COLLEGE OF ENGINEERING
MECHANICAL ENGINEERING
UNIVERSITY OF MICHIGAN

Mechanical Engineering Seminar Series

Industrial decarbonization and the role of emerging technologies

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Inaugural Mellichamp Chair
Sustainability Science for Emerging Technologies
UCSB

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Abstract

Decarbonization of the industrial sector is critical for meeting global climate change mitigation ambitions, but is proving difficult due to the complexities and costs of transforming traditional industrial processes. This seminar will first present detailed mitigation scenario results, which map out decarbonization technology pathways for the global industrial sector and underscore the urgency of emerging technology deployment. Next, the importance of new manufacturing system modeling methods will be discussed, which integrate engineering analysis, life-cycle assessment, energy systems modeling, and economic analysis for more robust emerging technology research and deployment decisions. To illustrate the utility of such integrated approaches, recent case studies on additive manufacturing processes applied to lightweight aircraft components and industrial tooling will be presented. These examples shed light on which applications might yield the greatest sustainability benefits, as well as which technical and cost challenges must be overcome to more fully realize these benefits to accelerate the industrial decarbonization agenda.

Bio

Eric Masanet is the inaugural Mellichamp Chair in Sustainability Science for Emerging Technologies at UCSB. His research develops energy and materials systems models to identify technology and policy pathways for decarbonizing industrial systems. From 2015-2017, he led the Energy Demand Technology Unit at the International Energy Agency in Paris, where he oversaw energy analyses of the global industrial, transport, and buildings sectors. He is currently a Lead Author of Chapter 5 (Demand) for Working Group III of the IPCC's Sixth Assessment Report and a member of the Research Advisory Board at the American Council for an Energy Efficient Economy (ACEEE). He is also the former Editor in Chief of Resources, Conservation, and Recycling, the leading peer-reviewed journal on sustainable resource systems. From 2012 -2019 he was an Associate Professor in the McCormick School of Engineering and Applied Science at Northwestern University. From 2004-2012 he was a Research/Staff Scientist and Deputy Head in the International Energy Studies Group at Lawrence Berkeley National Laboratory. While at LBNL he held a joint research appointment in UC Berkeley's College of Engineering, where he also served as Program Manager for the Engineering and Business for Sustainability Certificate Program. He holds a PhD in mechanical engineering from UC Berkeley, with an emphasis in sustainable manufacturing.

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