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Knowledge Management & Predictive Analytics in Manufacturing

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ABSTRACT:

My presentation will highlight the ongoing research at the Center for e-Design at UMass Amherst on knowledge management and predictive analytics in manufacturing, with a particular focus on additively manufactured systems. As part of my talk, I will introduce an ontology-based knowledge management framework to support product realization; and I will highlight our suite of synergistic ontologies to model design context, human factors, standards and regulations, and manufacturability and how they can support design ideation, information and knowledge capture, and design validation. I will follow that up with a metamodeling-based mathematical framework to represent constituent system behavior that offers a reusable and composable paradigm to study, analyze, diagnose, forecast, and design manufactured systems. My talk will feature several essential, interrelated topics such as optimal sampling, model selection, learning-based updating, verification and validation, and composable model integration. I will summarize with an overarching theme of how predictive analytics, supported by knowledge management through ontologies, can facilitate digital design and smart manufacturing.

BIOGRAPHY:

Dr. Sundar Krishnamurty is the Ronnie & Eugene Isenberg Distinguished Professorship in Engineering and Department Head in the Department of Mechanical and Industrial Engineering at the University of Massachusetts Amherst. He is the Site-Director for the NSF I/UCRC Center for e-Design and PI for the NSF I-Corps @ UMass Amherst program. Krishnamurty currently serves as a member of the National Academy of Engineering (NAE) Study Committee on Strengthening the Talent for National Defense: Infusing Advanced Manufacturing in Engineering Education. Krishnamurty is a fellow of American Society of Mechanical Engineers (ASME) and recently served as an elected member of the Department Head/Chair of the ASME Executive Committee. For his pioneering work in modeling & simulation and engineering knowledge management in design and manufacturing, Krishnamurty received the 2022 Excellence in Research Award from the Computers and Information in Engineering (CIE) Division of ASME.