

**Customized and Sustainable Design Strategies in
Additive Manufacturing**

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**Seminar on Wednesday, March 1, 2017 at 11:00 am in 2004 Black
Seminar host: Abhijit Chandra**

Abstract

With the recent advances in materials and processes, additive manufacturing (AM) technologies are evolving from prototyping to functional part fabrication for a broad range of applications. The AM-enabled design flexibility provides AM processes with great potential in product family development where both design commonality and diversity are desired to satisfy various customer requirements. Challenges exist in developing new customized and sustainable design methods that can utilize the AM advantages to improve the product family competitiveness in a cost efficient way. Design has been adapted to changing environments, such as customers' preferences, technologies, economic situations, company's strategies, regulations, and competitive moves. Strategic adaptability is essential in capitalizing on future investment opportunities and responding properly to market trends in sustainability. In this talk, I will discuss research opportunities and design challenges for customization and sustainability in additive manufacturing. In this research, we attempt to compensate the performance compromise by proposing the novel concept of an additive manufactured variable platform (VP). The objective of this research is to develop a design framework that helps designers implement additive manufactured VP modules within product families. The implementation of additive manufactured VP modules shows a significant improvement in a product family's performance at low cost, without significant compromise in design commonality. Future research directions in AM technologies and limitations encountered in existing designs will also be discussed along with introducing current on-going projects in Singapore Centre for 3D Printing (SC3DP), Nanyang Technological University (NTU) and Singapore Institute of Advanced Manufacturing (SIMTech), A*Star, Singapore.

Bio

Dr. **Seung Ki Moon** is currently an assistant professor in School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore. He received his Ph.D. degree in Industrial Engineering from the Pennsylvania State University, USA, in 2008, his M.S. and B.S. degrees in Industrial Engineering from Hanyang University, South Korea, in 1995 and 1992, respectively. He worked as a Senior Research Engineer at the Hyundai Motor Company, South Korea for eight years before embarking on his PhD degree. After completing his doctoral degree, he joined the Department of Mechanical Engineering, Texas A&M University for one year as a postdoctoral research associate. He is interested in the boundary-spanning research that integrates the knowledge of design, engineering, and economics. His current focuses include applying sciences and economic theory to the design of customized and sustainable products, services and systems, strategic and multidisciplinary design optimization, advanced modeling and simulation, design for additive manufacturing/3D printing, embedded sensor design for 3D Printing, and advanced remanufacturing.

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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