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Presentation Title: *"Industrializing Additive Manufacturing at Ohio State University: Advancements in Metal, Polymer, and Concrete Applications"*

Presenter Name & Title:

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Abstract:

As the technology leader of additive manufacturing at the Ohio State University's Center for Design and Manufacturing Excellence (CDME), I will discuss the recent strides made in industrializing additive manufacturing (AM), focusing on several key research areas at CDME and their potential impacts.

Our lattice research targets the design of lightweight, high-strength structures for critical no-fail industries like aerospace, space, and biomedical applications. We have made significant progress in producing unique lattice configurations and test specimen, offering enhanced performance and reliability.



Laser technological advancements are also driving our progress in AM. Our use of ring laser technology for beam shaping has enhanced the fabrication of aluminum and nickel components, expanding the industrial capabilities of AM. We are also integrating carbon nanotubes into the Laser Powder Bed Fusion (LPBF) process, demonstrating potential for improved material properties and multifunctional applications. There are also key challenges in AM such as LPBF build interruptions. We investigate build stop causes, effects, and developing strategies for uninterrupted high-quality part production. Furthermore, our work in laser scanning strategies for tungsten printing offers novel solutions for crack suppression at the ductile-brittle transition.

The additive manufacturing field has wide-reaching implications, including construction. We are exploring construction 3D printing, with the potential to fabricate large-scale structures efficiently.

Our ongoing research at CDME is dedicated to advancing the industrialization of AM through applied research, contributing to the development of innovative processes and applications. We strive to strengthen the manufacturing competitiveness in the United States, pushing the boundaries of what's possible one layer at a time.

Speaker Bio Sketch:

Ben DiMarco is the Additive Manufacturing Technology Leader and Principal Engineer at The Ohio State University's Center for Design and Manufacturing Excellence. His mission is to industrialize additive manufacturing and bridge the gap between industry and academia by building a collaborative ecosystem that accelerates the resolution of real-world applied research problems. He has a master's degree with a technical emphasis in Additive Manufacturing. Prior to joining the team at Ohio State, Ben worked 9 years at Honda R&D Americas where he started the metal additive manufacturing lab at Honda Aerospace. At Honda, Ben was responsible for setting initial strategies for additive manufacturing process development and technology related to metal laser powder bed fusion. At OSU, Ben is a key leader in metal additive operations and has executed complex research projects for Laser Powder Bed Fusion (LPBF), Binder Jetting (B-Jet), and Directed Energy Deposition (DED). Ben is a participating member of professional standards committees including AMS, ASTM, and SAE. Additionally, volunteered on the SAE Dayton Board for 5 years and was acting section chairman for 3 years. In 2022, Ben was selected as an America Makes ambassador in the field of Additive Manufacturing.