

NEWSLETTER FALL 2019

https://community.asme.org/manufacturing_engineering_division/default.aspx/

- ❖ Message from the Chair.....1
- ❖ 14th ASME International Manufacturing Science and Engineering Conference (MSEC).....3
- ❖ Student Manufacturing Design Competition.....5
- ❖ Early Career Forum at MSES2019.....5
- ❖ ASME Journal of Manufacturing Science and Engineering (JMSE)6
- ❖ ASME Journal of Micro and Nano-manufacturing (JMNM)7
- ❖ Blackall Machine Tool and Gage Award8
- ❖ William T. Ennor Manufacturing Technology Award..... 8
- ❖ Chao and Trigger Young Manufacturing Engineer Award.9
- ❖ M. Eugene Merchant Manufacturing Medal of ASME/SME9
- ❖ Milton C. Shaw Manufacturing Research Medal9
- ❖ Kornel F. Ehmann Manufacturing Medal9
- ❖ Manufacturing Engineering Division (MED) 100 Years Celebration.....10
- ❖ Design, Materials and Manufacturing (DMM) Segment Update.....10
- ❖ Women in Advanced Manufacturing (WIAM).....11
- ❖ 15th ASME International Manufacturing Science and Engineering Conference12
- ❖ Reusable Abstraction of Manufacturing RAMP14
- ❖ Advanced Manufacturing Track, ASME 2019 IMECE.....15
- ❖ In Memoriam for J Temple Black.....16

EDITOR – Gracious Ngaile, North Carolina State University

Message from the Chair

Dear Manufacturing Engineering Division (MED) members, on behalf of the MED Executive Committee (EC), I am writing to provide you with an update on the state of the Division and to share this MED Fall 2019 newsletter, collaboratively contributed by many volunteers and put together by the MED Newsletter Editor, Professor Gracious Ngaile.



Dr. Radu Pavel, MED EC Chair

We are living exciting times for Manufacturing. The advances in digitalization, automation and connectivity

are transforming Manufacturing into a highly computerized and complex ecosystem, with opportunities for breakthroughs and growth at an unprecedented rate. Industry 4.0 concepts have strongly highlighted the close dependence and relationship between design and manufacturing – concepts from MxD (former Digital Manufacturing and Design Innovation Institute) such as digital twin and digital integration point to the strong connectivity between design and manufacturing – hence between mechanical engineering and manufacturing engineering.

Given the current trends and the growing importance of Manufacturing not just nationally but worldwide, the Manufacturing Engineering Division (MED) continues to be strong. The Division currently has 13,614 members of which 2,168 are students and roughly 18% are international members. Financially, the Division’s segregated fund is currently at a level of about \$177,700. With no further revenue from conferences and journals, the EC continued to be prudent in spending, still capable of supporting many activities such as the Student Manufacturing Design Competition, the Symposium Invited Speaker program, awards, etc.

Active member participation is key to sustaining a healthy volunteer-based organization like ASME MED. Our Executive Committee is highly motivated to serve the community and is energized by the increase in visibility and role of Manufacturing in the society by the current trends associated with the fourth industrial revolution. After an outstanding and inspiring leadership provided by Professor Kevin Chou for almost two fiscal years (two MSEC cycles), it is my turn to chair the EC. In this new role, I am honored to be part of a team that proudly represents and serves the MED community: Professor Laine Mears (Vice Chair), Dr. Moneer Helu (Program Chair), Professor Frank Pfefferkorn (Treasurer) and Professor Barbara Linke (Secretary). Further, MED is well served by nine Technical Committees (TC). With the raise of smart manufacturing technologies, the EC has been in review of MED’s TC structures: how to better

respond to the quick changing manufacturing world, and how to better fulfill the MED's mission not only serve our members, but also actively engage with the global dynamic manufacturing community. As a result, with feedback from the MED community, the EC has re-named some and added new Technical Committees, many of them having new leadership in the 2019-2020 term:

- Additive Manufacturing: Dr. Jarred Heigel (chair); Asst. Prof. Yayue Pan (vice chair);
- Manufacturing Processes: Dr. Wayne Cai (chair); Asst. Prof. Ihab Ragai (vice chair);
- Manufacturing Equipment and Automation: Dr. Parakshit Mehta (chair); Asst. Prof. Burak Sencer (vice chair);
- Manufacturing Systems: Dr. Michael Brundage (chair); Asst. Prof. Hui Wang (vice chair);
- Quality & Reliability: Asst. Prof. Yong Wang (chair); Asst. Prof. Dazhong Wu (vice chair);
- Life Cycle Engineering: Asst. Prof. Nancy Diaz-Elsayed (chair); Asst. Prof. Daniel Cooper (vice chair);
- Nano/Micro/Meso Manufacturing: Assoc. Prof. Xinyu Liu (chair); Asst. Prof. Rajiv Malhotra (vice chair);
- Biomanufacturing: Asst. Prof. Roland Chen (chair); Asst. Prof. Changxue Xu (vice chair);
- Advanced Materials Manufacturing: Asst. Prof. Srikanth Pilla (Chair); Res. Assoc. Prof. Mihaela Banu (vice chair).

Professor Gracious Ngaile continues to serve as our Newsletter Editor bringing you this well-conceived Fall 2019 edition. Research Associate Professor Mihaela Banu, from University of Michigan is our new Web and Communications Officer for MED, providing timely updates on matters of interests to our membership.

Our Division is also supported by two dedicated ASME staff, Ms. Barbara Zlatnik and Mr. Edmond Valpoort. Multiple other ASME staff, including top leadership, continue to support MED and its flagship conference MSEC in various functions and EC is grateful for their support.

MSEC, held jointly with the North American Manufacturing Research Conference (NAMRC) is a world-class advanced manufacturing event. Details about this year's conference are presented in the next section. A conference like this only comes together with some outstanding volunteer support. The EC would like to sincerely thank Asst. Prof. Ihab Ragai, and the entire team at Penn State Behrend in Erie, Pennsylvania for the many hours and positive energy they brought to hosting

the event. Additionally, we extend our thanks to Professors ZJ Pei and Barbara S. Linke for organizing the outstanding technical lineup for MSEC. If you were unable to attend the conference, a summary provided by the Technical Program Chairs, Professors ZJ Pei and Barbara Linke, is included in this newsletter. We can't thank both of them enough for organizing such a large-scale, and yet impeccable, technical program for MSEC. Moreover, we were very honored that ASME President, Dr. Said Jahanmir, joined us at MSEC2019 to provide guidance and support in making MED better, and get the voice of the community as input for future ASME planning of service and product offerings.

NSF's Advanced Manufacturing Program provided once again a very generous grant for students as a means of supporting and encouraging their participation at MSEC 2019. This grant supported 79 students out of 199 student applicants. The Division is extremely grateful to the respective NSF Program Directors for their strong and continued support (since 2009) in engaging next-generation manufacturing engineers in conference activities.

We look forward to MSEC 2020 when the conference visits Cincinnati, Ohio for the first time at the University of Cincinnati. We expect another large and distinguished audience particularly because the conference is co-located with SME's NAMRC and JSME's LEM&P conferences, and MED celebrates 100 years from its formation. Therefore, we encourage you to submit your work and register early. Please explore the MSEC 2020 website for opportunities to submit papers and posters or propose state-of-the-art papers.

MSEC 2020, will be hosted by Professor Sam Anand and a team of colleagues from University of Cincinnati at Duke Energy Center in Cincinnati, OH. The technical program will be chaired by Professor Barbara Linke and co-chaired by Professor Karl Hapaala. MSEC 2020 is expected to be an extraordinary event with balanced university research and industrial insights from experts across the globe. Manuscripts are due November 15 at the ASME conference website through one of various symposia. Other opportunities exist for participating in the conference including sponsorship for students to compete in the Student Manufacturing Design Competition. Details can be found under the "honors and awards" section of the ASME MED website. Other ways to experience the conference include attending the variety of sessions, discussion panels, invited speaker presentations, the Early Career Forum, the Women in Advanced Manufacturing Forum, the Reusable

Abstractions of Manufacturing Processes (RAMP) Competition or by visiting the industrial exhibitions. Professors Linke and Hapaala are putting together a wonderful program for us all. More details can be found on the conference website and at the end of this newsletter.

Another way to get your voice heard in the manufacturing community is through recognition of our leaders, both new and experienced. As a community of scholars and volunteers, it is very important to honor our distinguished colleagues. Awardees serve as role models, inspiring their peers and future generations to aim toward excellence. Awards administered by MED include the Outstanding Service Award, Blackall Machine Tool and Gage Award, the William T. Ennor Manufacturing Technology Award, the Chao and Trigger Young Manufacturing Researcher Award, the Milton C. Shaw Manufacturing Medal, and the M. Eugene Merchant Manufacturing Medal of ASME/SME. In 2019, MED successfully established a new award, the Ehmann Medal Award, which is annually recognizing authors of the best paper published in the ASME Journal of Micro- and Nano-Manufacturing. Please submit nominations for any of the awards to the respective committee chairs. Contact information can be found at the MED awards website:

https://community.asme.org/manufacturing_engineering_division/w/wiki/3659.honors-awards.aspx

MED has two technical journals that are among the best for disseminating manufacturing research: the ASME Journal of Manufacturing Science and Engineering (JMSE) edited by Professor Y. Lawrence Yao of Columbia University and the ASME Journal of Micro- and Nano-Manufacturing (JMNM) edited by Professor Nicholas Xuanlai Fang of Massachusetts Institute of Technology. Both editors show strong commitment to publishing excellent research findings within our journals. The EC would like to thank Professors Fang and Yao and all of the associate editors for their dedicated service and hard work on behalf of the MED community. We strongly encourage the MED members to volunteer for the journals and submit papers for publication.

Division leadership is exploring opportunities to collaborate with other ASME technical divisions and groups looking for manufacturing expertise. We encourage you to be creative in finding and proposing ways to help MED continue to grow its influence and impact.

In 2020 the MED will observe 100 years from its creation. In view of this milestone year, the MED leadership is planning to organize activities that will celebrate the division's 100 years of existence and contributions to industry and society. This newsletter includes a summary of the activities planned for celebration of this important milestone, provided by Professor Gloria Wiens. Manufacturing catalyzes innovation, knowledge and economic value creation. In 2020, in addition to celebrating its 100 years of existence, the MED will have the chance to promote the value and opportunities that Manufacturing creates. Therefore, the Executive Committee of MED looks forward to collaborating with the entire MED community and related organizations to make the centennial celebrations both memorable and instructive.

There are plenty of ways to get involved with MED and ASME. I highly encourage manufacturing researchers to join MED Technical Committees (TC) and actively participate, and contribute whatever you may, in our programs and activities.

We thank you again for your membership and continued support to our Division. Please do not hesitate to contact the MED leadership if you have any questions and/or suggestions.

I wish you a productive year and look forward to seeing you at MSEC2020.

Dr. Radu Pavel, MED EC Chair (2019-2020)
TechSolve Inc.
pavel@techsolve.org

14th ASME International Manufacturing Science and Engineering Conference (Hosted by Penn State Erie, The Behrend College, June 10-14, 2019): Technical Program Report

Submitted by Zhijian (ZJ) Pei and Barbara Linke-Program Chairs

The 14th ASME International Manufacturing Science and Engineering Conference (MSEC 2019), sponsored by the Manufacturing Engineering Division (MED) of ASME, was jointly held with the 47th North American Manufacturing Research Conference (NAMRC 47), sponsored by the North American manufacturing Research Institute of SME (NAMRI/SME). The collocated conference was hosted by Penn State Erie, The Behrend College, from June 10 to June 14, 2019, in Erie, Pennsylvania. As leading world-class societies in the Mechanical and Manufacturing Engineering fields, SME and ASME act as effective bridges

between industries, government laboratories, and academic institutions. This joint conference symbolizes the continued collaboration between these esteemed organizations in research exchange and knowledge dissemination in the Manufacturing fields.

MSEC 2019 received about 250 draft papers and 60 poster submissions. After a rigorous peer review process, 219 technical papers and 58 posters were accepted for presentation in over 88 technical sessions. This year, MSEC had 29 symposia in 6 Technical Tracks: Additive Manufacturing, Manufacturing Equipment and Systems, Manufacturing Processes, Materials, Bio and Sustainable Manufacturing, and Posters. The conference also included three student-centric events: Early Career Forum, Student Manufacturing Design Competition, and the Reusable Abstractions of Manufacturing Processes (RAMP) Competition and Workshop.

NAMRC 47 / MSEC 2019 continued to feature the annual Manufacturing Blue Sky Competition, funded by National Science Foundation (NSF), and two special sessions: "Federal Agencies' Perspectives on Advanced Manufacturing" and "What's New at NSF". The winner of the Blue Sky Competition will receive the NAMRI/SME Dornfeld Manufacturing Vision Award, named in honor of the late Professor David Dornfeld, to recognize outstanding vision and leadership within the manufacturing community.

For its inaugural event, the Forum on Women in Advanced Manufacturing (WIAM) showcased successful career paths, discussed next generation technologies and gender gap in the field of manufacturing engineering (MfgE) with seven high profile women panelists. The event was hosted by the ASME Manufacturing Engineering Division and ASME Technical Events and Content (TEC) Sector.

MSEC 2019 (co-located with NAMRC 47) brought together 592 participants from 26 countries. This number includes 235 students. The Civil, Mechanical and Manufacturing Innovation (CMMI) Division of the National Science Foundation (NSF) supported student conference participation. 199 students studying in U.S. institutions who were planning to attend the MSEC 2019/NAMRC 47 applied for this opportunity: 79 of them received the NSF Travel Grant that helped defray their cost of attending the conference. The students receiving NSF support included PhD, MS, and BS students, of these some were veterans, women, and students from historically underrepresented groups, including students with disabilities. Approximately 80% of the total registered conference attendees came from academic

institutions, 13% from industry, and 7% from government.

The joint conferences hosted four daily opening keynote speakers and one luncheon keynote speaker: Shaun S. Gleason, Director, Cyber & Applied Data Analytics Division, National Security Sciences Directorate, Oak Ridge National Laboratory; Susan Smyth, Chief Scientist for GM Manufacturing, Director, Manufacturing Systems Research, General Motors (Ret.); Alan I. Taub, Professor of Materials Science & Engineering and Mechanical Engineering, University of Michigan, Senior Technical Advisor, Lightweight Innovations for Tomorrow (LIFT); Michael F. Molnar, Director, Office of Advanced Manufacturing, National Institute of Standards and Technology; and Robert W. Ivester, Director, Federal Energy Management Program, DoE's Office of Energy Efficiency and Renewable Energy.

The MSEC symposium organizers nominated 14 papers for the Best Paper Award. These 14 papers were reviewed and ranked by symposium organizers. The Technical Program Chair compiled the results and then handed off final decision making to the MED executive committee. The final awards were as follows:

- *1st place:* MSEC 2019-2936 "Failure Detection and Remaining Life Estimation for Ion Mill Etching Process Through Deep-Learning Based Multimodal Data Fusion." *Authors:* Anqi He, Xiaoning Jin, Northeastern University.
- *2nd place:* MSEC 2019-2879 "Localized Microstructures Fabrication Through Standing Surface Acoustic Wave and User-Defined Waveguides." *Authors:* Yancheng Wang, Chenyang Han, Deqing Mei, Chengyao Xu, Zhejiang University
- *3rd place:* MSEC 2019-2987 "A Numerical Study on the Keyhole Formation During Laser Powder Bed Fusion Process." *Authors:* Subin Shrestha, Y. Kevin Chou, University of Louisville.

The Technical Program Chair selected the recipient of the Best Organizer of a Symposium and Session (BOSS) Award in consultation with the MED Executive Committee. The recipients of this award were Chao Ma (Texas A&M University), John Vickers (NASA), and Jianguo Wu (industry) for Symposium 1-1: Additive Manufacturing of Ceramics, Concretes, and Composites.

The conference program is the result of the outstanding efforts of many people. We would like to thank all the authors for their technical paper and poster submissions.

We also express our gratitude to all the organizers for their dedicated management of the tracks and symposia, as well as for guarding the quality of the papers and posters to be presented, which has contributed a great deal to the success of the conference technical program. We would also like to thank the host Organizing Committee, the Conference Coordinating Committee, the NAMRI/SME Scientific Committee, and the ASME MED Executive and Technical Committees. Our thanks also go to the ASME staff for their outstanding contributions in presenting conference information on the Internet, managing the submitted technical papers and posters, and ensuring high-quality publication of the conference proceedings for MSEC 2019.

2019 ASME/SME Student Manufacturing Design Competition

Submitted by Moneer Helu- Student Competition Coordinator

The 2019 ASME/SME Student Manufacturing Design Competition jointly sponsored by ASME MED and NAMRI/SME took place on June 11, 2019 during the 2019 NAMRC/MSEC hosted by Penn State Behrend in Erie, PA. The competition included eight finalist teams from six universities: Case Western Reserve University, Oregon State University, Penn State University, Rensselaer Polytechnic Institute, University of New Hampshire, and University of Texas at Dallas. At least one member of each team attended the conference and participated in the final presentations, and many teams received travel assistance from MED and/or the National Science Foundation.

The final presentations were evaluated by three judges: Mr. Dale Lombardo (GE Research), Dr. Shawn Moylan (NIST), and Prof. Frank Pfefferkorn (University of Wisconsin – Madison). Each finalist was evaluated on seven criteria: communicating the problem to be solved; effectively meeting requirements; integrity of the analysis; creativity of the design; goal-driven testing approach; impact of design on manufacturing cost, quality, or other performance measures; and quality of the presentation. Cash prizes were awarded to the top three finalists:

- *1st Place (\$1000 prize): Precision Automated Fluid Dispensing Machine* by Keaton Adcock, Jonathan Madera, Stephen Brocius, Monica Dallacasa, Reid Goins, and Christian Vieira of the University of Texas at Dallas (*Faculty Advisor: Wooram Park*)
- *2nd Place (\$750 prize): Wire Line Start-up Sampler* by Elizabeth Labra, Nicholas Azzarito, Nicholas Kilbreath, Vincent Le, John Leitch, and Nicole Maly of the University of Texas at Dallas (*Faculty Advisor: James Wilt*)
- *3rd Place (\$500 prize): Automated Machine Tool Utilizing Mobile Robotics* by Spencer Sullivan, Elise Baribault, Katelyn Dudley, Lucas Gagnon, Eric Schliemann, and Nicholas Wheeler of the University of New Hampshire (*Faculty Advisor: Brad Kinsey*)

All finalists provided excellent presentations that demonstrated the high-quality of their work and their potential for high impact with industry. Overall, the event was a success and continues the tradition of highlighting outstanding student work at MSEC.

Early Career Forum at MSEC 2019

Submitted by Arif Malik - Organizing Committee Chair

The Early Career Forum was held during the joint conference of the 14th ASME International Manufacturing Science and Engineering Conference (MSEC 2019), and the 47th NAMRI/SME North American Manufacturing Research Conference (NAMRC 47), at Penn State, Erie, PA. The event attracted over 160 participants who discussed career opportunities, paths, and planning with a diverse and talented panel representing industry, academia, and government career paths. The event was sponsored by the National Science Foundation, Penelec - a *FirstEnergy* Company, and NAMRI/SME. The goal of the Early Career Forum was to provide current students at all levels of graduate and undergraduate programs, as well as recent graduates, with better information/knowledge of various research and technical positions in industry, academia, and national laboratories. This was achieved by a small-scale networking event where students were introduced to a panel of 8 diverse professionals, with wide-ranging experience in industry, academia, and government. The panelists are shown below.



Dr. Tahany El-Wardany
Industry
(United Technologies)



Dr. Maureen Fang
Industry / Gov't
(Lockheed Martin)



Dr. Robert Hart
Academia / Industry
(UT Dallas)



Peter Jay, J.D.
Industry
(Wenderoth, Lind, Ponack, LLP)



Dr. Barbara Linke
Academia
(UC Davis)



Dr. Crystal Morrison
Industry / Gov't
(EverRise)



Dr. Brian Weiss
Government
(NIST)



Dr. Gloria Wiens
Academia / Gov't
(UF)

Journal Reports

ASME Journal of Manufacturing Science and Engineering (JMSE)

Submitted by Y. Lawrence Yao - Editor

The Journal is prosperous, and each year we see steadily increasing submission rates and reduced time that papers spend in review. As was the case last year, each of our twelve monthly issues is allotted 200 pages, for a total of 2,400 annual pages. Our impact factor has increased to 2.616, thanks in part to reduced review times and Special Issues.

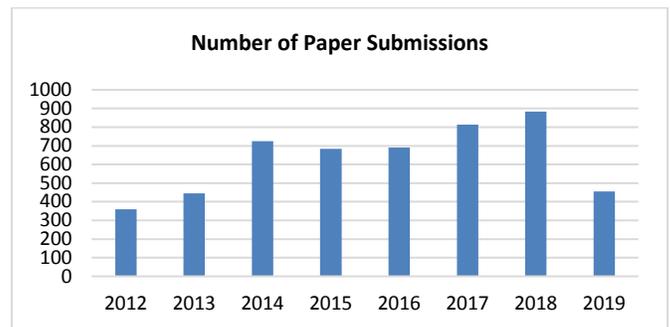
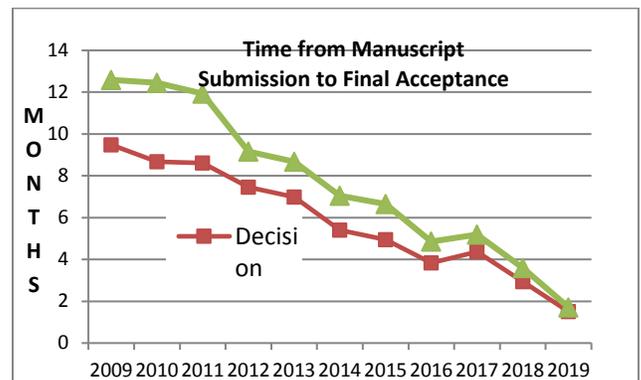
With confidence in this strong improvement, we still continue to streamline our review process without sacrificing feedback quality. The time papers spent in review and the number of submissions are shown below. Please note that the data in the following charts is as of 6/6/2019.

As in past years, we plan to draw readers to JMSE through the publication of robust and timely special issues. We completed one this year—an issue on **Sustainable Life Cycle Engineering** (February 2019)—and are hard at work on a Special Issue (November 2020) to celebrate **MED's Centennial**.



This was the tenth Early Career Forum at these co-located conferences. The forum consisted of a brief introduction from each panelist, followed by group discussions where each panelist addressed questions from four tables of 10 students. Every 12 minutes, students were given the opportunity to freely move to panelist locations suiting their specific interests.

The informal nature of the forum facilitated meaningful discussions, where questions could be answered from all the students. Students came away feeling more knowledgeable about future opportunities in manufacturing engineering and related careers. Through their own experiences, the panelists also enhanced the students' enthusiasm and confidence by discussing the exciting array of available career paths, as well as important advice on how to overcome career related challenges. The organizing committee would like to thank all who participated. The committee would also like to extend its gratitude to the National Science Foundation, for covering the conference registration costs and lodging for 80 students, and to both Penelec and NAMRI/SME for paying for the pizza dinner that was served to all forum participants. Our gratitude also goes out to the staff at Penn State Erie for their invaluable support in making this well-attended Early Career Forum so successful.



We wish to thank Guest Editors Sara Behdad of University at Buffalo, William Z. Bernstein of National Institute of Standards and Technology, and Karl R. Haapala of Oregon State University for their exemplary handling of submissions for the issue on Sustainable Life Cycle Engineering. We also thank Laine Mears of Clemson University, Warren DeVries of University of Maryland, Baltimore County, and Albert Shih of University of Michigan, who are hard at work on the Centennial issue.

With strong support from the MED Executive Committee – particularly Kevin Chou, the former EC Chair, and ZJ Pei, the MSEC 2019 Program Chair – we’ve established a fast-tracking system between well-reviewed MSEC papers and subsequent publication in JMSE. MSEC 2019 papers that received a “journal quality” rating from at least one reviewer were considered for JMSE publication without further review. Among the 249 final papers accepted by MSEC 2019, 46 were considered by JMSE and 12 were fast tracked. We plan to continue this process for MSEC 2020 to provide a streamlined way for quality papers to appear in the Journal sooner. Our current Editorial Board consists of 19 members, including the TE. We are excited to welcome a new Associate Editor since last fall: Steven Schmid, University of Notre Dame. Additionally, Associate Editor Sam Anand, University of Cincinnati, has kindly agreed to serve another term of three years, and his term has been extended accordingly.

On behalf of the Editorial Board, I would like to thank the authors and reviewers for their continued support of JMSE, and thank the MED Executive Committee for its guidance and support. I also invite and strongly encourage you to participate in the process of strengthening the Journal by sending me your thoughts and ideas for improving JMSE and our service to the community: yly1@columbia.edu, 212-854-2887.

ASME Journal of Micro and Nano-manufacturing (JMNM)

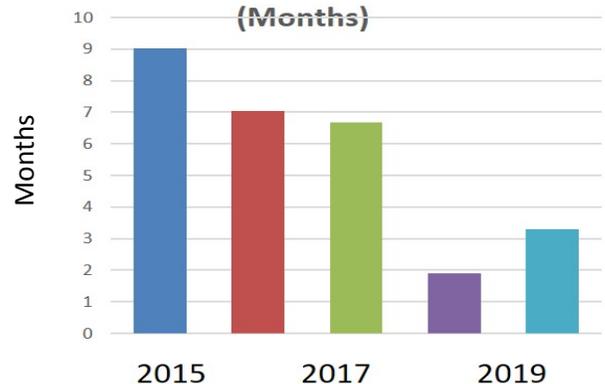
Submitted by Nicholas Fang - Editor

The *ASME Journal of Micro- and Nano-Manufacturing (JMNM)* has reached out to a broad research community in academia, national laboratories, as well as researchers and developers in industry by offering high-quality publications within the ASME journal series.

The mission of JMNM is to disseminate original theoretical and applied research in the areas of micro- and nanomanufacturing, with emphasis on the latest

advancements in research and development, such as design, computational methods, mechatronics, metrology, materials, and basic sciences to the manufacturing community. Meanwhile, as today’s technical challenges arise in energy, health, sustainability, and society, we also welcome submissions and technical themes addressing special needs in emerging areas, such as optics and photonics, biomedical devices such as precision surgical tooling platforms and tissue engineering, advanced manufacturing for smart fabrics and textiles, to broader societal challenges such as water and renewable energy. As of October 2019, we received submission of more than 51 papers from research institutions over 30 countries worldwide, with increased submission from Europe, Asia, and middle East countries.

Time from Submission to Final Production (Months)



This year we continue to welcome high-quality papers from MSEC and I2M2 conference sessions to submit extended versions of their top-rated work to our Journal. MSEC papers that were rated as “journal quality” have been invited for a fast track to publication. We have maintained our Submission-to-Acceptance time to about 3 months since 2018. We attribute this gained efficiency to well-maintained and managed review progression that allows for the same rigorous and quality review process, in the shortest time possible.

On behalf of the Editorial Board, I would like to thank all the authors and reviewers for their continued support of JMNM. The past year has seen the departure of Editorial Board members, Professor Stefan Dimov from University of Birmingham and Prof Ulf Engel of University of Erlangen-Nuremberg, Martin Jun from Purdue University and Marriner Merrill from US Naval Research Laboratory. During 2019 we enlisted a couple of new Guest Editors including Guest Editor Dr. Irene Fassi, from the Institute of Industrial Technologies and Automation (ITIA), Italy, and Dr

Lawrence Kulinsky from UC Irvine to assist us in editing submissions from our Special Section from International Conference on Micro Manufacturing of March 2019, and Dr. Michael Cullinan of University of Texas at Austin, who is overseeing a special issue on Metrology and Control for Micro and Nanomanufacturing for publication in September 2020; Jay D. Park from University of Massachusetts and Sorabh Saha from Georgia Institute of Technology. Additionally, Dr Lawrence Kulinsky from UC Irvine will assist us in editing submissions from our Special Section from International Conference on Micro Manufacturing for publication in March 2020. Asst. Prof. Ping Guo will also be joining us as a Guest Editor to oversee a special issue with anticipated publication in December 2020 titled Advances in Micro and Nano Manufacturing.

I am proud to work with a team of international experts on the JNMN Editorial Board who provide expertise and conduct the peer-review process for our full-length research papers and technical briefs. We look forward to continuing our work within and beyond the ASME community in creating a platform for scholars and experts from across the globe to educate and discover.

Please submit your manuscripts to JNMN at <http://journaltool.asme.org>.

Honors Committee Reports

Every year ASME bestows a number of awards on our most outstanding colleagues for their efforts to move various aspects of the manufacturing field forward. It is important that these individuals be recognized for their tremendous contributions. Please consider nominating a deserving colleague for one for the ASME administered by MED including the Blackall Machine Tool and Gage Award, the William T. Ennor Manufacturing Technology Award, the Chao and Trigger Young Manufacturing Engineer Award, the Milton C. Shaw Manufacturing Medal, the M. Eugene Merchant Manufacturing Medal of ASME/SME, and the Ehmann Medal. See <https://www.asme.org/about-asme/get-involved/honors-awards> for further information on these awards and their nomination process.

Blackall Machine Tool and Gage Award

Submitted by Yuebin Guo - Committee Chair

The Blackall Machine Tool and Gage Award is presented for the best original paper or papers (not published

elsewhere) which has/have been presented before ASME and/or published by ASME during the two calendar years immediately preceding the year of the award. The paper(s) should clearly demonstrate that the science and engineering technologies outlined in the paper, resulted in a significant contribution to the manufacturing processes and systems for the design or application of machine tools, gauges, dimensional measuring instruments, or new manufacturing technologies and metrology approaches. Papers by multiple authors are eligible. The award shall be made annually if warranted. The award was established in 1954 by Frederick S. Blackall, Jr., Fellow and Seventy-second President of the Society.

The recipients of 2019 Blackall Machine Tool and Gage Award are Burak Sencer and Shingo Tajima for the paper "Frequency Optimal Feed Motion Planning in Computer Numerical Controlled Machine Tools for Vibration Avoidance", ASME Transactions Journal of Manufacturing Science and Engineering, JANUARY 2017, Vol. 139 / 011006.

William T. Ennor Manufacturing Technology Award

Submitted by Yuebin Guo - Committee Chair

On behalf of the ASME Ennor and Blackall Award Committees, I would like to ask your help to nominate qualified colleagues for the two prestigious awards. Your nominations will help the ASME award committee to make convincing decisions. Please pay attention to the nomination deadlines and the conflict-of-interests. The nomination details can be found at <https://www.asme.org/about-asme/get-involved/honors-awards>.

The William T. Ennor Manufacturing Technology Award is presented to an individual or team of individuals for developing or contributing significantly to an innovative manufacturing technology, the implementation of which has resulted in substantial economic and/or societal benefits. The award was established by the Production Engineering Division (now the Manufacturing Engineering Division) in conjunction with the Alcoa Company in 1990.

The recipient of 2019 William T. Ennor Manufacturing Technology Award is Dr. Steven J. Skerlos at The University of Michigan at Ann Arbor for the discovery, development, and commercialization of supercritical carbon dioxide machining fluids. Supercritical Carbon Dioxide enables oil-free machining of biomedical

components and, with minimal quantity lubricant added, achieves high productivity and tool life for advanced aerospace and automotive alloys.

Chao and Trigger Young Manufacturing Engineer Award

Submitted by Yong Huang - Committee Chair

The Chao and Trigger Young Manufacturing Engineering Award recognizes a young manufacturing researcher under 40 with potential for significant fundamental contributions to the science and technology of manufacturing processes.

On behalf of the members of the award selection committee, it is our pleasure to announce that the Chao and Trigger awardee for 2019 is Professor Jingjing Li of Penn State University. Prof. Li is recognized for her contributions to the forming and joining of lightweight materials and structures through fundamental understanding of the process-structure-property relationships in thermomechanical processing, development of new joining technologies for dissimilar metals, and invention of new materials characterization techniques.

M. Eugene Merchant Manufacturing Medal of ASME/SME

Submitted by John Sutherland - Committee Chair

The M. Eugene Merchant Manufacturing Medal of ASME/SME was established in 1986 in recognition of the numerous contributions of Dr. M. Eugene Merchant to manufacturing research and its successful implementation. The medal is awarded annually to an individual who has had significant influence and responsibility for improving the productivity and efficiency (either by research or by implementation of research) of manufacturing operation(s). The board of award (selection committee) consists of notable manufacturing experts from ASME and/or SME. Past recipients of the Merchant Medal include Seiueemon Inaba (Fanuc), Edson Gaylord (Ingersoll Milling Machine), George Fisher (Motorola), Laurence Seifert (AT&T), Norman Augustine (Lockheed Martin), and Richard Dauch (American Axle and Manufacturing). The Merchant Medal board of award is pleased to announce that Sujeet Chand, SVP & CTO of Rockwell Automation, is the recipient of the 2019 Merchant Medal. Dr. Chand is being recognized for his leadership in developing and promoting Smart Manufacturing technologies. This year's medal presentation occurred at the SME

International Awards Gala held in Detroit (the site for the medal presentation alternates between ASME and SME venues from year to year).

Congratulations to Dr. Chand on this well-deserved honor!

Nominations are now being sought for the 2020 M. Eugene Merchant Manufacturing Medal of ASME/SME. The due date for nominations is 1 February 2020. Please send all nominations to Professor John W. Sutherland (jwsuther@purdue.edu).

Milton C. Shaw Manufacturing Research Medal

Submitted by Yong Huang - Committee Chair

The Milton C. Shaw Research Medal established in 2009, recognizes significant fundamental contributions to the science and technology of manufacturing processes.

On behalf of the Milton C. Shaw Manufacturing Research Medal Committee, we are pleased to announce that the 2019 Milton C. Shaw Manufacturing Research Medal is awarded to Professor Srinivasan Chandrasekar of Purdue University. Chosen from a set of outstanding nominees, Prof. Chandrasekar is recognized for his contributions to mechanics and microstructure aspects of material removal and deformation processes, and pioneering applications of machining-based processes for materials manufacturing.

Kornel F. Ehmman Manufacturing Medal

Submitted by Jian Cao - Committee Chair

The Kornel F. Ehmman Manufacturing Medal is presented for the best current original journal paper or papers (not published elsewhere) which has/have been presented before ASME and/or published by ASME during the two calendar years immediately preceding the year of the award. The paper(s) should clearly demonstrate that the science and engineering technologies outlined in the paper, resulted in a significant contribution to the micro- or nano-scale manufacturing processes and systems.

Papers by multiple authors are eligible. The award will be made annually if warranted.

The award was established in 2019 by the Manufacturing Engineering Division of ASME. More details about the award can be found at:

<https://www.asme.org/about-asme/honors-awards/unit-awards/kornel-f-ehmann-manufacturing-medal>

Nomination Deadline for All Awards above:

Due February 1 annually, except December 15 for the Blackall Machine Tool and Gage Award (one and a half months earlier). Please visit the ASME MED awards website for details:

https://community.asme.org/manufacturing_engineering_division/w/wiki/3659.honors-awards.aspx

Manufacturing Engineering Division 100 Years Celebration

**Submitted by Gloria Wiens, Chair,
MED Centennial Planning Committee**

The Manufacturing Engineering Division (MED) will celebrate its 100-year Anniversary in 2020! Join us in celebrating this important milestone:

- By participating in MSEC and IMECE activities that not only reflect on the MED growth throughout the years but are forward-looking of manufacturing impact to the society.
- By helping amplify ASME's strategic core technology areas, specifically manufacturing and robotics, and many of the eight enabling applications and cross-cutting technologies (https://www.asme.org/wwwasmeorg/media/ResourceFiles/AboutASME/ASME_Strategy.pdf).
- By becoming a sponsor for MED Centennial events, listed below - e.g., host Centennial reception/dinner, publication of a booklet on the History of MED 100 Years. -
Benefits range from: Your sponsorship listed in ME Magazine house-adds, ME Magazine special articles, and/or History of MED 100 Years booklet – all distributed widely amongst ASME membership; your sponsorship recognized and prominent signage at MSEC 2020 and IMECE 2020; company logo on ASME/MED website; to being recognized in MSEC celebration slides.

Celebration Activities in-the-works:

- (1) Historical perspective
 - a. History of MED 100 Years booklet
 - b. Special MED article(s) in Mechanical Engineering

- c. JMSE and JMNM special issues to document manufacturing technology advancement (*Pre-views for JMSE were presented at MSEC 2019*)
- (2) Forward looking of manufacturing impact to the society
 - a. Activities in conferences (such as IMECE, MSEC, etc.) with manufacturing-theme activities including keynotes, panels, and high-level promotion video
 - b. ASME Wiki Project: "Unwritten Laws of Engineering for the 21st Century" For details, see link: https://community.asme.org/manufacturing_engineering_division/b/weblog/archive/2019/06/05/invitation-to-participate-in-asme-wiki-project-unwritten-laws-of-engineering.aspx
 - c. Other outreach activities such as Manufacturing Day, E-Fest/EFx, etc.
 - (3) Engaging the manufacturing engineering community
 - a. Festivities – MED dinner/reception/cake!
 - b. Hands-on student activities during conferences (MSEC and/or IMECE)

Interested in Volunteering to help with the organization of 'celebration' activities? Interested in becoming a sponsor? Contact Gloria Wiens, Chair, MED Centennial Planning Committee, Email: gwiens@ufl.edu

Design, Materials and Manufacturing (DMM) Segment

Submitted by Gloria Wiens – DMM SLT Leader and Liaison to MED

The Design, Materials, and Manufacturing (DMM) Segment is part of the Technical Events and Content (TEC) sector of ASME. The DMM Segment Leadership Team (SLT) serves as a liaison between the TEC sector and ASME divisions that have ties to engineering design, materials science, and manufacturing. The SLT's purpose is to foster collaboration between the TEC sector and the divisions and to promote growth of the divisions' events and conferences. The Segment supports technical research and event content development that is often multi-disciplinary in nature and that can be applied in fields such as additive manufacturing, computer engineering, medical devices, aerospace, automotive, robotics and general manufacturing.

Within ASME, the DMM SLT engages experts from academe, industry, national laboratories and ASME through its membership and strategic recruitment of Subject Matter Experts in support of new initiatives and providing ASME market insight. DMM SLT appreciates MED's openness to collaborate on strategic initiatives (additive manufacturing and robotics) and support in establishing ASME's leadership in manufacturing.

DMM SLT continues to align its event portfolio and improve events based on "lessons learned". DMM SLT has aligned with two of ASME's core technology areas (1- Additive & Emerging Manufacturing Technologies and 4- Robotics & Control) and three enabling technologies (2- Integrated Design & Manufacturing, 3-Next-Generation Electronics and 5-Advanced Materials). In addition, DMM supports the Manufacturing Technology Advisory Panels (TAPs) which are focused on Additive Manufacturing and Smart Manufacturing & Digital Transformation topics.

Current events in the DMM Segment include IDETC/CIE, DSCC, FPMC, INTERPAK, ISPS, JRC, MSEC, SMASIS and other technical conferences, events, workshops and training. The following are examples of the success of new initiatives. The 2nd Industry Forum on 'Robotics for Inspection and Maintenance' was held in September 2019. In March 2019, the ASME Advanced Manufacturing and Repair for Gas Turbines (AMRGT) conference was hosted by Siemens on their campus in Berlin, Germany; an ASME cross-segment activity that is considered to be a spin-off of DMM's 2014 additive manufacturing and design event (AM3D). Due to its great success, ASME is holding AMRGT Symposium in March 2020. Another additive manufacturing spin-off is AM Medical: Additive Manufacturing & Innovations to be held in May 2020.

Last year's DMM's Technical Review Process initiative led by Subbu Subramanian (1997-1998 MED Chair) for identification of best practices on maintaining quality standards in the review process has been elevated to a TEC Sector project level. DMM is providing segment cross-sector representation on the newly formed Codes & Standard Sector's Board on Science & Technology (BST) Task Group on Advanced Manufacturing. ASME's ECLIPSE Interns have formed projects in the technology space of DMM Divisions: 1) natural language processing project to study MSEC papers and ASME standards, and 2) documenting MED history and potentially extending effort to other divisions celebrating their centennials in 2020.

DMM continues to strive for more proactive partnerships and engagements with its divisions and their Technical Committees. For Division engagement, DMM holds quarterly telecons, SLT members serve as liaisons to ASME Divisions, and provides TEC Development Funds for new division initiatives. In this inaugural year of the TEC Development Fund initiative, DMM received 8 proposals and awarded funds to 4. MED was one of the awardees, with development funds provided in support of their new initiative aimed to address the gender gap in the field of manufacturing engineering. This resulted in a successful forum on Women in Advanced Manufacturing (WIAM) co-located and held at MSEC 2019; with plans for a 2nd WIAM forum for MSEC 2020. The TEC is in now its second year of providing development funds to the divisions with DMM Divisions recipients of three of the fifteen new awards.

Currently in-play is TEC restructuring based on recommendations of the ASME Presidential Task Force on Organizational Structure. With emphasis on arriving at a TEC structure providing greater support, communication and opportunities for Divisions while aligning with ASME strategic technologies and mission, DMM and other Segments have been engaging their divisions in gathering their leadership's feedback on the 'draft' of proposed new TEC structure. With this feedback and awaiting Board of Governors upcoming decision, DMM is organizing a Spring 2020 workshop with its divisions leadership for working together with them on DMM's strategic implementation of the new TEC structure, best-practices and innovative ideas.

<p style="text-align: center;"><u>FY2020 DMM SLT Membership:</u> <i>Academe (4), Industry (5), National Lab (1), ASME Staff*</i></p>
<p style="text-align: center;">Gloria Wiens (SLT Lead), Steve Reese (TEC Rep), Dean Bartles (Division Engagement Lead), Diann Brei, Abhijit Dasgupta, Larry Dickinson (BST Task Group on Adv. Mfg.), Pierre Larochelle, Ying-Feng Pang, K (Subbu) Subramanian, Nathan Taylor and Barbara Zlatnik*</p>

Women in Advanced Manufacturing

Submitted by Barbara Linke and Gloria Wiens

The Forum on Women in Advanced Manufacturing (WIAM) had its inaugural event on June 11, 2019, from 2:00pm-5:30pm at the ASME International Manufacturing Science and Engineering Conference (MSEC2019) in Erie's Bayfront Convention Center, Erie, PA. The forum was organized by the Manufacturing Engineering Division (MED) under the leadership of Kevin

Chou (MED Chair and Principal on TEC Award), Gloria Wiens (University of Florida), Maureen Fang (Lockheed Martin), and Barbara Linke (University of California Davis).

The event showcased successful career paths and discussed next generation technologies as well as the gender gap in the field of manufacturing engineering. It followed the lunch keynote speech by Susan M. Smyth, Chief Scientist for GM Manufacturing and Director Manufacturing Systems Research – General Motors (retired). The forum featured (i) seven panelists from industry, government and academia, (ii) a break-out session to discuss new opportunities for the diverse next generation in manufacturing engineering, and (iii) a networking reception.



The photos are the courtesy of Penn State Behrend, Erie, PA, 2019, from the conference host website.

The panelists were Dianne Chong, Vice President for Research and Technology – Boeing Engineering, Operations & Technology (retired), Tahany El-Wardany, Fellow, Advanced Manufacturing – United Technologies Research Center, Victoria Fry, Technical Solutions Executive – Autodesk, Inc., Teresa Malueg, Antisubmarine Warfare Sensors (ASW) and Mission Systems Programs Director – Lockheed Martin Corporation, Brigid Mullany, ENG/CMMI: AM & LEAP HI Program Director – National Science Foundation / Professor – University of North Carolina at Charlotte,

Elisabeth Smith, President & CEO – Acutec Precision Aerospace, Inc., who was also the host for the company tour, and Danielle Zeng, Technical Expert in Materials and Manufacturing – Ford Research and Innovation Center. Session moderators were Maureen Fang, Technical Product Manager – Lockheed Martin and Crystal Morrison, Founder & CEO – EverRise.

With a total of 48 attendees including panelists, moderators and organizers, a list of actionable recommendations to the MED leadership team was developed. There was clear support of continuing the WIAM forum and planning activities are in process for MSEC 2020.

Upcoming Events

15th ASME International Manufacturing Science and Engineering Conference

Submitted by Barbara Linke, Karl Haapala, and Sam Anand - Program Chairs and Conference Chair

Our next conference, MSEC 2020, will be hosted by the **University of Cincinnati** on June 22 - 26, 2020, in Cincinnati, Ohio, USA. It will be co-located with the 48th North American Manufacturing Research Conference (NAMRC - sponsored by NAMRI/SME) and the International Conference on Leading Edge Manufacturing/ Materials & Processing (LEM&P - sponsored by the Japan Society of Mechanical Engineers (JSME)).

For details, visit Conference Host website:

<https://ceas.uc.edu/events/msec-namrc-lem-p-2020.html>

ASME website:

<https://event.asme.org/MSEC>; and

ASME submission web tool:

<https://msec.secure-platform.com/a/organizations/main/home>

Publication Schedule

The overall publication schedule for MSEC2020 is given below. (Note: For specific details and questions regarding these dates, please contact the appropriate symposium organizers.)

Submission of Abstract/Full-Length Draft Paper for Review

November 15, 2019

Notes: You must submit your abstract and full-length paper at the same time. ONLY presenters from industry may submit an abstract as “Presentation Only”. In addition, poster abstracts shall be submitted by this deadline.

Paper Reviews Completed

January 28, 2020

Draft Paper Acceptance Notification

January 31, 2020

Electronic Copyright Form Submission Process Opens

February 03, 2020

Submission of Revised Paper for Review (if required)

February 28, 2020

Submission of Posters

February 28, 2020

Author Notification of Acceptance of Revised Paper

March 12, 2020

Submission of Copyright Form

March 19, 2020

Note: Electronic Copyright transfer forms are requested upon acceptance of the draft or revised draft and prior to the submittal of the final paper.

Submission of Final Paper

March 26, 2020

Note: In accordance with ASME final paper requirements publication in the conference proceedings is not guaranteed if materials (including final paper and copyright transfer form) are received after March 26, 2020.

Author Registration Deadline

April 15, 2020

Note: A presenter must be identified for each presentation. The presenter of each paper, poster, or presentation only submission will be required to pay the author registration by this deadline.

Technical Program

12 Tracks and 39 Symposia

Track 1: Additive Manufacturing — Track Chair: Jarred Heigel, Co-chair: Yayue Pan

1. Additive Manufacturing of Ceramics, Concretes, and Composites
2. Advances in Modeling and Simulation of Additive Manufacturing Processes
3. Hybrid Manufacturing - Integrated Process Chains to Leverage Additive Manufacturing
4. Defects in Metal Additive Manufacturing: Formation, Characterization and Mechanical Evaluation
5. Computational Methods and Process Planning for Additive Manufacturing
6. Advances in Additive Manufacturing of Multi-material Structures and Composites
7. Advances in Metal Additive Manufacturing Processes (cosponsored by Manufacturing Processes TC)

Track 2: Advanced Materials Manufacturing — Track Chair: Srikanth Pilla, Co-chair: Mihaela Banu

1. High Performance Renewable Materials and Sustainable Manufacturing (cosponsored by Life Cycle Engineering TC)
2. Data-Driven Plastics and Composites Manufacturing Systems
3. Integrative Manufacturing Systems for Advanced Composites and Multi-Material Hybrids

Track 3: Biomanufacturing — Track Chair: Roland Chen, Co-chair: Changxue Xu

1. Advances in 3D Bioprinting of Tissue-Engineered Scaffolds and Living Tissue Constructs
2. Advances in Manufacturing, Design, and Analysis of Biomedical Devices
3. Bio-/Nano-Materials and Self-Organizing Smart Structures (cosponsored by Nano/Micro/Meso Manufacturing TC)

Track 4: Life Cycle Engineering — Track Chair Nancy Diaz-Elseyed, Co-chair: Daniel Cooper

1. Sustainability and Cost Dimensions of Additive Manufacturing (cosponsored by Additive Manufacturing TC)
2. Advances in Modeling, Analysis, and Applications of Smart and Sustainable Manufacturing Systems (cosponsored by Manufacturing Systems TC)

Track 5: Manufacturing Equipment and Automation —
Track Chair: Parakshit Mehta, Co-chair: Burak Sencer

1. Innovations in Equipment Design, Control and Automation
2. Advances in the Mechanics of Cutting, Forming and Materials Processing
3. Tribology of Material Removal/Deformation Processes and Machinery

Track 6: Manufacturing Processes — Track chair: Wayne Cai, Co-chair: Ihab Ragai

1. Advances in Nontraditional Manufacturing Processes (cosponsored by Nano/Micro/Meso Manufacturing TC)
2. Advances in Finishing Processes: Hard Machining, Grinding, and Abrasive Finishing
3. Advances in Lightweight and Dissimilar Materials Joining
4. Advances in Processing of Polymers and Polymer Composites (Advanced Materials Manufacturing TC)
5. Advances in Assisted and Augmented Manufacturing Processes
6. Laser-based Advanced Manufacturing and Material Processing

Track 7: Manufacturing Systems — Track Chair: Michael Brundage, Co-chair: Hui Wang

1. Collaborative Robotic Assembly: Challenges and Opportunities for the Manufacturing Industry
2. Quality Assurance in Additive Manufacturing Systems: Sensing, Analytics, and Control (cosponsored by Additive Manufacturing TC)
3. Advances in Competitive Manufacturing Engineering (cosponsored by Life Cycle Engineering TC)
4. Cognitive Manufacturing: Challenges, Technologies, and Applications
5. Advances in Modeling, Analysis, and Simulation of Manufacturing Systems for Optimized Throughput and Performance
6. Cyber-Physical Systems and Cybersecurity in Industry 4.0
7. Advances in Human Systems Integration and Intelligence Augmentation in Manufacturing Systems
8. Smart Manufacturing System Modeling and Decision Making

9. Internet and Digital Twins Technology for Smart Manufacturing

10. Prognostics and Health Management (PHM) using IIoT, Data Analytics and Artificial Intelligence

11. Nanofluids for Lubrication and Thermal Management in Manufacturing (cosponsored by Manufacturing Processes TC)

Track 8: Nano/Micro/Meso Manufacturing - Track Chair: Xinyu Liu, Co-chair: Rajiv Malhotra

1. Design and Manufacturing of Nano-to-Meso Porous Structures

2. Advances in Micro and Nano Manufacturing – Kornel Ehmann Symposium (cosponsored by Manufacturing Processes TC)

Track 9: Quality & Reliability — Track Chair: Yong Wang, Co-chair: Dazhong Wu

1. Reliability Engineering and System Safety in Advanced Manufacturing

3. Advances in Quality and Continuous Improvement in Manufacturing Development and Execution (cosponsored by Manufacturing Systems TC)

Track 10: Posters – Track Chair: Karl Haapala, Co-chair: Barbara Linke

Track 11: Student Manufacturing Design Competition – Track Chair: Frank Pfefferkorn

Track 12: Reusable Abstractions of Manufacturing Processes (RAMP) Competition – Track Chair: William Bernstein

4th Annual RAMP 2020 Competition

Submitted by William Bernstein

To advance sustainable manufacturing practices and promote resource efficiency, US industries need reliable measurement methods to evaluate sustainability performances such as energy and material consumption, emissions, waste, and water usage of manufacturing processes. However, the current use of ad-hoc methods and unstructured data to describe sustainability of specific manufacturing processes cannot effectively support the development of the needed reliable measurement methods. Furthermore, industry lacks the needed measurement science, and structured information base for characterizing manufacturing

processes that will allow evaluation of sustainability performances and facilitate industry adoption of resulting standards for sustainable manufacturing.

There is a need to develop formal methods and standards for acquiring and exchanging information about manufacturing processes. This approach will enable manufacturers and solution providers the necessary tools and techniques to characterize manufacturing processes in a consistent and computer interpretable way. Ultimately this would lead to a collective effort by the manufacturing sector to support effective communication of computational analytics and sharing of sustainability performance data and help establish a consolidated repository for reuse of these models.

Manufacturers need models to improve operations, to protect the environment, to share information, and to compose them into systems. System characterization, whether it be the individual manufacturing process or the broader manufacturing system, defines the frame of reference needed to evaluate and improve the performance of a given system against a norm. Using valued manufacturing models, manufacturers will be better equipped to simulate, improve, and optimize key manufacturing processes.

This competition focuses on the modeling of manufacturing processes for system-level sustainability (i.e., economic, environmental, and social) assessment. Models can span from traditional scale down to nanoscale processes and be based on mechanical, electrical, chemical, biochemical, and bio technologies. Any process type - including batch, continuous, and discrete event - is acceptable. Since sustainability is a balance of competing objectives including cost and time as well as environmental considerations, many different types of process performance metrics may be considered. In addition, the use of the models for system-level sustainability performance is encouraged.

The purpose of the competition is to maintain a venue to foster interest in characterizing manufacturing processes – leading to a common set of descriptive models and performance metrics that support effective and consistent system level analysis and comparisons spanning various manufacturing processes and resources. This year's Theme is **Model Exploration**.

Similar to previous RAMP competitions (from 2017-2019), the building blocks of each submission are the Unit Manufacturing Process (UMP) models, representing Reusable Abstractions of Manufacturing Processes

(RAMP). Possible approaches that participants could take to address this year's theme include (but not limited to) the following:

- Connecting UMP model(s) to experimental set-ups or testbeds
- Relating part design attributes to UMP model(s)
- Linking UMP model(s) to traditional workflows, (e.g., DES, DOE, LCA, Optimization)
- Formally describing use bounds and feasibility constraints of UMP model(s)
- “Connecting the dots” of UMP model(s) to other emerging smart manufacturing standards (e.g., MTConnect, OPC-UA)

A submission may be entered in the competition by submitting a packet to the RAMP 2020 Competition Organizers. Entries must be received by February 24, 2020.

Finalists selected from the entrants (individual or group) will be expected to give an oral presentation of their submission at the 2020 NAMRC/MSEC. Cash prizes will be awarded to the winners! More information about submission requirements can be found at the NAMRC/MSEC website.

Advanced Manufacturing Track, ASME 2019 IMECE

Submitted by William J. Emblom – Track Organizer

ASME's International Mechanical Engineering Congress and Exposition (IMECE) is the largest interdisciplinary mechanical engineering conference in the world and the Advanced Manufacturing Track continues to grow because of the renewed emphasis on manufacturing in academia, industry, and government. This year's conference, IMECE 2019, will be held at the Calvin L. Rampton Salt Palace Convention Center in Salt Lake City, UT on November 11-15.

Conference website:

<https://www.asme.org/events/imece>

Technical Program

The Advanced Manufacturing Track has 13 technical topics and 2 plenary sessions.

- 2-1 Advanced Manufacturing Plenary
- 2-2 Conference-Wide Symposium on Additive Manufacturing
- 2-3 Measurement Science, Sensors, Non-destructive Evaluation (NDE) and Process Control for Advanced Manufacturing
- 2-4 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships
- 2-5 Advanced Machining and Finishing Processes
- 2-6 4th Symposium on Fastening, Adhesive bonding, and Welding Technology
- 2-7 Advanced Material Forming - Novel Processes, Mechanics, and Characterization
- 2-8 Innovative Product and Process Design
- 2-9 Computational Modeling and Simulation for Advanced Manufacturing
- 2-10 Variation Simulation and Design for Assembly
- 2-11 Robotics and Automation in Advanced Manufacturing
- 2-12 Laser-Based Advanced Manufacturing and Materials* Processing
- 2-13 Digital Manufacturing for Industry 4.0 Applications
- 2-14 General Manufacturing

Track Plenary Talks

Speaker: Lyle E. Levine (NIST)

Presentation Title: Building Parts by Welding Millions of Little Bits of Metals Together: What can go wrong and how do we fix it?

Speaker: Brigid Mullany (NSF)

Presentation Title: Finishing freeform surfaces, a new surface characterization approach, and future trends in manufacturing.

Technical Sessions

There are total 40 sessions across various topics in Advanced Manufacturing, 208 technical presentations and over 150 technical publications making it the 4th largest Track at IMECE.

Outstanding Paper Award

The inaugural Outstanding Paper Award for the IMECE Advanced Manufacturing Track. In addition, three runners up papers will be recognized at the AMT Awards Reception.

For the program details, please visit <https://event.asme.org/IMECE>.

In Memoriam for J Temple Black

Submitted by Brian and Lynn Paul

J Temple Black died of congestive heart failure on Thursday, May 16, 2019, at his home in Auburn, Alabama. He was 25 days shy of his 82nd birthday. J was preceded in death by his beloved wife of 51+ years, Carol, and is survived by his three children and five grandchildren.



Professor Black earned his undergraduate degree from Lehigh University, his master's from West Virginia University (WVU) and his doctorate from the University of Illinois Urbana-Champaign (UIUC).

He was the lead author for *DeGarmo's Materials and Processes in Manufacturing* and distinguished himself in two very different fields of research and education within manufacturing engineering: metal cutting and lean manufacturing systems. Highly respected in his fields of expertise, Professor Black was the first-ever person to be named a triple Fellow of the Institute of Industrial (and Systems) Engineers, the Society of Manufacturing Engineers and the American Society of Mechanical Engineers.

"There's bunches of people out there who never heard me talk about Lean and bunches of people out there who never heard me talk about metal cutting," said J as he reminisced following an acceptance speech on the occasion of being awarded the Institute of Industrial Engineers Lean Teacher of the Year Award in 2004. He was still actively involved as a guest lecturer in the AU lean manufacturing systems course as recently as fall 2018 and was a great ambassador for the manufacturing engineering discipline.

In Professor Black's metal cutting career, his notable firsts included:

- Performed the first metal cutting experiments (momentum turning) using Factorial Design (1961-1962)

- First to examine chips in SEM, TEM and HVTEM from micromachining (“ultramicrotomy” - before it was called nano-machining)
- First to develop SEM technique to measure razor blade edge radius (Tree Micrographs) and do research for American Safety Razor (unpublished) leading to multi-bladed razors
- First to perform orthogonal metal cutting experiments on a metal alloy (silver-tin) with a stacking fault energy vs. shear angle (ASME Transactions, 1985)
- First in situ metal cutting in SEM (NAMRC, 1973 and elsewhere)
- Founding Editor for the Journal of Manufacturing Processes
- Developed first videographics for orthogonal machining leading to new mechanics (Black-Huang Model)

In Professor Black’s lean manufacturing systems career, his notable firsts included:

- First paper on manufacturing cells in *Industrial Engineering* (1983)
- First to perform digital simulation of TPS (Kanban) and TSS self-balancing cells (with Bernie Schroer at UAH)
- First to build robotic pull manufacturing cells with decouplers

A Professor Emeritus at Auburn University (AU), Professor Black taught at the university level over a span of 57 years. Prior to his 35-year tenure at Auburn, he taught at WVU, UIUC, University of Vermont, University of Rhode Island, the Ohio State University, University of Central Florida, and the University of Alabama – Huntsville.

In addition to JT’s academic pursuits, he had a wide variety of other interests. He was a published poet (*Poetry for Engineers from Engineers* with P. K. Wright), songwriter and playwright. He was a physical artist who turned a steel-banded wagon wheel and dairy-farm milk can into a coffee table, two antique brass fire extinguishers into end table lamps, and old Sports Illustrated covers into collages to memorialize sports heroes such as Michael Jordan or Bo Jackson. He was a pug dog lover breeding and showing championship pugs at the highest levels.

He was a tennis enthusiast who had a USTA-member tennis club on his property, won tennis championships over the span of five decades and umpired professional tennis matches. Those interested in donating to the Carol Strom and J T. Black Scholarship Fund at Auburn University may do so through this link:

<https://secure.auburn.edu/s/1715/giving/form.aspx?sid=1715&gid=2&pgid=1086&cid=1898&dids=594&bledit=1&appealcode=BLACKSTROMMEM>

Should you have comments or suggestions regarding the information presented in this Newsletter, please do not hesitate to contact members of the EC and MED Technical Committees listed below.

ASME MED Executive Committee Members (2019-2020)				
Chair	Vice-Chair	Program Chair	Treasurer	Secretary
Radu Pavel	Laine Mears	Moneer Helu	Frank Pfefferkorn	Barbara Linke
TechSolve	Clemson University	National Institute of Science and Technology (NIST)	University of Wisconsin-Madison	University of California Davis
pavel@TechSolve.org	mears@clemson.edu	moneer.helu@nist.gov	frank.pfefferkorn@wisc.edu	bslinke@ucdavis.edu
ASME MED Technical Committees (2019-2020)				
Additive Manufacturing	Chair: Jarred Heigel (Third Wave Systems, jarred.heigel@gmail.com) Vice-Chair: Yayue Pan (University of Illinois at Chicago, ifr1@psu.edu)			
Manufacturing Processes	Chair: Wayne Cai (General Motors, wayne.cai@gm.com) Vice-Chair: Ihab Ragai (Penn State – Erie, ifr1@psu.edu)			
Manufacturing Equipment and Automation	Chair: Parikshit Mehta (Arconic, Parikshit.Mehta@arconic.com) Vice-Chair: Burak Sencer (Oregon State University, burak.sencer@oregonstate.edu)			
Manufacturing Systems	Chair: Michael Brundage (NIST, michael.brundage@nist.gov) Vice-Chair: Hui Wang (Florida State University, hwang10@eng.famu.fsu.edu)			
Quality and Reliability	Chair: Yong Wang (Binghamton Univ., yongwang@binghamton.edu) Vice-Chair: Dazhong Wu (University of Central Florida, dazhong.wu@ucf.edu)			
Life Cycle Engineering	Chair: Nancy Diaz-Elsayed (University of South Florida, nancyd1@usf.edu) Vice-Chair: Daniel Cooper (University of Michigan, drcooper@umich.edu)			
Nano/Micro/Meso Manufacturing	Chair: Xinyu Liu (Lamar University, xinyu.liu@lamar.edu) Vice-Chair: Rajiv Malhotra (Rutgers University, rajiv.malhotra@rutgers.edu)			
Biomanufacturing	Chair: Roland Chen (Washington State Univ., roland.chen@wsu.edu) Vice-Chair: Changxue Xu (Texas Tech University, changxue.xu@ttu.edu)			
Advanced Materials Manufacturing	Chair: Srikanth Pilla (Clemson University, spilla@clemson.edu) Vice-Chair: Mihaela Banu (University of Michigan, mbanu@umich.edu)			