NAMRC 52 | MSEC 2024

June 17 – June 21, 2024
Knoxville, Tennessee, USA

https://utconferences.eventsair.com/2024-msec-namrc/

MSEC 2024 SYMPOSIUM LIST AND CALL FOR PAPERS

This final list of symposia is approved by the ASME MED Committee.

MSEC 2024 invites **ALL** high-quality advanced manufacturing research papers, even if they may not directly fit into one of these symposia. We ask authors to find the closest related symposium to place papers into. Technical Chairs and the Symposium Organizers will coordinate review of these submitted papers.

Technical Chairs:

Chinedum (Chi) Okwudire, University of Michigan (okwudire@umich.edu)

Guha Manogharan, Pennsylvania State University (gum53@psu.edu)

Key Dates

- Abstract submission (abstract must be submitted before uploading paper): October 23, 2023
- Abstract acceptance: October 26, 2023
- Full manuscript submission deadline: November 1, 2023
- Copyright transfer form submission deadline: March 19, 2024
- Final revised manuscript submission deadline: March 20, 2024
- Presenting author registration deadline: April 10, 2024

Submissions will only be accepted via the ASME website: https://event.asme.org/MSEC/. No papers may be submitted to the organizers by email.

MSEC 2024 Paper Types

The following paper types may be submitted to any symposium in response to this call:

Full Papers

Full papers undergo full peer review and are published in the conference proceedings. A full paper is 7-10 pages long. It reports technically original research that is of major and archival value to the manufacturing community. An accepted full paper is accompanied by a 25-minute oral presentation (including Q&A) at the conference. A full paper is eligible for the best paper award and, if deemed to be of journal quality, may be channeled to an appropriate ASME journal for fast-tracked review and publication.

Brief Papers (New to MSEC 2024!)

Brief papers undergo full peer review and are published in the conference proceedings, in the same manner as full papers. A brief paper is 4-5 pages long. It reports technically original research that is of significant and archival value to the engineering community. A brief paper may contain preliminary work that has not yet been fully developed. An accepted brief paper is accompanied by a 15-minute oral presentation (including Q&A) at the conference and a poster presentation during the poster session. The expectation is that the authors will use the oral and poster presentations of a brief paper as an opportunity to get feedback from the engineering community leading to a full-length conference or journal paper in the near future. A brief paper is NOT eligible for the best paper award nor can it be fast-tracked for journal publication. However, the accompanying poster is eligible for the best poster award.

Presentation-only Papers

Presentation-only papers require only an abstract submission. They do not undergo peer review and are not published in the proceedings. A journal paper published in the *ASME Journal of Manufacturing Science and Engineering* or the *ASME Journal of Micro and Nano Manufacturing* between March 2023 and February 2024 may be submitted as a presentation-only paper by its corresponding author. A presentation-only paper may also be submitted by industry participants, if all the co-authors of the paper are from industry. An accepted presentation-only paper is accompanied by a 15-minute oral presentation (including Q&A) and an optional poster presentation during the poster session. A presentation-only paper is NOT eligible for the best paper award nor can it be fast-tracked for journal publication. However, the accompanying poster (where applicable) is eligible for the best poster award.

Note that there are ***separate templates*** to submit full and brief papers, and posters. Visit https://msec.secure-platform.com/a/page/author_resources/information_and_templates for more information about the paper types and to download the appropriate templates.

MSEC 2024 Symposia

ADDITIVE MANUFACTURING		
AdM1_1	Advances in Metal Additive Manufacturing Processes	Dr. Ala Qattawi, University of Toledo, Toledo, OH, USA. 419-530-3140; ala.qattawi@utoledo.edu
		Dr. Dong Lin, Oregon State University, Corvallis, OR, USA. 541-737-7074; dong.lin@oregonstate.edu
		Dr. Wenchao Zhou, University of Arkansas, Fayetteville, AR, USA. 479-575-7250; zhouw@uark.edu
		Dr. Ho Yeung, NIST, Washington DC, USA, 301-975-2786; ho.yeung@nist.gov
		Dr. Hector Siller, University of North Texas, Denton, TX, USA. 940-565-2362 hector.siller@unt.edu
AdM1_2	In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing	Dr. Sarah Wolff, The Ohio State University, wolff.357@osu.edu
		Dr. Andy Fan, Oregon State University, zhaoyan.fan@oregonstate.edu
		Dr. Samantha Webster, National Institute of Standards and Technology (NIST), samantha.webster@nist.gov
		Dr. Andelle Kudzal, Naval Surface Warfare Center Carderock, andelle.d.kudzal.civ@us.navy.mil
AdM1_3	Multi-Material Processing in Additive Manufacturing	Dr. Monique McClain, Purdue University, mcclain5@purdue.edu
		Dr. Weinan Xu, University of Akron, weinanxu@uakron.edu
		Dr. Jay Park, University of Massachusetts Lowell, Jay_Park@uml.edu
		Dr. Yanliang Zhang, University of Notre Dame, yzhang45@nd.edu
		Dr. Mostafa Yourdkhani, Colorado State University, yourd@colostate.edu
AdM1_4	Smart Additive Manufacturing	Dr. Azadeh Haghighi, University of Illinois Chicago, Chicago, IL, USA, ahaghi3@uic.edu
		Dr. Prahalada Rao, Virginia Tech, VA, USA, prahalad@vt.edu
		Dr. Molong Duan, Hong Kong University of Science and Technology, Hong Kong SAR, China, duan@ust.hk
		Dr. Uduak Inyang-Udoh, University of Michigan, Ann Arbor, MI, USA, udinyang@umich.edu

ADVANCED MATERIALS MANUFACTURING		
AMM2_1	Advances in Digital Twins of Manufacturing Processes and Systems	Dr. Weihong “Grace” Guo, Rutgers University, New Brunswick, NJ, USA. wg152@soe.rutgers.edu
		Dr. Mihaela Banu, University of Michigan, Ann Arbor, MI, USA. mbanu@umich.edu
		Dr. Teresa Rinker, General Motors LLC, Warren, MI, USA. teresa.rinker@gm.com
		Dr. Paromita Nath, Rowan University, Glassboro, NJ, USA. nath@rowan.edu
		Dr. Chukwuzubelu Ufodike, Texas A&M University, College Station, TX, USA. ufodike@tamu.edu
AMM2_2	Advances in Manufacturing and Processing of Polymers and Composites	Prof. Erina Joyee, University of North Carolina at Charlotte, NC, US. 704-687-8930; ejoyee@charlotte.edu
		Prof. Felicia Stan, Dunarea de Jos University of Galati, GL, Romania. +40-742-947-501; felicia.stan@ugal.ro
		Prof. Kenan Song, Arizona State University, Tempe, AZ, US. 480-727-2720; kenan.song@asu.edu
		Prof. Kun (Kelvin) Fu, University of Delaware, Newark, DE, US. 302-831-2008; kfu@udel.edu
		Nestor Vasquez, DuPont, Newark, DE, US. 989-430-9440; nestor.a.vasquez@dupont.com
AMM2_3	Convergent Manufacturing of Advanced Materials for Hybrid Manufacturing Systems and Products	Dr. Thomas Feldhausen, Oak Ridge National Laboratory, Oak Ridge, TN USA. feldhausenta@ornl.gov
		Dr. Saeed Farahani, Cleveland State University, Cleveland, OH, USA. s.farahani@csuohio.edu
		Dr. Jason Jones, Hybrid Manufacturing Technologies, McKinney, TX USA. jj@hybridmanutech.com
		Dr. Christopher Saldana, Department of Energy, Washington, DC USA, christopher.saldana@ee.doe.gov
		Dr. Chao Wang, University of Iowa, Iowa City, IA, USA. chao-wang-2@uiowa.edu
BIOMANUFACTURING		
BioM3_1	Advances in Design, Manufacturing, and Analysis of Biomedical Devices	Dr. Lei Chen, University of Massachusetts Lowell, Lowell, MA, USA. 978-934-2994; Lei_Chen@uml.edu
		Dr. Yi Wang, University of Missouri, Columbia, MO, USA. 573-882-2340; yiwang@missouri.edu

		Dr. Dian-Ru Annie Li, National Taiwan University, Taiwan. (+886)-2-3366-2745; dianrul@ntu.edu.tw
BioM3_2	Advances in Manufacturing of Tissue Constructs/Medical Implants and Bioinspired Materials/Structures for Healthcare Applications	Dr. Changxue Xu, Texas Tech University, Lubbock, TX, USA. changxue.xu@ttu.edu
		Dr. Cindy (Xiangjia) Li, Arizona State University, Tempe, AZ, USA. xiangjia.li@asu.edu
		Dr. Ryan B. Wicker, University of Texas at El Paso, El Paso, TX, USA. rwicker@utep.edu
		Dr. Yang Yang, San Diego State University, San Diego, CA, USA. yyang10@sdsu.edu
		Dr. Yong Huang, University of Florida, Gainesville, FL, USA. yongh@ufl.edu
LIFE CYCLE ENGINEERING		
LCE4_1	Advances in Sustainable Manufacturing for Improved Component Life Cycle Performance	Dr. Ritin Mathews, MDF, Oak ridge national lab, Oak Ridge, TN, USA. 516-373-8653; mathewsr@ornl.gov
		Dr. Julius Schoop, University of Kentucky, Lexington, KY, USA. 859-323-8308; julius.schoop@uky.edu
		Dr. Muyue Han, North Carolina A&T State University, Greensboro, NC; mhan@ncat.edu
		Dr. Sheng Yang, University of Guelph, Guelph, ON, Canada. syang19@uoguelph.ca
		Dr. Guoying Dong, University of Colorado Denver, Denver, CO, USA. guoying.dong@ucdenver.edu
LCE4_2	Systems Engineering and Digital Technologies for Circular Economy	Dr. Abheek Chatterjee, University of Maryland, College Park, MD, USA. achatt31@umd.edu
		Dr. Jing (Julia) Zhao, Penn State University, The Behrend College, Erie, PA, USA. jqz5665@psu.edu
		Dr. Astrid Layton, Texas A&M University, College Station, TX, USA. alayton@tamu.edu
		Dr. Matthew Triebe, National Institute of Standards & Technology, Gaithersburg, MD, USA. matthew.triebe@nist.gov
		Dr. Nehika Mathur, National Institute of Standards & Technology, Gaithersburg, MD, USA. nehika.mathur@nist.gov
MANUFACTURING EQUIPMENT & AUTOMATION		
MEA5_1	Innovations in Equipment Design, Control and Automation	Dr. Chandra Nath, Purdue University, West Lafayette, IN, USA, Ph: +1-217-607-3029, nathc@purdue.edu

		Dr. Lei Zhou, University of Wisconsin-Madison, WI, USA, Ph: 1-617-694-8231, lei.zhou@wisc.edu
		Dr. Huitaek Yun, Korea Advanced Institute of Sci & Tech (KAIST), Daejeon, S. Korea, +82-42-350-3011, htyun@kaist.ac.kr
MEA5_2	Semiconductor Manufacturing: Metrology, Inspection, Systems, and Processes	Dr. ChaBum Lee, Texas A&M University, College Station, TX, IA, USA. +1-979-458-8121 cblee@tamu.edu
		Dr. Byunggi Kim, The University of Tokyo, Tokyo, Japan, +81-3-5452-6305, bkim@iis.u-tokyo.ac.jp
		Dr. Jiyong Park, Korea Institute of Industrial Technology, Songdo, S. Korea, +82-32-850-0288, j.park@kitech.re.kr
		Dr. Gregory Vogl, National Institute of Standards and Technology, Gaithersburg, MD, gregory.vogl@nist.gov
MANUFACTURING PROCESSES		
MP6_1	Advances in Clean Energy and E-Mobility Manufacturing	Dr. Lei Chen, University of Michigan-Dearborn, Dearborn, MI, USA. 313-593-5122; leichn@umich.edu
		Dr. Alessandro Ascari, University of Bologna, Bologna, Italy; a.ascari@unibo.it
		Dr. Chris Yuan, Case Western Reserve University, Cleveland, OH, USA. 216-368-5191; chris.yuan@case.edu
		Dr. Erica Liverani, University of Bologna, Bologna, Italy; erica.liverani2@unibo.it
		Dr. Wayne Cai, General Motors, Warren, MI, USA. 248-807-3949; wayne.cai@gm.com
MP6_2	Advances in Machining and Metrology	Dr. Bruce L. Tai, Texas A&M University, College Station, TX, USA, btai@tamu.edu
		Dr. Xiaoliang Jin, University of British Columbia, Vancouver, BC, Canada, xjin@mech.ubc.ca
		Dr. Yi-Tang Kao, Saint-Gobain, Northborough, MA, USA, yitangkao@gmail.com
		Dr. Takashi Matsumura, Tokyo Denki University, JAPAN. Ph: +81-70-7667-8941; tmatsumu@cck.dendai.ac.jp
		Dr. Norikazu Suzuki, Chuo University, JAPAN. Ph: +81-30-3817-1838; nsuzuki@mech.chuo-u.ac.jp
MP6_3	Advances in Surface Engineering: Process, Metrology, and Property/Performance	Dr. Beiwen Li, Iowa State University, beiwen@iastate.edu
		Dr. Yiliang (Leon) Liao, Iowa State University, leonl@iastate.edu

		Dr. Sougata Roy, Iowa State University, sroy@iastate.edu
MP6_4	Deformation Processing of Metals and Alloys	Dr. Dinakar Sagapuram, Department of Industrial and Systems Engineering, Texas A&M University, dinakar@tamu.edu
		Dr. Jinjin Ha, Department of Mechanical Engineering, University of New Hampshire, Jinjin.Ha@unh.edu
		Dr. Yang Guo, Department of Mechanical Engineering, Michigan State University, yguo@msu.edu
MP6_5	Innovative Joining Processes for Advanced Materials	Dr. Xun Liu, The Ohio State University, Columbus, OH, USA, phone: (614)2928915, liu.7054@osu.edu
		Dr. Yunwu Ma, Shanghai Platform for Smart Manufacturing, Shanghai, China, phone: (86)(21)68286971, mayw@spsm.net.cn
		Dr. Yongbing Li, Shanghai Jiao Tong University, Shanghai, China, phone: (86)(21)34206305, yongbinglee@sjtu.edu.cn
MANUFACTURING SYSTEMS		
MS7_1	AI for Smart Manufacturing Systems	Dr. Chenhui Shao, University of Illinois at Urbana-Champaign; +1 (217) 300-4750; chshao@illinois.edu
		Dr. Shenghan Guo, Arizona State University; +1 (480) 727-5120; shenghan.guo@asu.edu
		Dr. Ran Jin, Virginia Tech; +1 (540) 231-2262; jran5@vt.edu
		Dr. Yujie Chen, Caterpillar Inc., +1 (309) 494-3683; chenyujie711@gmail.com
NANO/MICRO/MESO MANUFACTURING		
NMM8_1	Advances in Meso, Micro and Nano Manufacturing in Industry 4.0	Dr. Soham Mujumdar, IIT Bombay, Mumbai, India, Ph: +91-9922900074, sohammujumdar@iitb.ac.in
		Dr. Ashif Iquebal, Arizona State University, Tempe, AZ, USA., +1-979-739-2685, aiquebal@asu.edu
		Dr. Wayne Hung, Texas A&M University, College Station, TX, USA, +1-979-845-4989, hung@tamu.edu
		Dr. Sekhar Rakurty, M.K. Morse Company, Canton, OH, USA, +1-801-889-5228, RakurtyS@mkmorse.com

QUALITY & RELIABILITY		
QR9_1	Bridging Academic Research and Industrial Practices on Machine Learning for Advanced Manufacturing	Dr. Peng (Edward) Wang, University of Kentucky, Lexington, KY, USA. 859-562-2415; edward.wang@uky.edu
		Dr. Hantang Qin, University of Wisconsin-Madison, Madison, WI, USA. 919-961-9602; hqin52@wisc.edu
		Dr. Shaopeng Liu, GE Aerospace Research, Niskayuna, NY, USA. sliu@ge.com
		Dr. Hassan Ghassemi-Armaki, General Motors R&D, MI, USA. hassan.ghassemi-armaki@gm.com

— Call for Papers —

A Symposium on

Advances in Metal Additive Manufacturing Processes

Sponsored by the ASME Manufacturing Engineering Division's
Additive Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

As technology advances and becomes more cost-effective, metal additive manufacturing (AM), is likely to play an increasingly important role in various industries including aerospace, automotive, medical, defense, and more. Metal AM delivers complex metal structures with excellent physical properties using a wide range of industrial materials, such as titanium, stainless steel, Inconel, superalloys, and refractory metals. However, the lack of fundamental understanding of the metal AM processes has made it challenging to control the quality of the product and thus thwarted the progress in the adoption of metal AM. Recent advancements in metal AM expanded the processes' capabilities to fabricate AM materials by hybrid techniques, 4-D AM of functional metal alloys, 5-D AM, and beyond. This symposium will report the latest progress in all aspects of metal AM, such as new metal AM processes and systems, process control and development, characterization, process-structure-property relationships of AM, numerical tools, related simulation, and modeling. This symposium expands beyond the traditional 3-D AM techniques to new metal AM processes and systems of functional materials and structures using AM and hybrid manufacturing processes that enable metal fabrication beyond 3-D. Authors are encouraged to submit drafts related to metal AM that may contribute to improving the product quality, reducing the cost and risk of adopting metal AM, or new applications of metal AM. Authors from government, academia, and industries are all encouraged to participate. Specific topics of interest include, but are not limited to:

- Development of metal AM processes, materials, systems, or hybrid processes: 3-D, 4-D, 5-D, and beyond.
- AM material and mechanical characterizations: morphological, size distribution, composition, and thermal properties of metals including structural, functional, refractory, and superalloys.
- Simulation, modeling, and process-structure-property relationships using experimental and/or computational approaches and related validation.
- AM process planning: scan path planning, speed/power synchronization, material reduction, scanning strategies, heat-assisted fabrication, etc., and their effects on part quality/performance.
  Post-process characterization of metal AM: such as microstructure, mechanical properties, fatigue, elevated temperature testing, and non-destructive testing.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Attract a high-profile international keynote speaker

Organizers

Dr. Ala Qattawi, University of Toledo, Toledo, OH, USA. 419-530-3140; ala.qattawi@utoledo.edu
Dr. Dong Lin, Oregon State University, Corvallis, OR, USA. 541-737-7074; dong.lin@oregonstate.edu
Dr. Wenchao Zhou, University of Arkansas, Fayetteville, AR, USA. 479-575-7250; zhouw@uark.edu
Dr. Ho Yeung, NIST, Washington DC, USA, 301-975-2786; ho.yeung@nist.gov
Dr. Hector Siller, University of North Texas, Denton, TX, USA. 940-565-2362 hector.siller@unt.edu

— Call for Papers —

A Symposium on

In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's
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Technical Focus

Key bottlenecks in additive manufacturing (AM) processes are the certification and qualification of AM parts for industrial use, especially for applications in aerospace or in biomedical sectors. Much of the understanding of the final AM occur during ex situ characterization – for example, slicing parts, polishing cross-sections, and investigating microstructure and porosity with microscopy. Challenges in this approach show that measurements of an AM part's characteristics, including defects, structure, geometry (which can change with warping), and properties can be time-consuming and cost-prohibitive, requiring many builds and many hours of testing and characterization. However, in situ monitoring techniques and non-destructive evaluation of AM parts show promise in not only reducing processing and testing time, but also in more rapid certification and qualification in several ways: prediction of any defects or properties of the final AM part, closed-loop control of the AM process, and finally better understanding of the process physics, which can drive data-driven or modeling approaches. This symposium focuses on the advances in measurement science and techniques for more rapid qualification and certification of AM parts that could have industrial impact. Specific topics of interest include, but are not limited to:

- Qualification and certification of materials, processes, and products;
- Operando and custom, open-architecture manufacturing machines and instrumentation;
- In situ imaging during manufacturing processing, including thermal and optical;
- In situ methods such as X-ray or neutron diffraction, spectroscopy, thermocouple, and ultrasonic methods;
- Surface-based methods to detect for melt pool size or ripples for metal additive manufacturing;
- Data-driven techniques to consolidate monitoring data for prediction and control;
- Defect or anomaly detection during in situ monitoring;
- Non-destructive characterization after the process for porosity or stress states;
- Coupled simulation and experiments to predict for defects or anomalies;
- Data analytics that incorporate in situ and/or non-destructive measurements to qualify parts

Paper Submission (Dates are subject to change.)

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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

Organizers

Dr. Sarah Wolff, The Ohio State University, wolff.357@osu.edu
Dr. Andy Fan, Oregon State University, zhaoyan.fan@oregonstate.edu
Dr. Samantha Webster, National Institute of Standards and Technology (NIST), samantha.webster@nist.gov
Dr. Andelle Kudzal, Naval Surface Warfare Center Carderock, andelle.d.kudzal.civ@us.navy.mil

— Call for Papers —

A Symposium on

Multi-Material Processing in Additive Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's
Additive Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
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Technical Focus

As additive manufacturing (AM) technologies evolve, there is more desire to locally tune properties within a 3D printed structure. Although locally varying composition enables control in overall function, there are many knowledge gaps such as how multi-material AM processing affects interfacial properties, how precisely composition can be tuned during a multi-material AM process, how to assess the quality of functionally graded structures, etc. In addition, combining dissimilar materials in-situ (e.g., electronic chips with polymers or ceramic coatings on metals) requires understanding of how multiple AM or manufacturing processes affect interfacial quality. Although there are many existing demonstrations of multi-material AM, this session focuses on research that advances knowledge of how multi-material AM processes control interfacial or local properties and how new and advanced characterization strategies can assess the properties of multi-material structures. This session will include a variety of AM methods used to produce metals, polymers, ceramics, electronics, etc.

- Modeling and simulation of multi-material interfacial adhesion
- Functional hybrid/composite materials design and synthesis for additive manufacturing
- Experimental techniques to assess multi-material interfaces
- Measurement techniques to assess compositional gradients
- Machine/software control advances that improve multi-material additive manufacturing processing

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Additional Symposium Activities

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

- Attract a top keynote speaker

Organizers

Dr. Monique McClain, Purdue University, mcclain5@purdue.edu
Dr. Weinan Xu, University of Akron, weinanxu@uakron.edu
Dr. Jay Park, University of Massachusetts Lowell, Jay_Park@uml.edu
Dr. Yanliang Zhang, University of Notre Dame, yzhang45@nd.edu
Dr. Mostafa Yourdkhani, Colorado State University, yourd@colostate.edu

— Call for Papers —

A Symposium on

Smart Additive Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's
Additive Manufacturing Technical Committee
Manufacturing Systems Technical Committee
Quality & Reliability Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
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Technical Focus

There is a lot of excitement about the potential of smart manufacturing (involving the use of information, automation, computation, software, sensing, and networking technologies) to revolutionize the manufacturing industry, e.g., by boosting manufacturing quality and productivity at low cost. An excellent application for such "smart" technologies is additive manufacturing (AM), another area of manufacturing that is gaining a lot of traction but is plagued by quality, productivity, and cost issues. This symposium will focus on research aimed at leveraging advances in sensing, automation, computation, software, networking, big data analytics, machine learning, control, etc., to reduce trial and error, and enhance the quality, productivity, scalability, cost-effectiveness and functionality of AM. Specific topics of interest include, but are not limited to:

- Data-driven predictive modeling of AM processes
- Physics and/or data-driven part design
- In-process and post-built defect detection, characterization, and analysis
- Digital twin of AM process and equipment
- New sensing modalities and data fusion techniques for AM process monitoring and control
- In-situ monitoring and control techniques for AM
- Applications of machine learning (e.g., physics-guided) in any phase of AM, including design and materials
- Use of cloud/edge and high-performance computing to advance AM
- Embedded sensors and integrated functionalities using AM
- Industrial Internet of Things (IIoT) applications in AM
- Novel applications of commercial software in AM

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Additional Symposium Activities

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

- Work to promote high-quality submissions

Organizers

Dr. Azadeh Haghighi, University of Illinois Chicago, Chicago, IL, USA, ahaghi3@uic.edu
Dr. Prahalada Rao, Virginia Tech, VA, USA, prahalad@vt.edu
Dr. Molong Duan, Hong Kong University of Science and Technology, Hong Kong SAR, China, duan@ust.hk
Dr. Uduak Inyang-Udoh, University of Michigan, Ann Arbor, MI, USA, udinyang@umich.edu

— Call for Papers —

A Symposium on

Advances in Digital Twins of Manufacturing Processes and Systems

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Manufacturing Processes Technical Committee
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Technical Focus

Manufacturing processes are becoming increasingly data-rich and data-driven. Integrating manufacturing data and process and system models in real-time, a digital twin (DT) may function as an autonomous and dynamic digital replica. This, in turn, may enable manufacturers not only to understand and monitor a system but also proactively control the process or system in real-time or a product over its life cycle. DTs offer immense potential in optimizing entire manufacturing systems, facilitating predictive maintenance, and enabling agile decision-making to enhance overall operational efficiency and productivity. The aim of this call is to provide a forum for researchers and practitioners to assess, understand, and review the dynamically evolving DT concept, definitions, and perspectives of DT technologies with applications in manufacturing. Specific topics of interest include, but are not limited to:

- DT concept, definitions, and technologies with applications in manufacturing processes and systems.
- DT framework, building blocks, and enabling components for manufacturing processes and systems.
- Physical-digital integration and interaction in DTs.
- Physics-based simulation models and reduced order models applied to DTs.
- Data-driven and machine learning/AI models applied to DTs.
- Technical innovations in sensors, high-speed communication, and data curation and integration to facilitate DTs.
- Edge control strategies and execution using DTs.
- Construction and implementation of DTs considering uncertainty.
- Process improvement and optimization using DTs.
- Predictive maintenance and quality control through DTs.
- Next-generation DTs for addressing gaps in the existing digital workflow.
- DT-enabled process development and materials development.
- Using DTs to develop next-generation materials and manufacturing technologies to increase U.S. industrial competitiveness and to drive economy-wide decarbonization.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a high-profile international keynote speaker
- Work to promote high-quality submissions
- Organize a special issue in the ASME Journal of Manufacturing Science and Engineering

Organizers

Dr. Weihong "Grace" Guo, Rutgers University, New Brunswick, NJ, USA. wg152@soe.rutgers.edu
Dr. Mihaela Banu, University of Michigan, Ann Arbor, MI, USA. mbanu@umich.edu
Dr. Teresa Rinker, General Motors LLC, Warren, MI, USA. teresa.rinker@gm.com
Dr. Paromita Nath, Rowan University, Glassboro, NJ, USA. nath@rowan.edu
Dr. Chukwuzubelu Ufodike, Texas A&M University, College Station, TX, USA. ufodike@tamu.edu

— Call for Papers —

A Symposium on

Advances in Manufacturing and Processing of Polymers and Composites

Sponsored by the ASME Manufacturing Engineering Division's
Advanced Materials Manufacturing Technical Committee
Manufacturing Processes Technical Committee
Additive Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

This symposium will provide a platform for interdisciplinary discussion on recent development in polymer processing and manufacturing, including polymer-based materials discovery and development, ceramic-polymer composites, manufacturing strategy and modifications, composite architectures and constructions, mechanical analysis and characterizations, modeling and simulation, machine learning and emerging cloud technology-assisted polymer processing and manufacturing, and functional devices design and applications. Specific topics include, but are not limited to:

- Liquid molding and casting, thermoplastic and thermoset molding, injection molding, overmolding processes
- Fiber spinning processes, cast and blown film extrusion, stretching forming processes
- Advances in polymer and composite additive manufacturing techniques (e.g., FDM, SLA, DLP, SLS, DIW, and Hybrid AM)
- Advances in manufacturing of multi-scale and multi-material components and structures
- Reactive processing and functional additives
- Materials removal and ablation processes
- Joining and welding of polymers and composites and interface mechanics
- Precision instrumentation and tooling for injection molding/extrusion/fiber spinning/thermoforming
- Sustainability of polymer and composite processes, recycling processes and properties of recycled materials
- SMART polymers, self-healing materials, foams and composites for Earth and Space environment
- Polymers and composites for biosystems, biomedical devices and energy and electronic devices
- Process dynamics, rheology and modeling in polymer processing
- Advanced characterization, monitoring and control of polymers and polymer composites
- Machine learning and AI in polymer processing and advance manufacturing

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a high-profile international keynote speaker
- Organize a state-of-the-art paper that will be the lead article in the special issue

Organizers

Prof. Erina Joyee, University of North Carolina at Charlotte, NC, US. 704-687-8930; ejoyee@charlotte.edu
Prof. Felicia Stan, Dunarea de Jos University of Galati, GL, Romania. +40-742-947-501; felicia.stan@ugal.ro
Prof. Kenan Song, Arizona State University, Tempe, AZ, US. 480-727-2720; kenan.song@asu.edu
Prof. Kun (Kelvin) Fu, University of Delaware, Newark, DE, US. 302-831-2008; kfu@udel.edu
Nestor Vasquez, DuPont, Newark, DE, US. 989-430-9440; nestor.a.vasquez@dupont.com

— Call for Papers —

A Symposium on

Convergent Manufacturing of Advanced Materials for Hybrid Manufacturing Systems and Products

Sponsored by the ASME Manufacturing Engineering Division's
Advanced Materials Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

The convergence of multiple manufacturing techniques and processing domains has enabled new uses of existing manufacturing equipment in novel workflows. For example, integration of additive, subtractive, and inspection techniques by means of hybrid manufacturing has enabled manufacturers to reduce labor and material costs by mitigating disjointed processing. The aim of this symposium is to provide a forum for researchers and practitioners to share and review the recent developments in the area of convergent manufacturing systems for the use of advanced materials in the production of multi-functional products. Papers are welcome to include process planning, process/system development, material property analysis of resulting components, and novel experimental approaches with applications in aerospace, automotive, tooling, repair, renewable energy, etc. This symposium invites papers from academia, national laboratories, and industry to present findings in topic areas including, but not limited to:

- Integration of additive manufacturing with conventional processes in a single manufacturing operation/system
- Design for hybrid manufacturing using Integrated Computational Materials Engineering (ICME)
- CAD/CAM process modeling, development, and optimization for additive/subtractive manufacturing
- Hybrid manufacturing processes for multi-functional products, such as flexible and in-mold electronics
- Recycling of materials and remanufacturing of products to extend product lifecycle and reduce CO2 emissions
- Digital twins, modeling and simulation of production systems for advanced materials and improved system performance
- Accelerated validation methods for integrated systems including advanced materials
- Multi-scale or multi-physics processing for hybrid manufacturing

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Invite one high-profile keynote speaker from the industry to share industrial needs and practices about development and deployment of convergent manufacturing systems
- Work to promote high-quality submissions – four organizers will cover all relevant societies for outreach
- Organize a special issue in the ASME Journal of Manufacturing Sciences and Engineering in the topic of "Converge Manufacturing System and Hybrid Manufacturing".

Organizers

Dr. Thomas Feldhausen, Oak Ridge National Laboratory, Oak Ridge, TN USA. feldhausenta@ornl.gov
Dr. Saeed Farahani, Cleveland State University, Cleveland, OH, USA. s.farahani@csuohio.edu
Dr. Jason Jones, Hybrid Manufacturing Technologies, McKinney, TX USA. jj@hybridmanutech.com
Dr. Christopher Saldana, Department of Energy, Washington, DC USA, christopher.saldana@ee.doe.gov
Dr. Chao Wang, University of Iowa, Iowa City, IA, USA. chao-wang-2@uiowa.edu

— Call for Papers —

A Symposium on

Advances in Design, Manufacturing, and Analysis of Biomedical Devices

Sponsored by the ASME Manufacturing Engineering Division's
Biomanufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

The characteristics, use, and performance of novel materials, structures, and devices for biomedical applications entail unique requirements for biomedical manufacturing. A better understanding of biomedical manufacturing processes leads to safer, smarter, and environment-friendly biomedical devices, thus reducing healthcare costs and complications. Besides continual improvement of generic devices, emerging technologies (e.g., additive manufacturing, machine learning, and robotics) have created novel ideas and new tools in biomedical devices and applications. These applications include the manufacturing of soft materials, patient specific medical or assistive devices, novel surgical tools, medical and surgical robots, intraoperative monitoring and feedback, etc. This symposium aims to identify the constraints imposed on manufacturing processes by the requirements of biomedical materials and products, present forefront research results, highlight needs and solutions in biomedical device design, manufacturing, and analysis, and point to new paths for biomedical manufacturing processes. Original contributions are invited in, but not limited to the following areas:

- Analysis of biological tissue manipulation processes and modeling/experimentation of clinical procedures.
- Design, manufacturing, and analysis of advanced medical devices and tools for clinical procedures.
- Characterization and modeling of biomedical and biological materials and related manufacturing processes.
- Novel manufacturing processes, equipment, and materials for biomedical manufacturing and applications.
- Advances in process validation and verification in biomedical manufacturing.
- Devices, processes, controls, and systems in medical robotics.
- Design and manufacturing of medical simulation tools and systems.
- Machine learning and artificial intelligence in biomedical manufacturing and devices.
- Reviews of the state-of-the-art knowledge, technology, and research needs in biomedical manufacturing and development of biomedical devices.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to organize a paper on state-of-the-art biomedical manufacturing and/or certain biomedical devices
- Collate fast-tracked journal papers from this symposium into a special issue on Biomedical Manufacturing in ASME Journal of Manufacturing Science and Engineering and/or the ASME Journal of Micro and Nano Manufacturing.

Organizers

Dr. Lei Chen, University of Massachusetts Lowell, Lowell, MA, USA. 978-934-2994; Lei_Chen@uml.edu
Dr. Yi Wang, University of Missouri, Columbia, MO, USA. 573-882-2340; yiwang@missouri.edu
Dr. Dian-Ru Annie Li, National Taiwan University, Taiwan. (+886)-2-3366-2745; dianrul@ntu.edu.tw

— Call for Papers —

A Symposium on

Advances in Manufacturing of Tissue Constructs/Medical Implants and Bioinspired Materials/Structures for Healthcare Applications

Sponsored by the ASME Manufacturing Engineering Division's
Biomanufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Advanced manufacturing has revolutionized fabrication of 2D/3D structures for diverse healthcare applications, particularly in the development of tissues and medical implants to replace damaged or injured human tissues and organs. Biomaterials like metals, ceramics, polymers, and composites are commonly used in these applications. Nature's high-performance materials and structures serve as valuable inspirations for designing the next-generation of biomaterials with exceptional acoustic, optical, electrical, thermal, mechanical, and hydrodynamic properties. The associated challenges and complexities include biomaterial formulation, cell and biomaterial interaction, design and optimization of tissue constructs and medical implants, design and fabrication of bioinspired material and structures, biomanufacturing challenges related to living cells' sensitivities and processing various bioinspired materials, and 3D/4D printing of bioinspired functional medical devices. This symposium focuses on cutting-edge research advances in the fabrication of tissue-engineered scaffolds, medical implants, and bioinspired materials and structures for various applications. Specific topics of interest include, but are not limited to:

- Development of new bioinks and biomaterials.
- Modeling and analysis of biomanufacturing process.
- Innovation of new bioprinting or manufacturing approaches.
- Engineering 2D/3D cellular microenvironments.
- Design and 3D bioprinting of complex tissues and organs.
- Organ-on-chips and microfluid devices with bioinspired interfacial structures.
- Design, fabrication, and characterization of medical implants.
- Design, modeling and simulation of bioinspired structures and material systems for 3D printing.
- Innovative manufacturing processes for bioinspired material and structures fabrication.
- 3D/4D printing of bioinspired actuators, robots, and metamaterials for healthcare applications.
- 3D printing of healthcare wearable devices.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Organizers

Dr. Changxue Xu, Texas Tech University, Lubbock, TX, USA. changxue.xu@ttu.edu
Dr. Cindy (Xiangjia) Li, Arizona State University, Tempe, AZ, USA. xiangjia.li@asu.edu
Dr. Ryan B. Wicker, University of Texas at El Paso, El Paso, TX, USA. rwicker@utep.edu
Dr. Yang Yang, San Diego State University, San Diego, CA, USA. yyang10@sdsu.edu
Dr. Yong Huang, University of Florida, Gainesville, FL, USA. yongh@ufl.edu

— Call for Papers —

A Symposium on

Advances in Sustainable Manufacturing for Improved Component Life Cycle Performance

Sponsored by the ASME Manufacturing Engineering Division's
Life Cycle Engineering & Manufacturing Processes Technical Committees
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

This symposium focuses on advances in sustainability-driven manufacturing processes, analysis of the underlying physics, their influence on the performance of manufactured parts, and associated carbon footprint and climate change impacts. Although decarbonization and sustainability efforts in manufacturing are in full flow, there is limited emphasis on analysis of long-term (including multiple life cycle) performance of machine tools, manufacturing processes, and manufactured components due to process-induced residual stresses, associated distortions, surface quality, and fatigue characteristics. To that end, participation from experts across academia, industry, and national laboratories working in fields such as sustainable manufacturing processes, process/structure/performance relationships, and component failure (fatigue, wear, corrosion, etc.), and life cycle analysis is sought to enable more sustainable manufacturing practices across process, product, and system levels. Specific topics of interest include, but are not limited to:

- Sustainability-driven design for additive, subtractive, and hybrid manufacturing.
- Advanced manufacturing of functional parts for clean energy and climate mitigation such as hydrogen storage, wind turbines, small modular reactors, biomass and biorefinery, and carbon capture.
- Multi-disciplinary and convergent approaches for characterization, modeling, and optimization of complex relationships between manufacturing process and life cycle performance.
- Influence of process-specific thermomechanical loads in conventional manufacturing operations such as casting, rolling, forging, and machining on part quality and performance.
- Residual stress, distortion, and microstructure in manufacturing and its impact on component life cycle performance.
- Modeling of process/structure/performance relationships and quantitative service life prediction.
- AI and machine learning for LCA modeling and assessment for advanced manufacturing.
- Additive manufacturing for extended life cycle performance through repair, remanufacturing, recycling.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a high-profile international keynote speaker.

Organizers

Dr. Ritin Mathews, MDF, Oak ridge national lab, Oak Ridge, TN, USA. 516-373-8653; mathewsr@ornl.gov
Dr. Julius Schoop, University of Kentucky, Lexington, KY, USA. 859-323-8308; julius.schoop@uky.edu
Dr. Muyue Han, North Carolina A&T State University, Greensboro, NC; mhan@ncat.edu
Dr. Sheng Yang, University of Guelph, Guelph, ON, Canada. syang19@uoguelph.ca
Dr. Guoying Dong, University of Colorado Denver, Denver, CO, USA. guoying.dong@ucdenver.edu

— Call for Papers —

A Symposium on

Systems Engineering and Digital Technologies for Circular Economy

Sponsored by the ASME Manufacturing Engineering Division's
Life Cycle Engineering Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Circular economy (CE) aims to reduce natural resource consumption, waste generation, and related detrimental environmental, social, and economic impacts by keeping materials circulating in the economy. Due to global resource scarcity, fostering CE in the resource-intensive manufacturing sector is critical to achieving the United Nation's Sustainable Development Goals. However, the implementation of CE remains challenging as it inherently requires the integration of multiple stakeholders through the exchange of resources and information. Moreover, a systems-level understanding of how stakeholder decisions and interactions affect disruption response is required as supply chain resilience is critical to achieve CE. Implementation of CE also requires advancements in design, manufacturing, and end-of-life treatments. Finally, enabling synergistic information sharing through digital technologies is required to achieve manufacturing CE. This symposium invites novel research on systems engineering approaches and technological innovations (including digital technologies) to advance CE. Example topics of interest are identified below; however, all relevant research is invited.

- Investigation of CE projects using complex adaptive systems modeling and analysis tools such as system dynamics, agent based modeling, and network analysis.
- Supply chain integrated comprehensive sustainability assessment considering multiple stakeholders
- Early-stage product/process design methods for material recovery at end-of-life
- Multi-attribute decision-making frameworks for comparing CE policies/strategies
- Resilience analysis of circular product supply chains, and synergies and trade-offs with sustainability objectives
- Advances in recovery processes (recycling, remanufacturing, etc.) and technological capabilities for resource utilization
- Data-driven approaches for facilitating open-loop and closed-loop material recovery such as prediction of secondary material availability and quality
- Internet of Things/digital thread implementation to facilitate synergistic information sharing for manufacturing CE
- Requirements engineering and practical implications for circular product design including efficient disassembly and disassembly process planning
- Industrial ecology and related approaches for CE implementation
- Application of Model-Based Systems Engineering for representation of circular manufacturing systems

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

To highlight advancements in this technical area and engage the community, symposium organizers will:

- Work to set up a panel discussion with SE and CE experts or invite a high-profile keynote speaker
- Work on organizing a special issue in an ASME Journal

Organizers

Dr. Abheek Chatterjee, University of Maryland, College Park, MD, USA. achatt31@umd.edu
Dr. Jing (Julia) Zhao, Penn State University, The Behrend College, Erie, PA, USA. jqz5665@psu.edu
Dr. Astrid Layton, Texas A&M University, College Station, TX, USA. alayton@tamu.edu
Dr. Matthew Triebe, National Institute of Standards & Technology, Gaithersburg, MD, USA. matthew.triebe@nist.gov
Dr. Nehika Mathur, National Institute of Standards & Technology, Gaithersburg, MD, USA. nehika.mathur@nist.gov

— Call for Papers —

A Symposium on

Innovations in Equipment Design, Control and Automation

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Equipment and Automation Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Advances in manufacturing technologies need to be aided by innovations in manufacturing equipment, tooling, and control/automation for effective deployment and commercialization. Most often, innovations in equipment/tooling design or control/automation are inspired by the requirements of a new manufacturing technology or the need to improve existing manufacturing processes. This symposium focuses on such demonstrated innovations in the design and control of equipment or components that enable new or improve existing manufacturing technologies. Specific topics of interest include, but are not limited to:

- Machine tools, industrial robots, and other machines in manufacturing
- Modeling, monitoring, and control of manufacturing equipment (CNC machining, joining, forming, and so on)
- Design and control of additive manufacturing machines, metrology systems, or hybrid machine systems
- Advances in sensors, actuators, motion command algorithms for positioning systems
- Data acquisition methods and data-driven machine tool/process automation and control
- Design and control of novel precision positioning systems (e.g., lithography, deposition, micro-machining)
- Sensor systems and integration for manufacturing equipment (e.g., sensor assisted 3D printing or machining)
- Artificial intelligence and machine learning for equipment control, autonomous operation, and smart manufacturing
- Novel tool holder design, tool path planning (e.g., in machining), and tool design (e.g., in forming)
- Automation in metrology systems and processes
- Novel multi-axis machine structures and controllers
- Remote data collection and smart control of equipment, cloud data storage, accessibility, and processibility.

Papers must demonstrate the testing of the new design or control methods to improve a manufacturing process. Contributions from industry in this area are particularly encouraged. With a lead article on state-of-the art in this field, a high-profile international keynote speaker will be invited by the symposium organizers.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Invite a high-profile international keynote speaker.
- Organize a special issue in the ASME Journal of Manufacturing Science and Engineering, and
- Organize a state-of-the-art paper that will be the lead article in the special issue.

Organizers

Dr. Chandra Nath, Purdue University, West Lafayette, IN, USA, Ph: +1-217-607-3029, nathc@purdue.edu
Dr. Lei Zhou, University of Wisconsin-Madison, WI, USA, Ph: 1-617-694-8231, lei.zhou@wisc.edu
Dr. Huitaek Yun, Korea Advanced Institute of Sci & Tech (KAIST), Daejeon, S. Korea, +82-42-350-3011, htyun@kaist.ac.kr

— Call for Papers —

A Symposium on

Semiconductor Manufacturing: Metrology, Inspection, Systems, and Processes

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Equipment and Automation Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Semiconductors are integral components of computers, tablets, cell phones and personal devices, and semiconductor manufacturing technology significantly drives the evolution of commercial products because the performance of semiconductor manufacturing equipment directly contributes to productivity and manufacturability. There is a need for new technology to meet the constant everchanging demands of the semiconductor market, but unfortunately there are few university-level investigations into semiconductor equipment and machines because industry leads that competitive research. Therefore, there are only a limited number of research and education opportunities for students to gain knowledge and hands-on experience in semiconductor manufacturing. The goals of this symposium are to form an academy-level semiconductor manufacturing research community, responding to the CHIPS and Science Act initiatives, and to extend semiconductor research capabilities that are transformative to industrial adaption. Specific topics of interest include, but are not limited to:

- Semiconductor processes: etching, deposition, coating, lithography, cleaning, chemical-mechanical polishing (CMP), etc.
- Lithography and patterning technologies
- Semiconductor packaging technologies: wafer bonding, heterogeneous integration, etc.
- Metrology, inspection, testing, and instrumentation technology for advancing semiconductor manufacturing
- Surface engineering and critical dimension (CD) characterization by destructive/nondestructive techniques
- Calibration techniques and data analytics
- Automatic inspection feature extraction and recognition
- Approaches to machine-learning/deep-learning based metrology
- Semiconductor manufacturing system design and development
- Semiconductor device design and fabrication
- Semiconductor workforce development and case studies

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Organizers

Dr. ChaBum Lee, Texas A&M University, College Station, TX, IA, USA. +1-979-458-8121 cblee@tamu.edu
Dr. Byunggi Kim, The University of Tokyo, Tokyo, Japan, +81-3-5452-6305, bkim@iis.u-tokyo.ac.jp
Dr. Jiyong Park, Korea Institute of Industrial Technology, Songdo, S. Korea, +82-32-850-0288, j.park@kitech.re.kr
Dr. Gregory Vogl, National Institute of Standards and Technology, Gaithersburg, MD, gregory.vogl@nist.gov

— Call for Papers —

A Symposium on

Advances in Clean Energy and E-Mobility Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Processes Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Carbon neutrality is a major driving force for the development of renewable clean energy, e.g., batteries, fuel cells, solar cells, wind, hydropower, nuclear, etc., to replace the traditional fossil fuel and petroleum-based energy. Electro-mobility has become a world-wide recognized definition related to the use of electric energy to propel several types of vehicles: from motorcycles to cars, from scooters to buses. The introduction of clean energy (batteries and/or fuel cells) in modern vehicles has determined the rapid adoption of dedicated manufacturing processes that should be able to deal with massive production, low waste and high flexibility to face the continuous improvements characterizing this new disruptive industrial scenario. The manufacturing aspect for clean energy attracts increasing attention since the manufacturing cost, waste and carbon emissions play a significant role in the adoption of clean energy. This symposium focuses on research advances concerning manufacturing processes to produce clean energy and related components in electro-mobility and other decarbonization applications. Specific topics of interest include, but are not limited to:

- Novel manufacturing technologies and methods for clean energy.
- Joining, cutting, and texturing for production of battery electrodes, cells, and packs.
- Additive manufacturing processes for production of advanced housings and highly electro-conductive materials.
- Manufacturing process and system design and optimization.
- In-situ monitoring and sensing the manufacturing process for clean energy.
- Computational modeling and simulation for manufacturing process of clean energy.
- Artificial intelligence in clean energy manufacturing.
- Manufacturing equipment, facility, and infrastructure for clean energy.
- Sustainability and scalability of manufacturing technologies.

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a high-profile international keynote speaker.
- Work to attract the members in clean energy manufacturing to broaden the manufacturing community.

Organizers

Dr. Lei Chen, University of Michigan-Dearborn, Dearborn, MI, USA. 313-593-5122; leichn@umich.edu
Dr. Alessandro Ascari, University of Bologna, Bologna, Italy; a.ascari@unibo.it
Dr. Chris Yuan, Case Western Reserve University, Cleveland, OH, USA. 216-368-5191; chris.yuan@case.edu
Dr. Erica Liverani, University of Bologna, Bologna, Italy; erica.liverani2@unibo.it
Dr. Wayne Cai, General Motors, Warren, MI, USA. 248-807-3949; wayne.cai@gm.com

— Call for Papers —

A Symposium on

Advances in Machining and Metrology

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Processes Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Machining and metrology are required for manufacturing of diversified products at different scales. Despite being a traditional area, the technologies continue to evolve to improve the part quality, handle new materials, and reduce energy consumption and environmental impacts. New topics have emerged in the past few years, such as hybrid manufacturing and smart manufacturing, in both hardware and software development. There is also a great need from the industry to seek advanced machining research, collaborate with academia, and find future workforce with a strong background in this field. However, with the enlarging scope of the manufacturing community, machining research has been dramatically diluted. This symposium aims to provide and resume a platform for both applied and fundamental machining works on machining, metrology, instrumentation, and AI-enabled technologies. Specific topics may include, but are not limited to:

- Advances in machine tools, cutting/abrasive tools, coatings, and tooling
- Advances in machining processes: cutting, abrasive machining, polishing, laser, EDM, etc.
- Modeling and simulations of multi-scale machining processes
- Machining of difficult-to-process materials, such as new alloys, ceramics, or composites.
- Machining in the hybrid manufacturing scheme
- Machining dynamics
- Ultra-precision machining
- Tribology and surface science in machining
- Sustainability issues and solutions
- In-situ sensing, measurement, and diagnostics
- Smart machining with sensor fusion and machine learning
- Process planning for multi-axis and multi-tasking machining operations
- Optical and photonic measurements
- Dimensional/form errors, measurement instruments, and uncertainty evaluation
- Quality control for production

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a high-profile keynote speaker
- Organize a review paper on the topic(s) of interest to summary the state-of-the-art machining research

Organizers

Dr. Bruce L. Tai, Texas A&M University, College Station, TX, USA, btai@tamu.edu
Dr. Xiaoliang Jin, University of British Columbia, Vancouver, BC, Canada, xjin@mech.ubc.ca
Dr. Yi-Tang Kao, Saint-Gobain, Northborough, MA, USA, yitangkao@gmail.com
Dr. Takashi Matsumura, Tokyo Denki University, JAPAN. Ph: +81-70-7667-8941; tmatsumu@cck.dendai.ac.jp
Dr. Norikazu Suzuki, Chuo University, JAPAN. Ph: +81-30-3817-1838; nsuzuki@mech.chuo-u.ac.jp

— Call for Papers —

A Symposium on

Advances in Surface Engineering: Process, Metrology, and Property/Performance

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Processes Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Surface quality and integrity play critical roles on determining the functionality and durability of a large variety of manufactured products. Advances in surface engineering techniques, particularly novel processing approaches and advanced inspection/analytical methodologies, will lead to the design and manufacturing of high-performance surfaces at various length scales. This symposium will focus on the research advances in the field of surface science and engineering, with emphases on manufacturing process innovation, dimensional metrology, surface inspection/characterization, and properties/performance. Such surface engineering techniques will have industrial impact by achieving better dimensional or process accuracy, better understanding of factors affecting the specific manufacturing process, and, ultimately, reduction of manufacturing costs through improved control and reduced process development time. Specific topics of interest include, but are not limited to:

- Surface quality of components fabricated by machining, casting, welding, additive manufacturing, etc.
- Advanced functional surfaces/coatings: nanotechnology, energy conversion/storage, biomaterials and biodevices, etc.
- Theoretical calculation/modeling of surface processing.
- Surface science of catalysis, electrocatalysis, photocatalysis, photoelectrochemical devices, etc.
- Dimensional metrology: metrology system design and fabrication, 3D/4D metrology methods, precision calibration techniques, machine-learning/deep-learning based metrology, etc.
- Surface inspection/characterization: surface profilometry in manufacturing processes, characterization of surface topography, trustworthiness of 3D surface topography data, surface data analytics, etc.
- In-situ/in-process/multi-modal measurement techniques for additive or other manufacturing processes.
- Surface properties: tribology (friction and wear), corrosion and oxidation resistance, hydrophilicity/hydrophobicity, contact/bending fatigue, etc.
- Multifunctional performance of advanced surface designs for energy, biomedical, environmental applications.
- Semiconductor (wafer, photomask, pellicle, etc.) surface/defect metrology and inspection.

Paper Submission (Dates are subject to change.)

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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 ASME Journal of Micro and Nano-Manufacturing
- Organize a state-of-the-art paper that will be the lead article in the special issue
- Promote a partnering platform connecting university research with industry R&D for successful partnerships

Organizers

Dr. Beiwen Li, Iowa State University, beiwen@iastate.edu
Dr. Yiliang (Leon) Liao, Iowa State University, leonl@iastate.edu
Dr. Sougata Roy, Iowa State University, sroy@iastate.edu

— Call for Papers —

A Symposium on

Deformation Processing of Metals and Alloys

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Processes Technical Committee
Advanced Materials Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

This symposium will bring together material scientists, mechanicians, industrial and mechanical engineers to discuss recent advances in the mechanics and materials science of deformation-based processes for metals and alloys including bulk forming, sheet metal forming, metal cutting and other solid-state deformation processing techniques. The symposium will contain papers showcasing state-of-the-art experimental, analytical, and computational mechanics techniques applied to investigation of metal plasticity, friction and failure phenomena underlying these manufacturing processes. A broad array of metallic materials and deformation processes fall under the ambit of this call, ranging from basic scientific study to commercial application. Special topics of interest include, but are not limited to:

- New deformation-based processing approaches for sustainable production of metals and alloys;
- Innovative experimental methods for studying plastic deformation, flow localization and ductile failure in metal forming, cutting and other solid-state processing approaches;
- Applications of in-situ full-field optical methods (high-speed imaging, DIC, photoelasticity, etc.) to investigate the deformation mechanics;
- Advances in multi-scale modeling approaches (phenomenological, crystal plasticity, etc.) for modeling plasticity and failure in forming processes;
- Coupled effects between microstructure, plasticity and fracture;
- Development of new experimental approaches and constitutive models for modeling material behavior under process-relevant thermomechanical conditions, including nonproportional loading, and high plastic strains, strain rates and temperatures;
- Investigation of contact mechanics, tribology, friction and wear related aspects in deformation processing;
- Size-scale and chemo-mechanical effects in deformation and forming processes.

Paper Submission (Dates are subject to change.)

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Additional Symposium Activities

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

- Work to attract a high-profile international keynote speaker for the symposium;
- Organize a special issue in the ASME Journal of Manufacturing Science and Engineering

Organizers

Dr. Dinakar Sagapuram, Department of Industrial and Systems Engineering, Texas A&M University, dinakar@tamu.edu
Dr. Jinjin Ha, Department of Mechanical Engineering, University of New Hampshire, Jinjin.Ha@unh.edu
Dr. Yang Guo, Department of Mechanical Engineering, Michigan State University, yguo@msu.edu

— Call for Papers —

A Symposium on

Innovative Joining Processes for Advanced Materials

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Processes Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference (MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Joining is an essential element in manufacturing complex structures and products - from custom products such as aircrafts, ships and medical devices to high volume products such as automobiles, appliances and microelectronics devices. Current trends in product design saw increased usage of lightweight and dissimilar materials, including metal alloys, metal matrix nanocomposites, carbon fiber composites and high entropy alloys etc. We are hence inviting researchers from academia, government and industry to share the advances and innovations in the field of joining of lightweight and dissimilar materials. The symposium consists of paper presentations. Specific topics of interest include, but are not limited to:

- Advanced fusion welding technologies, such as laser-based joining processes, high energy beam welding, and high-efficiency digital arc welding;
- Novel solid-state joining technologies, such as friction-based welding, impact welding, and ultrasonic welding etc.;
- Novel mechanical joining methods such as non-prehole riveting, single-sided riveting, and high-efficiency interference fit riveting etc.;
- Multi-energy field hybrid joining assisted by magnetic field, ultrasonic vibration, friction, and/or Joule heating etc.;
- Joining process and joint performance modeling with advanced computational methods such as multi-scale, multi-phase, and meshfree methods;
- On-line joining process monitoring, quality prediction and adaptive control using artificial intelligence etc.;
- Non-destructive joint structure evaluation using advanced observation techniques such as neutron diffraction, CT, and ultrasonic etc.

Paper Submission (Dates are subject to change.)

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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
- Organize a state-of-the-art paper that will be the lead article in the special issue

Organizers

Dr. Xun Liu, The Ohio State University, Columbus, OH, USA, phone: (614)2928915, liu.7054@osu.edu
Dr. Yunwu Ma, Shanghai Platform for Smart Manufacturing, Shanghai, China, phone: (86)(21)68286971, mayw@spsm.net.cn
Dr. Yongbing Li, Shanghai Jiao Tong University, Shanghai, China, phone: (86)(21)34206305, yongbinglee@sjtu.edu.cn

— Call for Papers —

A Symposium on

AI for Smart Manufacturing Systems

Sponsored by the ASME Manufacturing Engineering Division's
Manufacturing Systems Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Artificial Intelligence (AI) plays a pivotal role in the smart manufacturing (Industry 4.0) transformation. The deployment of industrial internet of things (IIoT), sensors, and digital technologies has resulted in a data-rich industrial landscape, opening up new opportunities to augment manufacturing intelligence. As modern manufacturing systems become increasingly complex, agile, and reconfigurable, innovative AI methodologies tailored for manufacturing applications are critically needed to harness industrial big data and engineering knowledge. The integration of AI models that use data from multiple sources with engineering principles can create next-generation decision-making capabilities for variation analysis, diagnostic and prognostic modeling, process control, scheduling, etc. These capabilities enhance system self-awareness, productivity, quality, resilience, sustainability, energy efficiency, and overall manufacturing performance. This symposium focuses on AI technologies that drive decision-making in smart manufacturing systems. Specific topics of interest include but are not limited to:

- Physics-informed machine learning for detecting and diagnosing system failures and remaining useful life prediction
- Variation analysis, anomaly detection, and maintenance through unsupervised or semi-supervised learning
- Computer vision and image processing supporting manufacturing decision-making
- High-dimensional data modeling and analysis for point clouds, multi-channel sensing signals, and tensors
- Monitoring, control, and design for failure-prone systems
- Multimodal data fusion for decision-making and informatics
- Statistics and machine learning for uncertainty quantification
- Decision-making in multi-stage manufacturing systems
- Data-efficient learning through transfer learning and federated learning
- Intelligent data acquisition enabled by optimal sensor system/network design and active learning
- Decision-making in cloud manufacturing and IIoT
- Manufacturing AI computation for quality and reliability excellence
- Human-robot collaboration in manufacturing systems
- Cyberinfrastructure supporting seamless integration of data acquisition, analytics, and secure information sharing

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website:*** ***https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

Additional Symposium Activities

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

- Work to attract a leading international keynote speaker,
- Recruit industrial and academic panelists to discuss emerging topics.

Organizers

Dr. Chenhui Shao, University of Illinois at Urbana-Champaign; +1 (217) 300-4750; chshao@illinois.edu
Dr. Shenghan Guo, Arizona State University; +1 (480) 727-5120; shenghan.guo@asu.edu
Dr. Ran Jin, Virginia Tech; +1 (540) 231-2262; jran5@vt.edu
Dr. Yujie Chen, Caterpillar Inc., +1 (309) 494-3683; chenyujie711@gmail.com

— Call for Papers —

A Symposium on

Advances in Meso, Micro and Nano Manufacturing in Industry 4.0

Sponsored by the ASME Manufacturing Engineering Division's
Nano/Micro/Meso Manufacturing Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

Meso-, Micro- and nano-scale manufacturing has gained significant attention in recent years, driven by the growing demand for production miniaturization and customization. Achieving high precision and product quality at this scale poses significant challenges, necessitating a deeper understanding of the underlying processes, development of advanced characterization methods, modeling and simulations, and effective monitoring techniques. This symposium aims to explore the latest advances in meso-, micro- and nano-scale manufacturing technologies together with sensing and machine leaning that address the aforementioned requirements. We welcome both theoretical and experimental contributions, with a particular interest in application-oriented novel manufacturing processes and systems. We strongly encourage papers from the industrial sector, as they provide valuable insights into real-world challenges and solutions. Specific topics of interest include, but are not limited to:

- Meso, micro and nano subtractive, additive, joining and hybrid manufacturing processes, systems, and technologies
- Process and system characterization, modeling, and simulation
- Micro and nanomaterials for manufacturing
- Scalable meso, micro and nanomanufacturing
- Digital twins and virtual manufacturing at the meso, micro, and nanoscale
- Manufacturing of non-traditional and novel materials, micro/nano-composites, polymer composites, and ceramics
- Surface engineering, texturing, surface integrity
- Process monitoring, inspection and control
- Machine learning and artificial intelligence to discover the process dynamics
- Measurement and metrology
- Novel product designs and assembly technologies
- Design and fabrication methods for micro-sensors, micro-actuators, motion systems, etc.
- Equipment for meso-, micro- and nano-scale manufacturing
- Applications of micro/nano additives and fluids for manufacturing
- Energy, sustainability and environmental aspects of meso, micro and nano manufacturing
- Meso, micro and nanomanufacturing for biomedical applications

Paper Submission (Dates are subject to change.)

Authors are encouraged to submit an abstract and full manuscript for review by **Oct 23, 2023 and November 01, 2023 respectively**. ***Submissions will only be accepted via the conference website: https://event.asme.org/MSEC/***. No papers are to be submitted to the organizers. The copyright transfer form must be completed by **March 19, 2024**. Final revised manuscripts must be submitted by **March 20, 2024**. The presenting author must register by **April 10, 2024** or the paper will be withdrawn from the conference proceedings.

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. Soham Mujumdar, IIT Bombay, Mumbai, India, Ph: +91-9922900074, sohammujumdar@iitb.ac.in
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Dr. Wayne Hung, Texas A&M University, College Station, TX, USA, +1-979-845-4989, hung@tamu.edu
Dr. Sekhar Rakurty, M.K. Morse Company, Canton, OH, USA, +1-801-889-5228, RakurtyS@mkmorse.com

— Call for Papers —

A Symposium on

Bridging Academic Research and Industrial Practices on Machine Learning for Advanced Manufacturing

Sponsored by the ASME Manufacturing Engineering Division's
Quality and Reliability Technical Committee
2024 ASME International Manufacturing Science & Engineering Conference
(MSEC2024)
June 17 – June 21, 2024
Knoxville, Tennessee, USA
Hosted by the University of Tennessee - Knoxville

Technical Focus

There are major gaps between academic advances in machine learning (ML) technique developments and industrial practices on ML deployment. Development of ML techniques that are deployable on the shop floor should consider challenges: 1) data collected from the shop floor are typically unstructured, unlabeled, and uncomprehensive; 2) manufacturing conditions on the shop floor are dynamically changing and evolving; 3) the performance of ML techniques should comply with high production and automation standards; 4) trustworthiness of data, protocols of data-sharing, and system cybersecurity should be further investigated. Correspondingly, the deployable ML techniques are expected to be trainable on imperfect shop floor data, generalizable to varying manufacturing conditions, and integrable to existing manufacturing infrastructure. Realizing these expectations requires close collaboration between academia and industry. This symposium will highlight recent academic works and industrial practices on moving ML deployment for advanced manufacturing. Topics of interest include, but are not limited to:

- Big shop floor data characterization, feature extraction, and discrimination
- Advanced ML models on big data learning, semi- and self-supervised learning, and continual (life-long) learning
- The interplay of physical modeling and ML data-driven modeling
- Multi-modal sensing data fusion for machine condition and part quality evaluation
- Intelligent, closed-loop, adaptive process control and quality assurance
- Transfer learning and federated learning on improving ML generalizability and adaptivity
- Methods to advance measurement science, standards, and test methods that enable trustworthiness, reliability, safety, and security for smart manufacturing systems

Paper Submission (Dates are subject to change.)

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Additional Symposium Activities

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

- Invite high-profile keynote speaker(s) from the industry to share industrial needs and practices about development and deployment of ML techniques for quality evaluation and assurance
- Work with MSEC technical committee on planning an Annual Big Manufacturing Data Challenge (to be started from 2025)

Organizers

Dr. Peng (Edward) Wang, University of Kentucky, Lexington, KY, USA. 859-562-2415; edward.wang@uky.edu
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