

# EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

## Made by Design: Rethinking Design in the Age of Additive Manufacturing

ABSTRACT - Additive manufacturing (AM, colloquially “3D printing”) has recently risen to prominence due, in part, to advancing technology, lowering costs, and broadening of useable materials. Additionally, the unique layer-by-layer nature of AM has caused an explosion of new design possibilities once thought impossible to manufacture. However, for AM technology to reach its full potential, designers and manufacturers must re-evaluate long held beliefs in the area of design for manufacturing. This talk will discuss how researchers are balancing the myriad design possibilities allowed by AM (e.g., free complexity, mass customization) with the reality of the new manufacturing limitations that AM places on engineering design.

Specific examples will demonstrate new possibilities allowed by both multi-material and multi-functional AM, including novel voxel-based design methods for functionally-graded materials and design restrictions for in-situ embedding. Additionally, current research into how AM affects design learning will be discussed, with special emphasis on whether learning about design for AM leads students to develop more creative design solutions. Finally, the use of novel educational platforms (e.g., virtual reality, makerspaces) will be discussed as they relate to improving design for AM understanding for participants in the Maker Movement.

**SPEAKER BIO** – Dr. Nick Meisel is an Assistant Professor of Engineering Design in the School of Engineering Design, Technology, and Professional Programs (SEDAPP) at Penn State and an affiliate faculty with the Department of Mechanical Engineering and the Center for Innovative Materials Processing Through Direct Digital Deposition (CIMP-3D). He graduated from Virginia Commonwealth University in 2010 with his B.S. in Mechanical Engineering and received his Ph.D. from Virginia Tech in Mechanical Engineering in 2015. He joined the faculty at Penn State in Fall 2015.

Meisel is the director of the Made by Design Lab, which conducts research in design for AM, including investigation into design concepts that drive innovation, limits on the manufacturability of designs, and the impact of AM on student design and manufacturing learning. His current research includes (1) improving the interfacial behavior of material jetted structures through functionally-graded material design, (2) establishing design rules for embedding multi-functional components in 3D printed parts, and (3) understanding the impact of AM technology on student design thinking.



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**TUESDAY, JANUARY 26, 2021**

**3:30 PM – 4:50 PM**

ZOOM/ONLINE \*PLEASE EMAIL [OWH@USC.EDU](mailto:OWH@USC.EDU) FOR PASSWORD\*