COLLEGE OF ENGINEERING
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Additive Manufacturing: Machine Learning, Mechanics, and Metallurgy

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Tuesday, Jan. 28th, 2025
4:00 PM to 5:00 PM
Room 2540 GGB

ME Seminar Link
Passcode: 690323

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Abstract:

The thermal histories in laser-based additive manufacturing (AM) of metal alloys results in microstructures that may contain phases, grain morphologies, or internal pores different from those seen in their conventionally processed counterparts. These microstructures dictate the resulting mechanical properties of the alloys; thus, to enable the adoption of AM for structural applications, an understanding of the links between microstructure and deformation and/or fracture is required to reliably design against failure. In this talk, I will present our work in three general areas: using in situ process monitoring to link processing signatures to defects and mechanical properties, modeling the impact of internal defects on the multiaxial failure behavior of additively manufactured metallic materials, and the development of a framework for designing functionally graded materials in which the composition is spatially tailored to impart site-specific properties within a 3D component.

Bio:

Allison Beese is a professor in the Department of Materials Science and Engineering at Penn State University. She also serves as Director of Penn State's Additive Manufacturing and Design graduate program and co-director of Penn State's Additive Manufacturing center (CIMP-3D). Her multiscale mechanics of materials research group focuses on using experimental and computational methods to identify and model the links between microstructural features and deformation and failure of materials, with a focus on additively manufactured metallic materials. She received her B.S. in Mechanical Engineering from Penn State, and M.S. and Ph.D. in Mechanical Engineering from MIT.