The North American Manufacturing Research Institution of the Society of Manufacturing Engineers invites you to attend the

Thirty-third North American Manufacturing Research Conference

NAMRC 33

May 24-27, 2005
New York, NY
USA

Hosted by

Columbia University

Fu Foundation School of Engineering and Applied Science, Department of Mechanical Engineering

Society of Manufacturing Engineers

NAMRI SME

North American Manufacturing Research Institution of the Society of Manufacturing Engineers

Dear Colleagues and Friends:

We welcome you to the Thirty-third North American Manufacturing Research Conference. NAMRC has been an established international forum for the presentation of cutting-edge research results throughout universities and industries from around the world since 1973. Leaders in manufacturing research have come to this conference to exchange findings and leading edge technological information. Participation in NAMRC 33 provides the authors with far-reaching recognition of their work, as well as yields valuable insight from other leaders in manufacturing research.

This year, 77 technical papers will be presented at the conference by researchers from universities, research institutes and industrial research laboratories located around the world. All of these complete manuscripts have been accepted for presentation at NAMRC 33 and published in the Transactions of the conference based on a stringent peer-review process conducted by the Scientific Committee of the North American Manufacturing Research Institution of SME (NAMRI/SME).

The conference will begin in the early evening of Tuesday, May 24, with a welcoming reception at the Alfred Lerner Hall, the conference site on Columbia University's Morningside Campus. On Wednesday, May 25, the conference opening ceremony will feature a keynote address by Michael Idelchik, vice president of the Advanced Technology Program, GE Global Research Center. Also, on Thursday morning, Kornel Ehmann, the current NAMRI/SME president will moderate a panel discussion on Micro manufacturing.

We want to extend a special invitation to our colleagues and friends in industry and academia to attend the conference. We look forward to your participation in this important event, renewing acquaintance with those of you who are regular attendees and to meet many of you who will be attending for the first time. We believe that participation in NAMRC 33 will be both an intriguing and beneficial experience for you.

Sincerely,

Y. Lawrence Yao
Richard W. Longman
Co-Chairs
NAMRC 33 Organizing Committee

What is NAMRC

NAMRC is an international forum for the presentation and critical discussion of the results of basic and applied research related to manufacturing and technology development. It is one of only a few events of its kind where technical innovations, new methods and applications of leading-edge technology from throughout the world are shared among manufacturing research, design, engineering, and production professionals from academia and industry. Because NAMRC takes place every year, the findings and breakthroughs presented here are topical and of current interest.

Why You Should Attend?

By attending NAMRC 33 you will:

- gain insight on the most recent developments in material removal and forming processes, automation and control of processes and systems, equipment accuracy and precision, and many other manufacturing related topics,
- participate in a dialogue between industry and academia on future needs for manufacturing processes and applications,
- enhance your knowledge of alternative manufacturing processes and applications,
- make valuable contacts with other leading manufacturing researchers and professionals.

About NAMRI/SME

The North American Manufacturing Research Institution of the Society of Manufacturing Engineers (NAMRI/SME) is an organization dedicated to manufacturing research and technology development. Its mission is to advance manufacturing engineering by promoting research and its application in industry. To learn more about NAMRI/SME or to become a member, visit the Web site at ***www.sme.org/namri.***

Sponsorship

The NAMRC 33 Organizing Committee thanks the Fu Foundation School of Engineering and Applied Science at Columbia University, GE Global Research Center, and Extrude Hone Corporation for their sponsorship of this conference.

Conference Publication

Papers accepted for and presented at NAMRC 33 will be contained in the hardbound *Transactions of the North American Manufacturing Research Institution of SME,* Volume 33, 2005. Participants who have paid the registration fee will receive a copy at the time of registration. Additional copies may be purchased by contacting an SME Customer Service Representative at (313) 271-1500, ext. 4500 or (800) 733-4763.

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Conference Site & Facilities

Columbia University, founded in New York in 1754, has just celebrated its 250th anniversary. It is one of the nation's leading research universities. During the last decade, for instance, it has been among the top 10 universities in receiving federal research funding. Seventy-two Nobel Laureates have taught, conducted research or studied at Columbia. Since 1970, 13% of all Nobel Laureates have some connection to the University. Although there is no Nobel Prize in engineering category, the Fu Foundation School of Engineering and Applied Science can list one award to current faculty in 2001 and two awards to alumni.

Located in Manhattan, Columbia University benefits from being in one of the most vibrant cities in the U.S. and in the world. The NAMRC Conference will be held on Columbia University's main campus — Morningside Heights campus. The conference site is Alfred Lerner Hall, which was completed in 2000, and features full conference facilities, comfortable lounges, spacious lobbies and wireless Internet access throughout the building. Carman Hall, which flanks the conference site, is offered as the main accommodation option for conference attendees. Both are within one block of the Columbia subway station at 116th Street and Broadway, from which one can readily access anywhere within New York City.

The Fu Foundation School of Engineering and Applied Science is comprised of 150 faculty members and is structured to foster interdisciplinary interactions among engineers and scientists. The School hosts a number of major research centers, including the NSF Nanotechnology Center for Electron Transport in Nanostructures, the Materials Research Science and Engineering Center, the Center for Applied Probability and the Earth Engineering Center. The School emphasizes a broad-based education, taking advantage of the strengths of the University in the sciences and the humanities.

The Fu Foundation School of Engineering and Applied Science has many activities related to material processing, manufacturing and automation research. Examples include research in nontraditional manufacturing processes such as laser-based and electrochemical-based processes, material deformation mechanisms and processes, learning and repetitive control, advanced robotics, micro and nanoscale fabrication and characterization processes, and optimization in manufacturing and logistic systems. Laboratory tours will be organized to selected facilities on campus.

Special Activities

In connection with NAMRC 33:

- NAMRI/SME Board Meeting, Tuesday, May 24, from 8:30 a.m. - 5:30 p.m. at Alfred Lerner Hall
- NSF CAREER Workshop, Tuesday, May 24, from 8:30 a.m. - 5:30 p.m. at Alfred Lerner Hall
- Welcoming Reception & Registration on Tuesday, May 24, from 5:30 - 8 p.m. at Alfred Lerner Hall
- Welcoming Ceremony and Keynote Address by Michael Idelchik, Vice President of Advanced Technology Program, GE Global Research Center, on Wednesday, May 25, from 8:30 - 10 a.m. at Alfred Lerner Hall
- NAMRI/SME Awards Luncheon and Founders Lecture on Wednesday, May 25, from Noon - 2 p.m. at the Low Rotunda
- Laboratory Tours, Wednesday, May 25, from 4 - 6 p.m.
- COMEC Meeting, Wednesday, May 25, from 4 - 6 p.m.
- NAMRC Banquet on Wednesday, May 25, from 7 - 10 p.m. on the Spirit of Hudson Cruise
- Micro-Manufacturing Panel, Thursday, May 26 from 8:30 - 10 a.m. at Alfred Lerner Hall
- NAMRI/SME and ASME/MED membership meetings on Thursday, May 26, from 4 - 6 p.m. at Alfred Lerner Hall
- Laboratory Tours, Thursday, May 26, from 4 - 6 p.m.
- NAMRC Reception on Thursday, May 26, from 6:30 - 8:30 p.m. at the Low Faculty Room

Student Research Presentation Contest

NARMC 33 will host the first Student Research Presentation Contest to recognize students' contributions to NAMRC and to encourage young talents to pursue a career in manufacturing research, which is of vital importance to the long-term goals of the manufacturing community. The contest is based on the student's oral presentation of a paper he or she co-authors. The student presentations will be part of regular technical sessions and have the same time limitation. The presentations will be judged by a panel, which comprises the NAMRI/SME Honors Committee members or their delegates. The judges will not judge their own students. The judgment will be primarily based on clarity of presentation including oral expression and use of visual aids. Originality and scientific merit of material presented may also be taken into account. First, second and third-place winners will be announced at the NAMRI General Membership Meeting on Thursday, May 26, 2005.

Laboratory and Campus Tours

May 25 & 26, 2005, 4 - 6 p.m.

NAMRC 33 will provide tours of the following research laboratories as well as other material processing and manufacturing-related facilities located on campus. You may also want to take a tour of the Columbia University campus on your own. Maps of the campus will be provided in your registration packet.

Manufacturing Research Laboratory
The Laboratory hosts various laser systems to facilitate research into novel and nontraditional manufacturing processes including laser shock peening, laser peen shaping, laser correction of distortions, laser cleaning and laser micro machining. The experimental investigations are complemented by detailed material characterization and numerical analysis.

The Columbia Nanomechanics Center
The Columbia Nanomechanics Research Center is directed by Jeffrey Kysar of the Mechanical Engineering Department and Xi Chen of the Civil Engineering and Engineering Mechanics Department. Current topics of research include nanocomposite thin films, which are synthesized by electrocodeposition of metals and nanoparticles. Mechanical characterization of the thin films is performed by a thin-film bulge tester in the laboratory. Another current project is to use Electron Backscatter Diffraction (EBSD) as well as micron-scale X-ray diffraction from the synchrotron source at Brookhaven National Laboratory to characterize the deformation and stress state induced by plastic deformation of metals. Facilities include: CNC wire Electrical Discharge Machine (EDM), laser-interferometric thin-film bulge tester to measure stress-strain response, Bridgman-Stockbarger crystal growth apparatus, microtensile tester for use in scanning electron microscope, as well as deposition facilities for nanocomposite thin films.

Optical Nanostructures Laboratory
The ability to control the flow of light has been greatly aided with the development of sub-wavelength structures—nanostructures with dimensions on the order of tens of nanometers to several hundred nanometers. At these lengthscales, we cannot only perturb the characteristics of light (through MEMS/NEMS structures), but also directly manage the dispersion of light, its interaction with atom-like matter and harness the amazingly extraordinary behaviors unexpected from the macro lengthscales. The laboratory explores these phenomena experimentally, supported by nanofabrication techniques and theoretical and numerical simulations.

Companion Program

Museums and special exhibitions
Museums in New York City are abundant and first-rate. A tour to museum exhibitions of interest will be organized, selecting from Metropolitan Museum of Art, Solomon R. Guggenheim Museum, Cooper-Hewitt National Museum of Design, and/or Museum of Modern Art (MoMA).

City highlights
Enjoy short walking tours through shops in the newly completed Time Warner Center on Columbus Circle, Central Park, Fifth Avenue, St. Patrick's Cathedral and/or Rockefeller Center.

Registration Fees

All fees are in U.S. dollars and payable to Columbia University. We accept VISA, MasterCard®, checks, money orders and purchase orders. Please complete one registration form per person. Companion Program participants should complete their own registration form. Make additional copies of the form as needed. All fees except the companion registration include entrance to all technical sessions, all conference materials, publications, meal functions, laboratory tours and industry tours. Included in the companion registration fees are conference breakfasts, banquet and two receptions; and the companion program tour (see Companion Program for details). There are no single-day registration fees. There are no reduced registration fees for authors or session chairs.

Cancellation and Refunds

Refunds, less an administrative fee of US $100, will be issued for all cancellations received in writing with a postmark before May 9, 2005. No refunds will be made after that date, but a substitution of attendees may be made by notifying the Conferencing Center prior to the conference. Please allow six to eight weeks to receive check refunds. Credit card refunds will be issued to the credit card that made payment. Should this event cancel in entirety, the University's liability is limited to a refund of the registration fees paid.

Lodging

Despite New York City's reputation for high costs of accommodation, Columbia University offers dormitory-style accommodations on campus for very reasonable rates. A block of rooms has also been reserved at two local hotels. For more information, go to ***www.mrl.columbia.edu/namrc33.***

Carman Hall

A dormitory-style housing, Carman Hall is near Alfred Lerner Hall. It is also located on Broadway and within 1 block of the 116th St./Broadway Subway Station. Fully renovated in 2001, it has central air conditioning with individually controlled thermostats in every room. Each room is over 200 sq. ft. set up with 2 twin beds and connected to a semi-private bathroom. Rooms are part of a two-bedroom suite. The bathrooms are cleaned daily and bedrooms are the responsibility of the guest. Towels are replaced at the request of the guest and linen is exchanged weekly. Each room has free high-speed 10/100 Ethernet access. Each individual floor has a small cable TV lounge area. The cost is $90.00 per room per night for double occupancy, or $60.00 per room per night for single occupancy; this rate includes all taxes. If you are interested in booking a suite, the cost is equivalent to two rooms. Please note that Carman Hall is a non-smoking environment. The rooms in Carman Hall will be available from Monday, May 23 to Sunday, May 29 (check-out date). To reserve a room or a suite, visit ***www.mrl.columbia.edu/namrc33.*** Rooms are guaranteed until **April 23, 2005** and may still be reserved after this day if available. If you arrive by taxi, the street address is 545 West 114th Street. If you arrive by Subway #1 or #9, please be sure to exit at the 116th St./Broadway Subway Station.

Hotel Lucerne
www.newyorkhotel.com
201 West 79th Street (at Amsterdam Avenue)
(800) 492-8122 or (212) 875-1000
Room rate: $170 (Single/Double) plus taxes
Special rate expires April 24, 2005. Please identify yourself with Columbia University's Department of Mechanical Engineering (Group #189174)

On the Ave Hotel
www.ontheave-nyc.com
2178 Broadway (at West 77th St.)
(212) 362-1100
(800) 497-6028 or (212) 651-3351
Room rate: $189 (Superior Room) plus taxes
Special rate expires April 23, 2005 (Code: NAMRC Conference)

Travel Information

New York City is conveniently served by three international airports, JFK, La Guardia, and Newark. There are many local transportation options to suit individual needs. For more information, go to ***www.mrl.columbia.edu/namrc33.***

From JFK, you may take a taxi, train/subway or bus. From La Guardia, taxi, and from Newark, train/subway is recommended. If you're arriving at Columbia by subway, take the #1 or #9 train uptown and get off at the 116th Street Station (Columbia University Station). The fare is flat $2.00. Tokens and more conveniently a MetroCard can be bought in any subway station. Enter the Columbia University campus through the big iron gates (with two big statues) that are visible as soon as you come out of the subway station. Proceed along the College Walk, take the first right turn and Alfred Lerner Hall (the conference site) and Carman Hall (the dormitory-style housing for the conference) are within 50 yards.

If you are coming by car, Columbia is best reached by taking the 95/96th Street exit of the Henry Hudson Parkway (West Side Highway). Use the 95th Street off-ramp and turn left onto Riverside Drive. Proceed north to 116th Street. A right turn at 116th Street leads you to the campus gate. Parking is available at nearby garages.

All international participants are responsible for their own visa and health insurance needs.

Climate

The average temperature in late May is 67 degrees Fahrenheit with temperatures dropping slightly in the evening.

How to Register

Mail, Fax or E-mail: Complete the registration form at the back of the program brochure or download from the conference Web site at ***www.mrl.columbia.edu/namrc33.*** Send your completed registration form with your payment (credit card information, check, money order or purchase order information) to:

Ms. Xiomara Perez-Betances
Department of Mechanical Engineering
Columbia University
220 Mudd Bldg, MC 4703
New York, NY 10027
Tel: (212) 854-6269
Fax: (212) 854-3304
E-mail: xp1@columbia.edu

NAMRC 33
Technical Sessions and Programs

Tuesday, May 24, 2005

8:30 a.m. - 5:30 p.m.

NAMRI/SME Board Meeting
Board Room 501, Alfred Lerner Hall

8:30 a.m. - 5:30 p.m.

NSF CAREER Workshop
Satow Room, Alfred Lerner Hall

5:30 p.m. - 8 p.m.

Conference Registration and Welcoming Reception
Room 555, Alfred Lerner Hall

Wednesday, June 2, 2004

7:30 a.m. - 8:30 a.m.

Registration and Breakfast
North Lobby, Alfred Lerner Hall

8:30 a.m. - 10:00 a.m.

Welcoming Ceremony
Roone Arledge Cinema, Alfred Lerner Hall

Opening Remarks
Y. Lawrence Yao and Richard W. Longman, Co-Chairs, NAMRC 33

Welcoming Remarks
Zvi Galil, Dean of the Fu Foundation School of Engineering and Applied Science, Columbia University

Keynote Address
Michael Idelchik, Vice President of Advanced Technology Program, GE Global Research Center

10:00 a.m. - 10:30 a.m.

Refreshment break
5th Floor Ramp, Alfred Lerner Hall

10:30 a.m. - Noon

Concurrent Technical Sessions

Session 1-A: Machinability and Cutting Tools

Room 555, Alfred Lerner Hall
Co-Chairs: Tugrul Özel, Rutgers University
Shuting Lei, Kansas State University

Determining the Geometric Machinability of Flat End Mills for 3-Axis CNC Machining with an Indexer
Y. Li*, M.C. Frank

Hard Turning of Quenched Alloy Steel Parts Using Conventional and Wiper Ceramic Inserts
W. Grzesik, T. Wanat

Experimental Investigations into Turning of AerMet 100 Alloy Using Uncoated and TiAlN Coated Inserts
A. Srivastava, D. Quinto

Session 1-B: Super-plastic and Hydroforming

Satow Room, Alfred Lerner Hall
Co-Chairs: M. W. Fu, Singapore Institute of Manufacturing Technology
Sridhar Santhanam, Villanova University

High Temperature Lubricant Test for Superplastic Forming
P.A. Friedman, W.B. Copple, R. Allor, S.G. Luckey

Correlation of Implicit Finite Element Analysis to Superplastic Forming Experiments
S.G. Luckey, P.A. Friedman, C. Xia, K.J. Weinmann

Numerical Simulation of Tube Hydroforming Benchmarks
K-K. Chen

Session 1-C: Sensing and Diagnosis

Room 569, Alfred Lerner Hall
Co-Chairs: Robert X. Gao, University of Massachusetts-Amherst
Tony L. Schmitz, University of Florida

Detection and Characterization of Surface Cracking in Sheet Metal Hemming Using Optical Method
S.J. Swillo, G. Lin*, S.J. Hu, K. Iyer, J. Yao, M. Koc, W. Cai

	Morning					Af
Tuesday May 24	*NAMRI/SME Board Meeting* Board Room 501 *NSF CAREER Workshop* Satow Room 8:00 am - 5:30 pm					
Wednesday May 25	*Registration & Breakfast* North Lobby 7:30 - 8:30 a.m.	*Welcome Ceremony* Roone Arledge Cinema 8:30 - 10:00 a.m.	*Morning coffee break* 10:00 - 10:30 a.m.	*Concurrent Sessions* Room 555 Satow Room Room 569 Room 568 10:30 a.m. - Noon	*Awards Luncheon* Low Rotunda Noon - 2:00 p.m.	
Thursday May 26	*Registration & Breakfast* 5th floor Ramp 7:30 - 8:30 a.m.	*Welcome Ceremony* Roone Arledge Cinema 8:30 - 10:00 a.m.	*Morning coffee break* 10:00 - 10:30 a.m.	*Concurrent Sessions* Room 555 Satow Room Room 569 Room 568 10:30 a.m. - Noon	*Luncheon* Barbecue Noon - 1.30 p.m.	
Friday May 27	*Registration & Breakfast* 5th floor Ramp 7:30 - 8:30 a.m.	*Welcome Ceremony* Roone Arledge Cinema 8:30 - 10:00 a.m.	*Morning coffee break* 10:00 - 10:30 a.m.	*Concurrent Sessions* Room 555 Satow Room Room 569 Room 568 10:30 a.m. - Noon	*Luncheon* Farris Booth Commons Noon - 1.30 p.m.	

Detailed information about the conference program and schedulde may be found on

Program-at-a-Glance

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ternoon | **Evening**

				Registration Main Ramp *Reception* Room 555 5:30- 8:00 p.m.
Concurrent Sessions Room 555 Satow Room Room 569 Room 568 2:00 - 3:30 p.m.	*Afternoon coffee break* 3:30 - 4:30 p.m.	*Concurrent Sessions* Room 555, Satow Room Room 569 *Laboratory Tours* *COMDEC Meething* 4:00 - 6:00 p.m.		*Banquet* "Spirit of Hudson" Cruise 7:00 - 10:00 p.m.
Concurrent Sessions Room 555 Satow Room Room 569 1:30- 3:30 p.m.	*Afternoon coffee break* 3:30 - 4:30 p.m.	*NAMRI Membership Meeting* Room 569 4:00 - 5:00 p.m. *Labratory Tours* 4:00 - 6:00 p.m.	*NAMRI Membership Meeting* Room 569 5:00 - 6:00 p.m.	*Reception* Low Faculty 6:30 - 8:30 p.m.

the NAMRC 33 Web site at ***www.mrl.columbia.edu/namrc33***

Surface Roughness in Grinding: Online Prediction with Adaptive Neuro-Fuzzy Inference System
M.S. Samhouri*, B.W. Surgenor

Engineering Driven Cause-Effect Modeling and Statistical Analysis for Multi-Operational Machining Process Diagnosis
J. Liu*, J. Li, J. Shi

Session 1-D: Advances in Nontraditional Manufacturing
Room 568, Alfred Lerner Hall
Co-Chairs: Sung Hoon Ahn, Seoul National University
Bin Wei, GE Global Research Center

Manufacturing and Energy Field Method
W. Zhang, D.P. Mika

Study of Dielectric Flow in Micro Hole Drilling by EDM
Z. Yu, K.P. Rajurkar

Experimental Study on Cutting Force in Rotary Ultrasonic Machining of Zirconia/Alumina Composites
Z.C. Li*, Z.J. Pei, P. Kwon, W.M. Zeng, C. Treadwell

Noon - 2 p.m.

Awards Luncheon and Founders Lecture
Low Rotunda
Presiding: Kornel Ehmann, President, NAMRI/SME

2 p.m. - 3:30 p.m.

Concurrent Technical Sessions

Session 2-A: Micro/Nano Characterizations and Processes
Room 555, Alfred Lerner Hall
Co-Chairs: Shreyes N. Melkote, Georgia Institute of Technology
Z.J. Pei, Kansas State University

Scanning Optical Microinterferometer for MEMS Metrology
M.C. Schmittdiel, T.R. Kurfess, F.L. Degertekin, B. Kim

Microstereolithography Based on Digital Micromirror Device for Complex Meso/Micro Structures
G.W. Hadipoespito, X. Li

Machined Surface and Subsurface in Relation to Cutting Edge Radius in Nanoscale Ductile Cutting of Silicon
S. Arefin, X.P. Li, M. Rahman, T. He

Session 2-B: Inspection and Calibration
Satow Room, Alfred Lerner Hall
Co-Chairs: N. Fang, Utah State University
Robert W. Ivester, National Institute of Standards and Technology

Uncertainty of Spatial Coordinate Measurements Using Trilateration
J.S. Canning*, J.C. Ziegert, T.L. Schmitz

Fiducial Calibration System
B. Woody*, S. Smith

An Effective Dimensional Inspection Method Based on Zone Fitting
J. Wang, N. Pendse, Y. Ding

Session 2-C: Cryogenic and Electrical Treatments
Room 569, Alfred Lerner Hall
Co-Chairs: Marwan K. Khraisheh, University of Kentucky
Wit Grzesik, Technical University of Opole

Viability of Electrically Treating 6061 T6511 Aluminum for Use in Manufacturing Processes
J.C. Heigel*, J.S. Andrawes, J.T. Roth, M.E. Hoque, R.M. Ford

Effect of Cryogenic Treatments on Tungsten Carbide Tool Life: Microstructural Analysis
A.H. Gallagher, C.D. Agosti, J.T. Roth

Interrupted Hard Turning with Cryogenically Cooled Ceramic Tools
R. Ghosh

Session 2-D: Process Optimizations
Room 568, Alfred Lerner Hall
Co-Chairs: David A. Guerra, Technology Institute of Monterrey
Steven Liang, Georgia Institute of Technology

Mathematics and Applications of the Approach of the Steepest-Ascending Tool Path Planning
Z.C. Chen, X. Chang

Hard Turning Optimization Using Neural Network Modeling and Swarm Intelligence
Y. Karpat*, T. Özel

Optimization of Process Parameters in Manufacturing: An Approach of Multiple Attribute Decision Making
W.P. Sun*, Z.J. Pei, E.S. Lee, G.R. Fisher

3:30 p.m. - 4:00 p.m.
Refreshment break
5th Floor Ramp, Alfred Lerner Hall

4:00 p.m. - 6:00 p.m.
Concurrent Technical Sessions

Session 3-A: Manufacturing Systems and Outlook
Room 555, Alfred Lerner Hall
Co-Chairs: John C. Ziegert, University of Florida
Lihui Wang, Integrated Manufacturing Technologies Institute, National Research Council of Canada

The Influence of Material Handling Operations on the Schedule Makespan in Manufacturing Cell Environments
R.F. Babiceanu*, F. Chen, R.H. Sturges

A Manufacturing Model to Enable Knowledge Maintenance in Decision Support Systems
D.A. Guerra, R. Young

Manufacturing — Its Evolution and Future
M.E. Merchant, D.A. Dornfeld, P.K. Wright

Session 3-B: Advances in Laser Based Processes
Satow Room, Alfred Lerner Hall
Co-Chairs: Patrick Kwon, Michigan State University
David Mika, GE Global Research Center

Investigation of Laser Assisted Modification of Silicon Nitride Ceramic for Enhanced Surface Integrity
L. Sun*, A.P. Malshe, W. Jiang

Analysis and Synthesis of Laser Forming Process of Varying Thickness Plate
P. Cheng*, Y. Fan, J. Zhang, Y.L. Yao, D. Mika, M. Graham, W. Zhang

Effects of Phase Transformations on Laser Forming of Ti-6Al-4V Alloy
Y. Fan*, P. Cheng, Y.L. Yao, Z. Yang, K. Egland

Nanoparticle-Enhanced Laser Micromachining of Polymeric Nanocomposites
Y. Lu, D. Shao, S. Chen

Session 3-C: Advances in Welding Research
Room 569, Alfred Lerner Hall
Co-Chairs: John T. Roth, Pennsylvania State University-Erie
Jyhwen Wang, Nachiket Pendse

A Study on Cold Working of Aluminum Spot Welds to Improve Fatigue Strength
D. Kim, R. Spitsen, T. Khosla, W. Li, S. Ryu, B. Lim

Friction Stir Welding FEM Model Improvement Through Inverse Thermal Characterization
L. Fratini, S. Beccari, G. Buffa*

Micro Thin Film Sensor Embedded in Metal Structures for In-Situ Process Monitoring During Ultrasonic Welding
X. Cheng, H. Choi, P. Schwieso, A. Datta, X. Li

Welding Induced Distortion Control Using Dynamic Thermal Tensioning
J. Xu, W. Li

4:00 p.m. - 6:00 p.m.
Laboratory Tours
Small tour groups will leave the Alfred Lerner Hall at 4:00 p.m. to visit laboratories on campus. Student guides will escort the groups.

4:00 p.m. - 6:00 p.m.
COMEC Meeting
Room TBD

7:00 p.m. - 10:00 p.m.
NAMRC Banquet
"Spirit of Hudson" Cruise
Busses will leave at 6:30 p.m. in front of the Alfred Lerner Hall.

THURSDAY, MAY 26, 2205

7:30 a.m. - 8:30 a.m.
Registration & Breakfast
5th Floor Ramp, Alfred Lerner Hall

8:30 a.m. - 10:00 a.m.
Panel on Micro Manufacturing — a WTEC Study
Room 555, Alfred Lerner Hall
Moderator: Kornel Ehmann, Northwestern University
Panelists: Jian Cao, National Science Foundation
Khershed Cooper, Naval Research Laboratory/Office of Naval Research
Martin Culpepper, Massachusetts Institute of Technology
Tom Kurfess, Georgia Institute of Technology

10:00 a.m. - 10:30 a.m.

Refreshment break

5th Floor Ramp, Alfred Lerner Hall

10:30 a.m. - Noon

Concurrent Technical Sessions

Session 4-A: Analysis of Machining System Components

Room 555, Alfred Lerner Hall

Co-Chairs: David A. Dornfeld, University of California-Berkeley
Radu Pavel, TechSolve, Inc.

Experimental Investigation of Membrane Fouling Due to Microfiltration of Semi-Synthetic Metalworking Fluids
J.E. Wentz*, S.G. Kapoor, R.E. DeVor, N. Rajagopalan,

Modeling of Fixturing Dynamic Stability Accounting for Material Removal Effect
H. Deng*, S.N. Melkote

Application of Sensitivity Theory to Performance Analysis of Feeddrive System of CNC Machines
O.J. Abdul-Baqi, S.A. Yost, M.G. Mehrabi

Session 4-B: Innovative Processes

Satow Room, Alfred Lerner Hall

Co-Chairs: Ranajit Ghosh, Air Products and Chemicals, Allentown, PA
W. Li, University of Washington

Surface Modification of Aluminum for Mold by Nitrogen Ion Implantation
H.J. Kang, S.H. Ahn

Toward Designing and Controlling the Microstructure and Properties of Aluminum Alloys Castings Using Mold Vibration
N. Abu-Dheir*, M.K. Khraisheh, K. Saito, A.T. Male

Glass Machining with Ball End Mill
T. Matsumura, T. Ono

Session 4-C: Innovative Designs

Room 569, Alfred Lerner Hall

Co-Chairs: John W. Sutherland, Michigan Technological University
Xiaochun Li, University of Wisconsin-Madison

Design and Simulation of Compliant Sheet-Metal Handling in Transfer Press System
G.Y. Liao, R.L. Frutiger

Vibration-Based Sensor Powering for Manufacturing Process Monitoring
R.X. Gao, Y. Cui*

Design and Event-Driven Control of Function Blocks for Adaptive Process Plan Execution
L. Wang, W. Jin, H-Y. Feng

Session 4-D: Advances in Grinding Research
Room 568, Alfred Lerner Hall
Co-Chairs: Matthew C. Frank, Iowa State University
X.P. Li, National University of Singapore

Simulation-Based Development of a Superabrasive Grinding Wheel with Defined Grain Structure
O. Braun, G. Warnecke, J.C. Aurich

Elimination of Cutting Fluids in Grinding: An Investigation on the Application of Solid Lubricants
V. Radhakrishnan, S. Shaji

Effect of Jet Coherency on Burn-Out for Non-Continuous Dress Creep-Feed Grinding
J.K. Steffen, A. Warkentin, R. Bauer, C.E. Becze

Noon - 1:30 p.m.
Luncheon

1:30 p.m. - 3:30 p.m.
Concurrent Technical Sessions

Session 5-A: Advances in Metal Forming
Room 555, Alfred Lerner Hall
Co-Chairs: Kuo-Kuang Chen, General Motors Research & Development Center
Klaus J. Weinmann, University of California-Berkeley

CAE Supported Design Solution Generation in Metal Forming Product Development
M.W. Fu, M.S. Yong, S. Tong, C.C. Wong

A Numerical Study on the Use of Draw Beads to Minimize the Earing Defect in Deep Drawing
V. Vahdat, Y.W. Chun, S. Santhanam

Forming Limit Diagrams for Single Point Incremental Forming
J. Jeswiet, D. Young

Forces in Single Point Incremental Forming
J. Jeswiet, A. Szekeres

Session 5-B: Predictions in Machining Processes
Satow Room, Alfred Lerner Hall
Co-Chairs: Zezhong C. Chen, Concordia University
I.S. Jawahir, University of Kentucky

Prediction of Rake and Flank Temperature Distributions During Wet and Dry Machining
J.C. Moller

Workpiece Material Model Based Predictions for Machining Processes
Y. Karpat, E. Zeren, T. Özel

Influences of the Material Shear Flow Stress and the Shear-Plane Angle on the Size Effect in Machining
N. Fang, W. Wang

Comparison of Measurements and Simulations for Machining of Aluminum
R.W. Ivester, E. Whitenton, L. Deshayes

Session 5-C Advances in Drilling Research
Room 569 Alfred Lerner Hall
Co-Chairs: Tom Kurfess, Georgia Institute of Technology
Anil Srivastava, TechSolve, Inc.

Development of Magnetostrictive Tool-Holder for Dry Deep Hole Drilling
A.J. Filipovic, J.W. Sutherland

Machinability of Titanium/Graphite Hybrid Composites in Drilling
D. Kim, M. Ramulu, W. Pedersen

Finite Element Simulation of 3D Drilling Using an Arbitrary Lagrangian Eulerian Approach
R. Parthasarathy, A.H. Adibi-Sedeh, B. Bahr

Burrless Drilling by Vibration Cutting Applying Ultrasonic Torsional Mode Vibration
H. Suzuki, H. Yagishita

3:30 p.m. - 4:00 p.m.
Refreshment break
5th Floor Ramp, Alfred Lerner Hall

4:00 p.m. - 5:00 p.m.
NAMRI Membership Meeting
Room 569, Alfred Lerner Hall

5:00 p.m. - 6:00 p.m.

ASME Membership Meeting

Room 569, Alfred Lerner Hall

4:00 p.m. - 6:00 p.m.

Laboratory Tours

Small tour groups will leave the Alfred Lerner Hall at 4:00 p.m. to visit laboratories on campus. Student guides will escort the groups.

6:30 p.m. - 8:30 p.m.

NAMRC Reception

Low Faculty Room on campus

FRIDAY, MAY 27, 2005

7:30 a.m. - 8:30 a.m.

Registration & Breakfast

5th Floor Ramp, Alfred Lerner Hall

8:30 a.m. - 10:00 a.m.

Concurrent Technical Sessions

Session 6-A: Numerical Modeling

Room 555, Alfred Lerner Hall

Co-Chairs: Livan Fratini, Palermo University
Yong Huang, Clemson University

A Hybrid Modeling Approach to Investigate Chip Morphology Transition with the Stagnation Effect by Cutting Edge Geometry
Q. Wen, Y.B. Guo

Experimental and Numerical Investigation on Self-Piercing Riveting
E. Atzeni, R. Ippolito, L. Settineri

Distinct Element Simulation of Ceramic Machining: Material Removal Mechanism
S. Lei, B. Yang

Session 6-B: Form and Dimensional Uncertainties

Satow Room, Alfred Lerner Hall

Co-Chairs: W. Pedersen, University of Minnesota-Duluth
Jamal Sheikh-Ahmad, Wichita State University

A Collaborative Design and Dimensional Verification System on the Internet
I-H. Song, S-C. Chung

Characterization of Workpiece Form Uncertainty for Uniform Sampling Patterns
R. Edgeworth, R. Wilhelm

Analysis of Sampling Effects on Form, Position and Size Errors for Cylindrical Features Using Multivariate Statistics
Y. Kovvur, H. Ramaswami, S. Anand

Session 6-C: Control and Identification
Room 569, Alfred Lerner Hall
Co-Chairs: M.G. Mehrabi, University of Detroit Mercy
Richard W. Longman, Columbia University

An In-Process Method for Controlling Sensor Standoff for Laser Range Measurement of Objects with Complex Surface Geometry
V. Srivatsan, R. Katz, D. Dutta

Surface Roughness in Grinding: Off-Line Identification with an Adaptive Neuro-Fuzzy Inference System
M.S. Samhouri, B.W. Surgenor

Multiple-Model Probabilistic Design of Robust Iterative Learning Controllers
K. Takanishi, M.Q. Phan, R.W. Longman

10:00 a.m. - 10:30 a.m.
Refreshment break
5th Floor Ramp, Alfred Lerner Hall

10:30 a.m. - Noon
Concurrent Technical Sessions

Session 7-A: Wear and Contact Fatigue
Room 555, Alfred Lerner Hall
Co-Chairs: A.K. Balaji, University of Utah
Y. B. Guo, The University of Alabama, Tuscaloosa

A Fundamental Study on the Impact of Surface Integrity by Hard Turning on Rolling Contact Fatigue
D.W. Schwach, Y.B. Guo

Proposed Tool Wear Model for Machining Particle Reinforced Metal Matrix Composites
W.E. Pedersen, M. Ramulu

On the Wear of Coated Carbide Inserts in High-Speed Turning of AISI 1045 Steel
A.K. Balaji, V. Varghese, A.D. Jayal

Session 7-B: Modeling Schemes
Satow Room, Alfred Lerner Hall
Co-Chairs: Sung-Chong Chung, Hanyang University
Robert Edgeworth, Intel Corporation

ANN Constitutive Model for High Strain-Rate Deformation of Al 7075-T6
S. Sen, J. Twomey, J. Sheikh-Ahmad

Force Modeling Under Dead Metal Zone Effect in Orthogonal Cutting with Chamfered Tools
Y. Long, Y. Huang

Thermo-Mechanical Modeling of Metal Cutting Using MARC Mentat
R. Pavel, A. Srivastava

Session 7-C: Modeling of Tool and Material Interactions
Room 569, Alfred Lerner Hall
Co-Chairs: Satish Bukkapatnam, Oklahoma State University
Luca Settineri, Polytechnic of Turin

On Friction Modeling in Orthogonal Machining: An Arbitrary Lagrangian Eulerian Finite Element Model
A.J. Haglund, H.A. Kishawy, R.J. Rogers

A Statistical Mechanistic Model of Acoustic Emission Generation from Shear Zone of Machining
S. Bukkapatnam, D.C. Chang

Modeling of Tool Flank Wear Progression During Orthogonal Machining of Metal Matrix Composites
S. Kannan, H.A. Kishawy, I.M. Deiab, M.K. Surappa

Noon - 1:00 p.m.
Luncheon

*** Student authors who have entered the Student Research Presentation Contest**

NAMRC 33 CONFERENCE REGISTRATION FORM

May 24-27, 2005 Columbia University, New York, NY, USA

Complete a form for each individual attending (including *Guest Program Registrants*)

First Name:_____ Last Name: _____

SME Membership #: _____ ☐ I am not an SME Member

Name (First and Last) Preference for Name Tag: _____

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REGISTRATION FEES (All fees are in U.S. Dollars)

☐ Full Conference Registration **before May 2, 2005** (SME member #:_____) $425
☐ Full Conference Registration **after May 2, 2005** (SME member #: _____) $475
☐ Full Conference Registration **before May 2, 2005** (Non-SME member) $465
☐ Full Conference Registration **after May 2, 2005** (Non-SME member) $515
☐ Student/Retiree Conference Registration **before May 2, 2005** (copy of student ID w/ registration).....$160
☐ Student/Retiree Conference Registration **after May 2, 2005** (copy of student ID w/ registration) $185
☐ Guest Program Registration $165
☐ Donation to NAMRI/SME Fund ☐ $20 ☐ $50 ☐ $100 ☐ $_____

TOTAL: _____

There will be a $100 administration fee for cancellations made prior to May 9, 2005.
There will be no refunds after May 9, however your registration may be transferred to another delegate.

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OTHER INFORMATION

☐ Yes, I am presenting a paper or other lecture at NAMRC
☐ Yes, I have special needs (dietary or disability)
Please specify: _____

☐ Yes, I will attend the Luncheon on **Friday, May 27**.

Please mail, fax or e-mail form with payment to:

Ms. Xiomara Perez-Betances
Department of Mechanical Engineering
Columbia University
220 Mudd Bldg, MC 4703
New York, NY 10027
Tel: (212) 854-6269/Fax: (212) 854-3304
E-mail: xp1@columbia.edu

Are you interested in hosting a future NAMRC?

Since 1973, NAMRC has been held on the campus of a host institution to encourage a dialogue between conference attendees, offer opportunities for laboratory tours and disseminate state-of-the-art manufacturing knowledge. Institutions wishing to host a NAMRC are encouraged to submit a proposal.

The NAMRI/SME Board of Directors reviews proposals annually. NAMRC site selections are usually made two to three years ahead to allow for adequate planning and promotion. Operating procedures that detail the responsibilities of the host institution and the Society of Manufacturing Engineers are available. Submission of a written proposal and formal presentation of the proposal (including a question-and-answer session) at a Board of Directors meeting is required. If the proposal is selected, the host institution will enter into a conference agreement with SME. The Board of Directors requires conference-planning updates at its semi-annual meetings. Information on how to submit a proposal is online at ***www.sme.org/namri***.

The deadline for receipt of proposals is April 15. This date allows for proposal review by the NAMR/SME Board of Directors prior to its meeting at NAMRC. Thirteen copies should be submitted to:

Mark Stratton
Community Relations Manager
Manufacturing Education & Research Community
Society of Manufacturing Engineers
One SME Drive
P.O. Box 930
Dearborn, MI 48121-0930
Phone: (313) 425-3307
E-mail: techcommunities@sme.org

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NAMRC 33

May 24-27, 2005