

MANUFACTURING LEADERSHIP SEMINARS

Additive Manufacturing: Capabilities, Challenges and Future



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ABSTRACT: Additive manufacturing (AM) provides unprecedented capabilities of building parts with complex geometry and customized properties. Additive manufacturing offers potential for going far beyond building complex parts. Despite the explosively growing interest and promising prospective, there remain many grand challenges to overcome to make metal AM widely acceptable in industry. This talk will first highlight various novel applications of AM that have been developed over the last twenty years in my group, spanning from novel material synthesis, functionally gradient materials, remanufacturing and nanoscale AM. Secondly, I will describe the ongoing efforts for developing key enabling technologies that can help expedite the implementation of AM via modeling of processes, microstructure, and resultant properties as well as in-process monitoring schemes. Finally, some future challenges and opportunities to be addressed will be described.

Yung C. Shin is the Donald A. & Nancy G. Roach Distinguished Professor of Advanced Manufacturing at Purdue University. He is also director of the Center for Laser-based Manufacturing at Purdue University. His research areas include additive manufacturing, laser processing of materials, advanced machining processes, and intelligent systems. He has published over 420 papers in archived journals and refereed conference proceedings. He is a fellow of SME and ASME and also a member of LIA, ASM and TMS. His honors include the ASME Blackall Machine Tool and Gage Award (2007), the best paper awards at the ASME MSEC (2011,2017), the best paper of the year award from Journal of Laser Applications (2012), the SME Frederick Taylor Research Medal (2015), SME/NAMRI S.M. Wu Research Implementation Award (2016), and College of Engineering Faculty Award of Excellence in Research (2018).

Lightning Talk: Biologicalisation Strategies for Resilience in Manufacturing: A Lesson From The COVID-19 Pandemic



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Nature offers examples of multiple strategies that are applied to achieve resilience during catastrophes and natural calamities. The COVID-19 pandemic has shaken our society and manufacturing systems, both physically and digitally. The lessons learned from this pandemic will be vital for effectively mitigating the strain to be put on such systems by future pandemics. This talk will highlight the lessons learned from the effect of the COVID-19 pandemic on manufacturing enterprises, especially at the interfaces of products, people, and processes. Using anecdotal examples, this talk will discuss strategies for resilience observed in natural structures that have applications in manufacturing, especially for mitigating the deleterious effects of disruptive events such as the COVID-19 pandemic.



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