

## Seminar Series

Sponsored by  
School of Materials Science and Engineering  
Thursday, January 18, 2007  
5:00 PM – Room 200 Olin Hall

### **Rapid Prototyping and Multi-material Manufacturing Technologies Accomplishments and Potentials**

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## **Abstract**

**Rapid prototyping has emerged in the last few years to become a critical manufacturing tool to improve the competitive stance of companies, allowing them to validate designs and get new designs to the market faster than ever before. This presentation quickly reviews the achievements of the first 15 years in the field of rapid prototyping or solid free form fabrication, showing improvements in capabilities, in materials, and in processing. It highlights where the technology is today, but more importantly, where it may go in the near future. Therefore, the presentation focuses on the potential of this technology to significantly affect how design is carried out when the designer is given freedom to design the materials as well as the artifacts. Research aspects of multi-material manufacturing are presented: their representation, and the need to consider volumetric instead of surface based representations; the tie between analysis and optimization, taking into account manufacturing constraints; and the processing challenges on machines that are today in the market. It concludes with open questions and potentials for further developments.**

### **Bio sketch:**

**Georges Fadel is a professor in the Department of Mechanical Engineering at Clemson University. He obtained a Ph.D. in Mechanical Engineering and an MS in Computer Science from Georgia Tech., and a Diploma in Mechanical Engineering**

**from the ETH, in Zurich, Switzerland. Dr. Fadel teaches design related courses and researches methodologies and tools to help designers deal with complexity (representation, coordination, optimization) and globalization issues (collaboration and networked virtual environments). He deals particularly with topics in packaging optimization (underhood packaging, component placement, structural and vehicle dynamic performance optimization) and multi-material design and manufacturing. He has published over one hundred research articles. He is member and fellow of the ASME, and past chair of its Technical Committee on Design Automation, and a member of AIAA, SAE and Sigma Xi. Dr. Fadel is member of the editorial board of the Structural and Multidisciplinary Optimization Journal. He has received significant funding from NSF, NASA, the AirForce, the ARMY TACOM (last 8 years), BMW, GM, and several industries to research topics in multidisciplinary design and collaboration.**