

# — Call for Papers —

A Symposium on

## Advances in Cyber Physical Systems, Stochastic Modeling, and Sensor Networks in Advanced Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's

*Manufacturing Systems and Manufacturing Equipment Technical Committees*

2019 ASME International Manufacturing Science and Engineering Conference (MSEC)\*

June 10-14, 2019

Erie, Pennsylvania

Hosted by Pennsylvania State University, The Behrend College

### Technical Focus

The advent of cyber-manufacturing systems is envisaged to revolutionize the status quo of manufacturing. In the cyber-manufacturing context, data and production, and IT and manufacturing, are integrated seamlessly. The goal of the cyber-manufacturing paradigm is to monitor and influence via data every operation of each manufacturing process; every run of each single manufacturing cell; and every move of each piece in its global supply chain. Realizing this vision entails accommodating enormous amounts of data. Thus, the consequential research challenge in cyber manufacturing is in forwarding advanced sensing, control, and automation approaches to regulate every level of the manufacturing system – from the single manufacturing cell to the shop floor to the factory control level to the global supply chain. Another aspect is the efficient and reliable data exchange needed which is critical for better product quality and productivity especially in Open Architecture Control frameworks. Even with the rise of affordable high-performance computing power, there are challenges in implementing data driven models into advanced manufacturing. This is because first principle deterministic models which are approximations of physical phenomena are rendered inadequate due to the inherent dynamic nature of the process, equipment and system. This calls for a stochastic approach for model generation/identification/fusion, and monitoring and control approaches.

This symposium aims to serve as a forum for addressing such challenges in the areas of ***data-driven modeling, sensor fusion and decision making for cyber-manufacturing systems, reliability and health monitoring of manufacturing systems, application of advanced mechatronics and automation to enable cyber-manufacturing, and*** stochasticity and data exchange for modeling, monitoring and control. Themes of interest include (but are not limited to) the following:

- Technical innovations in integration of data-driven and physics-based models in manufacturing
- Advanced methods and tools for sensor networks and sensor fusion in manufacturing applications
- Reliability and health monitoring of manufacturing systems
- Advanced manufacturing automation and robotics
- Data-driven decision making for advanced manufacturing
- Human-machine interaction in cyber-enabled manufacturing systems
- Standards enabling interoperability of different manufacturing systems
- Stochasticity in manufacturing processes, equipment and systems
- First principle/data-driven hybrid modeling approaches for monitoring and control
- Equipment and process health monitoring and diagnostics utilizing inter-process data
- Product quality, tool wear evolution, and their interactions across processes/equipment
- Product defect diagnosis and correction using process feed-forward and feedback data
- Probabilistic/stochastic process modeling and diagnosis ( Bayesian Networks, Hidden Markov Models, etc.)

### Paper Submission

Authors are encouraged to submit an abstract and full manuscript for review by November 02, 2018 via the conference website. Final revised manuscripts must be submitted by March 15, 2019. The copyright transfer form must be filled out by March 8, 2018, and the presenting author must pre-register by April 05, 2019; or the paper will be withdrawn from the conference. Authors may also consult [www.asme.org/divisions/med/call/](http://www.asme.org/divisions/med/call/) for updates. *No papers are to be submitted to the organizers; submissions will only be accepted via the conference website at [www.asmeconferences.org/msec2019/](http://www.asmeconferences.org/msec2019/).*

### Organizers:

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\* The conference is collocated with NAMRI/SME's 47<sup>th</sup> North American Manufacturing Research Conference (NAMRC47), which will have a separate call-for-papers. Please note that submissions of the same paper to more than one conferences are not permitted.