

— Call for Papers —
A Symposium on
Advances in Additive Manufacturing of Multi-material Structures and Composites

Sponsored by the ASME Manufacturing Engineering Division's
Additive Manufacturing Technical Committee
2020 ASME International Manufacturing Science and Engineering Conference (MSEC)*
June 22 – 26, 2020
Cincinnati, Ohio

Hosted by the University of Cincinnati, College of Engineering and Applied Science

Technical Focus

Composite structures consisting of two or more distinct material phases in macro-to-nano scale synergistically combine the properties and functionality of different materials to achieve unique overall functionality that cannot be achieved by single material structures. Examples of such systems include metal-, or polymer-matrix composites, bimetallic structures, patterned structures made of layered dissimilar materials, parts with embedded electronics or other functional elements, biocomposite systems etc. Emerging additive manufacturing technologies present a new opportunity to further the capabilities of such material systems by enabling (1) manufacturing of parts including multi-material structures and composites in highly complex and precisely controlled topologies and (2) layer-by-layer control of manufacturing process leading to the potential control over the morphology of various phases in the system. This improved process control and design freedom enable novel part properties and new engineering applications. Realization of this exciting potential calls for multi-disciplinary research to develop new feedstock materials and understand their properties, develop novel additive manufacturing processes and 3D printers with multi-material capabilities, devise process models identifying material-process-property relationships of composite additive manufacturing methods and understand and predict properties of the additively manufactured composites and multi-material parts. This symposium will feature the advances in these research domains focusing specifically on but not limited to:

- Design, implementation and control of novel 3D printer systems that can process multiple materials.
- Experimental characterization, modeling and simulation of additive manufacturing processes involving composite materials or multiple materials in one functional part.
- Design, processing, characterization, and optimization of composite feedstock materials including composite inks, powders, filaments, laminates, etc. excluding ceramics and ceramic-matrix composites.
- Experimental, analytical, and computational studies of properties in additively manufactured composite parts or multi-material structures.
- Feedstock-process-structure-performance relationships in additively manufactured composite materials and structures.
- Interfacial properties additively manufactured multi-material structures.
- Structural and functional applications of additively manufactured composites, nanocomposites, and multi-material structures. This includes but is not limited to parts integrated with electronics, sensors and other components requiring multi-material implementations.
- Novel design strategies for additively manufactured multi-material and composite parts, including topology optimization.
- Additively manufactured composites in industrial manufacturing and product development cycles: Challenges and promises

Paper Submission

Authors are encouraged to submit an abstract and full manuscript for review by **November 15, 2019** via the conference website. Final revised manuscripts must be submitted by **March 26, 2020**. The [copyright transfer form](#) must be filled out by March 19, 2020 and the presenting author must [pre-register](#) by **April 15, 2020** or the paper will be withdrawn from the conference. **No papers are to be submitted to the organizers; submissions will only be accepted via the conference website at <https://event.asme.org/MSEC/>.**

All papers accepted by MSEC2020 can be further submitted to any ASME journals, such as the highly prestigious Journal of Manufacturing Science and Engineering, for consideration of archival publication. In addition, high quality MSEC2020 papers will be automatically channeled to relevant ASME journals for fast-tracked publications

Additional Symposium Activities

To highlight advancements in this technical area, symposium organizers will:

- work to attract a high profile international keynote speaker
- organize a special issue in the ASME Journal of Manufacturing Science and Engineering or Journal of Manufacturing Processes
- organize a state-of-the-art paper that will be the lead article in the special issue

Organizers:

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* The conference is collocated with NAMRI/SME's 48th North American Manufacturing Research Conference (NAMRC48) and LEM&P (Leading Edge Manufacturing / Materials and Processing) by The Japan Society of Mechanical Engineers (JSME), which will have a separate call-for-papers. Please note that submissions of the same paper to more than one conferences are not permitted.