

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

**North American
Manufacturing
Research Conference**

NAMRC XXVII

May 25 - 28, 1999



North American Manufacturing
Research Institution of the
Society of Manufacturing Engineers



Berkeley
University of California

Hosted by the University of California, Berkeley

Dear Friends,

The University of California, Berkeley is pleased to host the 27th North American Manufacturing Research Conference (NAMRC) this year on May 25-28. NAMRC was organized in 1973 as a major international forum for discussion and dissemination of research results in the field of manufacturing science and technology. NAMRC provides a unique forum for active academic and industry researchers to exchange and discuss recently completed research or in-progress research in manufacturing technology and productivity.

This year over seventy papers will be presented at the conference from universities, research institutes, and industrial research laboratories around the world. All of these papers have been accepted based on a peer review process conducted by the NAMRI/SME Scientific Committee.

The Conference will begin on Tuesday, May 25, with a welcoming reception in the Bancroft Club Hotel. On Wednesday, May 26, the Conference Opening Ceremony will feature a keynote address by the Chairman, President, and CEO of the Solectron Corporation, Dr. Koichi Nishimura. The Conference Banquet will be held on a boat cruising the San Francisco Bay.

Each year, NAMRC attracts over 200 manufacturing research engineers and scientists, research and development managers, production engineers and managers, design specialists, metallurgists, manufacturing managers, research professors, graduate students, research assistants, manufacturing educators, and industry representatives.

We are looking forward to renewing acquaintances with you, our colleagues, at NAMRC XXVII. We believe the conference will be both an intriguing and beneficial one for you.

Cordially yours,

Handwritten signatures of Paul Wright and David Dornfeld. Paul Wright's signature is on the left, and David Dornfeld's signature is on the right.

David Dornfeld and Paul Wright
Co-Chairs
NAMRC XXVII Organizing Committee

What is NAMRC?

NAMRC is an international forum for the presentation and critical discussion of the results of basic and applied research in metal forming, material removal, manufacturing systems and controls. 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 between 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 Should You Attend?

By attending NAMRC XXVII you will:

- Gain insight on the most recent developments in material removal and forming processes, automation and control 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 alternate 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.

NAMRC XXVII PROGRAM-AT-A-GLANCE

Hosted By University of California, Berkeley • Berkeley, California USA

MORNING

AFTERNOON

EVENING

Tuesday May 25	Registration/Welcome Reception Bancroft Hotel 5-9 p.m.			Bay Dinner Cruise 7:00-9:30 p.m. (Transportation will be provided)			Wine & Cheese Reception Home of Paul Wright 5:45-9:30 p.m. (Transportation will be provided)		
Wednesday May 26	Registration & Breakfast Bechtel Engineering Center 7:30-8:30 a.m.	Opening Ceremony Sibley Auditorium 8:30-10:00 a.m.	Concurrent Sessions Bechtel Engineering Center 10:30-12:00 p.m.	Luncheon NAMRI/SME Awards Luncheon Pauley Ballroom, ASUC 12-1:30 p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-5:00 p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Tour Laboratory Tours 3:30-5:00 p.m.	NAMRI/SME Member Meeting Bechtel Engineering Center 3:30-4:30 p. m.	
	Registration & Breakfast Bechtel Engineering Center 7:30-8:30 a.m.	Concurrent Sessions Bechtel Engineering Center 8:30-12:00 noon.	Concurrent Sessions Bechtel Engineering Center 12:00-1:30 p.m.	Luncheon BBQ Faculty Club 12:00-1:30 p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Conference Adjournment	NAMRI/SME Working Group Meetings Bechtel Engineering Center 12:00-1:30 p.m.	
Thursday May 27	Registration & Breakfast Bechtel Engineering Center 7:30-8:30 a.m.	Concurrent Sessions Bechtel Engineering Center 8:30-12:00 noon.	Concurrent Sessions Bechtel Engineering Center 12:00-1:30 p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Conference Adjournment	NAMRI/SME Working Group Meetings Bechtel Engineering Center 12:00-1:30 p.m.	NAMRI/SME Member Meeting Bechtel Engineering Center 3:30-4:30 p. m.	
Friday May 28	Registration & Breakfast Bechtel Engineering Center 7:30-8:30 a.m.	Concurrent Sessions Bechtel Engineering Center 8:30 a.m.-12:00 noon	Concurrent Sessions Bechtel Engineering Center 12:00-1:30 p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Concurrent Sessions Bechtel Engineering Center 1:30-3:00p.m.	Conference Adjournment	NAMRI/SME Working Group Meetings Bechtel Engineering Center 12:00-1:30 p.m.	NAMRI/SME Member Meeting Bechtel Engineering Center 3:30-4:30 p. m.	

Conference Site

Situated between the East Bay foothills and the San Francisco Bay, the City of Berkeley, with a population of 105,000, enjoys a mild, year-round climate, perfect for outdoor activities. UC Berkeley is located on a lush 1,232 acre plot in the eastern sector of the city.

The hills surrounding the University present challenging hiking trails and stunning views, while the Berkeley Marina is a favorite for recreational boating, fishing, and kite flying. Neighborhood and regional parks such as the Rose Garden, Indian Rock, Tilden, and Cesar Chavez Park at the Waterfront, provide a wide range of recreation for individuals and families. A system of creeks runs through Berkeley, including Strawberry Creek, which meanders its way across the Berkeley campus.

The Department of Mechanical Engineering was established when the University of California was founded in 1868. The Department, first called the College of Mechanics, was one of the five original colleges at Berkeley. Starting with five faculty and an entering class of two students in 1873, the Department has grown to 44 regular faculty, 500 undergraduate students and 275 graduate students.

The Department graduates about 1% of the nation's BS degrees in mechanical engineering, about 5% of the MS degrees and 8% of the PhD degrees.

Facilities

Several facilities have been chosen for NAMRC XXVII. The Bancroft Hotel will be the site for the Tuesday Evening Registration and Welcoming Reception. All conference technical sessions will be held in the Bechtel Engineering Center, located on campus.

Sponsorship

The NAMRC XXVII Organizing Committee thanks the College of Engineering at UC Berkeley and the Mechanical Engineering industrial affiliates for their sponsorship supporting this conference.

Special Activities

NAMRC special activities begin with the Welcoming Reception on the evening of Tuesday, May 25 at the Bancroft Hotel. The hotel is located at 2680 Bancroft Way in Berkeley.

On Wednesday, May 26, the Annual NAMRC Banquet will feature an elegant dinner cruise.

The Thursday evening wine and cheese reception on May 27 will take place in the home of Professor Paul Wright. The reception is after the NAMRI/SME membership and ASME MED meetings that will be held in Sibley Auditorium in the Bechtel Engineering Center.

Laboratory Tours: Thursday, May 27, from 3:30-5:00 p.m.

The tours will highlight three laboratories in the facilities of the Mechanical Engineering Research areas. The tour of the Precision Machining Laboratory will focus on metals and hard materials processing, metrology, and machine tool design and control. The tour of the Integrated Manufacturing Laboratory will focus on the Cybercut project. The lab has focused on a new generation CAD/CAM system that is improving rapid prototyping systems for electro-mechanical components. The tour of the Non-conventional Manufacturing Laboratory will focus on the development of new materials and methods.

Publications

All papers presented at NAMRC XXVII will be contained in either the hard bound *Transactions of the North American Manufacturing Research Institution of SME*, Volume 27, 1999 or the soft cover *Technical Papers of the North American Manufacturing Research Institution of SME*, Volume 27, 1999. Participants who have paid the registration fee will receive copies of each at the time of registration. Additional copies of the publications may be purchased after May 25. Contact the SME Customer Service at (313) 271-1500 ext. 1600 or 1-800-733-4763.

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Additional Information

Vegetarian meals will be provided at each meal for those who request it. Please indicate your dietary requirements on the registration form. Also, those who require accommodations for disabilities should inform the University of California, Berkeley through the registration form.

Registration Fees

Registration fees for the full conference are \$350 (U.S. Funds) for registrations postmarked or faxed (with credit card information) on or before May 3, 1999, and \$400 after that date. The student/retiree registration is \$120, and the guest registration fee is \$135. All registration fees except the guest registration fees include all NAMRC meals and conference publications. Included in the guest registration fees are conference breakfasts, the conference banquet, and two receptions. There are no reduced registration fees for authors or session chairs.

Cancellation Policy

If you need to cancel your conference registration, you must notify the University of California, Berkeley at least ten (10) business days prior to the program's start date to receive a refund (less a \$50 administration fee). Please allow three weeks to receive a refund. Substitutions are permitted at any time. Please note that "no shows" do not receive refunds. No refunds will be given after the start of the conference.

Guest Program

San Francisco Highlights

The forty-nine square miles of San Francisco are a colorful tapestry of steep hills, picturesque houses, clanging cable cars, fishing boats, summer fog, Chinese pagodas, international cafes, and breathtaking views: Five continents and two centuries blend together on forty-three hills, waiting to be discovered. You'll tour some of the legendary landmarks of "Everybody's Favorite City."

Berkeley Walking Tour

The campus is an urban oasis that preserves much of the tranquil beauty of California's early years. The wooded 178-acre central campus area is known for its architectural and historical landmarks as well as the scenic passage of Strawberry Creek traversing the campus from end to end.

Please visit the NAMRC XXVII homepage at www.berkeley.edu/unex/eng/namrc for more information and up to the minute updates.

Travel

From Northbound Highway 101 (San Francisco/Daly City)

- Follow 101 North and then switch to 80 East, San Francisco/Oakland Bay Bridge
- After the Bay Bridge, Exit to I-80 East (Berkeley/Sacramento)
- Exit on University Avenue
- Continue East on University Avenue for approximately 1.5 miles to Oxford Street

From Westbound Highway 24 (Contra Costa County)

- Take 24 through the Caldecott Tunnel to Highway 13 Berkeley exit
- Continue on 13, Hwy 13 becomes Ashby Avenue near the Claremont Hotel
- Turn right at Shattuck Avenue
- Turn right at University Avenue and continue east one block to Oxford Street.

From Westbound Highway 13

- Highway 13 becomes Tunnel Road
- Continue on Tunnel Road. Tunnel Road becomes Ashby Avenue near the Claremont Hotel
- Turn right at Shattuck Avenue
- Turn right at University Avenue and continue east one block to Oxford Street.

From I-80 East or West

- Exit University Avenue
- Continue east on University Avenue for approximately 1.5 miles to Oxford Street

From Westbound I-580

- Exit I-80 East (to Berkeley, Sacramento)
- Exit at University Avenue
- Continue east on University Avenue for approximately 1.5 miles to Oxford Street

From North I-880 (San Jose; Hayward; Oakland Airport)

- Exit to 980
- Exit 580 West (to San Francisco)
- Exit 80 East (to Berkeley)
- Exit at University Avenue
- Continue East on University Avenue for approximately 1.5 mile to Oxford

Visa & Health Insurance

All international participants are requested to make arrangements for their U.S. Visa and health insurance.

Parking

On-campus parking is very limited and driving to the conference session is discouraged. Some conference hotels offer parking, and are a short walk to campus.

Lodging

Both the Bancroft Hotel and the Hotel Durant have been selected as primary lodging sites for the conference. Both are only a short walking distance to the UC Berkeley campus.

Bancroft Hotel

2680 Bancroft Way
Berkeley, CA 94704
Phone: (510) 549-1000
Fax: (510) 549-1070
Single/Double Occupancy: \$89.00
Deadline: April 15, 1999
Code: Request the UC Berkeley
NAMRC rate
Parking: \$6.00

Hotel Durant

2600 Durant Avenue
Berkeley, CA 94704
Phone: (510) 845-8981
Fax: (510) 486-0916
Single Occupancy: \$99.00
Double Occupancy: \$110.00
Deadline: April 23, 1999
Code: UC Berkeley NAMRC rate
Parking: \$5.00 per day

Hotel Shattuck

2086 Allston Way (at Shattuck)
Berkeley, CA 94704
Phone: (510) 845-7300
Fax: (510) 644-2088
Single occupancy: \$90.00
Double occupancy: \$100.00
Code: UC Berkeley NAMRC rate
Parking: Not available

(2 miles from campus)

Berkeley Radisson

200 Marina Blvd.
Berkeley, CA 94710
Phone: (888) 333-3333 or
(510) 548-7920
Fax: (510) 644-0846
Single/Double occupancy: \$135.00
Deadline: May 2, 1999
Code: UC Berkeley NAMRC rate
Parking: No Charge

Oakland Marriott

1001 Broadway
Oakland, CA
Phone: (510) 451-4000
Fax: (510) 839-0677
Single Occupancy: \$99.00
Double Occupancy: \$140.00
Deadline: May 4, 1999
Code: UC Berkeley NAMRC rate
Parking: \$12.00 per day

For conference participants who prefer resort and spa luxury accommodations (perhaps for a long weekend stay) we recommend:

Claremont Resort Hotel & Tennis Club

41 Tunnel Road
Oakland, CA 94705
(510) 843-3000
Rates: \$195

Weather

The weather in the Bay Area can be very unpredictable. Participants should plan to bring a windbreaker or jacket for the evening and appropriate clothing for the possibility of rain.

To Register

Register by mail or fax:

Complete the registration form at the back of this brochure and mail or fax it with payment to:

Department B

University of California Extension
1995 University Avenue
Berkeley, CA 94720
(510) 642-6027 (fax)

Register On-line:

See our home page at www.berkeley.edu/unex/eng/namrc

Additional Information

For more information on registration, please contact
Continuing Education in Engineering
UC Berkeley Extension
(510) 642-4151
(510) 642-6027 (fax)

NAMRC XXVII Technical Sessions and Programs

Wednesday, May 26, 1999

8:30-10:00

Welcoming Ceremony: Sibley Auditorium, Bechtel Engineering Center

Keynote Address: Dr. Koichi Nishimura, Chairman, President,
and CEO of The Solectron Corporation

10:00-10:30 a.m.

Coffee and Refreshment Break

10:30-12:00

Concurrent Sessions

Session 1-A: Forming 1, Continuous Processes

Co-Chairs: Ken-ichiro Mori, Toyohashi University
J. Klaus Weinmann, Michigan Technological University

**Theoretical and Experimental Analysis Of Surface Quality During
Glass Lubricated Hot Extrusion Process** by A. Joshi, D. Damodaran and
R. Shivpuri, The Ohio State University

**A Comparison Between An Improved Upper Bound, A Modified Slab
and Finite Element Methods for Flow Analysis in Shaped Extrusion Dies**
by H. A. Ghulman, J. S. Gunasekera and B. V. Mehta, Ohio University

**Design and Analysis of Direct Cold Drawing of Section Rods Using
Semi-Analytical Finite Element Method** by K. L. Wang, The City College of
the City University of New York

Session 1-B: Process Planning 1, Agents

Co-Chairs: Phil Abramowitz, Ford Motor Company
Jami Shah, Arizona State University

**An Agent-Based Mechanism for Manufacturability Evaluation in the
Product Realization Process** by S. Kashyap, Lucent Technologies/Bell
Laboratories and W. R. DeVries, Iowa State University

Multi-Agent Process Planning for a Networked Machining Service
by D. Dornfeld, P. Wright, F-C. Wang, P. Sheng, J. Stori, V. Sundararajan,
N. Krishnan and C-H. Chu, University of California at Berkeley

MINNCAPP: An Explanatory Computer-Aided Process Planning System
by D. Liu and K. A. Stelson, University of Minnesota

Session 1-C: Machining 1, Fixtures

Co-Chairs: Ken Goldberg, University of California at Berkeley
Shreyes Melkote, Georgia Institute of Technology

**An Experimental Evaluation of Coefficients of Static Friction
of Aluminum Workpiece—Fixture Element Pairs** by W. Xie,
E. C. DeMeter and M. W. Trethewey, The Pennsylvania State University

**Study for Optimum Fixture Design Considering Flatness Error
Due to Moving Cutting Heat Source** by Y. Huang and T. Hoshi, Toyohashi
University of Technology

An Optimum Design Approach to Fixture Synthesis for 3D Workpieces by
M. Y. Wang, University of Maryland

12:00 Noon - 1:30 p.m.

NAMRI/SME Awards Luncheon, Pauley Ballroom, ASUC

1:30-3:00 p.m.

Concurrent Technical Sessions

Session 2-A: Forming 2, Sheet Forming

Co-Chairs: Jian Cao, Northwestern University
Kim Stelson, University of Minnesota

The Use of Active Drawbeads in the Forming of Non-Symmetric Aluminum Panels by R. Li, K. J. Weinmann and A. Chandra, Michigan Technological University

Optimal Blanking Die Design for Arbitrary Blanks by T. J. Nye, McMaster University

A New Approach to Predicting Forming Limits of Steel Sheet by S. Xu and K. J. Weinmann, Michigan Technological University

Session 2-B: Process Planning II, Machining Issues

Co-Chairs: Dick Devor, University of Illinois, Urbana-Champaign
Kevin Otto, Massachusetts Institute of Technology

Approximating Geometric Designs with Simple Material Removal Processes and CAD/CAM Tools by B. E. Allen, University of Minnesota

Estimation of Machining Time in High Speed Milling of Prismatic Parts by C. A. Rodriguez, Instituto Tecnológico y de Estudios Superiores de Monterrey; T. Harnau, Y. Wang, N. Akgerman and T. Altan, The Ohio State University

An Examination of Cutting Fluid Mist Formation in Turning by Y. Yue, K. L. Gunter, D. J. Michalek and J. W. Sutherland, Michigan Technological University

Session 2-C: Machining II, Tolerances

Co-Chairs: Jun Ni, University of Michigan
Jami Stori, University of Illinois, Urbana-Champaign

Part Warpage Model Based on Machining-Induced Residual Stress by J. K. Jacobus, R. E. DeVor and S. G. Kapoor, University of Illinois at Urbana-Champaign

Process Capability to Guide Tolerancing in Manufacturing Systems by R. Suri, C. Painter and K. N. Otto, Massachusetts Institute of Technology

Non-Linear Methods for Conicity Tolerance Verification by S. H. Chung and S. Raman, University of Oklahoma

3:00-3:30 p.m.

Coffee and Refreshment Break

3:30-5:00 p.m.

Concurrent Technical Sessions

Session 3-A: Forming III, Tooling Issues

Co-Chairs: Taylor Altan, The Ohio State University
Jay Gunasekera, Ohio University

Ejection of Central Liquid Metal in Slab During Solidification Using Sequential Forging with Specified Dies by K-I. Mori, Toyohashi University of Technology; M. Shiomi and K. Osakada, Osaka University

The Role of Tool Segments in Determining Failure Characteristics of Cross Wedge Rolling by Z. Deng, M. R. Lovell and K. A. Tagavi, University of Kentucky

Improving Ironing Performance Using Dies Subjected to Ultrasonic Radial Vibration by M. Murakawa, P. Kaewtatip and M. Jin, Nippon Institute of Technology

Session 3-B: Process Planning III, Integration Issues

Co-Chairs: Chi-Hung Shen, General Motors
Frank Wang, University of California at Berkeley

Automatic Scanning Process Planning using a Stripe Sensor by F. Funtowicz and E. Zussman, Technion-Israel Institute of Technology

A "GATO" Algorithm for the Setup Planning of Prismatic Parts by H-C. Zhang and E. Lin, Texas Tech University

Least Square Curve and Surface Localization for Shape Conformance Checking by J. Qu and R. Sarma, Iowa State University

Session 3-C: Machining III, Modeling

Co-Chairs: Abdul Bayoumi, North Carolina State University
Shiv Kapoor, University of Illinois, Urbana-Champaign

Modeling of Five-Axis End Mill Cutting Using Axially Discretized Tool Moves
by B. K. Fussell, J. G. Hemmett and R. B. Jerard, University of New Hampshire

Determination of Constant 3D Cutting Force Coefficients and of Runout Parameters in End Milling by W-S. Yun and D-W. Cho, Pohang University of Science and Technology; and K. Ehmann, Northwestern University

A Finite Element Analysis of Chip Formation in the Machining of Fiber Reinforced Plastics by D. Arola and M. B. Sultan, University of Maryland Baltimore County; and M. Ramulu, University of Washington

5:00-6:00 p.m.

Special Session on Assessment of Machining Models

Co-Chairs: Shounak Athavale, Ford Motor Company
Ming Leu, National Science Foundation

7:00-9:30 p.m.

Dinner Cruise

Thursday, May 27, 1999

7:30-8:30

Registration and Continental Breakfast

8:30-10:00 a.m.

Concurrent Technical Sessions

Session 4-A: Forming IV, Modeling

Co-Chairs: Goverdhan Lahoti, The Timken Corporation
Rajiv Shivpuri, The Ohio State University

Blank Design in Sheet Metal Forming by the Backward Tracing Scheme of the Finite Element Method by H-H. Choi, T-W. Ku, B-S. Kang and S-M. Hwang, Pusan National University

Numerical and Experimental Optimization of the Clinching Process
by R. Ippolito and L. Settineri, Politecnico di Torino; A. Barcellona, University of Palermo; and F. Micari, University of Calabria

Stress-Based Prediction for the Straight Side-Wall Wrinkling in Deep Drawing Processes by X. Wang and J. Cao, Northwestern University

Session 4B: Machining IV, Hole Making

Co-Chairs: Lienjing Chen, United Technologies Research Center
Kori Ehmann, Northwestern University

Analysis and Optimization of Drill Cross-Sectional Geometry by Y. R. Chen and J. Ni, The University of Michigan

On the Mechanistic Modeling of Milling Cutting Forces: Hole Making Using an End-Mill Cutter by M. K. Khraisheh, King Fahd University of Petroleum and Minerals; A. E. Bayoumi and S. Barnwal, University of South Carolina

Experimental Study of Burr Formation in Drilling of Intersecting Holes with Gun and Twist Drills by J. Kim and D. A. Dornfeld, University of California at Berkeley; and R. J. Furness, Ford Motor Company

*see also paper #3, Session 8-B

Session 4-C: Precision Manufacturing III, Turning

Co-Chairs: Paul Sheng, University of California at Berkeley
Eyal Zussman, Technion-Israel Institute of Technology

Test Method for Identification of Optimal Cutting Conditions in Turning
by R. Ludwig, S. Siems, R. Kluge, D. Bahre and G. Warnecke, University of Kaiserslautern

Effects of Cutting Fluid Type on the Dimensional Accuracy of Tapped Threads by T. Cao, S. A. Batzer, and J. W. Sutherland, Michigan Technological University

Analysis of No. 50 Taper Joint Stiffness Under Axial and Radial Loading
by D. M. Shamane and Y. C. Shin, Purdue University

10:30-12:00 p.m.

Concurrent Technical Sessions

Session 5-A: Non-Traditional Processing I, Welding

Co-Chairs: Elijah Kannatey-Asibu, University of Michigan
R. Allen Miller, The Ohio State University

Three-Dimensional Modeling of Gas Metal Arc Welding Process
by Y-J. Chao and X. Qi, University of South Carolina

On-Line Expulsion Detection and Estimation for Resistance Spot Welding
by W. Li, S. J. Hu and J. Ni, The University of Michigan

Session 5-B: Precision Manufacturing I, Surface Issues

Co-Chairs: Delcie Durham, National Science Foundation
Calvin King, Sandia National Laboratories

Influence of Material Microstructure on Tool Performance in High Speed Machining by J. Boehner, Fraunhofer Institute for Production Technology; M. Dumitrescu and M. A. Elbestawi, McMaster University; T. I. El-Wardany and L. Chen, United Technologies Research Center

The Effect of Tool Edge Geometry on Workpiece Sub-Surface Deformation and Through-Thickness Residual Stresses for Hard-Turning of AISI 52100 Steel by J. D. Thiele and S. N. Melkote, Georgia Institute of Technology

Depth of Damage Induced in Ceramics by the Grinding Process
by J. E. Mayer, Jr., G-P. Fang, G. K. Purushothaman and B. Subramanian, Texas A & M University

Session 5-C: Sensors I, Real-Time Monitoring

Co-Chairs: Steven Liang, Georgia Institute of Technology
Yoichi Nakao, Kanagawa University

Internet-Based Real Time Remote Monitoring System for Machining Processes by A. Kapoor, Cerner Corporation; K. P. Rajurkar, R. E. Williams and R. R. Bishu, University of Nebraska-Lincoln

A Fiber-Optic Based Sensor Probe for Surface Roughness Measurement
by J. Liu, K. Yamazaki and Y. Zhou, University of California at Davis;
K. Tezuka, Mitutoyo Corporation

Neural Network Based Sensor Fusion for On-line Prediction of Delamination and Surface Roughness in Drilling AS4/PEEK Composites
by U. E. Enemuoh and A. S. El-Gizaway, University of Missouri-Columbia; and C. A. Okafor, University of Missouri-Rolla

12:00 Noon - 1:30 p.m.

BBQ Lunch at the Faculty Club

1:30-3:00 p.m.

Concurrent Technical Sessions

Session 6-A: Non-Traditional Processing II, Casting and EDM/ECM

Co-Chairs: Kamlakar Rajurkar, University of Nebraska at Lincoln
Ralph Resnick, Extrude Hone Corporation

Rotary Electrodischarge Machining of Polycrystalline Diamond
by S. Shrivastava, K. P. Rajurkar and W. S. Zhao, University of Nebraska-Lincoln

Pulsed ECM: Effect of Process Parameters on Surface Finish and Mechanical Fatigue Life of H-13 Tool Steel by B. W. Lilly, J. R. Brevick and Q. Shi, The Ohio State University

On the Manufacturing Complexity of Die-Cast Components
by M. El-Mehalawi and R. A. Miller, The Ohio State University

Session 6-B: Precision Manufacturing II, Grinding

Co-Chairs: Adrienne Lavine, University of California at Los Angeles
John Mayer, Texas A&M University

Rounding and Lobe Formation During Superfinishing by B. Varghese and S. Malkin, University of Massachusetts

Improvement of Workpiece Quality of Ceramic Engine Valves by Kinematic Simulation of the Valve Grinding Operation by U. Zitt, O. Braun and G. Warnecke, University of Kaiserslautern

Single Point Cutting of Machinable Glass Ceramics by G. Zhang, Y. Cao and L. Qi, University of Maryland at College Park

Session 6-C: Sensors II, Tool Wear

Co-Chairs: Bruce Kramer, University of California at Berkeley
Shivakumar Raman, University of Oklahoma

Worn Tool Forces Based on Ploughing Stresses by D. J. Waldorf, S. G. Kapoor and R. E. DeVor, University of Illinois at Urbana-Champaign

Using Multivariate Models to Monitor End-Mill Wear and Predict Tool Failure by J. T. Roth, Arkansas State University; and S. M. Pandit, Michigan Technological University

On-Line Tool Wear Compensation System in Milling Operation by T. Matsumura and E. Usui, Tokyo Denki University

3:00-3:30 p.m.
Coffee and Refreshment Break

3:30-4:30 p.m.
NAMRI/SME Member Meeting

4:30-5:30 p.m.
ASME MED Meeting

3:30-5:00 p.m.
Concurrent Laboratory Tours

6:30-9:30 p.m.
Wine and Cheese Reception in the home of Professor Paul Wright

Transportation to and from the reception will be provided. Buses will depart from UC Berkeley campus at 5:45 p.m. and again at 6:30 p.m.

Friday, May 28, 1999

7:30-8:30 a.m.
Registration and Continental Breakfast

8:30-10:00 a.m.
Concurrent Technical Sessions

Session 7-A: Control I, Applications

Co-Chairs: Gloria Wiens, University of Florida
Kazuo Yamazaki, University of California at Davis

Synthesis of a Geometric Adaptive Straightness Control System for Shaft Straightening by S-C. Kim and S-C. Chung, Hanyang University

Intelligent Control for Drilling of Carbon Fiber-Reinforced Laminates by M. Ozaki, M. Tomizuka, C. K. H. Dharan, M-S. Won and Y. Sheng, University of California at Berkeley

Stability Analysis of Chatter on a Tandem Rolling Mill by P-H. Hu and K. F. Ehmann, Northwestern University

Session 7-B: Inspection and Quality II, Integration Issues

Co-Chairs: Barry Fussell, University of New Hampshire
Robert Hillaire, Sandia National Laboratories

Autonomous Measurement of Physical Model Shape for Reverse Engineering by H. Aoyama and Y. Suzuki, Keio University

Design and Analysis of 2 1/2 Dimensional Measurement and Inspection System on the Machine Tool by K-D. Kim and S-C. Chung, Hanyang University

Full-Field Temperature and Three-Dimensional Displacement Measurements in Hostile Environments by H. W. Schreier, M. A. Sutton and Y. J. Chao, University of South Carolina; H. A. Bruck, University of Maryland; and J. Dydo, Edison Welding Institute

Session 7-C: Forming V, Modeling

Co-Chairs: Alan Male, University of Kentucky
Bill Wilson, University of Washington

Cooling Effects in Laser Forming by T. D. Hennige, Institute of Manufacturing Technology; and M. Geiger, University of Erlangen-Nuremberg

A Microstructure Dependent Flow Stress Model by P. M. Pauskar and R. Shivpuri, The Ohio State University

Computer Models for Die Casting Shot Sleeve Simulations by Q. Shi and J. R. Brevick, The Ohio State University

10:30-12:00 noon
Concurrent Sessions

Session 8-A: Inspection & Quality I: CMM

Co-Chairs: Debbie Krulewich, Lawrence Livermore National Laboratory
Tom Kurfess, Georgia Institute of Technology

Data Reduction for Computational Analysis of 3D Coordinate Measurement Data by A. A. Claudet and T. R. Kurfess, Georgia Institute of Technology

Real-Time Inspection Strategy for Dimensional Accuracy of Sculptured Surfaces in Coordinate Measuring Machine by J. H. Cho, Sam Sung Electro-Mechanics; J. A. Rice, Marquette University; and K. Kim, University of Illinois at Chicago

An Integrated Framework for Coordinate Measuring Machine (CMM)-Based Inspections of Flatness Tolerances by A. Sun and S. Anand, University of Cincinnati; and J. Tang, Cummins Engine Company, Inc.

Session 8-B: Data Structures: CAM Integration

Co-Chairs: Sung-Hoon Ahn, University of California at Berkeley
Ed DeMeter, Pennsylvania State University

Development of a CAM System Based on Boundary-Map Data Structure by M. Fujio and H. Yagishita, Numazu College of Technology; and H. Suzuki, Kyushu Institute of Technology

Optimal Tool Path Generation of Rough Cutting for Sculptured Surfaces Based on Path Patterns by Y. J. Chon, Bestar Corporation; J. A. Rice, Marquette University; and K. Kim, University of Illinois at Chicago

Small Hole Tapping of Difficult-to-Cut Materials by Means of Step Vibration Cutting by M. Jin, K. Ogasawara and M. Murakawa, Nippon Institute of Technology

8-C: Machines I: Performance

Co-Chairs: Jong-I Mou, Arizona State University
Masayoshi Tomizuka, University of California at Berkeley

Issues in Rapid Prototyping Metrology by T. Tucker and T. Kurfess, Georgia Institute of Technology

Workspace Analysis of a New Parallel Manipulator by M. Zaidie Abdul Majid, Z. Huang and Y. L. Yao, Columbia University

Dynamic Performance of Parallel Kinematic Machines by G. J. Wiens, University of Florida; and P. R. Johnston, Boeing Commercial Airplane Group

12:00 noon - 1:30 p.m:
NAMRI/SME Working Group Meetings

1:30 p.m:
Conference Adjournment

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