NAMRC 53

NAMRI/SME North American Manufacturing Research Conference

MSEC 2025

ASME MED Manufacturing Science and Engineering Conference

June 23–27, 2025

Greenville, SC, USA

CLEMSON UNIVERSITY

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CONFERENCE SCHEDULE

MONDAY, JUNE 23

Time	Location	Event
8:30–15:00	Think Tank	NAMRI Board of Directors Meeting
10:00–20:00	Conference Registration Desk	Registration/ Information
10:00–12:00		Tutorial 1 (Pre-registration required, parallel sessions)
13:00–15:00		Tutorial 2 (Pre-registration required, parallel sessions)
15:15–17:15	Think Tank	ASME MED Executive Committee Meeting
15:30–17:30		Tutorial 3 (Pre-registration required, parallel sessions)
15:00–18:00	Outside Ballroom	Exhibitor Booths Set-Up
16:00–18:00		Poster Set-Up
18:30–20:00	NOMA A	Welcome Reception

TUESDAY, JUNE 24

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–7:45	Ballroom	Breakfast
8:00–9:00	Outside Ballroom	Exhibitor Booths Set-Up
8:00–8:15	Ballroom	Welcome: Laine Mears
8:15–8:45	Ballroom	Welcomes: Mayor Knox White, Dean Anand Gramopadhye, SME Jeannine Kunz, ASME Susan Ipri-Brown
9:00–10:15	NOMA B&C	Student Manufacturing Design Competition 1
9:00–10:15		Technical Session I
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session II
10:30–11:45	NOMA B&C	Student Manufacturing Design Competition 2
12:00–13:30	Ballroom	Lunch
12:00–13:30	Think Tank	NAMRI Scientific Committee Members Meeting

CONFERENCE SCHEDULE

13:45–15:00		Technical Session III
13:45–15:00	NOMA B&C	Student Manufacturing Design Competition 3
13:45–15:00	Think Tank	JMSE Editorial Board Meeting
13:45–16:30	Teal	MSEC Poster Session
15:00–15:15	Teal	Afternoon Break
15:15–16:30		Technical Session IV
16:00–18:00	Ballroom	BIAM Forum
16:45–17:15	Think Tank	State of ASME MED Member Meeting
17:30–18:15	Think Tank	State of SME NAMRI Member Meeting
17:30–21:00	CU-ICAR Campus	Industry Night (Pre-registration Required)

WEDNESDAY, JUNE 25

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
7:30–9:00	Think Tank	SME Journals Meeting
8:00–8:55	Ballroom	Welcome and Keynote: Mike Molnar
9:00–10:15	Ballroom	Workshop: National Manufacturing Strategy
9:00–10:15		Technical Session V
9:00–10:15	Redbud C	Student Research Competition 1
9:00–10:15	NOMA B&C	Supplemental Technical Session
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session VI
10:30–11:45	Redbud C	Student Research Competition 2
10:30–11:45	NOMA B&C	Federal Agency Roundtable
12:00–13:30	Ballroom	ASME MED Award Luncheon
13:45–15:00	Redbud C	Student Research Competition 3
13:45–15:00	Teal	Chill out with SME – Membership Meeting

CONFERENCE SCHEDULE

13:45–15:00	NOMA B&C	SME Blue Sky Competition I
13:45–15:00		Technical Session VII
14:30–17:30	Ballroom	Women in Advanced Manufacturing (WIAM) Forum
15:00–15:15	Teal	Afternoon Break
15:15–16:30		Technical Session VIII
15:15–16:30	NOMA B&C	SME Blue Sky Competition 2
16:30–16:45	Teal	Afternoon Break
16:45–18:00		Technical Session IX
18:00–19:30	NOMA B&C	Joint SME Journals and Scientific Committee Reception
18:15–21:00	Ballroom	NSF Early Career Forum

THURSDAY, JUNE 26

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
8:00–8:45	Ballroom	Welcome and Industry Panel
9:00–10:15		Technical Session X
9:00–10:15	NOMA B	Doctoral Symposium 1
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session XI
10:30–11:45	NOMA B	Doctoral Symposium 2
10:30–11:45	Think Tank	International Collaborative Research and Education Session
12:00–13:30	Ballroom	SME NAMRI Awards Luncheon
13:45–15:00		Technical Session XII
13:45–15:00	Think Tank	Doctoral Symposium 3
15:00–15:30	Teal	Afternoon Break
15:15–16:30		Technical Session XIII

CONFERENCE SCHEDULE

15:15–16:30	Think Tank	Doctoral Symposium 4
15:15–16:30	NOMA B&C	FMNet Roadmap Panel Session
16:00–18:00	Ballroom	Blacks in Advanced-Additive Manufacturing (BiAM) Forum
16:30–16:45	Teal	Afternoon Break
16:45–18:00	NOMA B&C	Technical Session XIV
16:45–18:00	NOMA B&C	IMTG ASME Panel: Intelligent Manufacturing
18:00–20:45	BMW Training Center	Banquet

FRIDAY, JUNE 27

Time	Location	Event
7:00–12:00	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
9:00–13:00	Outside Ballroom	Exhibitor Booths Open
9:00–10:15		Technical Session XV
10:30–11:45		Technical Session XVI
12:00–13:00	Ballroom	Boxed Lunch
12:30–14:00	BMW Mfg. Plant	Factory Tour 1
13:15–14:45	BMW Mfg. Plant	Factory Tour 2

CONFERENCE RESOURCES

Registration: Registration will be in the Greenville Hyatt Regency (220 North Main Street, Greenville, SC 29601) from Monday–Friday.

Exhibitors: Exhibitor/Sponsor booths will be in the atrium behind the registration desk.

Coffee Breaks: Coffee, tea, water, and light snacks will be served during morning and afternoon breaks in the Teal room.

Name Badges: Please wear your badge at all times and especially to all conference events. Admission to events including meals will be determined by your badge. Your name badge also provides useful information for other attendees.

Conference Program: The conference program is accessible using the **Swoogo: Attendee Mobile** app available in Apple store and Google Play store.

Apple Store

Google Play

Alternatively, an electronic pdf of all conference details is available from the host website: https://www.clemson.edu/cecas/namrc-msec/

Wireless Internet Access: Scan for wireless networks. Select the **ConferenceOne** network with Password:**NAMRCMSEC25**. Scroll down and click Continue to the Internet. You are now ready to use the Internet. This is an unsecured network.

General Help: Please visit the registration desk for all conference questions.

Downtown Greenville Area Safety Tips: The City of Greenville Police Department reminds you to take reasonable safety precautions, including:

- Do not leave personal property such as laptop computers, wallets, cash, jewelry, or bicycles unattended and unsecured
- Do not leave items of value visible in a parked car
- Stay alert and aware of any people and circumstances around you.
- Report suspicious activity or persons to the police immediately : 911 for emergencies and (864) 271-5333 for non-emergencies.

CONFERENCE RESOURCES

Transportation*:*

- Shuttles will be provided for Industry Night on Tuesday and the banquet on Thursday. Pre-registration is required for these events.

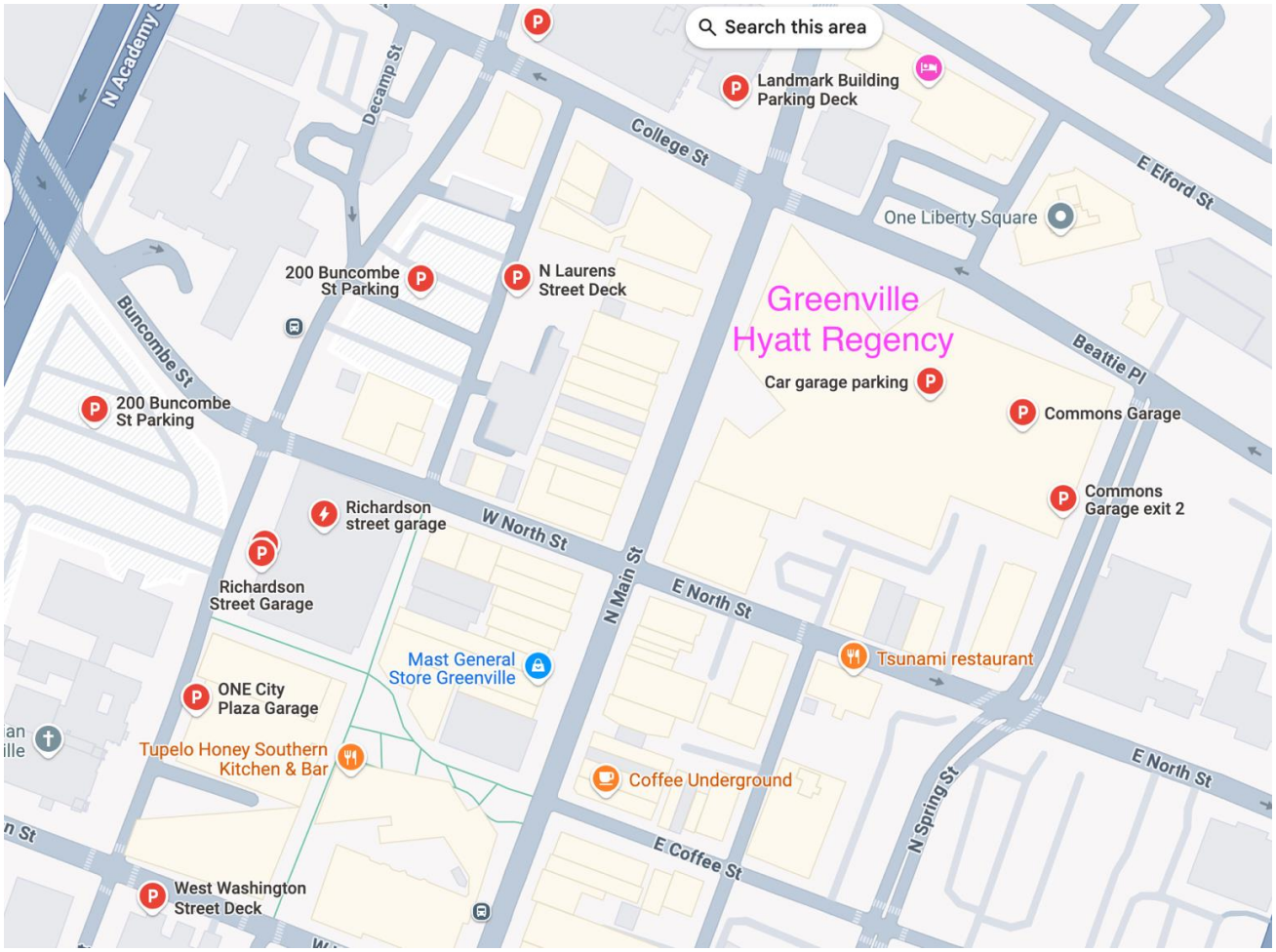
Tuesday, June 24 Industry Night	
Service to CU-ICAR Campus, Greenville, SC **From** Hyatt Regency, Greenville, SC	Service to Hyatt Regency, Greenville, SC **From** CU-ICAR Campus, Greenville, SC
16:45 Multiple buses depart in 15-minute intervals ending at 18:30	19:00 Multiple buses depart in 15-minute intervals ending at 21:15
Thursday, June 26 Banquet	
Service to BMW Training Center, Greer, SC **From** Hyatt Regency, Greenville, SC	Service to Hyatt Regency From BMW Training Center, Greer, SC
17:30 Multiple buses depart in 30-minute intervals ending at 18:30	19:30 Multiple buses depart in 30-minute intervals ending at 21:00

CONFERENCE RESOURCES

Parking

Covered parking is available in the Commons Garage adjacent to the Hyatt Regence hotel (220 North Main Street, Greenville, SC). Additional parking decks are within close walking distance.

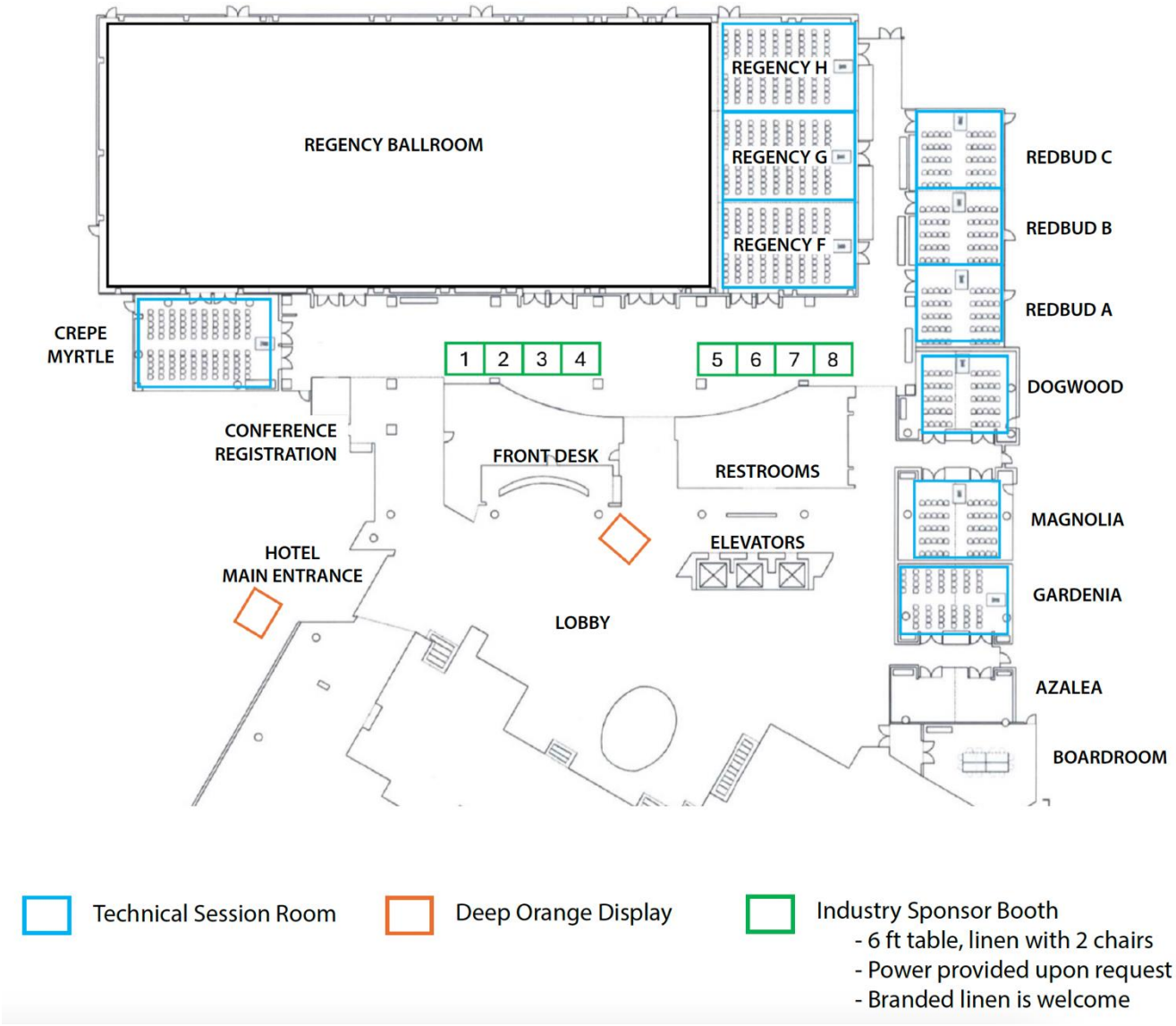
https://www.greenvillesc.gov/519/City-Garages-Lots



CONFERENCE RESOURCES

Greenville Hyatt Regency Maps

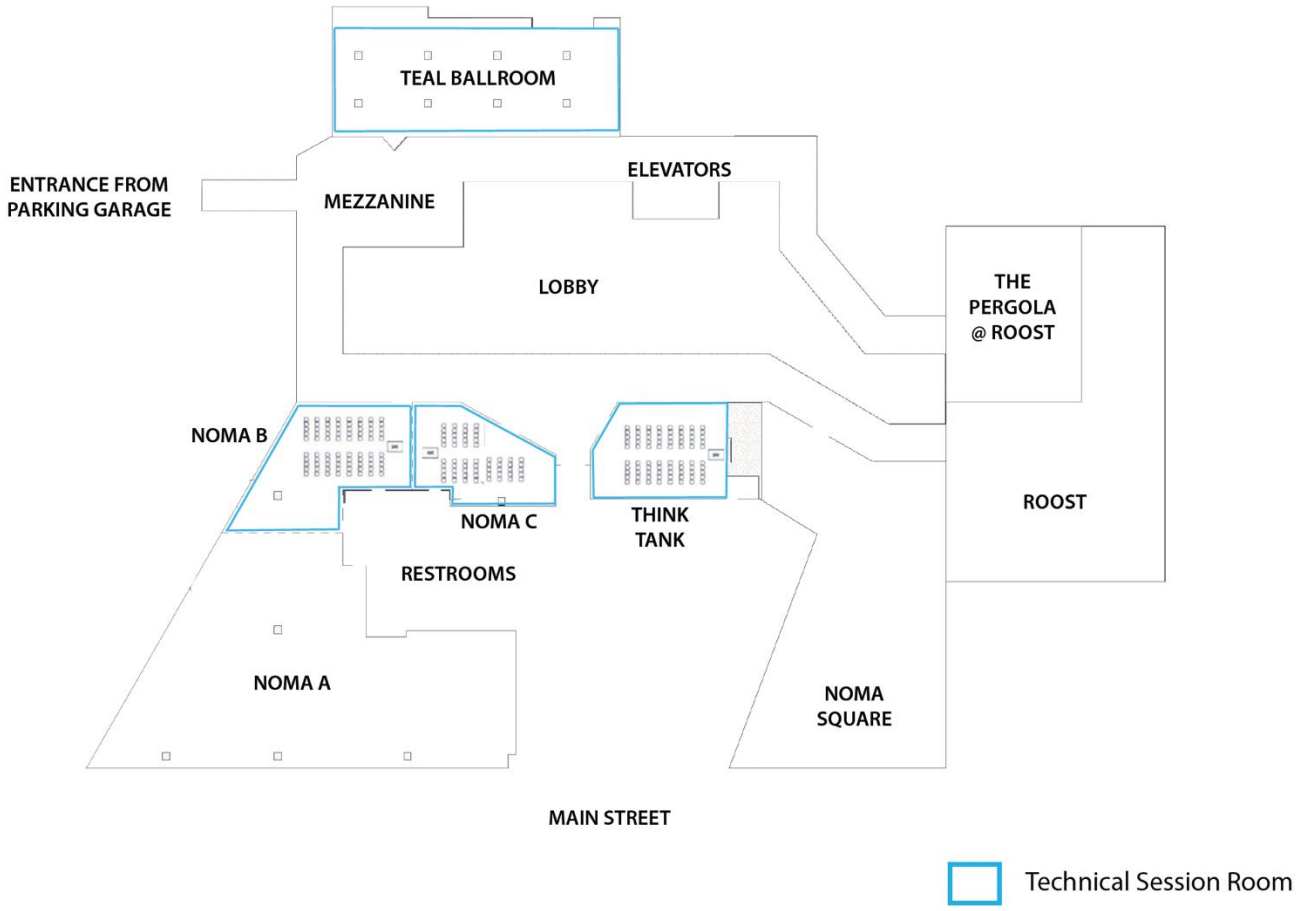
First Floor (lobby level):



CONFERENCE RESOURCES

Greenville Hyatt Regency Maps

Second Floor (Main Street level):



CONFERENCE RESOURCES

Exploring Greenville

Welcome to Greenville, SC. To help you find local activities, we invite you to review the Visit Greenville website: https://www.visitgreenvillesc.com/ which provides information about outdoor activities, restaurants, shopping, and other local activities.

Also, please explore the official Greenville SC website: https://www.greenvillesc.gov/101/Visitors which gives you everything you need to know about the city and its many attractions. Maps, dining, entertainment and the many ways to explore Greenville and the surrounding area.

Greenville downtown Main Street:

https://www.visitgreenvillesc.com/listing/downtown-greenville-main-street/14422/

Falls Park (10 minute walk):

https://www.greenvillesc.gov/167/Falls-Park

Swamp Rabbit Trail (running, biking, bike rental):

https://www.greenvillesc.gov/316/Swamp-Rabbit-Trail

Greenville Drive baseball (Red Sox minor league team; there is a game Sunday at 3:05pm):

https://www.milb.com/greenville

https://gd1.glitnirticketing.com/gdticket/web/stadiumg_b_svgw.php?status_id=2&event_id=114&tfl=&_ga=2.175412450.1392588270.1747485516-895342030.1747485516&refresh=1747485621

Downtown Restaurants:

https://www.visitgreenvillesc.com/food-drink/

Greenville County Museum of Art (large Andrew Wyeth collection):

https://gcma.org/

Other Greenville culture:

https://www.visitgreenvillesc.com/things-to-do/arts-culture/

WELCOME FROM CLEMSON UNIVERSITY

Welcome from the NAMRC 53 | MSEC 2025 Organizing Committee

We extend a warm and enthusiastic welcome to the co-located 53rd NAMRI/SME North American Manufacturing Research Conference (NAMRC 53) and 2025 ASME MED Manufacturing Science and Engineering Conference (MSEC 2025) hosted by Clemson University. It is our pleasure to welcome you to this annual gathering of manufacturing research and education experts. Conference topics include manufacturing processes, materials, systems, equipment, automation, and metrology. Fundamental and applied research presentations will be provided by students, faculty, industry professionals, and government staff. We are honored to host our keynote speakers from the City of Greenville, US Department of Defense, and the Advanced Manufacturing National Program Office. We are also pleased to offer tutorials from manufacturing research leaders on key topics. We hope that you will enjoy the conference and make some meaningful connections!

Organizing Committee

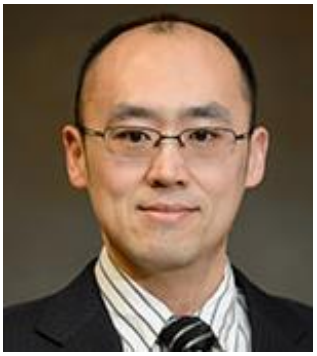
Dr. Laine Mears
Committee Chair
Director, Clemson School of Mechanical and Automotive Engineering

Dr. Vinita Jansari
Postdoctoral Researcher

Dr. Matthew Krugh
Research Assistant Professor

Carol Beckham
Program Coordinator

Dr. Shunyu Liu
Assistant Professor
Automotive Engineering



Dr. Xin Zhao
Associate Professor
Mechanical Engineering

WELCOME FROM CLEMSON UNIVERSITY

Dr. Mary Beth Kurz
Associate Professor
Industrial Engineering

Dr. Hongseok Choi
Associate Professor
Mech. Engineering

Dr. Saeed Farahani
Assistant Professor
Automotive Engineering

Dr. Yunyi Jia
Professor
Automotive Engineering

Dr. Ramy Harik
Exxon Chair
Auto. Engineering

Dr. Mark Johnson
Hash Professor
Materials Science

Dr. Andy Henderson
President, Hendtech

Dr. Ankit Agarwal
Postdoctoral
Auto. Engineering

Dr. Bing Li
Associate Professor
Automotive Engineering

WELCOME FROM TECHNICAL PROGRAM LEADERSHIP

On behalf of the Scientific and Technical Program Committees, we welcome you to this joint International Manufacturing Conference hosted by Clemson University from June 23rd to June 27th, 2025 in Greenville, South Carolina. The joint conference consists of the 53rd North American Manufacturing Research Conference (NAMRC 53), sponsored by the North American Manufacturing Research Institution of the Society of Manufacturing Engineers (NAMRI | SME), and ASME International Manufacturing Science and Engineering Conference (MSEC 2025), sponsored by the Manufacturing Engineering Division (MED) of ASME. As a leading international conference on manufacturing research, NAMRC and MSEC act as a global bridge between industries, government laboratories, and academic institutions. The two co-located conferences symbolize the continued collaboration between SME and ASME, two esteemed organizations in research exchange and knowledge dissemination for the advancement of manufacturing. While the two conferences are held jointly, the paper submission, review, and acceptance processes were conducted separately for NAMRC and MSEC.

NAMRC 53 this year received 269 technical paper submissions from authors in 35 countries across six continents in the world. The papers were put through a rigorous peer review process, with each paper receiving at least three reviews. At the end of the process, a total of 193 papers were accepted for publication in the journal Manufacturing Letters which acts as the Proceedings of NAMRI | SME and presentation at the conference in 76 technical sessions. There are also 5 presentation-only contributions. These papers and presentations address a wide range of basic and applied manufacturing research topics in seven Tracks: (1) Manufacturing Systems, (2) Manufacturing Processes, (3) Material Removal, (4) Additive Manufacturing, (5) Smart Manufacturing and Cyber-Physical Systems, (6) Manufacturing Education and Case Studies, and (7) Sustainable Manufacturing. We are grateful to members of the Scientific Committee and all the reviewers for their critical assessment of the large number of submissions within a short period of time between the end-of-the-year holidays and the new year. NAMRC continues to attract quality research papers. A total of 17 papers submitted to NAMRC 53 were recommended for fast-tracking to the SME Journal of Manufacturing Systems (JMS) or Journal of Manufacturing Processes (JMP), based on the outcome of the review process. These fast-tracked papers have now all been published online.

NAMRC 53 continues to feature the annual NSF Manufacturing Blue Sky Competition, funded by the National Science Foundation (NSF). The winner of the Competition will receive the NAMRI | SME Dornfeld Manufacturing Vision Award, named in honor of the late Professor David Dornfeld. As in the past, NAMRC 53 continues to sponsor the Student Research Presentations (SRP) Competition, with 9 student-led papers selected by the Scientific Committee for participation in the competition this year. This year, we have also received a good number of contributions from the Korean Society of Manufacturing Technology Engineers (KSMTE). These papers will be presented in 4 SME-KSMTE joint sessions at NAMRC 53. In addition, a special session on International Collaborative Research and Education will be included in the program, where some of the activities and results of the 2024 NSF IRES Advanced Studies Institute (ASI) on Manufacturing Frontiers Leveraging Unique Facilities in Italy will be presented.

Continuing the inaugural effort, the MSEC technical program will continue to publish brief papers this year in addition to full length papers. Brief papers undergo full peer review and

WELCOME FROM TECHNICAL PROGRAM LEADERSHIP

are published in the conference proceedings, in the same manner as full papers. However, they are shorter in length than full papers and, therefore, can be used to report preliminary research results for early feedback from the manufacturing community. Each brief paper is accompanied by a 15-minute technical talk (as opposed to 25 minutes for a full paper), and an optional poster presentation.

MSEC 2025 received 211 technical paper submissions, of which 52 (24%) were brief papers and 159 (76%) were full papers. After the peer review process, 147 papers were accepted, of which 22 (15%) were brief papers and 125 (85%) were full papers. In addition, we had a record-breaking 90 poster submissions. We also accepted 7 presentation-only abstracts from industry, 32 presentations from recently published papers in the Journal of Manufacturing Science and Engineering, and 16 presentations for the Doctoral Symposium.

The conference program is the result of the outstanding efforts of many people. We would like to thank all the symposium organizers, technical committee members, track chairs and co-chairs, authors, and reviewers for their technical contributions and dedication to supporting this joint conference. Our sincere gratitude goes to the members of the Scientific Committee and the ASME MED Executive Committee for their leadership and guidance in preparing the program. Finally, we would like to thank the staff of SME, ASME, and the Host Organizing Committee for doing an outstanding job in managing all aspects of the two co-located conferences – from maintaining/updating conference information on the websites to handling the many logistic issues. We also extend our gratitude to the sponsors for their financial support. We are grateful to the Civil, Mechanical, and Manufacturing Innovation (CMMI) Division of NSF for sponsoring the Women in Advanced Manufacturing Forum, and for providing registration and accommodation support for more than 80 selected students and early-career participants from across the United States.

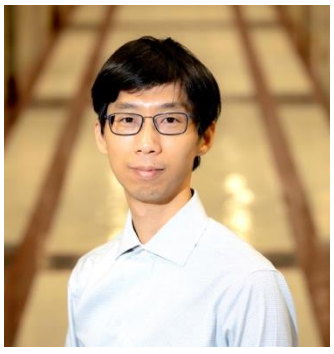
We wish you a productive conference experience at Clemson University, an enjoyable time in downtown Greenville, SC, and a long-lasting professional benefit from your affiliation with SME and ASME!

WELCOME FROM TECHNICAL PROGRAM LEADERSHIP

Xun Xu
University of Auckland, New Zealand
NAMRI SME Scientific Committee Chair

Guha Manogharan
Pennsylvania State Univ., USA
MSEC 2025 Program Chair

Stefania Bruschi
Università di Padova, Italy
NAMRI Scientific Committee Co-Chair

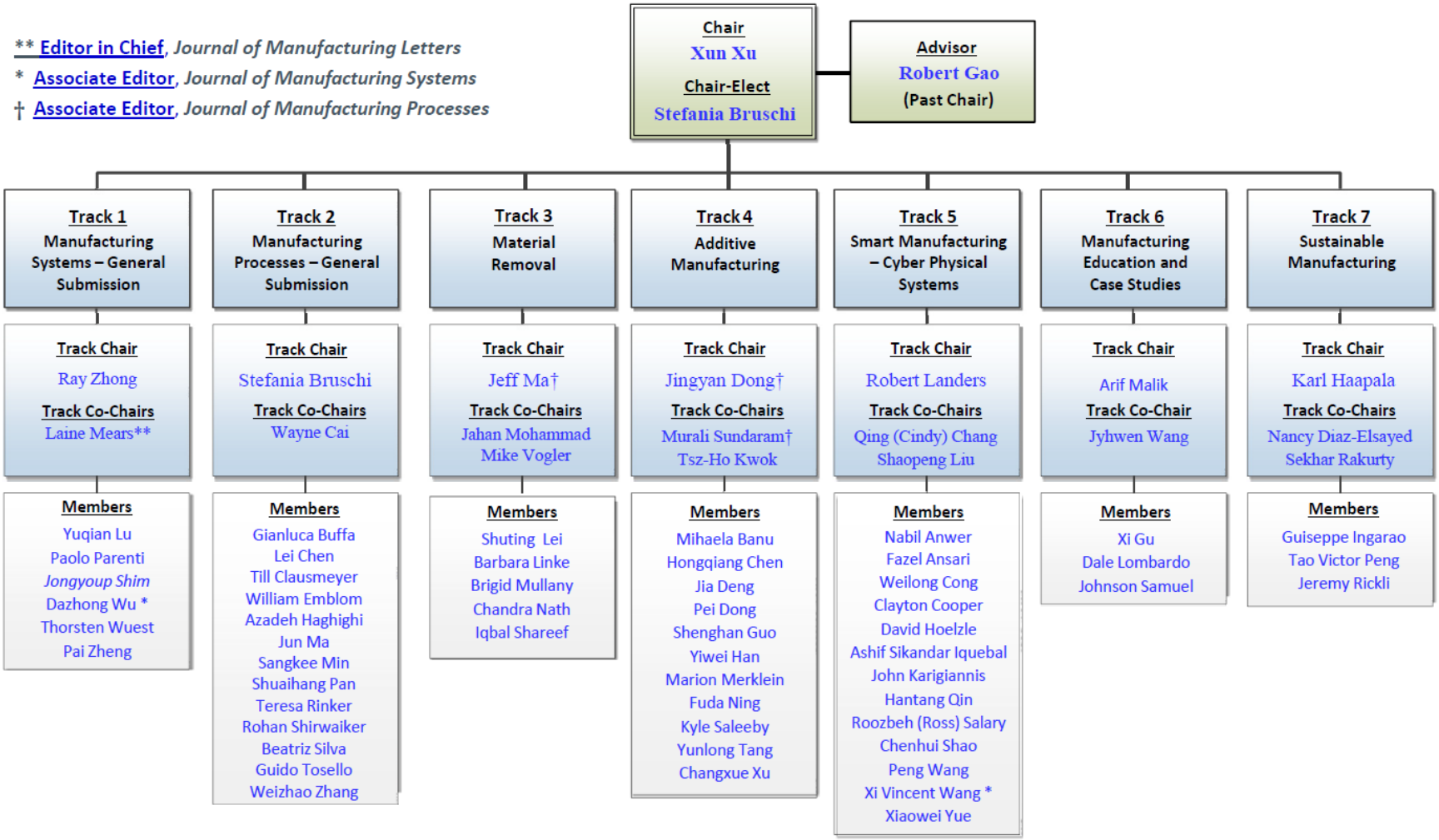


Ping Guo
Northwestern University, USA
MSEC 2025 Vice Chair

CONFERENCE SPONSORS

Platinum	BMW, NSF, CLEMSON UNIVERSITY
Diamond	CATERPILLAR, SIEMENS
Gold	ManufacturingUSA, GE Aerospace
Contributing	ASME SETTING THE STANDARD, sme, CLEMSON GRADUATE SCHOOL, CLEMSON COMPOSITES CENTER, ACCESS, Phillips, KISTLER measure. analyze. innovate., Krauss Maffei

NAMRI/SME SCIENTIFIC COMMITTEE



https://www.sme.org/education/manufacturing-research/namri-scientific-committee-organization/

MSEC TRACK & SYMPOSIUM ORGANIZERS

AdM-1-1: Smart Additive Manufacturing
Organizers:
Dr. Azadeh Haghighi, University of Illinois Chicago, Chicago, IL, USA
Dr. Prahalada Rao, Virginia Tech, VA, USA
Dr. Molong Duan, Hong Kong University of Science and Technology, Hong Kong SAR, China,
Dr. Uduak Inyang-Udoh, University of Michigan, Ann Arbor, MI, USA
Dr. Tuhin Mukherjee, Iowa State University, Ames, IA, USA

AdM-1-2: Multi-Material Processing in Additive Manufacturing
Organizers:
Dr. Monique McClain, Purdue University, West Lafayette, IN, USA
Dr. Jay Park, University of Massachusetts Lowell, Lowell, MA, USA
Dr. Mostafa Yourdkhani, Colorado State University, Fort Collins, USA
Dr. Elham Mirkoohi, Auburn University, Auburn, AL, USA

AdM-1-3: Advances in Metal Additive Manufacturing Processes
Organizers:
Dr. Ala Qattawi, University of Toledo, Toledo, OH, USA
Dr. Dong Lin, Oregon State University, Corvallis, OR, USA
Dr. Ho Yeung, NIST, Washington DC, USA
Dr. Hector Siller, University of North Texas, Denton, TX, USA
Dr. Elham Mirkoohi, Auburn University, Auburn, AL, USA

AdM-1-4: In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing
Organizers:
Dr. Andy Fan, Oregon State University
Dr. Sarah Wolff, The Ohio State University
Dr. Arvind Shankar Raman, Applied Materials Inc.
Dr. Samantha Webster, National Institute of Standards and Technology (NIST)
Dr. Andelle Kudzal, Naval Surface Warfare Center Carderock

AMM-2-1: Advances in Manufacturing and Processing of Polymers and Composites
Organizers:
Dr. Erina Joyee, University of North Carolina at Charlotte, NC, US
Dr. Felicia Stan, Dunarea de Jos University of Galati, GL, Romania
Dr. Kenan Song, Arizona State University, Tempe, AZ, US
Dr. Zipeng Guo, Rochester Institute of Technology, NY, US

AMM-2-2: Laser-based Advanced Manufacturing and Material Processing
Organizers:
Dr. Chang Ye, Huazhong University of S&T, Wuhan, China
Dr. Wenda Tan, The University of Michigan, Ann Arbor, MI, USA
Dr. Qiong (Eric) Nian, Arizona State University, Tempe, AZ
Dr. Xin Zhao, Clemson University, Clemson, SC, USA

AMM-2-3: Smart, Innovative, and Low-cost Tooling Systems for Advanced Materials Manufacturing
Organizers:
Dr. Saeed Farahani, Clemson University, Greenville, SC, USA
Dr. Thomas Feldhausen, Oak Ridge National Laboratory, Oak Ridge, TN, USA
Dr. Kazi Md Masum Billah, University of Houston-Clear Lake, TX, USA

MSEC TRACK & SYMPOSIUM ORGANIZERS

Dr. Hamed Dardaei Joghan, Technical University Dortmund, Dortmund, Germany
Mr. Curtis Krick, Kistler Instrument Corp., Novi, MI, USA

BioM-3-1: Bio-Manufacturing of Engineered Living Materials
Organizers:
Dr. Congrui Grace Jin, Texas A&M University, College Station, TX, USA
Dr. Chenglin Wu, Texas A&M University, College Station, TX, USA
Mr. Miles Adams, Myco Industries Group, LLC
Dr. Weinan Xu, University of Akron, Akron, OH, USA
Dr. Hongyu Nick Zhou, University of Tennessee at Knoxville, Knoxville, TN, USA
Dr. Qiming Wang, University of Southern California, Los Angeles, CA, USA

BioM-3-2: Advanced Manufacturing of Functional Devices and Bioinspired Structures
Organizers:
Dr. Xiangjia Li, Arizona State University, Tempe, AZ, USA
Dr. Yang Yang, San Diego State University, San Diego, CA, USA
Dr. Ketki Lichade, University at Buffalo-SUNY, Buffalo, NY, USA
Dr. Zipeng Guo, Rochester Institute of Technology, Rochester, NY, USA

LCE4-1: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability
Organizers:
Dr. Jing (Julia) Zhao, Penn State University, The Behrend College, Erie, PA, USA
Dr. Muyue (Margret) Han, North Carolina A&T State University, Greensboro, NC, USA
Dr. Jesús Pérez-Cardona, University of Puerto Rico–Mayagüez Campus, Mayagüez, PR

MEA-5-1: Semiconductor Manufacturing: Metrology, Inspection, Equipment, and Processes
Organizers:
Dr. ChaBum Lee, Texas A&M University, College Station, TX, IA, USA
Dr. Xiangyu Guo, Arizona State University, Mesa, AZ, USA
Dr. Jiyong Park, Korea Institute of Industrial Technology, Songdo, S. Korea

MP-6-1: Advances in Surface Engineering: Process, Metrology, and Property / Performance
Organizers:
Dr. Yiliang (Leon) Liao, Iowa State University, Ames, IA, USA
Dr. Beiwen Li, University of Georgia, Athens, GA, USA
Dr. Avik Samanta, University of South Florida, Tampa, FL, USA

MP-6-2: Advances in Clean Energy and E-Mobility Manufacturing
Organizers:
Dr. Alessandro Ascari, University of Bologna, Bologna, Italy
Dr. Lei Chen, University of Michigan-Dearborn, Dearborn, MI, USA
Dr. Jianlin Li, Argonne National Laboratory, Lemont, IL, USA
Dr. Erica Liverani, University of Bologna, Bologna, Italy
Dr. Wayne Cai, General Motors, Warren, MI, USA

MP-6-3: Advanced Machining and Deformation Processes
Organizers:

MSEC TRACK & SYMPOSIUM ORGANIZERS

Dr. Dinakar Sagapuram, Texas A&M University, College Station, TX, USA
Dr. Xiaoliang Jin, University of British Columbia, Vancouver, BC, Canada
Dr. Yang Guo, Michigan State University, East Lansing, MI, USA
Dr. Bruce L. Tai, Texas A&M University, College Station, TX, USA
Dr. David Yan, San Jose State University, San Jose, CA, USA

MP-6-4: Innovative Welding and Joining Processes of Advanced Materials and Structures
Organizers:
Dr. Xun Liu, The Ohio State University, Columbus, OH, USA
Dr. Yunwu Ma, Shanghai Platform for Smart Manufacturing, Shanghai, China
Dr. Yongbing Li, Shanghai Jiao Tong University, Shanghai, China
Dr. Abdul Sayeed Khan, University of Michigan Ann Arbor, MI, USA

MS-7-1: Innovations in Equipment Design, Control and Automation
Organizers:
Dr. Chandra Nath, Purdue University, West Lafayette, IN, USA
Dr. Huitaek Yun, Korea Advanced Institute of Sci & Tech (KAIST), Daejeon, S. Korea
Dr. Kyle Saleeby, Georgia Institute of Technology, Atlanta, GA, USA

MS-7-2: Human Integration to Smart Manufacturing Systems
Organizers:
Dr. Vinita Gangaram Jansari, Clemson University, SC, USA
Dr. Ankit Agarwal, Clemson University, SC, USA
Dr. Thorsten Wuest, University of South Carolina, SC, USA

NNM-8-1: Advances in Manufacturing of Thin Films and Coatings
Organizers:
Dr. Semih Akin, Rensselaer Polytechnic Institute, Troy, NY, USA
Dr. Chandra Nath, Purdue University, West Lafayette, IN, USA
Dr. James Nowak, MIT Lincoln Laboratory, Lexington, MA, USA

NNM-8-2: Advances in Meso, Micro, and Nano Subtractive and Formative Manufacturing
Organizers:
Dr. Soham Mujumdar, IIT Bombay, Mumbai, India
Dr. Sekhar Rakurty, The M.K. Morse Company, Canton, OH, USA
Dr. Muhammad Pervej Jahan, Miami University, Oxford, OH, USA

QR-9-1: Explainable AI for Knowledge Discovery in Manufacturing Systems
Organizers:
Dr. Joseph (Yossi) Cohen, Rutgers University, New Brunswick, NJ, USA
Dr. Weihong (Grace) Guo, Rutgers University, New Brunswick, NJ, USA
Dr. Xi Gu, Rutgers University, New Brunswick, NJ, USA
Dr. Devesh Upadhyay, Saab, Inc., East Syracuse, NY, USA

TRAVEL AWARD RECIPIENTS

The organizers of the NAMRC53/MSEC2025 gratefully acknowledge the generous support of the National Science Foundation (NSF) in providing financial support to the following students and early-career engineers to attend the conference.

Student awardees

Ahammed Dewan Sal-Sabil, *Montana State U.*
Nafi Ahmed, *North Carolina State University*
Kazi Owais Ahmed, *University of California Davis*
Anika Akther, *NC A&T State University*
Shah Rumman Ansary, *Texas Tech University*
Vipul Bansal, *University of Wisconsin Madison*
Caroline Barrett, *University of North Carolina at Charlotte*
Kshitij Bhatta, *University of Virgina*
Ravi Srivatsa Bindiganavile Narasimhan, *Texas A&M*
Sampson Canacoo, *Texas A&M University*
Navaneeth Chandran, *University of Cincinnati*
Yunxia Chen, *University of Florida*
Yan-Ting Chen, *Rochester Institute of Technology*
Yanze Chen, *North Carolina State University*
Yi-Ping Chen, *Northwestern University*
Siying Chen, *Purdue University*
Pedro Doukas, *University of New Hampshire*
Laura Duenas Gonzalez, *Arizona State University*
Gabriel Dzukey, *University of Toledo*
Dolor Enarevba, *Oregon State University*
Ahmadreza Eslaminia, *University of Illinois at Urbana Champaign*
Meysam Faegh, *University of Illinois Chicago*
Felicia Fashanu, *University of California Davis*
Jose Galarza, *University of Texas Rio Grande Valley*
Anju Gautam, *University of Cincinnati*
Jacob Harris, *University of Michigan*
Kaitlyn Hartman, *Penn State University*
Chuan He, *University of Michigan, Ann Arbor*
Tien Herd, *University of North Carolina Charlotte*
Nesat Hojjati, *Oklahoma State University*
Rafid Hussein, *Kansas State University*
Dare Idowu, *Oregon State University*
MD Shafikul Islam, *Louisiana State University*
Lakshmia Srinivasan, *Purdue University*
Nazanin Tabatabaei, *University of Iowa*
Dane Ungurait, *University of Florida*
Allen Moncey Varghese, *Arizona State University*
Jingwen Wang, *University of Illinois, Chicago*
Luohaoran Wang, *University of Michigan*
Ashish Jacob, *Pennsylvania State University*
Dylan Joralmon, *Arizona State University*
Brinley Jordan, *University of South Florida*
Donghee Kang, *Texas A&M University*
Putong Kang, *Northwestern University*
Anasheh Khecho, *University of North Carolina at Charlotte*
Geun Young Kim, *Georgia Institute of Technology*
Pavel Koprov, *North Carolina State University*
Kristofer Laser, *Pennsylvania State University, Erie*
Hojun Lee, *Purdue University*
Rong Lei, *Rutgers University*
Licheng Liang, *State University of New York at Buffalo*
Desmond Mensah, *University of New Hampshire*
Ankush Kumar Mishra, *Iowa State University*
Lutfun Nipa, *University of North Texas*
Ridwan Olabiyi, *Arizona State University*
Anandkumar Patel, *Rutgers University*
Gabrielle Paul, *Oregon State University*
Amin Poorabdol Mianjy, *University of Louisiana at Lafayette*
Chen Qian, *University of Michigan*
Sara Ranjbareslamloo, *University of Toledo*
Kamyar Raoufi, *Oregon State University*
Lily Raymond, *University of Nevada, Reno*
Ethan Regal, *Case Western Reserve University*
Charles Ringham, *University of California Davis*
Jackson Sanders, *Texas A&M University*
Jack Shanks, *Worcester Polytechnic Institute*
Haoran Shi, *University of Michigan*
Sara Shonkwiler, *University of California, Berkeley*
Nikita Shubin, *Miami University*
Lakshmi Srinivasan, *Purdue University*
Nazanin Tabatabaei, *University of Iowa*
Dane Ungurait, *University of Florida*
Allen Moncey Varghese, *Arizona State University*
Jingwen Wang, *University of Illinois Chicago*

TRAVEL AWARD RECIPIENTS

Muhammad Waseem, *University of Virginia*
Harry Watkins, *Georgia Institute of Technology*
Xiaohan Wu, *Purdue University*
Aditya Yalamanchili, *Texas A&M University*
Jiaqi Yang, *Binghamton University*
Rujing Zha, *Northwestern University*
Bo Zhao, *University of Utah*
Yuhao Zhong, *Texas A&M University*
Fan Zhou, *West Virginia University*
Christian Zuniga, *University of Louisville*
Pablo Andres Zuniga Navarrete, *University of Louisville*

SESSION SUMMARY AT A GLANCE

	Location		Outside Ballroom	Main Ballroom	Crepe Myrtle	Redbud A	Redbud B	Redbud C	Regency F	Dogwood	Gardenia	Magnolia	Regency G	Regency H	NOMA A	NOMA BC	Teal	Think Tank
Monday	08:30–15:00																	NAMRI Board Meeting
6/23/25	10:00–12:00	Registration Desk opens				Tutorial (Redbud ABC)												
	13:00–15:00					Tutorial (Redbud ABC)												
	15:00–16:30			NAMRI Awards Rehearsal														
	15:15–17:15		Exhibitor Booth Setup															ASME MED EC Meeting
	15:30–17:30					Tutorial (Redbud ABC)												
	18:30–20:00														Welcome Reception			
Tuesday	07:00–08:00	Registration Desk opens		Breakfast														
6/24/25	08:00–09:00			Welcome & Keynote														
	09:00–10:15		Exhibitor Booths		NAMRI Track 3 Keynote NAMRC 4	NAMRC 13 NAMRC 14 NAMRC 15	NAMRC 10 NAMRC 88 NAMRC 128	NAMRC 19 NAMRC 20 NAMRC 188	NAMRC 2 NAMRC 108 NAMRC 24		MSEC-153006 MSEC-155351 MSEC-155404	MSEC-155315 MSEC-155704 MSEC-155736	MSEC-152596 MSEC-155872 MSEC-155542	MSEC-154422 MSEC-155176 MSEC-155261		Student Mfg. Design Comp 1		
	10:30–11:45		Exhibitor Booths		NAMRC 181 NAMRC 69 NAMRC 140	NAMRC 53 NAMRC 152 NAMRC 3	NAMRC 27 NAMRC 23 NAMRC 1	NAMRC 21 NAMRC 29 NAMRC 39	NAMRC Track 4 Keynote NAMRC 84		MSEC-155588 MSEC-155749 MSEC-155761	MSEC-155905 JMSE-24-1484 JMSE-25-1079	MSEC-155844 MSEC-154527 MSEC-155726	MSEC-155352 MSEC-155590 MSEC-155762		Student Mfg. Design Comp 2		
	12:00–13:30		Exhibitor Booths	Lunch														NAMRI Scientific Committee Members Meeting
	13:45–15:00		Exhibitor Booths		NAMRC 41 NAMRC 71 NAMRC 255	NAMRC 59 NAMRC 68 NAMRC 117	NAMRC 56 NAMRC 35 NAMRC 62	NAMRC 12 NAMRC 83 NAMRC 58	NAMRC 22 NAMRC 37 NAMRC 89		MSEC-155771 MSEC-155799 MSEC-155833	MSEC-155456 MSEC-155578 MSEC-155294	MSEC-155609 MSEC-155759 MSEC-155431	MSEC-155662 MSEC-155691 MSEC-155740		Student Mfg. Design Comp 3	Poster Session	JSME Editorial Board Meeting
	15:15–16:30		Exhibitor Booths		NAMRC 221 NAMRC 82 NAMRC 87	NAMRC 97 NAMRC 18 NAMRC 70	NAMRC 96 NAMRC 238 NAMRC 8	NAMRC 49 NAMRC 77 NAMRC 103	NAMRC 42 NAMRC 72 NAMRC 162								Poster Session	
	16:00–17:45			BIAM Forum														
	16:45–17:15																	ASME MED Member Meeting
	17:15–18:15																	SME NAMRI Member Meeting
	17:30–21:00	Industry Night CU-ICAR																
Wednesday	07:00–08:00	Registration Desk opens		Breakfast														
6/25/25	07:30–9:00																	SME Journals Meeting
	08:00–09:00			Welcome & Keynote														
	09:00–10:15		Exhibitor Booths		NAMRC 120 NAMRC 194 NAMRC 104	NAMRC 105 NAMRC 5 NAMRC 158	NAMRC 170 NAMRC 17 NAMRC 227	NAMRC 138 NAMRC 271 NAMRC 195	NAMRC 201 NAMRC 33 NAMRC 91		MSEC-155920 JMSE-23-1591 JMSE-23-1611	MSEC-155706 MSEC-155757	MSEC-155822 MSEC-155493 JMSE-23-1528	MSEC-155631 MSEC-155765 JMSE-24-1557		Workshop on National Strategy for Advanced Manufacturing		
	10:30–11:45		Exhibitor Booths		NAMRC 63 NAMRC 115 NAMRC 147	NAMRC 74 NAMRC 16 NAMRC 66	NAMRC 123 NAMRC 132	NAMRC 220 NAMRC 240 NAMRC 239	NAMRC 184 NAMRC 179 NAMRC 99		MSEC-154225 MSEC-155476 JMSE-24-1569	MSEC-155398 JMSE-23-1768 JMSE-24-1396	MSEC-155537 MSEC-151300 JMSE-23-1529	MSEC-156064 MSEC-155871 MSEC-155869		Federal Agency Roundtable		
	12:00–13:30		Exhibitor Booths	ASME Awards Luncheon														

SESSION SUMMARY AT A GLANCE

	Location		Outside Ballroom	Main Ballroom	Crepe Myrtle	Redbud A	Redbud B	Redbud C	Regency F	Dogwood	Gardenia	Magnolia	Regency G	Regency H	NOMA A	NOMA BC	Teal	Think Tank
Wednesday	13:45–15:00		Exhibitor Booths		NAMRC 116 NAMRC 264 NAMRC 268	NAMRC 164 NAMRC 270 NAMRC 234	NAMRC 113 NAMRC 102 NAMRC 64	NAMRC 73 NAMRC 151 NAMRC 261	NAMRC 112 NAMRC 122 NAMRC 121		MSEC-155144 MSEC-155169 JMSE-24-1480	MSEC-Invited Talk MSEC-151374	MSEC-155373 MSEC-155697 MSEC-155475	MSEC-155483 MSEC-155497 JMSE-24-1631		Blue Sky Competition 1	SME Student Membership Meeting	
6/25/25	14:15–17:30		Exhibitor Booths	WIAM Forum														
	15:15–16:30		Exhibitor Booths		NAMRC 124 NAMRC 78 NAMRC 222	NAMRC 245 NAMRC 256 NAMRC 144	NAMRC 166 NAMRC 76 NAMRC 118	NAMRC 92 NAMRC 67 NAMRC 260	NAMRC 130 NAMRC 154		MSEC-155464 MSEC-155613 MSEC-155563	MSEC-155328 MSEC-155439 MSEC-155533	MSEC-155857 MSEC-155934 JMSE-24-1045	MSEC-155596 MSEC-155020 MSEC-155744		Blue Sky Competition 2		
	16:00–18:00																	
	16:45–18:00				NAMRC 131 NAMRC 110	NAMRC 241 NAMRC 183	NAMRC 40 NAMRC 159 NAMRC 248	NAMRC 129 NAMRC 127 NAMRC 167	NAMRC 174 NAMRC 197 NAMRC 269		MSEC-155526 MSEC-155605 JMSE-24-1599	MSEC-155600 MSEC-155601 MSEC-155585	MSEC-151292 MSEC-155436 MSEC-154993	MSEC-155349 MSEC-155441 MSEC-151342				
	18:15–19:30															SME Reception		
	18:15–21:00			Early Career Forum														
Thursday	07:00–08:00	Registration Desk opens		Breakfast														
6/26/25	08:00–09:00			Welcome & Industry Panel														
	09:00–10:15		Exhibitor Booths		NAMRC 86 NAMRC 272 NAMRC 119	NAMRC 182 NAMRC 247 NAMRC 237	NAMRC 6 NAMRC 212 NAMRC 52	NAMRC 200 NAMRC 192 NAMRC 214	NAMRC 169 NAMRC 190 NAMRC 265		MSEC-155206 MSEC-155344 MSEC-155425	MSEC-155627 MSEC-155658 MSEC-151281	MSEC-155594 MSEC-155721 MSEC-155750	MSEC-155839 MSEC-155889 JMSE-24-1389		MSEC-166148 MSEC-166341 MSEC-169302 MSEC-170267		
	10:30–11:45		Exhibitor Booths		NAMRC 189 NAMRC 180 NAMRC 93	NAMRC 32 NAMRC 55 NAMRC 30	NAMRC 101 NAMRC 204 NAMRC 243	NAMRC 230 NAMRC 136 NAMRC 225	NAMRC 177 NAMRC 163 NAMRC 232		MSEC-155173 MSEC-155442 MSEC-154895	MSEC-155694 MSEC-151574 MSEC-154821	MSEC-155767 MSEC-155899 MSEC-155924	MSEC-155632 JMSE-24-1388		MSEC-164653 MSEC-165165 MSEC-167464 MSEC-170318		NAMRC ICRE
	11:45–13:30		Exhibitor Booths	NAMRI Awards Luncheon														
	13:45–15:00		Exhibitor Booths		NAMRC 219 NAMRC 254 NAMRC 36	NAMRC 114 NAMRC 186 NAMRC 206	NAMRC 224 NAMRC 125 NAMRC 80	NAMRC 149 NAMRC 176	NAMRC 145 NAMRC 203 NAMRC 235		MSEC-155671 MSEC-155912 MSEC-152987	MSEC-155808 JMSE-23-1745 JMSE-24-1104 MSEC-155693	MSEC-155129 MSEC-155444 MSEC-155544	MSEC-155548 MSEC-155660 MSEC-155708				
	15:15–16:30		Exhibitor Booths		NAMRC 209 NAMRC 252 NAMRC 141	NAMRC 242 NAMRC 216	NAMRC 202 NAMRC 107 NAMRC 161	NAMRC 143 NAMRC 153 NAMRC 267	NAMRC 75 NAMRC 198 NAMRC 208		MSEC-155442 MSEC-155150 MSEC-155202	MSEC-155909 JMSE-24-1366 MSEC-155785	MSEC-155551 MSEC-155670 MSEC-155758	MSEC-155570 MSEC-155926 MSEC-155640		FMNet Roadmap Panel Session		MSEC-164596 MSEC-168549 MSEC-170059 MSEC-170201
	16:45–18:00				NAMRC 156 NAMRC 251 NAMRC 61	NAMRC 223 NAMRC 211 NAMRC 109	NAMRC 11 NAMRC 191 NAMRC 148	NAMRC 146 NAMRC 185 NAMRC 257	NAMRC 218 NAMRC 213 NAMRC 207		MSEC-155503 MSEC-155836 MSEC-155471	MSEC-151844 MSEC-155739 MSEC-156059	MSEC-155846 MSEC-155840 JMSE-24-1162	MSEC-155848 MSEC-155851 MSEC-155873		IMTG ASME Panel Discussion on Intelligent Manufacturing		MSEC-166325 MSEC-165774 MSEC-169530 MSEC-166983
	18:00–20:45	Banquet Dinner @ BMW Training Center																
Friday	07:00–08:00	Registration Desk opens		Breakfast														
6/27/25	08:00–09:00																	
	09:00–10:15		Exhibitor Booths			NAMRC 266 NAMRC 139 NAMRC 160		NAMRC 253 NAMRC 263 NAMRC 249	NAMRC 229 NAMRC 226 NAMRC 157		MSEC-155649 MSEC-155868		MSEC-155639 MSEC-155743 MSEC-155760	MSEC-155879 MSEC-155781 MSEC-155673				
	10:30–11:45		Exhibitor Booths			NAMRC 175 NAMRC 168		NAMRC 95 NAMRC 135	NAMRC 258 NAMRC 165									
	12:00–13:30		Boxed Lunch															
	12:30–15:45	BMW Tours																

MONDAY JUNE 23, 2025

Time	Location	Event
8:30–15:00	Think Tank	NAMRI Board of Directors Meeting
10:00–20:00	Conference Registration Desk	Registration/ Information
10:00–12:00		Tutorial 1 (Pre-registration required, parallel sessions)
13:00–15:00		Tutorial 2 (Pre-registration required, parallel sessions)
15:15–17:15	Think Tank	ASME MED Executive Committee Meeting
15:30–17:30		Tutorial 3 (Pre-registration required, parallel sessions)
15:00–18:00	Outside Ballroom	Exhibitor Booths Set-Up
16:00–18:00		Poster Set-Up
18:30–20:00	NOMA A	Welcome Reception

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Tutorials

The tutorials will provide an introduction and overview of topics relevant to MSEC/NAMRC attendees. The target audience are attendees with topic interest, but not deep experience. Tutorials will provide both fundamentals and applications. Each tutorial lasts two hours and the format is classroom lecture with demonstrations.

The intent of the following tutorial sessions is to provide an introduction and overview of topics related to NAMRC/MSEC attendees. The target audience are attendees with topic interest, but not deep experience. The workshop should provide both fundamentals and applications. The workshop length will be approximately two hours, and the format will be lecture-style and hands-on workshops. See individual workshop descriptions for further details.

Time	Location 1	Location 2	Location 3
	Hyatt Regency Redbud room	CMI Multipurpose Room (#236)	CU-ICAR CGEC 401
10:00 am - 12:00 pm	Testbed as a Service: Getting Started with Streaming Authentic Manufacturing Datasets	Metal Additive Manufacturing	
13:00 pm - 15:00 pm	Control of Manufacturing Systems, Machines, and Processes in the Context of Industry 4.0	New Hybrid Molding Technologies for Composites and Multi-Material Parts	
15:30 pm - 17:30 pm	Solid-State Metal Additive Manufacturing (SSAM)	Siemens NX X Immersive Engineering with Sony XR Headset	Clemson's Deep Orange Student-Led Vehicle Development Process

Cost per tutorial

- $75 non-student

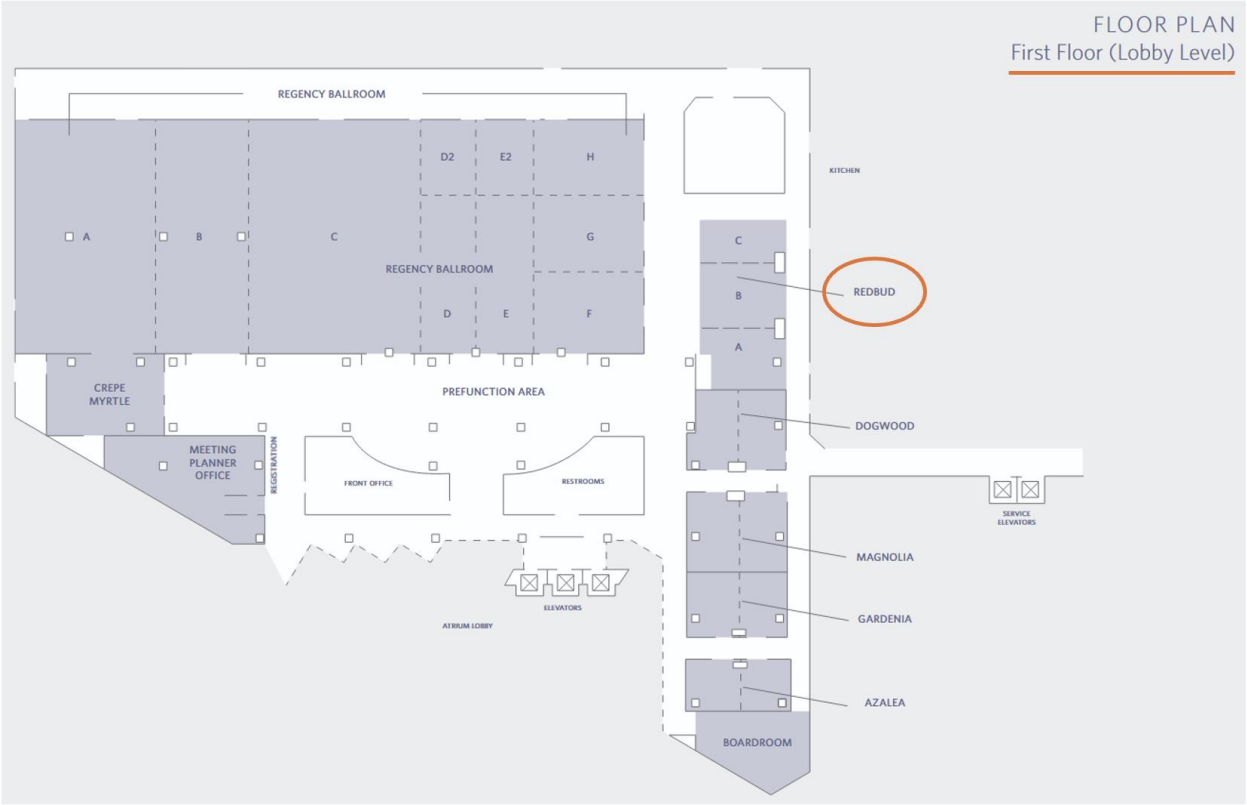
For any workshops held at the off-site location (CU-ICAR campus), attendees are responsible for arranging their own transportation.

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Location 1

Redbud room
The Hyatt Regency
220 N Main St.
Greenville, SC 29601



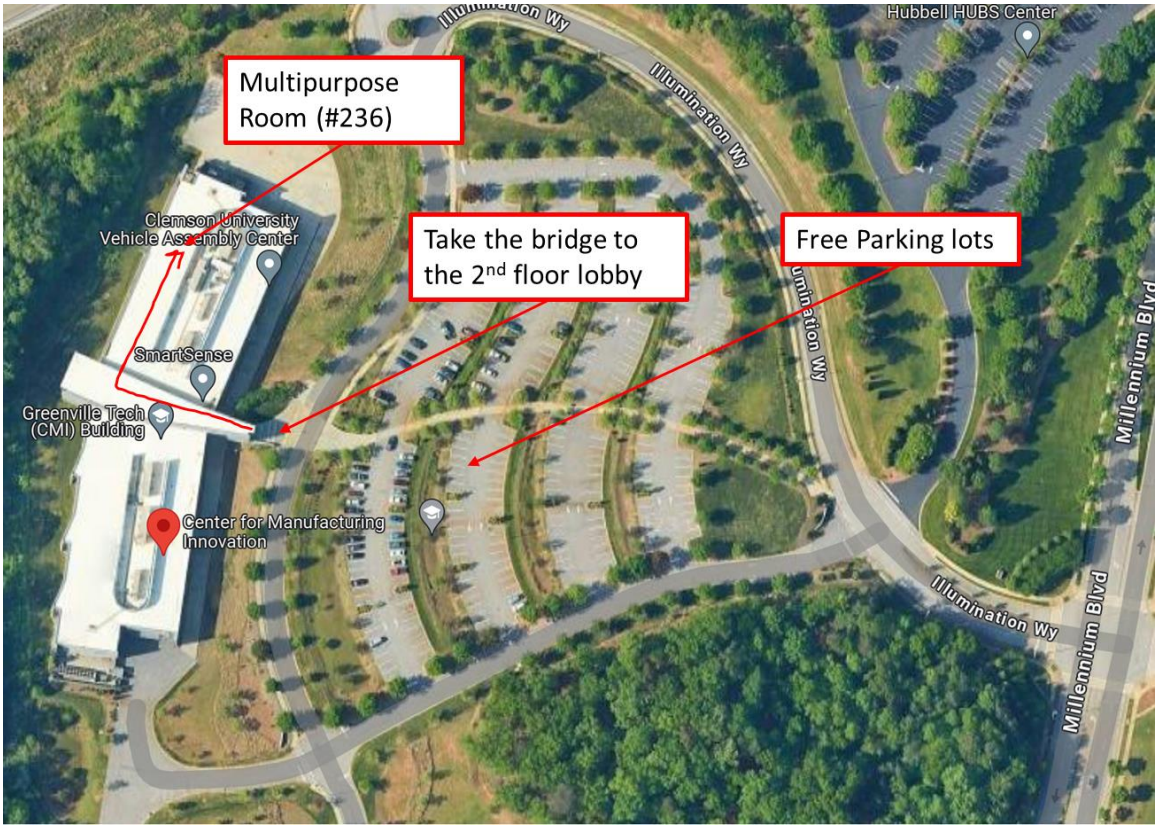
TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Location 2

CMI (Center for Manufacturing Innovation)
Multipurpose Room (#236)

575 Millennium Blvd.
Greenville, SC 29607



TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Location 3

CU-ICAR (Clemson University International Center for Automotive Research)
CGEC (Carroll A. Campbell Jr. Graduate Engineering Center) 401

4 Research Dr.
Greenville, SC 29607

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Testbed as a Service: Getting Started with Streaming Authentic Manufacturing Datasets

Location 1: Hyatt Regency Redbud Room

Matt McCormick, PhD Candidate in Mechanical Engineering, Molinaroli College of Engineering and Computing & McNair Aerospace Center, University of South Carolina

Fadi El Kalach, PhD Candidate in Auto. Engr., Clemson Composites Center, Clemson University.

Thorsten Wuest, Professor, Professor of Mechanical Engineering, Molinaroli College of Engineering and Computing & McNair Aerospace Center, University of South Carolina

Description

Smart and Advanced Manufacturing applications require data to generate actionable insights. However, commissioned testbeds in academia and data from production systems in industry are scarce, and when they are available, the acquisition of authentic data from commissioned testbeds is fraught with challenges. This material is based upon work supported by the National Science Foundation under Grant No. 2119654. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. This tutorial aligns with the objectives of disseminating tools and software which will facilitate the adoption of Smart Manufacturing and Industry 4.0 techniques in both academia and industry. Attendees will gain valuable knowledge in utilizing new technologies which accelerate the development of intelligent solutions on the factory floor across disciplines and backgrounds. This ensures the tutorial is highly valuable for participants looking for theoretical and practical advancements and their translation into meaningful real-world applications.

This workshop will provide an overview and introduction to the method, tooling, and datasets to

- Enable workshop participants to utilize provided tooling and datasets to support their research and education objectives.
- Provide a foundation for the owners of commissioned testbeds to publish streaming data for researchers, educators, and students to consume.
- Workshop participants will get hands on with TaaS tooling and data streaming from two manufacturing testbeds:
    - Cell phone assembly line
    - Rocket assembly line.

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Control of manufacturing systems, machines, and processes in the context of Industry 4.0

Location 1: Hyatt Regency Redbud Room

Chinedum Okwudire, Professor, University of Michigan

Biography

Chinedum (Chi) Okwudire is a Professor of Mechanical Engineering and Miller Faculty Scholar at the University of Michigan. His research is focused on exploiting knowledge at the intersection of machine design, control and computing to boost the performance of manufacturing automation systems at low cost. Chi has received a number of awards including the CAREER Award from the National Science Foundation; the Young Investigator Award from the International Symposium on Flexible Automation; the Outstanding Young Manufacturing Engineer Award from SME; the Ralph Teetor Educational Award from SAE International; the Education Award from SME; and the Russell Severance Springer Visiting Professorship from UC Berkeley. In 2022, he was selected by SME as one of the 25 leaders transforming manufacturing. He has co-authored several award-winning papers in the areas of manufacturing automation, control and mechatronics. He is the founder and CTO of Ulendo Technologies Inc., a company focused on advanced automation solutions for the manufacturing industry.

Description

The control of manufacturing systems, machines, and processes is being transformed by the technologies shaping the smart manufacturing (Industry 4.0) revolution. This tutorial will review key technologies, including the Internet of things (IoT), cloud computing, artificial intelligence/machine learning, and digital twins, that are driving smart manufacturing. Then it will provide industrial case studies and specific examples to show how participants can leverage these technologies to improve the quality, productivity, and/or cost effectiveness of manufacturing machines and processes through advanced control. The tutorial will be interactive and will not assume any prior background in control theory.

At the end of this tutorial, participants will be able to:

- Appreciate key technologies shaping Smart Manufacturing, and their relevance to manufacturing control
- Identify major classes of control used in manufacturing and other industries, and their importance
- Identify industry-relevant cases where advanced control, supported by smart manufacturing technologies, is leading to significant improvements in performance

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Solid-state metal additive manufacturing (SSAM)

Location 1: Hyatt Regency Redbud Room

Frank Pfefferkorn, Professor, University of Wisconsin-Madison

Biography

Dr. Frank Pfefferkorn is a Professor and the Associate Chair for Graduate Studies in the Department of Mechanical Engineering and the Director of the Manufacturing Systems Engineering Program at the University of Wisconsin-Madison. His Doctoral Degree is in Mechanical Engineering from Purdue University in West Lafayette, IN (2002). His core expertise is in the experimental and numerical investigation of discrete metal part manufacturing process physics. Dr. Pfefferkorn's research focuses on where the tool meets the workpiece, whether that tool is a mechanical cutting tool, laser beam, or friction stir tool. He has conducted advanced manufacturing process research for 29 years. He has active research projects in solid-state joining, laser polishing, instrumenting cutting tools, solid-state metal additive manufacturing, and multi-material additive/subtractive manufacturing. Dr. Pfefferkorn has authored over 165 peer-reviewed publications in these areas, including journal articles, conference proceedings, and invited book chapters. His research has been funded by the US NSF, US Department of Energy, US ONR, Wisconsin Alumni Research Foundation, Machine Tool Technology Research Foundation, Austrian Marshall Plan Foundation, and industry.

Description

This tutorial describes the deposition (printing) of metal using processes in which the material does not exceed the melting point. This is achieved by hot-working the metal: temperatures are usually between 70% and 95% of the solidus temperature. Metal is deformed and bonded to the substrate by utilizing friction, pressure, velocity, and time. The severe plastic deformation during deposition results in a fine-grained microstructure. The dynamic recrystallization and lower temperatures and temperatures gradients, compared with melting-based processes, results in less formation of intermetallic phases, oxides, and residual stresses. It must also be noted that the hot working nature of the processes results in large forces and torques (at least locally). Significant advantages of these processes are their ability to deposit almost any metal alloy, create deposits / bonds between dissimilar materials, and achieve high deposition rates. However, significant knowledge gaps still exist in how to achieve the full potential of SSAM. The solid-state additive manufacturing processes are still in the early stages of adoption and this tutorial aims at providing a foundation of information that will enable the attendee to begin the process of evaluating these processes for their application(s) and pursue additional sources to increase their knowledge.

The following topics are covered in detail:

- Description of process physics
- Research insights and applications
- Comparison of hybrid friction surfacing (rod) to wire arc additive manufacturing and directed energy deposition (powder)
- Benefits, challenges/limitations, and future directions

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Metal Additive Manufacturing

Location 2: Greenville Tech Center for Manufacturing Innovation (CMI)

Shunyu Liu, Assistant Professor, Clemson University

Biography

Shunyu Liu joined the Department of Automotive Engineering at Clemson University as an Assistant Professor in January 2021 after earning her Ph.D. in Mechanical Engineering from Purdue University in December 2020. Her research areas include laser additive manufacturing (AM), hybrid AM, advanced materials development, computational materials science, and machine learning. Her experimental research focuses on structural and functional metals, multi-material fabrication, and advanced materials for extreme environments. Her computational research centers on developing simulation frameworks to model process-microstructure-property relationships for laser AM. She is also building a thermal-mechanical-metallurgical model for a novel hybrid in-situ rolled AM process. Additionally, she integrates machine learning for materials design, process optimization, and defect control. She is the recipient of the NSF CAREER Award (2023), the SME Susan Smyth Outstanding Young Manufacturing Engineer Award (2024), and the NSF EPSCoR Research Fellowship (2025). Over the past four years at Clemson, she has secured nine grants totaling ~$10 million, with over $2.6 million as her share, funded by NSF, DOE, ARL, and Clemson University. With expertise in advanced manufacturing, materials science, solid mechanics, and applied mathematics, her research aims to pioneer cutting-edge manufacturing techniques and develop innovative materials for next-generation applications.

Description

This workshop aims to equip participants with fundamental knowledge and practical skills in metal additive manufacturing, with a focus on fabricating high-performance structures and synthesizing multifunctional materials for critical applications. It will begin with an introduction to key wire- and powder-based metal additive manufacturing technologies, highlighting different joining methods that create metallurgical, physical, and mechanical bonds in the fabricated parts. Industry case studies will be presented to showcase real-world applications. Attendees will also have the opportunity to visit the Additive Manufacturing and Advanced Materials (AM&AM) Laboratory at Clemson University, explore the metal printers, and examine demonstration samples. Additionally, a live demonstration of printers in operation will be provided.

- Overview of metal additive manufacturing technologies (20 mins)
- Industry case studies and applications (20 mins)
- Tour of the AM&AM Laboratory (30 mins)
- Examination of demonstration samples (20 mins)
- Live printing demonstration (20 mins)
- Q&A and Open Discussion (10 mins)

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: New Hybrid Molding Technologies for Composites and Multi-Materials Parts

Location 2: Greenville Tech Center for Manufacturing Innovation (CMI)

Saeed Farahani, Assistant Professor, Clemson University

Biography. Saeed Farahani is an Assistant Professor in the School of Mechanical and Automotive Engineering and the Associate Director of Clemson Composites Center. He has B.S. and M.S. degrees in Mechanical Engineering from Sharif University and Ph.D. in Automotive Engineering (manufacturing field) from Clemson University. His research is primarily in the field of advanced manufacturing, particularly in the areas of hybrid and smart manufacturing systems. His research has integrated analytical models, numericale simulations, statistical and machine learning methods, sensors, and industrial IoT solutions to advance manufacturing systems for composites and multi-material/functional components. His research has been sponsored by DOE, DOD, DOC, SCRA, and multiple companies. Farahani has also more than 10 years of working in the industry in the field of design and manufacturing special tools and machinery. He serves as an associate editor for SAE Journal of Sustainable Transportation, Energy, Environment, & Policy (STEEP), the chair of Advanced Materials Manufacturing Technical Committee in ASME Manufacturing Engineering Division, and a board member of Injection Molding Division in Society of Plastic Engineering.

Description. This workshop introduces several new innovative hybrid molding techniques that have recently been developed based on different integrations of injection-based processes with forming, foaming and additive manufacturing technologies with the aim of cost-efficiently manufacturing composites and multi-material parts and/or increasing the performance and functionality of such parts. The session will cover both theoretical and practical aspects of these technologies. As part of this workshop, participants will get the chance to visit Clemson Composites Center (CCC) and its unique large-scale hybrid manufacturing cell. This workshop will end by engaging attendees in a hands-on activity that allows participants to design and produce a personalized souvenir using a hybrid process known as Additive Insert Molding (AIM).

- Introduction to several hybrid molding technologies (20 mins)
- Tooling, modelling, and process control challenges (20 mins)
- Visit and demonstration of CCC's large-scale hybrid manufacturing cell (20 mins)
- Hands-on Session (50 mins):
  - Introduction to the equipment and safety procedures.
  - Attendees will design and 3D print inserts using pre-configured templates.
  - Demonstration of the AIM process to make custom items.
- Open discussion for questions and future applications (10 mins)

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Siemens NX X Immersive Engineering with Sony XR Headset

Location 2: Greenville Tech Center for Manufacturing Innovation (CMI)

Charlie Hitson and Jonathan Nichols, Siemens Digital Industries Software

Biography

Charlie Hitson is a Presales Solutions Consultant at Siemens specializing in multi-disciplinary design and optimization and the application of Industrial AI and Machine Learning across design, manufacturing and sustainment in the Aerospace & Defense industry. Charlie holds a degree in mechanical engineering from Clemson University's College of Engineering, Computing, and Applied Sciences and is currently pursuing an MBA at Clemson's Graduate School of Business.

Jonathan Nichols, a mechanical engineering Clemson Alumni, is a Siemens solutions consultant that specializes in different design and manufacturing practices within the Siemens Xcelerator Design center suite. He has over 6 years of field experience in engineering design and manufacturing. He primarily focuses on additive design and manufacturing, smart manufacturing, and simulation-driven design applications. He predominantly assists companies in the aerospace industry.

Description

This workshop showcases the latest advancements in immersive design and engineering, from designing within augmented environments to conducting design reviews and modifications. This technology reduces physical prototyping costs, speeds up design reviews, and improves communication between engineering teams and stakeholders. The session will include live design changes in immersive spaces, evaluating designs at actual scale, and visualizing product designs through augmented reality or photorealistic virtual reality. Most of the workshop will be dedicated to attendees' hands-on immersive experiences using the Sony XR headset and Siemens NX X CAD tool.

The following topics are covered in this tutorial:

- Introduction to Siemens NX X Immersive Engineering (20 mins)
- Live demonstration of NX X Immersive Engineering (10 mins)
- Hands-on Session (60 mins):
  - Introduction to the hardware and software
  - Attendees will maneuver in the virtual space to perform engineering design reviews
  - Attendees will perform live design changes while in the virtual space
- Open discussion for questions and future applications (10 mins)

TUTORIAL SESSIONS

MONDAY, JUNE 23, 2025

Topic: Clemson's Deep Orange Student-Led Vehicle Development Process

Location 3: CU-ICAR Campbell Center Room 401

James Forbes, Professor of Practice, Clemson University

Biography

James Forbes is a professor of Practice in Automotive Engineering at the Clemson University-International Center for Automotive Research (CU-ICAR). He received his BS and MS degrees in Mechanical Engineering from Worcester Polytechnic Institute in Massachusetts. He then went on to work for Ford Motor Company for over 32 years in a wide range of vehicle engineering roles. His career has focused on the many aspects of vehicle systems and attribute engineering, working in a structured systems-engineering approach with global engineering teams.

Description

This tutorial provides an overview of the "Deep Orange" program, an experiential learning program which is part of the Automotive Engineering Masters program at Clemson. Deep Orange presents the students with a "grand challenge" for a new vehicle concept. From this grand challenge, students engineer and fabricate a drivable concept car designed to meet the wants and needs of a target customer. The program stresses teamwork and mimics the vehicle development process used in industry.

Presentation outline:

- Scope of Automotive Engineering (20 min)
- History of Deep Orange (20 min)
- Lab Tours (30 min)
- Discussion of overall development process (40 min)
  - Target customer definition
  - Requirement Development
  - Initial Digital Design
  - Analytical Development
  - Fabrication and Testing
  - Roll out / Unveiling
- Questions (10 min)

TUESDAY JUNE 24, 2025

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–7:45	Ballroom	Breakfast
8:00–9:00	Outside Ballroom	Exhibitor Booths Set-Up
8:00–8:15	Ballroom	Welcome: Laine Mears
8:15–8:45	Ballroom	Welcomes: Mayor Knox White, Dean Anand Gramopadhye, SME Jeannine Kunz, ASME Susan Ipri-Brown
9:00–10:15	NOMA B&C	Student Manufacturing Design Competition 1
9:00–10:15		Technical Session I
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session II
10:30–11:45	NOMA B&C	Student Manufacturing Design Competition 2
12:00–13:30	Ballroom	Lunch
12:00–13:30	Think Tank	NAMRI Scientific Committee Members Meeting
13:45–15:00		Technical Session III
13:45–15:00	NOMA B&C	Student Manufacturing Design Competition 3
13:45–15:00	Think Tank	JMSE Editorial Board Meeting
13:45–16:30	Teal	MSEC Poster Session
15:00–15:15	Teal	Afternoon Break
15:15–16:30		Technical Session IV
16:00–18:00	Ballroom	BIAM Forum
16:45–17:15	Think Tank	State of ASME MED Member Meeting
17:30–18:15	Think Tank	State of SME NAMRI Member Meeting
17:30–21:00	CU-ICAR Campus	Industry Night (Pre-registration Required)

WELCOME

TUESDAY JUNE 24, 2025

Opening remarks

Knox White

Mayor of Greenville, SC

8:10-8:20 | Ballroom

Biography

Knox White has served as Mayor of Greenville, South Carolina since December 1995. As Mayor he has the goal of making the City of Greenville, South Carolina “the most beautiful, livable, and welcoming city in America.

His tenure as mayor has been defined by neighborhood revitalization, economic development, and transformational projects for downtown. Over the past two decades, Greenville has earned national acclaim for its livability and has become an award-winning destination.

In 2018, Mayor White was profiled in Time Magazine as one of “31 People Who Are Changing the South.” Key strategic projects spearheaded during his terms include removal of a four-lane highway bridge allowing for the subsequent creation of the iconic Falls Park, recruitment of new retail to downtown, Fluor Field - a downtown minor league baseball stadium, the Swamp Rabbit Trail - a bike and walking trail system throughout the city, development along the downtown Reedy River riverfront, and public art initiatives along Main Street.

The latest project is Unity Park where a partially abandoned and once segregated part of the city has been transformed into a beautiful 60-acre park to be enjoyed by all. Adjacent to the park will be 9 acres of workforce and affordable housing which will be one of the largest footprints of affordable housing in the city of Greenville.

A graduate of Wake Forest University and the University of South Carolina Law School, Knox White was formerly a partner with the law firm of Haynsworth, Sinkler & Boyd. Mayor White is an honorary member of the American Society of Landscape Architects. He is a frequent speaker on the importance of thoughtful and collaborative urban planning.

Mayor Knox White is a native of the City of Greenville where he, his wife Marsha, their two adult children and their families all reside.

WELCOME

TUESDAY JUNE 24, 2025

Opening Remarks

Anand Gramopadhye

Dean, Clemson College of Engineering, Computing, and Applied Sciences

8:20-8:25 | Ballroom

Biography

Gramopadhye joined Clemson in 1992 as an assistant professor. He was named chairman of the industrial engineering department in 2003 and assistant to the dean of the College of Engineering, Computing and Applied Sciences in 2010. In 2011, he was appointed associate vice president for workforce development. Anand Gramopadhye assumed the position of Dean of the College of Engineering, Computing and Applied Sciences on July 1, 2013. He now oversees 12 departments.

- Principal Investigator on more than 75 research grants and awards generating more than $45 million in funding.
- More than 300 publications and a Fellow of the Institute of Industrial Engineers
- Recognized twice by the National Academy of Engineering through the Frontiers in Engineering Program as one of the top 60 engineers in the country
- Editor in Chief of the International Journal of Industrial Ergonomics

WELCOME

TUESDAY JUNE 24, 2025

Opening Remarks

Jeannine Kunz

Executive Director and CEO, SME

8:25-8:35 | Ballroom

Biography

Throughout her 25 years in manufacturing, Jeannine has worked at the intersection of technology, talent, and industry growth, advocating for the transformation of manufacturing through advancements in technologies and workforce innovation.

Kunz previously served as SME's Chief Workforce Development Officer, where she led national initiatives aimed at advancing the US manufacturing workforce. Her team focused on strategizing nationally while partnering locally to build a holistic approach to attracting, developing and retaining talent. This approach optimizes and scales effective local initiatives and programs to train current and future talent across the US in partnership with employers, educators, other non-profits and government.

A passionate advocate for the advancement of manufacturing, Kunz serves on several boards and committees that focus on both technology and workforce development. These include board positions for the Manufacturing Technology Deployment Group and the Coalition for Career Development, chair for the manufacturing division of the National Defense Industrial Association (NDIA) workforce committee, and a member of the education and workforce committee for Advanced Robotics for Manufacturing (ARM) Institute. In 2023, Kunz was awarded the ARM Institute Champion Award in recognition of going above and beyond to advocate for her mission of strengthening manufacturing in the US.

In addition to her leadership role in workforce development and technology integration, Kunz frequently speaks at industry events and appears in prominent media outlets such as CNBC, Forbes, IndustryWeek, and NPR Marketplace. Her insights and expertise extend to policy, having testified before Congress on issues related to the manufacturing workforce and the supply chain for the Department of Defense. Recognized for her contributions, Kunz was named one of "Crain's Detroit Business" Notable Women in Manufacturing (2018) and Notable Women in Education (2019).

Kunz has been an SME member since 2008 and continues to drive the organization's mission to accelerate widespread adoption of manufacturing technologies and build North America's talent and capabilities.

WELCOME

TUESDAY JUNE 24, 2025

Opening Remarks

Susan Ipri-Brown

Past President, ASME

8:35-8:45 | Ballroom

Biography

Susan Ipri-Brown is the 143rd president of the American Society of Mechanical Engineers (ASME). She is a Fellow of ASME, has served on the ASME Board of Governors, and has been an active member of the Society for 34 years, including her years as a student member.

Ipri-Brown is a strategic partnership specialist at the National Institute of Standards and Technology (NIST) Office of Advanced Manufacturing (OAM), which also serves as the Advanced Manufacturing National Program Office for Manufacturing USA. Prior to joining OAM, she served as the associate dean for educational outreach, as founding director of the ExploreHope Academic Outreach Office, and as an associate professor of engineering instruction at Hope College in Holland, Mich. She also served as associate director of the STEM Education Partnerships at Northwestern University, where she directed teacher professional development programs, grant writing, and new program development.

At ASME, Ipri-Brown has held numerous positions of leadership, including serving on the ASME Board of Governors and the Executive Committee, and as a member of the Public Affairs and Outreach Council. She served as vice president of the Committee on Government Relations and was named an ASME Federal Fellow and served at the White House Office of Science and Technology Policy where she fostered strategic partnerships to support technology-based economic development initiatives. She also held the position of vice president of ASME's Global Outreach and was a member of the Society's Council on Education.

Ipri-Brown actively encourages the next generation of engineers through STEM programs for area Scout councils along with devoting time as a coach and judge for FIRST robotics programs. Within her work and community, she is a long-time advocate of programs that enhance diversity, equity, and inclusion in the engineering profession.

Ipri-Brown earned her master's degree in mechanical engineering from the Massachusetts Institute of Technology and received a bachelor's degree in mechanical and aerospace engineering from Princeton University. She is a recipient of the ASME Dedicated Service Award.

INDUSTRY NIGHT

TUESDAY JUNE 24, 2025

.June 24, 2025 – 17:30 to 21:00

Clemson University - International Center for Automotive Research (CU-ICAR)

Carroll A. Campbell Jr. Graduate Engineering Center (CGEC)

4 Research Drive, Greenville, South Carolina - 29607

Organizers

Laine Mears, Vinita Gangaram Jansari, Matthew Krugh, Carol Ann Beckham, Ankit Agarwal, Ramy Harik

Description

Industry Night is an engaging and informal event that brings together industry and government sponsors with students in the manufacturing domain. It fosters an opportunity for attendees to explore sponsor booths, engage in meaningful interaction with professionals from the industry and learn about career opportunities and innovations. The event also includes presentations from leading industries, including BMW, Siemens, Caterpillar, and General Electric, tours of the laboratories at Clemson University-International Center for Automotive Research (CU-ICAR) and Greenville Technical College Center for Manufacturing Innovation (CMI), and food/beverages throughout the evening. Additionally, the event offers a chance to interact with students and faculty from Clemson Automotive Engineering.

INDUSTRY NIGHT

TUESDAY JUNE 24, 2025

Agenda

16:00 - 17:30	Industry booth setup
17:30 - 21:00	Event starts, social networking at industry booths, laboratory tour at CU-ICAR and CMI, food/beverages at food trucks
18:15 - 18:30	Welcome by Dr. Ramy Harik (Venue: Auditorium)
18:30 – 19:30	Industry presentations by BMW, Siemens, Caterpillar, General Electric (Venue: Auditorium)
21:00	Event ends

Transportation

- Complimentary bus service will be provided to and from the Hyatt Regency Greenville. The first bus will depart at 5:30 PM, with additional buses running every 15 minutes. The last bus from the Hyatt Regency will leave at 6:15 PM. For the return trip, buses will begin departing the event site at 7:00 PM, with the final bus leaving at 9:15 PM.
- Rideshare services like Uber and Lyft are also available for your convenience.
- If you plan to drive, free parking is available at **5 Research Drive, Greenville, South Carolina, 29607**.

Food and Beverages

A variety of local food trucks will be at the event site, offering meals, snacks, and beverages for purchase.

Sponsors

Platinum	BMW, NSF, CLEMSON UNIVERSITY
Diamond	CATERPILLAR, SIEMENS
Gold	ManufacturingUSA, GE Aerospace
Contributing	ASME, sme, GRADUATE SCHOOL, CLEMSON COMPOSITES CENTER, ACCESS, Phillips, KISTLER measure. analyze. innovate., Krauss Maffei

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC Poster Session

15:15-16:30 | Teal

Posters will be on display until Thursday.

MSEC-165689: Evaluation of the Stepped Iso-Stress Method for Creep Prediction in 3D Printed PETG Components With Varying Infill Patterns
Mohamad Alagheband, Florida State University

MSEC-155795: Yield Production Optimization of Nanoporous Copper Powders via Chemical Dealloying for Metal Additive Manufacturing
Aishwarya Thotta Jayachandran, Arizona State University

MSEC-163892: Multiphysics Modeling of the Influence of Scanning Parameters on Melt Pool Geometry in Directed Energy Deposition
Emmanuel Bamido, University of Texas at Austin

MSEC-165572: Geometric Defect Detection of Components in the Lded Process and In-Situ Compensation Strategy Based on Model Reconstruction
Zhenguo Nie, Tsinghua University

MSEC-165626: Real-Time Monitoring of 3D Prostheses Residual Stress Field During Additive Manufacturing Using Graph Neural Networks
Zhenguo Nie, Tsinghua University

MSEC-166263: Enhancing Fatigue Performance of Lpbf-Produced 316l Stainless Steel via Plastic Deformation
Sha Ouyang, University of New Hampshire

MSEC-154851: Experimental Characterization and Analysis of Mechanical Properties of 3D Printed Carbon-Fiber and Metal Filled Polylactic Acid (PLA) Composites Using Design of Experiment
Dongqing Pan, University of North Alabama

MSEC-155634: Direct Ink Writing of Magnetically Actuated Self-Healing Hydrogels
Timothy Ong, Arizona State University

MSEC-155919: Vat Photopolymerization of Resin/liquid Crystal-Based Polarizer for Optical Steganography
Tengteng Tang, Arizona State University

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-163111: 3D Printing by Direct Ink Writing (DIW) of Dual-Curable Elastomers for Soft Robotic and Flexible Electronic Applications
Emrah Demirkal, West Virginia University

MSEC-164230: Adaptive Optimization of Blow Molding Process Based on Multi-Modal Deep Learning and Genetic Algorithms
Nahyun Kim, Sungkyunkwan University

MSEC-161599: Defect Free Grinding oF Irradiated Silicon Nitride
Craig Seidelson, University of Indianapolis

MSEC-165397: Bioprinting of a High-Efficient Macroencapsulation System for Subcutaneous Transplantation of Pancreatic Islets
Hyun-Woo Kang, Ulsan National Institute of Science and Technology

MSEC-164254: Fabrication of Basement-Mimetic Substrate via 3D Printing Technology
Jongmin Kim, POSTECH

MSEC-155794: 3D-Printed Biomimetic Structures for Enhanced Water Transport and Seawater Desalination Through Solar Evaporation
Qingqing He, San Diego State University

MSEC-165303: Shared Additive Manufacturing Network for Metal Remanufacturing: Cost-Aware Hub Distribution and Order Allocation
Anika Akther, North Carolina Agricultural and Technical State University

MSEC-166016: Binder Jetting 3D Printing Utilizing Waste Algae Powder: A Feasibility Study
Jackson Sanders, Texas A&M University

MSEC-165740: Ammonia Synthesis via Synergistic Plasma-Electrochemical Nitrogen Reduction
Snigdha Rashinkar, University of Massachusetts Lowell

MSEC-166718: Real-Time Deformation Tracking for Automated English Wheel Manufacturing
Guanzhong Hu, Northwestern University

MSEC-165961: A Frequency Domain Physics Informed Neural Network for Tool-Tip Displacement Estimation Using On-Machine Vibration
Ryan Hall, University of Utah

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-165073: Sequential Learning for Integrated Safety and Quality Assurance in Human-Robot Collaborative Manufacturing Systems
Yuhao Zhong, Texas A&M University

MSEC-158796: Unsupervised Learning for Tool Condition Monitoring: Reconstruction Error Analysis
Soomin Lee, Korea Institute of Industrial Technology

MSEC-151318: Gas Pore Formation Characteristics and Dynamics for Material Properties of Ti-6Al-4V and Stainless Steel 316L in Laser-Powder Directed Energy Deposition Process
Dong Hee Kang, Texas A&M University

MSEC-163883: Effect of Defects in Thin-Walled Components for Aerospace Application
A-Sun Truth, University of the District of Columbia

MSEC-164257: Scalable and Expeditious Additive Manufacturing of Aluminum Alloy for Automotive Application
Zhiyuan Qu, Michigan State University

MSEC-164347: Fusion-Based vs Solid-State Additive Manufacturing of Ti6Al4V: Microstructure, Properties, and Sustainability Insights
Bhavesh Chaudhary, Indian Institute of Technology - Bombay, Mumbai

MSEC-164751: Synthetic Data-Based Chatter Classification in Mobile Machine Tools
Chang Hyeon Mun, Ulsan National Institute of Science and Technology

MSEC-164934: Novel Tool Life Evaluation in Grinding Process Using Sensory Tool Holder
Herterng Yau, National Chung Cheng University

MSEC-165381: Vision-Based Autonomous Lavender Harvesting Robot
Reiki Tanaya Karuka, Michigan Technological University

MSEC-165529: A Physics Informed Data Driven Model for Dynamic Rcsa Approximations
Ryan Hall, University of Utah

MSEC-165639: Study of Residual Stress in Additively Manufactured In718
Sara Ranjbareslamloo, University of Toledo

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-165653: Metal-Embedded Bacterial Cellulose for Triboelectric Energy Harvesting
Sk Shamim Hasan Abir, Rensselaer Polytechnic Institute

MSEC-165745: Impact of Tool Surface Finish in Friction Stir Powder Processing
Rachel Store, Michigan Technological University

MSEC-165808: Monitoring of Lm Guideway Using Acceleration Signals
Byungsun Park, Kyungpook National University

MSEC-165954: A Study of the Parameters Affecting Friction Stir Welding of Similar and Dissimilar Polymeric Materials
Kristofer Laser, The Pennsylvania State University, Erie

MSEC-165596: Development and Characterization of Dauber: Miniaturized Additive Friction Stir Deposition
Malachi Landis, Northwestern University

MSEC-165291: Classification of Pizoelectric Actuator Motion With Multimodal Large Language Model
Hongbo Zhang, Middle Tennessee State University

MSEC-162969: Cronet: A Convolutional Recurrent Operator Approximator Network to Accelerate Topology Optimization
Ridwan Olabiyi, Arizona State University

MSEC-164769: Experimental Evaluation and Data-Driven Modeling of Conductive Patterns on Electrospun Substrates
Christian Zuniga-Navarrete, University of Louisville

MSEC-165282: Application of Unit Manufacturing Process Models to Aid Process Selection for Rapid Part Manufacturing
Gabrielle Paul, Oregon State University

MSEC-165298: Complex Value Autoencoder for Machinery Audio Generation
Allen Moncey Varghese, Arizona State University

MSEC-165469: Manufacturing of Biomass Material for Sustainable Thermal Insulation Application
Licheng Liang, State University of New York at Buffalo

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-166097: Linear Volumetric Additive Manufacturing of Polymer Structures via Light Initiated Direct Growth
Shah Md Ashiquzzama Nipu, Arizona State University

MSEC-166179: The Impact of Substrate Color on Feature Resolution in 3D Inkjet Printing
Karin Chen, Karlsruhe Institute of Technology

MSEC-166289: Modeling In-Situ Stereovision Data for Improving Porosity Prediction in Metal Binder Jetting
Hui Wang, Florida A&M University

MSEC-166584: Analysis of Sound Signals for Defect Monitoring in DED Additive Manufacturing
Ming-Chyuan Lu, National Chung Hsing University

MSEC-165824: Thermal Simulation-Based Predictive Height Model for Waam-Based Hybrid Manufacturing
Nicholas Hendrickson, Michigan Technological University

MSEC-169327: Sparsest: Exploiting Data Sparsity in Spatiotemporal Modeling and Prediction
Junfeng Wu, Rensselaer Polytechnic Institute

MSEC-169406: Enhancing Sapphire Machining Through Ultrasonic Vibration-Assisted Scribing
Shah Rumman Ansary, Texas Tech University

MSEC-169617: Volumetric Decomposition for Collision-Free Manufacturing of Three-Dimensional Structural Electronics
Ashish Jacob, The Pennsylvania State University

MSEC-169826: Toward In-Situ Sensing of Powder Packing Quality in Metal Binder Jetting Using Recoating Force
Chen Qian, University of Michigan

MSEC-169850: Smartscan 2.0: An Intelligent Scan Sequence Optimization Approach for LPBF Driven by Thermomechanical Models
Chuan He, University of Michigan, Ann Arbor

MSEC-170167: Feedrate Optimization Based on Part-to-Part Learning in Repeated Machining
Cheng-Hao Chou, University of Michigan

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-170222: A Benchmark-Based Comparison of Sustainability Assessment Tools in Manufacturing
Pietro Andrea Miciaccia, Politecnico di Bari

MSEC-170258: Developing High-Throughput 3D Printed Precision Macro-Sensors Using Engineered Nanosensors
Henry Ware, NC State University

MSEC-170268: Layered Fabrication of High-Performance PAN-GF Composites from Recycled Wind Turbine Blade Waste
Varunkumar Thippanna, University of Georgia

MSEC-170274: Optimizing PLA/PCL Blends for 3D-Printed Pelvic Scaffolds via Direct Ink Writing
Fatemeh Mozaffar, University of Georgia

MSEC-170283: Mapping Circularity Metrics Interrelationships Using Network Analysis for Circular Product Design Decision Making
Dhanraj Kharal, University of Kentucky

MSEC-170306: An Experimental Investigation of Surface Integrity in Machining of Ultra-High Strength Flash 600 Steel
Manpreet Singh, University of Kentucky

MSEC-169722: Fragility Aware Grasping With Application for Handling Green Parts 3D Printed Using Binder Jetting
Artyom Boyarov, University of Michigan

MSEC-169812: Large Language Model-Assisted Bayesian Optimization for Improved Parameter Selection in Additive Manufacturing
Milad Azvar, University of Michigan

MSEC-170097: Meld (Friction Stir) Printed Al6061 at High Deposition Rates - Process and Material Properties
Michael Talachian, Louisiana State University

MSEC-170299: Study on the Effects of Magnetically Assisted Heat Treatment on Cold-Sprayed Copper
Alan Hensley, University of Kentucky

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-170305: Influence of Tool Geometry on Processing and Properties of Al-Mg-Si Alloy in Additive Friction Stir Deposition
Nimesh Fernando, University of Kentucky

MSEC-170327: Cold Spray of High Temperature Al Alloy
Md. Shad Bin Salam, University of Kentucky

MSEC-170328: Comparative Study of Nitrogen and Helium Gas Cold-Sprayed Refractory Metals
Solomon Azu, University of Kentucky

MSEC-170281: Acoustic Emission (AE) Analysis for Defect Identification in Additive Friction Stir Deposition
Mahela Prasanna, University of Kentucky

MSEC-169410: Machine Learning-Enhanced Direct Ink Writing for Advanced Conductive Composites and Solid-State Electrolytes in Energy Storage Applications
Sri Vaishnavi Thummalapalli, University of Georgia

MSEC-169424: Hybrid Multi-Material Direct Ink Writing for Patterning Functional Materials
Dhanush Patil, University of Georgia

MSEC-170086: Functionally Graded Tpms Lattice Structures Optimized to Improve Mechanical Strength for Biomedical Applications
Kaitlyn Hartman, Penn State University

MSEC-170133: Study of Thermal Accumulation on Ti64 and Pmma During Ultrafast Laser Ablation
Shubha Majumder, Clemson University

MSEC-170307: Microstructural Evolution and Mechanical Properties of Aluminum/copper Multi-Material Systems Produced by Additive Friction Stir Deposition
Shivangi Paliwal, University of Kentucky

MSEC-162300: Comparative Analysis of Recycled Pet and Hdpe Filament Production Using Pultrusion for Sustainable 3d Printing
Brinley Jordan, University of South Florida

MSEC-165528: AI Analysis of Micrographs Can Tell How Heterogeneous Surface Textures Inform Hardness
Himanshu Balhara, Texas A&M University

POSTER SESSION

TUESDAY JUNE 24, 2025

MSEC-166281: Machine Learning-Assisted Ultrasonic Testing for Metal Additive Manufacturing
Thiraj Wegala, Auburn University

MSEC-170340: Particle Image Velocimetry-Based Characterization of Shear Angle Instability Induced by Thermomechanical Loading in Orthogonal Cutting of Ti-6Al-4V
Victor Sodje, University of Kentucky

MSEC-170755: High-Fidelity Modeling of Droplet Evolution in Electrohydrodynamic Jet Printing
Clayton Burkhalter, University of Illinois Urbana-Champaign

MSEC-166044: Direct Observation of the Tool-Chip Contact in Machining
Raymond Gwilliam, Texas A&M University

BLACKS IN ADVANCED/ADDITIVE MANUFACTURING

TUESDAY JUNE 24, 2025

Blacks in Advanced-Additive Manufacturing (BiAM) Forum

Title: "Accelerating Innovation: Strategies for Career Growth in Additive Manufacturing"

Date and Time: June 24, 2025, 4:00pm–6:00pm
Location: Ballroom

About the Forum

Hosted by Blacks in Advanced-Additive Manufacturing (BiAM), this forum brings together faculty, researchers, graduate students, and industry professionals to share actionable strategies for success in additive and advanced manufacturing. Whether pursuing a faculty position, leading a research program, or advancing in industry, attendees will gain insights, mentorship, and valuable connections. This event is sponsored by ASME and SME.

Open to all NAMRC MSEC attendees — Event registration is required:

https://forms.gle/DqQCRSYCQbwvYsmFA

Agenda:

0–5 mins | Welcome & Introduction
Dr. Chukwuzubelu Ufodike (Texas A&M University)
Dr. Chinedum Okwudire (University of Michigan)
Opening remarks and forum objectives

5–15 mins | SME & ASME Collaboration Spotlight
Invited representatives from SME and ASME
Overview of programs and resources supporting early-career growth in AM

15–45 mins | Panel Discussion: Building a Successful Career in Advanced Manufacturing
Moderator: Dr. Chukwuzubelu Ufodike
Panelists from academia, industry, and national labs
Topics may include:
- Navigating the transition from PhD to academia or industry
- Gaining research visibility and funding
- Building collaborative networks
- Leadership and mobility across sectors
- Lessons from career journeys

BLACKS IN ADVANCED/ADDITIVE MANUFACTURING

TUESDAY JUNE 24, 2025

45–55 mins | Audience Q&A
Live discussion with panelists on research, career planning, and mentorship

55–65 mins | Launch of the BiAM Mentorship Program
Presenter: Dr. Chukwuzubelu Ufodike
Overview of a new mentorship initiative supporting aspiring faculty and researchers. Enrollment details provided.

65–85 mins | Facilitated Networking Breakouts
Small-group discussions on:
- Tenure-track navigation
- Funding and proposal strategies
- Industry-academia collaboration
- Visibility and influence in AM

85–90 mins | Closing Remarks
Dr. Chinedum Okwudire
Key takeaways and invitation to continue engaging with BiAM programs

Contact:
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BiAM: Empowering talent. Accelerating innovation. Building community.

BLACKS IN ADVANCED/ADDITIVE MANUFACTURING

TUESDAY JUNE 24, 2025

About the FOUNDERS

Dr. Chukwuzubelu Ufodike is an Assistant Professor and Charlotte and Walter Buchanan Faculty Fellow in the Department of Engineering Technology & Industrial Distribution at Texas A&M University. He holds joint (courtesy) appointments in the Department of Mechanical Engineering, the Department of Multidisciplinary Engineering, and the School of Engineering Medicine (EnMed). He also serves as the Director of the Digital Manufacturing and Distribution Lab (DMD-Lab) at the Texas A&M Engineering Experiment Station (TEES). Dr. Ufodike leads the Professor Ufodike Research Group (PURG), which focuses on AI-enhanced adaptive additive manufacturing for precision engineering. His group actively trains undergraduate and graduate students—including master's and Ph.D. candidates—as well as postdoctoral researchers. The team is internationally recognized as one of the leading research groups in the computational and numerical modeling of polymer flow in Fused Filament Fabrication (FFF) additive manufacturing, with far-reaching implications for industries worldwide. This positions Dr. Ufodike as a distinguished leader shaping the future of additive and digital manufacturing systems. Beyond research, Dr. Ufodike is the visionary founder of Blacks in Advanced-Additive Manufacturing (BiAM) and PrintLearn, reflecting his deep and sustained commitment to excellence in engineering education.

Dr. Chinedum (Chi) Okwudire is a Professor of Mechanical Engineering and Miller Faculty Scholar at the University of Michigan. His research is focused on exploiting knowledge at the intersection of machine design, control and computing to boost the performance of manufacturing automation systems at low cost. Chi has received a number of awards including the CAREER Award from the National Science Foundation; the Young Investigator Award from the International Symposium on Flexible Automation; the Outstanding Young Manufacturing Engineer Award from SME; the Ralph Teetor Educational Award from SAE International; the Education Award from SME; and the Russell Severance Springer Visiting Professorship from UC Berkeley. In 2022, he was selected by SME as one of the 25 leaders transforming manufacturing. He has co-authored several award-winning papers in the areas of manufacturing automation, control and mechatronics. He is the founder and CTO of Ulendo Technologies Inc., a company focused on advanced automation solutions for the manufacturing industry.

NAMRC TRACK 3 KEYNOTE

TUESDAY JUNE 24, 2025

Digital Twin Assisted

Machine Tool Monitoring

Yusuf Altintas

Distinguished University Scholar

University of British Columbia, Canada

09:00-10:15 | Crepe Myrtle

Abstract

The science-based digital models allow for the virtual design of machine tools, simulation, optimization, and online monitoring of machining operations. The combination of simulation and online-collected sensory data leads to the calibration of material coefficients, tool, and machine-dependent uncertainties in the models. The digital models can predict changes in cutting conditions, such as cutter–part engagement boundaries, chip loads, cumulative material removal, and trends in cutting force and torque variations ahead of tool positions along the tool path. When this digital data is combined with the measured sensory data in a digital twin setting, it becomes possible to monitor tool wear, tool breakage, chatter occurrence, spindle health, and contouring errors during part machining. The talk will present sample digital models of part machining and the digital twin-assisted monitoring system developed in our laboratory.

Biography

Yusuf Altintas is a Distinguished University Scholar and the NSERC–Pratt & Whitney Canada and Sandvik Coromant Industrial Research Chair Professor at the University of British Columbia. He conducts fundamental and applied research in metal cutting mechanics, machine tool vibrations, and control. The digital machining technologies developed in his laboratory are used worldwide in the manufacturing industry. His research is sponsored by the Natural Sciences and Engineering Research Council of Canada (NSERC) and global aerospace, machine tool, cutting tool, and automotive industries. He published a fundamental textbook on machining mechanics, machine tool vibrations, and control. He is a fellow of CIRP, ASME, SME, NAE, and the Royal Society of Canada. He is the holder of the Officer of the Order of Canada medal, received honorary doctoral degrees from Stuttgart and Budapest Universities, and received several awards for his contributions to manufacturing engineering. He has published about 230 journal articles, with approximately 44,000 citations and an h-index of 109.

NAMRC TRACK 4 KEYNOTE

TUESDAY JUNE 24, 2025

3D and 4D Bioprinting for Tissue Engineering

Ming Leu

Curators' Distinguished Professor and Keith & Pat Bailey Professor
Missouri University of Science and Technology, USA

10:30-11:45 | Regency F

Abstract

3D printing is an additive manufacturing technology that builds three-dimensional objects layer by layer, enabling the fabrication of complex geometries using multiple materials, including graded compositions. When these materials respond to external stimuli such as temperature, pressure, humidity, or pH, the process is referred to as 4D printing. This talk is on 3D and 4D printing technologies using bioresorbable materials—including biopolymers, bioceramics, and biocomposites—that can incorporate living cells for tissue repair and regeneration. It will cover recent advancements in 3D and 4D bioprinting technologies, materials and applications. Additionally, the speaker will present his research on 3D-printed constructs for skin and bone tissue engineering, where scaffolds and dressings were fabricated via extrusion-based freeform fabrication for bone regeneration and wound treatment. The talk will conclude with an outlook on future research directions and challenges in 3D and 4D bioprinting.

Biography

Dr. Ming C. Leu is a Curators' Distinguished Professor and the Keith & Pat Bailey Professor in the Department of Mechanical and Aerospace Engineering at Missouri University of Science and Technology. He founded the Center for Aerospace Manufacturing Technologies in 2004, serving as its director until 2016, and was also the Director of the Intelligent Systems Center from 2003 to 2020. Dr. Leu was a Program Director at the National Science Foundation (1996-1999), the State Chair Professor in Manufacturing Productivity at the New Jersey Institute of Technology (1987-1996), and an Assistant Professor at Cornell University (1981-1987). Dr. Leu earned his Ph.D. in 1981 from the University of California, Berkeley. His research interests include 3D printing, additive manufacturing, smart manufacturing, intelligent robotics, and cyber-physical systems. He has authored over 520 refereed journal and conference papers, one e-book, 11 book chapters, and holds five U.S. patents. Dr. Leu has received numerous prestigious awards for his work, including: the International Freeform and Additive Manufacturing Excellence Award (2020), ASME Milton Shaw Manufacturing Research Medal (2018), University of Missouri President's Leadership Award (2017), ASME Blackall Machine Tool and Gage Award (2014), Hideo Hanafusa Outstanding Investigator Award (2008), NJIT Harlan J. Perlis Research Award (1993), NSF Presidential Young Investigator Award (1985), and SAE Ralph R. Teetor Education Award (1985). He is a Fellow of SME, CIRP, and ASME.

NAMRC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

09:00-10:15 Crepe Myrtle	**Tech. Session I: Track 3 Material Removal I** *Session Chairs: Robert Gao and Yusuf Altintas*	
Track Keynote Presentation	Yusuf Altintas	Digital Twin Assisted Machine Tool Monitoring
4	Ross Zameroski, Michael Gomez and Tony Schmitz	Drill wear monitoring using a constrained-motion drilling dynamometer and aluminum witness sample

09:00-10:15 Redbud A	**Tech. Session I: Track 2 Manufact Proc I** *Session Chairs: Hany Osman and Guan-Cheng Chen*	
13	Guan-Cheng Chen, Alexander Killips, Azad Madni and Xiaochun Li	Nanotechnology-enhanced Squeeze Casting of Zamak 3 Alloy
14	Abdullah Al Rahi, Hany Osman, Ahmed Azab and Fazle Baki	Integrated Product-Platform Design and Multi-Period Lot-Sizing for Hybrid Manufacturing with Fuzzy Demand and Variant Substitution
15	Hany Osman, Ahmed Azab, M. Fazle Baki and Mohamed Gadalla	Stock design in hybrid manufacturing using a constrained clustering approach

09:00-10:15 Redbud B	**Tech. Session I: Track 7 Sustainable Manufacturing I** *Session Chairs: Sushanta Kumar Panigrahi and Mahathir Mohammad Bappy*	
10	Derrick Mirindi, James Hunter, David Sinkhonde and Frederic Mirindi	Machine learning-driven analysis of nanoparticle performance on concrete mechanical properties
88	Hossein Shakibaei, Md Shafikul Islam and Mahathir Bappy	A Fuzzy Data-Driven Framework for Enhanced Risk Management Decision-Making in Manufacturing: A Case Study
128	Hafiz Talal Arshad, Zhihui Wang, Tang Ji and Tao Peng	Digital Twin-driven Carbon Emissions Management in Manufacturing

09:00-10:15 Regency F	**Tech. Session I: Track 4 Additive Manufact I** *Session Chairs: Hitomi Yamaguchi and Santanu Paul*	
2	Bo Zhao, Kateland Hutt, Zilong Zhao, Pai Wang, Hitomi Yamaguchi and Shuaihang Pan	Scanning speed-induced surface roughness change and its impact on the corrosion resistance of IN718 fabricated by laser powder bed fusion
108	Santanu Paul, Ahmad Nourian Avval, Jon Gager, Samuel Boese, Chunyang Xia and Sinan Müftü	Coupled Thermal-Microstructure Analysis for the Wire Arc Directed Energy Deposition (WA-DED) of IN718
24	Deepak Kumar and Sunil Jha	Deposition Strategy Correlation with Texture Development, Geometric Homogeneity, and Mechanical Anisotropy in Robotic WAAM-Fabricated Aluminum Alloy Thick Walls

NAMRC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

09:00-10:15 **Redbud C**	**Tech. Session I: Track 5 Smart Manufact and CPS I** *Session Chairs: Adarsh Krishnamurthy and Sang Won Lee*	
19	Shi Yong Goh, Ankush Mishra, Manimaran Govindarasu, Baskar Ganapathysubramanian and Adarsh Krishnamurthy	Assessing the Cybersecurity of Connected 3D Printers Using Large Language Models (LLMs)
20	Seung Woo Paek, Yongho Lee, Huichan Park, Hyewon Shin and Sang Won Lee	Development of Distributed Network-Based Digital Twin with Real-Time Unstructured Data Processing: A Case Study on Directed Energy Deposition System
188	Dongmin Kang and Wenmeng Tian	Data Compression in Additive Manufacturing: Recent Progress and Opportunities

10:30-11:45 **Redbud A**	**Tech. Session II: Track 1 Manufact Sys I-Joint SME-KSMTE Session** *Session Chairs: Seok-min Kim and Thorsten Wuest*	
53	Jeongmo Kang and Sungchul Jee	A novel five-axis cross-coupling control system that considers the motion and dynamic constraints of feed drive systems
152	Jongyoup Shim, Jooho Hwang, Seung Guk Baek and Seung Kook Ro	On Vibration Suppressing Method for Robotic Machining by Inertial Moment Actuator using Gyroscopic Spindle
3	Jie Gu and John Agapiou	Dynamic Face Offset Compensation for CNC Machine Tools

10:30-11:45 **Redbud C**	**Tech. Session II: Track 2 Manufact Proc II** *Session Chairs: Jake Dvorak and Murali Sundaram*	
21	Tobechukwu Nwabueze, Ross Zameroski, Michael Gomez and Tony Schmitz	Displacement measurement using various Hall effect sensor-magnet configurations
29	Mohammad Fahim Yasir, Murali Sundaram, Nagaraja Iyyer and K.P. Rajurkar	A method to determine electrochemical kinetic parameters for multi-element anomalous co-deposition of Zn-Ni electroplating
39	Xinan Zhou, Jing Zou, Hangyu Li, Donghai Wang and Sun Jin	Rigid-flexible hybrid deviation analysis of battery stack assembly based on the Jacobian-Torsor model

10:30-11:45 **Redbud B**	**Tech. Session II: Track 3 Material Removal II** *Session Chairs: Jose Martins do Outeiro and David Gill*	
27	Necati Uçak, Jose Outeiro, Adem Çiçek and Kubilay Aslantas	Numerical analysis of the influence of sequential cuts during micro-milling of wrought and LPBF Ti6Al4V alloys
23	Andrew Schmidt, David Gill and Rowan Dickerson	ArcSaw – A New Tool for Rapid Machining of Sculpted Surfaces in Aramid Honeycomb
1	Hukuzo Yagishita	Highly Accurate Hole Making Technology of Ti6Al4V — Experimental Elucidation of Process for Hole Diameter in the Depth Direction to be Determined —

NAMRC TECHNICAL SESSIONS

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10:30-11:45 **Regency F**	**Tech. Session II: Track 4 Additive Manufact II** *Session Chairs: Xun Xu and Ming Leu*	
Track Keynote Presentation	Ming Leu	3D and 4D Bioprinting for Tissue
84	Johnathan Perino, Panayiotis Kousoulas and Y.B. Guo	Design, Hybrid Manufacturing, and Characterization of Porous Fracture Fixators

10:30-11:45 **Crepe Myrtle**	**Tech. Session II: Track 5 Smart Manufact and CPS II** *Session Chairs: Robert Gao and Jihyun Lee*	
181	Clayton Cooper, Jianjing Zhang, Yuebin Guo and Robert Gao	Surface roughness prediction in machining using two-stage domain-incremental learning with input dimensionality expansion
69	Pavel Koprov and Binil Starly	Industrial Metaverse Meets IIoT: Low-Code Platforms for Machine-to-Machine and Human-to-Machine Integration
140	Zhicong Rong, Ali Khishtan and Jihyun Lee	A Transfer Learning Approach for Chatter Detection in Multi-Posture Robot Machining

13:45-15:00 **Redbud A**	**Tech. Session III: Track 1 Manufact Sys II** *Session Chairs: Mahathir Mohammad Bappy and Wei Li*	
59	Vipul Bansal, Shiyu Zhou and Nicolas Strike	Two Step Training a Single Physics-Informed Neural Network for Solving Navier Stokes Equations with Various Boundary Conditions
68	Wei Li and Barrie Nault	Balancing trade-offs between three moments of completion times for one-stage production
117	Sabyasachi Biswas, Abdullah Al Mamun, Md Shafikul Islam and Mahathir Mohammad Bappy	Interpretable CNN Models for Computationally Efficient Bearing Fault Diagnosis Using Learnable Gaussian/Sinc Filters

13:45-15:00 **Redbud C**	**Tech. Session III: Track 2 Manufact Proc III** *Session Chairs: Marion Merklein and Andrea Ghiotti*	
12	Miriam Leicht and Marion Merklein	Novel process chain for forming micro gears with a module of 0.1 mm – Potentials and approaches for extending process limits
83	Wenjian Cao, Andrea Ghiotti and Stefania Bruschi	Modeling of adhered powder particles and waviness on additive manufacturing part surface in electrochemical polishing
58	Olayinka Olaogun and Peter Olubambi	An Investigation of Post-weld Heat Treatment for Welded AISI 1007 Steel Using TIG-MIG Hybrid Welding Technique

NAMRC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

13:45-15:00 **Redbud B**	**Tech. Session III: Track 3 Material Removal III** *Session Chairs: Joel RECH and Quentin Allen*	
56	Joel Rech, Sangil Han, Alexis Cavard, Marc Raffestin and Frédéric Valiorgue	Prediction of residual stresses induced in turning – Influence of cutting tool geometry
35	Yazan Tuffaha and Quentin Allen	Electric discharge machining of zirconia toughened alumina ceramic with an optimized assistive electrode method
62	Shahid Ali, Albina Aidossova, Nuray Begassilova, Anelya Gissa, Didier Talamona and Asma Perveen	Investigating Die-Sinking EDM drilling performance on Additively Manufactured SS316L Steel Lattice Structures

13:45-15:00 **Crepe Myrtle**	**Tech. Session III: Track 4 Additive Manufact III** *Session Chairs: Semih Akin and Jingyan Dong*	
41	Ping Ren and Jingyan Dong	Characterization of screen-printed silver nanowire (AgNW)-based soft strain sensors
71	Muhtadin Muhtadin, Semih Akin and Jung-Ting Tsai	Additive manufacturing of radially oriented gyroid carbon fiber composites for low-temperature thermal absorber applications
255	Jianming Zhou, Audai Al-Akailah and Fuda Ning	Prediction and Understanding of Warpage Generation during Additive Manufacturing of Continuous Carbon Fiber Composites

13:45-15:00 **Regency F**	**Tech. Session III: Track 5 Smart Manufact and CPS III** *Session Chairs: Jose Martins do Outeiro and Tero Kaarlela*	
22	Tero Kaarlela and Jose Outeiro	A Cyber-Physical Machine Tool Concept for Education and Workforce Training in CNC Machining
37	Semin Ahn, Dohyeon Kim and Sung-Hoon Ahn	Dynamic inaudible frequency shifting communication for multi-robot collaboration in manufacturing
89	Jie Ding, Ruifang Li, Ziheng Liu, Jiayi Liu and Wenjun Xu	A cognitive digital twin modeling method of robotic production line

15:15-16:30 **Redbud A**	**Tech. Session IV: Track 1 Manufact Sys III-Joint SME-KSMTE Session** *Session Chairs: Jongyoup Shim and Paolo Parenti*	
97	Taehyeon Kim, Jongwoo Hong, Seongsik Jeong, Sushanta Das, Amar Patil, Hae Jin Kim and Seong Chan Jun	Uniform Patterning of MXene-Based Slurry on Carbon Cloth for Flexible Supercapacitor by Roll-to-Roll Production
18	Derrick Mirindi, David Sinkhonde and Frederic Mirindi	Application of machine learning to predict the properties of wood- composite made from PET, HDPE, and PP fibres
70	Dixita Yadav, Yash Gopal Mittal, Swapnil Gujarathi and K. P. Karunakaran	Development of a Uniaxial Scissor Unit into a Tri-Axis Motion System via Double Universal Joints

NAMRC TECHNICAL SESSIONS

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15:15-16:30 **Redbud C**	**Tech. Session IV: Track 2 Manufact Proc IV** *Session Chairs: Jingyan Dong and Fenffeng Zhou*	
49	Yanze Chen and Jingyan Dong	Fabrication of Flexible Electronics by Screen Printing with PEDOT: PSS/Graphene Composite Ink
77	Siying Chen, Fengfeng Zhou, Bailley Reggetz, Eun Gyung Lee, Abbas Virji, Aliakbar Afshari, Martin Byung-Guk Jun and Semih Akin	Polymer metallization via cold spray: an investigation into the effects of particle hardness and morphology
103	Wanrui Zhang, Jianchao Zou, Zijing Hong, Lei Yang and Weizhao Zhang	Manufacturing shear-thickening-gel applied carbon fibre-reinforced polymer (SACFRP) with high toughness and enhanced impact-resistant performance

15:15-16:30 **Redbud B**	**Tech. Session IV: Track 3 Material Removal IV** *Session Chairs: Ankit Agarwal and Anurag Shanu*	
96	Sujay B J, Swarit Anand Singh, Ankit Agarwal, K A Desai and Laine Mears	Identifying Tool Wear Stages in Turning Process through Machined Surface Image Analysis Using Convolutional Neural Network
238	Alisa Ren, Mason Ma, Jiajie Wu, Jaydeep Karandikar, Chris Tyler, Tony Shi and Tony Schmitz	A Cutting Mechanics-based Machine Learning Modeling Method to Discover Governing Equations of Machining Dynamics
8	Anurag Shanu, Sharad Valvi and Pradeep Dixit	Numerical and experimental investigation of glass micromachining using ultrasonic-assisted electrochemical discharge machining

15:15-16:30 **Regency F**	**Tech. Session IV: Track 4 Additive Manufact IV** *Session Chairs: Xuan Song and Puneet Tandon*	
42	Jacob Atzen, Jackson Berlage, Prabhav Bhatt, Kevin Su, Xuan Yang and Xuan Song	Effect of interface geometry on dielectric properties of bi-continuous ceramic-polymer composites
72	Neshat Hojjati, Kumar Singarapu, Akash Deep, Sundararajan V. Madihally and Srikanthan Ramesh	3D bioprinting of multicellular constructs using HepG2 and HUVEC cells for in-vitro liver models
162	Rahul Soni, Vivek V. Bhandarkar, Ponappa K. and Puneet Tandon	3D Extrusion Printability of Corn Starch and Optimization of Process Parameters For Optimal Food Layered Manufacturing

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15:15-16:30 **Crepe Myrtle**	**Tech. Session IV: Track 5 Smart Manufact and CPS IV** *Session Chairs: Jian Cao and Ana Wooley*	
221	Nicholas Dewberry, Issa Alhmoud, Kevin Benton, Derick Suarez, Yi-Ping Chen, Vispi Karkaria, Ying-Kuan Tsai, Meccaya Brock, Nooralhuda Alazzawi, Shuva Chowdhury, Wei Chen, Jian Cao and Balakrishna Gokaraju	A Real-Time VR-Enabled Digital Twin Framework for Multi-User Interaction in Industry 4.0
82	Ana Wooley, Julia Bitencourt and Daniel Silva	Bridging the Gap Between Discrete Event Simulation and Digital Twin: A Manufacturing Case Study
87	M. Nafis Ahsan, Md Shafikul Islam and Mahathir Bappy	Generative Modeling in Smart Manufacturing: Applications, Challenges, and Future Directions

MSEC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

09:00-10:15 Regency H	**Technical Session I: Advances in Manufacturing and Processing of Polymers and Composites 1** *Session Chair: Erina Joyee*	
MSEC-154422	Su Yu, Jonathan Colton	Applying Hybrid Deep Neural Networks With Manually Derived Layers To Model Compression Strength Of Angled Cfrp In Aerospace Industry
MSEC-155176	Riley Rohauer, Kory Schimmelpfennig, Vincent Mei, Perrin Woods, Christopher L. Lewis, Md Ahasan Habib	Characterization and Prediction of Properties of Polymeric Materials for Extrusion-Based Bioprinting Process
MSEC-155261	Dr. Tabrej Khan, Tamer A. Sebaey	Characterization of the Quasi-Static Axial Crushing of Multi-Tubular Frp Composite Structures Using Commercially Available Frp Tubes and Pu Foam Filling.

09:00-10:15 Magnolia	**Technical Session I: Advances in Surface Engineering: Process, Metrology, and Property/Performance 1** *Session Chair: Yiliang (Leon) Lia*	
MSEC-155315	X. David Zhang, Xinchao Liu, Yifeng Wang, Chuck Zhang	A Study Of Effects Of Geometric Form Variations To Diametric Differential Of Threads
MSEC-155704	Shayan Bayki, Pushpendra Kumar, Soham Mujumdar	Enhancing Micro-Hardness of Mild Steel by Dbd Plasma Jet Enhanced Chemical Vapor Deposition of Tio2
MSEC-155736	Anurag Virendra Srivastava, Bhanupratap Gaur, Soham Mujumdar	Deposition of Titanium on Aluminum Using Electrical Discharge Coating Process With Additively Manufactured Tool

09:00-10:15 Gardenia	**Technical Session I: Explainable AI for Knowledge Discovery in Manufacturing Systems 1** *Session Chair: Grace Guo*	
MSEC-153006	Miles Bimrose, James Shin, Christopher Conway, Sameh Tawfick, William King	Fused Deposition Modeling Source Identification From Smartphone Photographs And Deep Learning
MSEC-155351	Chengyang Huang, Joseph Cohen, Xun Huan	Data-Driven Prediction and Uncertainty Quantification on Chemical Concentration in Electroless Plating Process
MSEC-155404	Joseph Cohen, Xun Huan	An Industrial Framework for Explainable Anomaly Detection: A Case Study for Pick-and-Place Machines

MSEC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

09:00-10:15 Regency G	**Technical Session I: Smart Additive Manufacturing 1** *Session Chair: Azadeh Haghighi*	
MSEC-152596	Longfei Zhou, Rojan Dahal, Xiaoxu Ji	Automatic Powder Bed Leveling For Direct Metal Laser Sintering Based On Machine Learning
MSEC-155872	Meysam Faegh, Reihane Arabpoor, Azadeh Haghighi	Leveraging Physics-Informed Neural Networks for Temperature Field Transfer From Single-Track to Multi-Track Multi-Head Additive Manufacturing
MSEC-155542	Haozhe Zheng, Yuxin Tong, Nathaniel Wood, Uduak Inyang-Udoh	Multi-Input Iterative Learning Control for Laser Powder Bed Fusion

09:00-10:15 NOMA B&C	**Technical Session I: Student Manufacturing Design Competition I** *Session Chairs: Johnson Samuel and Jaydeep Karandikar*	
	The University of Texas at Dallas	Hydrogel Polymer Aliquoting for Lyophilization
	The University of Arizona, Tucson	An Integrated Framework for Aerospace Component Repair Using Hybrid Laser Wire Additive Manufacturing
	The University of Texas at Austin	Additive Manufacturing with Robotics to Enable Swarm Applications

10:30-11:45 Regency H	**Technical Session II: Advances in Manufacturing and Processing of Polymers and Composites 2** *Session Chair: Felicia Stan*	
MSEC-155352	Yizhen Zhu, Shah Md Ashiquzzaman Nipu, Parimal Prabhudesai, Sheefali Ajay Balapure, Cindy Xiangjia Li	Linear Volumetric 3D Printing: Dual-Wavelength Initiation and Inhibition for Light-Induced Direct Growth
MSEC-155590	Felicia Stan, Catalin Fetecau, Ionut-Laurentiu Sandu, Adriana-Madalina Constantinescu (Turcanu)	Fused Granulate Fabrication of Polypropylene Carbon Nanotube Composites: A Preliminary Study
MSEC-155762	Andrew Lefors, Parsa Akbari, Shahrzad Rahmani, Roland Chen	A Scalable Fabrication Method for High Drug-Loading Capacity Hollow Microneedles

MSEC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

10:30-11:45 Magnolia	**Technical Session II: Advances in Surface Engineering: Process, Metrology, and Property/Performance 2** *Session Chairs: Beiwen Li and Avik Samanta*	
MSEC-155905	Akhter Zia, Syed Comail Abbas, Bashir Khoda	Engineering Mof-Enhanced 3D-Printed Monoliths for Scalable and Sustainable Water Filtration Solutions: Tackling Contaminant Leaching and Adsorption
JMSE-24-1484	Mikhail Khrenov, William Frieden Templeton, Sneha Prabha Narra	[J] ADDOPT: An Additive Manufacturing Optimal Control Framework Demonstrated in Minimizing Layer-Level Thermal Variance in Electron Beam Powder Bed Fusion
JMSE-25-1079	Chin-Cheng Shih, Bruce L. Tai	[J] Dynamic Cutting Force Estimation via Fourier Neural Operator (FNO) with Inferred 1 Machine Tool Dynamics: A Proof of Concept

10:30-11:45 Gardenia	**Technical Session II: Explainable AI for Knowledge Discovery in Manufacturing Systems 2** *Session Chair: Yossi Cohen*	
MSEC-155588	Sida Zhang, Richard Povinelli, Joseph Domblesky	Ensembling Deep Learning Models for Medal Surface Defect Classification
MSEC-155749	Rong Lei, Yuebin Guo, Weihong Guo	Fedscope-Kd: Knowledge Distillation-Enhanced Federated Learning via Shared Composition and Personalized Exploration for Heat Emission Prediction in Additive Manufacturing
MSEC-155761	Hankang Lee, Hui Yang	Multi-Agent Artificial Intelligence to Self-Organize Machine Networks for Resilient Manufacturing

10:30-11:45 Regency G	**Technical Session II: Smart Additive Manufacturing 2** *Session Chair: Prahalada Rao*	
MSEC-155844	Ali Bahrami, Christopher Watson, Dawn Tilbury, Kira Barton	Optimal Feed-Forward and Iterative Learning Control Framework for Enhanced Precision in Extrusion-Based Additive Manufacturing
MSEC-154527	Hyewon Shin, Seung Woo Paek, Nang Shwe Htike, Sang Won Lee	Development of an Artificial Intelligence Model for Height Prediction Using Multi-Sensor Melt-Pool Data in Directed Energy Deposition Process
MSEC-155726	Jeremy Cleeman, Adrian Jackson, Shane Esola, Chenhui Shao, Hongyi Xu, Rajiv Malhotra	Rapid Real-Time Defect Mitigation for Hardening In-Field Additive Manufacturing to Unknown Extraneous Disturbances

10:30-11:45 NOMA B&C	**Technical Session II: Student Manufacturing Design Competition II** *Session Chairs: Johnson Samuel and Jaydeep Karandikar*	
	University of Missouri	Smart Manufacturing: Guided Mixed Reality Control for Multiple CNC and 3D Printing Machines
	Auburn University	Machine Learning-Assisted Ultrasonic Testing And Its Application In Metal Additive Manufacturing
	Brigham Young University	Ultra High-Speed Friction Stir Lap Welding

MSEC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

13:45-15:00 Magnolia	**Technical Session III: Advances in Clean Energy and E-Mobility Manufacturing 1** *Session Chairs: Alessandro Ascari and Lei Chen*	
MSEC-155456	Chiara Gianassi, Erica Liverani, Alessandro Ascari, Andrea Tonoli, Andrea Cavagnino, Alessandro Fortunato	Characterization of fesi2.9 and Ss 316l Produced by Directed Energy Deposition for Bimetallic High-Speed Rotors
MSEC-155578	Chun Cao, Tianyu Wang, Mian Li, Yunlong Huang, Junjie Jiang, Songhua Zhang	An Efficient Segment Anything Model Adaptation Method for Electrode Overhang Analysis in Lithium-Ion Battery Manufacturing
MSEC-155294	Xinxin Yao, Karnpiwat Tantratian, Yaohong Xiao, Jinrong Su, Lei Chen	[B] Optimization of External Pressure in Pouch Cell Manufacturing Through Large-Scale Phase-Field Simulation

13:45-15:00 Regency H	**Technical Session III: Advances in Manufacturing and Processing of Polymers and Composites 3** *Session Chair: Kenan Song*	
MSEC-155662	Anasheh Khecho, Erina Baynojir Joyee	Material Behavior of Magneto-Responsive Polymer Composites in Extrusion-Based Direct Writing
MSEC-155691	Ziyi Xu, Shuaiyin He, Koukou Luo, Siqi Chen, Molong Duan	Additive Manufacturing With Continuous Fiber: A Comparison Between Prepreg and In-Situ Impregnated Fiber on Printing Accuracy, Bonding, and Mechanical Performance
MSEC-155740	Hanyu Zhu, Andrew Chang, Nina Valle, Wei Li	Modeling of Phase Separation and Growth in Immiscible Polymer Blends for Fabrication of High-Strength Medical Implants

13:45-15:00 Gardenia	**Technical Session III: Explainable AI for Knowledge Discovery in Manufacturing Systems 3** *Session Chair: Xi Gu*	
MSEC-155771	Samar Saleh, Yuebin Guo, Weihong Guo	Enhanced Counterfactual Explanations for Optimizing 3D Printing Parameters Using Shap and Nearest Neighbor Constraints With Physics-Based Validation
MSEC-155799	Lige Gan, Guangzhi Qu, Xiao Yue	Securing the Smart Factory: Interpretable Machine Learning for Intrusion Detection in Manufacturing
MSEC-155833	Behzad Esmaeilian, Willie Cade, Sara Behdad	Artificial Intelligence-Based Product Durability Assessment

MSEC TECHNICAL SESSIONS

TUESDAY JUNE 24, 2025

13:45-15:00 **Regency G**	**Technical Session III: Smart Additive Manufacturing 3** *Session Chair: Molong Duan*	
MSEC-155609	Yuexin Yang, Yi Zhou, Molong Duan	Contact-Force-Based Closed-Loop Control of Multi-Axis Additive Manufacturing With Continuous-Fiber-Reinforced Polymer
MSEC-155759	Angelo Hawa, Yangming Kou, Leonardo Gonzalez, Fred Hicken, Kira Barton	Online Model-Based Input Shaping for Precision Application Processes
MSEC-155431	Artyom Boyarov, Alexander Martinez-Marchese, Chinedum Okwudire	[B] Fragility Aware Grasping With Application for Handling Green Parts 3D Printed Using Binder Jetting

13:45-15:00 **NOMA B&C**	**Technical Session III: Student Manufacturing Design Competition III** *Session Chairs: Johnson Samuel and Jaydeep Karandikar*	
	Brigham Young University	Automated Acrylic Award Sanding Station
	IIT Bombay - India	A Novel Tri-Axial Scissor-based Motion System for Advanced Manufacturing

WEDNESDAY JUNE 25, 2025

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
7:30–9:00	Think Tank	SME Journals Meeting
8:00–8:55	Ballroom	Welcome and Keynote: Mike Molnar
9:00–10:15	Ballroom	Workshop: National Manufacturing Strategy
9:00–10:15		Technical Session V
9:00–10:15	Redbud C	Student Research Competition 1
9:00–10:15	NOMA B&C	Supplemental Technical Session
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session VI
10:30–11:45	Redbud C	Student Research Competition 2
10:30–11:45	NOMA B&C	Federal Agency Roundtable
12:00–13:30	Ballroom	ASME MED Award Luncheon
13:45–15:00	Redbud C	Student Research Competition 3
13:45–15:00	Teal	Chill out with SME – Membership Meeting
13:45–15:00	NOMA B&C	SME Blue Sky Competition I
13:45–15:00		Technical Session VII
14:30–17:30	Ballroom	Women in Advanced Manufacturing (WIAM) Forum
15:00–15:15	Teal	Afternoon Break
15:15–16:30		Technical Session VIII
15:15–16:30	NOMA B&C	SME Blue Sky Competition 2
16:30–16:45	Teal	Afternoon Break
16:45–18:00		Technical Session IX
18:00–19:30	NOMA B&C	Joint SME Journals and Scientific Committee Reception
18:15–21:00	Ballroom	NSF Early Career Forum

KEYNOTE

WEDNESDAY JUNE 25, 2025

Opening remarks

Robert Ivester

Senior Advisor on Advanced Manufacturing, NIST

8:00-8:10 | Ballroom

Biography

Robert W. Ivester, PhD currently serves as the senior advisor on advanced manufacturing at the National Institute of Standards and Technology. Previously, Ivester served as the Deputy Director of the Hollings Manufacturing Extension Partnership Program. The MEP National Network focuses its expertise and knowledge as well as that of its partners — industry, educational institutions, state governments, NIST and other federal research laboratories and agencies — on providing U.S. manufacturers with information and tools they need to improve productivity, assure consistent quality, accelerate the transfer of manufacturing technology and infuse innovation into production processes and new products. Ivester served at the Department of Energy for seven years, most recently as director of the Federal Energy Management Program in the Office of Energy Efficiency and Renewable Energy. FEMP oversees the implementation of policy and actions that result in energy efficiency implementation, renewable energy adoption, and reduction in energy and water use in federal government operations. He also served in the Advanced Manufacturing Office for six years. During that time, AMO launched five Manufacturing USA Institutes, the Critical Materials Hub, and hundreds of small R&D and technical assistance projects across the nation. Ivester also worked at NIST for over 16 years, leading and performing research in advanced manufacturing. He has been an instructor for the Johns Hopkins University Engineering for Professionals program for graduate-level studies in manufacturing engineering since 2001. Ivester is a fellow of SME and the American Society of Mechanical Engineers. He received his doctorate in engineering, master's degree in manufacturing engineering and a bachelor's degree in mechanical engineering from the University of Massachusetts at Amherst.

KEYNOTE

WEDNESDAY JUNE 25, 2025

Manufacturing USA – A Decade of Innovation and Collaboration

Mike Molnar

Director, Advanced Manufacturing National Program Office

8:10-8:55 | Ballroom

Abstract

Manufacturing USA® was established as a program ten years ago with the purpose of securing U.S. global leadership in advanced manufacturing through large-scale public-private collaboration on technology, supply chain, and workforce development. The institutes in the Manufacturing USA network convene business competitors, academic institutions, and other stakeholders to test applications of new technology, create new products, reduce cost, and risk, and enable the manufacturing workforce with the skills of the future.

This session will provide an overview of how the Manufacturing USA network is positioning the United States as a global leader in advanced manufacturing while also supporting critical infrastructure for national security. Additionally, the session will highlight the significant impact the MFG USA network has had on advancing technology, building partnerships, and revitalizing the manufacturing workforce, closing with news and developments underway.

Biography

Mike Molnar is the founding director of the Advanced Manufacturing National Program Office, the interagency team responsible for the Manufacturing USA program. Mike also leads the NIST Office of Advanced Manufacturing and serves as co-chair of the National Science and Technology Council, Subcommittee on Advanced Manufacturing – the team responsible for the National Strategic Plan for Advanced Manufacturing.

Prior to joining federal service in 2011 Mike had a successful industry career, including 25 years leading manufacturing and technology development at Cummins, a U.S. based global company that designs, manufactures, and distributes engines and power generation products. Midcareer he served as the first Manufacturing Policy Fellow in the White House Office of Science and Technology Policy. He earned a Bachelor's in Mechanical Engineering and Master's in Manufacturing Systems Engineering from the University of Wisconsin, and an Executive MBA from the University of Notre Dame. He is a licensed Professional Engineer, Certified Manufacturing Engineer, and was elected a Fellow of SME and a Fellow and Honorary Member of ASME.

WORKSHOP ON NATIONAL STRATEGY FOR ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Public Input on the 2026-2030 National Strategic Plan for Advanced Manufacturing

Hosted by

Said Jahanmir

Assistant Director for Federal Partnerships, Advanced Manufacturing National Program Office

9:00–10:15 | NOMA BC

The Subcommittee on Advanced Manufacturing (SAM) is in the process of updating the quadrennial National Strategic Plan for Advanced Manufacturing. The purpose of this roundtable event is to solicit information from the NAMRC/MSEC Manufacturing Conference participants regarding federal programs and activities to advance United States manufacturing competitiveness, including advanced manufacturing research and development that will create jobs, grow the economy across multiple industrial sectors, strengthen national security, and improve healthcare. Public input is also solicited through a request for information (RFI) from all interested parties to inform the development of the 2026-2030 National Strategic Plan for Advanced Manufacturing. This roundtable event will follow questions in the public RFI issued by the White House Office of Science and Technology Policy.

BLUE SKY COMPETITION

WEDNESDAY JUNE 25, 2025

SME Manufacturing Blue Sky Competition

Session 1: 13:45-15:00 | Session 2: 15:15-16:30 | Noma B/C

Organizers

Michael Sealy, Barbara Linke, and Moneer Helu

Description

Don't miss the eighth annual Blue Sky Competition at NAMRC 53, where presenters share bold, forward-looking ideas to shape the future of manufacturing research. All attendees are welcome to watch the live pitches and see who takes home the SME David Dornfeld Manufacturing Vision Award during the Awards Ceremony on Thursday, June 26. This is your chance to hear transformative ideas that cross disciplines and challenge the status quo.

Blue Sky Competition Finalists

Session I

(1) Manufacturing Empathy: Sensorial AI for Rewriting Human-AI Collaboration
Authors: Cristian Garcia-Ponce, Niloofar Rezaei, Marcus DiBattista, John Bradley Frericks, Jaime Andres Camelio (University of Georgia)

(2) Spatial Collective Intelligence for Symbiotic Manufacturing of Emergent Systems
Authors: Vinayak Krishnamurthy, Ergun Akleman, Zhenghui Sha (Texas A&M University)

(3) Evolutionary Digital Twins for Design and Manufacturing in Space
Authors: Jose Outeiro, Marjan Molavi-Zarandi, Ali Bonakdar, Taner Tunc (University of North Carolina at Charlotte)

Session II

(1) Build Space. In Space; an In-Situ Approach
Authors: Parth Ghube, Kunal Sonawane, David Bourne (Carnegie Mellon University)

(2) Quantum Spectral HoloSense: A Futuristic NDE Revolution
Authors: Aditya Babu, Anushrut Jignasu, Adarsh Krishnamurthy (Iowa State University)

(3) Music-inspired Autonomous Nano-Fab Platform: A Future Roadmap for Decentralized Semiconductor Manufacturing Solution
Authors: Zimo Wang, Jia Deng, ChingNam Cheng (State University of New York at Binghamton)

SME MEMBERSHIP MEETING

WEDNESDAY JUNE 25, 2025

SME Membership and Student Meeting

13:45-15:00 | Teal

SME Membership - Ice Cream Open House

Join us for an icy-cool adventure at the "Chill with SME - Ice Cream Open House"!

Indulge your sweet tooth while exploring the world of SME! Whether you're a student eager to learn about our vibrant Student Chapters or a professional looking to explore our Membership options, there's a scoop of knowledge waiting for you.

Discover the benefits of SME Membership, where innovation meets opportunity. Dive into the chill vibes of our emerging professionals' scene, or learn how institutions can engage with SME for mutual growth. Plus, get a taste of the exciting SME Engagement programs that make us more than just your average association.

FEDERAL AGENCY PANEL

WEDNESDAY JUNE 25, 2025

Federal Agency Program Directors Roundtable

10:30-11:45 | NOMA B/C

In this roundtable session, program directors from the National Science Foundation Advanced Manufacturing program, US Department of Energy Advanced Materials & Manufacturing Technologies Office, and others will update attendees on federal advanced manufacturing programs and plans. They will also answer questions from the audience.

ANDY WELLS is a Program Director in the National Science Foundation's Advanced Manufacturing program, and also co-leads the Future Manufacturing solicitation. He is an NSF representative to the National Science and Technology Council's (NSTC) Subcommittee on Advanced Manufacturing, and to the Manufacturing USA Interagency Working Group. He has over 25 years of experience developing and building precision equipment that enables manufacturers and researchers to visualize and transform materials at the micro- and nano-scale. Previously, he was a technical program manager at Thermo Fisher Scientific and FEI Company, where he led development of scanning electron microscopes and ion-beam machining tools for semiconductor, materials science, and life science customers. Prior to that, he developed equipment for laser and mechanical micromachining at Electro Scientific Industries and was an adjunct professor at Portland State University. He received his PhD and MS degrees in mechanical engineering from Caltech, and his bachelor's degree from Dartmouth.

SATISH BUKKAPATNAM is a Professor of Industrial & Systems Engineering, Regents Professor, Rockwell International Professor, College of Engineering, Director of TEES Institute for Manufacturing Systems, and Affiliated Faculty, Multidisciplinary Engineering and Biomedical Engineering. Dr. Satish T. S. Bukkapatnam's research in smart manufacturing addresses the harnessing of high-resolution nonlinear dynamic information, especially from wireless micro-electromechanical systems sensors, to improve the monitoring and prognostics, mainly of ultraprecision and nanomanufacturing processes and machines, and wearable sensors for cardiorespiratory process prognostics. His research has led to over 160 peer-reviewed publications (101 published/accepted in journals and 68 in conference proceedings); five pending patents; $6.5 million in grants as PI/Co-PI from the National Science Foundation, the U.S. Department of Defense and the private sector; and 17 best-paper/poster recognitions.

FEDERAL AGENCY PANEL

WEDNESDAY JUNE 25, 2025

DR. HUIJUAN DAI is the Next Generation Materials and Processes Program Manager for the US Department of Energy Advanced Materials & Manufacturing Technologies Office. At AMMTO, her portfolio encompasses smart manufacturing, cybersecurity for manufacturing, high-performance computing, additive manufacturing, composites, conductivity-enhanced materials, and materials designed for harsh service conditions. Dr. Dai's responsibilities include oversight of three Manufacturing USA institutes: the Institute for Advanced Composites Manufacturing Innovation (IACMI), the Collaborative Ecosystems Smart Manufacturing Innovation Institute (CESMII), and the Cybersecurity Manufacturing Innovation Institute (CyManII).

Before joining the U.S. Department of Energy (DOE), Dr. Dai spent over 15 years driving industry research and technology development across the aerospace, oil and gas, and renewable energy sectors. She played a key role in shaping the vision and technology strategies for advancing and implementing high-value advanced manufacturing and additive manufacturing opportunities across energy sectors. Huijuan also brings more than a decade of experience in program and team management, successfully leading multidisciplinary teams from idea generation, rapid prototyping to new technology/product introduction.

She has a Ph.D. in Materials Science from the University of Leicester in the United Kingdom, and an MBA with a specialization in Business Analytics from the University of South Carolina in the United States.

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

6th Women in Advanced Manufacturing (WIAM) Forum

Wednesday, June 25, 2025
Clemson University
Hyatt Regency, Greenville, SC
Grand Regency Room
14:30 PM ET-17:30 PM ET

The WIAM Forum 2025 will continue to showcase successful career paths, discuss next-generation technologies, and promote diversity, equity, and inclusion in the field of advanced manufacturing. This forum is organized by the ASME Manufacturing Engineering Division (MED). Funding for this event is being provided by MED and the ASME Technical and Engineering Communities (TEC) Sector, and it is co-sponsored by SME.

A registration fee of $5 is required. All genders are welcome!

Program Details

Session I: WIAM Welcome

Date and Time: Wednesday, June 25, 2025. 14:30 -14:45 PM ET
Agenda: The welcome session will include the WIAM 2025 Forum introduction and agenda, as well as a brief presentation of the WIAM 2025 sponsors: SME and ASME
Moderator: Dr. Ala Qattawi and Maya Reslan

Session II: Panel of Leaders in Manufacturing

Date and Time: Wednesday, June 25, 2025. 14:45 -16:00 PM ET
Panel Topic: Breaking Barriers, Building Futures: Challenges and Aspirations for Women in Advanced Manufacturing.
Panelists: Susan Ipri-Brown (NIST), Dr. Stefania Bruschi (University of Padova, SME Chair Elect), Dr. Fazleena Badurdeen (University of Kentucky), and Rashmi Vadlakonda (Trane Technologies)
Moderator: Dr. Azadeh Haghighi and Dr. Sarah Wolff

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Session III: WIAM Networking Event
Date and Time: Wednesday, June 25, 2025. 16:00 -16:30 PM ET

Agenda: The WIAM 2025 Forum will host a networking event following the technical panel, offering attendees the opportunity to engage in open discussions with the panelists and fellow participants. This event aims to foster connections, establish mentoring relationships, and build collegial bridges within the advanced manufacturing community.

Session IV: WIAM Professional Development Workshop

Date and Time: Wednesday, June 25, 2025. 16:30 -17:30 PM ET
Topic: Engineering Your Success: Best Practices for Productivity and Time Management
Overview: Balancing multiple projects, tight deadlines, and ongoing professional development can be challenging. This workshop offers strategies for engineering professionals and students to streamline their workflows, enhance productivity, and manage time effectively. Through this interactive workshop, participants will gain actionable insights for re-setting their priorities so that they can optimize their daily routines and achieve long-term success.
Presenter: Dr. Nancy Diaz-Elsayed

ASME MED WIAM 2025 Organizing Committees:
Chair – Ala Qattawi, University of Toledo
Vice Chair –Maya Reslan, NIST
Treasurer – Azadeh Haghighi, University of Illinois Chicago
Secretary – Sarah Wolff, Ohio State University
Liaison Coordinator – Nancy Diaz-Elsayed, University of South Florida
ASME Coordinator - Barbara Zlatnik, ASME

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

ASME MED WIAM 2025 Panel of Leaders in Manufacturing

Susan Ipri-Brown, National Inst. of Standards and Technology (NIST) Strategic Initiatives Manager

Susan Ipri-Brown is the strategic initiatives manager at the National Institute of Standards and Technology (NIST) Office of Advanced Manufacturing (OAM), which also serves as the Advanced Manufacturing National Program Office for Manufacturing USA. At OAM, Susan expands strategic collaborations in advanced manufacturing technology and workforce development among Manufacturing USA stakeholders inside and outside of government. Prior to joining OAM, she served as the associate dean for educational outreach, as founding director of the ExploreHope Academic Outreach Office, and as an associate professor of engineering instruction at Hope College in Holland, Michigan. Susan was the 2024-2025 President of the American Society of Mechanical Engineers. She earned her master's degree in mechanical engineering from the Massachusetts Institute of Technology and received a bachelor's degree in mechanical and aerospace engineering from Princeton University.

Dr. Stefania Bruschi, Univ. of Padova - Professor & Chair-elect Scientific Comm. of NAMRI SME

Stefania Bruschi, PhD, is a professor of Manufacturing Technologies at the Department of Industrial Engineering at the University of Padova, Italy, and is a member of the Board of Directors of the University. Her major research areas include sheet and bulk metal forming and machining of metal alloys, focusing on material behavior, process, and product performance. The research activities are carried out in the framework of EU and Italian-funded projects and research contracts with Italian and European manufacturing companies. She is a fellow of CIRP (The International Academy for Production Engineering), and currently Vice-Chair of the CIRP Scientific Technical Committee "Forming". She is a member of the Board of Directors of the North American Manufacturing Research Institution, where she now serves as Chair-elect of the Scientific Committee. She is a co-author of more than 300 Scopus-indexed publications.

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Dr. Fazleena Badurdeen, University of Kentucky- Earl Parker Robinson Chair Professor

Fazleena Badurdeen is the Earl Parker Robinson Chair Professor in the Department of Mechanical and Aerospace Engineering at the University of Kentucky. She also serves as the Director for the Manufacturing Systems Engineering master's program and is a core faculty member at the University of Kentucky's Institute for Sustainable Manufacturing, an internationally recognized center of excellence focused on cutting-edge research and technology development for sustainable products, processes and systems. Prof. Badurdeen is recognized for her expertise in sustainable and circular product design, measurement systems for circularity and sustainability evaluation, and modeling and analysis of manufacturing systems and supply chains. She has been involved in externally funded research exceeding $20 million and has published over 150 peer-reviewed papers. Prof. Badurdeen is the founding Chair of the International Forum on Sustainable Manufacturing and has served as a Technical Vice President for the Institute of Industrial and Systems Engineers (IISE). She is also an Editor for the Resources, Conservation, and Recycling journal and serves on the editorial boards of a number of other journals. Prof. Badurdeen received her PhD in Integrated (Industrial and Mechanical) Engineering and MS in Industrial Engineering, both from Ohio University, USA. She also holds an MBA from the Postgraduate Institute of Management, Sri Lanka and BS in Engineering from the University of Peradeniya, Sri Lanka. Prof. Badurdeen is a Fellow of IISE.

Rashmi Vadlakonda, Trane Technologies -SMART Transformation Engineer

Rashmi Vadlakonda is a SMART Transformation Engineer at Trane Technologies, where she leads initiatives to enhance digital and manufacturing processes. With expertise in Additive Manufacturing (AM) and Manufacturing Execution Systems (MES), Rashmi has been instrumental in optimizing production workflows and driving innovation. Her areas of interest include IT/OT integration and digital transformation, reflecting her commitment to advancing the manufacturing sector through cutting-edge technologies. Rashmi's career at Trane Technologies began as an AM Application Engineer. Her prior experience at Oak Ridge National Laboratory and Cyient, along with her academic background from North Carolina State University, positioned her as a subject matter expert in 3D printing technologies. She has successfully implemented these technologies across Trane Technologies' global operations, significantly improving productivity and cost efficiency.

In her current role, Rashmi has been a key member of the team responsible for the roll-out of Enterprise Resource Planning (ERP) and MES software at the Trane Technologies Columbia, SC manufacturing facility. She spearheaded the MES training for operations and engineering teams and continues to lead the continuous improvement of MES software. She led multiple projects that have reduced backlog and increased revenue. Her contributions have been crucial for the successful launch of new product lines and continuous process improvements. Beyond her technical contributions, Rashmi is an active leader in the manufacturing community. She serves as an Advisory Board Member for the SC Manufacturing Expo and Conference, a Board Member of the Additive Manufacturing Emerging Professionals Committee (AM EPC) at the Society of Manufacturing Engineers (SME), and is the past Vice Chair of Women in Manufacturing South Carolina. Her exceptional contributions have been recognized with numerous awards, including the 2023 Emerging Leader Award by the National Association of Manufacturers, the 2023 SME 30 under 30 by SME, and the 2024 South Carolina Manufacturing Power List. Rashmi holds a Master of Science in Mechanical Engineering from North Carolina State University and a Bachelor of Engineering in Mechanical Engineering from Osmania University, India.

ASME MED WIAM 2025 Organizing Committee

Ala Qattawi, University of Toledo- Associate Professor, WIAM 2025 Chair

Dr. Ala Qattawi is an associate professor at the Department of Mechanical, Industrial, and Manufacturing Engineering at the University of Toledo. She is the director and the principal investigator at the Integrated Design and Manufacturing (IDM) Laboratory at the University of Toledo, where her research group interests include advanced manufacturing: additive manufacturing and sheet metal forming, design for manufacturing, sustainable manufacturing, and Origami-inspired metal structures as well as applications to vehicles body-in-white design. She earned her Ph.D. in Automotive Engineering from Clemson University, specializing in metal fabrication, and served as a post-doctorate fellow at the International Center for Automotive Research in South Carolina. Ala has earned several awards, including the Hellman Faculty Award in 2016, the Young Manufacturing Engineer Award from SME in 2018, the Ralph Teetor Education Award from SAE in 2021, the Toyota Programmable System Innovation Fellowship Award in 2022, the ORR Best Paper Award from ASME in 2022, the Distinguished Alumni Award from Clemson University-Automotive Engineering Department in 2023, the 2023 Excellence in Supervision of Undergraduate Research Award from the University of Toledo, and the Engineering Research Initiation (ERI) Award from National Science Foundation in 2023.

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Maya Reslan, National Institute of Standards and Technology (NIST)– Associate Researcher, WIAM 2025 Vice Chair

Maya Reslan is an Associate Researcher at the National Institute of Standards and Technology in Gaithersburg, Maryland. Her research focuses on Lean manufacturing, maintenance workflows, advanced manufacturing, industry 4.0, and change management. She graduated from the Lebanese American University with a bachelor's in mechanical engineering in December of 2015 and then moved to Germany to pursue her Masters in Management and Engineering in production systems at RWTH Aachen.

Maya is a certified Six Sigma Green belt and has experience in many manufacturing environments, which include automotive, metal, furniture, pumps, aerospace, and others. Most of her work in industry varied between lean six sigma, continuous process improvements, supply chain management, risk mitigation, project management, inventory management, and others. She has held positions ranging from Business Development to Production Engineer to Research. She is also passionate about psychology and anthropology and has been integrating her engineering research in topics like work motivation, job attitudes, teams, enhancing performance and efficiency, and organizational development; mainly how employees can adapt to digitization and technology and transition into smart factories.

Maya is also an active member of ASME since 2012 and is currently serving the Career Engagement Center (CEC) and Student Leadership Training Conference (SLTC). She joined ASME during her second year of undergrad and has remained involved since. She is also an active volunteer in different societies and NGOs targeting humanitarian issues like the refugee crisis, poverty, and emergency relief. Furthermore, Maya's hobbies vary between Martial Arts, swimming, painting, volunteering, traveling, and experiencing new cultures.

Azadeh Haghighi, University of Illinois Chicago – Assistant Professor, WIAM2025 Treasurer

Dr. Azadeh Haghighi is an Assistant Professor at the Mechanical and Industrial Engineering Department, University of Illinois Chicago, and the director of the Smart Manufacturing of the Future Lab. She leads pioneering research initiatives focused on advancing novel manufacturing capabilities and intelligent decision-support systems, particularly within additive, hybrid, and robotic manufacturing processes. She serves as an associate editor for the Robotics and Computer-Integrated Manufacturing Journal and has received several notable recognitions, including the 2024 Susan Smyth SME Outstanding Young Manufacturing Engineer Award, UIC Chancellor's Translational Research Initiative Award, IMEC Future of Illinois Manufacturing Faculty Award, UIC Provost's Award for Graduate Research, and the Society of Manufacturing Engineers' Outstanding Paper Award.

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Sarah Wolff, Ohio State University – Assistant Professor, WIAM2025 Secretary

Dr. Sarah Wolff is an assistant professor in the mechanical and aerospace department at The Ohio State University. She was awarded the 2022 SME Outstanding Young Manufacturing Engineer Award. Her previous roles include an assistant professorship in the industrial and systems engineering department at Texas A&M University and an Enrico Fermi Fellow at Argonne National Laboratory. She graduated from Northwestern University in 2018 with a PhD in mechanical engineering. Dr. Wolff's expertise is in metal additive manufacturing and laser processing, particularly in the areas of situ monitoring, high-speed X-ray imaging, image processing, and microstructural characterization.

Nancy Diaz-Elsayed, University of South Florida – Assistant Professor, WIAM2025 Liaison Coordinator

Dr. Nancy Diaz-Elsayed is an Assistant Professor at the University of South Florida (USF) in the Department of Mechanical Engineering and the Program Director of the Introduction to Production Systems certificate program. She holds an M.S. and Ph.D. in Mechanical Engineering from UC Berkeley and a B.S. in Mechanical Engineering from MIT. Her research interests include system and process modelling, technology development for smart and sustainable systems, and the role of industrial symbiosis in the design and growth of urban environments. Dr. Diaz-Elsayed led the documentation of best practices for the recruitment and mentoring of Ph.D. students in STEM for USF's Sloan University Center of Exemplary Mentoring. She has been recognized as the 2025 Faculty Mentor of the Year from the Florida Undergraduate Research Association, and received the 2024 Women in Leadership and Philanthropy Dr. Kathleen Moore Faculty Excellence Award and the 2022 SME Sandra L. Bouckley Outstanding Young Manufacturing Engineer Award.

WOMEN IN ADVANCED MANUFACTURING

WEDNESDAY JUNE 25, 2025

Barbara Zlatnik, CAE, ASME – Senior Manager, Technical & Engineering Communities (TEC) Operations, WIAM2025 ASME Coordinator

Barbara Zlatnik is a Senior Manager at ASME supporting a number of the Society's technical divisions and technology groups. Barbara supports the division and technology group members and their leadership. Barbara has worked for several professional membership associations in various membership, volunteer management and customer service positions. She earned her Certified Association Executive credential in 2010.

EARLY CAREER FORUM

WEDNESDAY JUNE 25, 2025

Technology, Research & Development Professions in Academia, Industry & National Laboratories:

An Early Career Forum

Wednesday, June 19th | 18:00-21:00 | Ballroom

Technology, Research & Development Professions in Academia, Industry & National Laboratories: An Early Career Forum

Organized by: ASME/MED and NAMRI/SME

Sponsored by: The U.S. National Science Foundation (providing travel support to students)

Hosted by: Clemson University, Greenville, South Carolina

Purpose: The goal of this forum is to provide current students at all levels of graduate and undergraduate programs as well as recent graduates with information about various research and technical positions in academia, industry, and national laboratories. Panelists will present an overview of their careers and discuss how to be successful professionally in various settings in a roundtable format.

The forum will be held during the co-located manufacturing conferences at Clemson University: the ASME 2025 International Manufacturing Science and Engineering Conference (MSEC2025) and the NAMRI/SME 53rd North American Manufacturing Research Conference (NAMRC53).

Agenda

6:00 – 6:15 pm ET: Opening remarks and welcome
6:15 – 7:00 pm ET: Up to 3-minute spoken introductions by each panelist with Q&A session.
Break and switch-over of panelists.
7:15 – 8:00 pm ET: Up to 3-minute spoken introductions by each panelist with Q&A session.
8:00 – 9:00 pm ET: Roundtable discussions, Networking and wrap-up

EARLY CAREER FORUM

WEDNESDAY JUNE 25, 2025

Forum Format

1. Panelists will introduce themselves and discuss their career paths. Panelists have experience in conducting/leading research and engineering projects in academia, government labs, and industry.
2. During each panel session, 20 min will be set aside for audience members to participate in a live Q&A poll moderated by Prof. Okwudire
3. During the roundtable discussions, forum participants can discuss careers in academia, government, and industry. Panelists will discuss how to search for a job, career management, and funding, among other topics that is relevant to the panelist speaker. Participants will be able to visit with several panelists during the 1hr roundtable session.
4. During and after the forum, participants are encouraged to engage in conversations/discussions related to their professional and personal interests.

All registered conference participants are welcome to attend the forum with no additional fee.

Attendance of the Early Career Forum is mandatory for NSF Travel Grant student applicants.

2025 Early Career Forum Chair

Chinedum Okwudire, Ph.D.
Professor, University of Michigan

Email: okwudire@umich.edu

NAMRC TECHNICAL SESSIONS

WEDNESDAY JUNE 25, 2025

09:00-10:15 Redbud C	**Tech. Session V: Student Research Presentation I** *Session Chairs: Arif Malik and Stefania Bruschi*	
138	Jose Nazario, Dylan Pollard and Tony Schmitz	Milling force measurement using a constrained motion dynamometer with compensation
271	Sampson Canacoo, Shashank Galla, Yuhao Zhong, Saikiran Chary Nalband, Sean Michael Hayes, Monika Biener, Suhas Bhandarkar and Satish Bukkapatnam	Efficient screening of rare large pit anomalies on polished surfaces using a minimalist sampling scheme
195	Anuj Gautam, Manish Raj Aryal, Sourabh Deshpande, Shailesh Padalkar, Mikhail Nikolaenko, Ming Tang and Sam Anand	IIoT-enabled Digital Twin for legacy and smart factory machines with LLM integration

09:00-10:15 Redbud B	**Tech. Session V: Track 3 Material Removal V** *Session Chairs: Jose Martins do Outeiro and Ankit Agarwal*	
170	Ankit Agarwal, Aitha Sudheer Kumar, Vinita Gangaram Jansari, K A Desai and Laine Mears	Improving Vision-based Tool Wear State Identification under Varying Lighting Conditions using Human Guided-eXplainable AI Approach
17	Sujan Khadka, Rizwan Abdul Rahman Rashid, John Navarro-Devia, Angelo Papageorgiou, Guy Stephens and Suresh Palanisamy	Tool Life Prediction Models: Analysing the predictive reliability of Taylor's and Colding's Equations for Solid End Mills
227	Francisco Augusto Vieira da Silva, Henrique Sobral Franzão, Tayla Fernanda Serantoni Silveira and José Carlos Martins Outeiro	Prediction of surface modifications induced by orthogonal cutting of IN718 using uncoated WC-Co and PCBN cutting tools

09:00-10:15 Redbud A	**Tech. Session V: Track 7 Sustainable Manufacturing II** *Session Chairs: Livan Fratini and Abishek Balsamy Kamaraj*	
105	Simone Amantia, Kirill Kalashnikov, Gianni Campatelli, Livan Fratini and Giuseppe Ingarao	Life Cycle Assessment and Energy Characterization of Friction Surfacing Deposition of Aluminum Alloys
5	Abishek Balsamy-Kamaraj, Md Moynul Hasan, Saketh Merugu and Anju Gupta	Geometric Optimization of 3D-Printed Copper Surfaces for Enhanced Pool Boiling Heat Transfer
158	Nilesh Kumar and Sushanta Kumar Panigrahi	A casting strategy to develop high-performance Al-Si cast alloy

NAMRC TECHNICAL SESSIONS

WEDNESDAY JUNE 25, 2025

09:00-10:15 **Regency F**	**Tech. Session V: Track 4 Additive Manufact V** *Session Chairs: Chinedum Okwudire and Dehao Liu*	
201	Chuan He, Tao Liu and Chinedum Okwudire	SmartScan 2.0: An Intelligent Scan Sequence Optimization Approach for LPBF driven by Thermomechanical Models
33	Jiaqi Yang and Dehao Liu	Effects of processing parameters on joining strength of 316L-Cu interface in multi-materials laser powder bed fusion
91	Cheonghwa Lee, Jun Young Choi, Hyunsu Lee, Kisu Ok, Sung-Hoon Ahn and Ji Ho Jeon	Influence of Printing Orientation and Infill Pattern on the Impact Strength of Hybrid 3D-Printed PLA-CFRP Composite Structures

09:00-10:15 **Crepe Myrtle**	**Tech. Session V: Track 5 Smart Manufact and CPS V** *Session Chairs: Thorsten Wuest and Florian Oexle*	
120	Matthew McCormick and Thorsten Wuest	Testbed as a Service (TaaS): A Scalable Ecosystem for Smart Manufacturing and Industry 4.0 Collaboration
194	Matthew McCormick, Fadi El Kalach, Mojtaba Farahani, Ramy Harik and Thorsten Wuest	Rocket Assembly Line Testbed as a Service (TaaS): A Comparison of Data Acquisition Strategies
104	Florian Oexle, Fabian Heimberger, Alexander Puchta and Jürgen Fleischer	Automating Transfer Function Estimation: LSRF Method with Coherence-Based Pre-Filtering and Weighting Filters

10:30-11:45 **Redbud C**	**Tech. Session VI: Student Research Presentation II** *Session Chairs: Thorsten Wuest and Florian Oexle*	
220	Fan Chen, Rujing Zha, Jihoon Jeong, Shuheng Liao and Jian Cao	Directed Energy Deposition on Sheet Metal Forming for Reinforcement Structures
240	Dolor Enarevba, Karl Haapala and Nebojsa Jaksic	A Comparative Life Cycle Assessment of Kraft Lignin and Hemp Straw Fillers to Improve Ductility of Polylactide (PLA) 3D Printed Parts
239	Kojo Welbeck, Yahui Zhang, Ru Yang, Guangze Li, Hui-Ping Wang, Blair Carlson and Ping Guo	Graph Neural Networks for Patterned Welds Detection on Point Clouds

10:30-11:45 **Redbud B**	**Tech. Session VI: Track 2 Manufact Proc V** *Session Chairs: Roozbeh (Ross) Salary and Ibraheem Redhwi*	
123	Hamzeh Al-Qawasmi and Roozbeh Ross Salary	Design and Fabrication of Biodegradable Bone Tissue Scaffolds Based on the Nuclear Pasta Theory
132	Ibraheem Redhwi, Howon Noh, Sonal Padalkar and Pranav Shrotriya	Manufacturing Nanostructured Hydroxyapatite Films on Nylon Substrates Using Mechanical Alloying and High-Repetition Laser Techniques

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10:30-11:45 **Redbud A**	**Tech. Session VI: Track 1 Manufact Sys IV-Joint SME-KSMTE Session** *Session Chairs: Jongyoup Shim and Shreyes Melkote*	
74	Xiaoliang Yan, Zhichao Wang, David Rosen and Shreyes Melkote	Learning Precedence Relations for Manufacturing Operations Sequencing using Convolutional Recurrent Neural Networks
16	Jaehak Lee and Dong Yoon Lee	Development of Energy Consumption Monitoring System for Machine Tools in accordance with ISO14955
66	Yau Pan Lim and Runyang Zhong	An AI-powered data processing framework for RFID-captured manufacturing datasets

10:30-11:45 **Regency F**	**Tech. Session VI: Track 4 Additive Manufact VI** *Session Chairs: Murali Sundaram and Yang Cao*	
184	Dewan Sal-Sabil Ahammed and Yang Cao	Effect of gravity on electrohydrodynamic (EHD) printing of silver nanoparticle and polycaprolactone based inks
179	L.S. Nandipati and Murali Sundaram	Fabrication of Complex Overhangs by Electrochemical Additive Manufacturing Process by Tool Tip Modification
99	Kagiso Mapena, Olusoji Ayodele, Bukola Babalola, Adeola Borode and Peter Olubambi	On the microstructures and electrochemical studies of sintered and selective laser melted AlSi10Mg alloy in chloride environments

10:30-11:45 **Crepe Myrtle**	**Tech. Session VI: Track 5 Smart Manufact and CPS VI** *Session Chairs: Xun Xu and Chenhui Shao*	
63	Yangyang Liu, Tang Ji, Xiangyu Guo, Xun Xu and Jan Polzer	A Survey of Cognitive Digital Twin and the Potential Use of LLMs
115	Chen Li, Kshitij Bhatta, Muhammad Waseem, Jorge Arinez and Qing Chang	Can Pre-trained LLMs be used as out-of-the-box bottleneck detectors? An explorative study
147	Ahmadreza Eslaminia, Adrian Jackson, Beitong Tian, Avi Stern, Hallie Gordon, Rajiv Malhotra, Klara Nahrstedt and Chenhui Shao	FDM-Bench: A Comprehensive Benchmark for Evaluating Large Language Models in Additive Manufacturing Tasks

13:45-15:00 **Redbud C**	**Tech. Session VII: Student Research Presentation III** *Session Chairs: Xun Xu and Chenhui Shao*	
73	Muhammad Waseem, Changbai Tan, Seog-Chan Oh, Jorge Arinez and Qing Chang	Machine Learning-Enhanced Digital Twins for Predictive Analytics in Battery Pack Assembly
151	Ahmed Shoyeb Raihan, Austin Harper, Israt Zarin Era, Omar Al-Shebeeb, Thorsten Wuest, Srinjoy Das and Imtiaz Ahmed	A Data-Efficient Sequential Learning Framework for Melt Pool Defect Classification in Laser Powder Bed Fusion
261	Wei Ye, Shanshan Yang and Xingyu Li	A Bi-Level Supply Chain Resilience Model Using Cloud Manufacturing

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13:45-15:00 Redbud B	**Tech. Session VII: Track 2 Manufact Proc VI** *Session Chairs: Wei Li and Praveen Konka*	
113	Karl Bailey, Sumair Sunny, Ritin Mathews and Arif Malik	Impact of dynamic recrystallization in laser shock peening predicted via a coupled cellular automata finite element model
102	Kishore Mysore Nagaraja, Xinchang Zhang, Gabriel Martin Garcia and Wei Li	Spark plasma sintering – assisted embedding sapphire fiber optic sensor into stainless steel 316L: thermo-electric-mechanical finite element analysis
64	Praveen Konka and Venkata Reddy N	Effect of heat treatment on fatigue life and accuracy of incrementally formed AA2024

13:45-15:00 Redbud A	**Tech. Session VII: Track 1 Manufact Sys V-Joint SME-KSMTE Session** *Session Chairs: Seong Chan Jun and Ahmed Azab*	
164	Ahmed Azab and Hani Pourvaziri	Scheduling 4.0: A Digital Twin-based Approach for Scheduling and Related Smart Material-handling Considerations
270	Chengjun Jin, Young Kyu Kim, Hyungjum Jang, Xun Lu and Seok-min Kim	Fabrication of wire-grid polarizer with glass molded nanograting structure
234	Yeong-eun Yoo, Sang-Won Woo, Jae-Ho Jin, Doo-Sun Choi and Kyeong-Sik Shin	Design and Injection-Molding of Microfluidic Chip with Embedded Electrical Traces

13:45-15:00 Regency F	**Tech. Session VII: Track 4 Additive Manufact VII** *Session Chairs: Roozbeh (Ross) Salary and Nafi Ahmed*	
112	Nafi Ahmed and Rohan Shirwaiker	Digital Light Processing (DLP) Bioprinting of Collagen-Riboflavin Hydrogels for Cultivated Meat Applications
122	Haley Smith, Hannah Hanlon and Roozbeh Ross Salary	Parametric Design and Characterization of Novel TPMS Porous Scaffolds for Bone Tissue Engineering
121	Mingjun Chen and Yi Cai	Automatic Spatial Calibration for Dual-nozzle Extrusion-based 3D Printers

13:45-15:00 Crepe Myrtle	**Tech. Session VII: Track 5 Smart Manufact and CPS VII** *Session Chairs: Xun Xu and Varad Maitra*	
116	Nico Holmes, Luka Katavich and Xun Xu	Retrofitting Legacy Systems for Industry 4.0 via OPC UA and Distributed Control
264	Marcus DiBattista, John Frericks, Cristian Garcia and Jaime Camelio	SCOUT: An Autonomous UHF RFID-Equipped Robot Dog for Flexible Inventory Monitoring
268	Varad Maitra and Jing Shi	Augmented physics-based virtual metrology for chemical-mechanical planarization in semiconductor manufacturing

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15:15-16:30 **Redbud A**	**Tech. Session VIII: Track 1 Manufact Sys VI** *Session Chairs: Xi Gu and Beshoy Morkos*	
245	Fatemeh Mozaffar, Logan Smith and Beshoy Morkos	Tunes of Trust: A Framework for Auditory Nudges in Human-AI Manufacturing Collaboration
256	Xi Gu	Modeling and analysis of two-stage manufacturing systems with phase-type cycle time
144	Wenhang Dong, Shufei Li, Pai Zheng, Liang Liu and Shuo Chen	A 3DGS and LLM-based physical-to-virtual approach for human-robot interactive manufacturing

15:15-16:30 **Redbud C**	**Tech. Session VIII: Track 2 Manufact Proc V** *Session Chairs: Marion Merklein and Ashish Jacob*	
92	Bastian Zettl and Marion Merklein	Investigation of a novel automated surface treatment method within accumulative roll bonding of AA6016 sheets
67	Kazi Owais Ahmed and Masakazu Soshi	Algorithmic optimization of process selection for additive-subtractive hybrid manufacturing
260	Matthew Williams, Ashish Jacob and Guha Manogharan	Continuous 5-axis Routing of Syringe Deposited Conductive Traces over Topology Optimized Structures

15:15-16:30 **Redbud B**	**Tech. Session VIII: Track 7 Sustainable Manufacturing III** *Session Chairs: Nathan W. Hartman and Mahathir Mohammad Bappy*	
166	Sai Ashish Kumar Karanam and Nathan W. Hartman	LUNAR-XDT: An Integrated Framework for Sustainable Lunar Manufacturing Using Digital Twin (DT), Extended Reality (XR), and Extreme Design (XD) Principles
76	Majid Ul Hasan Syed and Iqbal Shareef	Enhanced design and performance evaluation of a novel orthotic knee joint
118	Blake Barbay, Mahathir Mohammad Bappy, Laura Ikuma and Isabelina Nahmens	Evaluating LASER Tracking for the Improvement of Quality Control Methods of Precast Concrete

15:15-16:30 **Regency F**	**Tech. Session VIII: Track 4 Additive Manufact VIII** *Session Chairs: Huachao Mao and Weijun Zhang*	
130	Marco Lafirenza, Weijun Zhang and Masakazu Soshi	Development of a cost-effective dual-camera real-time monitoring system for clad height control in 3D direct energy deposition processes
154	Yujie Shan, Xiaoqing Wang and Huachao Mao	Shrinkage Compensation of Additively Manufactured Parts with Measured Dimensions using Affine Transformations

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15:15-16:30 **Crepe Myrtle**	**Tech. Session VIII: Track 5 Smart Manufact and CPS VIII** *Session Chairs: Chenhui Shao and Sekhar Rakurty*	
124	Sixian Jia, Shichen Li, Jieliyue Sun, Michelle Dawson, Kimani Toussaint and Chenhui Shao	End-to-end part quality classification for two-photon lithography using computer vision
78	Ali Hosseinzadeh, Mohammad Shahin, Enrique Contreras Lopez, F. Frank Chen and Mazdak Maghanaki	Performance Evaluation of CNN Models for Steel Surface Defect Detection in Lean Manufacturing
222	Allen Moncey Varghese, Ashif Iquebal, Joseph Tarr and Chandra Sekhar Rakurty	AI-driven vision-based monitoring system for quality inspection of cutting tools

16:45-18:00 **Redbud A**	**Tech. Session IX: Track 1 Manufact Sys VII** *Session Chairs: Jaime Camelio and Peter Apata Olubambi*	
241	Ayoub Heydarzade, Niloofar Rezaei, Seyed Alireza Vaezi and Jaime Camelio	Multi-Layer Multi-Variable Value Stream Mapping: A Comprehensive Framework Across Operational, Environmental, and Social Layers with Integrated KPIs Interrelationships
183	Ufoma Silas Anamu, Peter Ifeolu Odetola and Peter Apata Olubambi	Investigation of the Nano-mechanical Properties of Pulse Electric Sintered TiAl-based High Entropy Alloys by CALPHAD-based Simulation and Experimental Studies

16:45-18:00 **Redbud C**	**Tech. Session IX: Track 2 Manufact Proc VIII** *Session Chairs: Sekhar Rakurty and Aqib Mashood Khan*	
129	Aqib Mashood Khan, Salman Pervaiz, Muhammad Jamil, Wei Zhao and Longhui Meng	New Investigations on the Performance Enhancement of Cryogenic-LN2 Assisted Sustainable Milling of Titanium Alloy
127	Ravi Bhatt, Mallika Bhatt and Nader Asnafi	Mathematical Modeling and Experimental Investigations on Forming Force during Tube Spinning of AA6061
167	Ravi Singh, Santosh Kumar, Edward James Brambley, Sudarshan Choudhary, Pankaj Kumar Singh and Sisir Dhara	Optimizing Formability of Incremental Sheet Forming using the Straight Groove Test assessed with a Variable Wall Angle Conical Frustum

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16:45-18:00 **Redbud B**	**Tech. Session IX: Track 6 Manufact Edu and Case Studies I** *Session Chairs: Arif Malik and Pascal Kienast*	
40	Martin Seimann, Pascal Kienast, Viktor Rudel, Pascal Rohe, Philipp Ganser and Thomas Bergs	Digital process chain: Knowledge based manufacturing of an intake fan blisk prototype
159	Sai Ashish Kumar Karanam and Nathan W. Hartman	A Systematic Review of Digital Twin (DT) and Virtual Learning Environments (VLE) for Smart Manufacturing Education
248	Meccaya Brock, Issa Alhmoud, Balakrishna Gokaraju and Shyam Aravamudhan	Digital Twin-Driven Semiconductor Training: Using AR/VR to Transform Manufacturing Education
16:45-18:00 **Regency F**	**Tech. Session IX: Track 4 Additive Manufact IX** *Session Chairs: Livan Fratini and Lauren Miller*	
174	Lauren Miller, Brett Compton and Tony Schmitz	Age hardening in additive friction stir deposition aluminum 7075
197	Dina Palmeri, Gaetano Pollara, Gianluca Buffa and Livan Fratini	On the effect of parts geometry and laser power in hybrid additive manufacturing of Ti-6Al-4V
269	Jiajie Wu, Mason Ma, Jaydeep Karandikar, Christopher Tyler, Tony Shi and Tony Schmitz	An Analytical Model Integrating Tool Kinematics and Material Flow for the Spindle Torque Predication in Additive Friction Stir Deposition
16:45-18:00 **Crepe Myrtle**	**Tech. Session IX: Track 5 Smart Manufact and CPS IX** *Session Chairs: Chenhui Shao and Hariharan Krishnaswamy*	
131	Eldho Paul, Geesara Kulathunga, Hariharan Krishnaswamy and Alexandr Klimchik	Springback Estimation In Incremental Sheet Metal Forming Using The Gaussian Process Regression Model
110	Shichen Li and Chenhui Shao	Multi-Modal Data Fusion for Moisture Content Prediction in Apple Drying

MSEC TECHNICAL SESSIONS

WEDNESDAY JUNE 25, 2025

09:00-10:15 Magnolia	**Technical Session V: Advances in Clean Energy and E-Mobility Manufacturing 2** *Session Chairs: Yjianlin Li and Erica Liverani*	
MSEC-155706	Alejandro Franco, Francisco Fernandez, Diego Galvez Aranda, Rashen Lou Omongos, Utkarsh Vijay	A Multi-Technique Machine Learning Workflow for Optimizing the Manufacturing Process of Functional Layers in Electrochemical Energy Devices
MSEC-155757	Luohaoran Wang, Jacob Harris, Bhavana Komaraju, Mihaela Banu	Data-Informed Designing of Pultruded Composite Battery Module Separators for Electric Vehicles

09:00-10:15 Regency H	**Technical Session V: Advances in Manufacturing and Processing of Polymers and Composites 4** *Session Chair: Zipen Guo*	
MSEC-155631	Kristofer Laser Jr., Natalie Barkley, Ihab Ragai, Alexander Schlarp, Haden Peters, Jocelyn Mcnany	Investigation of Friction Stir Welding of Polymeric Materials
MSEC-155765	Geun Young Kim, Shreyes Melkote, Jonathan Colton	Application of Chemistry-Informed Neural Networks in Modeling Cure Kinetics of Prepreg Materials
JMSE-24-1557	Chuan He, Nathaniel Wood, Nevzat Bircan Bugdayci, Chinedum Okwudire	[J] Generalized SmartScan: An Intelligent LPBF Scan Sequence Optimization Approach for Reduced Residual Stress and Distortion in Three-Dimensional Part Geometries

09:00-10:15 Gardenia	**Technical Session V: Explainable AI for Knowledge Discovery in Manufacturing Systems 4** *Session Chair: Devesh Upadhyay*	
MSEC-155920	Gunnika Kapoor, Komal Chawla, Tirthankar Ghosal, Kris Villez, Dan Coughlin, Tyden Rucker, Vincent Paquit, Soydan Ozcan, Seokpum Kim	Intelligent Manufacturing Support: Specialized Llms for Composite Material Processing and Equipment Operation
JMSE-23-1591	Changheon Han, Heebum Chun, Jiho Lee, Fengfeng Zhou, Huitaek Yun, ChaBum Lee, Martin B.G. Jun	[J] Hybrid Semiconductor Wafer Inspection Framework via Autonomous Data Annotation
JMSE-23-1611	Fengfeng Zhou, Xingyu Fu, Siying Chen, Changheon Han, Martin B. G. Jun	[J] Three-Dimensional Profile Reconstruction and Internal Defect Detection of Silicon Wafers Using Cascaded Fiber Optic Fabry–Pérot Interferometer and Leaky Field Detection Technologies

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WEDNESDAY JUNE 25, 2025

09:00-10:15 Dogwood	**Technical Session V: Siemens Digital - Sponsored Session** *Session Chair: Vinita Jansari*	
	Ryan Theeck	Battery Advanced Machine Automation
09:00-10:15 Regency G	**Technical Session V: Smart Additive Manufacturing 4** *Session Chair: Uduak Inyang-Udoh*	
MSEC-155822	Abdalmageed Almotari, Majed Ali, Gabriel Awuku Dzukey, Ala Qattawi	Predicting Tensile Strength in Laser Powder Bed Fusion (Lpbf) of In718 Using Neural Networks: The Influence of Heat Treatments and Process Parameters
MSEC-155493	Vivek V. Bhandarkar, Rahul Soni, Puneet Tandon	Comparative Performance Analysis of Cnn Models for Cracking Defect Detection in 3D-Printed Polymer Parts
JMSE-23-1528	Ritin Mathews, Arif Malik, Jaydeep Karandikar, Christopher Tyler, Scott Smith	[J] Iterative Stress Reconstruction Algorithm to Estimate Three-Dimensional Residual Stress Fields in Manufactured Components
10:30-11:45 Regency H	**Technical Session VI: Advances in Manufacturing and Processing of Polymers and Composites 5** *Session Chair: Kenan Song*	
MSEC-156064	Vivian H Chung, Zinal Patel, Dharneedar Ravichandran, Grace X. Gu	Processing Collagen – Hydroxyapatite Composite for Bone Tissue Engineering: A 3D Printing Perspective
MSEC-155871	Md Zahirul Islam, Prashant Lakhemaru, Luke Gibbon, Eric Hall, Chad Ulven	[B] Laminated Object Manufacturing of Thermoset Composites and Their Mechanical Characterization
MSEC-155869	Christian Narváez Muñoz, Fran Alexis, Nayeli Gomez, Jamil Segura, Cesar Portero, Joseph Guaman, Luis Segura	[B] Nanofibers and Artificial Intelligence: A Synergistic Approach for Next-Generation Sensors
10:30-11:45 Gardenia	**Technical Session VI: Human Integration to Smart Manufacturing Systems 1** *Session Chair: Vinita Gangaram Jansari*	
MSEC-154225	Hassan Hijry, Richard Olawoyin	Human-Centered Stress Monitoring in Smart Assembly Lines Using Explainable Ai With Shap
MSEC-155476	Medhavi Kamran, Snehesh Shrestha, Vinh Nguyen	Cognitive Workload Analysis in Collaborative Robotic Programming of Manufacturing Assemblies Using Teach Pendants
JMSE-24-1569	Arriana Nwodu, Zhengqian Jiang, Weihong “Grace” Guo, Hui Wang	[J] Repurposing Supply Chains and Process Planning Across Products Using a Similarity Model Based on Supernetworks

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10:30-11:45 Magnolia	**Technical Session VI: Innovative Welding and Joining Processes of Advanced Materials and Structures 1** *Session Chairs: Xi Gu and Yongbing Li*	
MSEC-155398	Avinash Ravi Raja, Sudesh Singh, Puneet Tandon, Meghanshu Vashista, Mohd Zaheer Khan Yusufzai	[B] Analysis of Friction Stir Welding Defects and Failure: A Preliminary Study
JMSE-23-1768	Erica Liverani, Caterina Angelon, Alessandro Ascari, Alessandro Fortunato	[J] Environmental Impact, Mechanical Properties, and Productivity: Considerations on Filler Wire and Scanning Strategy in Laser Welding
JMSE-24-1396	Matthew Ebert, Ronnie F. P. Stone, John Koithan, Wenchao Zhou, Matt Pharr, Yuri Estrin, Ergun Akleman, Zhenghui Sha, Vinayak Krishnamurthy	[J] NoodlePrint: Cooperative Multi-Robot Additive Manufacturing With Helically Interlocked Tiles

10:30-11:45 Regency G	**Technical Session VI: Smart Additive Manufacturing 5** *Session Chair: Tuhin Mukherjee*	
MSEC-155537	Dolor Enarevba, Ahmad Elhabashy, Karl Haapala, Zhaoyan (Andy) Fan	[B] Investigating the Possibility of Product Reconstruction in Manufacturing Using Side Channels – a Systematic Literature Review
MSEC-151300	George Bourgikos, Amit Hegde, Salvador Orozco Martinez, Sannmit Shinde, Ellen Wagman, Carl Herriot, Michael Stender, Christie Crandall	[P] Impact of Baseplate Clamping Location and Type on Residual Stress and Distortion in a Thermal Mechanical Model of Metal Additive Manufacturing
JMSE-23-1529	Kijoon Lee, Milad Ghayoor, V. Vinay K. Doddapaneni, Kenta Noma, Somayeh Pasebani, Chih-Hung Chang, Brian Fronk, Brian K. Paul	[J] A Microchannel Heat Exchanger Produced From a Metal Matrix Composite by Hybrid Laser Powder Bed Fusion and Inkjet Printing

13:45-15:00 Magnolia	**Technical Session VII: Advanced Machining and Deformation Processes 1** *Session Chair: Dinakar Sagapuram*	
MSEC-Invited Talk		How to Write Succint Review Papers with Tangible Outcomes: A Case Study on Hard Turning White Layer
MSEC-151374	Ravi Srivatsa Bindiganavile Narasimhan, Harshit Chawla, Dinakar Sagapuram	Thermal Modeling of Stick-Slip Frictional Contact in High-Speed Machining

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WEDNESDAY JUNE 25, 2025

13:45-15:00 Gardenia	**Technical Session VII: Innovations in Equipment Design, Control and Automation 1** *Session Chair: Huitaek Yun*	
MSEC-155144	Nazanin Mahjourian, Vinh Nguyen	Multimodal Object Detection Using Depth and Image Data for Manufacturing Parts
MSEC-155169	Joseph Domblesky, Richard Povinelli, Ross Crowley, Phil Voglewede	Sensor Based Ann System for Monitoring Die Fill in Forging
JMSE-24-1480	Rafid Hussein, Shuting Lei	[J] On the Effects of Substrate Temperature on Glass Internal Modification Using Femtosecond Laser Pulses

13:45-15:00 Regency H	**Technical Session VII: Laser-based Advanced Manufacturing and Material Processing 1** *Session Chair: Wenda Tan*	
MSEC-155483	Rafid Hussein, Shuting Lei	Welding of Preheated Glass Substrates Using Picosecond Laser Pulses
MSEC-155497	Shuhei Kodama, Kosuke Oike, Riku Kosugi, Keiichi Nakamoto	Fabrication of Micro/nano Multiscale Structures on Aluminum Alloy With Control of Laser-Induced Periodic Surface Structure
JMSE-24-1631	Mahtab Heydari, Bruce L. Tai	[J] A Machine Learning Approach for Rapid Solution of Three-Dimensional Moving Source Problems in Manufacturing

13:45-15:00 Regency G	**Technical Session VII: Multi-Material Processing in Additive Manufacturing 1** *Session Chairs: Monique McClain and Jay Park*	
MSEC-155373	Max Matura, Jianfeng Ma, Chao Ma	A Numerical Investigation of Alumina Powder Deformation Behaviors During Press Compaction Assisted Binder Jetting
MSEC-155697	Houda Houban, Sukayna Fakher, Jorge Sanchez Medina, Charles Snyers, Dieter De Baere, Zoé Jardon, Michaël Hinderdael	Crack Mitigation in Fe-Cu Hybrid Materials for Additive Manufacturing: A Study of Build Plate Preheating in Ded-Lb
MSEC-155475	Mychal Taylor, Georgia Kaufman, Hayden Fowler, Michael Gallegos, Emily Huntley, Samuel Leguizamon, David Boese, Guhaprasanna Manogharan, Bryan Kaehr	Powercell Packaging Using a Structural Electronics Approach

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15:15-16:30 Magnolia	**Technical Session VIII: Advanced Machining and Deformation Processes 2** *Session Chair: Dinakar Sagapuram*	
MSEC-155328	Shiqi Fang, Sebastian Schorr, Dirk Bähre	Efficient Machine Learning-Based Forecasting of Key Control Parameters for Analyzing Honing Stone Cutting Performance
MSEC-155439	Ravinder Kumar, Ravi Kumar Digavalli	Simulation of Hydroforming of a Two-Wheeler Fuel Tank With Large Depth for Lightweighting
MSEC-155533	Kateland Hutt, Spencer Schmidt, Jaime Van Der Veken, Hitomi Yamaguchi	Abrasive Delivery During Magnetic Field-Assisted Internal Finishing of Complex Additively-Manufactured Channels

15:15-16:30 Gardenia	**Technical Session VIII: Innovations in Equipment Design, Control and Automation 2** *Session Chair: Kyle Saleeby*	
MSEC-155464	James Femi-Oyetoro', Md Mashiur Rahman Shoummo, Bruce Jo	6-DOF (Degrees-of-Freedom) Robotic Arm-Assisted Modal Testing To Identify System Parameters
MSEC-155613	Yuseop Sim, Eunseob Kim, Jiho Lee, Hojun Lee, Dongjun Yun, No Bin Myeong, Yunjae Hwang, Hyung Wook Park, Martin Byung-Guk Jun	Sound Data Augmentation Using Frequency Response Superposition for Machine Tool State Recognition
MSEC-155563	Shih-Hsuan Chien, Burak Sencer	[B] A Neural Network-Based Friction Compensation Method for Machine Tool Feed Drives

15:15-16:30 Regency H	**Technical Session VIII: Laser-based Advanced Manufacturing and Material Processing 2** *Session Chairs: Qiong (Eric) Nian and Xin Zhao*	
MSEC-155596	Satyaki Sinha, Yang Du, Tuhin Mukherjee	Variations in Fusion Zone Geometry, Cooling Rates, and Solidification Parameters During Adjustable Mode Beam Laser Powder Bed Fusion
MSEC-155020	Richard Steinbrecht	[P] Optical Coherence Tomography (Oct) in Combination With Various Welding Tasks
MSEC-155744	Haoran Shi, Fangzhou Li, Wenda Tan	[B] Dynamic Keyhole Behavior and Fluid Flow in Multi-Laser Welding Process

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15:15-16:30 Regency G	**Technical Session VIII: Multi-Material Processing in Additive Manufacturing 2** *Session Chairs: Mostafa Yourdkhani and Elham Mirkoohi*	
MSEC-155857	Payton Baggott, Irtija Nazim, Manasi Shah, Rodrigo Martinez-Duarte	Characterization of Triangular Tungsten Carbide Lattices Material Properties and Structural Changes in Manufacturing With Sustainable Materials
MSEC-155934	Nazanin Tabatabaei, Xuan Song	Characterization of Interfaces Between Layers of Differently Sized Particles in Pressure-Assisted Binder Jetting
JMSE-24-1045	Hongtao Song, Nicholas A. Rodriguez, James S. Oakdale, Eric B. Duoss, Carolyn C. Seepersad, Richard H. Crawford	[J] Additive Manufacturing of Tough Silicone Via Large-Scale, High-Viscosity Vat Photopolymerization
16:45-18:00 Magnolia	**Technical Session IX: Advanced Machining and Deformation Processes 3** *Session Chair: Bruce Tai*	
MSEC-155600	Ruotong Wang, Xin Li, Kaiyan Zhang, Xueping Zhang	Grinding Temperature Prediction Modeling Framework Based on Single-to-Multi Grain Interaction Mechanism
MSEC-155601	Kaiyan Zhang, Xi Li, Ruotong Wang, Xueping Zhang	Ultrasonic Vibration Machining of Copper Graphite Electrode Sheet
MSEC-155585	Tyler Grimm, Ankit Agarwal, Laine Mears	[B] Brief Paper: Electric Pusle Assisted Milling
16:45-18:00 Regency G	**Technical Session IX: Advances in Metal Additive Manufacturing Processes 1** *Session Chair: Hector Siller*	
MSEC-151292	Jackson Motley, Mohammad Arjomandi, Tuhin Mukherjee	Effects of Longitudinal Arc Oscillation on Track Integrity During Collaborative Robot-Assisted Wire Arc Deposition
MSEC-155436	Lutfun Nipa, Hector R. Siller, Reza Mirshams	Nanoindentation-Driven Analysis of Mechanical Properties in Lpbf Ti6al4v
MSEC-154993	Jorge Neira, Ho Yeung	Laser Powder Bed Fusion Process Feedback Control Based on In-Situ Powder Layer Thickness

MSEC TECHNICAL SESSIONS

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16:45-18:00 Gardenia	**Technical Session IX: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability 1** *Session Chair: Muyue (Margret) Han*	
MSEC-155526	Xiaohan Wu, Venkat Roy, Neha Shakelly, John W. Sutherland, Fu Zhao	Bioleaching Gallium From E-Waste: Comparative Techno-Economic Assessment
MSEC-155605	Digvijaysinh Barad, Bryan Rasmussen	[B] Study on Continuous Compressed Air Flow Estimation: Pressure Decay Method vs Duty Cycle Approach
JMSE-24-1599	Jesús R. Pérez-Cardona, Nehika Mathur, Sidi Deng, Miha Zakotnik, Catalina Oana Tudor, John W. Sutherland	[J] Environmental and Economic Benefits of Harvesting Machine for Magnet-to-Magnet Recycling

16:45-18:00 Regency H	**Technical Session IX: Smart, Innovative, and Low-cost Tooling Systems for Advanced Materials Manufacturing 1** *Session Chair: Curtis Krick*	
MSEC-155349	Luke Shannon, Xiaoyi Liu, Mahdi Pirani, Hongpeng Yang, Yan Tong, Saeed Farahani	Modernizing Tooling Systems Through the Development of Hybrid Soft Sensors
MSEC-155441	Perrin Woods, Kenneth Houston, Nazmus Sakib, Christopher L. Lewis, Ahasan Habib	From Gantry Systems to Robotic Arms: A Versatile Hybrid 3D Bioprinting Nozzle With Real-Time Uv Curing
MSEC-151342	Hamed Dardaei Joghan, Marlon Hahn, Farin Weinert, Yannis P. Korkolis, A. Erman Tekkaya	[B] Effect of Ball Burnishing and Laser Polishing on the Surface Characteristics of Deposited Layers in Hybrid Additive Laminated Tooling

THURSDAY JUNE 26, 2025

Time	Location	Event
7:00–17:30	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
8:00–8:45	Ballroom	Welcome and Industry Panel
9:00–10:15		Technical Session X
9:00–10:15	NOMA B	Doctoral Symposium 1
10:00–17:00	Outside Ballroom	Exhibitor Booths Open
10:15–10:30	Teal	Morning Break
10:30–11:45		Technical Session XI
10:30–11:45	NOMA B	Doctoral Symposium 2
10:30–11:45	Think Tank	International Collaborative Research and Education Session
12:00–13:30	Ballroom	SME NAMRI Awards Luncheon
13:45–15:00		Technical Session XII
13:45–15:00	Think Tank	Doctoral Symposium 3
15:00–15:30	Teal	Afternoon Break
15:15–16:30		Technical Session XIII
15:15–16:30	Think Tank	Doctoral Symposium 4
15:15–16:30	NOMA B&C	FMNet Roadmap Panel Session
16:00–18:00	Ballroom	Blacks in Advanced-Additive Manufacturing (BiAM) Forum
16:30–16:45	Teal	Afternoon Break
16:45–18:00	NOMA B&C	Technical Session XIV
16:45–18:00	NOMA B&C	IMTG ASME Panel: Intelligent Manufacturing
18:00–20:45	BMW Training Center	Banquet

INDUSTRY PANEL ON MANUFACTURING RESEARCH

THURSDAY JUNE 26, 2025

Critical Research Gaps in Manufacturing Panel Session

Hosted by: Jeffrey Abell

Director & Chief Scientist for Global Manufacturing / Manufacturing Systems Research at General Motors

8:00-8:45 | Ballroom

Abstract

The SME NAMRC 53 and ASME MSEC 2025 Conferences will jointly host this plenary session. Open to all conference participants, this session provides a unique opportunity to discuss key research needed to shape the future of manufacturing. The session aims to foster an open dialogue between industry and academia to identify critical challenges in manufacturing. The discussions will focus on persistent and emerging challenges requiring research-driven solutions, followed by open dialogues between the audience and the panelists.

Dr. Jeffrey Abell is the Director and Chief Scientist for Global Materials and Manufacturing Systems Research at General Motors. He is responsible for GM's global manufacturing research strategies and activities including vehicle electrification, lightweight materials processing, automation, SMART Manufacturing, and systems and controls. Dr. Abell previously participated on a team that received $105M DOE grant for battery pack manufacturing and continuous improvement. He has developed several first-in-industry battery manufacturing technologies, including ultrasonic weld process monitoring and reconfigurable battery assembly systems resulting in significant cost savings. Dr. Abell's current research efforts include advanced propulsion, lightweight systems manufacturing, scalable and low-volume reconfigurable systems, and machine learning. Dr. Abell's global experience includes work assignments in Portugal and Germany as well as leading global teams. Dr. Abell is a three-time recipient of General Motors "Boss" Kettering Award, the highest technical honor given to General Motors employees. Dr. Abell's professional activities include: SME Board of Directors; chair of the Education and Accreditation Committee for SME; chair of the ABET Industrial Advisory Council; Dean's Advisory Council, Kettering University; and Advisory Board for Mechanical Engineering, Lawrence Technological University. He is a licensed professional engineer and has been elected Fellow of both ASME and SME.

SME NAMRI FOUNDER'S LECTURE

THURSDAY JUNE 26, 2025

NAMRI/SME Founder's Lecture 2025

An Overview of Advances in Machining Science of Aerospace Materials

Ramulu Mamidala

Boeing-Pennell Endowed Professor of Mechanical Engineering,
University of Washington

12:00-13:30 | Ballroom

Abstract

Composite materials are increasingly used in aerospace, automotive, marine, and defense industries. Recent aerospace trends focus on reducing emissions, weight, and the buy-to-fly ratio, leading to the use of high-strength hybrid materials like metal-composite stacks and fiber metal laminates. Fiber-reinforced plastic (FRP) composites, metal-composites, and fiber metal laminates are popular for their strength, low weight, and corrosion resistance. Machining is necessary for tolerance and surface finish, with edge trimming by milling or drilling for assembly are commonly used. These materials are stronger and lighter but require challenging machining processes, which can cause tool wear, friction, and other issues, increasing production time and cost. This presentation will clarify how to machine different composite materials in terms of operating conditions, cutting tools, and the appropriate machines. It also presents typical damage patterns caused by both traditional and nontraditional machining operations and strategies to reduce induced damage. Current practices and requirements for producing high quality critical composite components in the aerospace industry are also presented after review of the state of the art in both traditional and nontraditional methods of machining processes for composites and hybrid materials systems, discussing damage and modeling considering the factors like cutting forces, tool wear, and surface finish and most importantly the surface integrity. Some challenging issues will also be discussed for future research directions.

Biography

Ramulu Mamidala is the Boeing-Pennell Professor of Engineering, Professor in Department of Mechanical Engineering, Adjunctive Professor of Materials Science and Engineering and Industrial and Systems Engineering at University of Washington. Engaged heavily both in teaching and research for the past 43 years at the University of Washington. He was a leader of two interdisciplinary engineering programs, namely Co-director for the Program in Engineering and Manufacturing Management, and Director of the MSE Program in Manufacturing Engineering, University of Washington, Seattle, USA. He received his B.E (Mech Eng)) from Osmania University, MTech (Production Eng) from IIT New Delhi, India and PhD from University of Washington.

Dr. Mamidala was named Outstanding Teacher by the College of Engineering in 1985-86 and was ranked among the top ten professors at the University of Washington by graduating students in 1986. He received several prestigious awards, including the University of Washington's Faculty Excellence Award, the SAE Ralph R. Teetor Award, ASEE's AT&T Foundation Award and the NSF Presidential Young Investigator Award in 1989. In 1994, he earned the R1edu award for outstanding contributions to online learning. He has also received the Distinguished Alumnus in Academics award from Osmania University, India, and the Distinguished Contributions to Lifelong Learning Award from the University of Washington in 2012.

His other accolades include the ASEE's Isadore T. Davis Award, Academic Engineer of the Year from the Puget Sound Engineering Council, and the WJTA's Technology Award. He was honored with the SME's Jud Hall Composites Manufacturing Award in 2014. He is a member of the Washington State Academy of Sciences and a Fellow of ASME, SEM, ASM International, and SME. He has won several best research paper awards from organizations such as the US waterjet Association, International Waterjet Society, International Conference on Super Plastic Forming, and ASME. He has edited five ASME Symposium Proceedings and co-edited a book on machining ceramics and composites published in 1999. He is one of the founding members of the *Machining Science and Technology Journal*, also serving/served as an Associate Editor on five other Journals.

Dr. Mamidala's research interests reflect the multidisciplinary nature of materials, mechanics and manufacturing engineering, and primarily focus on aircraft materials and structures. He also has successful research programs in machining, drilling and surface integrity of composite materials and structures, fracture mechanics, fatigue and metal additive manufacturing. His research program has graduated 40 PhD and more than 250 MS degree students since 1986. Professor Mamidala has published more than 400 technical papers in these fields in refereed journals and conference proceedings.

DOCTORAL SYMPOSIUM

THURSDAY JUNE 26, 2025

Doctoral Symposium Presentations

Session 1: 09:00–10:15 | Session 2: 10:30–11:45 | NOMA B

Session 3: 13:45–15:00 | Session 4: 15:15-16:30 | Think Tank

A select group of doctoral students will present an overview of their research.

MSEC-166148: **Modernizing Manufacturing Systems for Attaining Zero-Defect Production**

Vinayak Khade, School of Mechanical and Automotive Engineering, Clemson University

Abstract: The ongoing shift towards smart manufacturing emphasizes the need for intelligent systems that ensure zero-defect production. Modernizing industrial equipment is a cost-effective approach, especially for SMEs, to facilitate this transition. This work focuses on additive manufacturing, particularly the FDM process, which involves complex interdependencies among process parameters, making defect mitigation challenging. A multi-stage framework is proposed that leverages real-time machine data and a multi-modal sensor network for defect identification and root-cause analysis. An LLM-based agentic framework is proposed to generate expert-level corrective actions using historical and domain knowledge, laying the groundwork for future autonomous manufacturing systems with on-the-fly control capabilities.

Bio: Vinayak Khade is a Ph.D. student in the School of Mechanical and Automotive Engineering at Clemson University. He holds a master's degree in automotive engineering from Clemson University, with a focus on vehicle manufacturing. His research interests lie in integrating artificial intelligence (AI) and machine learning (ML) into manufacturing processes to enhance efficiency, automation, and predictive capabilities. His broader interests encompass smart manufacturing, Industry 4.0, and the modernization of industrial systems through the integration of IoT sensors, AI, and ML. His previous work includes data-driven predictive maintenance and the development of novel representation tools for system design, aimed at optimizing industrial workflows and improving decision-making in manufacturing environments.

MSEC-166341: **A Cloud-Enabled Framework for Stakeholder Engagement in the Sustainability Assessment of Biobased Products**

Dolor Enarevba, School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University

Abstract: My research is motivated by the need for holistic, transparent, and dynamic sustainability assessment (SA) that enables accurate evaluation of the biobased product industry. Thus, my research aims to develop a cloud-enabled SA framework that integrates computing technologies supporting real-time, data-driven sustainability performance evaluation, thereby fostering stakeholder collaboration and holistic engineering solutions across the biobased product life cycle. To accomplish this vision, the requirements for a cloud-enabled SA framework are first defined. Based on the requirements, a conceptual framework is then developed to be integrated in a cloud-enabled environment. The framework is demonstrated for industrial hemp decortication and 3D-printing processes.

Bio: Dolor Enarevba is a Ph.D. candidate in the School of Mechanical, Industrial, and Manufacturing Engineering at Oregon State University (OSU), majoring in Mechanical Engineering with a minor in Food Science and Technology. He holds a B.Eng. (Federal University of Petroleum Resources in Nigeria), M.Sc. (University of Lagos in Nigeria), and M.S. (OSU), all in Mechanical Engineering. Dolor is a certified Lean Six Sigma Black Belt with over three years of industry experience in business excellence and process improvement. His research is centered on sustainable engineering, with a focus on biomanufacturing, life cycle assessment, and process improvement.

MSEC-169302: **A Federated Digital Twin Platform for Sustainable Composites Manufacturing**

Xiangyu Jiang, School of Mechanical and Automotive Engineering, Clemson University

Abstract: The composite industry faces sustainability challenges due to energy use and limited recycling. Existing digital twins lack material adaptability and cross-system sustainability integration. This research proposes a unified framework with adaptive modeling (OPC UA, AutoML), a RAMI4.0 engine (Ignition), and a blockchain Digital Product Passport (lifecycle assessment, reinforcement learning for thermodynamic optimization). Expected outcomes: streamlined deployment, enhanced interoperability, and improved curing efficiency. Validation includes simulations and Clemson pilots. This aims to lower Industry 4.0 adoption barriers for SMEs and integrate precision control with circular economy principles. Future work: federated twins and semantic integration for adaptive sustainable manufacturing.

Bio: I'm Xiangyu Jiang, a Ph.D. student at Clemson University's School of Mechanical and Automotive Engineering, specializing in smart manufacturing at the Clemson Composites Center. My research bridges digital twins for sustainable manufacturing and time-series data analytics

using hybrid intelligence. I'm currently developing a federated digital twin platform to link lifecycle data for advanced materials and building carbon footprint tracking through digital passports. Simultaneously, I'm creating machine learning-powered time-series visualization systems by integrating multi-sensor data to improve real-time process diagnostics. I seek collaborations with cross-disciplinary experts on industrial big-data and sustainable manufacturing, hoping to gain insights into emerging industry technologies.

MSEC-170267: **Investigation of Data-Driven Tool Condition Monitoring Systems for Subtractive Manufacturing Processes**

Sohan Nagaraj, Department of Mechanical Engineering, University of South Florida

Abstract: Subtractive manufacturing removes material from a workpiece to create precise components using techniques like milling, drilling, turning, and grinding. This research focuses on tool condition monitoring (TCM) to improve tool performance, part quality, and efficiency. First, it examines TCM in milling operations across materials with varying yield strengths. Second, it explores TCM in surgical drilling of synthetic bone to enhance safety and precision in medical applications. Finally, it investigates diamond-like coated tools, assessing both performance and environmental impact. Together, these studies aim to improve tool life, machining accuracy, and sustainability across industrial and healthcare manufacturing sectors.

Bio: Sohan Nagaraj is a PhD candidate in the Smart and Sustainable Systems Laboratory in the Mechanical Engineering department at the University of South Florida. His research focuses on tool condition monitoring for subtractive manufacturing, including end milling of materials with varying yield strengths, surgical bone drilling, and diamond-like coated tool machining with life cycle analysis. Sohan also brings industry experience as a quality engineering intern at Torrent Photonics, where he ensured part quality, conducted inspections, drafted non-conformance reports, and contributed to in-house component design for optical products used in satellite systems.

MSEC-164653: **Coating of Multiple Layers and Non-Newtonian Liquids on Rotating Discrete Objects**

Prateek Gupta, Department of Chemical Engineering and Materials Science, University of Minnesota

Abstract: Motivated by the need to improve fundamental understanding of multilayer and non-Newtonian liquid coatings on discrete objects, we consider model problems involving the flow of thin liquid films on rotating cylinders. For power-law liquids, a semi-analytical expression is derived for the critical rotation rate above which a monolayer liquid film does not drain. To understand the temporal evolution of the film along with surface-tension effects, the full two-dimensional

equations are solved using finite element simulations. Flow visualization experiments are performed to complement the simulation results. Our work suggests strategies for improving the uniformity of coatings on discrete objects.

Bio: Prateek Gupta is a doctoral candidate in the Department of Chemical Engineering and Materials Science at the University of Minnesota, working with Prof. Satish Kumar. His research focuses on the fluid mechanics of thin film flows and coating processes, particularly multilayer and non-Newtonian liquid films on rotating discrete objects. Prateek holds a Bachelor of Technology in Chemical Engineering from the Indian Institute of Technology (IIT) Kharagpur and a Master of Science in Chemical Engineering from the University of Minnesota.

MSEC-165165: **Optimization of Abrasive Machining of Additively Manufactured Veterinary Orthopedic Implants Considering Human-in-the-Loop**

Felicia F. Fashanu, Department of Mechanical and Aerospace Engineering, University of California, Davis

Abstract: Additive manufacturing (AM) technologies are promising for medical applications, particularly orthopedics. AM enables the production of complex, customized components tailored to individual patients. To meet necessary quality standards, the surface finishing process is crucial for 3D-printed implants. My research focuses on optimizing abrasive machining for cobalt chromium (CoCr) veterinary orthopedic implants while incorporating human-in-the-loop factors. It examines grinding parameters, including grinding force, feed rate, cutting speed, abrasive belt specifications, and material removal rate, correlating these factors with the surface quality of AM CoCr. Additionally, it involves designing a specialized platen for the grinding process and integrating human expertise throughout the operational phases.

Bio: I am Felicia Fashanu, a doctoral student in Mechanical and Aerospace Engineering at the University of California, Davis (UC Davis). My research focuses on advanced manufacturing, surface finishing, human-centered factories, and sustainability. In 2020, I earned a master's degree from UC Davis, completing a project on force-controlled grinding using a multi-grit scratch test. Previously, I was a design engineer at Cosco Fire Protection Inc., where I designed fire systems for the Chase Center Arena. I received my bachelor's degree in mechanical engineering from UC Davis in 2017 and an associate's degree from the College of Alameda in 2015. In my private time, I love to spend time with my family.

MSEC-167464: **Process Innovations in Incremental Sheet Forming (Isf)**

Putong Kang, Department of Mechanical Engineering, Northwestern University

Abstract: This research advances Incremental Sheet Forming (ISF) for multi-functional manufacturing, enabling surface texturing, morphing, and mold fabrication. A two-step forming strategy and toolpath design enhance drag reduction, coating adhesion, and biofouling resistance through textured surfaces and SLIPS coatings. Morphing is achieved by encoding residual strains through the use of ISF. Custom metal mold liners with fine features are rapidly fabricated and demonstrated. Machine learning-based segmentation further improves toolpath planning for complex geometries. Together, these innovations expand ISF into a digitally adaptive process for producing geometry-rich, high-performance components in marine, forming, and molding applications.

Bio: Putong Kang is a Ph.D. candidate in Mechanical Engineering at Northwestern University. His research focuses on advancing Incremental Sheet Forming (ISF) for applications in functional surfaces, morphing structures, and mold fabrication. By integrating experiments, analytical models, and machine learning, he aims to develop ISF as a digitally adaptive, multi-functional process. His work supports innovations in marine systems, lightweight structures, and rapid tooling. Putong is passionate about advanced manufacturing and is pursuing a career in industrial research and development to create scalable, high-impact fabrication solutions.

MSEC-170318: **Modeling and Control of Roll-to-Roll Manufacturing Systems for Metal Peeling**

Aditya Yalamanchili, Department of Mechanical Engineering, Texas A&M University

Abstract: Continuous manufacturing of thin metal foils using conventional rolling is energy and carbon-emissions intensive. Metal peeling is a novel, clean-energy alternative for continuous metal foil manufacturing through orthogonal machining under tension. Research in this dissertation focuses on real-time control of foil thickness during processing, transport, and coiling under prescribed tension and velocity. Objectives include developing physics-based foil transport models, cascaded control architectures integrating feedforward and feedback inputs, thermal analyses during transport, and developing scalable roll-to-roll systems for metal peeling. Extensive experiments corroborate the models and control strategies, demonstrating mitigation of process and machine disturbances and ensuring uniform, high-quality metal foil.

Bio: Aditya Yalamanchili is a PhD candidate in Mechanical Engineering at Texas A&M University. His dissertation focuses on modeling and control of roll-to-roll manufacturing systems for metal peeling. His research work thus far has been recognized by the Best Paper Award at the 2024 Roll-to-Roll USA Conference and earned the Best Student Research Award Finalist at the 2024 Modeling, Estimation and Control Conference. At Texas A&M, he received the Dr. J. George H.

Thompson Memorial Fellowship Award and is a two-time recipient of the Mechanical Engineering Graduate Student Research Grant.

MSEC-164596: **Modelling of Residual Stresses in Combined Additive Manufacturing and Machining Processes**

Shenliang Yang, Department of Mechanical Engineering, University of British Columbia

Abstract: Directed energy deposition (DED) is widely employed to restore damaged parts. To ensure satisfactory surface quality, machining is usually performed after DED. However, both DED and machining introduce complex residual stresses, which cause distortions and shorten service life. My thesis develops predictive models to simulate how residual stresses generate and interact during DED and machining processes. DED models show how heat transfer and material addition generate bulk stresses, while machining models demonstrate how initial states influence final surface stresses. These models allow engineers to customize process parameters, so as to enhance the reliability of manufactured components, especially for remanufacturing applications.

Bio: Shenliang Yang is a postdoc researcher in the Department of Mechanical Engineering at the University of British Columbia (UBC). He received his Ph.D. degree in Mechanical Engineering from UBC. Before that, he earned his Master's degree in Mechanical Engineering from Beihang University. In 2024, he obtained the Chinese Government Award for Outstanding Self-Financed Students Abroad. His research focuses on manufacturing process modelling, residual stress engineering, and thermo-mechanical analysis, particularly for aerospace materials.

MSEC-168549: **Measuring the Effect of Print Parameters and Material Choice on Adhesion in Dissimilar Material Printing**

Mitchell Donoughue, Department of Mechanical Engineering, Purdue University

Abstract: Dissimilar material printing (DMP), a subset of multi-material printing, prints materials with dissimilar mechanical and thermal properties. Adhesion between these materials can be a significant challenge, as many DMP applications require controllable adhesion. A modified double cantilever beam (DCB) test quantified adhesion between cast hydroxyl-terminated polybutadiene and 3D printed thermoplastic layers—two dissimilar materials. While surface roughness and fracture toughness showed no significant differences, the failure mode shifted. PLA and 5 and 10 wt.% polycaprolactone (PCL)/PVDF blends exhibited improved adhesion compared to other thermoplastics. These findings suggest better interfacial bonding and provide a testing framework for evaluating adhesion in DMP systems.

Bio: Mitchell Donoughue is a fourth-year PhD student in the Department of Mechanical Engineering at Purdue University. He earned his undergraduate degree in physics from Gustavus

Adolphus College in St. Peter, MN. His research focuses on additive manufacturing, with an emphasis on printing dissimilar materials using direct ink write (DIW) modified with vibration-assisted printing (VAP), as well as fused filament fabrication (FFF). His work aims to enable the reliable and repeatable production of parts from dissimilar materials, particularly elastomers and thermoplastics. In addition, he has conducted research on printing ceramic matrix composites (CMCs) and testing aluminum coatings for additive manufacturing. He was awarded a National Defense Science and Engineering Graduate (NDSEG) Fellowship in 2022.

MSEC-170059: **A Comprehensive Directed Energy Deposition (DED) Control System for Geometric Accuracy, Productivity, and Energy Management**

Weijun Zhang, Department of Mechanical and Aerospace Engineering, University of California, Davis

Abstract: This research addresses key challenges in laser powder-based directed energy deposition (LP-DED), including geometric inconsistency, low productivity, and residual stress. A comprehensive real-time control system is developed to manage energy and powder fluence delivery, ensuring stable clad geometry and temperature. The system integrates two modules: Productive Energy Fluence (PEF) and Quality Powder Fluence (QPF), which dynamically adjust feed rate, laser power, and powder flow rate based on in-situ monitoring. Experiments using thin wall samples demonstrate improved accuracy, reduced build time, and favorable stress outcomes. These findings offer a cost-effective, adaptive solution to advance LP-DED toward broader industrial adoption.

Bio: Weijun Zhang is a Ph.D. candidate in Mechanical and Aerospace Engineering at the University of California, Davis. He received his M.S. from UC Davis and B.S. from Shaoxing University. His research focuses on laser powder-based directed energy deposition (LP-DED), hybrid manufacturing, and real-time process control for metal additive manufacturing. He has published in leading journals such as Journal of Manufacturing Processes and CIRP Annals and collaborates with institutions including UW–Madison and J-PARC. He brings experience from Apple and teaching roles at UC Davis and has received multiple fellowships and academic honors.

MSEC-170201: **Direct Production of Sheet and Wire From Copper Contaminated Steel Scrap by Metal Peeling**

Ravi Srivatsa Bindiganavile Narasimhan, Department of Industrial and Systems Engineering, Texas A&M University

Abstract: Sheet and wire production from recycled steel is hindered by the presence of residual Cu in scrap, which causes surface embrittlement during hot rolling and drawing. This dissertation introduces a novel method, metal peeling, for producing sheet and wire directly from

recycled end-of-life steel through suppression of Cu-induced surface hot shortness. The research establishes the scientific basis for hot shortness suppression. Objectives include: demonstration of strip peeling from high Cu containing steels; modeling Cu diffusion phenomena; using Cu as precipitation hardening alloying element; analysis of energy and carbon savings by peeling; and extension of the concept for thin wire production.

Bio: Ravi Srivatsa is a Ph.D. student in the Department of Industrial and Systems Engineering at Texas A&M University. His research interests are in advanced manufacturing, mechanical design, and thermal modeling, with a specific focus on developing a single-step, energy-efficient metal peeling process for sheet, strip, and wire production. His contributions include analytical models for thermal and diffusion-related problems in machining, process design, and upcycling of metal scrap. His research is supported by the US National Science Foundation and Breakthrough Energy. Ravi previously worked at Addverb Technologies, optimizing custom conveyor systems and automation solutions for companies like PepsiCo, Flipkart, and Reliance.

MSEC-166325: **Electrically Assisted Vat Photopolymerization of Bio-Inspired Functional Materials**

Tengteng Tang, Department of Mechanical Engineering, Arizona State University

Abstract: Nature's complex structures enable survival in extreme environments through unique mechanical, optical, and electromagnetic properties. Inspired by this, electrically assisted vat photopolymerization (E-VPP) integrates electric fields with 3D printing to programmatically align nanofillers in bioinspired polymer composites. This technique enables the fabrication of multi-functional structures such as superhydrophobic surfaces, liquid crystal-aligned nanostructures, hygro-responsive porous systems, and polymer-metal hybrids. E-VPP overcomes traditional manufacturing limitations, offering programmable anisotropy and hierarchical complexity. It shows promise in applications like self-sensing, motion tracking, energy harvesting, and soft robotics, mimicking nature's adaptive strategies through advanced material design and additive manufacturing.

Bio: Tengteng Tang received his Ph.D. degree in Mechanical Engineering at Arizona State University in May 2025. His research interests mainly focus on biomimetic additive manufacturing (3D printing), employing vat photopolymerization, functional composite materials, and multi-physics fields to fabricate multi-scale and multi-functional structures for the application in self-sensing device, superhydrophobic surface, and optical steganography. The research outcomes have been published and highlighted in prestigious journals, including Advanced Functional Materials, Additive Manufacturing, ACS Applied Polymer Materials, Journal of Manufacturing Science and Engineering. Additionally, Tengteng is the recipient of 2023-2024 Mistletoe Research Fellowship and the Best Paper Award of MSEC2022 and 2023.

MSEC-165774: **Fabrication of Sensor-Embedded Heterogeneous Brain Simulant for the Evaluation of Impact-Induced Mild Traumatic Brain Injury**

Yunxia Chen, Department of Mechanical and Aerospace Engineering, University of Florida

Abstract: Mild traumatic brain injury (mTBI) remains a significant public health concern due to its poorly understood biomechanical mechanisms during traumatic events. This study introduces an integrated material-manufacturing approach to fabricate a sensor-embedded, biomimetic brain simulant that replicates the human brain's heterogeneous mechanical properties and neuroanatomical structures. The work integrates tunable gelatin microgel composites, a nested embedded printing technique, and compliant MXene-based soft sensors to enable real-time acquisition of deep tissue deformations during traumatic events with varied impact conditions. This platform offers valuable insights into mTBI mechanisms and informs strategies for injury prevention and future neurodegenerative disease investigations.

Bio: Dr. Yunxia Chen is a Postdoctoral Associate in the Department of Mechanical and Aerospace Engineering at the University of Florida, where she earned her Ph.D. in December 2024 under the mentorship of Dr. Yong Huang. Her research focuses on 3D bioprinting, soft electronics, and reinforced polymer composites. Dr. Chen has published 11 peer-reviewed papers in her field, including first-author articles in Advanced Materials (impact factor 30.2) and CIRP Annals. She has received multiple awards for research and mentorship excellence and serves as a reviewer for five peer-reviewed journals and conferences in manufacturing and biomedical engineering.

MSEC-169530: **Deciphering and Translating Bioinspired Structures for Engineering Materials Design via Computational Modeling and Machine**

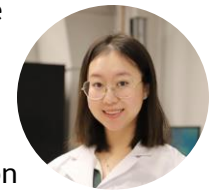
Zhangke Yang, Department of Mechanical Engineering, Clemson University

Abstract: Nature's structural materials, such as nacre, bone, and the mantis shrimp's dactyl club, inspire advanced material design through their unique structure–composition synergy. This work explores bioinspired nanocomposites and scaffolds using computational modeling, fabrication, and machine learning. Key contributions include impact-resistant polymer-graphene and nanoparticle-polymer composites, predictive models for bone-like scaffolds, and insights into the tendon-to-bone insertion's gradient structure. A multiscale model and CNN-based inverse design framework are developed to optimize structural fields for desired mechanical performance. Together, these findings advance the understanding and rational design of next-generation materials for applications in protective systems, aerospace, and biomedical engineering.

Bio: Dr. Zhangke Yang's research centers on bioinspired strategies for designing advanced materials, leveraging computational modeling and machine learning. He recently earned his Ph.D. in Mechanical Engineering from Clemson University and has made active contributions to this rapidly

evolving field through collaborations with bioengineers and materials scientists. His work has been published in leading journals such as Carbon, Journal of the Mechanical Behavior of Biomedical Materials, and the Journal of Applied Mechanics, and has been supported by grants from SC TRIMH, NSF SC EPSCoR, and USDA-AFRI.

MSEC-169983: **Bioinspired 3D Printing: From Smart Surfaces to Adaptive Structures**



Qingqing He, Department of Mechanical Engineering, San Diego State University

Abstract: This doctoral research leverages bio-inspired design and high-resolution 3D printing to develop multifunctional, innovative materials for soft robotics, sensing, and environmental systems. Inspired by Salvinia, filefish, and cuttlebone, the work focuses on (1) engineering superhydrophobic and oil-repellent surfaces and (2) creating robust, piezoelectric, and self-healing structures. Key innovations include Salvinia-inspired trichomes with 171.3° contact angles, anisotropic filefish surfaces for directional wetting, and Rochelle salt-infused lattices enabling self-sensing and self-repair. Applications range from force-mapping sports armor to AI-integrated hydrogels for robotic skin. These findings offer a blueprint for translating biological strategies into programmable, sustainable materials with broad technological impact.

Bio: Qingqing He received her M.S. degree in Mechanical Engineering from the University of Southern California in 2021. She is currently pursuing a joint Ph.D. with the Department of Mechanical Engineering at San Diego State University and the University of California, San Diego. Her research focuses on bio-inspired 3D-printed functional materials and advanced 3D printing technologies. She has received the SDSU College of Engineering's research symposium Best Poster award, the SDSU University Graduate Fellowship, and the NSF student travel award. Qingqing's work has been published in several high-impact journals, including Nature Communications, Advanced Materials, and Advanced Functional Materials.

ASME INTELLIGENT MANUFACTURING PANEL,

THURSDAY JUNE 26, 2025

Sponsored by ASME Technical and Engineering Communities (TEC) Sector

The emergence and growth of intelligent manufacturing (IM)—driven by technologies such as artificial intelligence (AI), advanced analytics, robotics, and cyber-physical systems—has been rapidly accelerating in recent years. Academic institutions are expanding efforts through new initiatives like seed grants, AI-integrated smart manufacturing curricula, and interdisciplinary research. Industry and government agencies are aligning to implement intelligent manufacturing methodologies to enhance operational efficiency, quality, and innovation.

This panel discusses how Industry, Academia, and Government Agencies are scaling their efforts to implement intelligent manufacturing solutions, with AI playing an increasingly critical but integrated role in this transformation.

What is discussed:

- **IM Implementation in Industry:** Learn how intelligent manufacturing technologies, including AI, are being implemented in large corporations and small to medium manufacturers.
- **What are the prerequisites?** What are the key Dos and Don'ts before introducing intelligent manufacturing systems, including AI-driven tools, in industrial environments?
- **Government agency's roles:** How are government agencies helping and coordinating these new challenges? How are academic researchers and industry partners working together toward successful AI implementation in the industry?
- **Role of students:** What are companies seeking in students and interns regarding AI knowledge, data skills, and systems thinking needed for intelligent manufacturing careers?

Who Should Attend This panel is ideal for industry professionals, academic researchers, and students interested in intelligent manufacturing systems, AI applications in industry, and workforce development.

Meet the Experts: Our panel includes leaders from global corporations, agile SMEs, and government agencies actively involved in digital and intelligent manufacturing innovation.

- **Doug Rhoda,** Founder, Chairman of Vectis Automation
- **Trisha Fish, Rapta Inc.,** VP of Strategy and Digital Transformation, AI-Enabled Quality Assurance & Qualification Digital Transformation Expert
- **Aman Chadha,** Head of a Gen AI team of scientists and managers at Amazon Web Services
- **Vinija Jain,** Meta, Machine Learning Engineer
- **Dr. Kahkashan Afrin,** Ceribell, Senior Product Manager, AI product

When and Where: Thursday June 26, 2025 (4:45 to 6:00 PM) in NOMA B & C

ASME INTELLIGENT MANUFACTURING PANEL,

THURSDAY JUNE 26, 2025

Moderators:

- **Dr. Sekhar Rakurty,** Research and Development Manager at The M. K. Morse Company
- **Dr. Ala Qattawi,** Associate Professor at The University of Toledo

Organizers:

- **Dr. Barbara Linke,** Professor at University of California, Davis
- **Dr. Frank Pfefferkorn,** Professor at University of Wisconsin-Madison
- **Dr. Yujie Chen,** Advanced Manufacturing Engineering Lead at Caterpillar Inc.
- **Dr. Andrew Henderson,** President/CEO at Hendtech LLC.
- **Dr. Ala Qattawi,** Associate Professor at The University of Toledo
- **Dr. Sekhar Rakurty,** Research and Development Manager at The M. K. Morse Company

Bios of panelists:

- **Doug Rhoda** is a visionary in intelligent manufacturing, with over 30 years of experience leading innovation at the intersection of robotics, automation, and digital transformation. As Founder, Chairman of Vectis Automation, Doug is advancing the democratization of collaborative robotic ("Cobot") welding solutions—bringing agile, human-centric automation to small and mid-sized manufacturers. Previously, Doug served as CEO of Wolf Robotics, where he led the development of cutting-edge technologies including robotic additive manufacturing (DED-Arc), friction stir welding, and hybrid subtractive/additive systems. His leadership fueled successful exits to global industrial leaders like Lincoln Electric and SCM Group, and helped shape the strategic direction of robotic welding in the U.S. A long-time advocate for intelligent automation, Doug integrates intelligent manufacturing technologies, adaptive sensing, and cyber-physical architectures into real-world manufacturing environments. He actively advises manufacturing startups, national labs, and technical universities, and serves on multiple industry boards through his work with the Pioneer Fund. Doug's work has earned him top honors including the AWS Excellence in Robotic Welding Award and the WEMCO Excellence in Welding Award. His focus on scalable technology, workforce development, and data-driven production makes him a key thought leader in the future of smart manufacturing

ASME INTELLIGENT MANUFACTURING PANEL,

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- **Trisha Fish** leads Rapta's dual-use innovation strategy and product roadmap, driving strategic growth across Defense and Aerospace sectors aligned with Rapta's commercial industrial customer base. She standardizes Rapta's AI-enabled Quality Assurance platform as a qualification digital transformation tool, positioning it as the core capability for digital qualification to support agile, hyper-speed, hyper-scale manufacturing and rapid field deployment.Trisha spearheads product innovation, overseeing roadmap development and execution tailored to defense and aerospace market requirements. She captures new market opportunities through targeted RDT&E contracts, strategic pilot initiatives with Department of Defense stakeholders, Science & Technology offices, and major OEMs, while fostering strategic partnerships with Small Businesses and academic institutions. Additionally, Trisha directs Rapta's Advanced Programs Growth strategy, guiding parallel rapid-development initiatives that accelerate enhancements of Rapta's flagship product features. Trisha holds a BS in Physics from the State University of New York at Geneseo and a Master of Science in Systems Engineering with a concentration in Data Analytics from the University of Virginia. With over 23 years of industry experience at Lockheed Martin and Elbit America, Trisha leverages deep domain expertise in EO/IR, Multi-INT fusion, AI/ML, and tracking and information exploitation for edge deployment. She positions Rapta as the industry standard for supplier qualification, digital certification, and manufacturability readiness across U.S. industrial and defense ecosystems, supporting Rapta's vision to supercharge humans, machines, factories, and depots.

- **Aman Chadha** manages a Generative AI team of scientists and managers at AWS, focusing on pre-training and fine-tuning LLM/VLM models for a wide range of use-cases. During his tenure at Amazon Alexa AI, he spearheaded Query Understanding and Personalization, enhancing user interactions while maintaining safety and reliability. At Apple, as part of the Machine Intelligence Neural Design (MIND) team, he specialized in designing on-device multimodal AI models for applications including NLP, Computer Vision, and Speech Recognition. In parallel to his industrial role, Aman actively advises projects at universities around the US and IITs in India, focusing on areas such as LLMs, prompt engineering, hallucination detection, bias and fairness, and multimodal AI. He has co-authored papers in leading conferences and journals, including ACL, EMNLP (Outstanding Award '23), AAAI, EACL, ECML, WSDM, CVPR, WACV, ICASSP, etc. His work has been featured in media outlets such as The Washington Post, Nature, Wikipedia, New Scientist, Analytics India Magazine, YourStory, etc.

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- **Vinija Jain** leads a team at the intersection of Generative AI and Recommender Systems at Meta Ads AI where she focuses on building intelligent, high-impact solutions that optimize advertiser outcomes and user engagement. Before joining Meta, she led an agentic AI startup in the customer support space, driving the development of autonomous agents to streamline customer interactions and enhance service quality for enterprise clients. Earlier in her career, she was with Amazon Music, where she worked on personalization and voice experiences, contributing to the integration of music intelligence within Alexa. Vinija's work lies at the intersection of product innovation and applied research, spanning areas such as generative modeling, user modeling, conversational AI, and reinforcement learning. She has co-authored papers in leading conferences and journals, including ACL, EMNLP (Outstanding Award '23), AAAI, EACL, ECML, WSDM, CVPR, WACV, ICASSP, and maintains a blog at vinija.ai.

- **Dr. Kahkashan Afrin** is a product and AI leader with deep expertise at the intersection of technology and strategy, and a passion for combining these expertise areas to drive real-world impact. She is currently a Senior Product Manager, AI Product at Ceribell, a MedTech company transforming the detection and treatment of neurological conditions through AI-driven innovation. Previously, she spent 4.5 years as a Management Consultant at McKinsey & Company's Digital & Analytics practice, advising Fortune 500 and public-sector clients on various digital & analytics topics, including digital transformation, AI strategy, and tech business building. She also led McKinsey's Generative AI Central Development Hub as an Engagement Manager.Dr. Afrin holds a Ph.D. in Industrial & Systems Engineering from Texas A&M University, where she developed novel ML/AI algorithms and built patented AI-enabled products.

ASME INTELLIGENT MANUFACTURING PANEL,

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Bios of Moderators:

- **Dr. Sekhar Rakurty** has over ten years of experience in industrial research and development within the manufacturing sector, particularly in designing cutting and machine tools and developing sustainable, AI-assisted manufacturing processes. He holds both a Master of Science and a Ph.D. in Mechanical Engineering from the University of Utah. He has over 15 approved patents distributed across multiple countries, along with more than five patent-pending applications. The patented products are sold internationally to a diverse range of end users. He serves as the industrial principal investigator for several federal and industrial grants focused on developing AI-assisted manufacturing processes and cutting tools for harsh environments. He is a member of the ASME Board of Standards and Testing Methods, Additionally, he is an associate editor for the Machining Science and Technology journal and is an Adjunct Professor in the Mechanical Engineering Department at the University of Akron.

- **Dr. Ala Qattawi** is an associate professor at the Department of Mechanical, Industrial, and Manufacturing Engineering at the University of Toledo. She is the director and the principal investigator at the Integrated Design and Manufacturing (IDM) Laboratory at the University of Toledo, where her research group interests include advanced manufacturing: additive manufacturing and sheet metal forming, design for manufacturing, sustainable manufacturing, and Origami-inspired metal structures as well as applications to vehicles body-in-white design. She earned her Ph.D. in Automotive Engineering from Clemson University, specializing in metal fabrication, and served as a post-doctorate fellow at the International Center for Automotive Research in South Carolina. Ala has earned several awards, including the Hellman Faculty Award in 2016, the Young Manufacturing Engineer Award from SME in 2018, the Ralph Teetor Education Award from SAE in 2021, the Toyota Programmable System Innovation Fellowship Award in 2022, the ORR Best Paper Award from ASME in 2022, the Distinguished Alumni Award from Clemson University-Automotive Engineering Department in 2023, the 2023 Excellence in Supervision of Undergraduate Research Award from the University of Toledo, and the Engineering Research Initiation (ERI) Award from National Science Foundation in 2023.

CONFERENCE BANQUET

THURSDAY JUNE 26, 2025

Welcome

Sherry McCraw

Vice President, Human Resources, BMW Manufacturing Corp.

19:00-21:00 | BMW Training Center

McCraw was one of the first BMW Associates hired at Plant Spartanburg in 1993. She has worked in several areas of assembly production, planning, engineering and technology. Since 2013, she has served as Vice President of Finance and Compliance, and from 2017 served as the Vice President of Assembly. She is currently the Vice President of Human Resources.

The conference banquet will take place at the new state-of-the-art BMW Technical Training Center, located at North Jones Rd. (State Rd S-42-9927), Greer, SC 29651. This is accessed by driving west from Interstate 85 Exit 60 for 0.4 mile (1 km), turning left into the main plant entrance, turning immediately left into the site operations area, and parking to the right at the first building. Buses are available for transport from the conference hotel, and parking is available and free if you choose to drive or carpool.

Google Maps link is here:

https://www.google.com/maps/dir/Commons+Garage,+60+Beattie+Pl,+Greenville,+SC+29601/VRVM%2B64+BMW+Technical+Training+Center+(TTC),+Greer,+SC+29651

09:00-10:15 **Redbud A**	**Tech. Session X: Track 1 Manufact Sys VIII** *Session Chairs: Yong Huang and Yan-Ting Chen*	
182	Dane Ungurait, Chuanshen Zhou, Kateland Hutt, Yunxia Chen, Adam Poniatowski, Joe Shaara, Paxton Howell, Yong Huang and Hitomi Yamaguchi	Computed Tomography Image-Based Measurements of Cortical Bone Thickness for Improved Bone Tissue Processing and Decision-Making
247	Yan-Ting Chen, Cheyn Rodriguez, Andrew Herbert and Rui Liu	An Analysis of Human Preference for Object Orientation in Mechanical Design Visualization
237	Peter Ifeolu Odetola, Ufoma Silas Anamu and Peter Apata Olubambi	Investigating The Microstructural and Mechanical Properties of Nickel-Aluminide Based High Entropy Alloys: A Combined CALPHAD-Based Modeling and Nanoindentation Study

09:00-10:15 **Redbud C**	**Tech. Session X: Track 2 Manufact Proc IX** *Session Chairs: Wayne Cai and Venkata Reddy Nallagundla*	
200	Pedro Doukas, Sha Ouyang, Jinjin Ha and Brad Kinsey	Development and initial testing of robotic blacksmithing apparatus
192	Xinxin Yao, Hasnain Hafiz, Lei Chen, Wayne Cai, Zirui Mao and Shenyang Hu	COARSE-GRAIN MOLECULAR DYNAMICS MODELING OF LI-ION BATTERY ELECTRODE MANUFACTURING: A SENSIVITY ANALYSIS STUDY
214	Shivaprasad Cherukupally, Wilfred Arokia Geoffrey, Gururaj A Bidnur, Rakesh Lingam and Venkata Reddy N	Enhancing Surface Quality and Accuracy in Hybrid Incremental Sheet Forming and Wire-Arc Direct Energy Deposition: A Focus on Path Planning and Reconfigurable Support

09:00-10:15 **Regency F**	**Tech. Session X: Track 4 Additive Manufact X** *Session Chairs: Jake Dvorak and Stephanie Lawson*	
169	Hutchison Peter, Kamren Sargent, Joshua Penney and Tony Schmitz	Path programming in Rhino 7 for wire arc additive manufacturing
190	Shashank Shukla, Ramesh Singh, Anil Saigal and Soham Mujumdar	Role of Premix Powder Size on Ternary Alloy Development via Laser-Directed Energy Deposition
265	Stephanie Lawson, Dongqing Yan, David Tavakoli, Ali Tabei and Somayeh Pasebani	Process-induced residual stress analysis of Inconel 625 and GRCop-42 dissimilar metal fabricated via coaxial wire-powder laser directed energy deposition

NAMRC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

09:00-10:15 Redbud B	**Tech. Session X: Track 4 Additive Manufact XI** *Session Chairs: Chao Ma and Asma Perveen*	
6	Mohammadamin Moghadasi, Erika Anglin, Catherine Jaraczewski, Zhijian Pei and Chao Ma	Effect of printing orientation on flexural strength of parts from binder jetting
212	Ahkar Min Thant, Jianfeng Ma and Muhammad P. Jahan	Enhancing Compressive Properties of SLS-printed Nylon Lattice Structures by Hybridization of Common Unit Cell Structures
52	Anel Zhumabekova, Asma Perveen and Didier Talamona	Comparison study of Selective Laser Melted Ti6Al4V and Ti6Al4V-8Ta Alloys: Mechanical & Corrosion Properties

09:00-10:15 Crepe Myrtle	**Tech. Session X: Track 5 Smart Manufact and CPS X** *Session Chairs: Jian Cao and Debejyo Chakraborty*	
86	Yi-Ping Chen, Vispi Karkaria, Ying-Kuan Tsai, Faith Rolark, Daniel Quispe, Robert Gao, Jian Cao and Wei Chen	Real-Time Decision-Making for Digital Twin in Additive Manufacturing with Model Predictive Control using Time-Series Deep Neural Networks
272	Nishat B. Alam, Nitol Saha, Victor Gadow, Ramy Harik and Juhyeong Ryu	Role of extended reality (XR) technologies in maintenance operations: Trends, challenges, and integration in Industry 4.0
119	Debejyo Chakraborty, Bernie Gallis, Jerome Schroeder, Paul Wright and Michael King	Automotive Industrial Non-scalar Data Sharing

10:30-11:45 Redbud A	**Tech. Session XI: Track 6 Manufact Edu and Case Studies II** *Session Chairs: Robert Hart and John Liu*	
32	John Liu, Daniel Braconnier, Zhen Zhao, Kaitlyn Gee, Kaitlyn P. Becker and A. John Hart	A LEGO®-themed Introduction to Manufacturing Course Developed for First-Year Undergraduate Students
55	Tony Schmitz, Mark Rubeo and Paul Lynch	ACENet: Training in CNC machining, metrology, casting, and forging
30	Robert Hart, Todd Polk and Jamie Gravell	Supporting student success in manufacturing project prototypes for an engineering capstone course

10:30-11:45 Redbud C	**Tech. Session XI: Track 2 Manufact Proc X** *Session Chairs: YIHAO ZHENG and Sathyan Subbiah*	
230	Patrick Chernjavsky, Yumo Wang, Jack Shanks, Rohit Dey, Shun Yu, Xunzhi Xie, Yang Liu and Yihao Zheng	Influence of flexible spindle characteristics on grinding dynamics in HydroFlex grinding: a numerical simulation with experimental validation
136	Nithya Srimurgan and Sathyan Subbiah	Carbo-thermal reduction of lunar highland regolith simulant for in-situ manufacturing of SiC
225	Md Habibur Rahman, Shyam Komath and Sathyan Subbiah	High-speed camera imaging-based investigations of compliance behavior and flap interactions in coated abrasive flap wheels

10:30-11:45 Redbud B	**Tech. Session XI: Track 7 Sustainable Manufacturing IV** *Session Chairs: Stefania Bruschi and Sekhar Rakurty*	
101	Stefania Bruschi, Rachele Bertolini, Alberto Fabrizi, Nicola Pozzato and Andrea Ghiotti	Sustainable machining of ARMCO pure iron
204	Isadora Cook, Dylan Sanders and Stephanie Lawson	Processing and material characterization of polylactic acid (PLA)-mycelium composite as a plastic alternative
243	Tanmay Tiwari, Aswani Kumar Singh and Chandra Sekhar Rakurty	Assessing Process and Environmental Performance of SiC-PEG Dielectric EDM: A Comparative Study

10:30-11:45 Regency F	**Tech. Session XI: Track 4 Additive Manufact XII** *Session Chairs: Hariharan Krishnaswamy and Farid Ahmed*	
177	Jose Galarza, Jorge Barron Jr, Luis Jimenez, Tamer Oraby, Jianzhi Li and Farid Ahmed	A machine learning approach to detect pores in laser powder bed fusion additive manufacturing
163	Ranjith Kumar Ilangovan, Murugaiyan Amirthalingam, Hariharan Krishnaswamy and Ravi Sanakar Kottada	Stress relaxation behaviour of laser powder bed fusion additive manufactured AlSi10Mg
232	Israt Zarin Era, Fan Zhou, Ahmed Shoyeb Raihan, Imtiaz Ahmed, Alan Abul-Haj, James Craig, Srinjoy Das and Zhichao Liu	In-Situ Melt Pool Characterization via Thermal Imaging for Defect Detection in Directed Energy Deposition Using Vision Transformers

10:30-11:45 Crepe Myrtle	**Tech. Session XI: Track 3 Material Removal VI** *Session Chairs: Shuting Lei and Taylor Barrett*	
189	Taylor Barrett, Beth L. Armstrong, Corson L. Cramer and Brigid Mullany	Assessment of the Grindability of Robocast Silicon Carbide
180	Shah Rumman Ansary, A K M Sarower Kabir, Nithin Lalith, Meng Zhang and Weilong Cong	Rotary Ultrasonic Micro-grooving of Silicon: Effects of Ultrasonic Vibration and Feeding Speed
93	Ronit Shah and Amitava Ghosh	The influence of substrate microstructure and radial rake angle on the performance of TiAlN coated end mills in slot milling of SS304

NAMRC TECHNICAL SESSIONS

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10:30-11:45 **Think Tank**	**Special Session: International Collaborative Research and Education** *Session Chair: ZJ Pei*	
ICRE	NSF IRES program director	Introduction to NSF's "International Research Experiences for Students (IRES) program
ICRE	Sarah Wolff and Marco Sortino	Activities and results of the 2024 NSF IRES Advanced Studies Institute (ASI) on Manufacturing Frontiers Leveraging Unique Facilities in Italy
ICRE	Sarah Wolff and Marco Sortino	Discussion on the 2026 ASI Manufacturing Frontiers Leveraging Unique Facilities in Italy
ICRE	Michael Biehler, Kat Hutt, Lauren Miller, and Jackson Sanders	Experiences and insights from student participants

13:45-15:00 **Redbud A**	**Tech. Session XII: Track 6 Manufact Edu and Case Studies III** *Session Chairs: Jake Dvorak and Kamyar Raoufi*	
114	Tyler Woodard, John Greene, Andrew Honeycutt and Tony Schmitz	Design, fabrication, and performance evaluation of an open-source desktop CNC milling machine
186	Kamyar Raoufi, Alejandra Hilbert, Christopher A. Sanchez, Zhaoyan Fan, Burak Sencer, Baldur Steingrimsson, Matthew L. Johnston and Karl R. Haapala	Development of a Quantitative Learning Assessment (QuLA) Method and its Application in Manufacturing Engineering Courses in Mechatronics
206	Eli McClain, Peter Fabe, Jelena Goldstein, Sarah Crane, Shanna Daly, Albert Shih and Daniel Cooper	Perceptions of manufacturing careers by mechanical engineering students at an R1 public university

13:45-15:00 **Redbud C**	**Tech. Session XII: Track 2 Manufact Proc XI** *Session Chairs: Torgeir Welo and Jihoon Jeong*	
149	Chanmi Moon, Sigmund Tronvoll, Jun Ma and Torgeir Welo	An experimental and numerical study of deformation characteristics in flexible stretch bending using reconfigurable tools
176	Hayoung Youn, Dong Hee Kang, Jaeseung Lim, Seongheum Han, Jae-Hak Lee, Jihoon Jeong and Seungman Kim	Scanning direction dependence on crystal orientations of a femtosecond laser-assisted 4H-SiC wafer slicing

13:45-15:00 Redbud B	**Tech. Session XII: Track 3 Material Removal VII** *Session Chairs: Takashi Matsumura and Xin Zhao*	
224	Chenyang Zhu, Rui Huang, Nian Xiang Sun and Xin Zhao	Ultrafast laser micromachining of through trenches in silicon wafers
125	Takashi Matsumura, Sho Watanabe, Fumihiro Uchiyama and Shoichi Tamura	High feed rate milling of carbon fiber reinforced plastic with PCD tool
80	Sagarika Banik, Indhu R, N Arunachalam and M S Ramachandra Rao	Formation of Graphitic Micro-Channels on Boron-Doped Diamond Electrodes via Femtosecond Laser Irradiation: A Route for Controlled sp^2 Functionalization

13:45-15:00 Regency F	**Tech. Session XII: Track 4 Additive Manufact XIII** *Session Chairs: Ala Qattawi and Meysam Faegh*	
145	Sara Ranjbareslamloo, Gabriel Awku Dzukey, Md Muhiul Islam Muhit and Ala Qattawi	Numerical and Experimental Study of Residual Stress in Additively Manufactured IN718
203	Ali Alshami, Abdelrahman Shuaib and Abdelraouf Mayyas	Evaluation of the Properties of Experimental Friction Stir Welding Pin Tools Consolidated from W-25%Wt. Re Alloy Using Laser Powder Bed Fusion (LPBF) Process
235	Meysam Faegh, Suyog Ghungrad and Azadeh Haghighi	A physics-informed neural network framework for decomposition and path planning in multi-laser additive manufacturing

13:45-15:00 Crepe Myrtle	**Tech. Session XII: Track 5 Smart Manufact and CPS XI** *Session Chairs: Satyandra K. Gupta and Matthew Krugh*	
219	Flanagan Waldherr, Matthew Krugh, Vinita Jansari and Laine Mears	Methodology for Manipulation of Workload in Manual Assembly Experiments
254	Rishabh Shukla, Samrudh Moode, Raj Talan and Satyandra K. Gupta	Learning Force-Conditioned Visuomotor Diffusion Policy from Human Demonstrations for Complex Robotic Assembly Tasks
36	Jing Zou, Xinan Zhou, Donghai Wang and Sun Jin	Integrated optimization of battery manufacturing plant production and inventory capacities under market demand uncertainty

15:15-16:30 Redbud A	**Tech. Session XIII: Track 6 Manufact Edu and Case Studies IV** *Session Chairs: Chinedum Okwudire and Sourabh Saha*	
242	Abhishek Singh, Pinyi Wu, Chinedum Okwudire and Mihaela Banu	Advancing Workforce Development through Additive Manufacturing Education and Training
216	Harry Watkins and Sourabh Saha	Teaching advanced manufacturing through course-based undergraduate research in a vertically integrated projects (VIP) class

15:15-16:30 Redbud C	**Tech. Session XIII: Track 2 Manufact Proc XII** *Session Chairs: Masoud M. Pour and Beiwen Li*	
143	Raphaela März and Marion Merklein	Comparison of metal additive manufacturing processes for the production of tailored blanks
153	John Baron, Muhammad Omer Naveed and Lei Chen	An Experimental Investigation of Hybrid Fused Filament Fabrication with In-Process Machining
267	Xuepeng Jiang, Li-Hsin Yeh, Mu'Ayyad Al-Shrida, Jakob Hamilton, Beiwen Li, Iris Rivero, Andrea Camacho-Betancourt, Weijun Shen and Hantang Qin	Impact of Self Organizing Map based Incremental Learning Parameters on In-Situ IR Melting Pool Imaging for Direct Energy Deposition

15:15-16:30 Regency F	**Tech. Session XIII: Track 4 Additive Manufact XIV** *Session Chairs: Shenghan Guo and Ridwan Olabiyi*	
75	Marc Corfmat, Charles Ringham and Masakazu Soshi	Adaptive toolpath for improved thermal management in additive manufacturing (AM)
198	Shengzhe Zhou and Wenmeng Tian	Privacy-Preserving Process-Defect Modelling for Metal-Based Additive Manufacturing Processes: A Federated Learning-based Case Study
208	Ridwan Olabiyi, Hui Yang and Ashif Iquebal	CRONet: A Convolutional Recurrent Operator Approximator Network to Accelerate Topology Optimization

15:15-16:30 Crepe Myrtle	**Tech. Session XIII: Track 5 Smart Manufact and CPS XII** *Session Chairs: Puneet Tandon and Benjamin Standfield*	
209	Allen Moncey Varghese, Binil Starly and Ashif Iquebal	Complex value autoencoder for machinery audio generation
252	Benjamin Standfield	Prediction and Compensation of Geometric Deformation in Federated Additive Manufacturing Environments
141	Mithilesh Kumar Tiwari, Abhay Kumar Dubey, Kritik Joshi, Adusumalli Sumanth, Ponappa K. and Puneet Tandon	Revolutionizing Hybrid Additive Manufacturing: The Impact of Digital Shadow-Driven Smart Dashboard and Augmented Reality on Operational Efficiency

15:15-16:30 Redbud B	**Tech. Session XIII: Track Cross-disciplinary research** *Session Chairs: Huachao Mao and Soham Mujumdar*	
202	Sara Shonkwiler, Tianshuang Qiu, Richard Ma, Chen Dai, Chang Li, Xiang Li, Hannah Budinoff and Sara McMains	Input part shape representation/deep learning architecture and dataset analysis for additive manufacturing part quality predictions
107	Mikhail Gladkikha, Yujie Shan, Jacob Ayers, Ed Tackett and Huachao Mao	Blueprint and case study for the digital supply chain: distributed additive manufacturing enables resilience and sustainability
161	Rajendra Hodgir, Ramesh Singh and Soham Mujumdar	Strengthening of Additively Manufactured SS316L by In-situ Laser Remelting

16:45-18:00 **Regency F**	**Tech. Session XIV: Track 4 Additive Manufact XV** *Session Chairs: Chinedum Okwudire and Paolo Parenti*	
218	Paolo Parenti, Talha Sunar and Bianca Maria Colosimo	Toward high quality and stable production in Metal Binder Jetting: process mapping for 17-4PH steel
213	Amin Poorabdol Mianjy, Sandesh Giri, Deep Nilesh Vira and Sen Liu	Effects of Part Size on Densification and Microstructure of 17-4 PH Stainless Steel Printed by Binder Jetting Additive Manufacturing
207	Chen Qian, Pinyi Wu and Chinedum Okwudire	Toward In-situ Sensing of Powder Packing Quality in Metal Binder Jetting Using Recoating Force

16:45-18:00 **Redbud B**	**Tech. Session XIV: Track 3 Material Removal VIII** *Session Chairs: Nathan Hartman and Tatsuya Sugihara*	
11	Jun-Young Oh and Wonkyun Lee	Model-based feed rate optimization with tool wear effect in milling
191	Sam Stencel and Nathan Hartman	Using machine learning with supplemented NC code to predict machining energy
148	Tatsuya Sugihara and Toshiyuki Enomoto	Exploring Surface Texturing Strategies for Improved High-Pressure Coolant Performance in Cutting Processes

16:45-18:00 **Redbud C**	**Tech. Session XIV: Track 2 Manufact Proc XIII** *Session Chairs: Peter Olubambi and Jake Dvorak*	
146	Jake Dvorak and Tony Schmitz	Elevated temperature structured light scanning for in situ monitoring of forging dies
185	Gadifele Mekgwe, Ojo Jeremiah Akinribide, Peter Olubambi and Samuel Olukayode Akinwamide	Sliding friction behaviour of spark plasma sintered graphite reinforced binderless TiC0.7 N0.3 at elevated temperature
257	Ufoma Silas Anamu, Peter Ifeolu Odetola and Peter Apata Olubambi	Effects of Processing Parameters of Mechanical Alloying and Pulse Electric Sintering of Ti20Al20Cr5Nb5Ni17Cu16Co17 High Entropy Alloys by Response Surface Methodology

16:45-18:00 **Redbud A**	**Tech. Session XIV: Track 4 Additive Manufact XVI** *Session Chairs: Steve Schmid and Cindy (Xiangjia) Li*	
223	Tien Herd, Corson Cramer and Steven Schmid	Influence of resin on stereolithography with silicon carbide
211	Dylan Joralmon, Soham Khairnar and Xiangjia Li	Rapid Fabrication of Multi-Metal 3D Objects with Adjustable Gradients by Continuous Interface Liquid Production (CLIP)
109	Kamren Sargent, Hutchison Peter, Joshua Penney and Tony Schmitz	Geometric repeatability of aluminum robotic WAAM

16:45-18:00 Crepe Myrtle	**Tech. Session XIV: Track 5 Smart Manufact and CPS XIII** *Session Chairs: Clayton Cooper and KUAN-MING LI*	
156	Minsung Kang and Hongyue Sun	EthicalFab: Toward Ethical Fabrication Process through Privacy-preserving Illegal Product Detection
251	Evans Nyanney and Zhaohui Geng	Unveil the Relationship Between Process and Design Embedded in the 3D Point Cloud using Unsupervised Learning
61	You-Jie Chuang, Ming-Chyuan Lu and Kuan-Ming Li	Impact of feature engineering and domain adaptation on tool wear prediction accuracy under variable cutting conditions

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

09:00-10:15 Magnolia	**Technical Session X: Advanced Machining and Deformation Processes 4** *Session Chair: David Yan*	
MSEC-155627	Aditya Yalamanchili, Dinakar Sagapuram, Prabhakar Pagilla	Real-Time Strip Thickness Control in Metal Peeling
MSEC-155658	Shilun Du, Yingda Hu, Yong Lei	Experimental Analyses on the Damage Effects of the Ultrasonically Activated Surgical Devices
MSEC-151281	Laymin Hoe, Yunfa Guo, Yanjin Lee, Kevin Lizarraga, David P. Yan	Ultraprecision Machining of Additively Manufactured Ti-5553 Alloy for Biomedical Applications

09:00-10:15 Regency G	**Technical Session X: Advances in Metal Additive Manufacturing Processes 2** *Session Chair: Dong Lin*	
MSEC-155594	Richard Baumer, Elvin Vuong, Dmytro Zagrebelnyy, Ezequiel Pessoa	Impact of Interpass Temperature on Properties of Aluminum Er2319 Produced by Wire Arc Additive Manufacturing With a Weave Path
MSEC-155721	Nismath Valiyakath Vadakkan Habeeb, Kevin Chou	Size Effects on Process-Induced Porosity in Laser Powder-Bed Fusion Additive Manufacturing
MSEC-155750	Emmanuel Bamido, Michael Cullinan	Multiphysics Modeling of the Influence of Scanning Parameters on Melt Pool Geometry in Directed Energy Deposition

09:00-10:15 Gardenia	**Technical Session X: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability 2** *Session Chair: Jing (Julia) Zhao*	
MSEC-155206	Matthew Triebe, Nehika Mathur, Ashley Hartwell, Kc Morris	Reference Model for Electric Vehicle Battery Recovery in a Circular Economy
MSEC-155344	Hadear Hassan, Amira Bushagour, Abheek Chatterjee, Astrid Layton	Quantitatively Supporting System-Level Sustainability and Resilience in Manufacturing
MSEC-155425	Lakshmi Srinivasan, Fu Zhao	Quantifying Carbon Footprint in Industrial Heat Treatment Processes Through Life Cycle Assessment

09:00-10:15 NOMA B	**Technical Session X: Doctoral Symposium 1** *Session Chair: Ping Guo*	
MSEC-166148	Vinayak Khade, Saeed Farahani	[P] Context-Aware Multi-Agent Framework for Smart Manufacturing
MSEC-166341	Dolor Enarevba	[P] A Cloud-Enabled Framework for Stakeholder Engagement in the Sustainability Assessment of Biobased Products
MSEC-169302	Xiangyu Jiang, Saeed Farahani	[P] A Federated Digital Twin Platform for Sustainable Composites Manufacturing
MSEC-170267	Sohan Nagaraj	[P] Investigation of Data-Driven Tool Condition Monitoring Systems for Subtractive Manufacturing Processes

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

09:00-10:15 Regency H	**Technical Session X: Smart, Innovative, and Low-cost Tooling Systems for Advanced Materials Manufacturing 2** *Session Chairs: Saeed Farhani and Hamed Joghan*	
MSEC-155839	Mahdi Pirani, David Kirk, Saeed Farahani	A Novel Low-Cost Tooling via a Hybrid Manufacturing Technology
MSEC-155889	Mason Hynds, Ojas Acharya, Atharva Shastri, Diego Terrazas, Mahdi Pirani, Saeed Farahani	Leveraging Standard Inserts in Fabrication of Low-Cost Tooling for High-Performance Applications
JMSE-24-1389	Mengfei Chen, Wenbo Sun, Weihong “Grace” Guo	[J] Adaptive Online Continual Learning for In-Situ Quality Prediction in Manufacturing Processes

10:30-11:45 Magnolia	**Technical Session XI: Advanced Machining and Deformation Processes 5** *Session Chair: David Yan and Bruce Tai*	
MSEC-155694	Hui Liu, Markus Meurer, Thomas Bergs	Investigation of Tool Temperature During End Milling: Experimental and Numerical Approaches
MSEC-151574	Markus Diegel, Markus Meurer, Thomas Bergs	Performance of Different Diamond Coatings and Substrate Materials in Cutting of Tungsten Carbide With Laser-Treated Tools
MSEC-154821	Kilian Brans, Markus Meurer, Thomas Bergs	Influence of the Material Production Route on the Chip Formation Mechanisms of the Lead-Free Copper-Zinc-Alloy Cuzn42 (Cw510l)

10:30-11:45 Regency G	**Technical Session XI: Advances in Metal Additive Manufacturing Processes 3** *Session Chair: Ala Qattawi*	
MSEC-155767	Hamed Dardaei Joghan, Philipp Heideck, Farin Weinert, A. Erman Tekkaya, Yannis P. Korkolis	Hybrid Additive Manufacturing of Double-Walled Tubes With Subsequent Forming Processes
MSEC-155899	Aishwarya Sarker, Santosh Thapa, Yang-Tse Cheng, Madhav Baral	[B] Mechanical Characterization of an Additively Manufactured Metallic Super Alloy Using Micro Tensile and Instrumented Indentation Testing
MSEC-155924	Sutonu Oraon, Rajesh Gorai, Shashank Shukla, Soham Mujumdar, Ramesh Singh	Experimental Characterization and Defect Mapping of Coaxial Wire Laser Directed Energy Deposition of Aisi 304

10:30-11:45 Gardenia	**Technical Session XI: Bio-Manufacturing of Engineered Living Materials 1** *Session Chairs: Congrui Jin and Qiming Wang*	
MSEC-155173	Rokeya Sarah, Riley Rohauer, Kory Schimmelpfennig, Shah Limon, Christopher Lewis, Md Ahasan Habib	Development of a Predictive Model to Optimize Bioink Formulations Tailored for Extrusion-Based Bioprinting
MSEC-155442	Yihao Xu, Rokeya Sarah, Yongmin Liu, Bashir Khoda, MD Ahsan Habib	Ai-Guided Bayesian Optimization for Predicting Bioink Viscosity in 3D Bioprinting
MSEC-154895	Nisha Rokaya, Erin Carr, Richard Wilson, Congrui Jin	Design of Engineered Living Materials for Martian Construction

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

10:30-11:45 NOMA B	**Technical Session XI: Doctoral Symposium 2** *Session Chair: Ping Guo*	
MSEC-164653	Prateek Gupta, Satish Kumar	[P] Coating of Multiple Layers and Non-Newtonian Liquids on Rotating Discrete Objects
MSEC-165165	Felicia Fashanu	[P] Optimization of Abrasive Machining of Additively Manufactured Veterinary Orthopedic Implants Considering Human-in-the-Loop
MSEC-167464	Putong Kang	[P] Process Innovations in Incremental Sheet Forming (Isf)
MSEC-170318	Aditya Yalamanchili	[P] Modeling and Control of Roll-to-Roll Manufacturing Systems for Metal Peeling

10:30-11:45 Regency H	**Technical Session XI: Semiconductor Manufacturing: Metrology, Inspection, Equipment, and Processes 1** *Session Chairs: Chabum Lee and Jiyong Park*	
MSEC-155632	Gugyeong Sung, Hyunjae Lee, Heebum Chun, Chabum Lee	[B] 3D Imaging Approach to TSV/TGV Critical Dimension Metrology and Inspection
JMSE-24-1388	Xiangtao Gong, Zhongjia Gao, Kai Jen Wu, Jinzhao Fu, Yan Wang, Heng Pan	[J] Powder Compaction Characteristics and Modeling of Calendering Process for Powder-Based Solvent-Free Manufacturing of Electrodes for Lithium-Ion Batteries

13:45-15:00 Magnolia	**Technical Session XII: Advanced Machining and Deformation Processes 6** *Session Chairs: Dinakar Sagapuram and Yang Guo*	
MSEC-155808	Desmond Mensah, Sha Ouyang, Qi Zhang, Brad Kinsey, Jinjin Ha	Leveraging Cyclic Bending Under Tension Data and an Artificial Neural Network to Predict Extrapolated Strain Hardening Behavior of Dual Phase Steels
JMSE-23-1745	Kaveh Rahimzadeh Berenji, Faraz Tehranizadeh, Erhan Budak	[J] Chatter Stability of Orthogonal Turn-Milling Process in Frequency and Discrete-Time Domains
JMSE-24-1104	Alessandro Fortunato, Erica Liverani, Lorenzo Cestone, Flavia Lerra, Alessandro Ascari, Hambal Iqbal, Adrian H.A. Lutey	[J] Dry Grinding: A More Sustainable Manufacturing Process for the Production of Automotive Gears
MSEC-155693	Felicia Fashanu, Brandon Gee, Barbara Linke	[B] Belt Grinding Simulation to Optimize Manual Grinding Process Parameters

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

13:45-15:00 Gardenia	**Technical Session XII: Bio-Manufacturing of Engineered Living Materials 2** *Session Chairs: Weinan Xu and Honyu Zhou*	
MSEC-155671	Lily Raymond, Liam Bond, John Samuel Thella, Christina Thella, Pengbo Chu, Yifei Jin	Digital Light Processing of Microfluidic Chips for Cell Separation
MSEC-155912	Ayman Alghamdi, Chuanshen Zhou, Ali Shams, John-Thomas Robinson, Renjing Wang, Taylor Rawlinson, Hitomi Yamaguchi, Yong Huang	Self-Supported Printing of Gelatin Composite-Based Engineered Living Materials
MSEC-152987	Miles Adams	[P] Engineering Biochar Enhanced Mycelium Composites for Sustainable Digital Fabrication and Energy Storage: A Novel Bio-Manufacturing Workflow

13:45-15:00 NOMA B	**Technical Session XII: Doctoral Symposium 3** *Session Chair: Ping Guo*	
MSEC-164596	Shenliang Yang	[P] Modelling of Residual Stresses in Combined Additive Manufacturing and Machining Processes
MSEC-168549	Mitchell Donoughue	[P] Measuring the Effect of Print Parameters and Material Choice on Adhesion in Dissimilar Material Printing
MSEC-170059	Weijun Zhang	[P] A Comprehensive Directed Energy Deposition (Ded) Control System for Geometric Accuracy, Productivity, and Energy Management
MSEC-170201	Ravi Srivatsa Bindiganavile Narasimhan	[P] Direct Production of Sheet and Wire From Copper Contaminated Steel Scrap by Metal Peeling

13:45-15:00 Regency G	**Technical Session XII: In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing 1** *Session Chairs: Arvind Shankar Raman and Andelle Kudzal*	
MSEC-155129	Brian Johnstone, Nicole Van Handel, Patrick Merighe, Christopher Saldana, Kyle Saleeby	In-Situ Measurement of Slitted Thin Walls in Laser Powder Bed Fusion
MSEC-155444	Harshin Sanam, Zhenghui Sha	Enhancing In-Situ Monitoring of Cooperative 3D Printing via Edge Detection and Image Augmentation
MSEC-155544	Khawlah Alharbi, Wei William Li, Hantang Qin	Partially Observable Markov Decision Processes (Pomdp) Framework for Decision-Making Under Uncertainty in Ehd Printing Using Image Based Monitoring System

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

13:45-15:00 Regency H	**Technical Session XII: Advances in Manufacturing of Thin Films and Coatings** *Session Chairs: Semih Akin and James Nowak*	
MSEC-155548	Melanie Howe, Luis Mantilla, Abishek Indupally, Rodrigo Martinez-Duarte	Optimization of Surface Roughness in the Electrodeposition Process
MSEC-155660	Nan Wang, Ruixiang Zheng, Runze Cai, Xueke Zheng, Mian Li	Modeling Periodic Defects Under Zigzag Scanning In Roll-To-Roll Manufacturing
MSEC-155708	Gobinda Chandra Behera, Nitin Vilas Desai, Sankha Deb	Implementation of Soft Computing-Based Metaheuristic Algorithms in Multi-Objective Environmentally-Conscious Machining Operation Sequence Optimization With Carbon Emission Reduction

15:15-16:30 Gardenia	**Technical Session XIII: Advanced Manufacturing of Functional Devices and Bioinspired Structures 1** *Session Chair: Cindy (Xiangjia) Li*	
MSEC-155442	Yihao Xu, Rokeya Sarah, Yongmin Liu, Bashir Khoda, MD Ahsan Habib	AI-Guided Bayesian Optimization for Predicting Bioink Viscosity in 3D Bioprinting
MSEC-155150	Shuai Chen, Qingqing He, Yang Yang, Han Xu	Development and Optimization of a Top-Down 3D Printing System for Single-Tank Multi-Material Fabrication Using Hydrogel-Rochelle Salt Composites
MSEC-155202	Leila Daly, Ibrahim Gusau, Riley Rohauer, Perrin Woods, Md Ahasan Habib, Christopher Lewis, Krittika Goyal	Development and Characterization of a 3D-Printable Pdms Composite With Batio3 for Enhanced Force Sensing in Soft Robotics

15:15-16:30 Regency H	**Technical Session XIII: Advances in Meso, Micro, and Nano Subtractive and Formative Manufacturing 1** *Session Chair: Soham Mujmudar*	
MSEC-155570	Nikita Shubin, Muhammad Jahan	Machining High-Aspect-Ratio Microelectrodes Using Micro-Edm-Based Self-Drilled Holes Technique
MSEC-155926	Prathamesh Nachankar, Aswani Kumar Singh, Anurag Virendra Srivastava, Soham Mujumdar	Performance Evaluation of Powder Mixed Electric Discharge Drilling for High Aspect Ratio Holes in Aluminium Alloy (Al7075)
MSEC-155640	Dilan Ratnayake, Douglas Jackson, Daniel Sills, Andriy Sherehiy, Dan Popa, Kevin Walsh	[B] Characterization of Aerosol Printing Conductive Traces and Custom Strain Gauges on Pcb

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

15:15-16:30 Magnolia	**Technical Session XIII: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability 3** *Session Chairs: Jing (Julia) Zhao and Muyue (Margret) Han*	
MSEC-155909	Prawin Sankar Balasubramaniam Ramesh Chandar, Barbara S Linke	A Deeper Look Into Fdm Printing: An Energy and Surface Topography Study
JMSE-24-1366	Masaki Michihata, Souki Fujimura, Shuzo Masui, Satoru Takahashi	[J] Concept of Error Compensation for Nonorthogonality in Two-Axis Displacement Measurement System Utilizing Single Grating Scale and Littrow Configuration
MSEC-155785	Nobel Karmakar, C. S. Kumar, Poonam Sundriyal	Fabrication of Alsi10mg Lattice Structure as Battery Electrodes via Laser Powder Bed Fusion Process

15:15-16:30 NOMA B	**Technical Session XIII: Doctoral Symposium 3** *Session Chair: Ping Guo*	
MSEC-166325	Tengteng Tang, Tengteng Tang	[P] Electrically Assisted Vat Photopolymerization of Bio-Inspired Functional Materials
MSEC-165774	Yunxia Chen	[P] Fabrication of Sensor-Embedded Heterogeneous Brain Simulant for the Evaluation of Impact-Induced Mild Traumatic Brain Injury
MSEC-169530	Zhangke Yang	[P] Deciphering and Translating Bioinspired Structures for Engineering Materials Design via Computational Modeling
MSEC-166983	Erin Carr, Congrui Jin, Nisha Rokaya, Richard Wilson	[P] Bioinspired 3D Printing: From Smart Surfaces to Adaptive Structures

15:15-16:30 Regency G	**Technical Session XIII: In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing 2** *Session Chair: Samantha Webster*	
MSEC-155551	Zifeng Wang, Samuel Boese, Aidan Sevinsky, Mrudul Satbhai, Ahmad Nourian, Sagar Kamarthi, Sinan Muftu, Xiaoning Jin	Part Authentication Through Encrypted Geometric-Magnetic Fingerprint Fusion in Cold Spray Additive Manufacturing
MSEC-155670	Gadde Deepak, Alaa Elwany, Yang Du	Additive Manufacturing In-Situ Process Monitoring and Stability Analysis
MSEC-155758	Sukayna Fakher, Houda Houban, Dieter De Baere, Jorge Sanchez Medina, Charles Snyers, Sanjeev Sheshadri, Zoe Jardon, Michaël Hinderdael	Effects of Thermal Gradient Control on Residual Stress and Distortion in L-Ded Fabricated Parts

MSEC TECHNICAL SESSIONS

THURSDAY JUNE 26, 2025

16:45-18:00 Magnolia	**Technical Session XIV: Advanced Machining and Deformation Processes 7** *Session Chair: Xialiang Jin*	
MSEC-151844	Tobias Kelliger, Markus Meurer, Thomas Bergs	Tailored Cutting Fluid Supply in Additively Manufactured Milling Tools for Aerospace Applications
MSEC-155739	Madhav Baral, Saroj Majakoti, Santosh Thapa, Yang-Tse Cheng	[B] Understanding Deformation Processes of a Rolled Aluminum Sheet Using Instrumented Indentation
MSEC-156059	Matthew Youssef, Sepideh Abolghasem, Satchit Ramnath, Mahmoud Dinar	[B] Voxel-Based Generative Modeling for Dynamic Process Planning in Subtractive Manufacturing

16:45-18:00 Gardenia	**Technical Session XIV: Advanced Manufacturing of Functional Devices and Bioinspired Structures 2** *Session Chair: Yang Yang*	
MSEC-155503	Shahid Hussain, Xiaoqing Tian, Dingyfei Ma, Tianlong Chang, Zaiyu Wang, Lian Xia, Jiang Han	Additive Fabrication of Hybrid Carbon Nanotube Composite for Piezoresistive Pressure Sensor and Its Properties
MSEC-155836	Rui Dong, Karla Magdalena Becerra Rosas, Wenda Tan	[B] Fabrication of Hierarchical Porous Copper Structures Using Binder Jetting and Space-Holders
MSEC-155471	Shah M Limon, Rokeya Sarah, Md Ahasan Habib	A Classification-Based Machine Learning Approach to Understand and Infer the Ultimate Successful Bioprinting Process

16:45-18:00 Regency H	**Technical Session XIV: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability 4** *Session Chair: Jing (Julia) Zhao*	
MSEC-155848	Ryan Elsasser, Hongliang Li, Ilya Kovalenko	A Digital Twin Framework for Computer Hardware Design and Assembly: A Risk-Prioritized Approach
MSEC-155851	Licheng Liang, Aditya Chivate, Zipeng Guo, Jason Armstrong, Chi Zhou	Roll-to-Roll Manufacturing of Biomass Material for Sustainable Thermal Insulation Application
MSEC-155873	Digvijaysinh Barad, Jordan Buechler, Bryan Rasmussen	[B] Optimizing Compressed Air System Efficiency in Manufacturing: A Study on Air Leak Repairs and Economical Impact

MSEC TECHNICAL SESSIONS

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16:45-18:00 Regency G	**Technical Session XIV: In Situ Monitoring, Non-Destructive Evaluation, and Qualification for Additive Manufacturing 3** *Session Chairs: Andy Fan and Sarah Wolff*	
MSEC-155846	Natalya Kublik, David Deisenroth, Bruno Azeredo	Computer-Aided Analysis of In-Situ Optical Imaging for Melt Pool Visualization and Accurate Laser Position Tracking
MSEC-155840	Laura Duenas Gonzalez, Natalya Kublik, Bruno Azeredo	[B] Modified Archimedes Method for Density Measurements of Samples Presenting Open Porosity
JMSE-24-1162	Aishwarya Deshpande, Christian Baumann, Patrick Faue, Michael Mayer, Gerald Ressel, Friedrich Bleicher, Frank E. Pfefferkorn	[J] Fully Consolidated Deposits From Oxide Dispersion Strengthened and Silicon Steel Powders Via Friction Surfacing

FRIDAY JUNE 27, 2025

Time	Location	Event
7:00–12:00	Conference Registration Desk	Registration/ Information
7:00–8:00	Ballroom	Breakfast
9:00–13:00	Outside Ballroom	Exhibitor Booths Open
9:00–10:15		Technical Session XV
10:30–11:45		Technical Session XVI
12:00–13:00	Ballroom	Boxed Lunch
12:30–14:00	BMW Mfg. Plant	Factory Tour 1
13:15–14:45	BMW Mfg. Plant	Factory Tour 2

NAMRC TECHNICAL SESSIONS

FRIDAY JUNE 27, 2025

09:00-10:15 **Regency F**	**Tech. Session XV: Track 4 Additive Manufact XVII** *Session Chairs: Zhichao Liu and Mrinal Dwivedi*	
229	Fan Zhou, Manikanta Grandhi, Xingru Tan, Tianwei Lu and Zhichao Liu	Effect of processing parameters on microstructure and properties of directed energy deposited 304H stainless steel
226	Weijun Shen, Xuepeng Jiang and Hantang Qin	Acoustic Absorption Performance Investigation in Standard and Custom Infill Patterns for FFF 3D Printing with PLA Material
157	Mrinal Dwivedi and N Arunachalam	Effect of build orientation on mechanical and physical properties of Ti-6Al-4V L-PBF additively manufactured thin structures without support

09:00-10:15 **Redbud A**	**Tech. Session XV: Track Cross-disciplinary research** *Session Chairs: Peter Apata Olubambi and Boya Zhao*	
266	Peter Ifeolu Odetola, Ufoma Silas Anamu and Peter Apata Olubambi	Investigating the Effects of Processing Parameters on Microstructure and Mechanical Properties of Ni-Al-Co-Cr-Cu-Mn-Ti High Entropy Alloys: a Response Surface Methodology Approach
139	Boya Zhao, Tian Wang and Pai Zheng	Large Language Model Driven Dynamic Trajectory Planning for Human-guided Robot Assembly
160	Peeyush Mahajan, Jeet Patil and Sushil Mishra	A novel approach to fabricate serpentine micro-channels using the micro-incremental forming process: Insights on microstructure and texture evolution

09:00-10:15 **Redbud C**	**Tech. Session XV: Track 2 Manufact Proc XIV** *Session Chairs: Martin Jun and Wei Li*	
253	Fengfeng Zhou, Xingyu Fu, Nobin Myeong, Siying Chen and Martin Jun	Cost-Efficient Laser Direct Writing of Flexible Electrodes Using Metal Matrix Composites
263	Shihao Li, Chris Martin, Enrique Velasquez Morquecho, Zijun Chen, Dongmei Chen and Wei Li	Modeling of Adhesion Dynamics in Roll-to-Roll Lamination Processes
249	Walid Asad, Shubha Majumder, Karuna Gowri, Martin King and Xin Zhao	Femtosecond Laser Micromachining of Barbed Sutures

10:30-11:45 **Regency F**	**Tech. Session XVI: Track 4 Additive Manufact XVIII** *Session Chairs: Sam Anand and NEHA CHOUDHARY*	
258	Navaneeth Chandran, Botao Zhang, Nathan Hertlein and Sam Anand	Topology Optimization of Support Structures for Additive Manufacturing to Minimize Distortion of Planar Surfaces and its Effect on Flatness Error
165	Sachin Alya, Neha Choudhary, Shashank Shukla and Ramesh Singh	Machining Characterization of Ultra-hard CPM 9V deposits obtained in Laser Directed Energy Deposition-based Die Restoration

NAMRC TECHNICAL SESSIONS

FRIDAY JUNE 27, 2025

10:30-11:45 Redbud A	**Tech. Session XVI: Track 7 Sustainable Manufacturing V** *Session Chairs: Varun Sharma and Prabhat Ranjan*	
175	Prabhat Ranjan, Aswani Kumar Singh and Soham Mujumdar	Drilling Performance Investigation and Economic Analysis with Minimum Quantity Lubrication (MQL)
168	Aswani Kumar Singh, Ramandeep Singh, R Durga Prasad Reddy and Varun Sharma	Improvement in surface quality of additively manufactured SS316L using sustainable ultrasonic assisted grinding with atomized green cutting fluid

10:30-11:45 Redbud C	**Tech. Session XVI: Track 2 Manufact Proc XV** *Session Chairs: Peter Olubambi and Vidya Tiwari*	
95	Vidya Tiwari, Prithivirajan Sekar and Sushanta Kumar Panigrahi	Effect of Strain-Integration Gas-Infusion Casting Process and Post-Treatment on the Corrosion Behavior of AZ91 Alloy
135	Emmanuel Olorundaisi and Peter Olubambi	Evaluating Microstructural Changes and Hardness in Ni14.286Al14.286Co14.286Fe14.286Mn14.286 Ti14.286Cr14.286 High-Entropy Alloy Subjected to Heat Treatment in Oxidative and Non-Oxidative Environments

MSEC TECHNICAL SESSIONS

FRIDAY JUNE 27, 2025

09:00-10:15 Regency G	**Technical Session XV: Advances in System-level Modeling and Analysis in Manufacturing Towards Sustainability 5** *Session Chair: Muyue (Margret) Han*	
MSEC-155639	Muyue Han, Lingxiang Yun, Yiran Yang, Jing Zhao, Anika Akther	Shared Additive Manufacturing Network for Metal Remanufacturing: Cost-Aware Hub Distribution and Order Allocation
MSEC-155743	Jingwen Wang, Martina Convertino, Lin Li	Sizing and Operation of Hybrid Photovoltaic-Thermal (Pvt) System in Manufacturing Facility Considering Integrated Demand Response
MSEC-155760	Hankang Lee, Hui Yang	Cognitive Digital Twin for Multi-Objective Production Scheduling in Sustainable Manufacturing

09:00-10:15 Gardenia	**Technical Session XV: Advanced Manufacturing of Functional Devices and Bioinspired Structures 3** *Session Chairs: Kethi Lichade and Zipeng Guo*	
MSEC-155649	Pablo Andres Zuniga, Christian Zuniga-Navarrete, Stalin Jamil Segura, Zipeng Guo, Sabur Baidya, Christian Narvaez-Munoz, Jessica Koehne, Luis Javier Segura	Experimental Assessment and Data-Driven Modeling of 3D Printed Conductive Patterns on Electrospun Substrates
MSEC-155868	Sai Hamsitha Reddy Guvvala, Mohammed Gayasuddin Shaik, Ketki Lichade	Single-Layer Photopolymerization Process for the Rapid Fabrication of Nature-Inspired Multifunctional Films

09:00-10:15 Regency H	**Technical Session XV: Innovations in Equipment Design, Control and Automation 3** *Session Chairs: Chandra Nath and Kyle Saleeby*	
MSEC-155879	Mohammed Gayasuddin Shaik, Sai Hamsitha Reddy Guvvala, Uma Bhattacharjee, Ketki Lichade	Rapid Fabrication of Mesoscale Structures Using Digital Light Projection-Based Nozzle-Assisted Continuous Printing
MSEC-155781	Sudhansu Sekhar Nath, Poonam Sundriyal	Optimization of 3d Printed Supercapacitors via Machine Learning
MSEC-155673	Hojun Lee, Young Woon Choi, Evin Lugo, Jiho Lee, Sang Won Lee, Martin Byung-Guk Jun	[B] Gmgp: Generalized Model for Grasp Planning of Vacuum and Parallel Jaw Grippers

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