Design Exploration of Additively Manufactured Metamaterials and Structures

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Abstract: Additive manufacturing (AM) is making a profound impact on the way engineers realize customized parts, but fully realizing the manufacturing freedom afforded by AM requires some significant advances in engineering design methods and tools. In this talk, we will explore some of the research frontiers at the intersection of AM and design innovation. Specifically, we will discuss interactive and process-aware design exploration frameworks that have been established to help engineers fully leverage AM capabilities by integrating data-driven design, topology optimization, and machine learning advancements with AM process characterization. We will also explore some of the new AM processes under development to expand those research frontiers. Examples include high viscosity stereolithography and reactive extrusion AM for high speed production of high-strength polymers and functionally graded, active materials.

Bio: Carolyn Conner Seepersad is the Woodruff Professor of Mechanical Engineering at the Georgia Institute of Technology. She is the Editor-in-Chief of the ASME Journal of Mechanical Design. Her research interests include design for additive manufacturing, simulation-based design of materials and structures, and process innovation in additive manufacturing. She is a member of the organizing committee of the annual Solid Freeform Fabrication Symposium and a member of SME’s Additive Manufacturing Technical Leadership Committee. She is the author of more than 150 peer-reviewed conference and journal publications.