

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

Twenty-Fifth North American Manufacturing Research Conference

**NAMRC XXV
May 21-23, 1997**



University of
Nebraska
Lincoln

Hosted by the University of Nebraska-Lincoln



Society of
Manufacturing
Engineers

NAMRI 

Sponsored by the North American Manufacturing Research
Institution of the Society of Manufacturing Engineers



Dear Friends,

The University of Nebraska-Lincoln is pleased to host the Twenty-Fifth North American Manufacturing Research Conference (NAMRC). The conference continues the spirit and purpose of the conferences organized since 1973. 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 eighty-five papers will be presented at the conference from universities, research institutes and industrial research laboratories from 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 Wednesday, May 21, with a presentation by Professor Klaus J. Weinmann, who will present a brief history of NAMRC and its future. Professor Serope Kalpakjian will give the now-traditional Founder's Lecture during the Wednesday luncheon.

We want to extend a special invitation to attend the conference to our colleagues from industry. Your input is a valuable and necessary component to the dialogue that takes place at NAMRC. Be assured that we will strive to provide a warm welcome and a productive environment.

We look forward to meeting old and making new friends at NAMRC XXV, and invite you to do the same. We believe that you will both enjoy and benefit from the experience.

Cordially,

Raju *Bob*

K.P. Rajurkar and R.E. Williams
Co-Chairs
NAMRC XXV 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 material forming, material removal and 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 XXV 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 provide manufacturing professionals with a means to exchange ideas and share findings with leading researchers in the field of manufacturing.

NAMRI/SME is administered through the Society of Manufacturing Engineers, an international professional society dedicated to serving its members and the manufacturing community through the advancement of professionalism, knowledge and learning.

PROGRAM-AT-A-GLANCE

	Morning					Afternoon			Evening
	7:30 - 8:30	8:30 - 10:00	10:00 - 10:30	10:30 - 12:00	12:00 - 1:30	1:30 - 3:00	3:00 - 3:30	3:30 - 5:00	
Tuesday May 20									Registration and Welcoming Reception Burnham Yates Conference Center Cornhusker Hotel 5:00 - 9:00
Wednesday May 21	Registration and Continental Breakfast Burnham Yates Conference Center	Opening Ceremony and Remarks Burnham Yates Conference Center	Break Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Luncheon Founder's Lecture Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Break Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Conference Banquet Lincoln Station Great Hall Historic Haymarket Area 6:30 - 9:30
Thursday May 22	Registration and Continental Breakfast Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Break Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	NAMRI/SME Awards Luncheon Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Break Burnham Yates Conference Center	Laboratory Tours: University of Nebraska- Lincoln	Wine and Cheese Reception Sheldon Memorial Art Gallery UNL Campus 5:00 - 6:30 NAMRI/SME Membership Meeting 6:30 - 7:30 ASME MED Meeting 7:30 - 8:30 Auditorium Sheldon Memorial Art Gallery UNL Campus
Friday May 23	Registration and Continental Breakfast Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Break Burnham Yates Conference Center	Concurrent Sessions Burnham Yates Conference Center	Conference Adjournment				

Conference Site

Nebraska's Capital city, Lincoln, will be the site of NAMRC XXV. Centrally located in the heartlands fifty miles west of Omaha on Interstate 80, Lincoln recently was ranked by Money Magazine as tenth on their list of most desirable cities in which to live. This came as no surprise to Lincoln's 200,000 residents, who recognize what Lincoln has to offer. With the Lied Center for the Performing Arts, which brings internationally renowned artists, musicians, productions and touring troupes to the state, and Lincoln's sixty-seven city parks, nine golf courses, children's zoo, botanical gardens, nature centers and seven lakes surrounding the city, Lincoln truly does offer "Nebraska — the Good Life."

The University of Nebraska-Lincoln, acclaimed academically as well as athletically, draws its 24,000 students from within Nebraska, from every state in the union, and from some 90 countries. The University's College of Engineering and Technology, and its Department of Industrial and Management Systems Engineering are proud to be hosting NAMRC XXV.

Nebraska's Grand Hotel, The Cornhusker, has been selected as the site of the concurrent sessions as well as the primary lodging site for NAMRC XXV. Located in downtown Lincoln and just a few minutes from the UNL campus, The Cornhusker is a AAA Four Diamond hotel. Additional lodging has been arranged at the nearby Ramada Hotel, a full-service hotel in downtown Lincoln, and at the Quality Inn located near the Lincoln Municipal Airport. Additional lodging will be available at reasonable rates throughout Lincoln.

Special Activities

The annual conference banquet will be held on the evening of Wednesday, May 21, at the Lincoln Station Great Hall in Lincoln's Historic Haymarket Area. This landmark downtown business district, within walking distance from The Cornhusker and The Ramada, contains restaurants, antique shops, nightspots and art galleries.

The Sheldon Memorial Art Gallery and Sculpture Garden on the UNL campus will be the site of the Thursday evening wine and cheese reception preceding the NAMRI/SME membership and ASME MED meetings. The Sheldon houses one of the nation's finest collections of twentieth century American art, including paintings, sculpture, graphics, photography and decorative arts.

NAMRC XXV — May 21-23, 1997

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Publications

All the papers to be presented at NAMRC XXV will be contained in either the hard bound "Transactions of the North American Manufacturing Research Institution of SME, Volume 25, 1997" or in the soft cover "Technical Papers of the North American Manufacturing Research Institution of SME - 1997." 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 at registration for \$75 and \$40 respectively. After the conference, they may be purchased through SME Customer Service at 1-800-733-4763.

Facilities

The Program Sessions will be held in The Cornhusker Hotel's Burnham Yates Conference Center. The adjacent Cornhusker Hotel is also the primary lodging site for the conference.

Additional Information

Vegetarian meals will be provided at each meal for those who request it. We ask that you indicate this preference on the registration form.

Registration Fees

Registration fees for the full conference are \$300 for registrations postmarked or faxed (with credit card information) on or before May 10, 1997, and \$360 after that date. The one day registration fee is \$200, the student/retiree registration is \$100, and the **guest registration fee is \$80. 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 registrations for authors or sessions chairs. Fees are refundable for cancellations received up to five working days prior to the start of the conference. Cancellations after this date, but prior to the start of the conference, will be assessed a \$50 cancellation charge. No refunds will be given after the start of the conference.

Guest Program

A non-technical program will be provided on Wednesday, May 21 and Thursday, May 22 for visiting spouses, guests and others who do not wish to attend the technical sessions. The program will include visits to such places as the world renowned Henry Doorly Zoo, Lied Jungle and Walter Scott Aquarium and the Eugene T. Mahoney State Park between Omaha and Lincoln, and other local attractions. The guest registration fee of \$80 includes conference breakfasts, the conference banquet, the welcoming reception and the wine and cheese reception. Additional expenses such as admission fees and lunches on the outings will vary depending on the activities and the number of participants, and will be charged to the participant accordingly.

Travel

Lincoln is located on Interstate 80. Lincoln Municipal Airport is served by United Airlines, TWA, Northwest Airlink and US Air Express. The airport is about a ten minute drive from downtown Lincoln and the UNL campus. Eppley Airfield in Omaha (approximately 50 miles from Lincoln on Interstate 80) is served by all major airlines with commercial shuttle service available approximately three times per day between Omaha and Lincoln from airport to airport. The cost of the shuttle is \$18 each way. Reservations are required and should be made as soon as possible but no later than 48 hours in advance to assure a place on the shuttle. For shuttle reservations call 1-800-888-9793, or 308-234-6066.

Visa & Health Insurance

All International participants are requested to make arrangements for their U.S. **Visa & health insurance.**

Parking

Guest parking will be available in the covered parking structures adjoining both The Cornhusker Hotel and the Ramada Hotel, and in the surface lots adjacent to the Quality Inn. Daily parking charges will vary from hotel to hotel.

Lodging

Special conference arrangements have been made at the hotels or motels listed below. Please make your reservations by calling the hotel or motel of your choice. All guest room rates are subject to the current state and local taxes. Any reservations made after the deadlines indicated will be subject to guest room and rate availability. Please mention NAMRC when making your reservations. Courtesy shuttle service is available upon request from the airport to each of the three hotels listed below. We strongly suggest that you make lodging and courtesy shuttle reservations early!

The Cornhusker Hotel (Conference site)

Nebraska's Grand Hotel
333 South 13th Street
Lincoln, NE 68508
402-474-7474
FAX 402-474-6006
1-800-793-7474

Single occupancy: \$82.00
Double occupancy: \$92.00
Deadline: May 5, 1997

Ramada Hotel (About 7 blocks from Conference site)

141 North 9th Street
Lincoln, NE 68508-1381
402-475-4011
FAX 402-475-9011

1-800-432-0002
Single occupancy: \$58.00
Double occupancy: \$63.00
Deadline: May 5, 1997

***Quality Inn, Lincoln Airport** (About 5 miles from Conference site)

I-80 at Airport
1101 West Bond Street
Lincoln, NE 68521
402-475-4971
FAX 402-475-0606

Please mention guest number
#4024723495
Single or Double occupancy: \$35.00
Deadline: May 5, 1997

Additional lodging is available at reasonable rates throughout Lincoln. Shuttle service will not be provided by the conference to and from these accommodations, however. For information about additional lodging nearby please contact the Lincoln Convention and Visitors' Bureau Lodging Line at 402-434-5334, available 24 hours a day. For additional information about Lincoln please call the Lincoln Convention and Visitors' Bureau toll-free at 1-800-423-8212.

* Limited shuttle service between the Quality Inn and the conference activities will be provided

Weather

Spring in Lincoln is somewhat unpredictable, although warm weather during the day is likely. Participants should plan to bring a windbreaker or jacket for the evenings and appropriate clothing for the possibility of rain. Overall, the weather should offer a nice opportunity for evening activities and excursions. Lincoln is in the Central Time Zone.

To Register

Complete the registration form at the back of this brochure. Include the proper fees, and mail or Fax to:

Becky Fasnacht-Pugsley
NAMRC XXV
175 Nebraska Hall
University of Nebraska-Lincoln
Lincoln, NE 68588-0518
USA

Phone: 402-472-3496
FAX 402-472-2410
fasnacht@unlinfo.unl.edu

NAMRC XXV Technical Sessions and Program

Tuesday, May 20

5:00 - 9:00 p.m.

Conference Registration: The Cornhusker Hotel's Burnham Yates Conference Center

5:00 - 9:00 p.m.

Reception: The Cornhusker Hotel's Burnham Yates Conference Center

Wednesday, May 21

7:30 - 8:30 a.m.

Registration and Continental Breakfast: Burnham Yates Conference Center

8:30 - 10:00 a.m.

Opening Ceremony: Burnham Yates Conference Center

Opening Remarks:

K.P. Rajurkar, Co-Chair of Organizing Committee
R.E. Williams, Co-Chair of Organizing Committee

Welcoming Remarks:

E. Benjamin Nelson, Governor of the State of Nebraska, Invited
James C. Moeser, Chancellor, University of Nebraska-Lincoln
James L. Hendrix, Dean, College of Engineering and Technology

Introductory Remarks:

Warren R. DeVries, NAMRI/SME President
Alan T. Male, SME President

Keynote Address:

"25 Years of NAMRC and Beyond"
Klaus J. Weinmann, Michigan Technological University

10:00 - 10:30 a.m.

Coffee Break: Burnham Yates Conference Center

10:30 a.m. - 12:00 noon

Three Concurrent Technical Sessions: Burnham Yates Conference Center (specific rooms will be listed on the Reader Display Boards throughout the Hotel and Conference Center)

A1: Forming - I

Co-Chairs **D. Durham**, University of Vermont
K. Ehmann, Northwestern University

Determination of Roll Speed in Twin Roll Strip Casting Using Finite Element Simulation and Model Experiment, K. Mori, M. Shiomi and K. Osakada, Osaka University, Japan

Model for Rotational Molding of Thermoplastics, G. Gogos, L. Olson, X. Liu and V.R. Pasham, University of Nebraska-Lincoln

Study of Stress Development in Axi-Symmetric Products Processed by Radial Forging Using 3-D Nonlinear FEM, J.H. Liou and D.Y. Jang, University of Missouri-Columbia

B1: Cutting - I

Co-Chairs **B. Rogers**, ISCO Inc.
W. Endres, University of Michigan

Predicting Optimum Cutting Conditions for Turning Operations at Varying Tool-Wear States, Z.J. Da, J.P. Sadler and I.S. Jawahir, University of Kentucky

Basic Characteristics on Cutting Effects in Correlation to Dynamic Effects, D. Bahre, M. Muller and G. Warnecke, University of Kaiserslautern, Germany

Finish Hard Turning of Powder Metallurgy M50 Steel, Y.K. Chou and C.J. Evans, National Institute of Standards and Technology

C1: Flexible Manufacturing Systems

Co-Chairs **J. Gerdeen**, University of Colorado, Denver
J. Ni, Michigan

An Integrated Approach to Simulation and Activity-Based Costing for Evaluating Alternative Manufacturing Cell Designs, R.E. Williams, P.A. Savory and R.R. Rasmussen, University of Nebraska-Lincoln

An Efficient Part Launching Heuristic for Intelligent Control of Flexible Manufacturing Systems, C.S. Shukla, Boston Scientific Corporation and F.F. Chen, University of Toledo

A Procedure for Identifying Exceptional Parts and/or Bottleneck Machine for a CMS Design, F. Choobineh and S. Thangamuthu, University of Nebraska-Lincoln

12:00 noon - 1:30 p.m. Lunch: Burnham Yates Conference Center

Founder's Lecture
"NAMRC I to NAMRC XXV: Reflections of a Founding Member"
Serope Kalpakjian
Illinois Institute of Technology

1:30 - 3:00 p.m.

Three Concurrent Technical Sessions: Burnham Yates Conference Center

A2: Extrusion

Co-Chairs **G. Lahoti**, Timken Co.
G. Gogos, University of Nebraska-Lincoln

The Application of Sensitivity Analysis and Robust Design Concepts to Titanium Alloy Extrusion, D. Damodaran and R. Shivpuri, Ohio State University

An Improved Upper Bound Method for Flow Analysis in Converging Extrusion Dies, H.A. Ghulman, J.S. Gunasekera and B.V. Mehta, Ohio University

A Simple Numerical Model for Real Time Determination of Temperatures and Pressures During Glass Lubricated Hot Extrusion, D. Damodaran and R. Shivpuri, Ohio State University

B2: Cutting - II

Co-Chairs **T. Loveless**, Learjet Inc.
D. Lucca, Oklahoma State University

Chatter Suppression Through Time-Varying Feedrate in Cutting Process, F. Yang and J. Yu, Jilin University of Technology, China and B. Zhang, University of Connecticut

An Energy-Based Approach Towards Obtaining an Analytical Solution for Chatter Vibration Level, W.J. Endres, University of Michigan

Computer Simulation of Orthogonal Metal Cutting Process: Determination of Material Properties and Effects of Tool Geometry on Chip Flow, S. Kumar, Ingersoll Cutting Tool Co., P. Fallbohmer and T. Altan, Ohio State University

C2: Manufacturing Planning

Co-Chairs **V. Melton**, Lucent Technologies
P. Sheng, University of California at Berkeley

A Genetic Algorithm for the Non-convex Cutting Stock Problem, R. Sharma, T. Balachander, S. Anand, C. McCord and Q. Zhang, University of Cincinnati

Extension of Usable Workspace of Rotational Axes in Robot Planning, Z. Huang and Y.L. Yao, Columbia University

Droplet Transfer Control for Gas Metal Arc Welding, Y.M. Zhang, Liguó E., R. Kovacevic, University of Kentucky

3:00 - 3:30 p.m.

Coffee Break: Burnham Yates Conference Center

3:30 - 5:00 p.m.

Three Concurrent Technical Sessions: Burnham Yates Conference Center

A3: Forming - II

Co-Chairs **R. Resnick**, Extrude Hone Corporation
W. Wilson, Northwestern University

Transducer Placement and Force Sensing Resolution in the Fine Blanking Process, A. R. Sorgenfrei, Johnson Controls, Inc. and K.J. Weinmann, Michigan Technological University

Sheet Metal Forming Process Control Using An Active Drawbead, S. Hao, Seagate Technology, S. Ramalingam and B.E. Klamecki, University of Minnesota

Flexible Beam-Based Modeling of Sheet Metal Assembly for Dimensional Control, B.W. Shiu, D. Ceglarek and J. Shi, University of Michigan

A Sensing System for Real Time Control of the Sheet Metal Drawing Process, S.K. Kernosky and K.J. Weinmann, Michigan Technological University

B3: Cutting - III

Co-Chairs **S. Komaragiri**, Smith Tools
E. Salisbury, Iowa State University

Tool Wear Mechanism in Cutting of MMCs and Its Relationship with Percentage Reinforcement, X. Li and W.K.H. Seah, University of Singapore, Singapore

Tool Wear and Temperature Using PDC Cutters in Granite Turning, C. Wilson and I.D. Marinescu, Kansas State University

C3: Design

Co-Chairs **A. Talero**, Square D Company
E. DeMeter, Pennsylvania State University

Minimum Zone Cylindricity Evaluation Using Improved Nonlinear Optimization Method (NOM), E.A. Orady, S. Li and Y. Chen, University of Michigan-Dearborn

Feature Recognition Using Curvature Regions for Design-for-Manufacturability Analysis, R. Sonthi and R. Gadh, University of Wisconsin-Madison, and G. Kunjur, Oracle Corporation

Extraction of Boundary Lines between Free Form Surfaces for Construction of Computer Model, H. Aoyama and I. Inasaki, Keio University, Japan

6:30 - 9:30 p.m.

Conference Banquet: Lincoln Station Great Hall

Van transportation to and from the banquet will be provided from the Cornhusker Hotel. The Great Hall is only one block walking distance from the Ramada Hotel.

Speaker: Gary L. Kuck, President, Centurion International Inc.

Thursday, May 22

7:30 - 8:30 a.m.

Registration and Continental Breakfast: Burnham Yates Conference Center

8:30 - 10:00 a.m.

Four Concurrent Technical Sessions: Burnham Yates Conference Center

A4: Rolling

Co-Chairs **T. Altan**, Ohio State University
V. Chandrasekhran, Caterpillar

A Technique for Robust Design of Roll Passes for Consistent Rod Quality, K. Yoshimura, Nippon Steel Corporation, Japan, S.D. Kini and R. Shivpuri, Ohio State University

Pass Schedule Optimal Design in Hot Rolling by the Finite Element Method, S. M. Byon and S. M. Hwang, Pohang University of Science and Technology

An FEM Based Integrated Model for Simulation of Metal Flow and Microstructure Evolution in Hot Rolling, P.M. Pauskar and R. Shivpuri, Ohio State University, H. Cho, Hong Lk University, Korea, and N. Kim, Sogang University, Korea

B4: Grinding - I

Co-Chairs **J. Grant**, Ford Motor Company
A. Srivastava, Institute of Advanced Manufacturing Sciences

Multi-Resolution Simulation of Grinding Wheel Surface, Y. Wang and K. S. Moon, Michigan Technological University

Creep-Feed Grinding of Al_2O_3 and Si_3N_4 Under Widely Different Conditions, K. Li and T.W. Liao, Louisiana State University, G.P. Fang and J.E. Mayer, Jr., Texas A&M University, and K. Breder, Oak Ridge National Laboratory

Investigation of Material Removal Mode in Ceramics Grinding, L. Yin and I.D. Marinescu, Kansas State University, T. Matsuo, Kumamoto University, Japan and R. Chen, Huazhong University of Science and Technology, China

B5: Milling

Co-Chairs **D. Stevenson**, General Motors Corporation
S. Liang, Georgia Institute of Technology

A Model-based Approach for Detection of Process Faults in the Face Milling Process, S. Jayaram, Automated Analysis Corporation, S.G. Kapoor and R.E. DeVor, University of Illinois at Urbana-Champaign

Evaluation of Tool Temperature in Milling Operation with Identifying Thermal Characteristics, T. Matsumura and E. Usui, Tokyo Denki University, Japan

Detection of Tool Breakage in Micro-End Milling Operations by Monitoring Acoustic Emission, I.N. Tansel, M.E. Trujillo, W.Y. Bao, and T.T. Arkan, Florida International University

C4: Machine Tools

Co-Chairs **B. Kline**, Montronix, Inc.
M. Lamphere, General Electric Aircraft Engines

Design Basis and Implementation of an Open Architecture Machine Tool Controller, R.W. Teltz and M.A. Elbestawi, McMaster University

On Using Parallel Link Manipulators as Machine Tools, B.S. El-Khasawneh and P.M. Ferreira, University of Illinois at Urbana-Champaign

A Framework for a Virtual Machine Tool, K.F. Ehmann, Northwestern University, R.E. DeVor and S. Kapoor, University of Illinois at Urbana-Champaign, E.C. DeMeter, Pennsylvania State University, D. Dornfeld, University of California, Berkeley, J. Ni, University of Michigan, K.P. Rajurkar, University of Nebraska-Lincoln, Y. Shin, Purdue University and J.W. Sutherland, Michigan Technological University

10:00 - 10:30 a.m.

Coffee Break: Burnham Yates Conference Center

10:30 a.m. - 12:00 noon

Three Concurrent Technical Sessions: Burnham Yates Conference Center

B6: Grinding - II

Co-Chairs **M. Tricard**, Norton Company
B. Wei, General Electric

Surface Finish of Ground Ceramics, J.E. Mayer, Jr., G.P. Fang and B.M. Garcia, Texas A&M University

Investigations of the Process of Electrochemical Dressing of Grinding Wheels Using Alternating Current, A. Golabczak and A. Koziarski, Technical University of Lodz, Poland and J. Kozak, Technical University of Warsaw, Poland

An Experimental Approach to Process Optimization in Peripheral Electrochemical Grinding, A. Geddam, City University of Hong Kong

B7: Drilling

Co-Chairs **B. Walters**, Transcrypt International
T. Kurfess, Georgia Institute of Technology

The Behaviour of Static Torque and Thrust due to Tool Wear in Drilling, M.A. Mannan, National University of Singapore and T. Nilsson, Royal Institute of Technology, Sweden

Geometric Parameter Optimization for Optimum Stress in a Twist Drill Using F.E.M., D.O.E., and Genetic Algorithm, D.Y. Jang and C.H. Kuo, University of Missouri-Columbia

Evaluation of the Performance of Diamond Coated Tungsten Carbide Drills, S. Chatterjee, A.G. Edwards and C.S. Feigler, University of Tennessee

C5: Machine Tool Errors

Co-Chairs **S. Kapoor**, University of Illinois at Urbana-Champaign
S. Melkote, Georgia Institute of Technology

A Close-Loop Method for Reducing Total Machining Errors: Experiment and Analysis, S.H. Suh, J.W. Sohn and S.Y. Jung, POSTECH, Korea and E.S. Lee, Research Institute of Industrial Science and Technology, Korea

Prediction of Part Form Errors from Machine Tool Measurements: Experimental Summary, R.G. Wilhelm, N. Srinivasan, F. Farabaugh and R. Hocken, University of North Carolina at Charlotte

Kinematic Error Estimation and Transmission Error Bounding for Stewart Platform Based Machine Tools, H. Tajbakhsh and P.M. Ferreira, University of Illinois at Urbana-Champaign

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

NAMRI/SME Awards Luncheon: Burnham Yates Conference Center

1:30 - 3:00 p.m.

Four Concurrent Technical Sessions: Burnham Yates Conference Center

B8: Milling/Drilling

Co-Chairs **C.H. Shen**, General Motors Corporation
M. Maheshwari, Lockheed Martin

The Physics of End Milling: Comparisons Between Simulations (EMSIM) and New Experimental Results From Touch-Probed Features, M.E. Mueller, University of California, Berkeley, R.E. DeVor, University of Illinois at Urbana-Champaign and P.K. Wright, University of California, Berkeley

Filletted Endmill Placement Problems and Error Analysis for Multi-Axis CNC Machining, Y.S. Lee, North Carolina State University

Design and Analysis of Helical Drill Points, H.C. Chyan and K.F. Ehmman, Northwestern University

B9: Deburring/Surface Finishing

Co-Chairs **D. Dornfeld**, University of California, Berkeley
L. Gillespie, Allied Signal-Aerospace Co.

An Experimental Study of Burr Formation for Face Milling 356 Aluminum, S.D. Jones and R.J. Furness, Ford Research Laboratory

Surface Improvement by Vibratory Cascade Finishing Process, P.C. Brust, Southwest Research Institute

A Preliminary Study on Fluidised Bed Abrasive Polishing, R. Jaganathan and V. Radhakrishnan, Indian Institute of Technology

Characterization of Indentation Impressions on Human Enamel for Hardness Measurements, G. Zhang, D.T. Le and S.R. Tucker, University of Maryland and S.J. Ng, Naval Air Warfare Center

B10: Electromachining - I

Co-Chairs **D. Risko**, Extrude Hone Corporation
A. Guha, Brush Wellman

Electrochemical Machining of Hard Passive Alloys with Pulse Reverse Current, C.D. Zhou, E.J. Taylor, J.J. Sun, L. Gebhart, E.C. Stortz, and R. P. Renz, Faraday Technology, Inc.

The Effect of Pulsed Electrochemical Machining on the Fatigue Life of H-13 Steel, B. Lilly and J. Brevick, Ohio State University and C.S. Chen, Eaton Corporation

The Study of Thermal Limitation of Electrochemical Machining Process, J. Kozak and K. Lubkowski, Warsaw University of Technology, Poland

C6: Fixturing and Machine Tools

Co-Chairs **T. Dineen**, Wilkinson Manufacturing
J. Hu, University of Michigan

The Impact of Clamping on Gear Accuracy During Grinding, A. Venkataraman, S.B. Rao and E.C. DeMeter, Pennsylvania State University

Stiffness Modeling of a Stewart Platform Based Milling Machine, C. Clinton and G. Zhang, University of Maryland and A. Wavering, National Institute of Standards and Technology

Correct and Complete Algorithms for Geometric Analysis and Design of Modular Fixturing Setups, V.N. Rajan, S. Prabhakar and K. Dhananjaya, Wichita State University

Kinematic Constraint of Workpieces During Machining: A Feature Based Approach, S. Kashyap, Lucent Technologies/Bell Labs Innovations and W.R. DeVries, Iowa State University

3:00 - 3:30 p.m.

Coffee Break: Burnham Yates Conference Center

3:30 - 5:00 p.m.

Laboratory Tours: University of Nebraska-Lincoln

5:00 - 6:30 p.m.

Wine and Cheese Reception: The Sheldon Memorial Art Gallery, UNL Campus

6:30 - 7:30 p.m.

NAMRI/SME Membership Meeting: Auditorium, Sheldon Memorial Art Gallery

7:30 - 8:30 p.m.

ASME Manufacturing Engineering Division Meeting: Auditorium, Sheldon Memorial Art Gallery

Friday, May 23

7:30 - 8:30 a.m.

Registration and Continental Breakfast: Burnham Yates Conference Center

8:30 - 10:00 a.m.

Four Concurrent Technical Sessions: Burnham Yates Conference Center

B11: Laser MachiningCo-Chairs **M. Hashish**, Flow International Corporation
A. Malshe, University of Arkansas**Planning Model for Long-Pulsed Laser Drilling**, S. Wang and P. Sheng, University of California, Berkeley**Effect of Beam Mode and Oxygen Purity on CO₂ Laser Cutting of Thick Steel Plate**, R.A. Danforth and P.A. Molian, Iowa State University**An Experimental Study of On-Line Estimation of Striations in Laser Cutting Process**, P. Di Pietro, Di Pietro and Sons Engineering, Australia, Y.L. Yao and K. Chen, Columbia University**B12: Machining Systems - I**Co-Chairs **S. Raman**, University of Oklahoma
J. Twomey, Wichita State University**Dynamic Behavior of Structural Components in Machining Systems Under Operating Conditions**, Y.C. Shin, S.A. Jensen and B.R. Jorgensen, Purdue University**An On-Line Learning Model for Getting the Correlation Factors of Cutting Parameters**, L.G. Shen, Z.J. Han, J.Z. Huang, Tsinghua University, China and C.A. van Luttervelt, Delft University of Technology, Netherlands**Finite Element Modeling of Residual Stress Control on Machined Surface**, H. Sasahara, Tokyo University of Agriculture and Technology, T. Obikawa and T. Shirakashi, Tokyo Institute of Technology**C7: Metrology**Co-Chair **B. Perrin**, Sundstrand Aerospace
R. Wilhelm, University of North Carolina-Charlotte**Feasibility of Rough Surface Interferometry Using He-Ne Laser Source**, S.M. Pandit and A. M. Godbole, Michigan Technological University**Sampling Methods and Substitute Geometry Algorithms for Measuring Cylinders in a Coordinate Measuring Machine**, B. Uppliappan, J. Raja, R.J. Hocken and K. Chen, University of North Carolina at Charlotte**A Study on the Effect of Welding Parameters and Heat Input Rates on Titanium Weld's Grain Size**, W.K.C. Yung, Hong Kong Polytechnic University, B. Ralph and R. Fenn, Brunel University of West London**C8: Precision/Micromanufacturing**Co-Chairs **G. Wiens**, University of Florida
D. Fang, Iowa State University**Process Planning for Agent-Based Precision Manufacturing**, D.A. Dornfeld and P.K. Wright, University of California, Berkeley**Versatile Single-Step Fabrication of Submicron Structures**, B.W. Robertson, H. Jiang, I. Gobulukoglu and T.L. Benninger, University of Nebraska-Lincoln**An Architecture for Integrated Design and Manufacturing of Precision Mechanical Components**, J. Stein, Integrated Constructs, Inc. and D.A. Dornfeld, University of California, Berkeley

10:00 - 10:30 a.m.

Coffee Break: Burnham Yates Conference Center

10:30 a.m. - 12:00 noon

Three Concurrent Technical Sessions: Burnham Yates Conference Center

B13: Electromachining - II

Co-Chairs **L. Rhoades**, Extrude Hone Corporation
Z. Katz, Rand Afrikans University

Multiple Input Model for Monitoring Workpiece Height in WEDM, W.M. Wang and K.P. Rajurkar, University of Nebraska-Lincoln

An Appropriate Model for EDM Wire Vibrations and its Implications for Stability, K.D. Murphy, University of Nebraska-Lincoln

CNC Horizontal Conjugate EDM With Synchronous Rotation, J.Q. Xia, J.C. Liu, Y.F. Guo and Z.X. Jia, Harbin Institute of Technology, China and W.M. Wang, University of Nebraska-Lincoln

B14: Machining Systems - II

Co-Chairs **J.I. Mou**, Arizona State University
A. Bagchi, MTD Products, Inc.

Optimization of Internal Bolted-Joint Force Transducers for Machine Tool Monitoring, P.L. Erickson and M.L. Philpott, University of Illinois at Urbana-Champaign and W.A. Kline, Montronix Inc.

Acoustic Emission Investigation of Ceramic Lapping Process, I.D. Marinescu and R. Zeng, Kansas State University

Modeling Geometric Process Variables in Path Planning, N. Balasubramanian and S. Raman, University of Oklahoma

B15: Waste Stream

Co-Chairs **R. Reddy**, University of Alabama
B. Dvorak, University of Nebraska-Lincoln

Chip Morphology and Bending Moment Models for Orthogonal Machining with Flat Faced Tools, S.A. Batzer, J.W. Sutherland and W.W. Olson, Michigan Technological University

Uncertainty Effects in Process Planning for Environmentally Conscious Machining, M. Srinivasan and P. Sheng, University of California at Berkeley

CFEST: An Internet-Based Cutting Fluid Evaluation Software Testbed, J.W. Sutherland, T. Cao, C.M. Daniel, Y. Yue, Y. Zheng, Michigan Technological University, P. Sheng, D. Bauer and M. Srinivasan, University of California at Berkeley, R.E. DeVor, S.G. Kapoor and S. Skerlos, University of Illinois at Urbana-Champaign

12:00 noon

Conference Adjournment

Registration Form

NAMRC XXV
 University of Nebraska-Lincoln
 May 21-23, 1997



Please duplicate this form for additional registrations.

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Organization _____

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Do you prefer vegetarian meals yes _____ no _____. If you have other special dietary needs or require accommodation for a disability please call.

Full Registration postmarked or faxed on/or before May 10, 1997	\$300	_____
Full Registration after May 10, 1997	\$360	_____
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One-Day Registration (specify day) _____	\$200	_____
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All registration fees except guest registration fees include all NAMRC meals and conference publications.

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