



University at Buffalo

Department of Mechanical
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Design for Additive Manufacturing— *A Digital Framework*

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Abstract

Additive Manufacturing (AM) technologies such as Selective Laser Melting (SLM) have seen successful applications in the gas turbine industry and many other areas over the past years. The technology has reached a point where the ability to design becomes a limiting factor. The potential of AM and its constraints are not well perceived or readily accessible by the design community. The existing product development process and tools tailored for conventional manufacturing are often incapable of capturing and enabling AM in design stages. Moreover, Design for Additive Manufacturing (DFAM) demands for a paradigm shift to digitally connect printers to design and to allow more rapid exploration of new ways of designing and making parts.

In this talk, we will introduce a digital DFAM framework that is closely tied to a generic design-to-AM process generalized from Siemens gas turbine development workflow. By integrating a wide range of AM domain knowledge and intelligent tools into the product development process, the framework paves the road for much broader and more successful applications of AM. We will highlight a few industrial gas turbine applications enabled by the framework, and discuss open topics that need further attention.

Bio Sketch



Dr. Wentao Fu is a senior additive manufacturing research engineer and DFAM technology lead in the Additive Manufacturing Department at Siemens Energy, Inc. He works with internal and external resources to identify, define, and execute projects that aim to enable the full additive manufacturing potential in the early design phase of industrial gas turbines. Prior to that, he was a research engineer at Caterpillar, where he brought digital manufacturing, design optimization, and cost modeling to successful applications in multiple product groups. Dr. Fu obtained his Ph.D. in manufacturing and design from The University of Texas at Austin in 2014, and his academic achievements in digital manufacturing and design have served as the foundation of the closed-loop design and manufacturing value chain that he has been promoting in the manufacturing industries.

Dr. Fu's research focuses on digital manufacturing and design, CAD/CAM, additive manufacturing, DFAM, design automation and optimization, and data-driven analytics. He has served as a reviewer for more than 10 leading journals and conferences, and was invited to co-chair multiple sessions at ASME international conferences. Dr. Fu was a recipient of the 2017 SME outstanding young manufacturing engineer award. He is a member of ASME and SME. *If you would like to meet Dr. Fu, contact Dr. Rahul Rai at rahulrai@buffalo.edu.*

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3:30 - 4:50 PM O'Brian Hall - Room 112

