The North American Manufacturing Research Institution of the Society of Manufacturing Engineers invites you to attend the Twenty-Sixth North American Manufacturing Research Conference

NAMRC XXVI
May 19-22, 1998

Photo by Gary Mose

(Sponsored by the Georgia Institute of Technology)

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

 Hosted by the Georgia Institute of Technology
Dear Friends,

The Georgia Institute of Technology is pleased to host the Twenty-Sixth North American Manufacturing Research Conference (NAMRC) this year on May 19-22. NAMRC was organized in 1973 as a major international forum for the 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 eighty 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 NAMRC/SME Scientific Committee.

The Conference will begin on Tuesday, May 19, with a welcoming reception in the Renaissance Atlanta Hotel Downtown. On Wednesday, May 20, the Conference Opening Ceremony will feature a keynote address by William B. Bullock, President of Lockheed Martin Aeronautical Systems. The traditional Founder’s Lecture will be given during the Wednesday luncheon by Dr. John G. Bollinger of the University of Wisconsin, Madison.

Each year, NAMRC attracts over 250 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 XXVI. We believe the conference will be both an intriguing and beneficial one for you.

Cordially yours,

Steven Y. Liang and Thomas R. Kurfess
Co-Chairs
NAMRC XXVI 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 XXVI 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 NAMRC/SME

The North American Manufacturing Research Institution is the Society of Manufacturing Engineers (NAMRC/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.
### Conference Site

Georgia's capital city of Atlanta will be the site of NAMRC XXVI. Atlanta is the 12th largest city in the United States with a metropolitan population of 3 million. The city is home to Cable News Network (CNN), The Coca-Cola Company, the Centers for Disease Control, the High Museum of Art, and the 1995 World Series Champion Atlanta Braves baseball team. Atlanta was also the host city for the 1996 Centennial Summer Olympic Games.

The Georgia Institute of Technology has a tradition of excellence in technological research and education, and is one of the world's premier technology-oriented universities. Georgia Tech boasts a superb faculty of world-class teachers, researchers, and consultants, and an excellent undergraduate and graduate student body.

Georgia Tech is consistently listed among the best universities in the nation. In *U.S. News & World Report*’s 1998 annual ranking of graduate schools in the United States, the College of Engineering at Georgia Tech is currently ranked number four, and has the number-one academic program in industrial engineering/manufacturing in the U.S.

### Facilities

Several facilities have been chosen for NAMRC XXVI. The Renaissance Atlanta Hotel Downtown will be the site for the Tuesday evening Registration and Welcoming Reception. All conference technical sessions will be held at the Georgia Tech Student Success Center, located on campus. The Opening Ceremony on Wednesday, May 20 will take place at the Robert Ferst Center for the Arts.

### Sponsor Recognition

The NAMRC XXVI Organizing Committee thanks the following organizations for their sponsorship supporting this year’s conference: the Manufacturing Research Center at Georgia Tech, The George W. Woodruff School of Mechanical Engineering at Georgia Tech, Ford Motor Company, General Motors Research and Development Center, The Torrington Company, and Extrude Hone Corporation.
Special Activities

NAMRC special activities begin with the Welcoming Reception on the evening of Tuesday, May 19, at the Renaissance Hotel. The hotel is located at 590 West Peachtree Street in downtown Atlanta.

The Wednesday evening wine and cheese reception on May 20 will take place in Georgia Tech's Alumni-Faculty House, located at 190 North Avenue, directly across the street from the Georgia Tech campus. The reception precedes the NAMRUSME membership and ASME MED meetings which will be held across the street in the Student Success Center Theater.

On Thursday, May 21, the Annual NAMRC Banquet will feature an exciting paddlewheel riverboat three-hour cruise on Stone Mountain Lake. The lake is part of the 3,200-acre Stone Mountain Park, located due east of Atlanta. The lake is located at the base of Stone Mountain, an 825-foot-high dome-shaped granite rock. Transportation to and from the Banquet will be provided. Buses will depart from the Manufacturing Research Center Building.

Laboratory Tours: May 21, 9:30-6:00 p.m.

Tour Coordinator: Jonathan S. Colton, Georgia Institute of Technology

The tours will highlight three Georgia Tech laboratories in the facilities of the George W. Woodruff School of Mechanical Engineering and the Manufacturing Research Center. The tours of the Precision Machining Laboratory will focus on metals and hard materials processing, metrology, and machine tool design and control. The tour of the Composites and Polymer Processing Laboratory will focus on the development of advanced polymer-based composites materials and novel processing techniques. The tour of the Center for Board Assembly Research will focus on the development of new materials and attachment techniques for the assembly and direct attachment of chips and electronic circuits directly to circuit boards.

Industry Tours

Tour Coordinator: Thomas R. Kurfees, Georgia Institute of Technology

A special industry tour of Lucent Technologies has been arranged for NAMRC attendees on Friday, May 22. Transportation will be provided. The bus will depart at 8:00 a.m. and return approximately at 12:00 noon. Participants will visit Lucent's Fiber Optic Production Facilities in Norcross, Georgia. Indicate your interest to attend the tour on the conference registration form. The Lucent tour is limited to 50 persons.

Panel Discussions

Future Prospects for Manufacturing Engineers (Session 5-D)

This session is designed to provide students and new engineers with an overview of the various challenges that are faced by engineers in the manufacturing sector. Seven representatives from industry, academia, and the government will discuss the opportunities available in manufacturing engineering. The discussions will present the various exciting challenges of today's modern engineer that far exceed the traditional duties of manufacturing personnel.

Electronics Manufacturing Research (Session 6-D)

The electronics industry has grown at an average rate of approximately 15 percent annually over the past three-and-a-half decades, recently surpassing the automotive industry to become the world's largest industry sector. This distinguished panel seeks to address the formidable fundamental and technological barriers facing the electronics manufacturing industry to enable the manufacturing research community to better understand the unique opportunities that exist for research advances and the critical areas that will have the greatest impact over the next decade.

CIRP International Workshop

Planned in conjunction with the NAMRC XXVI will be a one-day CIRP International Workshop on Modeling of Machining Operations. The CIRP Workshop will be held at Georgia Tech prior to the NAMRC conference on Tuesday, May 19, 1998. The CIRP workshop is designed to highlight the present status and future directions in modeling of machining operations through a series of invited presentations, panel discussions, and contributions on selected topics by active researchers, industry representatives, and government agencies.

The CIRP Workshop will consist of approximately three hours of invited presentations, two hours of contributions/discussion on selected topics in parallel streams, and an hour-and-a-half analysis/conclusions sessions. For more information, please visit CIRP's web site at http://www.egr.gatech.edu/~jawahir/CIRP.
NAHRM XXVI — May 19-22, 1998

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Publications

All papers presented at NAMRC XXVI will be contained in either the hardbound "Transactions of the North American Manufacturing Research Institution of SME, Volume 26, 1998" or the soft cover "Technical Papers of the North American Manufacturing Research Institution of SME, Volume 26, 1998." 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 22. Contact the SME Customer Service at (313) 271-1500 ext. 629 or 1-800-733-4763.

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 Georgia Tech through the registration form.

Registration Fees

Registration fees for the full conference are $390 (U.S. Funds) for registrations postmarked or faxed (with credit card information) on or before April 19, 1998, and $350 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 session chairs.

Cancellation Policy

If you need to cancel your conference registration, you must notify Georgia Tech Distance Learning, Continuing Education and Outreach by calling 404-894-2401 at least ten (10) business days prior to the program's start date to receive a refund (less a $50 administrative 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

A non-technical program will be provided on Wednesday, May 20 and Thursday, May 21 for visiting spouses, guests and others who do not wish to attend the technical sessions. The program will include visits to The World of Coca-Cola, a museum showcasing the Coca-Cola Company's history and memorabilia (fee: $6.00), and Underground Atlanta for lunch and shopping on May 20. On May 21 guests may attend a Studio Tour of Cable News Network (CNN) (fee: $7.00), and a walk through Centennial Olympic Park.

The guest registration fee of $80 includes conference breakfasts, the welcoming reception, the wine and cheese reception and the conference banquet. Additional expenses such as admission fees, subway fares, and lunches on the outings will vary depending on the activities. Participants will be asked to cover these additional charges on their own. Participants will meet at the NAMRC Conference Registration Desk in the Student Success Center on the morning of the outing (see program at a glance for time).

Travel

Atlanta and Georgia Tech are conveniently located off Interstate 75/85. Approaching from the south, you will see a sign for Exit 100 – West Peachtree Street shortly after passing through downtown Atlanta. Approaching from the north, take the North Avenue/Georgia Tech exit.

All hotels are easily accessible from the Atlanta Airport. The Atlanta Airport Shuttle service operates both of the recommended hotels with frequent runs between the hotels and airport daily. The shuttle service is located at the TAXI stand at the Airport. The fee is $17.00 round trip. The Atlanta Airport Shuttle phone number is (404) 768-7600. The airport has a taxi service as well.

Amtrak train service to Atlanta is available once a day from Washington, New Orleans, Birmingham and some other cities. The station is located at 1688 Peachtree Street N.W., not far north of Georgia Tech. The reservations number for Amtrak is 800-872-7245.

Directions will be included in your registration packet, or you can access the information directly off the SME homepage at http://www.sme.org/namrc, or the Georgia Tech Precision Machining Site at http://precision.me.gatech.edu.

Many domestic and international carriers serve the Atlanta Hartsfield International Airport. Atlanta is in the Eastern Time Zone.
Travel Discounts
Delta Air Lines offers special fares to attendees of Georgia Tech programs. Certain restrictions may apply. For information and reservations, call 1-800-241-6760 and refer to file U0175 (for domestic flights only). We recommend that you do not purchase a non-refundable airline ticket.

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 sessions is discouraged. The conference hotels offer parking, and are a short walk to campus.

Lodging
Both the Renaissance Atlanta Hotel Downtown and the Holiday Inn Express on North Avenue have been selected as primary lodging sites for the conference. Both are located in downtown Atlanta and are only a short walk to the Georgia Tech campus and Student Success Center, the site of many of the conference's activities and sessions.

Renaissance Atlanta Hotel Downtown
590 West Peachtree Street
Atlanta, Georgia USA 30308
Phone: 404-881-6000 (for reservations)
Fax: 404-815-5010
Web Site: www.renaissancehotels.com
Single/double occupancy: $99.00
Deadline: April 24, 1998
Code: request the Georgia Tech MARC-NARMC rate
Parking: $7.50 per day

Holiday Inn Express on North Avenue
244 North Avenue, N.W.
Atlanta, Georgia USA 30313
Phone: 404-881-0881 (for reservations)
Fax: 404-874-8838
Single/double occupancy: $79.00
Deadline: May 5, 1998
Code: request the Georgia Tech - NARMC rate
Parking: no charge

Weather
Spring in Atlanta is likely to be warm during the day. 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 to enjoy evening activities and excursions. Guests will enjoy experiencing spring's show of flowers in Georgia.

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:
Georgia Institute of Technology
Distance Learning, Continuing Education, and Outreach-R
P.O. Box 93686
Atlanta, Georgia USA 30377-0686
Fax: 404-894-8925
Email: register@conted.swann.gatech.edu
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Additional Information
For more information on registration, please contact the Department of Distance Learning at the FAX number provided. All other inquiries should be directed to Pam Rountree at The Manufacturing Research Center, Georgia Tech. Phone: 404-894-1740.

Special Note to Authors
Each conference meeting room will contain an overhead projector and 35 mm slide projector. If you require additional audio visual equipment, please advise Georgia Tech Department of Distance Learning as listed above, or note your requirements on the registration form. Please be specific in the type of equipment needed, including format and hardware/software requirements.
NAMRC XXVI Technical Sessions and Programs

Tuesday, May 19, 1998

5:00 - 9:00 p.m.
Conference Registration & Welcoming Reception: The Renaissance Atlanta Hotel - Downtown, 25th Floor

Wednesday, May 20, 1998

7:30 - 8:30 a.m.
Registration and Continental Breakfast: Robert Fertl Center for the Arts

8:30 - 10:00 a.m.
Opening Ceremony: Robert Fertl Center for the Arts
Opening Remarks: Thomas R. Kurkoff, Co-Chair, NAMRC XXVI
Organizing Committee
Steven Y. Liang, Co-Chair, NAMRC XXVI
Welcoming Remarks: Steven Danyuk, Director, Manufacturing Research Center, Georgia Institute of Technology
Ward O. Winer, Chair, George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology
Wayne O. Clough, President, Georgia Institute of Technology
Invited Remarks: Representative of the State of Georgia
Introductory Remarks: William R.D. Wilson, President, NAMRI/SME
Keynote Address: Flexible Manufacturing for the Next Generation
William B. Bullock, President, Lockheed Martin Aeronautical Systems

10:00 - 10:30 a.m.
Coffee and Refreshment Break: Student Success Center
Sponsored by Extrude Hone Corporation

10:30 a.m. - 12:00 noon
Concurrent Technical Sessions (Note: All Technical Sessions will be held at the Student Success Center)

Session 1A: Grinding and Finishing: Student Success Center Theater
Co-Chairs: William F. Bell, The Torgington Company
Kerstel F. Ehmann, Northwestern University
Assessment of Machining Performance of Dental Ceramics, G. Zhang, L. Qi, Y. Cao, University of Maryland at College Park; D.T. Le, Lanxide Corporation
Analysis and Simulation of Double Disc Grinding, N. Shanbhag, M. Rajan, J. Manjunathappa, S. Krishnamurti and S. Malik, University of Massachusetts
High Efficiency Superfinishing of Bearing Rings with CBN, I.D. Marinescu, G. Doutu, The University of Toledo; E. Bodeianni, Jacobs Chuck Manufacturing Company

Session 1B: Sheet Forming: President's Suites C & D
Co-Chairs: Ken-Ichiro Mori, Toyohashi University of Technology, Japan
Kim A. Stelson, University of Minnesota
Modeling and Evaluation of Superplastic Forming of Weldalite® 049 Sheet Products, G.T. Kritski, University of Michigan-Dearborn; A.S. El-Gizawy, University of Missouri-Columbia
An Analytical Model for Predicting Flange Wrinkling in Deep Drawing, X. Wang and J. Cao, Northwestern University
Modeling, Simulation and Optimization of Sequential Bending Process, Y. Wang and S. Shabber, University of Maryland

Session 1C: Systems: Press Suite A
Co-Chairs: Bruce M. Krueter, National Science Foundation
K. Subu Subramanian, Norton Company
Twenty-Five Years of NAMRC and Beyond - A Brief History and Outlook, K.J. Weinmann, Michigan Technological University
CYBERCUT: A Networked Machining Service. P. Wright and D.A.
Dornfeld, University of California at Berkeley
A Case-Based Approach for Cost Estimating in Net-Shape Manufacturing,
M. El-Mehalawi and R.A. Miller, The Ohio State University

12:00 noon - 1:30 p.m.
Luncheon: Student Success Center Festival Area
Sponsored by Ford Motor Company

Founder's Lecture
Visioneering Manufacturing for the Twenty-First Century
Dr. John G. Bollinger
University of Wisconsin, Madison

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

Session 2-A: Turning: Student Success Center Theater
Co-Chairs: Vivek Chandrasekharan, Caterpillar, Inc.
Mike J. Short, Lencor Technologies
Process Effects on White Layer Formation in Hard Turning, Y.K. Chou and
C.J. Evans, National Institute of Standards and Technology
Modeling of Thermo-Elastic Workpiece Deformation for Compensation of
Dimensional Errors in Turning of Hard Metals, D. Böhler, R. Dollmeier and
G. Warnecke, University of Kaiserslautern, Germany
A New Performance-Based Criterion for Optimum Cutting Conditions and
Cutting Tool Selection in Finish Turning, Z.J. Du, J.P. Sadler and I.S. Jawahir,
University of Kentucky
Dynamics of the Simultaneous Turning Process, I. Lazoglu, M. Vogler, S.G.
Kapoor and R.E. Dever, University of Illinois at Urbana-Champaign

Session 2-B: Forming Systems: President’s Suite C & D
Co-Chairs: Govindhan Lahoti, The Timken Co.
Rajiv Shrivastava, The Ohio State University
On Strains and Forming Limits of Metal Flow in the Drawbead Region of A
Draw Die, S.G. Xu and K.J. Weinmann, Michigan Technological University
Incremental Hammering Forming of Sheet Metal Automated Using CCD
Camera and Database, K. Mori, Toyohashi University of Technology, Japan;
M. Otsu, N. Fujiwara and K. Osakada, Osaka University, Japan
Modeling and Control of Hydraulic Forming Equipment, W.G. Frazier, Air
Force Research Laboratory, Wright-Patterson Air Force Base; E.A. Medina,
Austral Engineering and Software, Inc.

Co-Chairs: Ronald A. Boelander, Georgia Tech Research Institute
Ming C. Leu, National Science Foundation
Modeling Gradual Process Variables in Path Planning, N. Balasubramanian
and S. Raman, University of Oklahoma
Adaptive Tool Path Planning by Machining Strip Evaluation for 5-Axis
Complex Surface Machining, Y-S Lee, North Carolina State University
Simulation and Optimization System for Design of Multi-Stage Material
Process, E.A. Medina, Austral Engineering and Software, Inc.; J.C. Malas and
W.G. Frazier, Air Force Research Laboratory, Wright-Patterson Air Force Base

3:00 - 5:30 p.m.
Coffee and Refreshment Break: Student Success Center

3:30 - 5:00 p.m.
Concurrent Technical Sessions

Session 2-A: Turning: Student Success Center Theater
Co-Chairs: David A. Dornfeld, University of California at Berkeley
Richard J. Furey, Ford Motor Company
Basic Study on Step Vibration Cutting, M. Jin, K. Ogasaawara, M. Matakawa,
Nippon Institute of Technology, Japan
Turning of Beta-Titanium Alloys by Means of Ultrasonic Vibration, M.
Matsumura and M. Jin, Nippon Institute of Technology, Japan
Hard Turning of Steel, M.C. Shao and A. Vyas, Arizona State University
Session 3-B: Environmentally Conscious Manufacturing: President’s Suites C & D

Integration of Environmental Factors in Surface Planning: Part 2 — Multicriteria Hazard Evaluation, S. Thurwacher, D.J. Bauer and P.S. Sheng, University of California at Berkeley

Integration of Environmental Factors in Surface Planning: Part 1 — Mass and Energy Modeling, D.J. Bauer, S. Thurwacher and P.S. Sheng, University of California at Berkeley

Economical Cryogenic Milling for Environmentally Safe Manufacturing, S.Y. Hong, X. Qu and A. Lee, Columbia University

Environmental Conscious Design Support Model Using Fuzzy Analytic Hierarchy Process, Y. Yu and H-C Zhang, Texas Tech University

Session 3-C: Systems: Press Suite

Co-Chairs: Barney E. Klamecki, University of Minnesota
Radha Sarma, Iowa State University

Using Single Significant Factor in Due-Date Assignment Rules for Dynamic Job Shops, F-C. R. Chang, Southern Illinois University at Carbondale; J. Lyu, National Cheng Kung University, Taiwan

Development of Large Knowledge-Based Systems for a Manufacturing Setting, J.M. Twomey, Wichita State University; M. Littell, Boeing Commercial Airplane Group

Automated Yarn Creeling for the Fabric and Carpet Industry, M.L. Reif, R. Braga, H. Lipkin, Y. Wang, W. Holcombe and G. McMurry, Georgia Institute of Technology

5:00 - 6:30 p.m.
Wine and Cheese Reception: Alumni/Faculty House
Sponsored by The Terrington Company

6:30 - 7:30 p.m.
NAMRI/SME Membership Meeting: Student Success Center Theater

7:30 - 8:30 p.m.
ASME MD Meeting: Student Success Center Theater

Thursday, May 21, 1998

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

8:30 - 10:00 a.m.
Concurrent Technical Sessions (Note: All Technical Sessions will be held at the Student Success Center)

Session 4-A: Grinding and Finishing: Student Success Center Theater

Co-Chairs: David A. Stephenson, General Motors Corporation
Chen Zhou, Georgia Institute of Technology

Deformability of the Flexible Grinding Stone in a New Abrasive Machining Process for Three-Dimensional Geometry, H. Yamaguchi and J.R. Gilmore, Extrude Hone Corporation

Material Removal Symmetry in the Double-Sided Polishing Process, B.E. Klamecki, University of Minnesota

A Vacuum-Hydrostatic Shoe for Centerless Grinding, Y. Yang, Carter Controls, Inc.; B. Zang, University of Connecticut

Session 4-B: Bulk Forming and Casting: President’s Suites C & D

Co-Chairs: Delcie R. Durham, National Science Foundation
Klaus J. Weimann, Michigan Technological University

A Method for Identifying and Reducing the Geometric Variability of Injection Molding Die Sets, S.E. Ebenstein, V. Kiridenia, Y.M. Rodin, G.H. Smith, Ford Motor Company; M.S. Claar and D.M. Hildeoth, Visteon

Robust Design of Horizontal Pressure Die Casting Shot Sleeves, V.K. Park, Catholic University of Inha-Hyounsung, Korea; J.R. Brevick, The Ohio State University

Numerical Modeling of Erosive-Corrosive Wear of Molds in Permanent Mold Cooling of Aluminum Clutch Housing for Trucks, M. Ranganathan, R. Shivpuri and S. Balasubramaniam, The Ohio State University
Session 4-C: Tools: Press Suite A

Co-Chairs: Warren R. DeVries, Iowa State University
Glória J. Wies, University of Florida

Critical Assessment of Carbide and PCD Tool Performance in High Speed Milling of Dies and Molds, M. Dumirescu, M.A. Elbestawi, McMaster University, Canada; T.I. El-Wardany, L. Chen, United Technologies Research Center

Thermal Characterization of the Chip-Tool Interface When Using Coated Turning Inserts, W. Grzesik and P. Niezgoda, Technical University of Opole, Poland


10:00 - 10:30 a.m.

Coffee and Refreshment Break: Student Success Center
Sponsored by Extrude Hone Corporation

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

Concurrent Technical Sessions

Session 5-A: Drilling: Student Success Center Theatre

Co-Chairs: Chi-Hung Shen, General Motors Corporation
John W. Sutherland, Michigan Technological University

Integration of CAD of Drill with FEA of Drilling Burr Formation, Y.B. Guo, Purdue University; D.A. Dornfeld, University of California at Berkeley

Machinability Characterization in Drilling Graphite Fiber-Reinforced Composites, U.E. Enemoh, A.S. El-Gizawy, University of Missouri-Columbia; A.C. Okarfi, University of Missouri-Rolla

Finite Element Analysis of Drilling Burr Minimization with a Backap Material, Y. Guo, Purdue University; D.A. Dornfeld, University of California at Berkeley

Session 5-B: Bulk Forming: President's Suites C & D

Co-Chairs: George Kardamotnes, Georgia Institute of Technology
William R. Wilson, Northwestern University

Plane Strain Indentation of Ti6Al4V Blocks Between Opposed Flat Rigid Punches of Unequal Width, Two at the Top and One at the Bottom - II, S. Mardanpour and N.R. Chitkara, University of Manchester Institute of Science and Technology, United Kingdom

Roll Pass Design Optimization Applying Fuzzy Reasoning Techniques, S.D. Kini and R. Shyapuri, The Ohio State University


Session 5-C: Materials: Press Suite A

Co-Chairs: Hodge E. Jenkins, Lucent Technologies
Robert E. Williams, University of Nebraska-Lincoln


Effect of Hardness on Flow Stress of Aluminum, J.T. Black and R. Krishnamurthy, Auburn University

Modeling Microstructural Evolution and Phase Transformation in Shape Rolling, P. Pouak, S. Pauwle and R. Shyapuri, The Ohio State University

Session 5-D: Panel Discussion: Press Suite B

Future Prospects for Manufacturing Engineers

Moderator: Thomas R. Kurfess, Georgia Institute of Technology

Panelists:
William F. Bell, The Torrington Company
Richard E. DeVore, University of Illinois at Urbana-Champaign
Delece R. Durham, National Science Foundation
Dave E. Hardt, Massachusetts Institute of Technology
David A. Stephenson, General Motors Corporation
Paul K. Wright, University of California at Berkeley
Matthew J. Zaluze, Ford Motor Company

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

NAMRI/SME Awards Luncheon: Student Success Center Festival Area
Sponsored by General Motors Research and Development Center
1:30 - 3:00 p.m.
Concurrent Technical Sessions

Session 6-A: Milling: Student Success Center/Therma

Co-Chairs: Shiv G. Kapoor, University of Illinois at Urbana-Champaign
Karl F. Radune, The Torrington Company

Rear Gouge Detection and Elimination in Five-Axis NC Machining of Sculptured Surfaces, R. Sarma, Iowa State University


Determination of Tool Stiffness Using Neural Network in End Mill, S-L. Ko and S-K. Lee, Kon-Kuk University, Korea

Session 6-B: Non-Traditional Processes: President’s Suites C & D

Co-Chairs: K.P. Rajurkar, University of Nebraska-Lincoln
Ralph Resnick, Extrude Hone Corporation

A Feasibility Study of EDM Tooling Using Metalized Stereolithography Models, M.V. Lou, National Science Foundation; B. Yang and W.L. Yao, New Jersey Institute of Technology

Extruder Laser Micro machining of Nylon, T.C. Chang and P.A. Molian, Iowa State University

Development of an EDM CNC System for Conjugate Machining, B. Zhang, W.M. Wang, K.P. Rajurkar and A. Nairnman, University of Nebraska-Lincoln


Session 6-C: Sensors: Press Suite A

Co-Chairs: J.S. Jawahert, University of Kentucky
Beij B. Sells, Ford Motor Company

Early Prediction of Impending End-Milling Tool Failure Using Acceleration Signals, J.T. Roth and S.M. Pandit, Michigan Technological University


3:00 - 3:30 p.m.
Coffee and Refreshment Break: Manufacturing Research Center Atrium

3:30 - 5:00 p.m.
Laboratory Tours: Georgia Tech Manufacturing Research Center and George W. Woodruff School of Mechanical Engineering

6:30 - 9:30 p.m.
Conference Banquet: Georgia Stone Mountain Riverboat Cruise
Sponsored by The George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology

Transportation to and from the banquet will be provided. Buses will depart from the Manufacturing Research Center.

Friday, May 22, 1998
7:30 - 8:30 a.m.
Registration and Continental Breakfast: Student Success Center

8:00 a.m - 12:00 noon
Industry Tour: Lucent Technologies Fiber Optic Production Facilities
8:30 - 10:00 a.m.
Concurrent Technical Sessions (Note: All Technical Sessions will be held at the Student Success Center)

**Session 7-A: Milling: Student Success Center Theater**

**Co-Chairs:** Ismail Lagouge, University of Illinois at Urbana-Champaign
Hitomi Yamaguchi, Extrude Hone Corporation

A Comprehensive Model for the Flank Face Interference Mechanism in Peripheral Milling, S. Ranganath, D. Liu and J.W. Sutherland, Michigan Technological University


A Model-Based Approach for Radial Run-Out Estimation in the Face Milling Process, Akshay, Thru-put Technologies; S.G. Kapoor and R.E. DeVar, University of Illinois at Urbana-Champaign

**Session 7-B: Controls: President's Suites C & D**

**Co-Chairs:** Elijah Kameeta-Asebi, University of Michigan
Albert J. Shih, Cummins Engine Company


Lypasanov Stability Analysis of Distributed Control in Multiple Machine Heterarchical Manufacturing Cells, V.V. Prabhu, Pennsylvania State University

Using Localized Closed-Loop Force Control to Provide Robustness in Sheet Metal Forming, M.L. Bohn, S.U. Jurettie and K.J. Wetmenn, Michigan Technological University

**Session 7-Ci: Sensors: Student Success Center, Press Suite A**

**Co-Chairs:** Shouanak M. Athavele, Ford Motor Company
Wayne J. Beok, Georgia Institute of Technology

Real-Time Measurement for an Internal Grinding System, D.M. Longanbach and T.R. Kirlaeus, Georgia Institute of Technology

Vibration Analysis of a Ball Bearing With an Integrated Sensor, B.T. Holm-Hansen and R.X. Gao, University of Massachusetts

Fiber Tool for Noncontact Generation of Ultrasound, S.N. Hopko and J.C. Ume, Georgia Institute of Technology

**Session 7-D: Machine Tools: Press Suite B**

**Co-Chairs:** Yuan-Shian Lee, North Carolina State University
Paul S. Sheng, University of California at Berkeley

Analysis of Setting Errors in Precision Ball Screw Machining and Development of the Automatic Adjustable Center, M-Y Yang, J-G Choi and J-H Park, Korea Advanced Institute of Science and Technology

Predicting and Analyzing Misalignment Defects During Product Design, S. Das, New Jersey Institute of Technology; S. Ramachandra, Colovus Company


10:00 - 10:30 a.m.
Coffee and Refreshment Break: Student Success Center

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

**Session 8-A: Tools: Student Success Center Theater**

**Co-Chairs:** Yoichi Matsumoto, The Timken Company
Charles Ume, Georgia Institute of Technology

A Comparative Study of Dry Machining of A390 Alloy Using PCD and CVD Diamond Tools, A.P. Malsh, M.A. Taher, A. Musshondt, W.F. Schmid, H. Mohammed, E. Mohammed, University of Arkansas

Forces and Wear of PCD Tool in Turning of Granite, E. Wilson, Kansas State University; E.D. Martinez and G. Gu, University of Toledo

Tracing the Morphological Changes of Diamond Abrasives with Lead-Tape Imprints and SEM, T.W. Liao, K. Ii, Louisiana State University; S.B. McSpadden, Jr., Oak Ridge National Laboratory

**Session 8-B: Fixtures: President's Suites C & D**

**Co-Chairs:** Edward C. DeMeer, Pennsylvania State University
Robin Stevenson, General Motors Corporation
Session B-C: Machine Tools: Press Suite A

Co-Chairs: Richard B. Mindek, Jr., Pratt & Whitney
Jong-i Mou, Arizona State University

Modeling the Effects of Component Level Geometric and Form Deviations on Machine Tool Sideway Errors, C.M. Daniel and J.W. Sutherland, Michigan Technological University; W.W. Olson, University of Toledo

The Effect of Machine Stiffness on Strength of Ground Silicon Nitride, B. Zhang, F. Yang, J. Wang, Z. Zhu and R. Monahan, University of Connecticut

Calibration of Rotary Table in Multi-axis Machine Tools, S-H Sue, S-Y Jung, POSTECH; E-S Lee, Research Institute of Industrial Science & Technology, Korea

12:00 noon - 1:30 p.m.
Light Lunch: Student Success Center

1:30 p.m.
Conference Adjournment