Manufacturing Engineering Division

NEWSLETTER FALL 2009

EDITOR – Jaime Camelio

Message from the Chair

Dear Fellow Manufacturing Engineering Division (MED) Members:

We are about to pass 2009 and enter 2010. On behalf of the ASME Manufacturing Engineering Division (MED) Executive Committee, I would like to thank all the MED volunteers for your time and effort that have led to great successes of all the MED activities in 2009.

Many thanks to Dr. Jian Cao of Northwestern University for chairing this committee during 2008-2009 and for her continued guidance and support.

The MED executive committee oversees the operation of the division with about 3200 members with diverse manufacturing technology expertise. We have eight technical committees covering areas of manufacturing processes, manufacturing equipment, manufacturing systems, quality and reliability, life cycle engineering, nano/micro/meso manufacturing, biomanufacturing, and textile and composite engineering. The breadth and depth of manufacturing technology possessed by the MED members make MED one of the most important organizations in the States to serve the manufacturing community.

One of the primary tasks of MED is to provide platforms for the manufacturing community to exchange new ideas, foster innovations, and forge professional networks and collaborations. The Manufacturing Science and Engineering Conference (MSEC) has been a great platform to achieve these. Many thanks to this year's MSEC chairs, Professors Yung Shin and John Sullivan from Purdue University, for organizing an extremely successful conference. I also thank our program chairs Drs. Brad Kinsey and Yong Huang and symposium organizers for their hard work and dedication. Another important platform is the ASME Journal of Manufacturing Science and Engineering led by Professor Kornel Ehmann at Northwestern University. It is a world premium journal in manufacturing field. The MED also organizes or sponsors many technical workshops. I hope our MED members are aware of these venues and benefit from these services.

MED has seen increasing engineering student involvement. We have held another successful student design competition organized by Dr. Matt Bement of Los Alamos National Laboratory. I'd like to acknowledge the National Science Foundation for providing travel grants for 91 students to attend this

year's MSEC and student competition. Thanks Dr. Yong Huang for getting the NSF grant awarded. I'd like to thank all the professors who have guided their students in the MED activities. Student participation is extremely important for the division future growth and we will continue to improve our programs to attract more students.

As you may know that we will hold the MSEC next year at Penn State–Erie and it is to be chaired by Dr. John Roth. In 2012 we will have our very first joint MSEC/NAMRC conference at Oregon State University to be chaired by Dr. Brian Paul. Many thanks to Dr. Larry Yao of Columbia University for leading the effort on both MED and NAMRI sides to make this joint conference a reality. Hope the tremendous synergy can help build a greater platform to serve both organizations.

We sincerely hope you can participate in our division activities, become an ASME MED member if you are not yet, and make suggestions for us to improve our services.

I wish you and your family all have a pleasant holiday season.

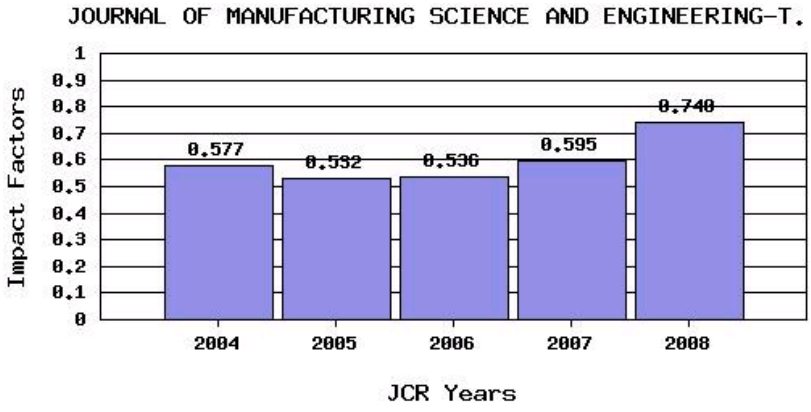
Bin Wei, Ph.D
MED Chair 2009-2010
Global Research Center, General Electric Company

ASME Journal of Manufacturing Science and Engineering – Status Report

Submitted by Kornel Ehmann

Current Status and Outlook

The submission dynamics is steady with about 350 submissions per year with an increasing number of international submissions. The gradually decreasing elapsed time between submission and publication and the change to a bi-monthly publication schedule are the most probable reasons for the jump in the Journal's impact factor.



The Journal's relation to its nearest competitors, in historic terms, has remained the same. A concern on the horizon is the need to further elevate the impact factor given that an ever-growing emphasis is placed on this indicator, in particular, abroad from where a significant percentage of submissions originate. The most important factor here is a further decrease in the review time that is mainly dominated by the responsiveness or the lack of thereof of the reviewers. It is, to a large extent,

the change in the responsiveness of the MED community that will have a significant bearing on this indicator.

Overall, the outlook is very positive and no major changes in the Journal's operations are envisioned for the near future.

New Associate Editors and Areas of Expertise

A number of new Associate Editors has been recently appointed to the Editorial Board. Their brief biographies will appear in one of the upcoming issues.

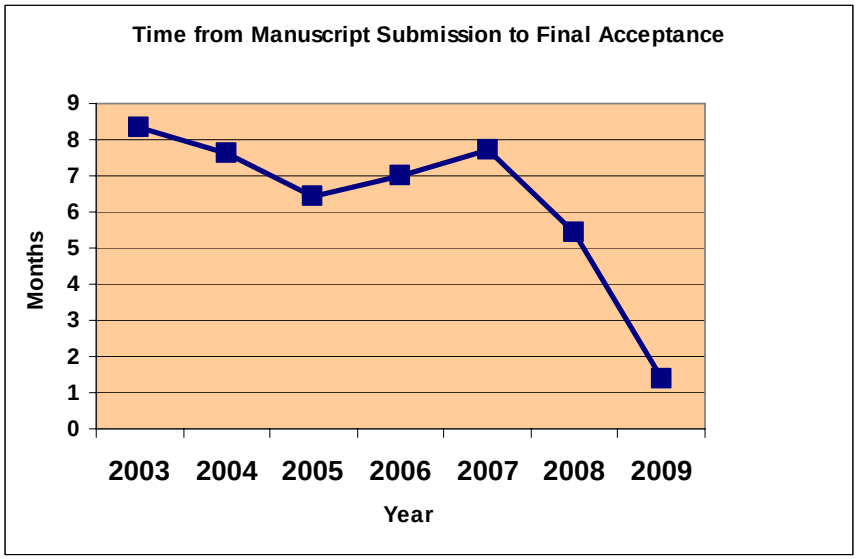
Name	Institution	Area of Research
Robert Gao	*University of Connecticut*	*Sensing/ Signal Processing, Diagnostics and monitoring*
Brad L. Kinsey	*University of New Hampshire*	*Metal Forming/Micro-Forming/Tribology*
Patrick Kwon	*Michigan State University*	*Maching/Advanced Materials/Powder Processing*
Y. S. Lee	*North Carolina State University*	*CAD/CAM, Computational Geometry, NC, Machining*
Steven J. Skerlos	*University of Michigan*	*Sustainable Manufacturing, Life Cycle Engineering, Metalworking Fluids*
Lih-Sheng (Tom) Turng	*University of Wisconsin-Madison*	*Injection Molding/Polymer Processing/Tissue Engineering Scaffolds*

Summary of Activity (January 1, 2006 – October 31, 2009)

The following table and graph indicate the submission dynamics and the elapsed time between submission and final manuscript approval by the Editor.

	2006	2007	2008	2009
Submitted Papers	384	363	330	307
Accepted Papers	7	13	57	16
Rejected Papers	117	87	107	41
Withdrawn Papers	49	54	41	34
Removed Papers	104	103	79	60
Open Papers	0	2	32	156
Published Papers	107	104	14	0
Num. of Pages	1,028	1,097	1,168	242

NOTE: *Numbers refer to papers submitted in the particular year.*



Special Projects

A special issue on "Nanomanufacturing" is in preparation. The target date for publication is the June or August issue of the Journal. There is still time to submit papers through the Journal's website.

Manufacturing Engineering Division Honors Committee Report

Submitted by Shounak Athavale

The Manufacturing Engineering Division Honors Committee is charged with making recommendation to the ASME Committee on Honors on the award of the Blackall Tool and Gage Award and the William T. Ennor Manufacturing Technology Award.

Blackall Tool and Gage Award

Four papers were nominated for this award – 2 new nominations and two holdover nominations (nominations remain active for two years from date of publication of the paper). The committee felt strongly that the most worthy paper was that of Bethany A. Woody, K. Scott Smith, Robert J. Hocken, Jimmie A. Miller, the authors of the paper "A Technique for Enhancing Machine Tool Accuracy by Transferring the Metrology Reference From the Machine Tool to the Workpiece", *Journal of Manufacturing Science and Engineering*, Volume 129, pp. 636-643, 2007. This paper presents a novel approach to transferring the accuracy of a CMM to a machine tool and incorporates a detailed error analysis which enables a realistic appraisal of the accuracy and limitations of the technique. The paper thus addresses the issues identified in the Blackall Award citation – *"…..clearly concerned with or related to the design or application of machine tools, gages, or dimensional measuring instruments,……"*

William T. Ennor Manufacturing Technology Award

The committee reviewed and evaluated three nominations for this award. (Nominations for the Ennor Award remain active for 5 years and nominators are encouraged to revise and expand nominations in subsequent years as additional information in support of a candidate becomes available.)

It is the committee's conclusion that Professor Jun Ni has made significant and notable contributions to the development and industrial implementation of manufacturing technology and practice and that his accomplishments rank with those of the top practicing engineers. His record in education and service to the manufacturing engineering profession are likewise noteworthy and supports his forefront position. His citation reads *"For pioneering development of innovative models and algorithms for maintenance policy design, and integrating statistical methods with control algorithms in machining and assembly processes that resulted in substantially higher accuracy and productivity improvements in many factories…"*

Suggestions to Nominators

Since, particularly for nominees from other than North America, the qualifications of all nominees are not equally well known to all committee members, personal knowledge of specific nominees is not formally considered by the committee and only the materials included in the nomination package are considered. Nominators should therefore NOT assume that the stature of the nominee is such that all members of the committee will be familiar with the nominee's accomplishments but should ensure that all information which the nominator would like the committee to consider is included in the nomination package.

The committee, in reaching its decision, pays particular attention to the extent to which the nominee meets the SPECIFIC requirements set in the award. For the Ennor Award these requirements are: *The William T. Ennor Manufacturing Technology Award was established in 1990 by the Production Engineering Division of ASME in honor of William T., "Bill", Ennor who was the Assistant Director of Research at the Alcoa Aluminum Research Laboratories. The award recognizes "one (or a team of) individual(s) who has (have) developed or contributed significantly to the development of an innovative manufacturing technology, the implementation of which has resulted in substantial economic and/or societal benefits.*

It is thus essential that the nomination package specifically address the individual elements of the award requirements. The committee does not request or accept additional information after the deadline. However, in rare cases the committee will request additional clarification. The description of economic/societal benefit would be strengthened considerably if numerical descriptions were used.

Complete nomination packages for the 2010 Ennor Manufacturing Technology Award and Blackall Machine Tool and Gage Award must be submitted before January, 2010 to the Manufacturing Engineering Honors Committee. Nomination forms and lists of past recipients are available at *www.asme.org/divisions/med* and click on HONORS & AWARDS.

Nominators should note that Blackall Award nominations receive active consideration for two years after the date of publication, while Ennor Award nominations receive active consideration for five years after the date of submission. In the case of Ennor Award nominees the committee suggests that nominators review pending nominations yearly and update them if merited. Nominators for the Ennor Award are also strongly urged to ensure that the nominee's contributions to the final part of the award citation i.e. "…the implementation of which has resulted in substantial economic and/or societal benefits." are well documented.

The Division Honors Committee will provide help in preparing nominations if the request is received before January 1, 2010.

Manufacturing Science and Engineering Conference MSEC 2009 Technical Program Report

Submitted by Brad Kinsey and Yong Huang

This was the fourth year for the Manufacturing Science and Engineering Conference (MSEC), and it has consistently grown each year. This year's program included 197 technical presentations in 21 symposia with topics ranging from traditional manufacturing areas such as machining and forming to new topics such as fuel cell and environmentally sustainable manufacturing. Two panel sessions also helped to define the future of manufacturing with discussions on the New Criteria for Engineering Optimization (CEO) and the Future of Manufacturing Research in the United States. In addition, a commercial session was included in the program for the first time and provided exhibitors an opportunity to discuss the technical aspects of their products. Finally, a poster session with 19 submissions was included for the second year to provide an opportunity for authors to present new results and exchange ideas. The number of technical publications has consistently grown with 118, 155, and 178 ASME technical papers accepted for the past three years for the conference. MSEC is truly an international conference with authors from 19 countries all over the world.

The symposium organizers nominated eight papers for the Best Paper Award. These eight papers were subjected to another round of reviews and ranking by the symposium organizers, MED executive committee, and past and present technical program chairs. The recipients of the Best Paper Award were Jie Feng, Bongsuk Kim, and Jun Ni for their paper entitled "Modeling of Ceramic Microgridning by Cohesive Zone Finite Element Method". The other finalists for the best paper award were Fanrong Kong and Radovan Kovacevic for their paper "Numerical and Experimental Study on the Thermally Induced

Residual Stresses Behavior in the Hybrid Laser/Arc Welding of Lap Joint" and Seounghyun Ham, John E. Wentz, Shiv Kapoor, and Richard DeVor for their paper "The Impact of Surface Forces on Particle Flow and Pore Blocking in the Microfiltration of Metal Working Fluids".

The technical program chairs also selected the recipients of the Best Organizer of Symposium and Sessions (BOSS) Award. The recipients for this year's award were Radu Pavel, Jarred Heigel, and Samuel Huang for their symposium entitled "Smart Machining - Advances in material processing and inspection". These organizers not only were responsive to requests from the technical program chairs but took a leadership role in determining tasks for all symposium organizers. Finally, they held a very high standard for the papers accepted to their symposium, which lead to superior quality technical sessions.

This year the National Science Foundation Manufacturing and Construction Machines and Equipment (MCME), Materials Processing and Manufacturing (MPM), and NanoManufacturing (NM) programs provided student travel funding for 90 students to attend MSEC. Of these students, 77% were Ph.D., 13% were Master's and 10% were Bachelor degree students and 28% were from groups underrepresented in engineering education. This support is gratefully acknowledged.

The Technical Program Chair for the 2009 MSEC conference was Prof. Brad Kinsey from the University of New Hampshire and Prof. Yong Huang from the Clemson University served as the Co-Chair.

MSEC Student Design Competition Results

Submitted by Matthew Bement

The Student Manufacturing Design Competition was established in 1995 by MED to recognize students for "any design of a system, component or process that can be used to promote the science and practice of manufacturing engineering." The purpose of the competition is to foster interest in manufacturing, provide the manufacturing engineering community with fresh new perspectives on design, and create a forum for students to share their new and innovative ideas. The results of this year are:

First place ($1000) – "Sustain-a-Bear™: Applying Manufacturing Sustainability Practices to Plush Stuffed Animals," Rensselaer Polytechnic Institute, presented by Christina Laskowski. Acknowledge support of NSF for student travel grants, and SolidWorks for providing the first place winners with a complimentary copy of the student version of SolidWorks.

Second place ($750) – "Low Impact Rapid Prototyper," University of New Hampshire, presented by Matthew Michaud. Acknowledge support of NSF for student travel grants.

Third place ($500) – "A Continuously Variable Transmission for a Bicycle," Columbia University, presented by Matthew Guido. Acknowledge support of NSF for student travel grants.

Manufacturing Conference Collocation Planned for 2011

Press Release

Submitted by Larry Yao

The recommendation for collocation of the ASME Manufacturing Science and Engineering Conference (MSEC) and the NAMRI/SME North American Manufacturing Research Conference (NAMRC) is planned to be first implemented in June 2011 at a combined event, selected to be hosted by **Oregon State University**. Both conferences will be held simultaneously **June 13- June 17, 2011**. **Professor Brian Paul** and an organizing committee of five faculty members will host the combined event.

The recommendation for collocation was made as the result of a study by a task force composed of both ASME and SME members. The task force conducted a survey in June with about 500 total respondents from both organizations including strong participation from industry. Overwhelming support for conference collocation motivated the acceptance of the task force recommendation by executive committee of ASME Manufacturing Engineering Division and the Board of North American Manufacturing Research Institute of SME (NAMRI/SME).

Planning for the collocated conference at OSU is currently underway, and involves input and representation from both ASME and SME. Three NAMRI board members will join three from MED/ASME to for a coordinating committee (CC) to assist the host with preparation and help to leverage advantage of the joint event. The coordinating committee consists of CC Chair, **Professor Jian Cao** (NAMRI Secretary, Northwestern Univ.), along with members Steve Hayashi (NAMRI President-Elect, GE Research), Shiva Raman (NAMRI Scientific Cmt Chair, Univ. of Oklahoma), Larry Yao (MED EC Vice Chair, Columbia Univ.), Matt Bement (MED EC Program Chair, Argonne National Lab), and Kevin Chou (2011 MSEC program Chair, Univ. of Alabama).

Efforts are being made from both sides to address concerns noted in the original study, particularly scheduling, organization, and publication cost issues. Collocation of these conferences, each considered a premier research gathering in North America, is expected to draw more academic and industry leaders, create higher international participation, improve networking, and improve conference reputation for both ASME and SME. Perhaps the greatest benefit of collocation is the creation of a larger, higher-impact conference to better serve the needs of the manufacturing research community.

For information on planning of the collocated conference, please contact Dr. Jian Cao at jcao@northwestern.edu or Dr. Brian Paul at brian.paul@oregonstate.edu.

Upcoming Events

Dear Colleagues:

It is our great pleasure to invite you to the 2010 ASME International Manufacturing Science and Engineering Conference (MSEC) to be hosted by Penn State Behrend in Erie, PA on October 12-15, 2010.

The conference is an annual forum sponsored by the Manufacturing Engineering Division (MED) of the American Society of Mechanical Engineers (ASME) to disseminate the most recent results of manufacturing research and development on a global scale. Since its inauguration in 2006, the MSEC has replaced the participation of MED technical sessions in the International Mechanical Engineering Congress and Exposition (IMECE) and this is the fifth year in this format following the excellent events in the previous years. With a different organizational structure than IMECE, the MSEC aims to deliver to our MED membership better value in terms of stronger technical programming, lower registration fees, lower hotel room rates, and fully covered meal and social functions.

Please consider registering early to take advantage of the low registration fee and hotel rates. We sincerely hope to see you at this exciting conference.

This conference will highlight cutting edge manufacturing research in technical paper, poster, and panel sessions. The deadline for paper submissions is March 29, 2010. Prospective authors are encouraged to submit an abstract by **February 1, 2010**. We look forward to seeing you in Erie.

The conference will be accepting submissions (http://www.asmeconferences.org/MSEC2010/) to the following symposia:

- SYMP 1: Manufacturing with Soft Materials
- SYMP 2: Sustainable Manufacturing of Advanced Composites
- SYMP 3: Advances in Nontraditional Manufacturing
- SYMP 4: Thermally-Enhanced Processes and Materials
- SYMP 5: Surface Integrity and Performance of Components by Multiscale Mfg
- SYMP 6: Advances of Abrasive Machining in Semiconductor Industry
- SYMP 7: Smart Machining
- SYMP 8: Green Energy System Manufacturing
- SYMP 9: Advances in Materials Forming

- SYMP 10: Advances in Modeling, Analysis, and Simulation of Manufacturing Processes
- SYMP 11: Laser Based Manufacturing
- SYMP 12: Advances in Micro/Meso Mechanical Manufacturing
- SYMP 13: Fabrication Process of Nanomaterials and Nanodevices
- SYMP 14: Sustainable Nanomanufacturing
- SYMP 15: Advances in Pervasive Sensing and Computing for Mfg Sys
- SYMP 16: Data Driven Manufacturing
- SYMP 17: Challenges in Adaptive Manufacturing Planning and Control
- SYMP 18: Advances in Biomanufacturing
- SYMP 19: Manufacturing System Maintenance
- SYMP 20: Manufacturing and Metrology Systems

Important Dates

Submission of abstract (optional, but strongly encouraged): February 1, 2010
Submission of full manuscript for review March 30, 2010
Paper reviews completed: June 15, 2010
Submission of posters for review: June 15, 2010
Acceptance notification of all paper authors: July 1, 2010
Acceptance notification of poster authors: July 6, 2010
Submission of ASME Copyright Transfer form: July 6, 2010
Author registration deadline: July 15, 2010
General pre-registration deadline: August 1, 2010

Summer Short Course on Principles of and Advances in Laser Micro/Nano Manufacturing Processes

Submitted by Jian Cao

June 1 – 4, 2010, Northwestern University, Evanston, IL

http://www.tam.northwestern.edu/summerinstitute

NSF Summer Institute on Nanomechanics, Nanomaterials, and Micro/Nano-manufacturing typically offers two summer short courses each year with one of them emphasizing on manufacturing related topics. The Summer Institute is sponsored by the NSF Civil Mechanical and Manufacturing Innovation division with additional financial support provided by three departments and four research centers of Northwestern University. Professors Yip-Wah Chung, Jian Cao, Ted Belytschko, and Wing K. Liu of Northwestern are the directors of the Institute.

In the summer of 2010, principles of and advances in laser micro/nano manufacturing processes will be the topic of one short course, organized by Prof. Yung Shin of Purdue and Profs. Jian Cao and Jane Wang of Northwestern. Lasers have been increasingly used in fabricating/shaping micro- and nano-features on various engineering and bio-materials. Since its introduction some forty years ago, lasers have spawned many applications in manufacturing, measurement strategies, and medical procedures. The objective of this short course is to provide attendees with a balanced review of principles and applications, as well as recent research trends. Topics include laser fundamentals, modeling, laser diagnostics and applications in micro- and nano-manufacturing.

The session on laser fundamentals will cover the basic principles of laser beam generation mechanisms, beam properties, optics, pulsing and focusing for different types of lasers including continuous, pulsed and ultrashort pulsed lasers.

The modeling session will present various modeling techniques describing laser-material interaction, plasma formation and expansion, heat transfer within the material under different regimes of laser pulse duration and fluence. In addition, some basic theories describing the solidification, phase transformation and microstructure evolution will be presented with examples for different laser-material processing applications.

The session on laser diagnostics will cover characterization techniques for beam power, energy and profile. In addition, different diagnostics techniques utilizing lasers and during laser-material interaction will be presented. This session also features some important process monitoring techniques for laser-based manufacturing processes.

Finally, the short course will be concluded with the illustrations of key developments and challenges of various laser-based applications in micro-, bio- and nano-manufacturing, including laser surface engineering, laser hole drilling, laser shock peening, laser direct writing or sintering, near field nano-manufacturing, bionanomanufacturing.

More information on speakers, registration, NSF fellowship application, accommodation and travel will be updated at the summer course website (http://www.tam.northwestern.edu/summerinstitute) as they become available. NSF fellowships are available to faculty members, high-school science teachers, post-docs and Ph.D. candidates from the U.S. The fellowship consists of full registration and hotel accommodation for the duration of the short course at double occupancy. The target deadline for fellowship application is February 5, 2010.