Thirtieth
North American
Manufacturing Research Conference

NAMRC XXX
May 21-24, 2002
West Lafayette, Indiana, USA

Hosted by
Purdue University
School of Mechanical Engineering
School of Industrial Engineering

North American Manufacturing Research Institution of the
Society of Manufacturing Engineers
Dear Colleagues and Friends:

We welcome you to the Thirtieth North American Manufacturing Research Conference. The Schools of Engineering at Purdue University are pleased to host the 30th North American Manufacturing Research Conference (NAMRC) on May 21-24, 2002. NAMRC has been an established international forum for the presentation of cutting edge research results throughout universities and industry 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 XXX provides the authors far-reaching recognition of their work, as well as yields valuable insight from other leaders in manufacturing research.

This year 89 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 XXX and publication in the Transactions of the conference based upon a stringent peer review process conducted by the Scientific Committee of the North American Manufacturing Research Institution of the Society of Manufacturing Engineers (NAMRI/SME).

The conference will begin in the early evening of Tuesday, May 21, with a welcoming reception at the East and West Faculty Lounge located in Stewart Center of Purdue University. On Wednesday, May 22, the conference Opening Ceremony will feature welcoming remarks by the president of Purdue University, Dr. Martin Jischke, Dean of Engineering, Dr. Linda P.B. Katehi, and a keynote speech by the executive vice president of Cummins, Dr. John Wall.

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 at this conference, and to meeting many of you who will be attending for the first time. We believe that participation in NAMRC XXX will be both an intriguing and beneficial experience for you.

Sincerely,

Yung C. Shin and C. Richard Liu
Co-Chairs
NAMRC XXX Organizing Committee
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<td>8:30 a.m.</td>
<td>NAMRI/SME Board Meeting</td>
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<td>Welcome Ceremony</td>
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<td>10:30-12:00 p.m.</td>
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<td>12:00-1:30 p.m.</td>
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<td>6:00-6:00 p.m.</td>
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<td>7:30-8:30 p.m.</td>
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**Venue:**
- Stewart Center
- Purdue Memorial Union
- North Ballroom
- Executive Committee Meeting

**Dates:**
- Tuesday, May 21
- Wednesday, May 22
- Thursday, May 23
- Friday, May 24
2002 NAMRI/SME Board of Directors

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Purdue University is a coeducational, state-assisted system in Indiana. Founded in 1869 and named after benefactor John Purdue, the University is one of the nation's leading research institutions with a reputation for excellent and affordable education. Building upon historical strengths in engineering and agriculture, the West Lafayette Campus now offers nearly 6,100 courses in more than 200 specializations in the schools of Agriculture, Consumer and Family Sciences, Education, Engineering, Health Sciences, Liberal Arts, Management, Nursing, Pharmacy and Pharmacal Sciences, Science, Technology, and Veterinary Medicine.

The main campus of Purdue University is located in West Lafayette, Indiana, in America's heartland. It is located 65 miles north of Indianapolis, the capital of Indiana, and 126 miles southeast of Chicago. The conference will be held at Stewart Center, the conferencing facility at Purdue University, which is located at the center of campus. Many campus buildings and local stores are within a few minutes walking distance.

With an undergraduate enrollment of nearly 6,000, graduate enrollment of about 1,800 and a faculty of about 270, Purdue's engineering program is one of the largest in the United States. It encompasses 13 schools. Research expenditures in the School of Engineering exceed $70,000,000 annually. This research is carried out in laboratories located in the individual academic units and in several multidisciplinary research centers and school research laboratories. Some of these research facilities include:

- Birck Nanotechnology Center
- Center for Collaborative Manufacturing
- Center for Laser-based Manufacturing
- Intelligent Manufacturing Laboratory
- Center for Computational Image Analysis and Data Visualization
- Center for Customer Driven Quality
- Center for the Management of Manufacturing Enterprises
- Computer Integrated Process Operations Consortium (CIPAC)
- Dasch Center for Management of Manufacturing Enterprises
- Purdue University Materials Consortium (MatCon)
- Software Engineering Research Center

The conference will be held at Stewart Center, adjacent to the Purdue Memorial Union. Three large meeting rooms, Fowler Hall (seating 400), and another conference room for board member meetings and special sessions have been reserved. Stewart Center also offers a fully equipped registration area. The center also features a comfortable lounge, spacious lobbies and complete telecommunications capabilities. A ballroom has been reserved for the reception, lunch, and dinner banquet.

In connection with NAMRC XXX:

- Welcoming Reception on Tuesday, May 21 from 5:30-9:00 p.m. in the East and West Faculty Lounge in the Purdue Memorial Union (PMU).
- Welcoming Ceremony and Keynote Address by Dr. Martin Hische, President of Purdue University, Dr. Linda P. Kuehl, Dean of Engineering, and Dr. John Wall, Executive Vice President and Chief Technical Officer, Cummins Engine Company, May 22 from 8:30-10:00 a.m. in Fowler Hall of Stewart Center.
- NAMRC/SME Awards Luncheon and Founders Lecture on Wednesday, May 22 (from 12:00-1:30 p.m. in the North Ballroom of PMU). The Founders Lecture will be presented by Professor John A. Schwy, University of Waterloo.
- COMEC will meet on Wednesday, May 23 from 1:30-3:00 p.m. in Room 204 of Stewart Center.
- NAMRC/SME Technical Committees will meet from 7:30-8:30 a.m. on May 22, 23, and 24 in Room 204 of Stewart Center.
- NAMRC Banquet on Wednesday, May 22 from 7:00-9:30 p.m. at the Trails.
- Luncheon on Thursday, May 23 from 12:00-1:30 p.m. at the North Ballroom of PMU.
- NAMRC/SME Member Meeting on Thursday, May 23 from 5:00-6:00 p.m. in Fowler Hall of Stewart Center.
- ASME MED Member Meeting on Thursday, May 23 from 6:00-7:00 p.m. in Fowler Hall of Stewart Center.
- NAMRC Reception on Thursday, May 23 from 7:30-9:30 p.m. at University Inn and Conference Center.
- Luncheon on Friday, May 24 from 12:00-1:30 p.m. in the North Ballroom of PMU.

NAMRC XXX will provide tours of various manufacturing related laboratories located on campus. Two time slots are available to tour the facilities: Wednesday, May 22 from 4:00-6:00 p.m., and Thursday, May 23 from 3:15-5:00 p.m.

You may also want to take a tour of the Purdue University campus on your own. Maps of the campus will be provided in your registration packet.

NAMRC XXX will provide tours of local manufacturing companies. The Caterpillar plant located in Lafayette produces very large engines used for power generators and ships. Fairfield Manufacturing is the largest gear producer in North America. Visitors will be able to see various manufacturing processes and systems used by these two companies.
Brooklin Twinrocker Tour
Over twenty-five years ago, Kathryn and Howard Clark combined their knowledge to start Twinrocker Papers in San Francisco. Needing more affordable working space, they returned to the family farm near Brookston, Indiana and have been working to create an awareness of the beauty and advantages of handmade papers ever since.

Their client list includes the giants of contemporary art such as Rothenberg, Johns, Rosenquist, Motherwell and Dine. They have also created limited edition prints and books for publishers such as Arion Press, Osiris Editions, and the Whitney Museum. In their store front in Brookston you can buy all the paper making supplies listed in their catalog, see beautiful papers, stationery, and hand bound books. While in Brookston you will have an opportunity to visit the Violet and Ivy Flower shop as well as eat lunch at an authentic German restaurant - Klein Brat Haus.

Frank Lloyd Wright Home Tour
Frank Lloyd Wright home constructed especially for Dr. John Christian and his wife in 1956. The home is named "Samara" and is one of only six homes where the people who commissioned Frank Lloyd Wright to build the home still live. You will be given a personal tour by Dr. Christian and see and hear the wonders of living in this exciting home and grounds! Lunch will be provided at a nearby restaurant.

Fowler House Museum
Check out the historic Fowler House Museum - a grand home built by one of John Purdue's best friends. Located in the historic district you will have an opportunity to see how the other half lived many years ago. Lunch will be served at a local Bed and Breakfast. After that you will have an opportunity to explore and visit with the owner of the Flower Mill - a wonderful Flower Shop owned by Jim Mailloux - a local florist who has been retained by the White House on several occasions to help decorate for holidays, as well as inaugurations.

All fees are in U.S. dollars and payable to Purdue University. We accept cash, check, money orders, VISA or MasterCard. Complete one registration form per person. Guest Program participants should complete their own registration form. Make additional copies of the form as needed. All fees except the guest registration include entrance to all technical sessions, and all conference materials, publications, meal functions, laboratory tours and industry tours. Included in the guest registration fees are conference breakfasts, banquet and two receptions, and guest program tour (see Guest Program for details).

There are no single-day registration fees. There are no reduced registration fees for authors or session chairs.

Refunds, less an administrative fee of $100.00 will be made for all cancellations received in writing and postmarked before May 10, 2002. No refunds will be made after that date, but a substitution of attendees may be made by notifying the Conference Center prior to the conference. Please allow six to eight weeks to receive refund checks. Credit card refunds will be issued to the credit card used for payment. Should this event cancel in entirety, University's liability is limited to a refund of the registration fees paid.

Attendees of NAMRC XXX can stay at Purdue Union Hotel or University Inn and Conference Center. Sixty rooms have been reserved at a rate of $75 per night at Purdue Union Hotel, with an additional 100 rooms reserved at University Inn and Conference Center at the reduced rate of $70 for single and $79 for double per night. Please mention "NAMRC" when making your reservations. The Purdue Memorial Union also offers various restaurants and cafeterias for guests and students as well as various recreational facilities, including bowling and billiards.

Purdue Memorial Union
(Conference site)
The Union Club Hotel
West Lafayette, IN 47907
800-320-6291
765-494-8913
Fax 765-494-8924
Deadline: May 3, 2002

University Inn and Conference Center
(At 3 miles from Conference site)
1001 Northwestern Avenue,
West Lafayette, IN 47906
800-777-8808
765-463-5911
Fax 765-497-3850
Deadline: May 3, 2002
If necessary there are more than 1,600 rooms available in motels within five miles of campus. For information, visit the web site: www.lafayette-in.com/Lodging.html

PARKING: Ample free parking is available at the parking garage across from the Purdue Memorial Union. Parking is free for those staying at the PMU and $3 per day for others.

*Note: Courtesy shuttle service will be available from University Inn and Conference Center to the conference site.
Purdue University is connected to several major highways. The campus is located approximately 65 miles northwest of Indianapolis and 190 miles southeast of Chicago. The campus can be accessed via Exit 172, 175, or 178 on interstate 65 from Indianapolis or Chicago airports. The conference site, Stewart Center, is located right behind the Purdue Memorial Union.

Shuttle service from the Indianapolis Airport is provided by Lafayette Limo every two hours at 5:33 for round trip to any hotel in the Lafayette area. Call (765) 497-3828 to make your shuttle reservation or visit www.lafayettelimo.com.

The Purdue University Airport is also located near campus. Daily commuter flights from Detroit are provided by the Northwest Airlift. The flight schedule from the Purdue University Airport is available through www.adpc.purdue.edu/PhysFac/AirportV.

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

Climate
The average temperature in May is 62 degrees Fahrenheit. Plan on sunny and warm weather. The temperature can drop in the evening, so you may want to bring a light jacket.

Time Zone
October to April: Eastern Standard Time (EST)
April to October: Central Standard Time (No Daylight Savings Time)

Mail:
Complete the registration form at the back of this brochure and mail it with your payment, using check, money order, or charge card number to

Business Office, Conference Division
Purdue University
1586 Stewart Center, Room 110
W. Lafayette, In. 47907-1586

FAX
(765)494-9567

Attention: Business Office, Conference Division

Visit the NAMRC XXX Web site: www.sme.org/namrc and link to the NAMRC XXX information or directly at www.widget.ecn.purdue.edu/namrc/ or call (765)244-2758 or email kthyman@ecn.purdue.edu.

NAMRC XXX Technical Sessions and Programs

8:30 a.m. – 9:30 p.m.
NAMRC/SME Board Meeting
204, Stewart Center

5:30 p.m. – 9:00 p.m.
Conference Registration and Welcoming Reception
East and West Faculty Lounge in the Purdue Memorial Union

7:30 a.m. – 8:30 a.m.
Registration and Breakfast
Common Area – East foyer, Stewart Center

8:30 a.m. – 10:00 a.m.
Welcoming Ceremony
Fowser Hall, Stewart Center

Opening Remarks:
Yunj C. Shin, Chair NAMRC XXX

Welcoming Remarks:
Dr. Martin Lischke, President, Purdue University
Dr. Linda P. Kajebi, Dean of Engineering, Purdue University

Introductory Remarks:
Phil Abramovitz, President, NAMRC/SME

Keynote Address:
21st Century Engine Requirements Pushing Manufacturing to the Limits
John Wall, Executive Vice President and Chief Technical Officer, Cummins Engine Company

10:00 a.m. – 10:30 a.m.
Refreshment Break

10:30 a.m. – 12:00 noon
Concurrent Technical Sessions

Session 1A: Forming I
214AB, Stewart Center

Co-Chairs: Bill Wilson, University of Washington
Jian Cao, Northwestern University

A. Smith, G. L. Niebur and G. Schmid, University of Notre Dame

Experimental Investigation of Internal Defects in the Gear Wedge Rolling Process
O. Li, M. Lovell and W. Slaughter, University of Pittsburgh

Production of Aluminium Extruded Dies Using A Laser-Based Flexible Fabrication Technique
V. Ijang, M. Stock and P. Mollar, Iowa State University

Session 1B: Die Technology
214AB, Stewart Center

Co-Chairs: R. Wirtz, University of Michigan
R. M. Frech, University of Wisconsin

V. Ijang, M. Stock, and P. Mollar, Iowa State University

Session 1C: Process Control
214BA, Stewart Center

Co-Chairs: D. L. Smith, Boeing
M. Bledzki, University of Illinois

W. J. Lenker, Lockheed Martin

Ballistic Limit of Diesel Engine Components
J. J. C. Eifert, Cummins Engine Company
Session 1-A: Material Removal I – Novel Hybrid Processes
214CD, Stewart Center

Co-Chairs: Robert Williams, University of Nebraska
           Bin Wei, GE Corporate Research

Performance Characteristics in Rotary Abrasive ElectroDischarge Machining (RAEDM)
I. Kozak, Visiting Professor from Warsaw University of Technology, K.P. Bajaj Lab, University of Nebraska-Lincoln

Fielding of Mold Cavity By Ultrasonic-Vibratory Placing Metal
S. Yamada, INCE Inc. and M. Jih and M. Mutakawa, Nippon Institute of Technology

Compressive Assessment of Laser-Assisted Machining For Various Ceramics
P.A. Rebco, F.E. Pfeifer, K.C. Shin, Purdue University, and F.P. Incopostra, University of Notre Dame

Session 1-C: Manufacturing Systems I – Microtechnology
218AB, Stewart Center

Co-Chairs: R. Paul, Oregon State University
           M.L. Pickart, University of Illinois at Urbana-Champaign

Surface Rake Damage Measurement in Silicon Wafer By Ion Sputterning
I.M. Zhang, Kansas State University, J.D. Sprow, Argonne National Laboratory, and C.F. Psut, Kansas State University

Micro-Seed Laser Scribed Passivation - Measuring Trench and Microstructure Characterization
W. Zhang and Y.L. Yao, Columbia University

Micro-Manufacturing of A Nano-Scratch Continuous-fiber Polymer Composites (Kwik System)
W. Zhang and S. Chen, Iowa State University

Session 1-B: Material Removal II – Grinding
218AB, Stewart Center

Co-Chairs: Marion B. Grant, Cummins Engine Company
           Li Zhang, University of Connecticut

An Experimental Investigation of the Grinding Force and Surface Finish on Nanocrystalline Ceramic Coatings
D.K. Dey, B. Zhang, and F.H. Deng, University of Connecticut

A Comparison of Grinding Force Arising From Oscillating Abrasive Sand and Clay Thickness
R.A. Chauhan, M.A. Mahan, National University of Singapore, S.J. Drew, and B.L. Stone, University of Western Australia

Invited Paper: From Virdol Corrugation (a-A203)
M.J. Jackson, University of Cambridge and B. Mills, University of Liverpool

12:00 noon – 1:30 p.m.
NUMISME Awards Luncheon and Founders Lecture
North Ball Room at Purdue Memorial Union
Presiding: P. Almassy, President, NUMISME
Lecture: Professor John A. Schey, University of Waterloo

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

Session 2-A: Forming II – Sheet Metal Forming
214AB, Stewart Center

Co-Chairs: Jian Guo, Northwestern University
           J. Jan Shi, University of Michigan

Prevention of Seizure for Onset Clearing in Multi-stage Deep Drawing of Pure Titanium Skirt
K. Miki, T. Morao, and T. Harada, Toyohashi University of Technology

Rapid Prototyping of a Headlight with Steel Skirt
J. Lysiewicz and P. Hagan, Queen’s University

Optical and Raubel Design of Laser Forming Processes
C. Liu and Y.T. Yik, Columbia University

An Overview of Multistep Applications in Aerospace Skew Metal Forming and Prototyping
K. Bjoertjoe, V. Johnson, General Motors Corporation, K. A. Jorgenson, EDS Corporation, and Y. Prabhakar, AIO Forming Engineering USA

Session 2-B: Material Removal III – Modeling/Characterization
214CD, Stewart Center

Co-Chairs: David Stephenson, General Motors
           Probal Acharya, Ford Research Laboratory

Morphology of Chip Formed Tools in High Speed Milling of Cu and Mild Tool Steel Using Ball End Mills
H.A. Khorasani, University of New Brunswick, and C.E. Boche, Pratt & Whitney Canada

Experimental Observations of Cutting Forces and Tool Wear Effects in Rapid Cuts in End Milling
Y. Choi and R. Narayanaswamy, Iowa State University

Relief Cutting Parameters and Manufacturing Chip Formation and Surface Integrity During Machining of AISI 316L
R. Mischke and F. Chmiel, Institute of Metals Research, Swedish Institute of Metals Research

Microstructural Modeling of Tooling Under Pressure Boundary Conditions Using Distinct Element Method
S. Lei and P. Karki, Kansas State University

Session 3: Manufacturing Systems II – Processing Techniques
218AB, Stewart Center

Co-Chairs: Gerald Brevick, Ohio State University
           Blaine Lilly, Ohio State University

A Practical New Approach to Manufacturing Low Cost High Temperature Composite Materials
T. Siegmund, R. Opar, J. Lurias, Purdue University and W. Stieber, North Dame, F.R. Jacobs, Indiana University, C. Foss, T. Cordell, National Composite Center, C. Parker, P. Sullivan, M. La Rose, Honeywell Aircraft Landing Systems
A New Heat Thower Model for Friction Stir Welding
M. Song and R. Kononovic, Southern Methodist University

Development of a Window Pressure Sensor with Remote Acoustic Transducer
L. Zhang, C.B. Yee, S.T. Kao, and D.J. Karmi, University of Massachusetts

An Experimental Study of the Fatigue Performance of a SiC/Al Metal Matrix Welding Process
W. Chen, C.L. Gunter, J.W. Sutherland, Michigan Technological University

Session 2-D: Material Removal IV – Machine Tools
218CD, Stewart Center

Co-Chairs: John Ziegert, University of Florida
           Y. Kevin Rong, Worcester Polytechnic Institute

Study Of In Situ Digital Engineering of CNC Machine Tool Spindles
N.S. Chaphalkar, X. Zhang, K. Yamasaki, University of California at Davis and M. Morl, Morl Seiki Co., Ltd.

A Reuse Kinematic Approach for Error Analysis of Machine Tools Using Ball Bar Test of Hexapod/Hexilt

Optimal Practical For Using HSK Tool Holder-Spline Spindle in Machining Applications
N.J. Agapitiou, P. Bandyopadhyay, C.H. Shen and D.A. Stephenson, General Motors

Al-Based Classification Methodology For The Modelling of Machine Tool Thermal Error
R. Ramesh, M.A. Mannan, and A.N. Poo, The National University of Singapore

3:30 p.m. – 4:00 p.m.
Refreshment Break

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

Session 2-D: Manufacturing Systems III – Planning and Set-up
218CD, Stewart Center

Co-Chairs: Michael Bieterman, The Boeing Company
           Daniel Walczyk, Rensselaer Polytechnic Institute

Integrated Setup Planning and Fixture Design: Issues and Solutions
S.H. Huang, University of Cincinnati, Y.K. Rong, Worcester Polytechnic Institute, D.W. Yen, Delphi Automotive Systems

Determination of Clamping Force Based on Minimization of Workpiece Elastic Deformation
S. Satsyanarayana and S. N. Mekhilef, Georgia Institute of Technology

An Integrated Approach to Tolermic Allowance, Process Planning and Scheduling
S. Anand, R.P. Palliappan, S. Uttam, and C. McCord, University of Cincinnati

An Architecture For Distributed Process Planning Using Function Blocks
L. Wang, National Research Council of Canada, and H.Y. Feng, The University of Western Ontario

Session 3-D: Multi-disciplinary Manufacturing Research Panel
218CD, Stewart Center

Co-Chairs: Ying C. Shin, Purdue University
           C. Richard Liu, Purdue University

Speakers: To be determined

1:30 p.m. – 5:30 p.m.
Council of Manufacturing Engineering Chairs/Coordinators (COMEC) Meeting
204, Stewart Center

4:00 p.m. – 6:00 p.m.
Concurrent Laboratory Tours
Purdue University Campus

Small tour groups will leave Stewart Center at 4:00 p.m. to visit different laboratories. Student guides will escort the groups.

7:00 p.m. – 9:30 p.m.
NAMIC Banquet
At Trails
Buses will begin leaving at 6:45 p.m. in front of Purdue Memorial Union and University Art and Conference Center. The buses will depart from the Trails at 9:30 p.m. to return to the hotel.
7:30 a.m. – 5:30 a.m.
Registration and Breakfast
Common Area – East Foyer, Stewani Center
8:00 a.m. – 10:00 a.m.
 Concurrent Technical Sessions

Session 4-A: Material Removal VI – Grinding
214AB, Stewart Center
Co-Chairs: T. R. Kurlese, Georgia Institute of Technology
I. Marincu, The University of Toledo

Thermal Aspects For Grinding of Grennite
X. Xu, H. Huang, W. Zeng, Huazhao University and S. Malkrn, University of Massachusetts

Predictive Modeling of Cutting Fluid Admittance in Cylindrical Grinding
Professor Steven Y. Liang, Georgia Institute of Technology Z. Chen, IBM Corporation, H.
Yanhuai, Utsukyama University and S. Liang, Georgia Institute of Technology

Wear of Potentially Abrasive Grinding Wheels
M. J. Jackson, University of Liverpool

In-Process Monitoring of Tying Using a Sensor Integrated Diamond Grinding Wheel
B. Vanghee, CE Superabrasives, S. Pathak, Tohoku Operations, R. Gao, S. Malkrn, University of Massachusetts and C. Gun, United Technologies Research Center

Session 4-B: Material Removal VII – Modeling
214CD, Stewart Center
Co-Chairs: I.S. Jawahir, University of Kentucky
William J. Endres, Michigan Technological University

Least Square Method For Determination of Cutting Force Parameters in End Milling – Model and Experimental Verification
I.S. Shahin, G. Yoonsoo, A.E. Bayouni and J.A. Khan, University of South Carolina

Prediction of Forces in Ball-End Milling Using RBF Neural Networks
H. El-Mosawy and J.F. Bieren, Purdue and M. Godallah, Cairo University

Accurate 3D Cutting Force Prediction Using Cutting-Condition - Independent Coefficients in Ball-End Milling
J.H. Ko and D.W. Cho, Pohang University of Science and Technology

Molding and Analysis of Internal Throat Forming
S. Chowdhury, O.B. Odogangan, S. Kapoor and R. DeVo, University of Illinois at Urbana-
Champaign

Session 4-C: Manufacturing Systems IV – Production Strategies
218AB, Stewart Center
Co-Chairs: Richard Furness, Ford Motor Co.
Soundar Kumars, Pennsylvania State University

An EEMac Milling System With Look-Ahead Strategy: Model, Simulation and Case Study
N. Pranathik, Syracuse University and James Simko, New Venture Gear Inc.

Assembly Strategies To Reduce Gear Wear In Planetary Gear Transmissions
S.M. Athanasiou, Ford Motor Co.

Selecting Manufacturing System Configuration Based on Performance Using AHP
V. Meri-Sperdeucet and S.I. Hu, University of Michigan

The Manufacturing System Design Decimation in the Automotive Electronics Industry
D.S. Cochran, G. Opocza, C. Tapia and Y.S. Kim, Massachusetts Institute of Technology

8:30 a.m. – 12:00 noon
ASME Manufacturing Engineering Division (MED) Executive Committee Meeting
204, Stewart Center
10:00 a.m. – 10:30 a.m.
Refreshment Break
10:30 a.m. – 12:00 noon
Concurrent Technical Sessions

Session 5-A: Forming IV – Numerical Modeling
214AB, Stewart Center
Co-Chairs: Tayyari Aham, The Ohio State University
Anil Bagchi, Shiloh Industries, Inc.

Comparison of Different Methods for Estimating Axial Symmetry With Rotational Axial Symmetry in Body Metal Forming
I. H. Hao, Royal Institute of Technology

Automated Automatic Work-Generation for Finite Element Simulation of Metal Forming
S.R. Ryoo and S.M. Huang, Pohang University of Science and Technology

A Study On The Stress Distribution In Cell Wrapping and Its Effect On Final Cell Deformation
S. Li and J. Cao, Northwestern University

Session 5-B: Material Removal VIII – Difficult-to-cut Materials
214CD, Stewart Center
Co-Chairs: C.H. Shen, General Motors
Walter W. Olson, The University of Toledo

Machining Hardened Steel With Ceramic-Coated and Uncoated CBN Cutting Tools
T.G. Dawson and T. Kurlese, Georgia Institute of Technology

High-Speed Facing of Age Hardened Inconel 718 Using Silicon Carbide Winder Radial Conley Tools
R.M. Arunnachalum and M.A. Mannan, National University of Singapore

N2+ Implanted Carbide Based Nitride Tools For Finish Hard Machining
Y. K. Chou and H. Sung, University of Alabama
Session 5-C: Manufacturing Systems V – Micro/Internano Technology
21AB, Stewart Center
Co-Chairs: Y. Lawrence Yao, Columbia University
X. Xu, Purdue University

Development of Nano-Scale Machine Tool (nMT) Systems
M.P. Vogler, X. Liu, S.G. Kapoor, R.E. DeVor, University of Illinois at Urbana-Champaign and K.F. Elmann, Northwestern University

Thermally-Enhanced Edge Registration for Aligning Metallic Microlaminated Devices
J.S. Thomas and B.K. Paul, Oregon State University

Next-Generation Processing Techniques for Improving Efficiency for Nano-Scale Heat Exchangers

12:00 noon – 1:30 p.m.
Lunch
North Ball Room at Purdue Memorial Union

1:30 p.m. – 3:00 p.m.
Concurrent Technical Sessions

Session 6-A: Material Removal IX – Dynamics
21AB, Stewart Center
Co-Chairs: David W. Yen, Delphi Automotive Systems
David Shamine, Caterpillar

The Stability Analysis of Machining with Controllable Time-Varying Dynamics
M. Wang and R. Fei, Beijing Polytechnic University

Predicting Tool Vibration in Process Dynamics During Sculptural Surface Machining
T. Bailey, United Technologies Research Center, T.F. El-Wardany, M. Dumitrescu and M.A. Elbestawi, McMaster University

Time Domain Clutter Prediction Including Tool Wear Effects During Face Turning of Nickel Based Super Alloys
B.E. Clancy, B. Rao and Y.C. Shin, Purdue University

Session 6-B: Material Removal X – Wear
21CD, Stewart Center
Co-Chairs: Warren DeVries, Iowa State University
Shuiping Lei, Kansas State University

Tool Temperature and Tool Life in Machining with Restricted Contact Tools
J. A. Arseculeriahne, University of New South Wales

Tool Wear When Tapping Hole On Gray Cast Iron Using High Cutting Speed
R.T. Coelho, A.A. Bezerra, University of Sao Paulo and M.S. Ice, Titex Plus Precision Cutting Tools S.A.

The Effects of Corner Radius and Edge Radius on Tool Flank Wear
W.J. Endres, Michigan Technological University and R.K. Kountanya, University of Michigan

Session 6-C: Material Removal XI – Material Characterization
21AB, Stewart Center
Co-Chairs: John Sutherland, Michigan Technological University
Ajay P. Malhite, University of Arkansas

Characterization of Cast Iron Surface With Graphite Patches Using Microlithographic Film
Professor J. Raja, University of North Carolina at Charlotte
B. Muralikrishnan and J. Raja, University of North Carolina at Charlotte,

Titanium Aluminide: Thermal Ductility, Heat Capacitance, and Coefficient of Thermal Expansion as a Function of Temperature
W.L. Borne and T.R. Kurkesh, Georgia Institute of Technology

Mechanical Behavior Characterization of the Secondary Shear Zone in Metal Cutting
Y.B. Guo, University of Alabama

Session 6-D: Manufacturing Engineering Education
21CD, Stewart Center
Co-Chairs: Christopher A. Brown, Worcester Institute of Technology
Eliyuay A. Cadby, University of Michigan – Dearborn

Invited papers:
PRIME - THE Partnership for Regional Innovation in Manufacturing Education
W.F. Envelebes, Robert Morris University, K. Harris, Penn State New Kensington, P. Cunningham, Community College of Allegheny County, S. Faeghn, Butler County Community College, R. Myers, Westmoreland County Community College
An Approach to Education in Life Cycle Engineering – 2001
I. Jeswiet, Queen’s University

Teaching Controls and Integration with the Hands-On use of Industrial Hardware
H. Jack, Grand Valley State University, Padnos Schoool of Engineering

3:00 p.m. – 3:15 p.m.
Refreshment Break

3:15 p.m. – 5:05 p.m.
Session 6-D: Manufacturing Engineering Education
21CD, Stewart Center

Accomplishments of Manufacturing Engineering Department at the University of Texas – Pan American
S.W. and R. Namblat, University of Texas – Pan American

Manufacturing Learning Center: A Model to Enhance Manufacturing Engineering Education
B.A. Kramer, Kansas State University, F. Azadivar, The University of Massachusetts at Dartmouth, J. Tucker, Kansas State University

Experiences in Technology-Based Instruction and Active Learning for a Manufacturing Course
Z.I. Pei, S. Hanna, T. Dienes and S. Lei, Kansas State University, Manhattan

Manufacturing Engineering Education: A Unified Approach
K.F. Elmann and W. Hopf, Northwestern University
5:05 p.m. – 6:00 p.m.
Panel on the Future of Manufacturing Engineering Education

3:15 p.m. – 5:00 p.m.
Concurrent Laboratory Tours
Small tour groups will leave Stewart Center at 4:00 p.m. to visit different laboratories. Student guides will escort the groups.

5:00 p.m. – 6:00 p.m.
NAMRI/SME Member Meeting
Fowler Hall, Stewart Center

6:00 p.m. – 7:00 p.m.
ASME MED Member Meeting
Fowler Hall, Stewart Center

7:30 p.m. – 9:30 p.m.
Reception
University Inn and Conference Center
Transportation will be provided from Purdue Memorial Union to University Inn and Conference Center

7:30 a.m. – 8:30 a.m.
Registration and Breakfast
Common Area – East Foyer, Stewart Center

8:00 a.m. – 10:00 a.m.
Concurrent Technical Sessions

Session 7-A: Forming V - Hydro Forming
214AB, Stewart Center

Co-Chairs: Klaus I. Weinfurter, Michigan Technological University
S.M. Hwang, Pohang University of Science and Technology

Finite Element Analysis of Siklet Metal Hydroforming
Y.C. Chang, S.M. Hwang and B.S. Kang, Pusan National University

Influence of Initial Thickness Distribution on Tool Deformation in Tube Hydroforming
A. Shirayori, S. Fuchizawa and M. Natsuaki, Utsunomiya University

Forming and Expanding of an Aluminum Alloy in Tube Hydroforming - Comparison of FEA Predictions with EasyForm Experimental Data
S. Kayan, J. Guo and B. Tuscan, Ohio State University

Numerical Analysis and Design for Tube Hydroforming Process by Rigid-Plastic Finite Element Method
S. Kim, B.S. Kang, Pusan National University and H.H. Choi, Pukyong National University

Session 7-B: Material Removal XII – Planning and Optimization
214CD, Stewart Center

Co-Chairs: James Stori, University of Illinois – Urbana Champaign
Saim Anand, University of Cincinnati

Optimization of Length of Travel in Face Milling Operations for Flat Surfaces
S. Rezaei, National Research Council of Canada, and R. Wary, Pennsylvania State University

WEBAC, Internet Based System For Intelligent Auditing and Reverse Engineering of CNC Part Programs
A. A. Deshpande, Massachusetts Institute of Technology, and S.S. Pande, Indian Institute of Technology Bombay

Design of a High-Speed Parallel Kinematics X-Y Table and Optimal Velocity Shaping For High-Speed Machining
I. Stori and P.M. Ferreira, University of Illinois at Urbana-Champaign

Exiger Cnome Bear Analysis for Boring Operation
S. Gu and H. Ho, DaimlerChrysler Corporation

Session 7-C: Manufacturing Systems VI – Product/Process Design
214AB, Stewart Center

Co-Chairs: Bilal Jefelbeh, Delphi Interior Systems
Yuan-Shin Lee, North Carolina State University

Virtual Clay Modeling System Used For Creating Basic Idea of Product Skup
H. I. Asayama and H. Fujiki, Keio University

Contact Sensitive Assistance in Computer Aided Design Systems
R.Naota, Osaka University

Fabrication of a Micro Humidity Sensor on a Title Flexible Substrate
J. C. O. K. Ng, S. Jung and S.A. Battersby, University of Arkansas

Management and Analysis of Design Constraints For Electronic-Mechanical Product Manufacturing
P.K. Wright, D.A. Domsfeld, M.G. Montero and C.H. Sequino, University of California at Berkeley

10:00 a.m. – 11:00 a.m.
ASME MED 2001 IMCE Symposium Organizers Planning Meeting
218C, Stewart Center

10:00 a.m. – 10:30 a.m.
Refreshment Break

10:30 a.m. – 12:00 noon
Concurrent Technical Sessions

Session 8-A: Material Removal XII - Dynamics
214AB, Stewart Center

Co-Chairs: Jun Ni, University of Michigan
K. Scott Smith, University of North Carolina at Charlotte
Conference Registration Form

NAMIC XXX
May 21-24, 2002, West Lafayette, Indiana, USA

Complete a form for each individual attending (including guest Program Registrants).
Make necessary copies for additional registrants prior to completing.

First Name: __________________________ Last Name: ___________________________
Professional Title: __________________________
Organisation: __________________________
Address: __________________________ State/Province: __________________________
Postal Code: __________________________ Country: __________________________
E-mail Address: __________________________ Day Phone: __________________________ Fax: __________________________

Additional Information
(Write all that apply)
☐ I require auxiliary aids/services due to a disability. Please contact me at the above address.
☐ I have special dietary needs, please indicate needs: __________________________
☐ ATTENDEE AV Requirements: __________________________
☐ I will be bringing my spouse/significant other. Name for badge: __________________________
☐ Host site would like to participate in the spouse tours.
☐ Please reserve my seat for the Industry Tour on Friday.
☐ I will attend Friday Luncheon.

Registration Fees
☐ Full Registration before May 1, 2002 ___________ $375 USD
☐ Full Registration after May 1, 2002 ___________ $425 USD
☐ Student/Retiree Registration ___________ $175 USD
☐ Guest Registration ___________ $155 USD

TOTAL: ___________

Purdue University is not responsible for costs due to cancellation.

Payment Method
☐ I will be using a company purchase order for the payment
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☐ Master card ☐ VISA ☐ Discover
Accuracy Number __________________________ Expiration Date __________________________
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Mail or Fax form with payment to:
Business Office, Conference Division
Purdue University
1586 Stewart Center, Room 110
W. Lafayette, IN 47907-1586
FAX 765-494-0567

PARKING: Ample free parking is available at the parking garage across from the Purdue Memorial Union. Parking is free for those staying at the PMU and $5 per day for others.