— Call for Papers —

A Symposium on

Advances in Smart Manufacturing for Resiliency and Sustainability across the Product Life Cycle

Sponsored by the ASME Manufacturing Engineering Division's

Life Cycle Engineering Technical Committee

2022 ASME International Manufacturing Science and Engineering Conference (MSEC)*

June 27-July 1, 2022

West Lafayette, Indiana, USA

Hosted by Purdue University, College of Engineering

Technical Focus

The COVID-19 and climate change crises have highlighted the need for resilient production systems that make products which are sustainable throughout the life cycle. The scale and urgency of this shift requires radical innovation of the physical processes used to transform (traditional, emerging, and secondary) feedstocks, and of the use of data to control and optimize the manufacturing enterprise, enabling rapid decision-making for environmental efficiency. Upstream material production and onsite fuel use dominate manufacuring's environmental impacts with innovations needed in material efficiency and process electrification. Manufacturing processes and systems already generate a lot of data; however, there are numerous challenges to using that data for pursuit of resilient and efficient manufacturing. Challenges include connecting the data to model-based resiliency and sustainability metrics that guide decision-making; uncertainty quantification, reduction, and interpretation; tradeoff analysis; and the lack of trained operators. This symposium explores understanding and innovation in resiliency and sustainability brought about by physical manufacturing innovations and smart technologies. Specific topics of interest include, but are not limited to:

- Development and application of manufacturing resiliency and sustainability metrics for the product life cycle
- Digital thread and permanent identifiers for the life cycle used in resiliency and sustainability modeling
- Data architectures and/or standards based on ontological resiliency and/or sustainability frameworks
- Machine learning applied to the modeling, design, or operation of sustainable production systems
- Modeling the relationships between system resiliency, redundancy, and environmental impacts
- Machine learning applied to the modeling, design, or operation of sustainable production systems.
- Closed loop production and circular economy considerations including product take back and remanufacturing
- Manufacturing process resilience to heterogeneous, time varying (e.g., recycled or reused) feedstocks
- Innovations in process material efficiency for mass production
- Process electrification and quantification of environmental impacts
- Rapid computer-supported tools for designing/improving manufacturing systems for resiliency/sustainability
- Workforce development: research and/or application on the knowledge and skill sets needed for LCE
- Theory and practice on cyber physical systems and digital twins for resource-efficient manufacturing
- Continuous monitoring and prognostics for worker safety and critical asset life extensions
- Social impact assessment for manufacturing workers and end users from emerging materials and processes
- Visualization-first approaches, such as augmented reality (AR) and InfoVis dashboards, for sustainability

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit a full manuscript for review by **November 15, 2021**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. Only industry presenters have the option to present without a paper. Final revised manuscripts must be submitted by **April 1, 2022**. The copyright transfer form must be completed by **April 1, 2022**. The presenting author must register by **April 22, 2022** or the paper will be withdrawn from the conference proceedings. **High quality MSEC 2022 papers will be channeled to an ASME journal for fast-tracked review and publication.** Accepted papers can be submitted for review to any ASME journal, such as the prestigious *ASME Journal of Manufacturing Science and Engineering* or the *ASME Journal of Micro and Nano Manufacturing*.

Additional Symposium Activities

To engage the community, symposium organizers will work to attract a high profile international keynote speaker.

Organizers

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