THE MATERIALS SCIENCE AND ENGINEERING DEPARTMENT
FALL COLLOQUIUM SERIES PRESENTS:

Glenn S. Daehn

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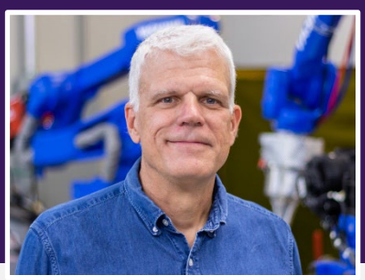

Next-Generation Manufacturing: Design, Tools & Materials

With the notable exception of additive manufacturing, there has been relatively little change in the way components for structural service are manufactured in the past decades. The large investment needed, and risks introduced with new manufacturing processes are key reasons for rates of innovation that are slower than most any other technical field. Here we will take a broad design-thinking approach and ask what kinds of manufacturing processes we would design for structural components if we were to start with a clean-sheet of paper. Following this thought exercise leads to some conclusions.

- We find that we should design component, select materials, and design manufacturing processes concurrently. This is a task well-suited to emerging machine learning methods.
- New digital tools can improve manufacturing agility and throughput, as well as component performance.
- The universe of possible manufacturing processes is very broad, much broader than is practiced.
- With some creativity, we can significantly expand the performance envelope for metallic structures.

Examples will leverage deformation processing, shock processing and solid-state joining, always with the goal to design the process to optimize structure, properties, and performance, as Morrie Fine taught us.

Glenn S. Daehn is the Mars G. Fontana Professor of Metallurgical Engineering within the Department of Materials Science and Engineering at The Ohio State University and Director of the new National Science Foundation Engineering Research Center HAMMER – Hybrid Autonomous Manufacturing Moving from Evolution to Revolution. A key element of the HAMMER program is the development of digital deformation technologies to impart materials properties and shape, complementing additive and subtractive digital methods. More broadly, his work spans from manufacturing process innovation, to providing authentic content and professional development for K-12 STEM teachers, to advancing manufacturing policy with a focus on the role of the 21st-century land grant university. His long-term research has been in impulse-based manufacturing processes for the joining, shaping, and cutting of material. Prof. Daehn is also active in several manufacturing initiatives, playing a keys role in establishing the Lightweight Innovations for Tomorrow Manufacturing USA institute, the Ohio State Center for Design and Manufacturing Excellence, and the Ohio Manufacturing Institute. He received his Ph.D. in materials science and engineering from Stanford University and a B.S. from Northwestern University.

Tuesday, November 7 • 4 pm CT • Tech L211

In person only; no Zoom

Questions? Contact allison.macknick@northwestern.edu

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