

**NAMRC-45  
NAMRI / SME North American  
Manufacturing Research  
Conference**

**MSEC 2017  
ASME International Manufacturing  
Science & Engineering Conference**

**ICM&P 2017  
JSME / International Conference  
On Materials Processing**

**June 4 – 8, 2017  
Los Angeles, California USA**

## Welcome to the International Manufacturing Research Conference 2017

We are pleased to welcome you to the 2017 International Manufacturing Research Conference, a joint conference of the 45<sup>th</sup> Society of Manufacturing Engineers (SME)'s North American Manufacturing Research Conference (NAMRC45), the American Society of Mechanical Engineers (ASME)'s International Manufacturing Science and Engineering Conference (MSEC 2017), and the Japan Society of Mechanical Engineers (JSME)'s International Conference on Materials Processing (ICM&P 2017), being held at the campus of the University of Southern California in Los Angeles, California.

The North American Manufacturing Research Conference (NAMRC) and International Manufacturing Science and Engineering Conference (MSEC) are two major international conferences held annually on manufacturing technology. In this year the International Conference on Materials Processing (ICM&P) will join together to promote enhanced conversations with Japanese researchers. The joint conferences truly represent a premier international forum on the latest development of manufacturing technologies and bring together both academic researchers and industrial practitioners from around the world for interchange of ideas and to promote research collaboration.

This flagship international meeting establishes a platform to showcase the newest ideas, cutting-edge research results, and emerging methodologies and tools. In addition to the excellent technical program, the International Manufacturing Research Conference will offer a number of receptions and social events on all four days of the conference including receptions in California Science Center and Los Angeles Memorial Coliseum, and three award luncheons. The program also includes a number of events, including a conference-wide breakfast for all attendees each morning, early career forum and student reception on Wednesday evening, and plant tours on Thursday afternoon.

A successful conference depends on many dedicated conference organizing committee, technical program committee, symposium organizers, authors, and reviewers. We would like to extend our sincerest appreciation to these members of our community who are devoted to the advances of manufacturing technology. Especially we would like to thank Prof. Lihui Wang (KTH), Prof. Johnson Samuel (RPI), and Prof. Satoshi Kishimoto (NIMS) for organizing the three conferences' paper review. We also wish to thank our keynote speakers, Prof Jim Davis (UCLA), Professor Friedrich Prinz (Stanford), and Mr. Scott Willoughby (Northrop Grumman) for sharing their experience and insight into the challenges of manufacturing research. Finally, special thanks to Ms. Shelly Lewis at USC for her assistance on administrative side to bring the conferences together.

We wish all of you for an enjoyable conference experience and a wonderful stay in Los Angeles.



**Prof. Yong Chen**  
*University of Southern California, USA*  
Conference Chair



**Prof. Xiaochun Li**  
*University of California Los Angeles, USA*  
Conference Co-Chair

## **Welcome from the 2017 NAMRC-MSEC-ICM&P Scientific Committee Chairs**

On behalf of the Scientific and Technical Program Committees, we welcome you to the joint International Manufacturing Conference consisting of the 45th North American Manufacturing Research Conference (NAMRC 45), sponsored by the North American Manufacturing Research Institution of SME (NAMRI/SME), the 12th ASME International Manufacturing Science and Engineering Conference (MSEC 2017), sponsored by the Manufacturing Engineering Division (MED) of ASME, and the sixth International Conference on Materials and Processing (ICM&P 2017), sponsored by the Materials and Processing Division of the Japan Society of Mechanical Engineers (JSME) and ASME, collocated and hosted by the University of Southern California (USC), from June 4 to June 8, 2017, in Los Angeles, California. As leading world-class societies in the Mechanical and Manufacturing Engineering fields, SME, ASME and JSME act as global 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 and Materials Processing fields.

Each of the collocated conferences includes technical sessions covering the full range of manufacturing topics. Every single paper submitted to the conferences was put through a rigorous peer review process. We are in debt to all reviewers for their critical assessment of a very large number of submissions.

NAMRC 45 received over 180 technical paper submissions. Following the review process, 140 papers were accepted for publication in the Proceedings of NAMRI/SME and presentation at the conference in 50 technical sessions. The papers included in the conference address a wide range of basic and applied manufacturing research topics in six tracks: Manufacturing Systems, Manufacturing Processes, Additive Manufacturing, Cyber-Physical Systems in Manufacturing, Manufacturing Education, and Manufacturing Implementation. Workforce Development and Outreach are combined with the Track of Manufacturing Education. This year, NAMRC 45 will feature the inaugural NAMRI/SME David Dornfeld Manufacturing Vision Award and Blue Sky Competition, funded by the National Science Foundation. 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. NAMRC 45 will also include a Student Research Presentations Competition.

MSEC 2017 received over 291 draft papers and 50 poster submissions. After a rigorous peer review process, 259 technical papers and 42 posters were accepted for presentation in over 96 technical sessions. In addition, the conference has 9 industry-sponsored research presentations and a workshop on 'Game-changing Ideas for Cost-effective Low-Volume Manufacturing' organized by MFOresight: The Alliance for Manufacturing Foresight. This year, MSEC has 30 symposia in 5 Technical Tracks: Additive Manufacturing, Processes, Materials, Manufacturing Equipment and Systems, and Bio and Sustainable Manufacturing. MSEC will also feature the Symposium-Invited Speakers Program, jointly with NAMRC and ICM&P, in three emerging areas: Big Data Implications for Manufacturing Innovation, Additive Manufacturing, and Nanotribology. The conference also includes three student-centric events: Early Career Forum, Student Manufacturing Design Competition and the Reusable Abstractions of Manufacturing Processes (RAMP) Competition.

ICM&P 2017 has a total of 112 presentations, including 3 keynote talks and 67 papers in over 34 technical sessions. This year the conference has 18 symposia in 4 Technical Tracks: Materials, Processing, Measurement and Evaluation, and Recent Trends in Materials/Processing. This is the fourth joint event between MSEC and ICM&P. ICM&P participants have abundant expertise in dealing with different conventional and emerging engineering materials such as, metals, ceramics, various types of composites, and multi-functional as well as smart materials. In addition they have expertise in the areas of both novel and traditional manufacturing processes. The collocated conference highlights strong technical areas of coherence between SME, ASME and JSME, while simultaneously also being an expression of

their distinct identities. This format will unquestionably cultivate a dynamic and stimulating environment to all the participants.

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, 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, the ICM&P Scientific Committee, and the ASME MED Executive and Technical Committees. Our thanks also go to the SME and ASME staff for their outstanding job in presenting conference information on the Internet, managing the submitted technical papers and posters, and ensuring high-quality publication of the conference proceedings for NAMRC 45, MSEC 2017, and ICM&P 2017. We would like to extend our gratitude to all sponsors for providing financial support. Additionally, we would like to thank the Advanced Manufacturing Cluster within the Civil, Mechanical, and Manufacturing Innovation (CMMI) Division of the National Science Foundation for sponsoring the MSEC Early Career Forum, the NAMRC “Blue Sky” Competition, and for providing registration and accommodation support for student participants from US universities.

We wish you a productive and enjoyable conference experience at USC in Los Angeles, California. We hope that the proceedings are beneficial and we sincerely wish that you have a long-lasting affiliation with the future of NAMRC, MSEC and ICM&P.



**Lihui Wang**

KTH Royal Institute of Technology,  
Sweden, NAMRI/SME Scientific  
Committee Chair



**Johnson Samuel**

Rensselaer Polytechnic Institute, USA  
MSEC 2017 Technical Program Chair



**Satoshi Kishimoto**

National Institute for Materials Science,  
Japan, ICM&P 2017 Conference Vice-chair  
and Executive Committee Chair



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## Conference General Information

**Los Angeles:** Since its founding on September 4, 1781, Los Angeles has grown into a dynamic metropolis with its eye on the future, while preserving its extraordinary cultural heritage. LA is one of the most ethnically diverse cities in the world, making it a truly global city. From San Pedro to the San Fernando Valley, LA is home to 211 sites that are on the National Register of Historic Places, including the Los Angeles Memorial Coliseum, the Bradbury Building, Watts Towers and the Ennis House. As the entertainment capital of the world and home to more creative residents than any other city, LA has a long history with film, TV, music and literature. From the world class LA Philharmonic to the Walt Disney Concert Hall, J. Paul Getty Museum and LACMA, LA's cultural legacy continues to grow. Diners across the world recognize LA as the birthplace of the Cobb Salad and French Dip, and a major influence on California and ethnic cuisines.

**Registration:** Registration will be located in the Engineering Plaza. The hours of operation are:

Sunday: 3:30 PM – 6:30 PM

Monday: 7:30 AM – 6:00 PM

Tuesday: 7:30 AM – 6:00 PM

Wednesday: 7:30 AM – 6:00 PM

Thursday: 9:00 AM – 11:00 AM (Information Only)

**Coffee Breaks:** There will be morning and afternoon breaks with coffee, tea, water, and light snacks located in the Engineering Plaza. There are also numerous restaurants on campus should you wish other options.

**Laboratory Tours:** 2 of the 3 USC lab tours are off campus and bus transportation will be provided. Pick up and drop off will be at the Engineering Plaza.

**Name Badges:** Please wear your badge at all times and especially to all conference events. Admission to events will be determined by your badge and all attendees must have a ticket for meals including guests. Your name badge is also useful information for other attendees.

**Registrants with Disabilities:** Whenever possible, we will make arrangements for registrants with disabilities. Advance notice is preferred. For on-site assistance, please visit the registration desk.

**Internet Access:** The University of Southern California has free wireless access points throughout the campus under USC Guest.

**Exhibitors:** Exhibitor/Sponsor booths are located in the Engineering Plaza

### Luncheons:

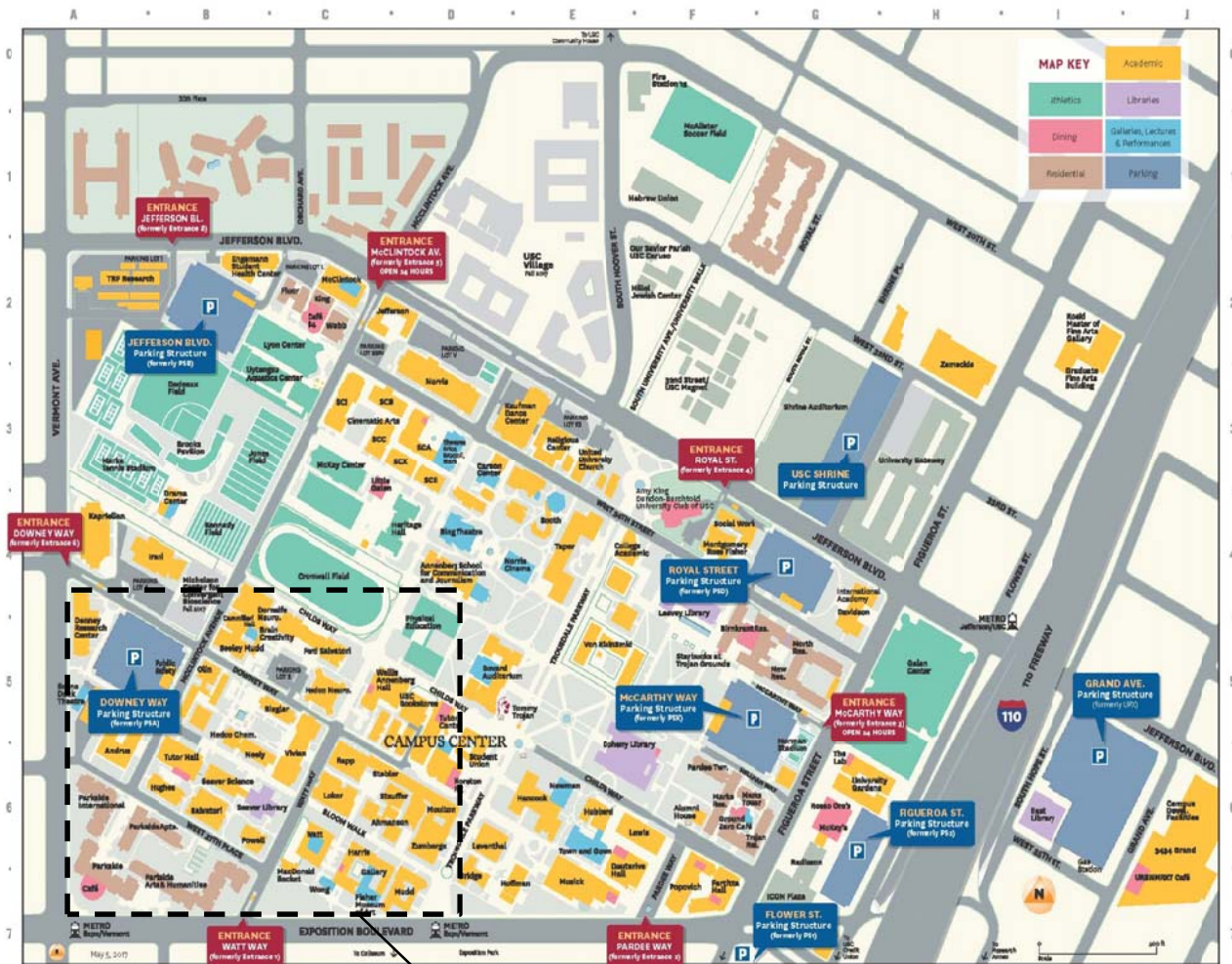
Monday: JSME Awards Luncheon, Ronald Tutor Campus Center Ballroom

Tuesday: ASME Awards Luncheon, Ronald Tutor Campus Center Ballroom

Wednesday: SME Awards Luncheon, Ronald Tutor Campus Center Ballroom

Everyone else will eat in Town & Gown (Check your ticket)

**General Help:** Look for the volunteers in Black Conference shirts for assistance

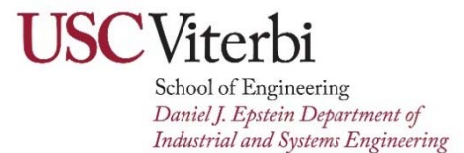


Conference Location



- SGM Seeley G. Mudd
- GFS Grace Ford Salvatori
- VHE Vivian Hall of Engineering
- SAL Salvatory Computer Center
- EEB Hughes Aircraft Electrical Engineering
- GER Andrus Gerontology Center
- IRC International Residential College @ Parkside
- PRB Parkside Arts & Humanities Residential College
- HAR Harris Hall
- ZHS Zumberge Hall
- VPD Verna & Peter Dauterive Hall

## OUR GENEROUS SPONSORS



National Science Foundation





# STUDENT TRAVEL AWARD RECIPIENTS

A National Science Foundation grant will provide support to select students from U.S. Institutions to attend the collocated 2017 ASME Manufacturing Science & Engineering Conference (MSEC2017), the SME 45<sup>th</sup> North American Manufacturing Research Conference (NAMRC45), and the JSME Japan Society of Mechanical Engineers (ICM&P 2017), at the University of Southern California in Los Angeles, California.

The organizers of the NAMRC45/MSEC2017/ICM&P2017 gratefully acknowledge the generous support of the National Science Foundation in providing financial support to the following students to attend the conference:

Omar Castiblanco, Bradley University

Ragha Vendra Rapphadu, Bradley University

Mario Perez-Dewey, Bucknell University

Jingyi Zhang, Case Western Reserve University

Stephanie Hulseley, Clemson University

Saheem Absar, Clemson University

Jamie Skovron, Clemson University

Matthew Krugh, Clemson University

Xiao Jia, Clemson University

Dakai Bian, Columbia University

Arkadeeep Kumar, Georgia Institute of Technology

Yixuan Feng, Georgia Institute of Technology

Roby Lynn, Georgia Institute of Technology

Dakota Morgan, Iowa State University

Pedram Parandoush, Kansas State University

John Paul Sibbitt, Kansas State University

Yang Yang, Kansas State University

Mojtaba Khanzadehdaghalian, Mississippi State University

Amir M. Aboutaleb, Mississippi State University

He Li, Missouri University of Science & Technology

Md. Md. Monirul Islam, Missouri University of Science & Technology

Jianlei Zhang, North Carolina State University

Lokesh Karthik Narayanan, North Carolina State University

Weizhao Zhang, Northwestern University

Nicolas Martinez-Prieto, Northwestern University

Kamyar Raoufi, Oregon State University

Hari Prashanth Narayan Nagarian, Oregon State University

Elham Mirkoohi, Oregon State University

Samantha N. Muhhuku, Penn State University, Erie

William Edwards, Penn State University, Erie

Derek Shaffer, Penn State University, Erie

Tyler Grimm, Penn State University, Erie

Haris Ali Kahn, Penn State University, UP

Chen Chen, Purdue University

Christopher Katinas, Purdue University

Alaaeldin Olleak, Rutgers University

Nick Duong, Saint Louis University

Houzhong Ding, Stevens Institute of Technology

Mohammad Samie Tootooni, SUNY-Binghamton

Roosbeh Salary, SUNY-Binghamton

Xinyan Ou, SUNY-Stony Brook

Qian Ye, SUNY-Stony Brook

Yi-Tang Kao, Texas A&M University

Behrouz Takabi, Texas A&M University

Xiaorui Ren, Texas A&M University

Srikumar Krishnamoorthy, Texas Tech University

Zhichao Liu, Texas Tech University

Yingbin Hu, Texas Tech University

Hui Wang, Texas Tech University

Jun Liu, The University of Akron

Hao Zhang, The University of Akron

Anil Yuksel, The University of Texas at Austin

Joon Hyong Cho, The University of Texas at Austin

Hamdy Ibrahim, The University of Toledo

Kuldeep Singh Sidhu, University of Cincinnati

Abishek Balsamy Kamaraj, University of Cincinnati

Anne Brant, University of Cincinnati

Anay Joshi, University of Cincinnati

Max Stein, University of Florida

Kyle Christensen, University of Florida

Lu Lu, University of Illinois at Chicago

Malek Nofal, University of Illinois at Chicago

Honghan Ye, University of Kentucky

Amin Abedini, University of Kentucky

Ayotunde Olayinka, University of Louisiana at Lafayette

Kevin Li, University of Maryland, College Park

Yang Liu, University of Michigan

Dian-Ru Li, University of Michigan

Xin Dong, University of Michigan

Deokkyun Yoon, University of Michigan

Kai Chen, University of Michigan

Shunyi Zhang, University of New Hampshire

Benjamin R. Mitchell, University of New Hampshire

Jacqueline McNally, University of New Hampshire

Brandon P. Smith, University of Washington – Seattle

Daniel Fanke, University of Wisconsin – Madison

Sinan Kesriklioglu, University of Wisconsin – Madison

WoongJo Choi, University of Wisconsin – Madison

Xavier Kelly, Virginia State

Che Hao Yang, Washington State University

Hossein Mohammadi, Washington State University

## OVERVIEW

Time	Event	Location
8:30am - 5:30pm	NAMRI Board Meeting	Radisson 1880 Room
12:00pm - 6:00pm	NSF Proposal Writing Workshop	Ronald Tutor Campus Center TCC227-Rosen Family Room
3:30pm - 6:00pm	Registration	Epstein Family Engineering Plaza
6:00pm - 9:00pm	Reception	California Science Center – Samuel Oschin Shuttle Endeavor Display Pavilion

**12:00pm – 6:00pm**

**NSF Proposal Writing Workshop**

**Room TCC-227**

Effective proposal writing is important for both the National Science Foundation (NSF) and principal investigators. To aid researchers in communicating clear research objectives and improving proposal quality, an NSF proposal writing workshop will be hosted at the NAMRC/MSEC Conference 2017, on Sunday, June 4, from 12 pm to 6 pm, which will be held at the University of Southern California in Los Angeles. The workshop will include a working lunch (12 pm to 1 pm), presentations by NSF program managers, breakout sessions to discuss example research objectives, and a question/answer period. Interested researchers may register on the conference web site <http://2017namrc-msec.usc.edu/>. There is a \$25 fee to cover food costs. The number of attendees is limited to 70 on a first come-first serve basis.

# **SAMUEL OSCHIN SPACE SHUTTLE ENDEAVOUR**

## **DISPLAY PAVILION**

On October 30, 2012, *Space Shuttle Endeavour* opened to the public in the Science Center's newly built Samuel Oschin Pavilion. In the Pavilion, guests are able to see Endeavour up close and discover some of the science behind this amazing space vehicle. The Samuel Oschin Pavilion also features SPACEHAB, a workshop for astronauts while in space, and a space shuttle main engine (SSME) which helped push the shuttle into orbit. Before entering the Pavilion, guests will be able to enjoy an introductory experience, *Endeavour: The California Story*, which celebrates Endeavour's many scientific achievements and its strong connection to California where all the orbiters were built. The California Story includes the Rocketdyne Operations Support Center (ROSC), which monitored the first 8<sup>1/2</sup> minutes of every shuttle launch, Endeavour's space potty and galley, and the tires from STS-134, Endeavour's final mission. In addition to the orbiter, our unique collection of *Air and Space Exhibits* explores the design of aircraft, spacecraft, and space probes for specific tasks by applying the principles of air, space, and flight.

Moving space shuttle *Endeavour* across the United States was a massive undertaking. *Endeavour* first flew on the back of a Boeing 747 from Cape Canaveral, Florida to Edwards Air Force Base in California, while making several stops along the way. After arrival, Endeavour honored many California landmarks as it flew over the State from Sacramento to Southern California while onlookers marveled at the sight all along the way. After landing at Los Angeles International Airport, the biggest adventure was yet to come, transporting *Endeavour* through the heart of urban Los Angeles to its new home at the California Science Center. At 78 feet wide, 57 feet high and 122 feet long—longer than two school buses—navigating the streets of Los Angeles and Inglewood required the guidance and skill of over 100 people. Police controlled traffic; engineers and technicians lifted power lines and took down traffic lights while approximately 1.5 million people lined the sidewalks to celebrate the event. Photographers and filmmakers were on hand to document this once-in-forever moment in history.

*Mission 26: The Big Endeavour* features photographs highlighting some of the spectacular scenes witnessed during space shuttle *Endeavour's* flight over California and her 12-mile, 68-hour journey through city streets to its final destination in the [Samuel Oschin Pavilion](#) at the California Science Center.



# KISTLER

**measure. analyze. innovate.**

Exhibit Table in Engineering Plaza

Mon, Tues, Wed



Exhibit Table in Engineering Plaza

Mon, Tues, Wed



Exhibit Table in Engineering Plaza

Mon, Tues, Wed

## OVERVIEW

Time	Event	Location
7:30am - 6:00pm	Registration	Epstein Family Engineering Plaza
8:00am - 10:00am	Vendor Set up	Epstein Family Engineering Breezeway
10:00am - 5:00pm	Exhibits	Epstein Family Engineering Breezeway
8:00am-9:00am	Breakfast	Ronald Tutor Campus Center Ballroom (RTCC)
8:00am - 8:10am	Welcome - Dean Yannis Yortsos (USC)	Ronald Tutor Campus Center Ballroom (RTCC)
8:10am - 8:20am	Updates on Mfg USA – Frank Gayle (Deputy Director of Adv. Mfg National Program Office)	Ronald Tutor Campus Center Ballroom (RTCC)
8:20am - 9:05am	Keynote: Jim Davis (UCLA Provost) : Integrating Operations and Information Technology (OT/IT) Systems and the Practice of Smart Manufacturing	Ronald Tutor Campus Center Ballroom (RTCC)
9:10am - 12:00pm	MED Executive Committee Meeting	Ronald Tutor Campus Center TCC232
9:15am – 10:45am	Technical Parallel Session - 1	
10:45am - 11:00am	Morning Break	Epstein Family Engineering Plaza
11:00am - 12:30pm	Student Manufacturing Design Competition - 1	Ronald Tutor Campus Center Franklin Suites (TCC 351/352)
11:00am - 12:30pm	MSEC Symposium Invited Speaker : Dr. William Regli (DARPA) - Big Data Implications for Manufacturing and Design Innovation	SGM 123
11:00am -12:30pm	Technical Parallel Session - 2	
12:30pm - 1:50pm	JSME Awards Luncheon, ICM&P	Ronald Tutor Campus Center Ballroom (RTCC)
12:30pm - 1:40pm	JSME Plenary 1 - Dr. Hideki Kyogoku - The Current Status and Prospects of Metal Additive Manufacturing in Japan	Ronald Tutor Campus Center Ballroom (RTCC)
1:40pm - 1:50pm	Stefan Altevogt/German Research Foundation DFG Talk	Ronald Tutor Campus Center Ballroom (RTCC)
12:30pm - 1:50pm	Luncheon-Open to All	Town & Gown
12:30pm - 1:50pm	JSME Editor's Meeting	Ronald Tutor Campus Center TCC450
2:00pm - 3:30pm	Student Manufacturing Design Competition - 2	Ronald Tutor Campus Center Franklin Suites (TCC 351/352)
2:00pm - 3:30pm	Cost-Effective Low-Volume Manufacturing: Part 1	SGM 124
2:00pm - 3:30pm	Technical Parallel Session - 3	
3:30pm - 3:45pm	Afternoon Break	Epstein Family Engineering Plaza
3:45 pm - 5:15 pm	Cost-Effective Low-Volume Manufacturing: Part 2	SGM 124
3:45pm - 5:15pm	Technical Parallel Session - 4	
5:30pm - 6:00pm	ASME MED Membership Meeting	Ronald Tutor Campus Center Franklin Suites (TCC 351/352)
6:00pm - 6:30pm	NAMRI SME Membership Meeting	Ronald Tutor Campus Center Franklin Suites (TCC 351/352)
7:00pm - 9:30pm	Reception	Los Angeles Memorial Coliseum

**Monday - June 5, 2017      8:20Am – 9:05Am      Ronald Tutor Campus Center Ballroom (RTCC)**

**Title - *“Integrating Operations and Information Technology (OT/IT) Systems and the Practice of Smart Manufacturing”***

**Speaker:** Dr. Jim Davis, Vice Provost, IT and CTO at UCLA

**Abstract:** Smart Manufacturing (SM) is the technology practice of applying advanced sensors, controls, platforms and modeling not only as advanced technologies but as integrated operations and information (OT/IT) technology systems. SM Technology practice is aligned with the opportunity/business oriented practice of end-to-end use of real-time, networked, data based intelligence for enterprise integration of dynamic market demands, high precision/qualified products, and enterprise and ecosystem optimization. Business and technology practice also combine to accelerate transformational use of data, extensive application of enterprise manufacturing intelligence, provider and practitioner market changes and adoption of advanced technologies to radically improve the precision, performance and efficiency of U.S. manufacturing. Increased economic, energy, and material productivity, zero incidents, reduced industry energy usage, and environmental sustainability all become competitive advantages. The Clean Energy Smart Manufacturing Innovation Institute (CESMII) is the 9th U.S. institute under the White House-led "Manufacturing USA" initiative.



**Biosketch:**

Jim co-founded the Smart Manufacturing Leadership Coalition (SMLC) that was recently selected to lead DOE's Clean Energy Smart Manufacturing Innovation Institute (CESMII), the 9<sup>th</sup> Manufacturing USA Institute and the 3<sup>rd</sup> DOE institute to be awarded.

Jim is Vice Provost, IT and CTO at UCLA with broad responsibilities focused on the investment and deployment of information technology in the university's academic research, education, and public service mission. He has accountability for university-wide planning and strategic investment in computational research, research informatics, educational technologies, mobility applications, research and education data strategies, privacy/security and internal and external community partnerships. Jim oversees UCLA's Institute for Digital Research and Education (IDRE).

Jim is also on UCLA's Department of Chemical and Biomolecular Engineering where he has done research and consulted extensively on AI, machine learning, intelligent systems, monitoring and control, and data/modeling systems across diverse industries including chemicals, refining, paper, packaging, metals and glass. Jim has work experience with Amoco Chemicals.





# MSEC Symposium Invited Speaker Program

**Monday, June 5, 2017**

**11:00Am - 12:30Pm**

**SGM 123**

**MSEC Session:** 8-3-2 Big Data Implications for Manufacturing & Design Innovation

**Title – “A New Kind of Thinking: Revolutionizing Design and Manufacturing”**

**Speaker:** Dr. William C. Regli, Acting Director of the Defense Sciences Office, Defense Advanced Research Projects Agency (DARPA).

**Abstract:** The revolution underway in manufacturing is the product of a diverse set of disciplines that have reached a level of maturity to offer radically new tools and capabilities. Because of these simultaneous advances in materials science, process control, robotics---and especially computation, data and machine intelligence---we can begin to envision design and production as an information-centric and algorithmic process. Somewhat surprisingly, however, many of our most advanced approaches to design and fabrication remain firmly grounded in methodologies and processes that literally go back centuries.

As we enter this era of computation, data and machine intelligence, we are offered the opportunity to reframe, tabula rasa, the system of design and production. We will discuss the need (and opportunities) for a paradigm shift in design and manufacturing and provide several examples of what the new scientific questions might be like. Ultimately, for each of these questions, the challenge is how to integrate human creativity and insight with computing machinery in order to have the machines not just as our tools---but as our partners.

**Biosketch:**

Dr. William Regli became the Acting Director of the Defense Sciences Office (DSO) in January 2017. For the past two years, Dr. William Regli was the Deputy Director of DSO. Dr. Regli is a computer scientist with a passion for addressing interdisciplinary and use-inspired problems using knowledge representation, physics-based modeling and other computational techniques. His most recent activities have focused on deploying cyber-infrastructure systems to capture and curate engineering and science data, and ensure the long-term sustainability of data. Dr. Regli’s current interests include computational tools to exploit the properties of advanced materials, additive manufacturing systems and enabling new paradigms for design and production.

Dr. Regli has published more than 250 technical articles, including those in leading venues for research in computer graphics, artificial intelligence, robotics, wireless networking, tissue engineering, and engineering design and manufacturing. His research has spawned two start-up technology companies (one focused on mobile communications for public safety, the other on information management in edge networks) and resulted in five U.S. Patents. He is a Fellow of the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE) and a senior member of both the Association of Computing Machinery (ACM) and Association for the Advancement of Artificial Intelligence (AAAI).





## ICM&P 2017 Plenary



Monday, June 5, 2017

12:30Pm – 13:40Pm

Ronald Tutor Campus Center Ballroom

JSME Awards Luncheon

**Title – “The current status and prospects of metal Additive Manufacturing in Japan”**

**Speaker:** Dr. Hideki Kyogoku, Professor, Faculty of Engineering, Kindai University. Technology Research Association for Future Additive Manufacturing (TRAFAM), Project Leader

**Abstract:** A new research association, Technology Research Association for Future Additive Manufacturing (TRAFAM), was established by the Ministry of Economy, Trade and Industry (METI) of Japan in FY2014 in order to perform “Manufacturing revolution program centering on 3D printing technology” including two projects of (A) Next-generation industrial 3D printers project and (B) Innovative 3D printer using a binder jetting process. By the result of these projects, it is strongly expected that the design and manufacturing technology performs innovation in the manufacturing industry in Japan, and the competitiveness of the Japanese manufacturing industry is reinforced. The membership of TRAFAM includes three academic institutions and 34 companies. The association’s mission is the development of innovative Additive Manufacturing systems that will meet the world's highest standards and the development of manufacturing technologies for high value-added products. TRAFAM is currently developing Powder Bed Fusion and Direct Energy Deposition types of metal AM machines with electron or laser beams. Two test benches and five types of prototype AM machines have been developed at the end of FY2014 and improved since then. In the presentation, the history, the current status and R&D activities of metal AM technology in Japan are introduced.

### **Biosketch:**

Professor Hideki Kyogoku, Faculty of Engineering, Kindai University, is a Councillor of Kindai University and a Fellow of Japan Society of Mechanical Engineers. He obtained a MS degree in Materials Science from Ehime University in 1979 and a Doctor of Engineering degree in Mechanical Systems Engineering from Tokyo Institute of Technology in 1989. He worked at Hiroshima Prefectural Technology Research Institute during 1979-1993. He started his academic career (Associate Professor) at Kindai University, Hiroshima, in 1993 and was promoted to a full professor in 1999. He worked at The University of Texas at Austin as a visiting research associate during 2001-2002. He founded the Advanced Additive Manufacturing research center at Kindai University, Hiroshima, in 2014 as its Director since then. He served as Vice-Dean of Faculty of Engineering during 2004-2008, Director of Research Institute of Fundamental Technology for Next Generation during 2007-2011, and Dean of Faculty of Engineering during 2008-2014 at Kindai University. He serves as the Project Leader of Technology Research Association for Future Additive Manufacturing (TRAFAM) from 2014. He has over 100 publications in peer reviewed journals. Externally, he was Vice-President of The Japan Society of Mechanical Engineers (JSME) during 2011-2012. He was the chairman of 5th JSME/ASME 2014 International Conferences on Materials and Processing (ICM&P2014).



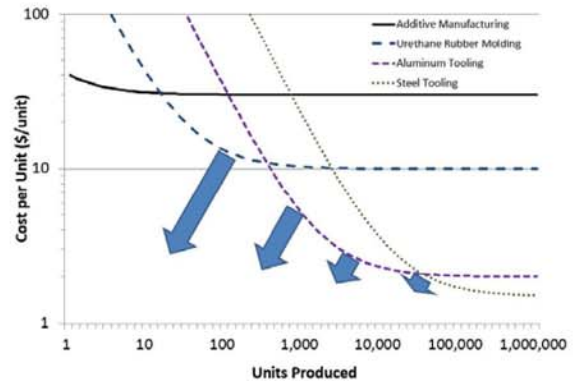
# ASME-MSEC Conference

Los Angeles, California

## Gamechanging Ideas for Cost-Effective Low-Volume Manufacturing Workshop

June 5, 2017, 2:00 pm – 5:15 pm, 124 Seeley G. Mudd Building

Low-volume manufacturing, in the quantities of 1,000-10,000, of innovative and specialized products at economical pricing is needed in nearly every industry, from medical devices to defense to consumer products. The highly-interactive workshop will address the challenge of creating technologies that have a low enough initial investment and unit cost that the overall cost/unit is competitive with mass production. Attendees will establish critical areas for further R&D and federal funding and such recommendations will be rolled up into a published whitepaper for dissemination to key stakeholders.



While 3D printing is enabling high-value, personalized products in the quantities of one or tens, and traditional high-volume manufacturing of commodity products allows for low unit costs as the costs of dies and molds are amortized over hundreds of thousands or even millions of units, there are significant opportunities and challenges to economically manufacture products at volumes between these two extremes (see figure). The workshop will explore potential low-volume manufacturing technologies, including, but not limited to:

- Technology for reconfigurable dies and molds (zero tooling cost)
- Technology to substantially lower die and mold production cost
- Technology to enable fully automated setup of manufacturing equipment or production lines
- Reconfigurable manufacturing equipment (e.g., LEGO-like building blocks)
- Novel molding, casting, or forming technologies that excel at small-lot quantities
- Low cost and scalable manufacturing technology for emerging areas (e.g. nano-manufacturing)

After a keynote speaker and invited researchers briefly explore the current state of the technologies, attendees will participate in breakout sessions to identify critical areas for further R&D and federal funding. The recommendations of each session will be reported out to the group and consolidated into a published whitepaper available on the MFOresight website ([www.mforesight.org](http://www.mforesight.org)).

**Organizers/Speakers:** Dan Walczyk (RPI), Rich Baker (Proto Labs), Jian Cao (Northwestern), Glenn Daehn (OSU), David Hardt (MIT), Tony Schmitz (UNC Charlotte), Jose Ulloa (Boston Scientific)

To continue exploring new ideas for transforming manufacturing, research, and education, please consider also attending the "Blue Sky Competition" session on Tuesday, June 6th!



Alliance for Manufacturing Foresight

**SPONSORED BY-** MFOresight: Alliance for Manufacturing Foresight, a federally-funded national consortium focused on the future of U.S. manufacturing. We convene thought leaders from industry and academia to forecast emerging technologies, aligning R&D needs with national priorities, to develop actionable recommendations to accelerate technology innovations, and to provide insights to government and industry decision makers to inform policy and investments in advanced manufacturing.

# LOS ANGELES MEMORIAL COLISEUM

The Los Angeles Memorial Coliseum opened June of 1923; some 5 months later, on October 6th, the first football game was played in the stadium, with the University of Southern California defeating Pomona College 23-7 before a crowd of 12,836. It was a modest beginning for a venue that would later play a very prominent role in college and professional football, and become the greatest stadium in the history of America.

In addition to serving as the home field for the USC Trojans since 1923, countless historic events have taken place inside these venerable walls during nine decades of celebrated history. It is the only facility in the world to play host to two Olympiads (X and XXIII), two Super Bowls (I and VII), one World Series (1959), a Papal Mass and visits by three U.S. Presidents: John F. Kennedy, Richard M. Nixon and Ronald Reagan.

Along with the adjacent Sports Arena, the Coliseum is credited with helping to start the migration of professional sports teams to the West Coast. The complex provided a home for the **Rams** (from Cleveland, 1946-79 NFL), the **Dodgers** (from Brooklyn, 1958-61, MLB), and the **Lakers** (from Minneapolis, 1960-67, NBA), and has also been home to a variety of Southern California teams as well the **Raiders** (from Oakland, 1982-94, NFL), UCLA Football (1933-81) and was the expansion home of the **Chargers** (1960, NFL) the **Clippers** (from San Diego, 1984-99, NBA), **USC Basketball** (1959-2006, NCAA), **UCLA Basketball** (1959-65, NCAA), the **Cobras** (1988, Arena Football), the **Ice Dogs** (1995-96, IHL), the **Sharks** (1972-74, WHA), the **Stars** (1968-70, ABA) and **Kings** (1967, NHL).

In 1984, the State of California and the United States Government declared the Coliseum a State and Federal Historical Landmark for its contribution to the history of California, as well as to that of the United States as a whole.

On March 29, 2008, the Los Angeles Dodgers and the Boston Red Sox set a Guinness World Record for the largest attendance ever at a baseball game with a crowd of 115,300. Other historic events include Billy Graham's appearance in 1963 in front of 134,254 (still an all-time Coliseum record), Nelson Mandela's 1990 triumphant return to the United States, the first ever Papal Mass by Pope John Paul II in 1987, and the 1976 Bicentennial Spectacular.

## The Coliseum Memorial Court of Honor

The Court of Honor, located at the Peristyle end of the Coliseum and comprised of 54 commemorative plaques at present, got a thorough refurbishment as well. Chronicling outstanding persons or events, athletic or otherwise, that have had a definite impact upon the history, glory and growth of the Coliseum, the plaques were restored to their former glory.



# PRESENTATION SCHEDULE FOR MONDAY

	Joint MSEC-NAMRC-ICMP Invited Talks	GFS 116	VHE 217	SAL 101	SAL 126	EEB 248
PARALLEL SESSION - 1 9:15 AM – 10:45 AM		NAMRC - TRACK 1 "Manufacturing Systems" - CNC Machine Tools 1	NAMRC - TRACK 1 "Manufacturing Systems" - Flow Shop Schedul- ing 1	NAMRC - TRACK 2 "Manufacturing Processes" - Machining 1	NAMRC - TRACK 2 "Manufactur- ing Processes" - Finishing Opera- tions 1	NAMRC - TRACK 2 "Manufacturing Processes" - Surface Integ- rity 1
PARALLEL SESSION - 2 11:00 AM – 12:30 PM	<b>MSEC Invited Symposium Speaker</b> Session: 8-3-2 Big Data Implications for Manufacturing & Design  <b>Title: "A New Kind of Thinking: Rev-                      olutionizing Design and Manufac-                      turing"</b>  <b>Speaker: Dr. William C. Regli, Acting                      Director of the Defense Sciences Of-                      fice, DARPA.</b>	NAMRC - TRACK 1 "Manufacturing Systems" - CNC Machine Tools 2	NAMRC - TRACK 1 "Manufacturing Systems" - Flow Shop Schedul- ing 2	NAMRC - TRACK 2 "Manufacturing Processes" - Machining 2	NAMRC - TRACK 2 "Manufactur- ing Processes" - Finishing Opera- tions 2	NAMRC - TRACK 2 "Manufacturing Processes" - Surface Integ- rity 2
PARALLEL SESSION - 3 2:00 PM – 3:30 PM		MSEC 1-2-5 - Additive Mfg.: Part Function- ality- 5	MSEC 2-3-1: Mfg. Process Modeling -1	MSEC 4-2-1: Mfg. Data Ana- lytics -1	MSEC 2-1-2: Joining/Assembly -2	MSEC 4-8-1: Mfg. Equip- ment -Design, Tooling & Au- tomation- 1
PARALLEL SESSION - 4 3:45 PM – 5:15 PM		MSEC 1-3-1 - Additive Mfg.: Micro & Nano Scale - 1	MSEC 2-3-2: Mfg. Process Modeling -2	MSEC 4-2-2: Mfg. Data Ana- lytics -2	MSEC 2-1-3: Joining/Assembly -3	MSEC 4-10-1 : Intelligent Ma- chining & In- spection - 1

**COLOR KEY:**

	MSEC
	Joint MSEC-NAMRC-ICMP Session
	NAMRC
	ICMP

## PRESENTATION SCHEDULE FOR MONDAY

GER 224	IRC 1016/1017	PRB MPR	PRB PC	PRB SCR	HAR 101	ZHS 159	ZHS 252	ZHS 352
NAMRC - TRACK 6 "Manufacturing Implementation" - 1	NAMRC - TRACK 1 "Manufacturing Systems" - Robot in Manufacturing	NAMRC - TRACK 1 "Manufacturing Systems" - Smart Factory	MSEC 4-5-1: Cloud Manufacturing -1	NAMRC - TRACK 3 "Additive Manufacturing" - Sustainability	NAMRC - TRACK 3 "Additive Manufacturing" - Jet Printing	NAMRC - TRACK 3 "Additive Manufacturing" - Miscellaneous	NAMRC - TRACK 2 "Manufacturing Processes" - Machining Composites	NAMRC - TRACK 2 "Manufacturing Processes" - Miscellaneous 1
NAMRC - TRACK 6 "Manufacturing Implementation" - 2	MSEC 3-1-1 : Composites Manufacturing - 1	MSEC 2-5-1 Forming Processes - 1	MSEC 4-4-1 : Advances in Machine Tools -1	MSEC 2-6-1 : Scalable Nanomanufacturing - 1	MSEC 5-2-1: Biomanufacturing Tissue Engineered Scaffolds -1	MSEC 5-1-1 : Biomedical Devices -1	ICMP 2-1-1; 4333, 4353, 4363 (Processing of Polymer Composites -1)	ICMP 2-3-1; 4332, 4308, 4385 (Advanced Casting & Forming)
MSEC 2-2-1: Assisted/Augmented Mfg. Processes -1	MSEC 3-3-1: Polymer Processing - 1	NAMRC - TRACK 2 "Manufacturing Processes" - Forming	MSEC 4-5-2: Cloud Manufacturing -2	MSEC 1-1-1 - Additive Mfg.: Microstructure & Properties - 1	MSEC 3-2-1: Mtrls & Processes for Energy Technologies -1	ICMP 2-4-1 ; 4354,4431 (Surface Modification Technology)	ICMP 2-1-2; 4371, 4368, 4383 (Processing of Polymer Composites -2)	ICMP 2-5-1; 4373, 4448 (Mechanics of Welding and Joining Technology)
MSEC 2-2-2: Assisted/Augmented Mfg. Processes -2	MSEC 4-9-1: Intelligent Maintenance of Mfg. Systems -1	MSEC 4-4-2 : Advances in Machine Tools -2	MSEC 4-3-1 : Manufacturing Digital Thread - 1	MSEC 1-1-2 - Additive Mfg.: Microstructure & Properties - 2	MSEC 5-4-1: Sustainability in Smart Manufacturing - 1	ICMP 2-4-2; 4326, 4352: (Surface Modification Technology, Wear & Tribology)	ICMP 2-1-3; 4379, 4348, 4345 (Processing of Polymer Composites -3)	ICMP 2-5-2; 4413, 4396: Evaluation Methods for Welding & Joining

**8:00am – 8:15am Welcome Address by Dean Yannis Yortsos (USC)**

Ronald Tutor Campus Center Ballroom (RTCC Ballroom)

**8:15am - 9:00am Keynote: Professor Jim Davis (UCLA Provost)**

“INTEGRATING OPERATIONS AND INFORMATION TECHNOLOGY (OT/IT) SYSTEMS AND THE PRACTICE OF SMART MANUFACTURING”

Ronald Tutor Campus Center Ballroom (RTCC Ballroom)

**9:15am – 10:45am Technical Parallel Session -1**

**NAMRC - TRACK 1 Manufacturing Systems - CNC Machine Tools 1**

**Room GFS 116**

Chairman: Binil Starly

NAMRC-88 A UNIVERSAL VELOCITY LIMIT CURVE GENERATOR CONSIDERING ABNORMAL TOOL PATH GEOMETRY FOR CNC MACHINE TOOLS

*Mo Chen, Xue-Cheng Xi, Wan-Sheng Zhao, Hao Chen and Hong-Da Liu*

NAMRC-161 ISO-SCALLOP TOOL PATH BUILDING ALGORITHM BASED ON "TOOL PERFORMANCE METRIC" FOR GENERALIZED CUTTER AND ARBITRARY MILLING ZONES IN 3-AXIS CNC MILLING OF FREE-FORM TRIANGULAR MESHED SURFACES

*Andrey Balabokhin and Joshua Tarbutton*

NAMRC-166 A MODULAR-ARCHITECTURE CONTROLLER FOR CNC SYSTEMS BASED ON OPEN-SOURCE ELECTRONICS

*Jorge E. Correa, Nicholas Toombs and Placid M. Ferreira*

**NAMRC - TRACK 1 Manufacturing Systems - Flow Shop Scheduling 1**

**Room VHE 217**

Chairman: Grace Guo

NAMRC-4 AN IMPROVED HEURISTIC FOR NO-WAIT FLOW SHOP TO MINIMIZE MAKESPAN

*Honghan Ye, Wei Li and Amin Abedini*

NAMRC-91 OPERATIONS STATUS AND BOTTLENECK ANALYSIS AND IMPROVEMENT OF A BATCH PROCESS MANUFACTURING LINE USING DISCRETE EVENT SIMULATION

*Sriram Velumani and He Tang*

NAMRC-146 MEASUREMENT OF OPERATOR-MACHINE INTERACTION ON A CHAKU-CHAKU ASSEMBLY LINE

*Matthew Krugh, Ethan McGee, Stephen McGee, Laine Mears, Andrej Ivanco, Kenneth Podd and Barbara Watkins*

**NAMRC - TRACK 2 "Manufacturing Processes" - Machining 1**

**Room SAL 101**

Chairman: Brad Kinsey

NAMRC-12 A FUNDAMENTAL INVESTIGATION OF MODULATED TOOL PATH TURNING MECHANICS

*Ryan Copenhaver, Mark Rubeo, Steven Guzorek, Saurabh Landge, K. Scott Smith, John Ziegert and Tony Schmitz*

NAMRC-74 A VIRTUAL SENSING BASED AUGMENTED PARTICLE FILTER FOR TOOL CONDITION PROGNOSIS

*Jinjiang Wang, Yinghao Zheng, Peng Wang and Robert X. Gao*

NAMRC-112 MACHINABILITY FOR DRY TURNING OF LASER CLADDED PARTS WITH CONVENTIONAL VS. WIPER INSERT

*P.R. Zhang, Z.Q. Liu and Y.B. Guo*

**NAMRC - TRACK 2 "Manufacturing Processes" - Finishing Operations 1**  
**Room SAL 126**

Chairman: Tony Schmitz

NAMRC-179 EXPERIMENTAL ANALYSIS OF LASER AND SCANNER CONTROL PARAMETERS DURING LASER POLISHING OF H13 STEEL

*Joshua Miller, Remus Tutunea-Fatan and Evgueni Bordatchev*

NAMRC-22 EFFECT OF VIBRATION ASSISTANCE ON SURFACE RESIDUAL STRESS IN GRINDING OF Ti6Al4V ALLOY

*Naresh Kumar Maroju and Xiaoliang Jin*

NAMRC-53 AN ANALYTICAL CHIP THICKNESS MODEL FOR PERFORMANCE ASSESSMENT IN SILICON CARBIDE GRINDING

*Sanjay Agarwal, Sanchit Kr. Khare, Ved Prakash Pandey and Manoj Patel*

**NAMRC - TRACK 2 Manufacturing Processes - Surface Integrity 1**  
**Room EEB 248**

Chairman: Ihab Ragai

NAMRC-181 EXPERIMENTAL INVESTIGATION OF DROPLET IMPACT ON METAL SURFACES IN REDUCED AMBIENT PRESSURE

*Benjamin Mitchell, Teagan Bate, Joseph Klewicki, Yannis Korkolis and Brad Kinsey*

NAMRC-108 SURFACE INTEGRITY AND CORROSION PERFORMANCE OF BIOMEDICAL MAGNESIUM-CALCIUM ALLOY PROCESSED BY HYBRID DRY CUTTING-FINISH BURNISHING

*M. Salahshoor, Y.B. Guo and C. Li*

NAMRC-107 BENCHMARK BURNISHING WITH ALMEN STRIP FOR SURFACE INTEGRITY

*Z.Y. Liu, C.H. Fu, M.P. Sealy and Y.B. Guo*

**NAMRC - TRACK 6 Manufacturing Implementation - 1**  
**Room GER 224**

Chairman: John Agapiou

NAMRC-106 DEXTEROUS PRINTING AND FABRICATION OF MULTI-FUNCTIONAL PARTS: SENTIMENTS IN SCIENCE AND ENGINEERING EDUCATION

*Jolie Frketic, Sean Psulkowski, Alexander Sharp and Tarik Dickens*

NAMRC-24 INTEGRATED DESIGN, MANUFACTURING AND ANALYSIS OF AIRFOIL AND NOZZLE SHAPES IN AN UNDERGRADUATE COURSE

*Barbara Linke, Ian Garretson, Fahad Jan and Mohamed Hafez*

NAMRC-154 ENABLING NON-EXPERT SUSTAINABLE MANUFACTURING PROCESS AND SUPPLY CHAIN ANALYSIS DURING THE EARLY PRODUCT DESIGN PHASE

*Kamyar Raoufi, Karl Haapala, Kathy Jackson, Kyoung-Yun Kim, Gul Kremer, and Carolyn Psenka*

**NAMRC - TRACK 1 Manufacturing Systems - Robot in Manufacturing**  
**Room IRC 1016/1017**

Chairman: Iqbal Shareef

NAMRC-61 HUMAN MOTION PREDICTION FOR HUMAN-ROBOT COLLABORATION

*Hongyi Liu and Lihui Wang*



NAMRC-19 DYNAMIC MODELING OF MANUFACTURING CAPABILITY FOR ROBOTIC DISASSEMBLY IN REMANUFACTURING

*Zongqing Zheng, Wenjun Xu, Zude Zhou, Duc Truong Pham, Yongzhi Qu and Jian Zhou*

NAMRC-20 MANUFACTURING CAPABILITY ASSESSMENT FOR HUMAN-ROBOT COLLABORATIVE DISASSEMBLY BASED ON MULTI-SOURCE DATA FUSION

*Huiping Cheng, Wenjun Xu, Qingsong Ai, Quan Liu, Zude Zhou and Duc Truong Pham*

**NAMRC - TRACK 1 Manufacturing Systems - Smart Factory**

**Room PRB MPR**

Chairman: Dazhong Wu

NAMRC-86 GENERAL MOTOR FAMILY FLEXIBILITY DESIGN BASED ON NICA-II

*Wei Wei, Pingyuan Wang, Zhenyu Tian, Jun Ji and Cui Jin*

NAMRC-48 OPTIMIZATION OF PROCESS PARAMETERS FOR MINIMIZATION OF SPECIFIC POWER CONSUMPTION AT TARGETED SURFACE ROUGHNESS

*Nitesh Sihag and Kuldip Singh Sangwan*

NAMRC-6 IOT-ENABLED SMART FACTORY VISIBILITY AND TRACEABILITY USING LASER-SCANNERS

*Ray Y. Zhong, Xun Xu and Lihui Wang*

**MSEC 4-5-1 CLOUD MANUFACTURING I**

**PRB PC**

Track Organizer: Mathew Kuttolamadom

Session Organizer: Xun Xu

Session Co-Organizer: Armin Lechler

MSEC2017-2639 A PERSONALIZED ATTRIBUTE DETERMINATION PROCESS IN A CLOUD-BASED ADAPTABLE PRODUCT CONFIGURATOR

*Pai Zheng, Shiqiang Yu, Xun Xu,*

MSEC2017-2987 PRODUCT-SERVICE FAMILY ENABLED PRODUCT CONFIGURATION SYSTEM FOR CLOUD MANUFACTURING

*Shiqiang Yu, Pai Zheng, Chunyang Yu, Xun Xu*

MSEC2017-3038 INTEROPERABILITY IN CLOUD MANUFACTURING AND PRACTICE ON PRIVATE CLOUD STRUCTURE FOR SMES

*Xi Vincent Wang, Lihui Wang*

**NAMRC - TRACK 3 Additive Manufacturing - Sustainability**

**Room PRB SCR**

Chairman: Yong Chen

NAMRC-158 ENVIRONMENTAL PERFORMANCE EVALUATION OF DIRECT METAL LASER SINTERING THROUGH EXERGY ANALYSIS

*Hari Prashanth Narayan Nagarajan and Karl Haapala*

NAMRC-65 A FRAMEWORK FOR EVALUATING ADDITIVE MANUFACTURING FEASIBILITY: SAM-CT

*Susan Smyth and Michael Grieves*

NAMRC-57 A GENERIC SUSTAINABILITY ASSESSMENT MODEL TOWARDS CONSOLIDATED PARTS FABRICATED BY ADDITIVE MANUFACTURING PROCESS

*Sheng Yang, Tanushree Talekar, Mohamed Aslam Sulthan and Yaoyao Fiona Zhao*

### **NAMRC - TRACK 3 Additive Manufacturing - Jet Printing**

#### **Room HAR 101**

Chairman: Xiaoyu (Rayne) Zheng

NAMRC-89 FABRICATION AND ELECTRICAL CHARACTERIZATION OF MULTI-LAYER CAPACITIVE TOUCH SENSORS ON FLEXIBLE SUBSTRATES BY ADDITIVE E-JET PRINTING

*Hantang Qin, Jingyan Dong and Yuan-Shin Lee*

NAMRC-160 IN-SITU DROPLET INSPECTION AND CONTROL SYSTEM FOR LIQUID METAL JET 3D PRINTING PROCESS

*Tianjiao Wang, Tsz-Ho Kwok and Chi Zhou*

NAMRC-73 HIGH-RESOLUTION ELECTROHYDRODYNAMIC (EHD) DIRECT PRINTING OF MOLTEN METAL

*Yiwei Han and Jingyan Dong*

### **NAMRC - TRACK 3 Additive Manufacturing – Miscellaneous**

#### **Room ZHS 159**

Chairman: Jyhwen Wang

NAMRC-35 INVESTIGATION OF SINTERING SHRINKAGE IN BINDER JETTING ADDITIVE MANUFACTURING PROCESS

*Yujia Wang and Yaoyao Fiona Zhao*

NAMRC-3 EFFECT OF LATTICE DESIGN AND PROCESS PARAMETERS ON DIMENSIONAL AND MECHANICAL PROPERTIES OF BINDER JET ADDITIVELY MANUFACTURED STAINLESS STEEL 316 FOR BONE SCAFFOLDS

*Sairam Vangapally, Kuldeep Agarwal, Alex Sheldon and Shaobiao Cai*

NAMRC-33 ULTRASONIC VIBRATION-ASSISTED LASER ENGINEERED NET SHAPING OF INCONEL 718 PARTS: A FEASIBILITY STUDY

*Fuda Ning, Yingbin Hu, Zhichao Liu, Weilong Cong, Yuzhou Li and Xinlin Wang*

### **NAMRC - TRACK 2 Manufacturing Processes - Machining Composites**

#### **Room ZHS 252**

Chairman: Murali Sundaram

NAMRC-131 ROTARY ULTRASONIC SURFACE MACHINING OF CFRP COMPOSITES: A COMPARISON WITH CONVENTIONAL SURFACE GRINDING

*Fuda Ning, Hui Wang, Yingbin Hu, Weilong Cong, Meng Zhang and Yuzhou Li*

NAMRC-173 MACHINABILITY STUDY OF UNIDIRECTIONAL CFRP LAMINATES BY SLOT MILLING

*Jianbo Sui, Wenping Zhao and Changle Li*

NAMRC-97 PARAMETER OPTIMIZATION ON SURFACE ROUGHNESS DURING MILLING OF WOVEN KENAF FIBER REINFORCED EPOXY COMPOSITE

*Azmi Harun, Che Hassan Che Haron, Jaharah A.Ghani and Suhaily Mokhtar*

### **NAMRC - TRACK 2 Manufacturing Processes - Miscellaneous 1**

#### **Room ZHS 352**

Chairman: Hitomi Yamaguchi

NAMRC-126 NUMERICAL INVESTIGATION OF ULTRASHORT LASER INTERACTION WITH DIELECTRIC MATERIALS BASED ON A PLASMA-TEMPERATURE COMBINED MODEL

*Xiao Jia and Xin Zhao*

NAMRC-138 WEIGHT REDUCTION OF HEAVY DUTY TRUCK COMPONENTS THROUGH HOLLOW GEOMETRY AND INTENSIVE QUENCHING

*James Lowrie, Hao Pang and Gracious Ngaile*

NAMRC-134 GEOMETRIC COMPLEXITY BASED PROCESS SELECTION FOR HYBRID MANUFACTURING

*Anay Joshi and Sam Anand*

11:00am – 12:30pm

## Student Manufacturing Design Competition

Track Organizer: **Radu Pavel**, *Techsolve Inc, Cincinnati, OH, United States*

### MSEC 9-1-1 Student Manufacturing Design Competition

#### Room TCC 351/352

Session Organizer: **Radu Pavel**, *Techsolve Inc, Cincinnati, OH, United States*

Session Co-Organizer: **Laine Mears**, *Clemson University, Anderson, SC, United States*, **Hitomi Yamaguchi**, *University Of Florida, Gainesville, FL, United States*

MSEC2017-3163 DESIGN OF A CONTINUOUS-TENSION-COMPRESSION MACHINE FOR SHEET METAL

#### Oral Presentation.

**Jacqueline McNally**, *University of New Hampshire, Rochester, NH, United States*

MSEC2017-3164 INVISIBELL

#### Oral Presentation.

**Swetha Sriram**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

MSEC2017-3165 DESIGN AND FABRICATION OF COST-EFFECTIVE FLEXIBLE THIN-FILM SOLAR CELLS USING ADDITIVE MANUFACTURING

#### Oral Presentation.

**Rinkesh Contractor**, *California State University, Fullerton, CA, United States*

MSEC2017-3166 THE DREAM MACHINE: A MULTI-TOOL ADDITIVE MANUFACTURING SYSTEM

#### Oral Presentation.

**Lindsey Bass**, *VirginiaTech, Blacksburg, VA, United States*

11:00am – 12:30pm

## Joint MSEC-NAMRC-JSME Symposia: MSEC Symposium Invited Speaker Program

Track Organizer: **Johnson Samuel**

Track Co-Organizer: **Lihui Wang**, **Satoshi Kishimoto**

### MSEC 8-3-2 Big Data Implications for Manufacturing & Design Innovation

#### Room SGM 123

Session Organizer: **Moneer Helu**

Session Co-Organizer: **Thomas Hedberg**

*This session features a 60 min talk on the topic of big data implications for manufacturing and design innovation followed by a 30 min audience Q & A session.*

MSEC2017-3171 A NEW KIND OF THINKING: REVOLUTIONIZING DESIGN AND MANUFACTURING

**William Regli**, *Defense Advanced Research Projects Agency (DARPA), Arlington, VA, United States*

**11:00am – 12:30pm Technical Parallel Session - 2**

**NAMRC - TRACK 1 Manufacturing Systems - CNC Machine Tools 2**  
**Room GFS 116**

Chairman: Binil Starly

NAMRC-69 COMPLIANCE ANALYSIS OF A NOVEL TOOL HEAD WITH PARALLEL KINEMATICS CONSIDERING JOINT CLEARANCE  
*Guang Yu, Jun Wu, Liping Wang, Zhufeng Shao and Ying Gao*

NAMRC-92 ADAPTIVE LEARNING CONTROL FOR THERMAL ERROR COMPENSATION OF 5-AXIS MACHINE TOOLS  
*Philip Blaser, Florentina Pavliček, Kotaro Mori, Josef Mayr, Sascha Weikert and Konrad Wegener*

NAMRC-70 PARTICLE LEARNING IN ONLINE TOOL WEAR DIAGNOSIS AND PROGNOSIS  
*Jianlei Zhang, Binil Starly, Yi Cai, Yuan-Shin Lee and Paul Cohen*

**NAMRC - TRACK 1 Manufacturing Systems - Flow Shop Scheduling 2**  
**Room VHE 217**

Chairman: Lihui Wang

NAMRC-45 REDUCTION OF TOOL WEAR BY SYSTEMATIC DESIGN OF THE TOOL CLAMPING SITUATION  
*Dominik Kraus, Marc Lieberenz and Peter Groche*

NAMRC-62 AN OPTIMIZATION MODEL FOR OPERATING ROOM SCHEDULING TO REDUCE BLOCKING ACROSS THE PERIOPERATIVE PROCESS  
*Amin Abedini, Wei Li and Honghan Ye*

NAMRC-83 MAXIMIZING OPERATING ROOM PERFORMANCE USING PORTFOLIO SELECTION  
*Vivek Reddy Gunna, Amin Abedini and Wei Li*

**NAMRC - TRACK 2 Manufacturing Processes - Machining 2**  
**Room SAL 101**

Chairman: Shreyes Melkote

NAMRC-98 EFFECT OF VIBRATION ON SURFACE TEXTURE DURING MACHINING MULTIPHASE MICROALLOYED STEEL  
*Sivaraman Vijayakumaran, Vijayaraghavan L and Sankaran S*

NAMRC-26 AN EXPERIMENTAL METHOD TO DETERMINE THE MINIMUM UNCUT CHIP THICKNESS (HMIN) IN ORTHOGONAL CUTTING  
*Reginaldo Coelho, Anselmo Diniz and Tatiany Silva*

NAMRC-140 COATED TOOL PERFORMANCE IN DRY TURNING OF SUPER DUPLEX STAINLESS STEEL  
*Rajaguru J and Arunachalam N*

**NAMRC - TRACK 2 Manufacturing Processes - Finishing Operations 2**  
**Room SAL 126**

Chairman: Masakazu Soshi

NAMRC-72 REDUCTION OF FRICTION USING ELECTROSPUN POLYMER COMPOSITE MICROBEADS EMULSIFIED IN MINERAL OIL  
*Danny Wong, Jesus Resendiz, Philip Egberts and Simon Park*

NAMRC-135 SURFACE GRINDING OF TI-6AL-4V ALLOY WITH SIC ABRASIVE WHEEL AT VARIOUS CUTTING CONDITIONS

*Rosemar Batista Da Silva, Antonio Vitor de Mello, Alisson Rocha Machado, Rogerio Valentim Gelamo, Anselmo Eduardo Diniz and Rodolfo Fischer Moreira de Oliveira*

NAMRC-156 QUALITY ENHANCEMENT WITH ULTRASONIC WAVE AND PULSED CURRENT IN ELECTROCHEMICAL MACHINING

*Wayne Hung, Jigar Patel, Zhujian Feng and Pedro Villanueva*

**NAMRC - TRACK 2 "Manufacturing Processes" - Surface Integrity 2**  
**Room EEB 248**

Chairman: Z.J. Pei

NAMRC-64 DYNAMIC DETECTION OF INSTABILITY DEFECTS IN TUBE ROTARY DRAW BENDING

*Enrico Simonetto, Andrea Ghiotti, Stefania Bruschi and Roberto Gemignani*

NAMRC-77 CORROSION BEHAVIOR OF TITANIUM IMPLANT WITH DIFFERENT SURFACE MORPHOLOGIES

*Guisen Wang, Yi Wan and Teng Wang*

NAMRC-43 ANALYSIS OF DIFFERENT SURFACE STRUCTURES OF HARD METAL GUIDING STONES IN THE HONING PROCESS

*Sven Klein, Shiqi Fang and Dirk Bähre*

**NAMRC - TRACK 6 "Manufacturing Implementation" - 2**  
**Room GER 224**

Chairman: John Agapiou

NAMRC-16 STUDY ON THE INNOVATION INCUBATION ABILITY EVALUATION OF HIGH TECHNOLOGY INDUSTRY IN CHINA FROM THE PERSPECTIVE OF VALUE-CHAIN –

*Jianlin Zhou, Guohong Wang, Shulin Lan and Chen Yang*

NAMRC-13 INCORPORATING A SOCIAL IMPLEMENTATION PROGRAM INTO A MANUFACTURING EDUCATION PROGRAM IN JAPAN: CASE STUDY IN COLLABORATION WITH A MEDICAL FACILITY

*Hukuzo Yagishita and Mikio Fujio*

**MSEC 3-1-1 Machining of Composites**  
**Room IRC1016/1017**

Session Organizer: Daniel F. Walczyk

Session Co-Organizer: Christopher Hansen, David Gill,

MSEC2017-2694 STUDYING THE MECHANISMS OF HIGH RATES OF TOOL WEAR IN THE MACHINING OF ARAMID HONEYCOMB COMPOSITES

*David Gill, Derek Yip-Hoi, Max Meaker, Taryn Boni, Alex Brennen, Erica Eggeman, Aidan Anderson,*

MSEC2017-2737 EFFECT OF CRYOGENIC CONDITIONS ON THE DRILLING PERFORMANCE OF CARBON-CARBON (C-C) COMPOSITES

*Y.-Q. Wang, L.-S. Han, H.-B. Liu, K. Li, Y. Ma*

MSEC2017-3052 STUDY OF CHIP MORPHOLOGY AND CHIP FORMATION MECHANISM DURING MACHINING OF MAGNESIUM-BASED METAL MATRIX COMPOSITES

*Brian Davis, David Dabrow, Licheng Ju, Anhai Li, Chengying Xu, Yong Huang*

## **MSEC 2-5-1 Forming I: Incremental Forming Processes**

### **Room PRB MPR**

Session Organizer: Ihab Ragai

Session Co-Organizer: Z.Q. Sheng

MSEC2017-3029 MATERIAL FLOW ANALYSIS FOR THE INCREMENTAL SHEET-BULK GEARING BY ROTATING TOOLS

*Sebastian Wernicke, Peter Sieczkarek, Joshua Grodotzki, Soeren Gies, Nooman Ben Khalifa, A. Erman Tekkaya,*

MSEC2017-3036 THE EFFECT OF MULTI-POINT ELECTRICAL PATHS ON GLOBAL SPRINGBACK ELIMINATION IN SINGLE POINT INCREMENTAL FORMING

*Jacklyn Niebauer, Derek Shaffer, Ihab Ragai, John Roth,*

MSEC2017-3037 THE EFFECTS OF POLARITY AND CURRENT PATH IN ELECTRICALLY ASSISTED SINGLE POINT INCREMENTAL FORMING OF 2024-T3 ALUMINUM

*Tyler Grimm, Ihab Ragai, John Roth,*

## **MSEC 4-4-1 Machining Process Controls on Multi-axis and Multi-tasking Machine Tools**

### **Room PRB PC**

Session Organizer: Keiichi Shirase

Session Co-Organizer: Shreyes Melkote

MSEC2017-2777 CUTTING FORCE PREDICTION OF BALL END MILLING BASED ON FULLY VOXEL REPRESENTATION OF CUTTING EDGE AND INSTANTANEOUS WORKPIECE SHAPE

*Isamu Nishida, Ryuma Okumura, Ryuta Sato, Keiichi Shirase,*

MSEC2017-2958 CHIP ADHESION AND TOOL WEAR IN DRIVEN ROTARY CUTTING OF STAINLESS STEEL

*Hiroyuki Sasahara, Masato Goto, Wataru Takahashi, Hiromasa Yamamoto, Toshiyuki Muraki,*

MSEC2017-3030 CUTTING SIMULATION IN DRILLING ON CYLINDER SURFACE IN TURNING CENTER OPERATION

*Takashi Matsumura, Shoichi Tamura*

## **MSEC 2-6-1 Scalable Nanomanufacturing**

### **Room PRB SCR**

Session Organizer: Liang Pan

Session Co-Organizer: Rajiv Malhotra

MSEC2017-2681 DESIGN AND FABRICATION OF ELECTROSTATIC MICROCOLUMN WITH VARYING APERTURES IN MASSIVELY PARALLEL ELECTRON BEAM LITHOGRAPHY

*Zhidong Du, Ye Wen, Liang Pan*

MSEC2017-2972 DESIGN OF A TIP BASED IN-LINE METROLOGY SYSTEM FOR ROLL-TO-ROLL MANUFACTURED FLEXIBLE ELECTRONIC DEVICES

*Liam G. Connolly, Michael Cullinan*

MSEC2017-3059 GRAPHENE GROWTH ON AND TRANSFER FROM PLATINUM THIN FILMS

*Joon Hyong Cho, Michael Cullinan*

## **MSEC 5-2-1 Advances in Biomanufacturing of Tissue-Engineered Scaffolds – 1**

### **Room HAR 101**

Session Organizer: Changxue Xu

Session Co-Organizer: Ruitong Xiong

MSEC2017-2853 A METHODOLOGY FOR QUANTIFYING CELL DENSITY AND DISTRIBUTION IN MULTIDIMENSIONAL BIOPRINTED GELATIN-ALGINATE CONSTRUCTS

*Houzhu Ding, Enyan Dai, Filippos Tournomousis, Robert Chang*

MSEC2017-3020 INVESTIGATION OF CELLULAR CONFINEMENT IN 3D MICROSACLE FIBROUS SUBSTRATES: FABRICATION AND METROLOGY

*Filippos Tournomousis, William Boettcher, Houzhu Ding, Robert Chang*

## **MSEC 5-1-1 Tissue cutting**

### **Room ZHE 159**

Session Organizer: Jason Moore,

Session Co-Organizer: Roland Chen

MSEC2017-2619 DESIGN AND DEVELOPMENT OF NOVEL LUBRICANT FREE TRANSMISSION SYSTEM FOR MANUAL BONE DRILLING MACHINE

*Mehdi Salehi, David Sternkopf, Eric Schilling, Ruediger Haas,*

MSEC2017-2850 ASYMMETRIC FLEXURE HINGE FOR COMPLIANT VIBRATIONAL TISSUE CUTTING

*Justin Jones, Yuan-Shin Lee, Jason Moore*

MSEC2017-3000 AN EXPERIMENTAL METHOD OF NEEDLE DEFLECTION AND PROSTATE MOVEMENT USING THE ANATOMICALLY ACCURATE PROSTATE SIMULATOR AND THE ELECTROMAGNETIC TRACKING SYSTEM

*Dian-Ru Li, Jih-Kai Yeh, Wei-Chen Lin, Jeffrey S. Montgomery, Albert Shih,*

## **ICMP 2-1-1 Advances in Processing of Polymer based Composites 1**

### **Room ZHS 252**

Session Organizer: Ryosuke Matsuzaki

Session Co-Organizer: Satoshi Kobayashi

ICMP2017-4353 MOLECULAR ORIENTATION SIMULATION IN EXTRUSION DRAWING OF PLA BILLETS WITH THE FINITE ELEMENT METHOD

*Masato SAKAGUCHI, Satoshi Kobayashi, Shinji Ogihara*

ICMP2017-4363 EXAMINATION OF OPTOMIZATION OF MOLDING CONDITION ON HYBLID MOLDING

*Maskai Ohishi, Akio Ohtani, Asami Nakai*

ICMP2017-4333 VISCOPLASTIC BEHAVIOR IN ANGLE-PLY CFRP LAMINATES

*Shinji Ogihara*

## **ICMP 2-3-1 Processing Advanced Casting and Forming**

### **Room ZHS 352**

Session Organizer: Hisaki Watari

Session Co-Organizer: Takahiro Ohashi

ICMP2017-4308 A STUDY ON THE SAND MOLD COLLAPSIBILITY FOR MULTI-CAVITY CASTING PROCESS OF ALUMINUM

*Yoshio FUKUSHIMA, Tomoaki SAKATA, Akiko SAKAMOTO, Takashi SUDA, Jun OZAWA*

ICMP2017-4332 CASTING OF ALUMINUM ALLOY CLAD STRIP BY TWIN ROLL CASTER

*Toshio Haga*

ICMP2017-4385 HOT FORGING CHARACTERISTICS OF HIGH ALUMINUM CONTENT TRC MATERIALS

*Hisaki Watari, Sueji Hirawatari, Tomohiro Kishi, Shinichi Nishida, Mayumi Suzuki, Toshio Haga*



**2:00pm – 3:30pm**  
**Student Manufacturing Design Competition**

**MONDAY, JUNE 5, 2017**

**MSEC 9-1-2 Student Manufacturing Design Competition**

**Room TCC 351/352**

Session Organizer: **Radu Pavel**, *Techsolve Inc, Cincinnati, OH, United States*

Session Co-Organizer: **Laine Mears**, *Clemson University, Anderson, SC, United States*, **Hitomi Yamaguchi**, *University Of Florida, Gainesville, FL, United States*

MSEC2017-3167 MIND IN THE MACHINE

**Oral Presentation.**

**Freddy Wang**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

MSEC2017-3168 CIRCULATOR PACKAGING ROBOT

**Oral Presentation**

**Jamie Gravell**, *University of Texas at Dallas, Richardson, TX, United States*

MSEC2017-3169 DESIGN AND MANUFACTURE OF A COMPLIANT JOINT FOR MITIGATING QUADRANT GLITCHES

**Oral Presentation.**

**Xingjian Liu**, *University of Michigan, Ann Arbor, MI, United States*

MSEC2017-3170 SURVIVAL WALLET TEAM

**Oral Presentation**

**Sam Chiappone**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

**2:00pm – 3:30pm**

**Joint MSEC-NAMRC-JSME Symposia: MForesight Event**

Track Organizer: **Johnson Samuel**, *Rensselaer Polytechnic Insitute, Troy, NY, United States*

Track Co-Organizer: **Lihui Wang**, *KTH, Royal Institute of Technology, Sweden, Stockholm, Select State/Province, Sweden*,  
**Satoshi Kishimoto**, *National Institute for Materials Science, Tsukuba, Ibaraki, Japan*

**8-2-1 Cost-Effective Low-Volume Manufacturing - Part 1** \*Part 2 will take place in SGM 124 from 3:45pm – 5:15pm\*

**Room SGM 124**

Session Sponsor: **MForesight: Alliance for Manufacturing Foresight** ([www.mforesight.org](http://www.mforesight.org))

Session Organizer: **Daniel F. Walczyk**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Session Co-Organizer: **Glenn Daehn**, *The Ohio State University, Columbus, OH, United States*

Session Co-Organizer: **David Hardt**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

**2:00pm – 3:30pm Technical Parallel Session - 3**

**MSEC 1-2-5 Enhancement of Component Design, Properties & Functionality Part2**

**Room GFS 116**

Session Organizer: Alessandro Ascari

Session Co-Organizer: Alessandro Fortunato

MSEC2017-3018 OVERHANG SUPPORT STRUCTURE DESIGN FOR ELECTRON BEAM ADDITIVE MANUFACTURING

*Bo Cheng, Y. Kevin Chou*

MSEC2017-3048 DEVELOPMENT OF A NEW LASER-ASSISTED ADDITIVE MANUFACTURING TECHNOLOGY FOR HYBRID FUNCTIONALLY GRADED MATERIAL COMPOSITES

*Jung Sub Kim, Young Chang Kim, Sang Won Lee, Jeonghan Ko, Haseung Chung,*

MSEC2017-3021 EFFECTS OF POST WELD HEAT TREATMENTS (PWHT) ON FRICTION STIR WELDED AA2219-T87 JOINTS

*Mohammad Dewan, Muhammad Wahab, Khurshida Sharmin*

**MSEC 2-3-1 Additive Manufacturing**

**Room VHE 217**

Session Organizer: **Alireza Shirazi**

Session Co-Organizer: **Zhichao (Charlie) Li**

MSEC2017-2621 GEOMETRY-DRIVEN FINITE ELEMENT FOR FOUR-DIMENSIONAL PRINTING

*Tsz Ho Kwok*

MSEC2017-2721 INDUCTION HARDENING PROCESS WITH PREHEAT TO ELIMINATE CRACKING AND IMPROVE QUALITY OF A LARGE PART WITH VARIOUS WALL THICKNESS

*Zhichao (Charlie) Li, Blake Ferguson*

MSEC2017-2939 NUMERICAL MODELING OF METAL-BASED ADDITIVE MANUFACTURING PROCESS USING LEVEL SET METHODS

*Qian Ye, Shikui Chen*

**MSEC 4-2-1 Smart Manufacturing in Big Data Era**

**Room SAL 101**

MSEC2017-2695 DYNAMIC SAMPLING DESIGN FOR CHARACTERIZING SPATIOTEMPORAL PROCESSES IN MANUFACTURING

*Chenhui Shao, Jionghua (Judy) Jin, S. Jack Hu*

MSEC2017-2840 APPROACHES TO IMPLEMENT STATISTICAL PROCESS CONTROL FOR MANUFACTURING IN BIG DATA ERA

*Shing Chang*

MSEC2017-2937 SMART MANUFACTURING THROUGH A FRAMEWORK FOR A KNOWLEDGE-BASED DIAGNOSIS SYSTEM

*Michael P. Brundage, Boonserm Kulvatunyou, Toyosi Ademujimi, Badarinath Rakshith,*

## **MSEC 2-1-2 Process Control and Optimization**

### **Room SAL 126**

Session Organizer: Scott Miller

Session Co-Organizer: Xun Liu

MSEC2017-2692 ON-LINE DETECTION OF FRICTION STIR WELDED JOINTS BY HIGH TEMPERATURE PHASED ARRAY ULTRASONIC INSPECTION AND CONTROL OF WELD PROCESS PARAMETERS

*Daniel Huggett, Muhammad Wahab, Ayman Okeil, T. W. Liao*

MSEC2017-2605 OPTIMIZATION OF FRICTION STIR WELDING PROCESS PARAMETERS TO JOIN AL 5052 AND AL 6061 ALLOY PLATES USING GREY-TAGUCHI TECHNIQUE

*Sandeep Renangi, Sudhakara Dara, Prasanthi G*

MSEC2017-2786 INVESTIGATION OF THE CLEANING AND WELDING STEPS FROM THE FRICTION ELEMENT WELDING PROCESS

*Jamie D. Skovron, Brandt Ruzskiewicz, Ankit Varma, Yuxin Li, Laine Mears, Xin Zhao, Tim Abke, Hongseok Choi,*

## **MSEC 4-8-1 Machining and Process Control -1**

### **Room EEB 248**

Session Organizer: Burak Sencer

Session Co-Organizer: Norikazu Suzuki

MSEC2017-2749 MACHINING OPERATION PROCESS PLANNING SYSTEM CONSIDERING USER STRATEGIES AND INTENTIONS

*Taishi Hirai, Isamu Nishida, Ryuta Sato, Keiichi Shirase*

MSEC2017-2928 DESIGN OF ANISOTROPIC BORING TOOLS WITH L/D = 10 FOR CHATTER FREE CUTTING

*Wataru Takahashi, Norikazu Suzuki, Shamoto Eiji*

MSEC2017-3054 CHATTER SUPPRESSION IN PARALLEL TURNING WITH UNEQUAL PITCH USING OBSERVER BASED CUTTING FORCE ESTIMATION

*Shinya Sakata, Takashi Kadota, Yuki Yamada, Kenichi Nakanishi, Hayato Yoshioka, Norikazu Suzuki, Yasuhiro Kakinuma*

## **MSEC 2-2-1 Laser Assisted Manufacturing Processes**

### **Room GER 224**

Session Organizer: Farbod Akhavan Niaki

Session Co-Organizer: Hossein Mohammadi

MSEC2017-2758 DUCTILE REGIME SCRATCHING OF A ROCK SAMPLE IN A LASER ASSISTED MACHINING TECHNIQUE

*Barkin Bakir, Hossein Mohammadi, John Patten*

MSEC2017-2864 DEVELOPMENT OF MULTI-AXIS LASER-ASSISTED MILLING DEVICE

*Dong-Hyeon Kim, Wan-Sik Woo, Won-Shik Chu, Sung-Hoon Ahn, Choon-Man Lee*

MSEC2017-3014 EFFECT OF TEMPERING TEMPERATURE ON HARDNESS AND MICROSTRUCTURE OF LASER SURFACE REMELTED AISI H13 TOOL STEEL

*Debapriya Patra Karmakar, Gopinath Muvvala, Ashish Kumar Nath*

### **MSEC 3-3-1 Fabrication and Testing of Polymers and Polymer-based Composites I**

#### **Room IRC1016/1017**

Session Organizer: Ozlem Yasar

Session Co-Organizer: Loredana Santo

MSEC2017-2760 INVESTIGATION OF STRUCTURE-PROPERTY RELATIONSHIPS IN THERMOPLASTIC POLYURETHANE/MULTIWALLED CARBON NANOTUBE COMPOSITES

*Felicia Stan, Catalin Fetecau, Nicoleta V. Stanciu, Razvan T. Rosculeț, Laurentiu I. Sandu*

MSEC2017-2792 NEW MODEL FOR HYPER-ELASTIC MATERIALS BEHAVIOR WITH AN APPLICATION ON NATURAL RUBBER

*Ahmed Korba, Mark E Barkey*

### **NAMRC - TRACK 2 "Manufacturing Processes" – Forming**

#### **Room PRB MPR**

Chairman: Albert Shih

NAMRC-52 DESIGNING, MANUFACTURING AND PROCESSING OF TAILORED BLANKS IN A SHEET-BULK METAL FORMING PROCESS

*Robert Schulte, Philipp Hildenbrand, Michael Lechner and Marion Merklein*

NAMRC-30 EXPERIMENTAL DETERMINATION OF THE EFFECTIVE VISCOSITY OF PLASTICIZED ALUMINUM ALLOY 6061-T6 DURING FRICTION STIR FORMING

*Daniel Franke, Justin Morrow, Michael Zinn, Neil Duffie and Frank Pfefferkorn*

NAMRC-34 THE EFFECT OF HYDRAULIC BULGE PROCESS ON THE SURFACE TOPOGRAPHY OF ANNEALED AISI 304 STAINLESS STEEL

*Ayotunde Olayinka, William Emblom, Thomas Pasacrete and Scott Wagner*

### **MSEC4-5-2 Cloud Manufacturing II**

#### **Room PRB PC**

Session Organizer: Xun Xu

Session Co-Organizer: Miroslav Ljubcic

MSEC2017-2656 SOFTWARE DEFINED MANUFACTURING EXTENDS CLOUD-BASED CONTROL

*Armin Lechler, Alexander Verl,*

MSEC2017-2703 CROSS-LAYER OPTIMIZATION MODEL TOWARDS SERVICE-ORIENTED ROBOTIC MANUFACTURING SYSTEMS

*Jiaqiang Zhang, Quan Liu, Wenjun Xu, Zude Zhou, Duc Truong Pham,*

MSEC2017-3012 RAPIDLY DEPLOYABLE MTCONNECT-BASED MACHINE TOOL MONITORING SYSTEMS

*Roby Lynn, Wafa Louhichi, Mahmoud Parto, Ethan Wescoat, Thomas Kurfess*

### **MSEC 1-1-1 The Effects of Surface Properties in Additive Manufacturing**

#### **Room PRB SCR**

Session Organizer: Kira Barton

Session Co-Organizer: Jarred Heigel, Kevin Chou

MSEC2017-2841 INVESTIGATION OF WEAR AND CORROSION CHARACTERISTICS OF STELLITE-6 AND STELLITE-21 LAYERS DEPOSITED BY CO-AXIAL LASER CLADDING

*Debapriya Patra Karmakar, Gopinath Muvvala, Soham Harmalkar, Ashish Kumar Nath,*

MSEC2017-2753 EFFECTS OF SURFACE ROUGHNESS ON BONDING BEHAVIOR OF COLD SPRAY Ti6AL4V COATINGS

*Wen Sun, Adrian Wei Yee Tan, Iulian Marinescu, Erjia Liu*

MSEC2017-3024 DEVELOPMENT OF LASER POLISHING AS AN AUXILIARY POST-PROCESS TO IMPROVE SURFACE QUALITY IN FUSED DEPOSITION MODELING PARTS

*Mario Perez-Dewey, Durul Ulutan*

### **MSEC 3-2-1 Processing of Energy Materials**

#### **Room HAR 101**

Session Organizer: Aleksandra Fortier

Session Co-Organizer: Nilesh Kumar

MSEC2017-2603 THE EFFECTS OF LASER AND MECHANICAL FORMING ON THE HARDNESS AND MICROSTRUCTURAL LAYOUT OF COMMERCIAL PURE GRADE 2 TITANIUM ALLOY PLATES

*Kadephi V Mjali, Peter Madindwa Mashinini, Annelize Els-Botes*

MSEC2017-2894 ULTRASONIC PELLETTING AND SYNCHRONIZED TORREFACTION OF CELLULOSIC BIOMASS FOR BIOENERGY PRODUCTION

*Yang Yang, Nicholas Eisenbarth, Xiaoxu Song, Meng Zhang, Donghai Wang*

MSEC2017-3008 EXPERIMENTAL INVESTIGATIONS ON SURFACE ROUGHNESS, CUTTING FORCES AND TOOL WEAR IN TURNING OF SUPER DUPLEX STAINLESS STEEL WITH COATED CARBIDE INSERTS

*Shirish Kadam, Rohit Khake, Sadaiah Mudigond*

### **ICMP 2-4-1 Surface Modification Technology**

#### **Room ZHS 159**

Session Organizer: Hiroki Akasaka

Session Co-Organizer: Yuko Aono

ICMP2017-4354 DRY LASER PEENING ON METAL THIN FILM USING TRANSPARENT SOLID MEDIUM

*Yuko Aono, Atsushi Hirata, Hitoshi Tokura*

ICMP2017-4431 NUMERICAL STUDY OF PLASMA STATE WHILE INTERNAL DEPOSITION OF DLC FILMS ONTO METAL TUBE

*Ryota Takamura, Hiroki Akasaka, Naoto Ohtake*

### **ICMP 2-1-2 Advances in Processing of Polymer based Composites 2**

#### **Room ZHS 252**

Session Organizer: Norimichi Nanami

Session Co-Organizer: Satoshi Kobayashi

ICMP2017-4368 SEMI-VISCOELASTIC FE ANALYSIS OF PROCESS-INDUCED DEFORMATION IN COMPOSITE LAMINATES

*Keiji Ogi, Hiroaki Matsutani, Narumichi Sato*

ICMP2017-4371 SHORTENING IN RESIN IMPREGNATION TIME OF VARTM PROCESS AND INTERLAMINAR TOUGHENING FOR GFRP BY INSERTING POLYAMIDE MESH

*Hayato Nakatani, Yosuke Handa, Katsuhiko Osaka*

ICMP2017-4383 DATA ASSIMILATION FOR ESTIMATION OF COMPOSITE CURING PROCESS BY INTEGRATING SIMULATION AND MEASUREMENTS  
*Junya Ishizuka, Ryosuke Matsuzaki, Takeshi Tachikawa*

**ICMP 2-5-1 Mechanics of Advanced Welding and Joining Technology**

**Room ZHS 352**

Session Organizer: Masaaki Otsu

Session Co-Organizer: Yukio Miyashita

ICMP2017-4373 JOINING CHARACTERISTICS AND RESIDUAL STRESS CHARACTERISTICS OF FRICTION WELDING BETWEEN DISSIMILAR SHAPES AND DISSIMILAR MATERIALS

*Tsuyoshi Takahashi, Masaaki Kimura*

ICMP2017-4448 RESEARCH ON VARIATION CHARACTERISTICS OF THE TEMPERATURE FIELD OF GALVANIZED STEEL SHEET IN THE LASER BRAZING COMBINED WITH SIMULATION AND EXPERIMENT

*H.J. Liu, X.D. Zhang*

**3:45pm – 5:15pm**

**Joint MSEC-NAMRC-JSME Symposia: MForesight Event**

Track Organizer: **Johnson Samuel**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Track Co-Organizer: **Lihui Wang**, *KTH, Royal Institute of Technology, Sweden, Stockholm, Select State/Province, Sweden*, **Satoshi Kishimoto**, *National Institute for Materials Science, Tsukuba, Ibaraki, Japan*

**8-2-2 Cost-Effective Low-Volume Manufacturing - Part 2**

**Room SGM 124**

Session Sponsor: **MForesight: Alliance for Manufacturing Foresight**, ([www.mforesight.org](http://www.mforesight.org))

Session Organizer: **Daniel F. Walczyk**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Session Co-Organizer: **Glenn Daehn**, *The Ohio State University, Columbus, OH, United States*

Session Co-Organizer: **David Hardt**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

**3:45pm – 5:15pm Technical Parallel Session - 4**

**MSEC 1-3-1 Advances in Micro- and Nano- Additive Manufacturing - 1**

**GFS 116**

Session Organizer: Xiaoming Yu

Session Co-Organizer: Yuen-Shan Leung

MSEC2017-2731 DEVELOPMENT AND CHARACTERIZATIONS OF LIQUID BRIDGE BASED MICROSTEREOLITHOGRAPHY (LBMSL) SYSTEM

*Yanfeng Lu, Sumanth Kashyap, Md Omar Faruk Emon, Jeongwoo Lee, Jae-Won Choi*

MSEC2017-3031 MULTI-SCALE STEREOLITHOGRAPHY USING SHAPED BEAMS

*Yong Chen, Huachao Mao, Yuen-Shan Leung, Yuanrui Li, Pan Hu, Wei Wu*

MSEC2017-2788 AXIAL CONTROL OF TWO-PHOTON POLYMERIZATION WITH FEMTOSECOND BESSEL BEAM

*Xiaoming Yu, Meng Zhang, Shuting Lei*

**MSEC 2-3-2 Manufacturing Processing I**

**VHE 217**

Session Organizer: Zhichao (Charlie) Li

Session Co-Organizer: Alireza Shirazi

MSEC2017-2741 STUDY ON THE GENERATION AND REDISTRIBUTION MECHANISM OF RESIDUAL STRESS IN BILATERAL ROLLING CORRECTION PROCESS FOR THIN-WALLED PARTS

*Laixiao Lu, Jie Sun, Kai Guo, Jianfeng Li,*

MSEC2017-2878 CHARACTERIZATION OF MACHINING DISTORTION DUE TO RESIDUAL STRESSES IN QUENCHED

ALUMINUM

*Destiny R. Garcia, Michael R. Hill, Jan C. Aurich, Barbara S. Linke*

MSEC2017-3058 EFFICIENT PREDICTION OF CONTACT BEHAVIOR IN A 6-HIGH ROLLING MILL WITH CONTINUOUSLY VARIABLE CROWN INTERMEDIATE ROLLS

*Feng Zhang, Arif Malik*

## **MSEC 4-2-2 Data-Driven Engineering Modeling in Advanced Manufacturing**

### **SAL 101**

Session Organizer: Brian Weiss,

Session Co-Organizer: Qing Chang, Xiaoning Jin

MSEC2017-2771 REINFORCEMENT LEARNING BASED REAL-TIME CONTROL POLICY FOR TWO-MACHINE-ONE-BUFFER PRODUCTION SYSTEM

*Wei Zheng, Yong LEI, Qing Chang*

MSEC2017-2787 HIERARCHICAL DECOMPOSITION OF A MANUFACTURING WORK CELL TO PROMOTE MONITORING, DIAGNOSTICS, AND PROGNOSTICS

*Brian Weiss, Guixiu Qiao*

MSEC2017-2856 CO-SIMULATION RESEARCH OF THE BALANCING CONTROL OF THE MOVING BEAM OF A HEAVY HYDRAULIC PRESS DURING THE DIE FORGING PROCESS

*Wenzhu Wang, Dong Du, Rendong Wu, Chaolong Yuan, Baohua Chang*

## **MSEC 2-1-3 Experimental Studies**

### **SAL 126**

Session Organizer: Xun Liu

Session Co-Organizer: Weihong Guo

MSEC2017-2700 ANALYSIS OF FRICTION STIR RIVETING PROCESSES: A REVIEW

*Haris Khan, Jingjing Li, Chenhui Shao*

MSEC2017-2803 ELECTRICALLY ASSISTED FRICTION STIR SPOT WELDING OF ALUMINUM ALLOY TO ADVANCED HIGH STRENGTH STEEL

*Kai Chen, Xun Liu, Jun Ni*

MSEC2017-3084 INVESTIGATION ON BURR HEIGHT CONTROL AND CHIP MORPHOLOGY IN DRY DRILLING OF TITANIUM ALLOYS

*Shaochun Sui, Xiaohua Li, Chao Sun*

## **MSEC 4-10-1 Monitoring, Sensing and Control - Session 1**

### **EEB 248**

Session Organizer: Robert Landers

Session Co-Organizer: Radu Pavel

MSEC2017-2756 VIBRATION CONTROL OF COMPUTER NUMERICALLY CONTROLLED LATHE WITH CFRP PIPE FRAME

*Honoka Yamada, Kazuki Sawatani, Yoshitaka Morimoto, Naohiko Suzuki, Yoshiyuki Kaneko,*

MSEC2017-2773 MEASUREMENT-BASED ADAPTIVE MACHINING BY DIRECT SPATIAL DEFORMATION OF TEMPLATE CAM DATA

*Zhengcai Zhao, Yucan Fu, Jihua Xu, Yong Chen*

MSEC2017-2934 TOOL-CHIP INTERFACE TEMPERATURE MEASUREMENT IN INTERRUPTED AND CONTINUOUS OBLIQUE CUTTING

*Sinan Kesriklioglu, Justin Morrow, Frank Pfefferkorn*



## **MSEC 2-2-2 Electrical and Cryogenic Assistance in Machining**

### **GER 224**

Session Organizer: Ala Qattawi

Session Co-Organizer: Brandt Ruszkiewicz

MSEC2017-2766 AN INVESTIGATION OF ELECTROPLASTIC DRILLING OF MILD STEEL

*Brandt Ruszkiewicz, Elizabeth Gendreau, Farbod Akhavan Niaki, Laine Mears*

MSEC2017-2935 EXPERIMENTAL TOOL WEAR OBSERVATION OF ASSISTED HIGH PRESSURE CRYOGENIC JET IN HARD TURNING PROCESS

*Dong Min Kim, Do young Kim, Hyung Wook Park, In Su Jo, Tae Jin Song, Kyung Soo Paik*

MSEC2017-3046 ELECTRICALLY ASSISTED DRILLING OF USIBOR 1500 BORON STEEL AND ITS IMPLICATIONS FOR ELECTRICALLY ASSISTED MACHINING

*Nived Govind Karumatt, Brandt Ruszkiewicz, Laine Mears*

## **MSEC 4-9-1 Intelligent Maintenance Decision Making of Manufacturing Systems-1**

### **IRC 1016/1017**

Session Organizer: Zeyi Sun

Session Co-Organizer: Yong Wang

MSEC2017-2643 FEATURE SELECTION FOR HELICOPTER SWASHPLATE BEARING FAULT DIAGNOSIS

*Yong Wang, Lin Li*

MSEC2017-2880 A NEW REINFORCEMENT LEARNING ALGORITHM WITH FIXED EXPLORATION FOR SEMI-MARKOV CONTROL IN PREVENTIVE MAINTENANCE

*Angelo Encapera, Abhijit Gosavi,*

MSEC2017-2936 FRAMEWORK AND SENSITIVITY ANALYSIS OF JOINT ENERGY AND MAINTENANCE PLANNING CONSIDERING PRODUCTION THROUGHPUT REQUIREMENTS

*Fadwa Dababneh, Rahul Shah, Zeyi Sun, Lin Li*

## **MSEC 4-4-2 Kinematical Controls & In-Process Measurements on Multi-axis and Multi-tasking Machine Tools**

### **PRB MPR**

Session Organizer: Takashi Matsumura

Session Co-Organizer: Hiroyuki Sasahara

MSEC2017-2665 DEVELOPMENT OF POST-PROCESSING SYSTEM FOR THREE TYPES OF FIVE-AXIS MACHINE TOOLS BASED ON SOLID MODEL

*Jiangang Li, Yangpeng Song, Ye Liu*

MSEC2017-2711 ENERGY CONSUMPTION OF FEED-DRIVE SYSTEMS THAT DEPENDS ON THE WORKPIECE-SETTING POSITION IN A FIVE-AXIS MACHINING CENTER

*Sato, Yuta Inoue, Keiichi Shirase, Akio Hayashi*

MSEC2017-2689 CHARACTERIZATION MODELLING AND ANALYSIS OF LIGHT REFLECTANCE DURING IN-PROCESS SURFACE MEASUREMENTS USING WHITE LIGHT BASED 3D OPTICAL GAUGE

*Ankit Barde, Pasquale Franciosa, Darek Ceglarek, Manoj Kumar Tiwari*

## **MSEC 4-3-1 Industry Implementations and Case Studies**

### **PRB PC**

Session Organizer: Thomas Hedberg

Session Co-Organizer: Moneer Helu, Binil Starly, Yuan-Shin Lee, Scott Lu

MSEC2017-2966 IMPLEMENTING THE DIGITAL THREAD USING DIGITAL TWINS

*Martin Hardwick*

MSEC2017-3090 QIF AND THE LANDSCAPE OF DIGITAL METROLOGY

*Edward Morse*

MSEC2017-3093 INTEROPERABILITY FOR FEEDBACK LOOPS FROM DIMENSIONAL METROLOGY IN DIGITAL MANUFACTURING

*Robert Brown*

## **MSEC 1-1-2 Process Characterization for Additive Manufacturing**

### **PRB SCR**

Session Co-Organizer: Jarred Heigel, Kevin Chou

MSEC2017-2843 FUNDAMENTAL STUDY OF FUSED-COATING BASED METAL ADDITIVE MANUFACTURING

*Xuwei Fang, Jun Du, Zhengying Wei, Xin Wang, Pengfei He, Hao Bai, Bowen Wang, Bingheng Lu*

MSEC2017-2873 NUMERICAL MODELING OF GRAIN GROWTH IN LASER ENGINEERED NET SHAPING (LENS) OF AISI 316 STAINLESS STEEL

*Wenda Tan, Xuxiao Li*

MSEC2017-2974 MODELING PARTICLE SPRAY AND CAPTURE EFFICIENCY FOR DIRECT LASER DEPOSITION USING A FOUR NOZZLE POWDER INJECTION SYSTEM

*Christopher Katinas, Weixiao Shang, Yung Shin, Jun Chen*

## **MSEC 5-4-1 Sustainable Manufacturing: Design and Planning**

### **HAR 101**

Session Organizer: William Bernstein,

Session Co-Organizer: Yang Li

MSEC2017-2874 HYPOTHETICAL SUSTAINABILITY AXIOMS FOR AXIOMATIC DESIGN WITH AN APPLICATION IN GRINDING MACHINE DESIGN

*Ian Garretson, Bernd Peukert, Barbara S. Linke, Eckart Uhlmann,*

MSEC2017-2994 NONLINEAR PARAMETER ESTIMATION IN A TYPICAL INDUSTRIAL AIR HANDLER UNIT

*Lujia Feng, Pierluigi Pisu, Laine Mears, Jörg Schulte*

MSEC2017-3047 INTEGRATE MANUFACTURING PLANNING TO CLOUD MANUFACTURING FRAMEWORK

*Xiangyun Li, Luping Zhang, Chunxia Yu*

## **ICMP 2-4-2 Surface modification Technology, Wear and Tribology**

### **ZHS 159**

Session Organizer: Yuko Aono

Session Co-Organizer: Hiroki Akasaka

ICMP2017-4326 MODELLING THE BENDING FORCE IN A THREE ROLL BENDING MACHINE PYRAMIDAL TYPE

*Anibal Faruk Abedrabbo Hazbun*

ICMP2017-4352 COMBINED EFFECTS OF NANO-SIZED SILICON CARBIDE AND MOLYBDENUM DISULFIDE DISPERSED IN POLYMER OVERLAY ON FRICTION PROPERTIES OF JOURNAL BEARING

*Kazuki Enomoto, Takayuki Doi, Takuma Akaioi, Hatsuhiko Usami*

## **ICMP 2-1-3 Advances in Processing of Polymer based Composites 3**

### **ZHS 252**

Session Organizer: Hayato Nakatani

Session Co-Organizer: Satoshi Kobayashi

ICMP2017-4345 EVALUATION OF WEAK BOND IN INTERFACE OF ADHESIVE JOINTED CARBON FIBER REINFORCED PLASTICS USING ACOUSTIC EMISSION MEASUREMENT

*Hiroyuki Yamada, Satoshi Kobayashi*

ICMP2017-4348 NUMERICAL SIMULATION FOR LONGITUDINAL COMPRESSION OF A UNIDIRECTIONAL CARBON FIBER REINFORCED PLASTIC CONSTRUCTED BY X-RAY COMPUTED TOMOGRAPHY

*Keisuke Iizuka, Masahito Ueda, Takuya Takahashi, Akinori Yoshimura, Masahiro Nakayama*

ICMP2017-4379 EFFECT OF NEEDLE PUNCHING PROCESS ON FATIGUE AND RESIDUAL PROPERTIES OF CHOPPED STRAND MAT COMPOSITES

*Daiki Ichikawa, Ryo Marui, Tohru Morii, Akio Ohtani*

## **ICMP 2-5-2 Evaluation method**

### **ZHS 352**

Session Organizer: Masaaki Otsu

Session Co-Organizer: Yukio Miyashita

ICMP2017-4396 STUDY ON EVALUATION METHOD AND MECHANISM OF ADHESION BEHAVIOR AT MECHANICALLY JOINED PARTS IN CAST ALUMINUM ALLOYS

*Yukio Miyashita, Ruben Septianus, Yuichi Otsuka, Tetsuri Yamada, Kiyoshi Shirato*

ICMP2017-4413 EFFECTS OF ADHESIVES ON EVALUATION METHOD OF INTERFACIAL STRENGTH OF PLASMA-SPRAYED HAP COATING

*Yuichi Otsuka, Yoshihisa Hiraku, Yuki Hakozaiki, Yukio Miyashita, Yoshiharu Mutoh*

## OVERVIEW

7:30am - 6:00pm	Registration	Epstein Family Engineering Plaza
8:00am - 10:00am	Vendor Set up	Epstein Family Engineering Breezeway
10:00am - 5:00pm	Exhibits	Epstein Family Engineering Breezeway
8:00am-9:00am	Breakfast	Ronald Tutor Campus Center Ballroom (RTCC)
8:00am - 8:15am	Welcome	Ronald Tutor Campus Center Ballroom (RTCC)
8:15am - 9:00am	Keynote: Prof. Fritz Prinz (Stanford University) Thin-Film Processing Beyond Semiconductor Fabrication	Ronald Tutor Campus Center Ballroom (RTCC)
9:15am - 10:45am	Technical Parallel Session - 5	
9:15am - 12:30pm	Reusable Abstractions of Manufacturing Processes (RAMP) Competition Finalists Presentations	VPD 105
10:45am - 11:00am	Morning Break	Epstein Family Engineering Plaza
11:00am - 12:30pm	"Blue Sky" Sessions Sponsored by NSF	SGM 124
11:00am - 12:30pm	MSEC Symp. Invited Speaker : Prof. David Bourell: The Development and Prospects for Additive Manufacturing	SGM 123
11:00am - 12:30pm	Technical Parallel Session - 6	
12:30pm - 1:50pm	ASME/MSEC Awards Luncheon	Ronald Tutor Campus Center Ballroom (RTCC)
12:30pm - 1:50pm	Luncheon-Open to All	Town & Gown
2:00pm - 3:30pm	"Blue Sky" Sessions Sponsored by NSF	SGM 124
2:00pm - 5:30pm	Reusable Abstractions of Manufacturing Processes (RAMP) Workshop on Formalizing Manuf Processes for Structured Sustainability Assessments	VPD 105
2:00pm - 3:30pm	Technical Parallel Session - 7	
3:00pm - 4:00pm	Poster Session Set-Up	Town & Gown
3:30pm - 3:45pm	Afternoon Break	Epstein Family Engineering Plaza
3:45pm - 5:15pm	MSEC Symp. Invited Speaker : Prof. Robert Carpick :Emerging Trends in Nanotribology, and their Implications for Manufacturing	SGM 123
3:45pm - 5:15pm	Technical Parallel Session - 8	
5:30pm - 7:00pm	Laboratory Tours	Start in Eng Quad - M.C. Gill Composites Center VHE 406 - Game Pipe Lab 746 West Adams - Center for Advanced Manuf (CAM)
7:00pm - 9:00pm	MSEC Poster Session	Town & Gown

Tuesday - June 6, 2017

8:15Am – 9:00Am

RTCC Ballroom

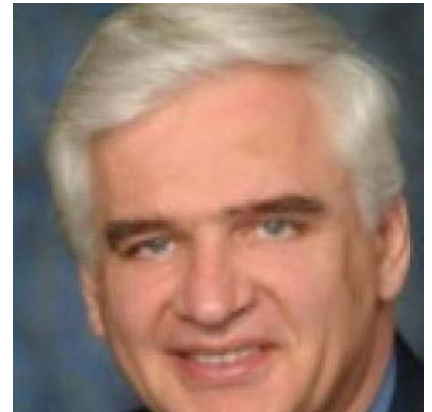
**Title – “*Thin-Film Processing Beyond Semiconductor Fabrication*”**

**Speaker** - Friedrich Prinz, the Finmeccanica Professor in the School of Engineering at Stanford University, Professor of Materials Science and Engineering, Professor of Mechanical Engineering and Senior Fellow at the Precourt Institute for Energy

**Abstract:** A number of processes developed by the Semiconductor Industry during the last few decades may enable substantial performance enhancements for renewable energy conversion devices. One example is Chemical Vapor Deposition, in particular, Atomic Layer Deposition (ALD). ALD allows for the realization of catalyst structures with unprecedented performance. Beyond catalysis, ALD coating is gaining acceptance as a protector of active cathode particles for next generation batteries. In addition, thin film deposition techniques may further enhance the performance of solar cell devices while improving their economy. This talk will outline how semiconducting processes may ultimately have a significant impact on industries, far beyond the scope of their original applications.

**Biosketch:**

Fritz Prinz is the Finmeccanica Professor in the School of Engineering at Stanford University, Professor of Materials Science and Engineering, Professor of Mechanical Engineering and Senior Fellow at the Precourt Institute for Energy. He also serves as the Director of the Nanoscale Prototyping Laboratory at Stanford. A solid-state physicist by training, Prinz leads a group of doctoral students who are addressing fundamental issues on energy conversion and storage at the nanoscale. In his Laboratory, prototype fuel cells, solar cells and batteries are used to test new concepts and novel material structures using atomic layer deposition, scanning tunneling microscopy and other technologies. Prinz is also interested in learning from nature, particularly understanding the electron transport chain in plant cells. The Prinz group, in collaboration with biologist Arthur Grossman, were the first to extract electrons directly from plant cells subjected to light stimulus. Before coming to Stanford in 1994, he was on the faculty at Carnegie Mellon University. Prinz earned a PhD in physics at the University of Vienna in Austria.





## MSEC Symposium Invited Speaker Program

Tuesday, June 6, 2017

11Am - 12:30Pm

SGM 123

MSEC Session: 8-3-1 Additive Manufacturing

Title – “*The Development and Prospects for Additive Manufacturing*”

**Speaker:** Dr. David L. Bourell, Temple Foundation Professor, Mechanical Engineering Department, The University of Texas at Austin.

**Abstract:** Modern Additive Manufacturing (AM) is proposed to have begun in 1988 with the first transfer of a commercial AM machine, the SLA-1 by 3D Systems. However, the concept of layered additive manufacturing significantly predates the computer. The author divides developments in AM into three historical categories with illustrations that draw from US patents. Earliest is AM prehistory, dating back almost 150 years and associated with the period before the advent of computers. Second are AM precursors. Covering the period from about 1960 to 1984, these inventions embodied all the salient aspects of modern AM, but none were commercialized. It is speculated that a contributing factor was the limited knowledge and general utilization difficulty of modern distributed computing. Finally, modern AM exploded onto the commercial sector starting in the mid-1980s with most current processes being invented in a ~10-year period from 1985-1995. The presentation will close with a brief analysis of recent developments, a future outlook and identification of some current challenges to advancement of AM technologies.

### Biosketch:

Dr. David L. Bourell is the Temple Foundation Professor of Mechanical Engineering at The University of Texas at Austin. He is currently Director of the Laboratory for Freeform Fabrication. Dr. Bourell's areas of research include particulate processing with emphasis on sintering kinetics and densification, and materials issues associated with Laser Sintering (LS). Professor Bourell is a leading expert in advanced materials for Laser Sintering, having worked in this area since 1988.

Dave was the lead author on the original materials patent for LS technology. Issuing in 1990, this patent has been cited by over 190 other patents, and it represents the original intellectual property for mixed and coated powders for LS, including binders. Since 1995, he has chaired the organizing committee for the Annual International Solid Freeform Fabrication Symposium – An Additive Manufacturing Conference. This meeting is a leading research conference on additive manufacturing. He holds 9 primary patents dealing with materials innovations in LS dating back to 1990 and has published over 200 papers in journals, conference proceedings and book chapters.

Dr. Bourell is a Fellow of ASM International and TMS, and he is also a lifetime member of TMS. He was elected an Associate Member of the CIRP in 2013. In 2009, he received the TMS Materials Processing and Manufacturing Division Distinguished Scientist/Engineer Award. He has received two major conference career awards in additive manufacturing: the SFF Symposium FAME Award and the Portuguese VRAP Career Educator Award. He is also the 2017 recipient of the SME Albert Sargent Award for “significant accomplishments in the field of manufacturing processes, methods or systems”.





## MSEC Symposium Invited Speaker Program

Tuesday, June 6, 2017

3:45Pm – 5:15Pm

SGM 123

**MSEC Session:** 8-3-3 Nanotribology Implications for Manufacturing

**Title- “Emerging Trends in Nanotribology, and their Implications for Manufacturing”**

**Speaker:** Dr. Robert W. Carpick, John Henry Towne Professor and Department Chair, Mechanical Engineering & Applied Mechanics, University of Pennsylvania.

**Abstract:** Advanced manufacturing methods are continually progressing to smaller scales in multiple ways, including manufactured component feature size, finished surface roughness, and desired dimensional accuracy. At small length scales, the high surface-to-volume ratio ensures that surface interactions such as friction, adhesion, and wear, become critically important in controlling the manufacturing process, and must also be accounted for in designing small-scale devices that will function properly. Unfortunately, a lack of fundamental understanding of such tribological interactions has prevented the rational design of small-scale manufacturing processes. In this talk, I will review challenges and opportunities in micro- and nano-manufacturing, and will highlight tribology problems and the solutions that exist for addressing them which have been developed through basic research in tribology. Examples will include: the successful development of nanocrystalline diamond tool coatings to enable the dry micro-milling of aluminum; the development of nanostructured diamond atomic force microscope probes for tip-based nanomanufacturing; new insights into the fundamental origins of wear at the nanoscale enabled by *in situ* electron microscopy studies of contact, sliding, and wear; and a novel, early-stage nanoscale additive manufacturing process we call “nanotribological printing”.

### **Biosketch:**

Robert Carpick is John Henry Towne Professor, Dept. of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, where he has served as Department Chair since 2011. Previously, he was a faculty member at the University of Wisconsin-Madison (2000-2007). He received his B.Sc. from the University of Toronto (1991), and his Ph.D. from the University of California at Berkeley (1997), both in Physics, and was a postdoc at Sandia National Laboratory (1998-1999). He studies nanotribology, nanomechanics, and scanning probes. He is the recipient of a NSF CAREER award (2001), the ASEE Outstanding New Mechanics Educator award (2003), the ASME Newkirk award (2009), an R&D 100 Award (2009), and is a Fellow of the American Physical Society, the AVS, the Materials Research Society, and the Society of Tribologists and Lubrication Engineers. He holds 5 patents and has authored over 150 peer-reviewed journal publications.





The inaugural **NAMRI/SME David Dornfeld Manufacturing Vision Award and Blue Sky Competition**, funded by the National Science Foundation, will be held during the 2017 North American Manufacturing Research Conference/Manufacturing Science and Engineering Conference (NAMRC/MSEC), June 4-8, 2017, in Los Angeles.

The desired outcome of this competition is to:

- Reach beyond research papers that present completed work, toward new ideas and visions for manufacturing research and education that can catalyze new directions within the manufacturing community.
- Presentations should be open-ended, causing the community to consider the "outrageous"; presenting new challenges in new application domains requiring new approaches that are likely to stimulate significant new interest.
- Presentations should reach beyond the research activities of the speaker, providing bold visions of the future of manufacturing, and the research and education needed to achieve the vision.

To encourage truly visionary concepts of research and education, the top presentation, as determined by the program committee, will receive the inaugural NAMRI/SME Dornfeld Manufacturing Vision Award, named in honor of the late David Dornfeld, PhD, FSME, to recognize outstanding vision and leadership within the manufacturing community.

After the conference, SME will post links to abstracts and presentation slides, so that the ideas can be disseminated broadly to the manufacturing community.

**Funding Acknowledgement:**





## PRESENTATION SCHEDULE FOR TUESDAY

	Joint MSEC-NAMRC-ICMP Invited Talks	GFS 116/VPD 116	VHE 217	SAL 101	SAL 126	EEB 248
PARALLEL SESSION - 5 9:15 AM – 10:45 AM	X	MSEC 1-3-2 - Additive Mfg.: Micro & Nano Scale - 2  MSEC 4-7-1 Cyber Manu- facturing	MSEC 2-3-3: Mfg. Process Modeling -3	MSEC 3-3-2: Polymer Pro- cessing - 2	MSEC 4-2-3: Mfg. Data Analytics -3	MSEC 4-10-2 : Intelligent Ma- chining & Inspec- tion - 2
PARALLEL SESSION - 6 11:00 AM – 12:30 PM	<b>MSEC Invited Symposium Speaker</b> Session: 8-3-1 Additive Manufacturing  <b>Title: "The Development and Pro- spects for Additive Manufacturing"</b>  <b>Speaker: Dr. David L. Bourell</b> , Temple Foundation Professor, Mechanical Engineering Department, The Univer- sity of Texas at Austin.	MSEC 3-4-1 : Sur- face/Sub-surf ace Function- alization -1	MSEC 2-3-4: Mfg. Process Modeling -4	MSEC 3-1-2 : Composites Manufacturing - 2	MSEC 5-2-2: Bi- omanufacturing Tissue Engi- neered Scaffolds -2	MSEC 2-4-1: Non-traditional Mfg. Processes -1
PARALLEL SESSION - 7 2:00 PM – 3:30 PM	X	NAMRC - TRACK 1 "Manufactur- ing Systems" - Ap- plications 1	NAMRC - TRACK 5 "Manufactur- ing Education, Workforce Development, and Out- reach" - 1	NAMRC - TRACK 2 "Manufactur- ing Processes" - Manufacturing Composites 1	NAMRC - TRACK 2 "Manufacturing Processes" - Joining 1	NAMRC - TRACK 4 "Cyber-Physical Systems in Man- ufacturing" - 1
PARALLEL SESSION - 8 3:45 PM – 5:15 PM	<b>MSEC Invited Symposium Speaker</b> Session: 8-3-3 Nanotribology Implica- tions for Manufacturing  <b>Title: "Emerging Trends in Nanotri- bology, and their Implications for Manufacturing"</b>  <b>Speaker: Dr. Robert W. Carpick</b> , John Henry Towne Professor and Depart- ment Chair, Mechanical Engineering & Applied Mechanics, University of Pennsylvania.	NAMRC - TRACK 1 "Manufactur- ing Systems" - Ap- plications 2	NAMRC - TRACK 5 "Manufactur- ing Education, Workforce Development, and Out- reach" - 2	NAMRC - TRACK 2 "Manufactur- ing Processes" - Manufacturing Composites 2	NAMRC - TRACK 2 "Manufacturing Processes" - Joining 2	NAMRC - TRACK 4 "Cyber-Physical Systems in Man- ufacturing" - 2

COLOR  
KEY:

MSEC

Joint MSEC-NAMRC-ICMP Session

NAMRC

ICMP

## PRESENTATION SCHEDULE FOR TUESDAY

GER 224	IRC 1016/1017	PRB MPR	PRB PC	PRB SCR	HAR 101	ZHS 159	ZHS 252	ZHS 352
MSEC 2-2-4: Assist- ed/Augment- ed Mfg. Processes -4 (SOA Paper)	MSEC 5-3-1: Process Char- acterizations for Sustainabil- ity Assessment	MSEC 2-5-2 Forming Processes - 2	MSEC 4-3-2 : Manufac- turing Digital Thread - 2	MSEC 1-2-1 - Additive Mfg.: Part Func- tionality -1	MSEC 5-4-2: Sus- tainability in Smart Manufac- turing - 2	ICMP1-1-1; 4335, 4343, 4334 (Poly- mer and Polymer Matrix Composites)	ICMP 2-1-4; 4384, 4394, 4376 (Pro- cessing of Polymer Composites -4)	ICMP2-9-1; 4360, 4388, 4404 (Die- less/die-free Forming)
MSEC 2-2-3: Assist- ed/Augment- ed Mfg. Processes -3	ICMP1-3-1: 4447, 4303, 4319 (Ad- vanced tu- ral/functional Mtrls.)	MSEC 2-5-3 Forming Processes - 3	MSEC 4-5-3: Cloud Man- ufacturing -3	MSEC 2-6-2 + ICMP 1-6-3 (4351): Scalable Nano- manufac- turing - 2	ICMP 2-8-1 4374, 4346 (Forming)	MSEC 5-1-2 : Biomedical Devices -2	ICMP1-4-2: 4381, 4409, 4436 (Meas- urement & Monitoring)	ICMP 3-2-1; 4330, 4424, 4433 (Dy- namic Be- havior of Materials & Structures -1 )
NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Material Properties 1	NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Process Optimiza- tion 1	NAMRC - TRACK 3 "Additive Manu- facturing" - Support Structure	MSEC 2-3-6: Mfg. Process Modeling - 5	NAMRC - TRACK 2 "Manufac- turing Processes" - Miscellane- ous 2	MSEC 4-8-2: Mfg. Equipment -Design, Tooling & Automa- tion- 2	MSEC 4-5-4: Cloud Man- ufacturing -4	ICMP 1-4-1: 4419, 4325, 4342 (Energy Harvesting and Energy Devices)	ICMP 3-2-2; 4425, 4418, 4391 (Dy- namic Be- havior of Materials & Structures -2 )
NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Material Properties 2	NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Process Optimiza- tion 2	MSEC 1-2-2 - Additive Mfg.: Part Functionality -2	MSEC 2-3-8: Mfg. Process Modeling - 7	MSEC 4-11-1 - Nano Mfg Systems	MSEC 3-2-2: Mtrls & Process- es for En- ergy Tech- nologies -2	MSEC 4-5-5: Cloud Man- ufacturing -5	ICMP1-4-4; 4320, 4440, 4426 (Sensors)	ICMP 3-3-1; 4336, 4309, 4323 (Meas- urement & Non-destruct ive Evalua- tions -1 )

**8:00am - 9:00am Keynote: Professor Freidrich Prinz (Stanford University)**

“THIN-FILM PROCESSING BEYOND SEMICONDUCTOR FABRICATION”

**Ronald Tutor Campus Center Ballroom (RTCC Ballroom)**

**9:15am – 10:45am**

**Reusable Abstractions of Manufacturing Processes (RAMP) Challenge**

Track Organizer: **Swee Leong**, *NIST, Gaithersburg, MD, United States*

Track Co-Organizer: **Donald Libes**, *NIST, Gaithersburg, MD, United States*, **Kevin W. Lyons**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **KC Morris**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Alex Brodsky**, *George Mason University, Fairfax, VA, United States*

**MSEC 10-1-1 RAMP Competition: Non-traditional Processes**

**Room VPD 105**

Session Organizer: **Swee Leong**, *NIST, Gaithersburg, MD, United States*

Session Co-Organizer: **Kevin W. Lyons**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

MSEC2017-3174 SUSTAINABLE MANUFACTURING ANALYSIS OF ATOMIC LAYER DEPOSITION OF AL<sub>2</sub>O<sub>3</sub> THIN FILM

**Oral Presentation.**

**Chris Yuan**, *Case western reserve university, cleveland, OH, United States*

MSEC2017-3175 A SYSTEM AND ARCHITECTURE OF FUSED DEPOSITION MODELING - UNIT MANUFACTURING PROCESS

**Oral Presentation.**

**Rong Pan**, *Arizona State University, Tempe, AZ, United States*

MSEC2017-3177 MANUAL GRINDING OPERATION

**Oral Presentation.**

**Jayanti Das**, *UC Davis, Davis, CA, United States*

MSEC2017-3182 MODELLING FOR FUSED FILAMENT FABRICATION ADDITIVE MANUFACTURING PROCESS

**Oral Presentation.**

**Vittal Prabhu**, *Penn State University, University Park, PA, United States*

**9:15 am – 10:45 am Technical Parallel Session - 5****MSEC 1-3-2 Advances in Micro- and Nano- Additive Manufacturing - 2****GFS 116**

Session Organizer: Jing Shi

Session Co-Organizer: Michael Cullinan

MSEC2017-2911 INVESTIGATION OF POROSITY AND MECHANICAL PROPERTIES OF GRAPHENE NANOPATELETS REINFORCED ALSI10MG BY SELECTIVE LASER MELTING

*Yachao Wang, Jing Shi, Shiqiang Lu, Weihan Xiao*

MSEC2017-2913 ON THE FATIGUE PERFORMANCE OF NANOPARTICLES REINFORCED IRON BY SELECTIVE LASER MELTING

*Yachao Wang, Jing Shi, Shiqiang Lu, Weihan Xiao*

MSEC2017-2975 LASER SINTERING OF COPPER NANOPARTICLES: A SIMPLIFIED MODEL FOR FLUENCE ESTIMATION AND VALIDATION

*Nilabh Roy, William Jou, Feng He, Jihoon Jeong, Yaguo Wang, Michael Cullinan*

**MSEC 4-7-1 High Performance Computing & Artificial Intelligence for Cybermanufacturing****VPD 116**

Session Organizer: Dazhong Wu

Session Co-Organizer: Janis Terpenny

MSEC2017-2679 DATA-DRIVEN PROGNOSTICS USING RANDOM FORESTS: PREDICTION OF TOOL WEAR

*Dazhong Wu, Connor Jennings, Janis Terpenny, Robert Gao, Soundar Kumara, Towards a Robot Task Ontology Standard*

MSEC2017-2783 TOWARDS A ROBOT TASK ONTOLOGY STANDARD

*Stephen Balakirsky, Craig Schlenoff, Sandro Rama Fiorini, Signe Redfield, Marcos Barreto, Hirenkumar Nakawala, Joel Luis Carbonera, Larisa Soldatova, Julita Bermejo-Alonso, Fatima Maikore, Paulo Goncalves, Elena De Momi, Veera Ragavan Sampath Kumar, Tamas Haidegger*

MSEC2017-3069 CUTTING PROCESS MONITORING SYSTEM USING AUDIBLE SOUND SIGNALS AND MACHINE LEARNING TECHNIQUES: AN APPLICATION TO END MILLING

*Achyuth Kothuru, Sai Prasad Nooka, Rui Liu*

**MSEC 2-3-3 Machining I****VHE 217**

Session Organizer: Jianfeng Ma

Session Co-Organizer: Zhichao (Charlie) Li

MSEC2017-2924 STUDYING CHIP-BREAKERS FOR FINISH TURNING OF 1035 CARBON STEEL

*Chandra Nath, Ippei Kono,*

MSEC2017-2938 A STUDY OF CHIP-BREAKER GEOMETRIES FOR WIDE-RANGE DOCS WHEN TURNING 1035 CARBON STEEL

*Chandra Nath, Ippei Kono*

## **MSEC 3-3-2 Fabrication and Testing of Polymers and Polymer-based Composites II**

### **SAL 101**

Session Organizer: Loredana Santo,  
Session Co-Organizer: Catalin Fetecau

MSEC2017-2809 THE EFFECT OF POLYETHYLENE (GLYCOL) DIACRYLATE POST-FABRICATION REST TIME ON COMPRESSIVE PROPERTIES  
*Ozlem Yasar, Serkan Inceoglu, Ramesh Prashad*

MSEC2017-2763 FABRICATION OF MICRO-CHANNELS IN PMMA BY TIP-BASED MICROFABRICATION TECHNIQUE: DEPTH AND FRICTION ANALYSIS  
*Felicia Stan, Catalin Fetecau, Nicoleta V. Stanciu*

MSEC2017-3039 ANALYSIS OF CRYOGENICALLY TREATED SHEET NYLON 6/6  
*Derek Shaffer, Cody Reinstadtler, John Roth, Ihab Ragai,*

## **MSEC 4-2-3 Data Analytics in Advanced Manufacturing**

### **SAL 126**

Session Organizer: Guixiu Qiao,  
Session Co-Organizer: Xiaoning Jin

MSEC2017-2782 ACCURACY DEGRADATION ANALYSIS FOR INDUSTRIAL ROBOT SYSTEMS  
*Guixiu Qiao, Brian Weiss*

MSEC2017-2830 RESEARCH ON THE COORDINATION OF MULTIPLE AIR CIRCULATING TEMPERING FURNACES USING SYSTEM IDENTIFICATION AND PREDICTIVE CONTROL IN MANUFACTURING OF NON-COMBUSTIBLE ALUMINUM COMPOSITE PANELS  
*Renhe Ji, Dong Du, Baohua Chang, Li Wang, Jinle Zeng, Yuxiang Hong*

MSEC2017-2926 INVESTIGATION ON DRILLING PERFORMANCE OF TITANIUM ALLOY Ti6Al4V BASED ON RESPONSE SURFACE METHOD  
*Zhaoju Zhu, Shaochun Sui, Jie Sun, Jianfeng Li, Kai Liu*

## **MSEC 4-10-2 Monitoring, Sensing and Control - Session 2**

### **EEB 248**

Session Organizer: Frank Pfefferkorn  
Session Co-Organizer: Christopher Martin

MSEC2017-2789 REPLACING MECHANIZED OXYFUEL CUTTING SENSORS WITH ION CURRENT SENSING  
*Christopher Martin*

MSEC2017-2858 AUGMENTED REALITY SOLUTIONS IN MECHANICAL ENGINEERING  
*Philipp Klimant, Christian Kollatsch, Marco Schumann*

MSEC2017-3028 MODELING OF ABSOLUTE DISTANCE METER SHIFT INSIDE A LASER TRACKER  
*He Li, Robert Landers, Douglas Bristow*

## **MSEC 2-2-4 Novel Methods of Assisted / Augmented Manufacturing**

### **GER 224**

Session Organizer: Brad Kinsey,  
Session Co-Organizer: Jarred Heigel

MSEC2017-3098 STATE OF THE ART: A REVIEW OF ELECTRICALLY-ASSISTED MANUFACTURING WITH EMPHASIS ON MODELING AND UNDERSTANDING OF THE ELECTROPLASTIC EFFECT

*Brandt Ruskiewicz, Tyler Grimm, Ihab Ragai, Laine Mears, John Roth*

MSEC2017-3062 BENDING-ADDITIVE-MACHINING HYBRID MANUFACTURING OF SHEET METAL STRUCTURES

*Ye Li, Raghavendra Kalyan Rappthadu*

## **MSEC 5-3-1 Manufacturing Process Characterizations for System Level Sustainability Assessment**

### **IRC 1016/1017**

Session Organizer: Kevin W. Lyons  
Session Co-Organizer: Karl Haapala, Barbara S. Linke

MSEC2017-3051 A DESKTOP APPLICATION FOR SUSTAINABILITY PERFORMANCE ASSESSMENT OF COMPOSED UNIT-BASED MANUFACTURING SYSTEMS

*Matteo M. Smullin, Zahra Iman, Karl Haapala*

MSEC2017-2970 CRADLE-TO-GRAVE LIFE CYCLE ASSESSMENT OF SOLID-STATE PEROVSKITE SOLAR CELLS

**Technical Publication.** MSEC2017-2970

*Jingyi Zhang, Xianfeng Gao, Yelin Deng, Yuanchun Zha, Chris Yuan*

MSEC2017-2734 INVESTIGATION OF RELATIONSHIP BETWEEN SUGAR YIELD AND PARTICLE SIZE IN BIOFUEL MANUFACTURING

**Technical Publication.** MSEC2017-2734

*Rajkamal Kesharwani, Xiaoxu Song, Yang Yang, Zeyi Sun, Meng Zhang, Cihan Dagli*

## **MSEC 2-5-2 Forming II: Modeling of forming processes**

### **PRB MPR**

Session Organizer: Z.Q. Sheng  
Session Co-Organizer: Rajiv Malhotra

MSEC2017-2615 COMBINED EXTRUSION-FORGING: SIMULATION, EXPERIMENTAL AND MICROSCOPIC INVESTIGATION OF AXISYMMETRIC SINGLE COLLAR COLLET CHUCK HOLDER

*Srikar Potnuru, Susanta Kumar Sahoo, Santosh Kumar Sahoo*

MSEC2017-2774 ANALYSIS OF INNOVATIVE INCREMENTAL COLD FORMING PROCESS FOR THE MANUFACTURING OF AEROSPACE ROTATING PARTS

*Marcos Perez*

MSEC2017-2956 PREDICTING SHEET FORMING LIMIT OF ALUMINUM ALLOYS FOR COLD AND WARM FORMING BY DEVELOPING A DUCTILE FAILURE CRITERION

*Z.Q. Sheng, Pankaj Mallick*

## **MSEC 4-3-2 Enabling the Digital Thread in Manufacturing**

### **PRB PC**

Session Organizer: Moneer Helu

Session Co-Organizer: Thomas Hedberg, Binil Starly, Yuan-Shin Lee, Scott Lu

MSEC2017-2790 DEVELOPING A CAPABILITY-BASED SIMILARITY METRIC FOR MANUFACTURING PROCESSES

*Kevin Li, William Bernstein*

MSEC2017-2825 ON THE APPLICATION OF MODEL-BASED DEFINITION STRATEGIES TO THE DELIVERY OF TECHNICAL TRAINING

*Jorge Camba, Manuel Contero, David Pérez-López, Pedro Company*

MSEC2017-2979 TOWARDS IDENTIFYING THE ELEMENTS OF A MINIMUM INFORMATION MODEL FOR USE IN A MODEL-BASED DEFINITION

*Alexander Miller, Nathan Hartman, Thomas Hedberg, Jesse Zahner, Allison Barnard Feeney*

## **MSEC 1-2-1 Characterization of Material & Component Properties Part 1**

### **PRB SCR**

Session Organizer: Alessandro Fortunato

Session Co-Organizer: Alessandro Ascari

MSEC2017-2769 EFFECT OF DIFFERENT HEAT TREATMENTS ON MECHANICAL PROPERTIES OF LASER SINTERED ADDITIVE MANUFACTURED PARTS

*Sagar Sarkar, Siva Kumar Cheruvu, Ashish Kumar Nath*

MSEC2017-2624 ADDITIVE MANUFACTURING THERMO-MECHANICAL PROCESSING INFLUENCE ON TENSILE MECHANICAL BEHAVIOR

*Omar Fergani, Steven Liang, Torgeir Welo, Mohamed Elmansori*

MSEC2017-2835 CHARACTERIZATION OF LATTICE STRUCTURES FOR ADDITIVE MANUFACTURING OF LIGHTWEIGHT MECHANICAL COMPONENTS

*Erica Liverani, Adrian Lutey, Alessandro Fortunato, Alessandro Ascari*

## **MSEC 5-4-2 Sustainable Manufacturing: Performance Management**

### **HAR 101**

Session Organizer: Shaw C Feng

Session Co-Organizer: Michael P. Brundage, Yang Li

MSEC2017-2733 A CASE STUDY INVESTIGATING THE ENVIRONMENTAL IMPACT OF PELLETING IN CELLULOSIC BIOFUEL MANUFACTURING

*Rajkamal Kesharwani, Md Monirul Islam, Xiaoxu Song, Zeyi Sun, Meng Zhang, Cihan Dagli*

MSEC2017-2877 PROCEDURE FOR SELECTING KEY PERFORMANCE INDICATORS FOR SUSTAINABLE MANUFACTURING

*Shaw C Feng, Deoqratis Kibira, Michael P. Brundage, KC Morris*

MSEC2017-2879 PERFORMANCE EVALUATION OF SUPERHARD COATINGS IN DRILLING OF TI-6AL-4V ALLOY

*Dinh Nguyen, Patrick Kwon, Vadim Voznyuk, Dae-wook Kim*

## **ICMP 1-1-1 Polymer and Polymer Matrix Composite**

### **ZHS 159**

Session Organizer: Shinji Ogihara

ICMP2017-4335 STIFFNESS REDUCTION DUE TO MATRIX CRACKING IN ANGLE-PLY COMPOSITE LAMINATES

*Shinji Ogihara, Mohammad Fikry Mohammad Jelani, Ryuta Kitamura*

ICMP2017-4343 AE CHARACTERIZATION OF MICROFRACTURE PROCESS DURING BENDING TESTS OF SILICA-PARTICLE-FILLED-EPOXY RESIN

*Ryosuke Fujimoto, Fumito Matsuo, Shuichi Wakayama, Yasuo Karasawa, Naoto Kameda, Takashi Abe*

ICMP2017-4334 INVESTIGATION OF THE QUALITY OF AUTOCLAVED COMPOSITE PLATES THROUGH WORKING PROCESS

*Norimichi Nanami, Toshikazu Uchida, Yosuke Watanabe, Katsuyuki Hara, Koji Kuroda, Hiroyuki Hamada, Akihiko Goto, Hayato Nakatani*

## **ICMP 2-1-4 Advances in Processing of Polymer based Composites 4**

### **ZHS 252**

Session Organizer: Satoshi Kobayashi

Session Co-Organizer: Asami Nakai

ICMP2017-4376 EFFECTS OF DIE SHAPE AND MOLDING CONDITION ON COMPOSITE PIPES BY PULTRUSION MOLDING

*Asami Nakai, Kyuso Morino, Tatsuya Banno, Masaaki Yagi, Akio Ohtani*

ICMP2017-4384 MECHANICAL PROPERTIES OF CFRTP FABRICATED BY FDM 3D PRINTER

*Taishi Nakamura, Ryosuke Matsuzaki, Akira Todoroki, Masahito Ueda, Yoshiyasu Hirano*

ICMP2017-4394 SOME SUGGESTIONS FOR IMPROVEMENT OF THE TOPOLOGY OPTIMIZATION FOR ADDITIVE MANUFACTURING OF FIBER REINFORCED COMPOSITES

*Kohji Suzuki*

## **ICMP 2-9-1 Dieless/Die Free Metal Forming Process**

### **ZHS 352**

Session Organizer: Masaaki Otsu

Session Co-Organizer: Tsuyoshi Furushima

ICMP2017-4360 WALL THICKNESS CONTROL OF MAGNESIUM ALLOY TUBES BY SEMI-DIELESS DRAWING PROCESS

*Tsuyoshi Furushima, Yutaro Hirose, Ken-Ichi Manabe*

ICMP2017-4388 IMPROVEMENT OF FORMING ACCURACY USING PRE-FORMED SHAPE BY FRICTION STIR INCREMENTAL FORMING

*Masaaki Otsu, Hiroshi Goto, Masato Okada, Hidenori Yoshimura, Ryo Matsumoto, Takayuki Muranaka*

ICMP2017-4404 LOADING HISTORY DEPENDENCE OF MNS GRAIN DEFORMATION IN FREE-CUTTING STEEL SUM23

*Masaaki Itabashi*



11:00am – 12:30pm

## Joint MSEC-NAMRC-JSME Symposia: MSEC Symposium Invited Speaker Program

Track Organizer: **Johnson Samuel**

Track Co-Organizer: **Lihui Wang, Satoshi Kishimoto**

### MSEC 8-3-1 Additive Manufacturing

#### Room SGM 123

Session Organizer: Kira Barton

Session Co-Organizer: Jarred Heigel, Kevin Chou

*This session features a 60 min talk on the topic of additive manufacturing followed by a 30 min audience Q & A session.*

### MSEC2017-3162 THE DEVELOPMENT AND PROSPECTS FOR ADDITIVE MANUFACTURING

*Dave Bourell, Univ Of Texas Austin, Austin, TX, United States*

11:00am – 12:30pm

## Reusable Abstractions of Manufacturing Processes (RAMP) Challenge

Track Organizer: **Swee Leong**, *NIST, Gaithersburg, MD, United States*

Track Co-Organizer: **Donald Libes**, *NIST, Gaithersburg, MD, United States*, **Kevin W. Lyons**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **KC Morris**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Alex Brodsky**, *George Mason University, Fairfax, VA, United States*

### MSEC 10-1-2 RAMP Competition: Traditional Processes

#### Room VPD 105

Session Organizer: **William Bernstein**, *NIST, Gaithersburg, MD, United States*

Session Co-Organizer: **Donald Libes**, *NIST, Gaithersburg, MD, United States*

### MSEC2017-3178 MILLING EFFICIENCY INVESTIGATION

#### Oral Presentation.

*Evan Brooke, Stony Brook University, Glen Rock, NJ, United States*

### MSEC2017-3179 ROUGH MACHINING OF IMPELLERS UMP

#### Oral Presentation.

*Zhenhua Wu, Virginia State University, Petersburg, VA, United States*

### MMSEC2017-3180 MACHINING OF PRISMATIC PARTS

#### Oral Presentation.

*Dusan Sormaz, Ohio Univ, Athens, OH, United States*

### MSEC2017-3181 FUSE DIFFUSER-DRILL, MILL, TURN

#### Oral Presentation.

*Liam Klein, Stony Brook University, Stony Brook, NJ, United States*

11:00am – 12:30pm

**NAMRI/SME David Dornfeld Manufacturing Vision Award and Blue Sky Competition**

Room SGM 124

11:00am – 12:30pm Technical Parallel Session - 6

**MSEC 3-4-1 Surface and Sub-Surface Functionalization: Ceramic Materials & Grinding**

**GFS 116**

Session Organizer: Rahul Chaudhari

Session Co-Organizer: Hitomi Yamaguchi

MSEC2017-2687 PHASE TRANSFORMATIONS DURING HIGH-SPEED, HIGH-TEMPERATURE SCRATCHING OF SILICON

*Chirag Alreja, Sathyan Subbiah*

MSEC2017-2980 EFFECT OF BINDER CONTENT ON HYBRID MAGNETIC TOOL BEHAVIOR

*Max Stein, Hitomi Yamaguchi,*

MSEC2017-2710 EXPERIMENTAL INVESTIGATIONS FOR WEAR PROPERTIES OF RAPID TOOLING WITH NANO SCALE FILLERS FOR GRINDING APPLICATIONS

*Kamaljit Singh Boparai, Rupinder Singh*

**MSEC 2-3-4 Machining II**

**VHE 217**

Session Organizer: Jianfeng Ma

Session Co-Organizer: Zhichao (Charlie) Li

MSEC2017-2674 CONTROLLING TOPOGRAPHY OF MACHINED SURFACE FOR ADHESIVE-SEALING

*Shun Liu, Sun Jin, Xueping Zhang, Lixin Wang, Benfu Mei, Bin Hu,*

MSEC2017-2712 CHATTER DETECTION IN MILLING PROCESS BASED ON TIME-FREQUENCY ANALYSIS

*Meng-Kun Liu, Quang M. Tran, Yi-Wen Qui, Chunhui Chung*

MSEC2017-2891 VARIABLE DAMPING PROFILES FOR LASER SHOCK PEENING SIMULATION USING MODAL ANALYSIS AND THE SEATD METHOD

*Mohammad Hatamleh, Jagannathan Shankar Mahadevan, Arif Malik, Dong Qian*

**MSEC 3-1-2 Composites Manufacturing and Monitoring**

**SAL 101**

Session Organizer: Konstantine Fetfatsidis

Session Co-Organizer: Daniel F. Walczyk

MSEC2017-2872 MANUFACTURING SELF-HEALING COMPOSITES WITH AUTOMATED FIBER PLACEMENT

*Konstantine Fetfatsidis, Christopher Hansen, Andrew Burke*

MSEC2017-2887 IN-SITU OBSERVATIONS AND PRESSURE MEASUREMENTS FOR AUTOCLAVE CO-CURE OF HONEYCOMB CORE SANDWICH STRUCTURES

*Mark Anders, Daniel Zebrine, Timotei Centea, Steven Nutt*

MSEC2017-2895 BOUNDARY CONTROL ON EMBEDDED HEATERS FOR COMPOSITE JOINING

*Brandon Smith, Mahdi Ashrafi, Mark Tuttle, Santosh Devasia*

### **MSEC 5-2-2 Advances in Biomanufacturing of Tissue-Engineered Scaffolds – 2**

#### **SAL 126**

Session Organizer: Changxue Xu

Session Co-Organizer: Yifei Jin

MSEC2017-2742 CRIMPED FIBER PRINTING VIA E-JETTING FOR TISSUE ENGINEERING

*Yang Wu, Jerry YH Fuh, Yoke San Wong*

MSEC2017-2921 STUDY OF LIVING CELL DISTRIBUTION DURING INKJET PRINTING OF BIOINK

*Mengyun Zhang, Srikumar Krishnamoorthy, Hongtao Song, Changxue Xu*

MSEC2017-3050 STUDY OF LAYER FORMATION DURING DROPLET-BASED 3D PRINTING OF GEL STRUCTURES

*Kyle Christensen, Yong Huang*

### **MSEC 2-4-1 Advances in Nontraditional Manufacturing Processes-1**

#### **EEB 248**

Session Organizer: Abishek Kamaraj

Session Co-Organizer: Xiuqing Hao

MSEC2017-2626 NON-CONTACT ULTRASONIC ABRASIVE MACHINING OF WIRE-ELECTRICAL DISCHARGE MACHINED SUS304 STEEL

*Kai Liang Tan, Swee Hock Yeo*

MSEC2017-2678 STUDY ON OIL ADSORPTION AND POLISHING CHARACTERISTICS BY NOVEL NANOFIBER PAD FOR ULTRA-PRECISION ABRASIVE MACHINING

*Wei Wu, Lei MA, Toshiki Hirogaki, Eiichi Aoyama, Morihiko Ikegaya, Takatsugu Echizenya, Hiroyoshi Sota*

MSEC2017-2726 SURFACE GRINDING OF CFRP COMPOSITES USING ROTARY ULTRASONIC MACHINING: EFFECTS OF ULTRASONIC POWER

*Hui Wang, Yingbin Hu, Fuda Ning, Yuzhou Li, Meng Zhang, Weilong (Ben) Cong, Samantha Smallwood*

### **MSEC 2-2-3 Ultrasonic- and Modulation-Assisted Machining**

#### **GER 224**

Session Organizer: Yujie Chen

Session Co-Organizer: Durul Ulutan

MSEC2017-2780 SURFACE GRINDING OF OPTICAL BK7/K9 GLASS USING ROTARY ULTRASONIC MACHINING: AN EXPERIMENTAL STUDY

*Yingbin Hu, Hui Wang, Fuda Ning, Weilong (Ben) Cong, Yuzhou Li*

MSEC2017-2863 Rotary Ultrasonic Machining: Effects of Tool End Angle on Delamination of CFRP Drilling

*Palamandadige Fernando, Meng Zhang, Zhijian Pei, Weilong (Ben) Cong*

MSEC2017-2886 EXPERIMENTAL EVALUATION OF CUTTING KINEMATICS AND CHIP EVACUATION IN DRILLING WITH LOW-FREQUENCY MODULATION-ASSISTED MACHINING

*Yang Guo, James Mann*

### **ICMP1-3-1 Advanced Structural/Functional Materials**

#### **IRC 1016/1017**

Session Organizer: Satoshi Kishimoto

Session Co-Organizer: Yoshihiko Hangai

ICMP2017-4303 ESTIMATION OF STRESS AND DISPLACEMENT AROUND NICK ZONE OF ZIPPER PULL TAB FORMED ON PAPERBOARD

*Shigeru Nagasawa, Masahiro Uehara, Chiharu Matsumoto, Haruya Kambe, Weerayut Jina,*

IMP2017-4319 CHARACTERISTICS OF LAMINATED SPARK PLASMA SINTERED COMPACTS COMPOSED OF ALUMINA-PARTICLE-DISPERSED MAGNESIUM AND MAGNESIUM

*Shigehiro Kawamori, Hiroshi Fujiwara, Yukio Kasuga*

ICMP2017-4447 STRUCTURAL ANALYSIS OF AUTOMOBILE GAS FILLING PUMP NOZZLE CASTED ALUMINUM FUNCTIONAL MATERIAL

*Ozdogan Karaçali*

### **MSEC 2-5-3 Forming III: Modeling & Experiments**

#### **PRB MPR**

Session Organizer: Scott Wagner

Session Co-Organizer: Brad Kinsey

MSEC2017-2644 BALL BURNISHING UNDER HIGH VELOCITIES USING A NEW ROLLING TOOL CONCEPT

*Lars Hiegemann, A. Erman Tekkaya,*

MSEC2017-3026 BENDING MECHANISM ANALYSIS FOR LASER FORMING OF METAL FOAM

*Tizian Bucher, Adelaide Young, Min Zhang, Chang Jun Chen, Y Lawrence Yao*

MSEC2017-2826 ANALYTICAL AND EXPERIMENTAL EVALUATION OF FLOW CHARACTERISTICS OF ANNEALED AISI 304 STAINLESS STEEL SHEET IN MULTI-SCALE BULGE FORMING

*Ayotunde Olayinka, William Emblom, Scott Wagner*

### **MSEC 4-5-3 Cloud Manufacturing III**

#### **PRB PC**

Session Organizer: Miroslav Ljubicic

Session Co-Organizer: Ray Zhong

MSEC2017-2815 CLOUD MANUFACTURING-ENABLED PRODUCTION LOGISTICS SERVICE SYSTEM IN INDUSTRIAL PARK

*Kai Kang, Ting Qu, Hao Luo, Suxiu Xu, Congdong Li, George Huang*

MSEC2017-2827 DISRUPTION RECOVERY MODEL FOR COMPLEX FLOW SHOP SCHEDULING WITH CONSIDERING BEHAVIOR UNDER ENVIRONMENT OF THE INTERNET OF THINGS

*Bo Hongguang, Li Huanzhi, Zhang Huilin, Guo Yi, Mu Wei*

MSEC2017-2839 MULTI-TASK SCHEDULING BASED ON QOS EVALUATION IN CLOUD MANUFACTURING SYSTEM

*Feng Li, Lin Zhang, Yuanjun Laili*

## **MSEC 2-6-2 & ICMP 1-6-3 Scalable Nanomanufacturing – II**

### **PRB SCR**

Session Organizer: Yong Gan

Session Co-Organizer: Rajiv Malhotra

MSEC2017-2638 ELECTROSPUN SODIUM-COBALT OXIDE CERAMIC NANOFIBER AND THE ELECTROMAGNETIC RESPONSES

*Arturo Bautista, Juan Aguado, Yong Gan*

MSEC2017-2739 RAPID INTENSE PULSE LIGHT SINTERING OF COPPER SULPHIDE NANOPARTICLE FILMS

*Shalu Bansal, Zhongwei Gao, Chih-hung Chang, Rajiv Malhotra*

ICMP2017-4351 DEVELOPMENT OF CNF/FRAME-RESISTANT MAGNESIUM ALLOY COMPOSITES

*Gen Sasaki, Youqiang Yao, Kenjiro Sugio*

## **ICMP2-8-1 Forming**

### **HAR 101**

Session Organizer: Masaaki Otsu

Session Co-Organizer: Kazuhiko Kitamura

ICMP2017-4374 DEVELOPMENT OF CHLORIDE-FREE OIL FOR COLD FORMING OF STAINLESS STEEL

*Tomohiro Takaki, Kazuhiko Kitamura, Makino Takehiko, Jun-ichi Shibata*

ICMP2017-4346 EFFECTS OF FRICTION WELDING CONDITIONS ON TENSILE STRENGTH OF FRICTION WELDED JOINT BETWEEN 5052 AL ALLOY AND PURE COPPER

*Masaaki Kimura, Yuusuke Inui, Masahiro Kusaka, Koichi Kaizu*

## **MSEC 5-1-2 Tissue joining**

### **ZHS 159**

Session Organizer: Roland Chen

Session Co-Organizer: Yancheng Wang

MSEC2017-2944 MEASUREMENT OF TISSUE THERMAL CONDUCTIVITY WITH VARIABLE THERMAL DOSE DURING AN ELECTROSURGICAL JOINING PROCESS

*Che-Hao Yang, Samantha Kaonis, Wei Li, Roland Chen*

MSEC2017-2962 PATTERNED MICROSTRUCTURE ARRAY FABRICATION BY USING A NOVEL STANDING SURFACE ACOUSTIC WAVE DEVICE

*Yancheng Wang, Dai Xue, Zhaoxin Deng, Deqing Mei*

MSEC2017-3091 DYNAMIC ELECTRICAL IMPEDANCE IN BIPOLAR TISSUE WELDING

*Xiaoran Li, Russell Borduin, Roland Chen Wei Li,*

## **ICMP 1-4-2 Measurement and Monitoring**

### **ZHS 252**

Session Organizer: Kentaro Takagi

ICMP2017-4381 REAL-TIME MONITORING OF BIOLOGICAL CELLS TRACTION AND MIGRATION DYNAMICS BY IONIC POLYMER METAL COMPOSITES (IPMCS) MICROPILLARS/SUBSTRATES

*Abouhamed Saberi, Sharon Ashworth, Mohsen Shahinpoor*

ICMP2017-4409 FABRICATION OF IRRADIATED GRID ONTO THE PHOTOCROMIC PAINT FOR DEFORMATION MEASUREMENT

*Satoshi Kishimoto*

ICMP2017-4436 RECENT DEVELOPMENTS IN SMART COMPOSITES AND LAMINATES

*Hiroshi Asanuma*

## **ICMP 3-2-1 Dynamic Behavior of Materials and Structures – I**

### **ZHS 352**

Session Organizer: Hidetoshi Kobayashi

Session Co-Organizer: Masaaki Itabashi

ICMP2017-4424 EFFECT OF STRAIN RATE DEPENDENCE OF CELL WALL MATERIAL ON DYNAMIC COMPRESSIVE BEHAVIOR OF ALUMINUM FOAMS

*Ken-ichi Tanigaki, Keitaro Horikawa, Hidetoshi Kobayashi, Kinya Ogawa,*

ICMP2017-4433 EFFECTS OF BOUNDARY CONDITION AND CELL STRUCTURE ON DYNAMIC AXIAL CRUSHING HONEYCOMB

*Tsutomu Umeda, Koji Mimura*

ICMP2017-4330 MICROSTRUCTURAL EVOLUTION IN ALUMINUM ALLOYS CAUSED BY HIGH SPEED DEFORMATION

*Keitaro Horikawa, Ken-ichi Tanigaki, Hidetoshi Kobayashi*



Exhibit Table in Engineering Plaza  
Mon, Tues, Wed



Exhibit Table in Engineering Plaza  
Mon, Tues, Wed

**2:00pm – 3:30pm**

**RAMP Workshop: Formalizing Manufacturing Processes for Structured Sustainability Assessments**

Track Organizer: **Swee Leong**, *NIST, Gaithersburg, MD, United States*

Track Co-Organizer: **Donald Libes**, *NIST, Gaithersburg, MD, United States*, **Kevin W. Lyons**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **KC Morris**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Alex Brodsky**, *George Mason University, Fairfax, VA, United States*

**MSEC 10-2-1 Formal Methods and Technologies for Characterizing Processes**

**Room VPD 105**

Session Organizer: **William Bernstein**, *NIST, Gaithersburg, MD, United States*

Session Co-Organizer: **Mohan Krishnamoorthy**, *George Mason University, Fairfax, VA, United States*

**2:00pm – 3:30pm**

**NAMRI/SME David Dornfeld Manufacturing Vision Award and Blue Sky Competition**

**Room SGM 124**



**2:00pm – 3:30pm Technical Parallel Session - 7**

**NAMRC - TRACK 1 "Manufacturing Systems" - Applications 1**  
**GFS 116**

Chairman: Ray Zhong

NAMRC-176 DATA ANALYTICS FRAMEWORK FOR SEMI-CONTINUOUS MANUFACTURING PROCESS – IMPLEMENTATION VISION WITH A USE CASE  
*Parikshit Mehta, Christopher Seaman and Sergio Butkewitsch-Choze*

NAMRC-102 ECONOMIC EVALUATION OF LIGNOCELLULOSIC BIOFUEL MANUFACTURING CONSIDERING INTEGRATED LIGNIN WASTE CONVERSION TO HYDROCARBON FUELS

*Yuntian Ge, Fadwa Dababneh and Lin Li*

NAMRC-46 DEVELOPMENT OF A SMART PLASTIC INJECTION MOLD WITH CONFORMAL COOLING CHANNELS

*Hong-Seok Park and Xuan-Phuong Dang*

**NAMRC - TRACK 5 Manufacturing Education, Workforce Development, and Outreach - 1**  
**VHE 217**

Chairman: Hitomi Yamaguchi

NAMRC-178 ERROR COMPENSATION AND ACCURACY IMPROVEMENTS IN 5-AXIS MACHINE TOOLS USING THE GLOBAL OFFSET METHOD  
*Jie Gu, John Agapiou and Sheri Kurgin*

NAMRC-162 PERIODIC ERROR COMPENSATION IN FIBER-COUPLED HETERODYNE INTERFEROMETRY

*Chao Lu, Jon Ellis, Ethan Burnam-Fay, Tony Schmitz and Joshua Tarbutton*

NAMRC-60 INCORPORATION OF PHYSICS-BASED MACHINING MODELS IN REAL-TIME DECISION MAKING VIA METAMODELS

*Bhisham Sharma, Rishab Harikrishnan, Stuart McCrorie, Marc Conner, Meisam Salahshoor, Abhijit Deshmukh and Michael Sangid*

**NAMRC - TRACK 2 "Manufacturing Processes" - Manufacturing Composites 1**  
**SAL 101**

Chairman: Dinakar Sagapuram

NAMRC-78 TOOL TEMPERATURE IN SLOTTING OF CFRP COMPOSITES

*Mohamed El-Hofy, Sein Leung Soo, David Aspinwall, Wei-Ming Sim, David Pearson, Rachid M'Saoubi and Peter Harden*

NAMRC-37 A FUNDAMENTAL STUDY OF NANO ELECTRODEPOSITION USING A COMBINED MOLECULAR DYNAMICS AND QUANTUM MECHANICAL ELECTRON FORCE FIELD APPROACH

*Anne Brant and Murali Sundaram*

NAMRC-124 AL-TIB2 NANOCOMPOSITES PRODUCED BY FLUX-ASSISTED LIQUID-STATE PROCESSING

*Abdolreza Javadi, Chezheng Cao and Xiaochun Li*

**NAMRC - TRACK 2 "Manufacturing Processes" - Joining 1**  
**SAL 126**

Chairman: Livan Fratini

NAMRC-9 INVESTIGATION INTO THE USE OF ADHESIVE FILLERS AND SOFT START CURING TO REDUCE THE DISTORTION OF A WORK-PIECE SUPPORTED BY PAAW JOINTS

*Kristopher Doll, Haochen Xie and Edward De Meter*

NAMRC-28 ENHANCEMENT OF MECHANICAL PROPERTIES OF FSWED AA7075 LAP JOINTS THROUGH IN-SITU FABRICATION OF MMC

*Gianluca Buffa, Davide Campanella and Livan Fratini*

NAMRC-157 NUMERICAL INVESTIGATION OF CP-TI/CU110 IMPACT WELDING USING SMOOTHED PARTICLE HYDRODYNAMICS AND ARBITRARY LAGRANGIAN-EULERIAN METHODS

*Ali Nassiri, Shunyi Zhang, Taeseon Lee, Tim Abke, Anupam Vivek, Brad Kinsey and Glenn Daehn*

**NAMRC - TRACK 4 "Cyber-Physical Systems in Manufacturing" – 1**  
**EEB 248**

Chairman: Tsz Ho KWOK

NAMRC-15 AUGMENTED REALITY-ASSISTED INTELLIGENT WINDOW FOR CYBER-PHYSICAL MACHINE TOOLS

*Chao Liu, Sheng Cao, Wayne Tse and Xun Xu*

NAMRC-10 MACHINE LEARNING-BASED CPS FOR CLUSTERING HIGH THROUGHPUT MACHINING CYCLE CONDITIONS

*Javier Díaz, Concha Bielza and Pedro Larrañaga*

NAMRC-127 STREAMING MACHINE GENERATED DATA TO ENABLE A THIRD-PARTY ECOSYSTEM OF DIGITAL MANUFACTURING APPS

*Shaurabh Singh, James Barkley, Yuan-Shin Lee, Paul Cohen, Binil Starly and Atin Angrish*

**NAMRC - TRACK 3 "Additive Manufacturing" - Material Properties 1**  
**GER 224**

Chairman: Jingyan Dong

NAMRC-41 EXPERIMENTAL CHARACTERIZATION OF CLAD MICROSTRUCTURE AND ITS CORRELATION WITH RESIDUAL STRESSES

*Santanu Paul, Khushahal Thool, Ramesh Singh, Indradev Samajdar and Wenyi Yan*

NAMRC-149 THERMAL EFFECT ON CLAD DIMENSION FOR LASER DEPOSITED INCONEL 718

*Jennifer Bennett, Sarah Wolff, Gregory Hyatt, Kornel Ehmann and Jian Cao*

NAMRC-100 EXPERIMENTAL STUDY ON MECHANICAL PROPERTIES OF SINGLE- AND DUAL-MATERIAL 3D PRINTED PRODUCTS

*Heechang Kim, Eunju Park, Suhyun Kim, Bumsoo Park, Namhun Kim and Seungchul Lee*

**NAMRC - TRACK 3 "Additive Manufacturing" - Process Optimization 1**  
**IRC 1016/1017**

Chairman: Yong Huang

NAMRC-96 GRAIN-BASED SUPPORT ARCHITECTURE DESIGN FOR ADDITIVE MANUFACTURING

*Ahasan Habib and Bashir Khoda*

NAMRC-120 DESIGN OPTIMIZATION OF PLASTIC INJECTION TOOLING FOR ADDITIVE MANUFACTURING

*Tong Wu, Suchana Akter Jahan, Yi Zhang, Jing Zhang, Hazim El-Mounayri and Andres Tovar*

NAMRC-118 THERMO-MECHANICAL DESIGN OPTIMIZATION OF CONFORMAL COOLING CHANNELS USING DESIGN OF EXPERIMENTS APPROACH

*Suchana Akter Jahan, Tong Wu, Yi Zhang, Jing Zhang, Andres Tovar and Hazim El-Mounayri*

### **NAMRC - TRACK 3 "Additive Manufacturing" - Support Structure**

#### **PRB MPR**

Chairman: Dazhong Wu

NAMRC-147 HIGHLY REMOVABLE WATER SUPPORT FOR STEREOLITHOGRAPHY

*Jie Jin and Yong Chen*

NAMRC-40 ELECTROHYDRODYNAMIC PRINTING MULTI-SCALE MULTI-PATTERN SCAFFOLD FOR 3D CELL CULTURE

*Jie Sun*

NAMRC-54 SUPPORT STRUCTURE DEVELOPMENT AND INITIAL RESULTS FOR METAL POWDER BED FUSION ADDITIVE MANUFACTURING

*Dakota Morgan, Emmanuel Agba and Chris Hill*

### **MSEC 2-3-6 Material Processing & Machining III**

#### **PRB PC**

Session Organizer: Xueping Zhang

Session Co-Organizer: Sebastian Barth

MSEC2017-2759 MODELING OF THE GRINDING WHEEL TOPOGRAPHY DEPENDING ON THE RECIPE-DEPENDENT VOLUMETRIC COMPOSITION

*Fritz Klocke, Sebastian Barth, Michael Rom, Christian Wrobel*

MSEC2017-3043 FEM INVESTIGATION OF THE EFFECTS OF IMPACT SPEED AND ANGLE OF IMPACTS OF ABRASIVE IN THE VIBRATION ASSISTED NANO IMPACT MACHINING BY LOOSE ABRASIVES

*Nick Duong, Jianfeng Ma, Shuting Lei,*

MSEC2017-3009 EXPERIMENTAL AND NUMERICAL ANALYSIS OF BURN MARKS AND SHRINKAGE EFFECT ON INJECTION MOLDING

*Saeed Beheshtian Mesgaran, Seyyed Emad Seyyed Mousavi, Farzad Elhami Nik*

### **NAMRC - TRACK 2 "Manufacturing Processes" - Miscellaneous 2**

#### **PRB SCR**

Chairman: Fiona Zhao

NAMRC-85 CHARACTERIZATION OF WELD ATTRIBUTES IN ULTRASONIC WELDING OF SHORT CARBON FIBER REINFORCED THERMOPLASTIC COMPOSITES

*Kaifeng Wang, Daniel Shriver, Yang Li, Mihaela Banu, S. Jack Hu, Guoxian Xiao, Jorge Arinez and Hua-Tzu Fan*

NAMRC-171 ON THE ANALYSIS OF METAL DROPLETS DURING COLD METAL TRANSFER

*Chen Zhou, Hongliang Wang, Thomas Perry and James Schroth*

NAMRC-66 OPTIMUM PROCESS PARAMETERS FOR SPRINGBACK REDUCTION OF SINGLE POINT INCREMENTALLY FORMED POLYCARBONATE

*William Edwards, Tyler Grimm, Ihab Ragai and John Roth*

## **MSEC 4-8-2 Innovative Tooling-1**

### **HAR 101**

Session Organizer: Burak Sencer

Session Co-Organizer: Yasuhiro Kakinuma

MSEC2017-2699 THE PRESSURE STRAIGHTENING TECHNOLOGY OF LINEAR GUIDE RAILS USING DUAL INDENTER-DUAL CLAMP SYSTEM

*Zhang Yongquan, Lu Hong, Wei Fan, Wang Shaojun, Wei Qinyu, Ling He*

MSEC2017-2702 AN EFFECTIVE SPIRAL TRAJECTORY GENERATION APPROACH FOR THE TURNING OF PISTON SKIRT WITH MIDDLE-BULGED VARYING ELLIPSE

*Lu Hong, Su Xiangang, Zhang Xinbao, Zhang Yongquan, Wei Fan, Wang Shaojun*

MSEC2017-2829 DESIGN AND DEVELOPMENT OF DOUBLE SPIRAL SHAPED FLEXURAL FEED STAGE FOR MICRO-DRILLING WORKSTATION

*Kiran Bhole, Megha Janbandhu, Sachin Mastud*

## **MSEC 4-5-4 Cloud Manufacturing IV**

### **ZHS 159**

Session Organizer: Yujie Chen

Session Co-Organizer: Ray Zhong

MSEC2017-2705 HYPERGRAPH-BASED MODELING OF MANUFACTURING SERVICES IN CLOUD MANUFACTURING

*Meng Yu, Wenjun Xu, Jiwei Hu, Zude Zhou, Duc Truong Pham*

MSEC2017-2807 THE BEHAVIOR SIMULATION OF MANUFACTURING SERVICES IN A SERVICE-ORIENTED NETWORKED MANUFACTURING ENVIRONMENT

*Jingbo Wang, Ping Lou, Xuemei Jiang, Qin Wei, Yongzhi Qu*

MSEC2017-2817 AN INDIVIDUAL REQUIREMENTS-ORIENTED SERVICE SCHEDULING METHOD IN CLOUD MANUFACTURING

*Longfei Zhou, Lin Zhang, Lei Ren*

## **ICMP 1-4-1 Energy harvesting and Energy devices**

### **ZHS 252**

Session Organizer: Minoru Taya

ICMP2017-4325 DEPLOYABLE RENEWABLE ENERGY DEVICES FOR DISASTER MITIGATION WITH SMART NANOGRI

*Mehrdad Ghasemi Nejjad, Brenden Minei, Caton Gabrick, Matsu Thornton, Reza Ghorbani*

ICMP2017-4342 ENERGY HARVESTING FROM TEMPERATURE CHANGE BY PIEZOELECTRIC/CNT-BASED POLYMER COMPOSITE LAMINATES

*Marina Fox, Kotaro Mori, Fumio Narita*

ICMP2017-4419 DEVELOPMENT OF CU/UNTWISTED CNT COMPOSITE WITH HIGH AMPACITY AND CONDUCTIVITY

*Hiroyuki Kawada, Takahiro Sakai, Taesung Kim, Hidefumi Nikawa, Atsushi Hosoi*

## **ICMP 3-2-2 Dynamic Behavior of Materials and Structures – II**

### **ZHS 352**

Session Organizer: Masaaki Itabashi

Session Co-Organizer: Tsutomu Umeda

ICMP2017-4418 CONSTITUTIVE RELATION OF ADHESIVE LAYER UNDER COMBINED LOADING CONDITIONS

*Norihide Abe, Yuki Yamagata, Yu Sekiguchi, Chiaki Sato*

ICMP2017-4391 ANALYSIS AND MEASUREMENT OF DYNAMIC PROPERTIES OF AN O-RING SUPPORTING A HIGH SPEED BEARING

*Tadayoshi Shoyama, Koji Fujimoto*

ICMP2017-4425 PROPAGATION BEHAVIOR OF STRESS WAVES IN TWO CONNECTED ELASTIC BODIES WITH MECHANICAL IMPEDANCE MATCHING

*Yuya Seo, Kinya Ogawa, Hidetoshi Kobayashi, Keitaro Horikawa, Ken-ichi Tanigaki*

**3:45pm – 5:15pm**

**Joint MSEC-NAMRC-JSME Symposia: MSEC Symposium Invited Speaker Program**

Track Organizer: **Johnson Samuel**

Track Co-Organizer: **Lihui Wang, Satoshi Kishimoto**

**MSEC 8-3-3 Nanotribology Implications for Manufacturing**

**Room SGM 123**

Session Organizer: **Mathew Kuttolamadom**

Session Co-Organizer: **Dinakar Sagapuram**

*This session features a 60 min talk, followed by a 30 min audience Q & A session.*

**MSEC2017-3172 EMERGING TRENDS IN NANOTRIBOLOGY, AND THEIR IMPLICATIONS FOR MANUFACTURING**

*Robert Carpick, Univ Of Pennsylvania, Philadelphia, PA, United States*

**3:45pm – 5:15pm**

**RAMP Workshop: Formalizing Manufacturing Processes for Structured Sustainability Assessments**

Track Organizer: **Swee Leong**, *NIST, Gaithersburg, MD, United States*

Track Co-Organizer: **Donald Libes**, *NIST, Gaithersburg, MD, United States*, **Kevin W. Lyons**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **KC Morris**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Alex Brodsky**, *George Mason University, Fairfax, VA, United States*

**MSEC 10-2-2 Hands-on Session: Model Building Using JSON and JSONiq**

**Room VPD 105**

Session Organizer: **Alex Brodsky**, *George Mason University, Fairfax, VA, United States*

Session Co-Organizer: **Mohan Krishnamoorthy**, *George Mason University, Fairfax, VA, United States*

3:45pm – 5:15pm

**Technical Parallel Session - 8**

**NAMRC - TRACK 1 "Manufacturing Systems" - Applications 2  
GFS 116**

Chairman: Moneer Helu

NAMRC-130 VIRTUALIZATION AND DEEP RECOGNITION FOR SYSTEM FAULT CLASSIFICATION

*Peng Wang, Ananya Ananya, Ruqiang Yan and Robert Gao*

NAMRC-63 FLEXIBLE FIXTURING CONFIGURATION DESIGN OF THIN-WALLED PART BASED ON MAGNETORHEOLOGICAL EFFECT

*Yongqing Wang, Qi Luo, Haibo Liu, Xianjun Sheng and Jun Zhang*

NAMRC-39 THREE DIMENSIONAL FINITE ELEMENT SIMULATION OF CUTTING FORCES AND CUTTING TEMPERATURE IN HARD MILLING OF AISI H13 STEEL

*Qing Zhang, Song Zhang and Jianfeng Li*

**NAMRC - TRACK 5 "Manufacturing Education, Workforce Development, and Outreach" - 2  
VHE 217**

Chairman: Hitomi Yamaguchi

NAMRC-ORAL TRAINING THE WORKFORCE IN ADVANCED COMPOSITES AND PROCESSES

*Joannie A. Harmon*

NAMRC-ORAL BECOMING A GLOBAL HUB OF MANUFACTURING TALENT: FLORIDA'S GREATER GAINESVILLE REGION

*Staci Bertrand*

NAMRC-109 EVALUATION OF QUENCHING METHODS FOR THE PURPOSE OF ACOUSTIC DATA COLLECTION

*Travis Roney, Samantha Muhhuku, Chetan Nikhare, Ihab Ragai and David Loker*

**NAMRC - TRACK 2 "Manufacturing Processes" - Manufacturing Composites 2  
SAL 101**

Chairman: Binil Starly

NAMRC-136 EFFECT OF BOTTOM SHAPE ON ACOUSTIC STREAMING IN ULTRASONIC PROCESSING OF METAL MATRIX NANOCOMPOSITES (MMNCS)

*Saheem Absar, Pavan Pasumarthi and Hongseok Choi*

NAMRC-148 SCALABLE MANUFACTURING OF 10 NM TIC NANOPARTICLES THROUGH MOLTEN SALT REACTION

*Chezeng Cao, Weiqing Liu, Abdolreza Javadi, Haonan Ling and Xiaochun Li*

NAMRC-67 HYBRID CO<sub>2</sub> LASER WATERJET HEAT (LWH) TREATMENT OF BINDERED BORON NITRIDE COMPOSITES WITH HARDNESS IMPROVEMENT

*Jingnan Zhao, Pranav Shrotriya and Kwang Shiong Wong*

**NAMRC - TRACK 2 "Manufacturing Processes" - Joining 2**  
**SAL 126**

Chairman: Livan Fratini

NAMRC-82 THE EFFECTS OF WELDING PARAMETERS AND BACKING PLATE DIFFUSIVITY ON ENERGY CONSUMPTION IN FRICTION STIR WELDING  
*Woongjo Choi, Justin Morrow, Frank Pfefferkorn and Michael Zinn*

NAMRC-29 THE EFFECT OF HORN KNURL GEOMETRY ON BATTERY TAB ULTRASONIC WELDING QUALITY: 2D FINITE ELEMENT SIMULATIONS  
*Wayne Cai*

NAMRC-145 OPTIMIZATION OF STEPLOCK® ORTHOTIC KNEE JOINT DESIGN  
*Omar Castiblanco and Iqbal Shareef*

**NAMRC - TRACK 4 Cyber-Physical Systems in Manufacturing - 2**  
**EEB 248**

Chairman: Song Xuan

NAMRC-44 DATA-DRIVEN WELD NUGGET WIDTH PREDICTION WITH DECISION TREE ALGORITHM  
*Fahim Ahmed and Kyoung-Yun Kim*

NAMRC-68 BIG DATA ANALYTICS BASED FAULT PREDICTION FOR SHOP FLOOR SCHEDULING  
*Wei Ji and Lihui Wang*

NAMRC-137 SENSOR DATA AND INFORMATION FUSION TO CONSTRUCT DIGITAL-TWINS VIRTUAL MACHINE TOOLS FOR CYBER-PHYSICAL MANUFACTURING  
*Yi Cai, Binil Starly, Shaurabh Singh, Paul Cohen and Yuan-Shin Lee*

**NAMRC - TRACK 3 Additive Manufacturing - Material Properties 2**  
**GER 224**

Chairman: Jingyan Dong

NAMRC-142 MICRO-SCALE TEXTURE FABRICATION USING IMMERSSED SURFACE ACCUMULATION  
*Xiangjia Li and Yong Chen*

NAMRC-128 EFFECTS OF HOT ISOSTATIC PRESSING ON COPPER PARTS FABRICATED VIA BINDER JETTING  
*Ashwath Yegyan Kumar, Yun Bai, Anders Eklund and Christopher Williams*

NAMRC-32 SIMULATION OF ELASTIC PROPERTIES OF SOLID-LATTICE HYBRID STRUCTURES FABRICATED BY ADDITIVE MANUFACTURING  
*Guoying Dong, Yunlong Tang and Yaoyao Fiona Zhao*

**NAMRC - TRACK 3 Additive Manufacturing - Process Optimization 2**  
**IRC 1016/1017**

Chairman: Stefania Bruschi

NAMRC-152 DIRECT BIO-PRINTING WITH HETEROGENEOUS TOPOLOGY DESIGN  
*Amm Nazmul Ahsan, Ruinan Xie and Bashir Khoda*

NAMRC-36 EXPERIMENTAL OPTIMIZATION OF FUSED DEPOSITION MODELLING PROCESSING PARAMETERS: A DESIGN-FOR-MANUFACTURING APPROACH  
*Ala'aldin Alafaghani, Ala Qattawi, Buraq Alrawi and Arturo Guzman*



NAMRC-153 HIERARCHICAL SCANNING DATA STRUCTURE FOR ADDITIVE MANUFACTURING

*Ahasan Habib and Bashir Khoda*

### **MSEC 1-2-2 Enhancement of Component Design, Properties & Functionality Part 1**

#### **PRB MPR**

Session Organizer: Alessandro Ascari

Session Co-Organizer: Alessandro Fortunato

MSEC2017-2823 CONSTRUCTION-SCALE 3D PRINTING: SHAPE STABILITY OF FRESH PRINTING CONCRETE

*Ali Kazemian, Xiao Yuan, Ryan Meier, Evan Cochran, Behrokh Khoshnevis*

MSEC2017-2918 RESIDUAL STRESS ENHANCEMENT IN 3D PRINTED INCONEL 718 SUPERALLOY TREATED BY ULTRASONIC NANO-CRYSTAL SURFACE MODIFICATION

*Jing Shi, Kuldeep Sidhu, Vijay Vasudevan, Seetha Mannava*

MSEC2017-2978 ENHANCING MECHANICAL PROPERTIES OF THIN-WALLED STRUCTURES USING NON-PLANAR EXTRUSION BASED ADDITIVE MANUFACTURING

*Abdullah Alsharhan, Timotei Centea, Satyandra Gupta*

### **MSEC 2-3-8 Machining V**

#### **PRB PC**

Session Organizer: Sebastian Barth

Session Co-Organizer: Xueping Zhang

MSEC2017-2673 PREDICTING MULTI-SCALE DIMENSIONAL ACCURACY OF ENGINE CYLINDER BY HONING

*Zaoyang Zhou, Xueping Zhang, Zhenqiang Yao, Lifeng Xi*

MSEC2017-2860 THERMAL LOAD DETERMINATION IN DRY MACHINING THROUGH A FIXED IDENTIFIABILITY CONJUGATE GRADIENT METHOD

*Patric Figueiredo, Marc Deppermann, Reinhold Kneer*

MSEC2017-3049 TURNING FORCE PREDICTION OF AISI 4130 CONSIDERING DYNAMIC RECRYSTALLIZATION

*Zhipeng Pan, Yixuan Feng, Xia Ji, Steven Liang*

### **MSEC 4-11-1 Nanomanufacturing of Multi-functional Systems**

#### **PRB SCR**

Session Organizer: Chunghorng Liu

Session Co-Organizer: Wenzhuo Wu, Dong Ding

MSEC2017-2680 PLASMONIC NANOFOCUSING IN DEEP AND EXTREME SUB-WAVELENGTH SCALE FOR SCALABLE NANOLITHOGRAPHY

*Zhidong Du, Chen Chen, Liang Pan*

MSEC2017-2818 TRANSPORT AND INTERFACIAL PHENOMENA IN NANOSCALE CONFINED LASER CRYSTALLIZATION

*Wan Shou, Heng Pan*

MSEC2017-2833 RATIONAL SYNTHESIS OF NANOSTRUCTURED ELECTRODE MATERIALS FOR HIGH-PERFORMANCE SUPERCAPACITORS

*CP Wong*

## **MSEC 3-2-2 Properties of Energy Materials**

### **HAR 101**

Session Organizer: Nilesh Kumar

Session Co-Organizer: Aleksandra Fortier

MSEC2017-2604 RESIDUAL STRESS DISTRIBUTION AND THE CONCEPT OF TOTAL FATIGUE STRESS IN LASER AND MECHANICALLY FORMED COMMERCIAL PURE GRADE 2 TITANIUM ALLOY PLATES

*Kadephi V Mjali, Peter Madindwa Mashinini, Annelize Els-Botes*

MSEC2017-2614 FATIGUE BEHAVIOR OF TWO NOTCHED CUTTING TOOL MATERIALS: M42 HSS AND WC-10COBALT

*Zainul Huda, Muhammad H. Ajani, Muhammad S. Ahmed*

MSEC2017-2882 UNDERSTANDING PLASTIC DEFORMATION MECHANISM(S) IN RECRYSTALLIZED ZIRCALOY-4

*Nilesh Kumar, Abdullah Alomari, K. L. Murty*

## **MSEC 4-5-5 Cloud Manufacturing V**

### **ZHS 159**

Session Organizer: Xi Vincent Wang

Session Co-Organizer: Wenjun Xu

MSEC2017-2708 DESIGN FOR ADDITIVE MANUFACTURING IN THE CLOUD PLATFORM

*Yuanbin Wang, Robert Blache, Xun Xu*

MSEC2017-2747 PROBABILISTIC MODEL FOR ONLINE 3D PRINTING SERVICE EVALUATION

*Jin Cui, Lin Zhang, Lei Ren*

MSEC2017-2889 BUSINESS PROCESS MODEL LIFE-CYCLE MANAGEMENT IN CLOUD MANUFACTURING

*Miroslav Ljubovic, Nenad Ivezic, Boonserm Kulvatunyou, Scott Nieman, , Nenad Anicic, Zoran Marjanovic*

## **ICMP 1-4-4 Sensors and Actuators**

### **ZHS 252**

Session Organizer: Junpei Sakurai

ICMP2017-4440 DESIGN OF DIELECTRIC ELASTOMER BASED ACTUATORS AND SENSORS

*Kevin Kadooka, Hiroya Imamura, Sara Neidenberg, Minoru Taya*

ICMP2017-4426 ARBITRARY ORDER SIMULATION WITH A SIMPLIFIED MULTI-PHYSICAL MODEL OF IPMC SENSOR

*Jun Takeda, Kentaro Takagi, Zicai Zhu, Kinji Asaka*

ICMP2017-4320 EFFECT OF MICROSTRUCTURE OF METAL-CORE PIEZOELECTRIC FIBER/ALUMINUM COMPOSITE ON ITS OUTPUT VOLTAGE CHARACTERISTIC

*Tetsuro Yanaseko, Hiroshi Sato, Isao Kuboki, Hiroshi Asanuma*

## **ICMP 3-3-1 Measurements and Nondestructive Evaluations-1**

### **ZHS 352**

Session Organizer: Tatsuro Kosaka

Session Co-Organizer: Yoshinao Kishimoto

ICMP2017-4309 ON THE TRANSDUCTION OF ULTRASOUND THROUGH A POLYMER FILM

***Hironori Tohyoh***

ICMP2017-4323 CHARACTERIZATION OF CONTACT CONDITION IN A FLANGE CONNECTION BY LONGITUDINAL WAVES

***Hideo Cho, Kanami Yamamoto, Kojiro Nishimiya, Hiroaki Ito, Junya Shimizu***

ICMP2017-4336 MOLTEN POLYMER MONITORING DURING SOLIDIFICATION BY ULTRASONIC PULSE-ECHO METHOD USING POLYGONAL BUFFER ROD

***Masanori Abe, Ikuo Ihara***

**5:30pm – 6:45pm**  
**USC Laboratory Tours**

**TUESDAY, JUNE 6, 2017**

**Viterbi Engineering Quad**

**M.C. Gill Composites Center (VHE 406) - Director Professor Steven Nutt**

Established in 1995 and endowed with a generous gift from M.C. Gill in 2002, the mission of the Center is to address problems associated with the design, manufacture, and behavior of composites and composite structures. The scope includes the training of graduate and undergraduate students through sponsored research projects and through course instruction. Personnel within the Center provide a range of expertise that includes Postdoctoral Associates, outstanding scholars with specialized skills in mechanics, polymer science, and manufacturing technology. Center personnel work closely with industrial sponsors, and recent industrial collaborations have involved the M.C. Gill Corporation, Airbus, General Electric, Composite Technology Corporation, HRL Laboratories, Raytheon, Cytac Engineered Materials, L'Garde Corporation, Bell Helicopter, NewBasis, HyperTherm Composites, and Northrop-Grumman.

**Game Pipe Lab – Director Professor Mike Zyda \*\*BUS Transportation\*\***

The USC GamePipe Laboratory of the University of Southern California is located in a secluded garden in Los Angeles. It was established by Director Michael Zyda and has been running for 10 years beginning in fall 2005.

GamePipe celebrated its 10th-anniversary last year and has attracted more than 1,500 students. GamePipe's program has been the number one program in the Princeton Review for six consecutive years. GamePipe has many instructors with field experience who are still working in the business; Artem Kovalovs from Naughty Dog, programmer of Last of Us and Uncharted 4, Technology Senior Director Jose Villeta from Disney Interactive Studio, and Google Product Manager Khaled Abdel Rahman, just to name a few.

**Center for Advanced Manufacturing (CAM) – Director Professor S.K. Gupta \*\*BUS Transportation\*\***

The University of Southern California has established a new center focused on Advanced Manufacturing. The center will support a comprehensive program in advanced manufacturing. The goals of the center are to:

- Grow manufacturing research at USC by launching new initiatives;
- Enrich educational experience of students and help in attracting high quality students to USC;
- Provide access to the latest manufacturing technology to the USC community; and
- Support manufacturing industry in the Southern California region.

**Focus Areas**

- The center has the following four focus areas:
- Focus Area 1: Digital Manufacturing.
- Focus Area 2: Additive Manufacturing.
- Focus Area 3: Robotics and Automation.
- Focus Area 4: Smart Manufacturing.

**7:00 pm – 9:00 pm**  
**Joint MSEC-NAMRC-JSME Poster Sessions**

**Town & Gown** [Note: Posters must be setup between 3-4 Pm]

# **NANOVEA<sup>®</sup>**

A Better Measure.

Exhibit Table in Engineering Plaza

Mon, Tues, Wed



# Springer

Exhibit Table in Engineering Plaza

Mon, Tues, Wed

## OVERVIEW

7:30am - 6:00pm	Registration	Epstein Family Engineering Plaza
8:00am - 10:00am	Vendor Set up	Epstein Family Engineering Breezeway
10:00am - 5:00pm	Exhibits	Epstein Family Engineering Breezeway
8:00am-9:00am	Breakfast	Ronald Tutor Campus Center Ballroom (RTCC)
8:00am - 8:15am	Welcome	Ronald Tutor Campus Center Ballroom (RTCC)
8:15am - 9:00am	Keynote: Scott Willoughby (Northrop Grumman) James Webb Space Telescope Talk	Ronald Tutor Campus Center Ballroom (RTCC)
9:15am - 10:00am	JSME Plenary 2- Dr. Hiroyuki Hamada: Looking at tradition, creating the future-DENTO MIRAI-	SGM 123
10:00am - 10:45am	JSME Keynote -Dr. Hiroshi Asanuma: Smart Disaster Mitigation Based on Novel Materials and Structures	SGM 123
9:15am - 10:45am	Technical Parallel Session - 9	
10:45am - 11:00am	Morning Break	Epstein Family Engineering Plaza
11:00am - 12:30pm	Technical Parallel Session - 10	
12:30pm - 1:40pm	Luncheon-open to all	Town and Gown
12:30pm - 1:40pm	Luncheon -SME/NAMRI Awards	Ronald Tutor Campus Center Ballroom (RTCC)
1:40pm - 2:00pm	NAMRI Founders Lecture-Don Lucca	Ronald Tutor Campus Center Ballroom (RTCC)
2:15pm - 3:45pm	Technical Parallel Session - 11	
3:45pm - 4:00pm	Afternoon Break	
4:00pm - 5:30pm	Technical Parallel Session - 12	
5:00pm - 8:00pm	Early Career Forum & Student Reception - Sponsored by NSF	Ronald Tutor Campus Center Ballroom (RTCC-A)
	Breakout Panel 1 - Academia	
	Breakout Panel 2 - Government	
	Breakout Panel 3 - Industry	

## Keynote Speech

Wednesday - June 7, 2017      8:15Am – 9:00Am      Ronald Tutor Campus Center Ballroom (RTCC)

**Title - *James Webb Space Telescope Talk***

**Speaker** - Scott P. Willoughby is the vice president and program manager for the James Webb Space Telescope (JWST) program at Northrop Grumman ([www.northropgrumman.com](http://www.northropgrumman.com)). The program is currently on contract for the design, development and delivery of the Observatory to NASA's Goddard Space Flight Center.

**Abstract:** Northrop Grumman is proud to lead the industry team building NASA's James Webb Space Telescope, which will unleash a new dawn of discovery when it launches in 2018! Scott Willoughby, vice president and program manager, James Webb Space Telescope, will discuss the incredible manufacturing behind this revolutionary observatory, which is the largest telescope ever built for space. The Webb Telescope is the scientific successor to the Hubble Space Telescope, and it will look back 13.5 billion years, providing images of the first galaxies formed and seeing unexplored planets around distant stars. The breakthrough technology developed for the Webb Telescope will expand our understanding of the universe, rewrite textbooks and inspire a future generation of engineers and scientists.



**Biosketch:**

Prior to serving as program manager for the James Webb Space Telescope, Scott Willoughby served as the P858 Program Manager in Advanced Concepts, Technology and Emerging Systems Division. His primary responsibilities were to drive process improvements and delivery of this critical and strategic program. He oversaw program management including financial management, capital, human resources, customer and subcontractor interfaces and all levels of contract management. Prior to that, Willoughby was the Program Manager for the Advanced Extremely High Frequency (AEHF) Program, where he led the team on early deliveries to Lockheed Martin for two AEHF payloads (Flight 1 and Flight 2) and positioned the program for a subsequent early delivery of Flight 3. In July 2009, AEHF was recognized by the Aerospace Systems President's Award for Customer Satisfaction related to these three early deliveries. Additionally, Willoughby was responsible for the Milstar program which included payload support for a constellation of five operational satellites. He also served as the Advanced EHF Deputy Program Manager for Flight 1 Payload production and delivery. Willoughby had overall responsibility and complete authority for day-to-day technical and schedule activities associated with completing the Flight 1 AEHF Payload hardware and software manufacturing, production, testing, integration and delivery. He interfaced extensively with the in-house core process owners and external customers in this role. Willoughby joined TRW in 1989 as a member of the technical staff. He received a bachelor's degree, summa cum laude, in Electrical Engineering from Lehigh University in 1989 and a master's degree in Communication Systems from the University of Southern California in 1991. He is also a graduate of the UCLA Executive Program at the Anderson School.



# ICM&P2017 Plenary



Wednesday, June 7, 2017 : 9:15Am – 10:00Am SGM 123

**Title – “Looking at tradition, creating the future-DENTO MIRAI”**

**Speaker:** Dr. Hiroyuki HAMADA, Professor, Kyoto Institute of Technology

**Abstract:** DENTO is tradition in Japanese and Mirai is future. In Kyoto Institute of Technology DENTO MIRAI education and research institute was established in 1997. The purpose of this institute is analyzing implicit knowledge in traditional craft industry by using scientific measurement and equipment and converting to scientific knowledge, and creating a new fabrication method by using the scientific knowledge, that make bright future. We started to analyze fabrication method of KyoYumi-Kyoto Bow-, KyoKawara-Kyoto Roof Tile-, Urushi painting, KyoKabe-Kyoto Wall-, and KyoKanaami-Kyoto Metal Wire Knitting-. In the research fabrication method was divided into several steps and name of each step was considered. By using three dimensional motion analysis, eye movement analysis, force measurement the comparison of expert and non-expert was performed.



**Biosketch:** Professor Hiroyuki HAMADA graduated in Doctoral degree from Doshisha University, Japan in Mechanical Engineering in 1985. The professional career has started in Kyoto Institute of Technology, Japan from 1986 and promoted to Professor in 1998 and now be the professional in Future-Applied Conventional Technology Center.





# ICM&P2017 Keynote



Wednesday June 7, 2017

10:00Am – 10: 45Am

SGM 123

## Smart Disaster Mitigation Based on Novel Materials and Structures



### HIROSHI ASANUMA

Dr. Engineering, Professor

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Cristian Vendittozzi, University of Brasilia, Brazil

Giancarlo Santilli, University of Brasilia, Brazil

Sontipee Aimmanee, King Mongkutof Brasilia, Brazilchnology Thonburi, Thailand

Chaiwat Ekkawatpanit, King MongkutBrasilia, Brazilchnology Thonburi, Thailandr d

Kyohichi Nakayasu, Hitachi Zosen Corporation, Japan

Gaku Tanaka, Chiba University, Japan

Kazuhiko Adachi, Chubu University, Japan

Tetsuro Yanaseko, Kogakuin University, Japan

Kazuhiro Kudo, Chiba University, Japan

Mitsunori Kubo, Chiba University, Japan

Yoshihisa Maruyama, Chiba University, Japan

Yun Lu, Chiba University, Japan

Satoshi Kishimoto, National Institute for Materials Science, Japan

Yasubumi Furuya, Tohoku University, Japan

**Abstract:** The authors have been establishing the concept . Ssaster Mitigation and Sustainable Engineeringve been establishing the concept ay not occur for ion and Sustainable Engineenot occur for a long peri It will be successfully

realized by novel structures and materials such as s and materials such as t ay not occur for ion and Sustainable E. Structures and devices for disaster mitigation consume lots oapanese earthquake and tsunami disasters on March 11, 2011, the authors have been exploring a new direction. Serious disasters may occur today, or may not occur for a long period of time. Structures and devices for disaster mitigation consume lots of money. So, they are better to be used daily and/or produce something useful such as energy for their monitoring, maintenance, corrosion suppression, self-repair, and so on. Compact and deployable structures are also very usefull.

Several structures have been considered by the authors based on the above mentioned concept, that is, Smart River Banks, Multifunctional Artificial Forests, Smart Inflatable Tsunami Airbags, in conjunction with “Applications of Electroactive Polymers in Electrical Power Generation Using Ocean Waves presented at the SPIE SS/NDE 2015 in San Diego as an invited presentation, and also, Smart Shelters, Smart Furniture, and so on. Some of them will be introduced in this presentation.

In addition, other related challenges in the world will be introduced such as the flap-gate type products (no energy, no operation Rising Seawall Ocean Wav etc.) developed by Hitachi Zosen Corporation (Hitz) in Japan, the Project MOSES in Italy, the LAYFIELD Aqua Dam in the USA, some deployable structures in Thailand, and so on. Especially, the flap-gate type products have been developed in a smart way and will be introduced in detail. Asanuma, Nakayasu et al. have been discussing how to enhance their smartness.

As for the general basic problems such as selection of materials, bonding of materials, long term durability, maintenance, repeatability, the authors have been trying in various ways. For example, in order to realize the deployable structures, lightweight materials such as aluminum alloys and carbon fiber reinforced plastics are better to be used instead of steels. To do this, relatively thick aluminum oxide layer was found to increase bonding strength and fracture toughness as well as to enhance corrosion resistance and prevent galvanic corrosion.

There exist other difficulties such as mutual understanding among mechanical engineers, civil engineers and many other people. The authors are trying to develop a research team covering variety of fields to work together by taking advantage/disadvantage of the location of Chiba University as a rt Shelters, Smart Furniture, and so on. Some of them will be introdus for Disaster Mitigation and Sustainability-Technical Section as a part of JSME (The Japan Society of Mechanical Engineers) M&P (Materials and Processing) Division to enhance Disaster Mitigation and Sustainable Engineering.

#### **Biosketch:**

Asanuma received Dr. Engineering from The University of Tokyo. After being a Research Associate at Institute of Industrial Science, The University of Tokyo and an Associate Professor at Chiba University, he became a Professor in the Department of Mechanical Engineering, Chiba University. He served as a chair of M&P Division of JSME. He started Active Material Systems-Technical Section of the division. He has been organizing sessions on Smart Materials and Structural Systems for MECJ (Mechanical Engineering Congress, Japan) as a chief organizer jointly with M&P (Materials & Processing), M&M (Materials & Mechanics), DMC (Dynamics, Measurement and Control) and Space Engineering Divisions of JSME. He also served as SPIE Conference Chair, Co-Chair, etc., and chairs/organizers of many other symposiums and workshops on Smart Materials and Structures. Recently, he proposed Disaster Mitigation and Sustainable Engineering and started System of Systems for Disaster Mitigation and Sustainability-Technical Section of the division. He has been organizing related sessions, forums and workshops. He has published over 70 journal papers, 90 conference papers, several books and patents, and has been in collaboration/ cooperation with over 30 universities/institutes/companies around the world. He has delivered keynote/invited presentations about 50 times. He is a JSME Fellow and an IOP Fellow.

## PRESENTATION SCHEDULE FOR WEDNESDAY

	Joint MSEC-NAMRC-ICMP Invited Talks	GFS 116	VHE 217	SAL 101	SAL 126	EEB 248
PARALLEL SESSION - 9 9:15 AM – 10:45 AM	<p>ICM&amp;P Plenary: "Looking at tradition, Creating the future-DENTO MIRAI", Dr. Hiroyuki HAMADA, Professor, Kyoto Institute of Technology.</p> <p>ICM&amp;P Keynote: "Smart Disaster Mitigation Based on Novel Materials and Structures", Dr. Hiroshi Asanuma, Professor, Chiba University.</p>	MSEC 3-4-2 : Sur- face/Sub-sur face Func- tionalization -2	MSEC 1-5-1 - Additive Mfg.: Sensing & Control - 1	MSEC 3-1-3 : Composites Manufacturing - 3	MSEC 2-1-1: Join- ing/Assembly -1	MSEC 2-4-2: Non-traditi onal Mfg. Processes -2
PARALLEL SESSION - 10 11:00 AM – 12:30 PM	X	NAMRC - TRACK 2 "Manufacturing processes" - In- cremental operations	NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Advanced Materials 1	NAMRC - TRACK 2 "Manufacturing Processes" - Machining 3	NAMRC - TRACK 2 "Manufacturing Processes" - Finishing Operations 3	NAMRC - TRACK 2 "Manufacturing Processes" - Milling 1
PARALLEL SESSION - 11 2:15 PM – 3:45 PM	X	NAMRC - TRACK 2 "Manufacturing processes" - incremental operations 2	NAMRC - TRACK 3 "Ad- ditive Manu- facturing" - Advanced Materials 2	NAMRC - TRACK 2 "Manufacturing Processes" - Machining 4	NAMRC - TRACK 2 "Manufacturing Processes" - Finishing Operations 4	NAMRC - TRACK 2 "Manufacturing Processes" - Milling 2
PARALLEL SESSION - 12 4:00 PM – 5:30 PM	X	MSEC 4-8-3: Mfg. Equipment -Design, Tooling & Automation- 3 (SOA Pa- per)	MSEC 1-4-1 - Additive Mfg.: Envi- ronmental Sustainability - 1	X	MSEC 5-2-3 : Biomanu- facturing Tis- sue Engineer- ing Scaffolds -3	MSEC 4-2-4: Mfg. Data Ana- lytics -4

<b>COLOR KEY:</b>	MSEC
	NAMRC
	ICMP

## PRESENTATION SCHEDULE FOR WEDNESDAY

GER 224	IRC 1016/10 17	PRB MPR	PRB PC	PRB SCR	HAR 101	ZHS 159	ZHS 252	ZHS 352
MSEC 1-5-2 - Additive Mfg.: Sensing & Control - 2	MSEC 1-3-3 - Additive Mfg.: Micro & Nano Scale -3	MSEC 1-2-3 - Additive Mfg.: Part Functionality -3	MSEC 2-3-9: Mfg. Process Modeling - 8	MSEC 2-4-4 + ICMP 2-2-1 (4347): Non-traditional Mfg. Processes -4	MSEC 3-2-3: Mtrls & Processes for Energy Technologies -3	MSEC 4-5-6: Cloud Manufacturing -6	ICMP 3-3-5; 4317, 4369, 4372 (Measurements & Non-destructive Evaluations -3 )	ICMP 1-6-1; 4341, 4349 (Metals & Metal Matrix Composites -1)
NAMRC - TRACK 2 "Manufacturing Processes" - Electrochemical Operations	MSEC 1-3-4 - Additive Mfg.: Micro & Nano Scale - 4	MSEC 1-2-4 - Additive Mfg.: Part Functionality - 4	X	ICMP1-4-3: 4427, 4366 (Shape Memory Alloys)	ICMP1-2-1; 4393, 4405, 4423 (Ceramics and Ceramic Matrix Composites -1 )	MSEC 4-5-7: Cloud Manufacturing -7	ICMP 3-3-6; 4392, 4316, 4312 (Measurements & Non-destructive Evaluations -2 )	ICMP 4-1-1; 4358, 4364, 4361 (Science of Craftsmanship - 1)
X	MSEC 1-3-5 - Additive Mfg.: Micro & Nano Scale - 5	MSEC 2-5-5 + ICMP 2-6-1 (4386 , #4359) Forming Processes - 5	MSEC 4-10-3 : Intelligent Machining & Inspection - 3	ICMP 3-3-2; 4311, 4315, 4390 (Mechanical Properties & Strength )	ICMP1-2-2; 4414, 4411, 4441 (Ceramics and Ceramic Matrix Composites -2 )	X	ICMP 4-2-1: 4380, 4430, 4439 (Smart Disaster Prevention: Novel Evaluation Method)	ICMP 4-1-7; 4328, 4370; 4365 (Science of Craftsmanship - 2)
MSEC 2-4-3: Non-traditional Mfg. Processes -3	MSEC 1-5-3 - Additive Mfg.: Sensing & Control - 3	ICMP1-6-2 ; 4321, 4304 (Metals and Metal Matrix Composites - 2)	MSEC 4-9-2: Intelligent Maintenance of Mfg. Systems -2	MSEC 5-4-3: Sustainability in Smart Manufacturing - 3	MSEC 5-1-3 : Biomedical Devices -3	X	ICMP 4-2-2; 4389;4445, 4437, (Smart Disaster Prevention: Sensors and Devices - 1)	ICMP 4-1-3; 4357, 4400, 4344 (Processing - 1)

**8:00 am - 9:00am Keynote: Scott Willoughby (Northrop Grumman)**

“JAMES WEBB SPACE TELESCOPE TALK”

Room: Ronald Tutor Campus Center Ballroom (RTCC Ballroom)

**9:15 am - 10:00am JSME Plenary Talk: Prof. Hiroyuki Hamada (Kyoto Institute of Technology)**

“LOOKING AT TRADITION, CREATING THE FUTURE - DENTO MIRAI”

Room: SGM 123

**10:00 am - 10:45am JSME Keynote: Prof. Hiroshi Asanuma (Chiba University)**

“SMART DISASTER MITIGATION BASED ON NOVEL MATERIALS AND STRUCTURES”

Room: SGM 123

**9:15am – 10:45am Technical Parallel Sessions - 9**

**MSEC 3-4-2 Surface and Sub-Surface Functionalization: Metals**

**GFS 116**

Session Organizer: Hitomi Yamaguchi  
 Session Co-Organizer: Rahul Chaudhari

MSEC2017-2746 STATIC RECRYSTALLIZATION BEHAVIOR OF A NITROGEN CONTROLLED Z2CN19-10 AUSTENITIC STAINLESS STEEL  
*Min Luo, Chun Xu, Bing Zhou, Yan-hui Guo, Rong-bin Li*

MSEC2017-2847 ULTRASONIC NANO-CRYSTAL SURFACE MODIFICATION ASSISTED GAS NITRIDING OF Ti6Al4V ALLOY  
*Jun Liu, Zhencheng Ren, Chi Ma, Yalin Dong, Chang Ye*

MSEC2017-3080 FABRICATION AND CHARACTERIZATION OF A BIOCOMPATIBLE COATING FORMED ON A HEAT-TREATED MAGNESIUM ALLOY USING MICRO-ARC OXIDATION  
*Hamdy Ibrahim, Mohammad Elahinia*

**MSEC 1-5-1 Measurement Science for Metal-Based Additive Manufacturing**

**VHE 217**

Session Organizer: Prahalad Rao  
 Session Co-Organizer: William Carter

MSEC2017-3119 MEASUREMENT SCIENCE FOR METAL-BASED ADDITIVE MANUFACTURING  
*Jarred Heigel,*

MSEC2017-2909 A METHODOLOGY FOR PREDICTING POROSITY FROM THERMAL IMAGING OF MELT POOLS IN ADDITIVE MANUFACTURING THIN WALL SECTIONS  
*Mojtaba Khanzadeh, Sudipta Chowdhury, Linkan Bian, Mark Tschopp*

MSEC2017-2657 MONITORING OF MOLTEN POOL THERMAL HISTORY AND ITS SIGNIFICANCE IN LASER CLADDING PROCESS  
*Gopinath Muvvala, Debapriya Patra Karmakar, Ashish Kumar Nath*

**MSEC 3-1-3 Composites Interlaminar Toughening**

**SAL 101**

Session Organizer: Christopher Hansen  
 Session Co-Organizer: Konstantine Fetfatsidis

MSEC2017-2981 INTERLAMINAR TOUGHENING OF GFRP: PART 1 ?ÇÖ IMPROVED DIFFUSION AND PRECIPITATION  
*Dakai Bian, Bradley R. Beeksma, Dong-Jin Shim, Marshall Jones, Y Lawrence Yao*

MSEC2017-2982 INTERLAMINAR TOUGHENING OF GFRP: PART 2 ?ÇÖ CHARACTERIZATION AND NUMERICAL SIMULATION OF CURING KINETICS  
*Dakai Bian Bradley R. Beeksma, Dong-Jin Shim, Marshall Jones, Y Lawrence Yao*

MSEC2017-2659 DEVELOPMENT OF HYBRID COMPOSITES (AL-SIC-C) THROUGH STIR CASTING: MACHINABILITY STUDIES

*Satyanarayana Kosaraju, Venu Gopal Anne, Swapnil Gosavi*

### **MSEC 2-1-1 Numerical modeling**

#### **SAL 126**

Session Organizer: Wayne Cai

Session Co-Organizer: Jingjing Li

MSEC2017-3019 FINITE ELEMENT ANALYSIS OF THE FRICTION STIR FORMING PROCESS

*Sladjan Lazarevic, Scott Miller, Grant Kruger, Theo van Niekerk, Blair Carlson*

MSEC2017-3034 SIMULATIONS OF MICROSTRUCTURE EVOLUTION DURING FRICTION STIR BLIND RIVETING USING A CELLULAR AUTOMATON METHOD

*Avik Samanta, Ninggang Shen, Haipeng Ji, Weiming Wang, Hongtao Ding, Jingjing Li*

MSEC2017-3092 INVESTIGATION ON THE EFFECTS OF PROCESS PARAMETERS ON DEFECT FORMATION IN FRICTION STIR WELDED SAMPLES VIA PREDICTIVE NUMERICAL MODELING AND EXPERIMENTS

*Abhishek Ajri, Yung Shin*

### **MSEC 2-4-2 Advances in Nontraditional Manufacturing Processes-2**

#### **EEB 248**

Session Organizer: Dong Lin,

Session Co-Organizer: Shiv Shailendar

MSEC2017-2781 CONTROL OF PRESSING FORCE IN MAGNETIC ABRASIVE FINISHING USING PERMANENT MAGNET END-MILL TOOL

*Lei Ma, Toshiki Hirogaki, Eiichi Aoyama, Furuki Tatsuya, Wei Wu*

MSEC2017-2927 CORRELATION OF PROCESS PARAMETERS TO SURFACE INTEGRITY RESPONSIBLE FOR WEAR RESISTANCE OF HVOF SPRAYED WC-NI COATINGS

*P.C. Du, X.P. Zhu, Y. Meng, M.K. Lei, D.M. Guo*

MSEC2017-2965 STUDY ON KEY METHODS OF ON-MACHINE MICRO MILLING CUTTER CONDITION INSPECTION BASED ON MACHINE VISION

*XI ZHANG, Benzheng Zhang, Yuanyuan Shi, Bo Shang*

### **MSEC 1-5-2 Strategies for Geometry and Dimensional Control in Additive Manufacturing**

#### **GER 224**

Session Organizer: Olga Wodo

Session Co-Organizer: Linkan Bian

MSEC2017-2794 ASSESSING THE GEOMETRIC INTEGRITY OF ADDITIVE MANUFACTURED PARTS FROM POINT CLOUD DATA USING SPECTRAL GRAPH THEORETIC SPARSE REPRESENTATION-BASED CLASSIFICATION

*M. Samie Tootooni, Prahalad Rao, Ashley Dsouza, Ryan Donovan, Zhenyu (James) Kong, Peter Borgesen*

MSEC2017-2892 ACCELERATED GEOMETRY ACCURACY OPTIMIZATION OF ADDITIVE MANUFACTURING PARTS

*Amir M. Aboutaleb, Linkan Bian, Prahalad Rao, Mark Tschopp*

MSEC2017-2991 VISION-BASED REAL-TIME LAYER ERROR QUANTIFICATION FOR ADDITIVE MANUFACTURING

*Haedong Jeong, Minsub Kim, Bumsoo Park, Seungchul Lee*

### **MSEC 1-3-3 Advances in Micro- and Nano- Additive Manufacturing – 3**

#### **IRC 1016/1017**

Session Organizer: Paul R. Chiarot

Session Co-Organizer: Ping Guo

MSEC2017-2893 DEPOSITION OF BEAD ARRAYS WITH VARIABLE DIAMETER BY SELF-FOCUSING OF ELECTROHYDRODYNAMIC JETS

*Nicolas Martinez-Prieto, Gabriela Fratta, Jian Cao, Kornel Ehmann*

MSEC2017-2960 STUDY OF MICROSCALE THREE-DIMENSIONAL PRINTING USING NEAR-FIELD MELT ELECTROSPINNING

*Xiangyu You, Chengcong Ye, Ping Guo*

MSEC2017-3032 STRUCTURE OF ELECTROSPRAY PRINTED DEPOSITS FOR SHORT SPRAY TIMES

*Nicholas Brown, Yaqun Zhu, Ao Li, Mingfei Zhao, Xin Yong, Paul R. Chiarot*

### **MSEC 1-2-3 Modeling, Optimization & Process Development Part1**

#### **PRB MPR**

Session Organizer: Alessandro Fortunato

Session Co-Organizer: Alessandro Ascari

MSEC2017-2666 EFFICIENT PROCESS PLANNING STRATEGIES FOR ADDITIVE MANUFACTURING

*Uppili Srinivasan Venkatesan, Sanjay S. Pande*

MSEC2017-2796 MULTI-OBJECTIVE BUILD ORIENTATION OPTIMIZATION FOR POWDER BED FUSION BY LASER

*Salah Eddine Brika, Yaoyao Fiona Zhao, Mathieu Brochu, Justin Mezzetta*

MSEC2017-2951 PROCESS DEVELOPMENT FOR A ROBOTIZED LASER WIRE ADDITIVE MANUFACTURING

*Meysam Akbari, Yaoyu Ding, Radovan Kovacevic*

### **MSEC 2-3-9 Advanced Milling Process Modeling**

#### **PRB PC**

Session Organizer: Zhipeng Pan,

Session Co-Organizer: Xiaohong Lu, Yixuan Feng,

MSEC2017-2906 DISCRETE ELEMENT SIMULATION OF THE STRESS WAVE IN HIGH SPEED MILLING

*Yifei Jiang, Jun Zhang, Yong He, Hongguang Liu, Afaq R. Memon, Wanhua Zhao*

MSEC2017-2997 EFFECTS OF TOOL NOSE CORNER RADIUS AND MAIN CUTTING-EDGE RADIUS ON CUTTING TEMPERATURE IN MICRO-MILLING INCONEL 718 PROCESS

*Xiaohong Lu, Hua Wang, Zhenyuan Jia, Likun Si, Steven Liang*

MSEC2017-2999 A NEW METHOD FOR THE PREDICTION OF MICRO-MILLING TOOL BREAKAGE

*Xiaohong Lu, Haixing Zhang, Zhenyuan Jia, Yixuan Feng, Steven Liang*



## **MSEC 2-4-4 & ICMP 2-2-1 Advances in Nontraditional Manufacturing Processes-4**

### **PRB SCR**

Session Organizer: Zhigang Wang

Session Co-Organizer: Pedram Parandoush, Murali Sundaram

MSEC2017-2723 INVESTIGATION OF THE WATER GUIDED LASER MICRO-JET MACHINING OF AERO ENGINE COMPONENTS

*Zhigang Wang*

ICMP2017-4347 ORIENTATION BEHAVIOR OF PLATE-LIKE CERAMIC PARTICLES BY DIFFERENTIAL SPEED POWDER ROLLING

*Kazunari Shinagawa, Qi Feng*

## **MSEC 3-2-3 Integration and Measurements in Energy Applications**

### **HAR 101**

Session Organizer: Nilesh Kumar,

Session Co-Organizer: Aleksandra Fortier

MSEC2017-2735 ENERGY EFFICIENCY STATE IDENTIFICATION IN MILLING PROCESSING BASED ON IMPROVED HMM

*Yun Cai, Hua Shao*

MSEC2017-2834 IMPROVING THE ENERGY EFFICIENCY OF ADSORPTION CHILLERS BY INTENSIFYING THERMAL MANAGEMENT SYSTEMS IN SORBENT BEDS

*Brian K. Paul, Kijoon Lee, Hailei Wang*

## **MSEC 4-5-6 Cloud Manufacturing VI**

### **ZHS 159**

Session Organizer: Yujie Chen

Session Co-Organizer: Benjamin Gernhardt

MSEC2017-2720 ORDER DATASET RELEASE SCHEME BASED ON SAFE K-ANONYMIZATION FOR PRIVACY PROTECTION IN CLOUD MANUFACTURING

*Hui Xiu, Xuemei Jiang, Xiaomei Zhang*

MSEC2017-2904 RESEARCH ON DATA GENERATION METHOD IN CLOUD MANUFACTURING SIMULATION PLATFORM

*Lin Zhang, Chun Zhao*

MSEC2017-3006 IMPLEMENTATION OF A KNOWLEDGE-BASED PRODUCTION PLANNING INCLUDING A DIRECT MANIPULATIVE PROCESS EDITOR AND A MEDIATOR ARCHITECTURE

*Benjamin Gernhardt, Matthias Hemmje, Tobias Vogel, Lihui Wang*

### **ICMP 3-3-5 Measurements and Nondestructive Evaluations-3**

#### **ZHS 252**

Session Organizer: Hideo Cho

Session Co-Organizer: Ikuo Ihara

*Heiya Yamasaki, Tatsuro Kosaka, Kazuhiro Kusakawa*

ICMP2017-4317 EVALUATION OF LOCAL STRAIN FLUCTUATION OF STRUCTURES BY SENSING LAYERS WITH BUILT-IN RAYLEIGH SCATTERING-BASED DISTRIBUTED FIBER-OPTIC SENSORS

*Tatsuro Kosaka, Yuki Handa, Kazuhiro Kusakawa, Masayuki Kitamura*

ICMP2017-4369 FEM SIMULATION AND EXPERIMENTAL EVALUATIONS USING AN FBG SENSOR OF PROCESS-INDUCED STRAIN OF REINFORCEMENTS OF FRP

*Heiya Yamasaki, Tatsuro Kosaka, Kazuhiro Kusakawa*

ICMP2017-4372 IDENTIFICATION OF DAMAGE TYPES IN COMPOSITES BASED ON REMOTE AE MEASUREMENT WITH A FIBER-OPTIC SENSOR

*Yoji Okabe, Fengming Yu, Naoki Shigeta*

### **ICMP 1-6-1 Metals and Metal Matrix Composites I**

#### **ZHS 352**

Session Organizer: Tetsuro Yanaseko,

Session Co-Organizer: Takahiro Ohashi

ICMP2017-4341 MICROSTRUCTURES AND MECHANICAL PROPERTY OF INTERMETALLIC COMPOUNDS REINFORCED COMPOSITES

*Yongbum Choi, Zhefeng Xu, Kazuhiro Matsugi, Kenjiro Sugio, Gen Sasaki*

ICMP2017-4349 EVALUATION OF SPATIAL DISTRIBUTION OF SECOND PHASE IN PARTICLE DISPERSED COMPOSITES WITH MACHINE LEARNING TECHNIQUE

*Kenjiro Sugio, Yosuke Ohtani, Yongbum Choi, Gen Sasaki*

**11:00am – 12:30pm Technical Parallel Session - 10**

**NAMRC - TRACK 2 Manufacturing Processes" - Incremental Operations  
GFS 116**

Chairman: Steven Schmid

NAMRC-99 PREDICTION OF FORMING FORCES IN SINGLE POINT INCREMENTAL FORMING

*Ankush Bansal, Rakesh Lingam, Sateesh Kumar Yadav and N Venkata Reddy*

NAMRC-121 A NOVEL MODIFICATION TO THE INCREMENTAL FORMING PROCESS, PART 1: MULTI-DIRECTIONAL TOOLING

*Tyler Grimm, Ihab Ragai and John Roth*

NAMRC-122 A NOVEL MODIFICATION TO THE INCREMENTAL FORMING PROCESS, PART 2: VALIDATION OF THE MULTI-DIRECTIONAL TOOLING METHOD

*Tyler Grimm, Ihab Ragai and John Roth*

**NAMRC - TRACK 3 Additive Manufacturing - Advanced Materials 1  
VHE 217**

Chairman: Meisam Salahshoor

NAMRC-115 MANUFACTURING OF SMART COMPOSITES WITH HYPERELASTIC PROPERTY GRADIENTS AND SHAPE MEMORY USING FUSED DEPOSITION

*Kevin Estelle, Dylan Blair, Kent Evans and Arda Gozen*

NAMRC-95 FABRICATION OF FUNCTIONALLY GRADED POROUS POLYMER STRUCTURES USING THERMAL BONDING LAMINATION TECHNIQUES

*Ying Zhang and Jyhwen Wang*

NAMRC-163 PHASE TRANSFORMATION AND SHOCK SENSOR RESPONSE OF ADDITIVELY MANUFACTURED PIEZOELECTRIC PVDF

*Joshua Tarbutton, Tue Le, Greg Helfrich and Max Kirkpatrick*

**NAMRC - TRACK 2 Manufacturing Processes - Machining 3  
SAL 101**

Chairman: Chandra Nath

NAMRC-101 DEVELOPMENT OF NOVEL CBN CUTTING TOOL FOR HIGH SPEED MACHINING OF INCONEL 718 FOCUSING ON COOLANT BEHAVIORS

*Tatsuya Sugihara, Haruki Tanaka and Toshiyuki Enomoto*

NAMRC-129 EXPERIMENTAL EVALUATION OF DIRECT LASER ASSISTED TURNING THROUGH A SAPPHIRE TOOL

*Yuan Wei, Chaneel Park and Simon Park*

NAMRC-132 AN INVESTIGATION OF SIDE FLOW DURING CHIP FORMATION IN ORTHOGONAL CUTTING

*Rui Liu, Elijah Eaton, Mendy Yu and Jason Kuang*

### **NAMRC - TRACK 2 Manufacturing Processes - Finishing Operations 3**

**SAL 126**

Chairman: Masakazu Soshi

NAMRC-42 UNDERSTANDING FLEXIBLE ABRASIVE BRUSH BEHAVIOUR FOR DOUBLE DISK MAGNETIC ABRASIVE FINISHING BASED ON FORCE SIGNATURE

*Prateek Kala, Varun Sharma, Girish Verma and Pulak Pandey*

NAMRC-94 INVESTIGATION ON GRINDABILITY OF MEDICAL IMPLANT MATERIAL USING VITREOUS BOND SILICON CARBIDE GRINDING WHEEL

*Suya Prem Anand P, Arunachalam N and Vijayaraghavan L*

NAMRC-174 THERMO-PHYSICAL MODELLING OF TRACK WIDTH DURING LASER POLISHING OF H13 TOOL STEEL

*Shirzad Mohajerani, Joshua D. Miller, O. Remus Tutunea-Fatan and Evgueni Bordatchev*

### **NAMRC - TRACK 2 Manufacturing Processes - Milling 1**

**EEB 248**

Chairman: Wayne Cai

NAMRC-76 AMPLITUDE RATIO: A NEW METRIC FOR MILLING STABILITY IDENTIFICATION

*Mark Rubeo and Tony Schmitz*

NAMRC-114 EFFECT OF ROBOT DYNAMICS ON THE MACHINING FORCES IN ROBOTIC MILLING

*Lejun Cen and Shreyes Melkote*

NAMRC-144 INVESTIGATION OF CHIP THICKNESS AND FORCE MODELLING OF TROCHOIDAL MILLING

*Abram Pleta, Farbod Akhavan Niaki and Laine Mears*

### **NAMRC - TRACK 2 "Manufacturing Processes" - Electrochemical Operations**

**GER 224**

Chairman: Bruce L. Tai

NAMRC-110 EXPERIMENTAL STUDY ON THE POROSITY OF ELECTROCHEMICAL NICKEL DEPOSITS

*Abishek B. Kamaraj, Hridayesh Shrestha, Emily Speck and Murali Sundaram*

NAMRC-150 SOLID STATE ELECTROCHEMICAL DIRECT WRITING OF COPPER NANOSTRUCTURES ON AN ION CONDUCTIVE PHOSPHATE GLASS USING ATOMIC FORCE MICROSCOPY

*Shama Barna, Arun Ramanathan, Kyle Jacobs, Glennys Mensing, Daniel Shoemaker and Placid Ferreira*

NAMRC-31 A COMPARATIVE STUDY ON MICRO-ELECTRO-DISCHARGE-MACHINED SURFACE CHARACTERISTICS OF NI-TI AND TI-6AL-4V WITH RESPECT TO BIOCOMPATIBILITY

*Muhammad Jahan, Pegah Kakavand and Farshid Alavi*

### **MSEC 1-3-4 ADVANCES IN MICRO- AND NANO- ADDITIVE MANUFACTURING – 4**

**IRC 1016/1017**

Session Organizer: Michael Cullinan

Session Co-Organizer: Xuan Song

MSEC2017-2811 EFFECT OF PARTICLE SHAPE ON NECK GROWTH AND SHRINKAGE OF NANOPARTICLES

*Elham Mirkoohi, Rajiv Malhotra*

MSEC2017-3075 POLARIZATION EFFECT ON OUT OF PLANE CONFIGURED NANOPARTICLE PACKING

*Anil Yuksel, Michael Cullinan, Jayathi Murthy*

MSEC2017-3074 INVESTIGATION OF THE CORRELATION BETWEEN MICRO-SCALE PARTICLE DISTRIBUTION IN 3D PRINTING AND MACROSCOPIC COMPOSITE PERFORMANCE

*Lu Lu, Erina Baynojr Joyee, Yayue Pan*

## **MSEC 1-2-4 Characterization of Material & Component Properties Part 2**

### **PRB MPR**

Session Organizer: Alessandro Ascari

Session Co-Organizer: Alessandro Fortunato

MSEC2017-2949 CHARACTERIZATION OF MATERIAL BEHAVIOR OF THE FUSED DEPOSITION MODELING PROCESSED PARTS

*Madhukar Somireddy, Aleksander Czekanski,*

MSEC2017-3015 PROCESS EFFECT ON PART SURFACE ROUGHNESS IN POWDER-BED ELECTRON BEAM ADDITIVE MANUFACTURING

*Subin Shrestha, Y. Kevin Chou*

MSEC2017-3061 DYNAMIC RESPONSE OF 3D-PRINTED BI-MATERIAL STRUCTURE USING DROP WEIGHT IMPACT TEST

*Anish Ravindra Amin, Yi-Tang Kao, Bruce Tai, Jyhwen Wang*

## **ICMP 1-4-3 Shape memory alloys and magnetostrictive alloys**

### **PRB SCR**

Session Organizer: Fumio Narita

ICMP2017-4366 HIGH THROUGHPUT CHARACTERIZATION METHOD FOR GLASS TRANSITION OF TI-NI-ZR HIGH FORMABLE SHAPE MEMORY ALLOYS BY MEASURING ELECTRICAL RESISTIVITY

*Junpei Sakurai, Motoki Murakami, Mizue Mizoshiri, Seiichi Hata*

ICMP2017-4427 MAGNETIC AND MAGNETOSTRICTIVE PROPERTIES IN HEAT-TREATED CO-FE WIRE FOR DESIGN OF SMART MATERIAL/DEVICE

*Takahiro Yamazaki, Takahisa Yamamoto, Yasubumi Furuya, Wataru Nakao*

## **ICMP 1-2-1 Ceramics and Ceramic Matrix Composites I**

### **HAR 101**

Session Organizer: Yasuo Kogo

Session Co-Organizer: Shuichi Wakayama

ICMP2017-4393 EXPERIMENTAL CHARACTERIZATION OF THERMAL SHOCK FRACTURE IN CERAMICS UNDER VARIOUS STRESS CONDITIONS

*Shuichi Wakayama, Daiki Chiba, Fumito Matsuoka, Katsumi Yoshida, Takenobu Sakai*

ICMP2017-4405 MICROCRACK OBSERVATIONS OF SIC FIBER/SIC COMPOSITE UNDER TENSILE LOADING USING DIGITAL IMAGE CORRELATION

*Masashi Sato, Tatsuya Kikuta, Takuya Aoki, Toshio Ogasawara*

ICMP2017-4423 MECHANICAL PROPERTIES AND OXIDATION RESISTANCE OF SI-ALLOY MELT-INFILTRATED TYRANNO ZMI FIBER COMPOSITES

*Takuya Aoki, Toru Tsunoura, Katsumi Yoshida, Toyohiko Yano, Toshio Ogasawara*

## **MSEC 4-5-7 Cloud Manufacturing VII**

### **ZHS 159**

Session Organizer: Xi Vincent Wang

Session Co-Organizer: Fei Tao

MSEC2017-2719 MULTI-TENANT ACCESS CONTROL MODEL FOR CLOUD MANUFACTURING

*Qianwen Chen, Zude Zhou, Xiaomei Zhang, Xuemei Jiang*

MSEC2017-2752 PRICING METHOD FOR SERVICE-ORIENTED MANUFACTURING WITH SUPPORT VECTOR MACHINE

*Qiunan Meng, Jian Lou, Xun Xu, Shiqiang Yu*

MSEC2017-3003 DATA-DRIVEN THERMAL COMFORT PREDICTION WITH SUPPORT VECTOR MACHINE

*Bo Peng, Sheng-Jen hsieh*

## **ICMP 3-3-6 Measurements and Nondestructive Evaluations-2**

### **ZHS 252**

Session Organizer: Hironori Tohmyoh

Session Co-Organizer: Ikuo Ihara

MSEC2017-4312 THE MEASURING TECHNIQUE OF THE TEMPERATURE IN A SPECIMEN DURING THE ROTATING BENDING FATIGUE TEST

*Taizoh Yamamoto, Benning Lian, Koji Gotoh*

ICMP2017-4392 NONDESTRUCTIVE TESTING METHOD FOR CONCRETE STRUCTURES BY USING WATER JET

*Kazuya Mori, Saeko Tokuomi*

ICMP2017-4316 IN SITU ESTIMATION OF SUPPORT REACTION ON THIN SHEET SUBJECTED TO LOCAL COMPRESSION USING DATA ASSIMILATION

*Yoshinao Kishimoto, Yuki Yoshi Kobayashi, Toshihisa Ohtsuka, Shin Yamagata*

## **ICMP 4-1-1 Science of craftsmanship I**

### **ZHS 352**

Session Organizer: Hayato Nakatani

Session Co-Organizer: Norimichi Nanami

ICMP2017-4358 INVESTIGATION FOR TACIT KNOWLEDGE ON THE BENDING TECHNIQUE OF FLORAL MATERIALS IN IKEBANA

*Akihiko Goto, Yuki Ikenobo, Norihito Yamaguchi, Hiroyuki Hamada, Norimichi Nanami, Hayato Nakatani*

ICMP2017-4364 SKILL ANALYSIS OF AN EXPERT IN KIOKE PRODUCTION

*Asami Nakai, Mayuko Toyooka, Takeshi Ueshiba, Shinya Mori, Ken Imanishi, Syuhei Yasuda, Hayato Nakatani, Norimichi Nanami, Hiroyuki Hamada, Akihiko Goto*

ICMP2017-4361 THE SELECTION METHOD FOR EXCELLENT KYOTO BOWS BASED ON THE BOW FORCE DRAW CURVE

*Norimichi Nanami, Kanjuro Shibata, Syuhei Yasuda, Kazuaki Yamashiro, Shinji Nojima, Ken Imanishi, Shinya Mori, Hiroyuki Hamada, Akihiko Goto, Hayato Nakatani*

**2:15pm – 3:45pm Technical Parallel Session - 11**

**NAMRC - TRACK 2 Manufacturing processes - Incremental Operations 2**

**GFS 116**

Chairman: Yuebin Guo

NAMRC-151 STUDY OF ULTRASONICALLY PROCESSED POLYMER-NANOPARTICLE SOLUTIONS FOR ELECTROSPINNING

*Stephanie Hulse, Saheem Absar and Hongseok Choi*

NAMRC-47 CONTROLLING PRODUCT STIFFNESS BY AN INCREMENTAL SHEET METAL FORMING PROCESS

*Daniel Hesse, Florian Hoppe and Peter Groche*

NAMRC-93 ON THE FRACTURE CHARACTERIZATION IN DOUBLE-SIDED INCREMENTAL FORMING OF Ti6Al4V SHEETS AT ELEVATED TEMPERATURES

*Beatrice Valoppi, Zixuan Zhang, Muyang Deng, Andrea Ghiotti, Stefania Bruschi, Kornel F. Ehamnn and Jian Cao*

**NAMRC - TRACK 3 Additive Manufacturing - Advanced Materials 2**

**VHE 217**

Chairman: Meisam Salahshoor

NAMRC-84 SELECTIVE LASER SINTERING OF PHASE CHANGE MATERIALS FOR THERMAL ENERGY STORAGE APPLICATIONS

*Malek Nofal, Yayue Pan and Said Al-Hallaj*

NAMRC-119 FEASIBILITY EXPLORATION OF SUPERALLOYS FOR AISI 4140 STEEL REPAIR USING LASER ENGINEERED NET SHAPING

*Zhichao Liu, Weilong Cong, Hyeol Kim, Fuda Ning, Qihong Jiang, Tao Li, Hong-Chao Zhang and Yingge Zhou*

**NAMRC - TRACK 2 Manufacturing Processes- Machining 4**

**SAL 101**

Chairman: Iqbal Shareef

NAMRC-87 THIN-SLOTS MACHINING OF COMPLIANT NEEDLES FOR VIBRATION-ASSISTED MEDICAL INSERTION

*Yuan-Shin Lee, Yi Cai and Jason Moore*

NAMRC-125 3D FINITE ELEMENT MODELING BASED INVESTIGATIONS OF MICRO-TEXTURED TOOL DESIGNS IN MACHINING TITANIUM ALLOY Ti-6Al-4V

*Alaa Olleak and Tugrul Ozel*

NAMRC-71 FINISH TURNING OF Ti-6Al-4V WITH THE ATOMIZATION-BASED CUTTING FLUID (ACF) SPRAY SYSTEM

*Chandra Nath, Shiv Kapoor and Anil Srivastava*

## **NAMRC - TRACK 2 Manufacturing Processes - Finishing Operations 4**

**SAL 126**

Chairman: Jian Cao

NAMRC-8 ANALYSIS OF SURFACE FINISH IMPROVEMENT DURING ULTRASONIC ASSISTED MAGNETIC ABRASIVE FINISHING ON CHEMICALLY TREATED TUNGSTEN SUBSTRATE

*Nitesh Sihag, Prateek Kala and Pulak Mohan Pandey*

NAMRC-27 SURFACE FINISH OF A HARDENED STAINLESS STEEL USING A NEW BURNISHING TOOL

*Fang-Jung Shiou, Shih-Ju Huang, Albert Shih, Jiang Zhu and Masahiko Yoshino*

NAMRC-180 LONGITUDINAL MILLING AND FINE ABRASIVE FINISHING OPERATIONS TO IMPROVE SURFACE INTEGRITY OF METAL AM COMPONENTS

*Ashif Iquebal, Skander Amri, Sanjay Shrestha, Guha Manogharan, Satish Bukkapatnam and Zimo Wang*

## **NAMRC - TRACK 2 "Manufacturing Processes" - Milling 2**

**EEB 248**

Chairman: Ed Smith

NAMRC-23 A Study of Milling Surface Quality during Period-2 Bifurcations

*Andrew Honeycutt and Tony Schmitz*

NAMRC-182 Time-averaged and instantaneous mechanistic models using artificial force synthesis in helical end milling

*Raja Kountanya, Changsheng Guo and Daniel Viens*

## **MSEC 1-3-5 Advances in Micro- and Nano- Additive Manufacturing – 5**

**IRC 1016/1017**

Session Organizer: Chi Zhou

Session Co-Organizer: Heng Pan

MSEC2017-2684 TOOL PATH PLANNING FOR DIRECTIONAL FREEZING BASED 3D NANO PRINTING PROCESS

*Guanglei Zhao, Chi Zhou, Dong Lin*

MSEC2017-2779 ACTIVE MIXING NOZZLE FOR MULTI-MATERIAL AND MULTI-SCALE 3D PRINTING

*Hongbo Lan*

MSEC2017-2900 POWDER-BASED ADDITIVE MANUFACTURING OF LI-ION BATTERIES AND MICROPOWDER MIXING CHARACTERISTICS

*Brandon Ludwig, Jin Liu, Zhangfeng Zheng, Yan Wang, Heng Pan*

## **MSEC 2-5-5 & ICMP 2-6-1 Forming Processes V: Modeling & Experiments**

**PRB MPR**

Session Organizer: **Rajiv Malhotra**, Oregon State University, Corvallis, OR, United States

Session Co-Organizer: **Ziqiang Sheng**, GM, Warren, MI, United States, **Katsuyoshi Kondoh**, Osaka University, Suita, Osaka, Japan

MSEC2017-2797 IMPACT OF NON-ISOTHERMAL WARM ROLLING ON MICROSTRUCTURE, TEXTURE AND MECHANICAL PROPERTIES

*Chun Xu, Xing-zhou AN, Xiao-hua RAO, Ya-nan Li*

ICMP2017-4386 COLD FORMING CHARACTERISTICS OF WROUGHT MAGNESIUM ALLOYS

*Hisaki Watari, Hayatto Aso, Kazuhito Tsuruoka*



ICMP2017-4359 FABRICATION OF FUNCTIONALLY GRADED ALUMINUM FOAM AND ITS COMPRESSIVE PROPERTIES

*Yoshihiko Hangai, Takao Utsunomiya, Tomoaki Morita, Osamu Kuwazuru*

### **MSEC 4-10-3 Monitoring, Sensing and Control - Session 3**

#### **PRB PC**

Session Organizer: Radu Pavel

Session Co-Organizer: Mathew Kuttolamadom

MSEC2017-2641 DESIGN OF HARDWARE TCP/IP STACK FOR SENSING SYSTEMS INTENDED FOR MONITORING OF MECHANICAL EQUIPMENT

*Zhengying Li, Zhiqiang Xu, Quan Liu*

MSEC2017-3027 EMPIRICAL MODELING OF MATERIAL REMOVAL CONSIDERING TOOL CONDITION IN CHEMICAL MECHANICAL PLANARIZATION PROCESS

*Zhenhua Wu*

MSEC2017-3022 DEVELOPMENT OF AN INTEGRATED MELT MODULATION SYSTEM TO MANIPULATE COLD-RUNNER INJECTION MOLDING PROCESSING PARAMETERS AND THEIR EFFECTS ON FINAL PRODUCT PHYSICAL AND OPTICAL PROPERTIES

*Majed Alsarheed*

### **ICMP 3-3-2 Mechanical Properties and Strength**

#### **PRB SCR**

Session Organizer: Masaaki Itabashi

Session Co-Organizer: Kazuya Mori

ICMP2017-4311 EFFECT OF CRACK CLOSURE ON SMALL CRACK PROPAGATION IN A POLYCRYSTALLINE NI-BASE SUPERALLOY UNDER TMF CONDITION

*Yasuhiro Yamazaki*

ICMP2017-4315 DEVELOPMENT OF CLAMP FORCE DETECTION WRENCH FOR BOLT/NUT ASSEMBLIES

*Shinji Hashimura, Yujiro Sekido, Kyoichi Komatsu*

ICMP2017-4390 MECHANICAL PROPERTIES MEASUREMENT OF MICRO BORON CARBIDE SAMPLES SIMULATING THE FUEL DEBRIS

*Moriyasu Kanari, Naoki Iitsuka, Keita Tominaga*

### **ICMP 1-2-2 Ceramics and Ceramic Matrix Composites II**

#### **HAR 101**

Session Organizer: Shuichi Wakayama

Session Co-Organizer: Yasuo Kogo

ICMP2017-4411 FRACTOGRAPHIC ANALYSIS ON COMPETITION BETWEEN CRACK PROPAGATION AND SELF-HEALING IN SELF-HEALING CERAMICS AT HIGH TEMPERATURE

*Wataro Nakao, Lee Jang-Won,*

ICMP2017-4414 INVESTIGATION OF SELF-HEALING ABILITY OF AL<sub>4</sub>SIC<sub>4</sub> AS HEALING AGENT

*Natsuko Kimura, Wataru Nakao*

ICMP2017-4441 MECHANICAL PROPERTIES OF SI-BASED BOND COAT MATERIALS IN ENVIRONMENTAL BARRIER COATING SYSTEM: EFFECT OF HEAT TREATMENT

*Ryo Inoue, Yuki Fujii, Syou Usami, Kazuma Chikamoto, Yasuo Kogo*

## **ICMP 4-2-1 Novel Evaluation Method**

### **ZHS 252**

Session Organizer: Kyoichi Nakayasu

ICMP2017-4380 DYNAMICS OF SMART INFLATABLE TSUNAMI AIRBAGS (TABS) FOR TSUNAMI DISASTER MITIGATION

***Mohsen Shahinpoor, Hiroshi Asanuma***

ICMP2017-4430 RECENT ADVANCES IN DISASTER MITIGATION AND SUSTAINABLE ENGINEERING

***Hiroshi Asanuma***

ICMP2017-4439 DAMAGE DETECTION METHOD FOR THE STRUCTURAL PARTS OF THE LARGE CONSTRUCTIONS BY MOIRÄ© METHOD

***Satoshi Kishimoto***

## **ICMP 4-1-7 Science of Craftsmanship II**

### **ZHS 352**

Session Organizer: Norimichi Nanami

Session Co-Organizer: Hiroyuki Hamada

ICMP2017-4328 TECHNOLOGY EVALUATION ON PAPER TUBES MANUFACTURE BY COMPARING BETWEEN EXPERT AND NON-EXPERT

***Mitsunori Suda, Takanori Kitamura, Zhiyuan Zhang, Hiroyuki Hamada***

ICMP2017-4370 PROCESS AND MOTION ANALYSES OF THE TYING UP METHOD OF KYO-KANOKOSHIBORI BETWEEN THE EXPERT AND NON-EXPERT

***Reiko Furoi, Shodai Kawakatsu, Kiyoko Kiso, Hiroyuki Hamada, Hayato Nakatani, Norimichi Nanami, Akihiko Goto***

ICMP2017-4365 THE DEVELOPMENT IN THE MAKING PROCESS OF SILK-SCREEN PRINTED JAPANESE TILES

***Hayato Nakatani, Masaki Sakata, Yoshito Nakano, Tomoko Ota, Masahisa Asada, Hiroyuki Hamada, Norimichi Nanami, Akihiko Goto***

**4:00 pm – 5:30 pm Technical Parallel Session - 12**

**MSEC 4-8-3 Machining & Process Control -2**

**GFS 116**

Session Organizer: Burak Sencer  
Session Co-Organizer: Durul Ulutan

MSEC2017-2611 ADAPTING WAREHOUSE MANAGEMENT SYSTEMS TO THE REQUIREMENTS OF THE EVOLVING ERA OF INDUSTRY 4.0  
*Cyril Alias, Udo Salewski, Viviana Elizabeth Ortiz Ruiz, Frank Eduardo Alarcón Olalla, José do Egypto Neirão Reymão, Bernd Noche*

MSEC2017-3104 PROCESS AND OPERATIONS CONTROL IN MODERN MANUFACTURING (STATE OF THE ART PAPER)  
*Dragan Djurdjanovic, Lin Li, Laine Mears, Farbod Akhavan Niaki, Asad Ul Haq*

**MSEC 1-4-1 Environmental Sustainability of Additive Manufacturing -1**

**VHE 217**

Session Organizer: William Bernstein  
Session Co-Organizer: Lin Li

MSEC2017-2871 MEASURING THE COMPLEXITY OF ADDITIVE MANUFACTURING SUPPLY CHAINS  
*Ardeshir Raihanian Mashhadi, Sara Behdad*

MSEC2017-2957 EVALUATION OF ENVIRONMENTAL SUSTAINABILITY FOR ADDITIVE MANUFACTURING BATCH PRODUCTION  
*Yiran Yang, Lin Li*

MSEC2017-3007 CHARACTERIZATION OF PARTICLE EMISSION FROM FUSE DEPOSITION MODELING PRINTERS  
*Timothy Simon, Giovanni Aguilera, Fu Zhao*

**MSEC 5-2-3 Advances in Biomanufacturing of Tissue-Engineered Scaffolds – 3**

**SAL 126**

Session Organizer: Jun Yin  
Session Co-Organizer: Changxue Xu

MSEC2017-2898 BINGHAM FLUID-ASSISTED FABRICATION OF 3D VASCULAR-LIKE CONSTRUCTS OF INTERPENETRATING NETWORK HYDROGEL  
*Srikumar Krishnamoorthy, Mengyun Zhang, Hongtao Song, Changxue Xu*

MSEC2017-2725 INVESTIGATING DIELECTRIC IMPEDANCE SPECTROSCOPY AS A NON-DESTRUCTIVE QUALITY ASSESSMENT TOOL FOR 3D CELLULAR CONSTRUCTS  
*Lokesh Karthik Narayanan, Trevor L. Thompson, Aditya Bhat, Binil Starly, Rohan A. Shirwaiker*

## **MSEC 4-2-4 Data-Driven Optimization for Manufacturing Decision-Making**

### **EEB 248**

Session Organizer: Tangbin Xia  
Session Co-Organizer: Weihong Guo

MSEC2017-2940 JOINT PRODUCTION AND MAINTENANCE DECISION-MAKING IN MIXED-MODEL ASSEMBLY SYSTEMS

*Xi Gu, Weihong Guo*

MSEC2017-3065 A MODIFIED DYNAMIC PROGRAMMING MODEL IN CONDITION-BASED MAINTENANCE OPTIMIZATION

*Mengkai Xu, Md. Noor E Alam, Sagar Kamarthi*

## **MSEC 2-4-3 Advances in Nontraditional Manufacturing Processes-3**

### **GER 224**

Session Organizer: Ning He  
Session Co-Organizer: Sagil James

MSEC2017-2993 EFFECT OF ARC-CURRENT AND PARTICLE MORPHOLOGY ON FRACTURE TOUGHNESS OF PLASMA SPRAYED ALUMINIUM OXIDE COATING

*Simanchal Kar, Partha Pratim Bandyopadhyay, Soumitra Paul*

MSEC2017-3035 LASER SURFACE ENGINEERING OF HIERARCHY HYDROXYAPATITE AEROGEL FOR BONE TISSUE ENGINEERING

*Pedram Parandoush, Hanxiong Fan, Xiaolei Song, Dong Lin*

MSEC2017-3072 TRIBOLOGICAL PROPERTIES OF TEXTURED CEMENTED CARBIDE SURFACES OF DIFFERENT WETTABILITY PRODUCED BY PULSE LASER

*Xiuqing Hao, Xiaolu Song, Liang Li, Ning He*

## **MSEC 1-5-3 Process Monitoring in Additive Manufacturing I**

### **IRC 1016/1017**

Session Organizer: Chi Zhou  
Session Co-Organizer: Jarred Heigel

MSEC2017-2947 ADDITIVE MANUFACTURING (AM) OF FLEXIBLE ELECTRONIC DEVICES: ONLINE MONITORING OF 3D LINE TOPOLOGY IN AEROSOL JET PRINTING PROCESS USING SHAPE-FROM-SHADING (SFS) IMAGE ANALYSIS

*Roozbeh Salary, Jack P Lombardi, Prahalad Rao, Mark Poliks*

MSEC2017-3016 PRELIMINARY TESTING OF TEMPERATURE MEASUREMENTS IN SELECTIVE LASER MELTING

*Bo Cheng, Stephen Cooke, Y. Kevin Chou*

MSEC2017-2942 MEASUREMENT OF THE MELT POOL LENGTH DURING SINGLE SCAN TRACKS IN A COMMERCIAL LASER POWDER BED FUSION PROCESS

*Jarred Heigel, Brandon Lane*

## **ICMP 1-6-2 Metals and Metal Matrix Composites II**

### **PRB MPR**

Session Organizer: Kenjiro Sugio,  
Session Co-Organizer: Yongbum Choi

ICMP2017-4304 MECHANICAL BEHAVIOR AND FAILURE OF EASILY-DECOMPOSABLE DISSIMILAR-MATERIALS-JOINT FABRICATED BY FRICTION STIR FORMING

*Takahiro Ohashi, Hamed Mofidi Tabatabaei, Tadashi Nishihara*

ICMP2017-4321 FABRICATION OF METAL MATRIX PIEZOELECTRIC COMPOSITE USING SURFACE OXIDIZED METAL FIBER AS INTERNAL ELECTRODE

*Kazuki Horikiri, Tetsuro Yanaseko, Isao Kuboki, Hiroshi Sato, Hiroshi Asanuma*

## **MSEC 4-9-2 Intelligent Maintenance Decision Making of Manufacturing Systems-2**

### **PRB PC**

Session Organizer: Yong Wang  
Session Co-Organizer: Zeyi Sun

MSEC2017-2736 A DATA-DRIVEN APPROACH TO DETECT MECHANICAL FAULTS IN WIND TURBINE GEARBOX

*Ruoyu Li, Zeyi Sun,*

MSEC2017-2765 REMAINING USEFUL LIFE ESTIMATION BASED ON A SEGMENTAL HIDDEN MARKOV MODEL WITH CONTINUOUS OBSERVATIONS

*Zhen Chen, Tangbin Xia, Ershun Pan*

## **MSEC 5-4-3 Sustainable Manufacturing: Scheduling and Control I**

### **PRB SCR**

Session Organizer: Qing Chang  
Session Co-Organizer: Jing Zou

MSEC2017-2630 FLEXIBLE JOB-SHOP SCHEDULING FOR REDUCED MANUFACTURING CARBON FOOTPRINT

*Qiong Liu, Youquan Tian, John Sutherland, Chao Wang, Freddy O. Chekem*

MSEC2017-2854 GANTRY SCHEDULING FOR TWO-MACHINE ONE-BUFFER COMPOSITE WORK CELL BY REINFORCEMENT LEARNING

*Jorge Arinez, Xinyan Ou, Qing Chang*

MSEC2017-2907 SIMULATION OPTIMIZATION FOR COMPUTER MODELS WITH MULTIVARIATE OUTPUT

*Raed Kontar, Shiyu Zhou, John Horst*

## **MSEC 5-1-3 Design and Fabrication of Medical Devices**

### **HAR 101**

Session Organizer: Scott Miller  
Session Co-Organizer: Roland Chen

MSEC2017-2814 DESIGN AND ANALYSIS OF SOFT GRIPPERS FOR HAND REHABILITATION

*Hongying Zhang, Yiqiang Wang, Michael Wang, Jerry YH Fuh, A Senthil Kumar*

MSEC2017-2992 THE DEVELOPMENT OF A NOVEL POSITIONING SYSTEM TO IMPROVE PULMONARY OUTCOMES IN CRITICALLY ILL PATIENTS  
*Kalie Hennigan, Scott Miller, Prakash Kabbur, Russell Woo*

MSEC2017-3002 MANUFACTURING AND COMPUTATIONAL FLUID DYNAMICS MODELING OF A PATIENT-SPECIFIC FISTULA MODEL  
*Yang Liu, Yihao Zheng, John Pitre, William Weitzel, Joseph Bull, Albert Shih*

#### **ICMP 4-2-2 Sensors and Devices 1**

##### **ZHS 252**

Session Organizer: Mohsen Shahinpoor

ICMP2017-4389 THE DEVELOPMENT OF THE FLAP GATE TYPE LAND LOCK  
*Kyoichi Nakayasu, Yuichiro Kimura, Toshiaki Morii, Yoshito Yamakawa*

ICMP2017-4445 OPTIMIZATION OF FBG SENSOR SENSITIVITY FOR DISASTER PREVENTION IN PIPELINES  
*Antonio Paolozzi, Ferdinando Felli, Cristian Vendittozzi, Claudio Paris, Hiroshi Asanuma*

ICMP2017-4437 DEVELOPMENT OF THERMOELECTRIC DEVICE UTILIZING SELECTIVE DIRECT BONDING TECHNOLOGY UTILIZING ANODIC OXIDE FILM ON ALUMINUM SURFACE  
*Hiroshi Sato, Tetsuro Yanaseko, Hiroshi Asanuma, Hatune Kawanishi*

#### **ICMP 4-1-3 Processing I**

##### **ZHS 352**

Session Organizer: Hiroyuki Hamada

Session Co-Organizer: Hayato Nakatani

ICMP2017-4400 LAP JOINING OF DISSIMILAR GRADE ALUMINUM ALLOYS BY FRICTION STIR FORMING PROCESS: A STUDY ON THE EFFECT OF TOOL PLUNGE DEPTH ON SHEAR STRENGTH OF THE JOINTS  
*Tinu P. Saju, R. Ganesh Narayanan*

ICMP2017-4344 EXPERIMENTAL AND NUMERICAL CHARACTERIZATION OF NANOFUID MINIMUM QUANTITY LUBRICATION END-MILLING PROCESS ACCORDING TO MIST SPRAYING CONDITION  
*Jin Woo Kim, Young Chang Kim, Jung Sub Kim, Sangwon Lee*

ICMP2017-4357 THERMAL TREATMENT AND MICROSTRUCTURE OBSERVATION FOR JAPANESE SEWING SCISSORS MADE BY THE "SO-HIZUKURI" FORGING PROCESS  
*Hayato Nakatani, Yasuko Kitajima, Takuya Sugimoto, Akihiko Goto, Hiroyuki Hamada*

**5:00pm – 8:00pm**

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

**Room:** Ronald Tutor Campus Center (RTCC-A)

**Organized by:** ASME/MED, NAMRI/SME, and JSME



**Sponsored by:** National Science Foundation

**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 better information/knowledge of various research positions in industry, academia, and national laboratories. The forum will further discuss how to be successful professionally in the various research settings.

**Agenda (Wednesday, June 7, 2017)**

- 5:00 – 5:15: Opening Remarks and Welcome
- 5:15 – 6:00: 5-minute spoken introduction by each panelist
- 6:00 – 6:15: Pizza and beverages served
- 6:15 – 7:30: Breakout panel discussions
  - Panel 1: Academia
  - Panel 2: Government
  - Panel 3: Industry
- 7:30 - 8:00: Wrap-up discussion, open questions and answers

**Forum Format:**

1. Each panelist will introduce themselves in approximately 5 minutes each. They have experience conducting research in academia, industry, and government labs.
2. Round-table discussions (parallel) will follow: one for academia, one for government and the other for industry. The round-table discussions will each have 3 panelists from diverse background/positions. Panelists will discuss such topics as how to search for a job, career management, funding for research, etc.
3. Food and beverages will be served during the forum.
4. After the forum participants are encouraged to engage in conversations/discussions related to their particular/personal interests.

**Fee:** Free for registered conference participants

**Attendance:**

Open to all registered conference participants

**Mandatory for NSF Travel Grant\* student applicants**

**Early Career Forum Chair:**

Dr. Frank Pfefferkorn, University of Wisconsin-Madison  
 Phone: 608-263-2668 Email: [frank.pfefferkorn@wisc.edu](mailto:frank.pfefferkorn@wisc.edu)

## Panelists:



### **Dr. Kira Barton, University of Michigan Ann Arbor**

Kira Barton is an Assistant Professor in the Department of Mechanical Engineering at the University of Michigan. She received her B.Sc. in Mechanical Engineering from the University of Colorado at Boulder in 2001. Following her B.Sc, Kira worked as a well control engineer for British Petroleum in Alaska, and then as an Engineer I for the Woods Hole Oceanographic Institution in Massachusetts. In 2004, she continued her education in mechanical engineering at the University of Illinois at Urbana-Champaign and completed her M.Sc. and Ph.D. degrees in 2006 and 2010, respectively. She held a postdoctoral research position at the University of Illinois from Fall 2010 until Fall 2011, at which point she joined the Mechanical Engineering Department at the University of Michigan at Ann Arbor. Kira conducts research in modeling, sensing, and control for applications in advanced manufacturing and robotics, with a specialization in Iterative Learning Control and micro-additive manufacturing. Kira is the recipient of an NSF CAREER Award in 2014, 2015 SME Outstanding Young Manufacturing Engineer Award, the 2015 University of Illinois, Department of Mechanical Science and Engineering Outstanding Young Alumni Award, and the 2016 University of Michigan, Department of Mechanical Engineering Department Achievement Award.



### **Dr. Wayne Cai, General Motors Global R&D**

Dr. Wayne Cai is a Staff Researcher at General Motors Global R&D Center in Warren, Michigan, USA. His research area is advanced manufacturing technology, where mechanics, materials, and mathematics (statistics) are used to optimize manufacturing processes and systems for improved quality, reliability and reduced cost. He is well-recognized for his innovation in automotive technologies, particularly li-ion battery design and manufacturing technologies, with over thirty US and international patents (or patent pending) and a number of GM trade-secrets inventions. He authored over seventy peer-reviewed research papers, one book on li-ion battery manufacturing, and is a frequently invited speaker at a variety of industrial and academic forums.

Dr. Cai is currently Chair of SAE Hybrid Electric Vehicle Committee, Vice Chair of ASME Manufacturing Process Technical Committee, Associated Chair of North American Manufacturing Research Institute. He also serves as an Associate Editor for ASME Journal of Manufacturing Science and Engineering and SME Journal of Manufacturing Processes. Dr. Cai received his Ph.D. degree from The University of Michigan.



### **Dr. Moneer Helu, National Institute of Standards and Technology**

Moneer Helu is a mechanical engineer and associate project leader in the Engineering Laboratory at the National Institute of Standards and Technology (NIST). He is also the Co-Leader of the NIST Smart Manufacturing Systems Test Bed. Moneer's current research focus is in the areas of monitoring, diagnostics, prognostics, and control for smart manufacturing systems. He is a member of the Technical Steering Committee and Technical Advisory Group for MTConnect, the Manufacturing Engineering Division of ASME, and the Scientific Committee of the SME North American Manufacturing Research Institute. He is also a Corporate Member of the International Academy for Production Engineering (CIRP). Prior to joining NIST in 2014, Moneer was the Associate Director of the Laboratory for Manufacturing and Sustainability (2014) and a Lecturer and Postdoctoral Researcher (2013-2014) in the Department of Mechanical Engineering at UC Berkeley. He received his Ph.D. (2013) and M.S. (2009) in Mechanical Engineering from UC Berkeley and S.B. (2007) in Mechanical Engineering from MIT. He has been recognized by SME in the 2014 list of the "30 Under 30: Future Leaders of Manufacturing."



### **Dr. Arif Malik, University of Texas Dallas**

Arif Malik has been an Associate Professor of Mechanical Engineering at The University of Texas at Dallas since 2015. Prior to joining UT Dallas, Malik was an Assistant Professor of Aerospace and Mechanical Engineering at Saint Louis University. He received his PhD from Wright State in 2007, and prior to this he held several positions in industry, including 2 years as an industrial ventilation applications engineer for Lau Industries, 5 years as a process control engineer for ARMCO/AK Steel, and 5 years in a start-up company that he co-founded to supply process control software for the metals manufacturing industry. Malik is a recipient of NSF's CAREER Award, and his research involves uncertainty-based computational mechanics to address interdisciplinary problems including metal forming, laser processing of metals, and adaptive structures for micro air vehicles. Besides research contributions in these fields, Malik and his graduate students run Engineering Brighter Futures for Autism events in Dallas, in which teens with autism gain valuable social collaboration skills while competing in manufacturing-related design-build-test 3D printing competitions





### **Dr. Laine Mears, Clemson University**

Laine Mears is the BMW SmartState Endowed Chair of Automotive Manufacturing, Professor and founding faculty member in the Automotive Engineering department at Clemson University. He teaches and conducts projects at the Clemson University International Center for Automotive Research. Teaching covers modeling and analysis of automotive manufacturing processes, quality systems and quality tools; research is in manufacturing quality estimation, Intelligent Machining Systems, manufacturing process design and control, and manufacturing equipment diagnostics. He has published over 100 peer-reviewed articles, and is the recipient of the NSF CAREER award, SAE Ralph Teetor Educational Award, the South Carolina Governor's Young Researcher Award for Excellence in Scientific Research and the IMECHE George Stephenson Gold Medal.

Dr. Mears has over 10 years' industry experience, holding positions with Hitachi Automotive and SKF Bearings both as Manufacturing Engineer and Engineering Manager in a high-volume precision manufacturing environment. Applicable work in industry includes leading quality implementation teams for QS-9000 and ISO-TS-16949 quality systems, power optimization of hard machining processes, and startup of a new bulk deformation rolling process. Dr. Mears has a B.S. in mechanical engineering from Virginia Tech (1993) and M.S. (2001) and Ph.D. (2006) degrees in mechanical engineering from Georgia Tech. He is a Fellow of the American Society of Mechanical Engineers and a Senior Member of both the Society of Manufacturing Engineers and the American Society for Quality. He is an ASQ Certified Quality Engineer (CQE), BMW Lean Six Sigma Black Belt, and a licensed Professional Engineer.



### **Dr. Sangkee Min, University of Wisconsin-Madison**

Sangkee Min earned his Ph.D. at UC Berkeley with manufacturing major in 2001. His Ph.D. work focused on very practical industrial problems like burr minimization from various machining processes and the outcome of his research was tested and implemented at the automotive and aerospace industry. After his Ph.D., he went to Japan as a special assistant professor at Keio University where he expanded his industrial connection to many Japanese industries; automotive, machine tool, tool makers, oil refinery, etc. with his environmental machining research.

He returned to the US for a venture opportunity that was to fabricate a customized knee surgery assistive device in 2005. He was working as a manufacturing director where he developed a traceable manufacturing system for high mix low volume medical device production. He left the company for another challenge, ultra-precision nano-machining that he considered as emerging and enabling technology. He joined DTL Corporation (Mori Seiki's US R&D) in 2009 where his team developed an ultra-precision 5-axis nano machine and machining technology.

He started his personal consulting on various subjects on manufacturing from technical process level consulting to global manufacturing strategy and manufacturing policy-making. With strong passion toward manufacturing and growing attention to US manufacturing, he started working for Lawrence Berkeley National Laboratory to assist its manufacturing strategy as a consultant and finally joined as a staff scientist in 2012. At LBNL, he has been working to establish the advanced manufacturing center integrating existing manufacturing excellence and developing new manufacturing technology with an emphasis on ultra-precision machining technology.

From a long history of his manufacturing experience at several countries (US, Japan, Germany, and Korea), he learned that one of key contributors of economic success of one country is keeping manufacturing excellence in the country while maintaining healthy manufacturing ecosystem and proper level of social respect toward manufacturing. He is working to contribute his knowledge and experience to revival of US manufacturing and keeping it sustainable as an assistant professor of Department of Mechanical Engineering at University of Wisconsin-Madison with three major research topics; UPM (Ultra-Precision Machining), SSM (Smart Sustainable Manufacturing), and MFD (Manufacturing for Design).



### **Dr. Shawn Moylan, National Institute of Standards and Technology**

Since 2006, Shawn Moylan has researched measurement science and metrology for advanced manufacturing processes at the National Institute of Standards and Technology (NIST). Currently Shawn is the project leader for Qualification for Additive Manufacturing Materials, Processes, and Parts focusing on developing test methods and reference data to reduce the high costs associated with qualifying critical components for aerospace, medical, and other applications. Prior to working in metals additive manufacturing and 3D printing, Shawn worked in 5-axis machine tool metrology, on-machine measurement of part geometry, smart machine tools, and micro/meso-scale manufacturing.

Shawn received his B.S. in mechanical engineering from the University of Notre Dame and Ph.D. from Purdue University. Shawn is currently on detail assignment in the Advanced Manufacturing National Program Office located at NIST.

Shawn is a leader and active member of the additive manufacturing and advanced manufacturing communities.

- Chair of Executive Committee for ASME Manufacturing Engineering Division (2016-2017, member since 2012)
- Member of Technical Roadmap Advisory Group for America Makes -- the national additive manufacturing innovation institute (2014 - present)
- Member of ASME Technical Advisory Panel on Additive Manufacturing and 3D printing (2016 – present)
- Co-chair of ASPE Spring Topical Meeting -- Achieving Precision Tolerances in Additive Manufacturing (2015, 2016)
- Member of Program Committee for ASME AM3D conference (2016)
- Member of Advisory Committee for SME MicroManufacturing Conference (2008-2011)



### **Dr. Ihab Ragai, Penn State University**

Dr. Ihab Ragai is Assistant Professor of Engineering at the Penn State University, Erie, PA. Prior to joining academia, he was the Senior Engineering Manager at Hitachi Truck in Canada, overseeing all projects related to product/process optimization, truck dynamics, fatigue analysis, structural and drive system components design, material selection, and manufacturing processes including casting, forging, welding, and sheet forming. For over 20 years, he has held several positions in industry as Design Engineer, Manufacturing Researcher, Project Engineer, and Project Manager. Dr. Ragai worked on several projects with ABB Germany, McDonnell Douglas Aerospace USA, Pratt & Whitney Canada, Canada Network of Centres of Excellence (AUTO21), and The Canadian Institute of Aerospace Research. His areas of expertise include advanced manufacturing processes, finite element simulation, material constitutive modeling, stress analysis, and design of aerospace and automotive components & systems.

Dr. Ragai attended universities in Egypt, Germany, the US and Canada, where he earned a Bachelor's degree in Manufacturing Engineering (1994), a Master's degree in Mechanical Design (1999), and a Ph.D. degree in Mechanical Engineering (2006). He is a registered Professional Engineer in the province of Ontario, Canada. He is currently serving as a Director in the board of the North American Manufacturing Research Institution (NAMRI/SME) and as an Associate Editor of the Journal of Manufacturing Research. Previously, he served as the Technical Program Chair of the 2014 Manufacturing Science and Engineering Conference (MSEC2014). He is a recipient of several national and international awards in the field of mechanical engineering.



### **Dr. Masakazu Soshi, University of California Davis**

Dr. Masakazu Soshi is an assistant professor at University of California Davis (UC Davis) since November 2012. He obtained his Ph.D. degree from UC Davis in 2009 with his dissertation entitled "A study on the development of a multi-purpose spindle for quality productive machining". In this study, he developed a unique dual motor spindle system for heavy duty CNC machining. In 2008, while still being a student, he was employed as an engineer by DMG Mori Co., Ltd., one of the largest CNC machine tool manufacturers in the world. He worked for the company as a spindle designer for the first half of his career in the company and then transferred to the production technology department to focus on improving productivity of machine tool manufacturing by developing a method of hard milling of cast iron for structural machine tool components. Since his new appointment at UC Davis in 2012, he established the Advanced Research for Manufacturing System (ARMS) Laboratory with emphasizes on machining processes and machine tool design. His research lab currently puts focus on unique applications and processes development using a hybrid CNC machine tool which combines traditional cutting and direct energy deposition (DED). He received the CIRP F.W. Taylor medal award in 2010. He published a total of 10 journals and some conference proceedings and patents after his appointment at UC Davis. Dr. Soshi serves as chairperson of Machine Tool Technologies Research Foundation (MTTRF) since 2013 where he has contributed to organize and lead the annual conferences.



### **Dr. Hitomi Yamaguchi Greenslet, University of Florida**

Hitomi Yamaguchi Greenslet is currently an associate professor in the Department of Mechanical and Aerospace Engineering at the University of Florida. The path that led her to UF includes positions in industry, national laboratories, and academia both inside and outside her native Japan. When she was studying for her master's degree, she interned for three months at the Paul Scherrer Institut in Switzerland. This experience and a previous supervisor inspired her to explore academia. In 1996, she received her doctorate from Utsunomiya University, Japan, and started her professional career as research associate at the University of Tokyo. She soon realized that industrial experience was necessary to effectively teach Manufacturing Engineering, and she left the university in 1997 and worked as research engineer at Extrude Hone Corporation in Pennsylvania. After gaining some industrial experience, she returned to her alma mater where she was research associate and later associate professor. In 2002-2003, she spent her sabbatical working as a researcher abroad at NASA Glenn Research Center in Ohio, and she left Utsunomiya University in 2007 and moved to UF.

Her research interests have evolved throughout her career and now include ultra-precision finishing (such as magnetic field-assisted finishing), surface functionalization, and medical-device development. Her work has

been published in over 80 refereed journal papers, and she has been granted 8 patents. She has received several awards, including Outstanding Young Engineer awards from JSME in 1995, SME in 2000, and JSAT in 2003. She is currently the secretary of the Scientific Technical Committee for Abrasive Processes (STC-G) of CIRP (the International Academy for Production Engineering). She also serves as the secretary of the North American Manufacturing Research Institute of SME. In recognition of her contributions, she has been elected as a fellow of both ASME (American Society of Mechanical Engineers) and SME. In addition to her research, she is passionate about working in the areas of Manufacturing Education and Workforce Development. She is the faculty advisor of the UF chapter of Pi Tau Sigma. She hosts students (from K-12 to university) in her laboratory every summer and has hosted events where professionals can share their experiences of engineering education and career development.

9:00am - 11:00am      Information Desk      Epstein Family Engineering Plaza

9:15am - 10:45am      Technical Parallel Session - 13

12:00pm - 1:00pm      Box Lunch      Epstein Family Engineering Plaza

1:00pm      Tour Departs      Haas Automation (Oxnard)

1:00pm - 6:00pm      ASME Workshop-Monitoring, Diagnostic,  
& Prognostic Guidelines to Support  
Health Management & Control Manuf  
Systems      Radisson 1880 Room

# Haas Automation

Haas Automation Plant Tour, Oxnard

Tour Date: Thursday, June 8, 2017

Bus leaves from Engineering Plaza at 1:00 PM and returns around 6PM.

Cost: \$20

Haas Automation is the largest machine tool builder in the western world, manufacturing a complete line of CNC vertical machining centers, horizontal machining centers, CNC lathes and rotary products. The company also builds a variety of specialty machines, including 5-axis machining centers, mold making machining centers, tool room machines, and gantry routers. Haas machine tools and rotary products are built to the exacting specifications of Gene Haas to deliver higher accuracy, repeatability, and durability than any other machine tools on the market.

Gene Haas founded Haas Automation, Inc., in 1983 to manufacture economical and reliable machine tools. The company entered the machine tool industry with the first-ever, fully automatic, programmable collet indexer – a device used to position parts for machining with very high accuracy. The Haas 5C collet indexer was a huge success, and over the next four years, the company expanded its product line to include a wide selection of fully programmable rotary tables, rotary indexers, and machine tool accessories.



In 1987, Haas Automation began developing its first vertical machining center (VMC), a machine designed to perform such machining operations as milling, drilling, tapping, and boring. This machine, the VF-1, was introduced at a cost that was competitive with machine tools from offshore manufacturers. Employing the latest equipment and procedures for close-tolerance manufacturing, the first VF-1 prototypes were completed in 1988 and introduced at the International Machine Tool Show (IMTS '88) in Chicago, Illinois.

At that time, industry scholars and members of the trade press were skeptical that an American-made machining center could be sold for less than \$50,000. Haas not only delivered on the price, but delivered the product as well, something other manufacturers often were unable to do. Today, the Haas VF-1 still sells for less than \$50,000, and in most instances, a customer's machine can be delivered within just a few weeks of the initial order.

To ensure accuracy, Haas produces all critical components in-house using dedicated state-of-the-art CNC machine tools. The company's 1-million-square-foot facility makes extensive use the latest lean manufacturing methods and just-in-time production practices to streamline production capabilities and reduce costs. This, combined with highly trained teams for electronics and mechanical assembly, allows Haas to control quality, cost, reliability, and availability.

The resulting savings and increased quality are passed on to the customer in the form of lower prices and better products.

Of the nearly 300 chip-making machine tools in the Haas machine shop, more than two-thirds are Haas machines – proof positive that the company believes in its own products. To increase production capacity and capability, new manufacturing equipment is added constantly, allowing Haas to produce more parts more efficiently, and further reduce the cost of Haas products to the end user.

Today, Haas manufactures four major product lines: vertical machining centers (VMCs), horizontal machining centers (HMCs), CNC lathes and rotary tables, as well as a number of large five-axis and specialty machines. All Haas products are manufactured at the company's expansive facility in Oxnard, California – the largest, most modern machine tool manufacturing operation in the United States.



# PRESENTATION SCHEDULE FOR THURSDAY

	Joint MSEC-NAMRC-ICMP Invited Talks	GFS 116	VHE 217	VPD 105**	SAL 126	EEB 248	GER 224
PARALLEL SESSION - 13 9:15 AM – 10:45 AM	X	MSEC 3-5-1 Tribology of Mfg. Processes	MSEC 1-4-2 + ICMP 1-5-1 (4421 + 4401): Additive Mfg. & Materials	NAMRC - TRACK 2 "Manufac- turing pro- cesses" - Machining 5	MSEC 3-3-3: Polymer Processing - 3	NAMRC - TRACK 2 "Manufac- turing pro- cesses" - Mi- cromilling	MSEC 2-2-5: Competitive Mfg. & As- sisted/Augme- nted Mfg. Processes -5

<b>COLOR KEY:</b>	MSEC
	Joint MSEC-NAMRC-ICMP Session
	NAMRC
	ICMP

## **PRESENTATION SCHEDULE FOR THURSDAY**

<b>IRC 1016/1017</b>	<b>PRB MPR</b>	<b>PRB PC</b>	<b>PRB SCR</b>	<b>HAR 101</b>	<b>ZHS 159</b>	<b>ZHS 252</b>
MSEC 4-1-1 Cyberphysical Systems	MSEC 2-5-4 Forming Processes - 4	MSEC 2-3-7: Mfg. Process Modeling - 6	MSEC 5-4-4: Sustainability in Smart Manufacturing - 4	MSEC 5-1-4 : Biomedical Devices -4	MSEC 4-5-8: Cloud Manu- facturing -8	ICMP 4-2-3: 4327; 4435, 4406, (Smart Disaster Prevention: Sensors and Devices - 2)



**9:15 am– 10:45am Technical Parallel Session - 13**

**MSEC 3-5-1 Tribological aspects of machining and surface deformation processes**

**GFS 116**

Session Organizer: Dinakar Sagapuram

Session Co-Organizer: Mathew Kuttolamadom

MSEC2017-2915 SUBSURFACE MICROSTRUCTURE AND CRYSTALLOGRAPHIC TEXTURE IN SURFACE SEVERE PLASTIC DEFORMATION PROCESSES

*Zhiyu Wang, Saurabh Basu, Christopher Saldana*

MSEC2017-3060 COOLANT CHANNEL AND FLOW CHARACTERISTICS OF MQL DRILL BITS: EXPERIMENTAL AND NUMERICAL ANALYSES

*Yi-Tang Kao, Behrouz Takabi, Mozheng Hu, Bruce Tai*

MSEC2017-3147 WEAR OF CUTTING TOOLS IN MODULATION-ASSISTED MACHINING OF STRUCTURAL METALS

*James Mann*

**MSEC 1-4-2 & 1-5-1 Additive Manufacturing: Processing & Materials**

**VHE 217**

Session Organizer: Fu Zhao

Session Co-Organizer: Lin Li, Fadwa Dababneh, Satoshi Kishimoto

MSEC2017-2983 DIMENSIONAL PERFORMANCE OF AS-BUILT ASSEMBLIES IN POLYJET ADDITIVE MANUFACTURING PROCESS

*Azadeh Haghighi, Yiran Yang, Lin Li*

ICMP2017-4421 FABRICATION OF THE LONG LENGTH AND SMALL DIAMETER HOLE ARRAY BY A 3D PRINTER

*Satoshi Kishimoto*

ICMP2017-4401 SUPPORT STRUCTURE DISTRIBUTION AND DEFORMATION OF NI-BASE ALLOY FABRICATED BY SELECTIVE LASER MELTING

*Toshi-Taka Ikeshoji, Masahiro Araki, Makiko Yonehara, Kazuya Nakamura, Ryo Akamatsu, Hideki Kyogoku*

**NAMRC - TRACK 2 Manufacturing Processes - Machining 5**

**VPD 105**

Chairman: Tugrul Ozel

NAMRC-56 MULTI-OBJECTIVE OPTIMIZATION IN MICROTURNING OF TITANIUM ALLOY USING PARTICLE SWARM TECHNIQUE

*Gopikrishnan A and Kanthababu Mani*

NAMRC-58 VARIABILITY OF THE MACHINABILITY ALONG THE CROSS SECTION OF DUCTILE IRON PRODUCED BY CONTINUOUS CASTING

*Aécio De Sousa, Álisson Machado, Rosemar Da Silva and Wilson Gursser*

NAMRC-103 QUASISTATIC ERROR MODELING AND MODEL TESTING FOR A 5-AXIS MACHINE

*Hua-Wei Ko, Patrick Bazzoli, J. Nisbett, Le Ma, Douglas Bristow, Robert Landers, Yujie Chen, Shiv Kapoor and Placid Ferreira*

### **MSEC 3-3-3 Production of Smart Composite Structures**

#### **SAL 126**

Session Organizer: Felicia Stan

Session Co-Organizer: Ozlem Yasar

MSEC2017-2775 CONCEPTUAL DESIGN OF AN EXPERIMENT FOR THE INTERNATIONAL SPACE STATION ABOUT COSMIC RAY SHIELDING MATERIALS

*Fabrizio Quadrini, Loredana Santo*

MSEC2017-2776 CONCEPTUAL DESIGN OF AN EXPERIMENT FOR THE INTERNATIONAL SPACE STATION ABOUT SHAPE MEMORY COMPOSITE IN SPACE ENVIRONMENT

*Loredana Santo, Denise Bellisario, Giovanni Matteo Tedde, Fabrizio Quadrini*

MSEC2017-2973 EXPERIMENTAL CHARACTERIZATION OF THE INTERACTION BETWEEN CARBON FIBER COMPOSITE PREPREGS DURING THE PRE-FORMING PROCESS

*Weizhao Zhang, Zixuan Zhang, Jie Lu, Qian Wang, Xuming Su, Danielle Zeng, Mansour Mirdamadi, Jian Cao*

### **NAMRC - TRACK 2 Manufacturing Processes - Micromilling**

#### **EEB 248**

Chairman: Stefania Bruschi

NAMRC-21 EFFECT OF LUBRICATION ON MACHINING RESPONSE AND DYNAMIC INSTABILITY IN HIGH-SPEED MICROMILLING OF TI-6AL-4V

*Rinku Mittal, Salil S. Kulkarni and Ramesh Singh*

NAMRC-117 MICRO-MILLING MACHINABILITY OF DED ADDITIVE TITANIUM TI-6AL-4V

*Giuseppe Bonaiti, Paolo Parenti, Massimiliano Annoni and Shiv Kapoor*

NAMRC-165 MICROMILLING OF POLY(METHYL METHACRYLATE, PMMA) USING SINGLE-CRYSTAL DIAMOND TOOLS

*Emrullah Korkmaz, Recep Onler and Burak Ozdoganlar*

### **MSEC 2-2-5 Competitive Manufacturing & Assisted/Augmented Processes**

#### **GER 224**

Session Organizer: Mohamed A. Gadalla

Session Co-Organizer: Durul Ulutan

MSEC2017-2654 INVESTIGATIONS ON THE APPLICATION OF MINIMUM QUANTITY SOLID LUBRICATION IN TURNING

*Mayurkumar Makhesana, Kaushik Patel*

MSEC2017-2691 ASSESSMENT OF OPTICAL PERFORMANCE OF ASPHERIC GERMANIUM LENS MANUFACTURED USING SINGLE POINT DIAMOND TURNING

*Shivam Yadav, Raju S. Pawade, Haseen Shaikh*

MSEC2017-2755 INTEGRATIVE TECHNOLOGY AND INSPECTION PLANNING: A CASE STUDY IN MEDICAL INDUSTRY

*Fritz Klocke, Johannes Müller, Patrick Mattfeld, Jan Kukulies, Robert H. Schmitt*

## **MSEC 4-1-1 Advances in Cyber Physical Systems and Robotics in Advanced Manufacturing**

### **IRC 1016/1017**

Session Organizer: Zhenhua Wu

Session Co-Organizer: Prahalad Rao, Vukica Jovanovic, Mathew Kuttolamadom, Parikshit (Perry) Mehta

MSEC2017-2888 USING STANDARDS IN A COMPETITION TO MEASURE AND SOLVE INDUSTRIAL ROBOTICS AGILITY CHALLENGES

*Anthony Downs, William Harrison, Craig Schlenoff*

MSEC2017-2955 SIMULATION BASED ON-LINE EVALUATION OF SINGULATION PLANS TO HANDLE PERCEPTION UNCERTAINTY IN ROBOTIC BIN PICKING

*Nithyananda Kumbala, Shantanu Thakar, Krishnanand Kaipa, Jeremy Marvel, Satyandra Gupta*

MSEC2017-3001 SIMULATION MODEL OF AUTOMATED HVAC SYSTEM CONTROL STRATEGY WITH THERMAL COMFORT AND OCCUPANCY CONSIDERATIONS

*Bo Peng, Sheng-Jen hsieh*

## **MSEC 2-5-4 Forming IV: Process Characterization**

### **PRB MPR**

Session Organizer: Yannis Korkolis

Session Co-Organizer: Rajiv Malhotra

MSEC2017-2715 MECHANICAL PROPERTIES AND MICROSTRUCTURES OF A356 ALLOY PREPARED BY CASTING COMBINED WITH FORGING

*Liang Zhenglong, Qi Zhang*

MSEC2017-2690 INFLUENCE OF DISLOCATION DENSITY AND SOLUTE ATOMS CONCENTRATION ON THE ELECTROPLASTIC EFFECT OF AL-CU ALLOY

*Weichao Wu, Chun Xu, Chaorun Si, Tian Xue*

MSEC2017-3045 EXPERIMENTAL INVESTIGATION OF KEY PROCESS PARAMETERS DURING CONTINUOUS-BENDING-UNDER-TENSION OF AA6022-T4

*Timothy Roemer, Brad Kinsey, Yannis Korkolis, Edward Momanyi*

## **MSEC 2-3-7 Machining IV**

### **PRB PC**

Session Organizer: Xueping Zhang

Session Co-Organizer: Sebastian Barth

MSEC2017-2798 INVESTIGATION OF THE EFFECTS OF MICROGROOVED CUTTING TOOL IN HIGH SPEED MACHINING OF AISI 1045 STEEL

*Xingbang Chen, Nick Duong, Jianfeng Ma, Shuting Lei*

MSEC2017-2932 CEL FEM INVESTIGATION OF EFFECTS OF MICROGROOVED CUTTING TOOLS IN HIGH SPEED MACHINING OF AISI 1045 STEEL

*Han Wu, Nick Duong, Jianfeng Ma, Shuting Lei*

## **MSEC 5-4-4 Sustainable Manufacturing: Scheduling and Control II**

### **PRB SCR**

Session Organizer: Michael P. Brundage

Session Co-Organizer: Thurston Sexton

MSEC2017-2930 DYNAMIC MANUFACTURING SCHEDULING UNDER REAL-TIME ELECTRICITY PRICING BASED ON MILP AND ARIMA

*Yuxin Zhai, Haiyan Wang, Fu Zhao, John Sutherland*

MSEC2017-2941 REAL-TIME RESILIENT CONTROL FOR STOCHASTIC PRODUCTION SYSTEM ENERGY EFFICIENCY

*Jorge Arinez, Jing Zou, Qing Chang, Yong LEI*

MSEC2017-2985 AN ENERGY SAVING SCHEDULING METHOD FOR JUST IN TIME MATERIAL HANDLING IN MIXED-MODEL ASSEMBLY LINE

*Liman Hu, Binghai Zhou, Yang Li*

### **MSEC 5-1-4 3D printing & scaffolds**

#### **HAR 101**

Session Organizer: Mei He

Session Co-Organizer: Bruce Tai

MSEC2017-2778 3D PRINTING OF MICROFLUIDICS FOR POINT OF CARE DIAGNOSIS

*John Sibbitt, Mei He*

MSEC2017-2954 PARAMETRIC TOPOLOGY OPTIMIZATION TOWARD RATIONAL DESIGN AND EFFICIENT PREFABRICATION FOR ADDITIVE MANUFACTURING

*Long Jiang, Hang Ye, Chi Zhou, Shikui Chen, Wenyao Xu*

MSEC2017-2989 EFFECT OF NEEDLE DIAMETER ON SCAFFOLD MORPHOLOGY AND STRENGTH IN E-JETTED POLYCAPROLACTONE SCAFFOLDS

*Aishwarya Bhargav, Wen Feng Lu, Vinicius Rosa, Jerry YH Fuh*

### **MSEC 4-5-8 Cloud Manufacturing VIII : Cyber Physical Systems**

#### **ZHS 159**

Session Organizer: Nenad Ivezic

Session Co-Organizer: Lin Zhang

MSEC2017-2704 DYNAMIC MANUFACTURING CAPABILITY ASSESSMENT OF INDUSTRIAL ROBOTS BASED ON FEEDBACK INFORMATION IN CLOUD MANUFACTURING

*Zeyu Zhang, Wenjun Xu, Quan Liu, Zude Zhou, Duc Truong Pham*

MSEC2017-2952 ENTERPRISES IN CLOUD MANUFACTURING: A PRELIMINARY EXPLORATION

*Yongkui Liu, Xun Xu, Ananth Srinivasan, Lin Zhang*

MSEC2017-2896 SMART PRODUCTION LINE: COMMON FACTORS AND DATA-DRIVEN IMPLEMENTATION METHOD

*Yongping Zhang, Ying Cheng, Fei Tao*

### **ICMP 4-2-3 Sensors and Devices 2**

#### **ZHS 252**

Session Organizer: Satoshi Kishimoto

Session Co-Organizer: Tetsuro Yanaseko

ICMP2017-4327 NIGHT TIME SENSORS FOR RAPID DETECTION OF AREAS IMPACTED BY DISASTERS

*Cristian Vendittozzi,, Giancarlo Santilli, Paolo Gessini*

ICMP2017-4406 OUTPUT VOLTAGE CHARACTERISTIC IN LARGE STRAIN OF METAL MATRIX PIEZOELECTRIC COMPOSITE

*Tetsuro Yanaseko, Yuki Hirayama, Hiroshi Sato, Hiroshi Asanuma*

ICMP2017-4435 FUNDAMENTAL STUDIES ON SMART WAVE/FLOOD MITIGATION STRUCTURES

*Hiroshi Asanuma*



**DFG** Deutsche  
Forschungsgemeinschaft



**Department of Engineering  
Professional Development**

UNIVERSITY OF WISCONSIN-MADISON

Sponsor of Early Career Forum

Time	Event	Location
8:00am - 3:00pm	ASME Workshop-Monitoring, Diagnostic, & Prognostic Guidelines to Support Health Management & Control Manuf Systems	Radisson 1880 Room

# NOTES

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