Sneha Prabha Narra, Ph.D.
Material Science and Engineering Department, IIT Kanpur
August 28, 2019, 5:30 pm

Microstructure and Porosity Control in Fusion-Based Direct Metal Additive Manufacturing Processes

Abstract

Additive manufacturing (AM) not only offers the flexibility to fabricate components with complex geometries but also provides the opportunity to control the processing conditions to modify the component properties. The first part of this talk focuses on Dr. Narra's prior work on microstructure and porosity control in laser powder bed fusion and electron beam AM processes. The main alloys studied in this work are Titanium alloy, Ti-6Al-4V and Aluminum alloy, AlSi10Mg. The second part of the talk focuses on the unexplored possibilities for the use of alternative feedstocks in fusion-based AM processes. Currently-used feedstock in powder bed fusion AM processes mainly include powders with spherical morphology. There are opportunities to use relatively cheaper powders and work with alloys that are not widely available in the form of spherical powders. This talk discusses preliminary results to motivate the utilization of non-standard powders with irregular morphology in powder bed fusion AM. The talk will be concluded by reviewing the current research trends towards addressing the challenges related to AM process cost, development, and qualification.

Bio

Dr. Narra received her M.S. degree in Computational Mechanics and Ph.D. degree in Mechanical Engineering from Carnegie Mellon University (CMU). After receiving her Ph.D., she worked as a Postdoctoral Research Associate at the Next Manufacturing Center at CMU from 2017-2018. She joined WPI as an Assistant Professor in Fall 2018 in the department of Mechanical Engineering. Her primary research area is Additive Manufacturing with a focus on parameter development, process control concepts, and design and fabrication informed by a multi-scale understanding of the material behavior.