

— Call for Papers —
A Symposium on
Design and Manufacturing of Nano-to-Meso Porous Structures

Sponsored by the ASME Manufacturing Engineering Division's
Nano/Micro/Meso 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

Cellular solids have diverse potential applications including bio-medical applications, tissue scaffold, aerospace, automotive, marine, and defense industries. Stochastic foams and periodic cellular structures (open and closed cell) are potential candidate for multi-functionality with superior performance i.e. meta-materials. However, the possibilities of 3D cellular architecture are often unaffordable due to both design and manufacturing limitations. Designing the porous structure with conventional CAD system is a challenge due to very large number of features and associated data sets. Topology optimization a popular concept for designing light weight porous structure with controllable properties, but are difficult to realize via current manufacturing processes. Traditional porous structure manufacturing processes are often limited size scale (meso-scale) and can be complex and costly due to the intricate architecture and nodal connections. Additionally, fabrication imperfections, i.e., topological (variations in nodal connectivity and missing strut) and dimensional (variations in cellular dimensions), are wide spread challenges. To make 3D cellular structures a promising alternative, it is essential to realize a not only versatile and scalable (nano to meso), but also low-cost, reliable, and high-fidelity manufacturing approach. Specific topics of interest include, but are not limited to:

- Design technique for porous structure (e.g. foam, periodic and non-periodic lattice, open or closed cell)
- A unifying technique for design, simulation, and manufacturing of porous structure.
- New application or product development with porous structure i.e. meta-materials.
- Manufacturing process for porous structure (polymer, ceramic or metal)
- Technical innovations in algorithms, structure models, and new applications.
- Reduction in design and manufacturing gap for porous structure.
- Characterization of the porous structure or Meta materials.
- The use of computer aided engineering in the integration of the porous structure design process.
- Quality control and measurement protocol for porous structure.
- Multi-material porous structure design and manufacturing.
- Virtual manufacturing to reduce process development time.
- Data reduction and organization protocol for porous structure design and manufacturing.
- Simulation strategies and their effect on cost reduction of both part and process.
- Advanced methods and tools for computer integrated manufacturing.
- Virtual control design and process planning.
- Simulation and process flow optimization strategies.
- Model-based process control.

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 Micro and Nano-Manufacturing
- organize a state-of-the-art paper that will be the lead article in the special issue

Organizers:

Dr. Bashir Khoda, The University of Maine, Orono, ME, USA. 207-581-5183; bashir.khoda@maine.edu
Dr. Chandra Nath, Hitachi America Ltd, R&D Div. MI, USA. 217-607-3029; nathc2@asme.org

* 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.