

FIERF SPONSORED METAMORPHIC MANUFACTURING WEBINAR

Metamorphic Manufacturing is an emerging concept of automated incremental thermomechanical deformation to shape a specific part and provide reproducibility, traceability, high productivity, and manufacturing agility all with the excellent product performance achieved from forging processes.

The ultimate goal of MM is the agile production of high-quality metallic parts. In this context high-quality indicates high-strength, low-mass components that can be used in safety-critical applications, while agility refers to producing such parts in a timely and adaptable manner, with low initiation costs, and without hard dies, but small local shaping tools are used. An important theme to note is that advances in a number of underlying technological areas (e.g., robotics, vision systems, computational methods, etc.) all point to the fact that the time is ripe for this new technology to emerge. Fulfillment of this vision could provide great strategic, economic, and national security benefits for the United States.

For more information, go to <https://www.tms.org/metamorphicmanufacturing>

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Presenters:



Nate Ames is the Executive Director for CDME where he oversees growth and daily operations. Prior to joining DME, Nate's work experiences included various industry positions where he has been involved in the design and implementation of engineering solutions into commercial markets. His positions include serving as Co-founder and Director of Engineering at Apeks Supercritical, Founder of the Nuclear Fabrication Consortium (NFC) with the Edison Welding Institute, Co-founder of Meetacular LTD, and President of Zoar Industries, Research Engineer at Swagelock, among other positions. As a founder of multiple small businesses, Nate has a firm understanding of the challenges of small business growth. His experience at EWI, where he founded the Nuclear Fabrication Consortium (NFC), brought on the responsibility of managing an international business development team where he implemented new strategic account plans for clients in order to grow sales. In 2008, he established the NFC, which in less than 4 years went from a concept to an organization with over 25 paying members, conducting over \$4 million dollars in precompetitive research. As president of Zoar Industries, Nate provided manufacturing entities with smart solutions for some of the most common hurdles encountered in typical early stage manufacturing companies. Nate has a B.S. and M.S. in Welding Engineering from Ohio State.

Presenters (cont.):



Dr. Kester Clarke is an assistant professor in the Metallurgical and Materials Engineering Department at Colorado School of Mines, and serves as the Forging Industry Education and Research Foundation (FIERF) Professor. He engages in research on deformation processes in metal alloys with the Center for Advanced Non-Ferrous Structural Alloys and the Advanced Steel Processing and Products Research Center. His research interests include alloy development, material deformation and fabrication processes, and the use of experimental and modeling methods to examine the effect of material processing

history and microstructure on mechanical properties and performance.



Glenn Daehn is The Mars G. Fontana Professor of Metallurgical Engineering in the Department of Materials Science and Engineering at The Ohio State University. His efforts span process innovation in creating new manufacturing processes, providing authentic content and professional development for K-12 STEM teachers and advancing manufacturing engagement in universities. His formal training includes a PhD in Materials Science and Engineering from Stanford University and an undergraduate degree from Northwestern University. Most of his current process innovation work is in

developing impulse-based manufacturing processes for the joining, shaping and cutting of material. Details on the work are available at <http://iml.osu.edu> and is supported by federal (NSF, DOE), state and industry sources. He has also been active in developing content and hosting professional development camps for high school STEM instructors, in collaboration with the ASM Materials Education Foundation, where he is currently Chair. Since these camps have begun in Ohio in 2005, at least 20 Ohio high schools now have full courses in materials science, and place students into the pipelines to undergraduate and community college education. Prof. Daehn is also active in many manufacturing initiatives, having a hand in founding the LIFT Manufacturing USA institute, Ohio State's Center for Design and Manufacturing Excellence and Ohio Manufacturing Institute. He also serves on the Executive Committee for MFOresight.

More information can be found at: <https://mse.osu.edu/people/daehn.1>