g., microlens arrays) illustrate research results.

**TUESDAY, OCTOBER 23, 2012
ANDRUS GERONTOLOGY BLDG (GER) ROOM 309
3:30 – 5:00 PM**

BIOSKETCH

David Rosen is a Professor and Associate Chair for Administration in the School of Mechanical Engineering at the Georgia Institute of Technology. He is Director of the Rapid Prototyping & Manufacturing Institute at Georgia Tech. He received his Ph.D. at the University of Massachusetts in 1992 and his Masters and Bachelors degrees from the University of Minnesota in 1987 and 1985, respectively, all in mechanical engineering. His research interests include computer-aided design, additive manufacturing, and design methodology. During his graduate school years, he was a software engineer at Computervision Corp. and a Visiting Research Scientist at Ford Research Laboratories. He is a Fellow of ASME, recently served on the ASME Computers and Information in Engineering Division Executive Committee, and received the 2012 ASME CIE Division Excellence in Research award.