The North American Manufacturing Research Institution of the Society of Manufacturing Engineers Announces its...

EIGHTEENTH NORTH AMERICAN MANUFACTURING RESEARCH CONFERENCE

NAMRC XVIII
May 22-25, 1990

Including the

CIRP International Working Seminar on Artificial Intelligence-Based Product Design
May 22, 1990

The Pennsylvania State University
University Park, Pennsylvania USA
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T. Ward, University of Louisville
R.J. Weinman, Michigan Technological University
W.D. Wilson, Northwestern University
P.K. Wright, New York University
S.M. Xia, University of Michigan
W.J. Zalewski, Mercia Research Associates
G. Zhang, University of Maryland

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REGISTRATION AND GENERAL INFORMATION

NAMRC XVIII CONFERENCE PROSPECTUS

The Eighteenth North American Manufacturing Research Conference (NAMRC XVIII), to be held May 22-25, 1990, is designed to provide a forum for the timely presentation and critical discussion of the results of basic and applied research in material forming, material removal, and manufacturing systems/automation. All papers presented at the conference are contained in the bound volume titled "Transactions of the North American Manufacturing Research Conference 1990." These papers have been accepted based upon a review of the papers in their full length form and highlight manufacturing research efforts from universities, centers, and companies from around the world.

The conference will feature three parallel sessions in material forming, material removal, and manufacturing systems. The sessions will include formal presentations of the papers and a discussion period following each presentation. We urge you to attend and actively participate in these sessions.

CONFERENCE LOCATION AND TRANSPORTATION TO CONFERENCE (See Map)

The conference will be held in the Keller Conference Center on Penn State's University Park Campus with the exception of the Opening Ceremony which will occur at the nearby Nittany Lion Inn.

The campus is in State College, Pennsylvania, near the geographical center of the state on Routes 36 and 222 and near I-80. US Air/US Air Express and United Express serve the University Park Airport, located five miles from campus. Limousine and taxi service (on call) are available for all flights.

TRANSACTIONS

All registered NAMRC participants will receive one bound copy of the "Transactions of the North American Manufacturing Research Conference 1990" at conference registration. Additional copies may be purchased at the conference or by contacting William R. Steiner, 410 Keller Conference Center, Pennsylvania State University, University Park, PA 16802, telephone (814) 865-9173. The cost per copy is $65 for NAMR/SME and SME members and $75 for nonmembers.
CIRP INTERNATIONAL WORKING SEMINAR

CIRP, the International Institution for Production Engineering Research, presents the International Working Seminar on Artificial Intelligence Based Product Design. This working seminar will serve as a forum to review AI-based design research activities and practice and will show directions for future research. This seminar features invited speakers.

The focus of this working seminar is on the aspects of Artificial Intelligence based design research with respect to product design. It will bring together eminent researchers in the field of design from various countries to integrate the ideas of design theory, design education, design for manufacturing and specialized AI techniques in design and Intelligent Computer Aided Design with respect to Product Upsizing.

All the papers presented by the members are contained in the Working Seminar Proceedings. This one-day seminar features eight prominent researchers from different countries. The sessions will include formal presentations of the papers followed by discussions and will conclude with a panel discussion.

SEMINAR LOCATION

The CIRP International Working Seminar will be held prior to the 18th NAMRI Conference, on May 22, 1990, at Penn State’s University Park Campus. All CIRP sessions will be held in Room 215, the Bebkom Building.

PROCEEDINGS

All registered CIRP Seminar participants will receive one bound copy of the "Proceedings of the CIRP Working Seminar on Artificial Intelligence Based Product Design," at seminar registration. Additional copies may be ordered on site.

LOGGING

Blocks of rooms have been reserved for the nights of May 22-24 at two State College hotels and at residence halls on the Penn State campus. Conference attendees are urged to make their reservations early. To receive the special conference rates, please mention that you are attending the North American Manufacturing Research Conference. The rates listed do not include tax.

<table>
<thead>
<tr>
<th>Lodging choices</th>
<th>Cut-Off Dates</th>
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<tbody>
<tr>
<td>Atherton Hilton</td>
<td>April 21, 1990</td>
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<tr>
<td>125 S. Atherton Street</td>
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<tr>
<td>(514) 221-2100</td>
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<tr>
<td>Days Inn Penn State</td>
<td>May 1, 1990</td>
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<tr>
<td>340 S. Pugh St</td>
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<tr>
<td>(514) 238-8414</td>
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<td>Residence Halls</td>
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<td>Penn State Campus</td>
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<td>(use registration form)</td>
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<tr>
<td>Single-$85 and up</td>
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<tr>
<td>Double-$167 and up</td>
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<td>Plus tax</td>
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<tr>
<td>Single-$93 and up</td>
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<tr>
<td>Double-$186 and up</td>
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<tr>
<td>Plus tax</td>
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<tr>
<td>2 Night Package (May 22-24)</td>
<td>May 9, 1990</td>
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<tr>
<td>3 Night Package (May 24-26)</td>
<td></td>
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<tr>
<td>Single-$89.50, Double-$148.25/person</td>
<td>no tax charged on 3 and 4 Night Packages</td>
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<tr>
<td>Bus service will be provided between the conference hotels and the Keller Conference Center.</td>
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</tbody>
</table>

PARKING

Parking is available at both conference hotels. A limited number of parking spots are available on campus for $2 per day on site.

SPouse PROGRAM

An informal program is planned, with visits to local museums, the Farmer’s (Amish) Market, Penn’s Cove, and other points of local interest. The $40 registration includes transportation and meals. Meals are not included. Fees for the Spouse Program are $40. To register, complete the appropriate information on the registration form.

REGISTRATION FEES

Registration fees for NAMRI XIX are: $250 (U.S. currency) for advance registration and $305 (U.S. currency) for on-site registration. This fee includes entrance to all sessions, a bound copy of the conference Transactions, refreshments, two lunches, and the conference banquet. There will be no one-day registration fees nor will there be any reduced fees for authors or session chairmen.

Students and retirees will be admitted to the conference for $60 (U.S. currency) for advanced registration and $75 (U.S. currency) on-site. This fee is a special rate to encourage attendance and includes entrance to all technical sessions, refreshments, and a bound copy of the conference Transactions. No meals are included.

Registration fees for "CIRP International Working Seminar on Artificial Intelligence Based Product Design" are $80 (U.S. currency) for advance registration and $100 (U.S. currency) for on-site registration. This fee includes entrance to all presentations, lunch on May 22nd, and one bound copy of the proceedings at seminar registration. Extra lunch tickets will be available for $12 each on May 23 and 24. Banquet tickets on May 23 are $22 each. Please indicate which extra meal tickets you wish to purchase on the registration form.

Extra refunds will be extended for cancellations received prior to May 9, 1990. After this date, no refund will be extended.

For additional information, contact Professor Paul H. Cohen at (814) 863-2357 or William R. Stender, Keller Conference Center at (814) 865-9173.

TO REGISTER

Complete and return the registration form with the proper fee. Checks, money orders, or purchase orders should be made payable to The Pennsylvania State University. All payments must be in U.S. currency. Send registration and payment to: William R. Stender, 410 Keller Conference Center, Pennsylvania State University, University Park, PA 16802.

FURTHER INFORMATION

For additional conference information, please contact Professor Irving H. M. Lewis at (814) 865-2885 or Professor Paul H. Cohen at (814) 863-2357. For questions regarding registration, call William R. Stender, Keller Conference Center at (814) 863-9173. During the conference, incoming messages for attendees will be accepted at (814) 865-9173 and will be posted on a bulletin board near the registration area.
TUESDAY, MAY 22
8:30 a.m.-8:50 a.m.
REGISTRATION 215 Hammond Building
8:50 a.m.-9:00 a.m.
OPENING CEREMONY 215 Hammond Building
Prof. Jonyung Han, Penn State, U.S.A.
9:00 a.m.-9:45 a.m.
9:45 a.m.-10:30 a.m.
"Design Philosophy and Intelligent Product Design," Prof. H. Yoshikawa,
University of Tokyo, Japan
10:30 a.m.-10:45 a.m.
COFFEE BREAK
10:45 a.m.-11:30 a.m.
"A Review of AI Based Product Design," Prof. I. Ham and Prof. S. Komura,
Pennsylvania State University, U.S.A.
11:30 a.m.-12:15 p.m.
"Computer Aided Design and Part Databases," Prof. J. Pfeiffer,
University of Ljubljana, Yugoslavia
12:15 p.m.-1:25 p.m.
LUNCHEON Atherton Hilton
1:30 p.m.-2:15 p.m.
"Evaluation-Theory-Practice of Design," Prof. J. Peters, Catholic University of
Leuven, Belgium
2:15 p.m.-3:00 p.m.
"Intelligent Computer Aided Design," Prof. S. Ohashi, Research Center for
Advanced Science and Technology, University of Tokyo, Japan
3:00 p.m.-3:15 p.m.
COFFEE BREAK
3:15 p.m.-4:00 p.m.
"Design Research— Trends and Future Directions," Prof. John R. Dam, 
Department of Mechanical Engineering, University of Massachusetts, U.S.A.
4:00 p.m.-4:45 p.m.
"Conceptual Design and Automata Theory," Prof. V.R. Mitrovic, University
of Zagreb, Yugoslavia
4:45 p.m.-5:45 p.m.
PANEL DISCUSSION

TUESDAY, MAY 22
5:00 p.m.-7:00 p.m.
REGISTRATION AND RECEPTION Atherton Hilton
7:00 p.m.
NAMRE/SME Board of Directors Dinner, Atherton Hilton, Whitney Room
8:00 p.m.
NAMRE/SME Board of Directors Meeting, Atherton Hilton, Vanderbilt Room

WEDNESDAY, MAY 23
8:00 a.m.-9:00 a.m.
REGISTRATION Keller Conference Center
9:00 a.m.-9:30 a.m.
OPENING CEREMONY Nittany Lion Inn, Colonial Room
OPENING REMARKS
P.H. Cohen and L. Ham
WELCOME REMARKS
W. Richardson, Executive Vice President and Provost, Pennsylvania State
University
J.A. Brighton, Dean of Engineering, Pennsylvania State University
INTRODUCTORY REMARKS
K.J. Weimann, NAMRE/SME President, Michigan Technological University
9:30 a.m.-10:00 a.m.
KEYNOTE PAPER
"The Historical Evolution of Computer-Integrated Manufacturing," M.E.
Merchant, Director of Advanced Manufacturing Research, Metco Research
Associates
10:00 a.m.-10:30 a.m.
COFFEE BREAK Keller Conference Center, 5th Floor
10:30 a.m.-12:00 Noon
SESSION F-1 506 Keller
Co-Chairmen: 9:1-6th, Battelle Memorial Institute and J.C. Conway, 
Pennsylvania State University
F-1-1: "A Penalty Rigid-Plastic Finite Element Method for Determination of
Stress Distributions at the Tool-Workpiece Interfaces in Metal Forming," 
S.M. Hoang, M.S. Jean and J.B. Park, Polbing Institute of Science and
Technology, Korea
**SESSION M-1**

Co-Chairmen: M.F. DeVries, University of Wisconsin and Y.C. Shen, Pennsylvania State University


M-1-2: "Monitoring of Peripheral Milling Using Acoustic Emission," M. Liu, Oklahoma State University, S.T. Lang, Georgia Institute of Technology

M-1-3: "Multiple Sensor Integration via Neural Networks for Estimating Surface Roughness and Rotor Torsion in Circumferential Milling," A.C. Oguns, M. Marous, and R. Tirpitz, University of Missouri-Rolla

**SESSION S-1**

Co-Chairmen: M.E. DeVor, University of Illinois at Urbana-Champaign and P. Egbele, Pennsylvania State University


S-1-3: "Obstacle Avoidance for Redundant Robots," R.M. Carr, K.A. Erickson, and P.M. Ferreira, University of Illinois at Urbana-Champaign

**LUNCHEON**
Uttary Lion Inn, Assembly Room

**SESSION M-2**

Co-Chairmen: R. Komanduri, Oklahoma State University and T.C. Ramani, Tennessee Technological University


M-2-6: "A New Approach to Estimating the Cutting Process Damping under Wobbing Conditions," S.C. Lin, National Tsing-Hua University, ROC, R.E. DeVor and S.G. Kapoor, University of Illinois at Urbana-Champaign, and J.W. Sutherland, PDC, Inc.

**SESSION S-2**

Co-Chairmen: S.Y. Lu, University of Illinois at Urbana-Champaign and S. Kamara, Pennsylvania State University

S-2-4: "Ultrasonic Part Recognition System Incorporated in a Microcomputer Controlled Robotic Cell," Z. Katz and D. DeM. Vilet, University of Natal, South Africa


**COFFEE BREAK**

**SESSION F-2**

Co-Chairmen: R.A. Kehler, University of Missouri-Rolla and C. Ried, Pennsylvania State University


F-2-8: "A New Approach to the Evaluation of High Strain Flow Curve Data Using the Tensile Test," M. Koorn, Ohio State University, A. Greber and K. Pohlmi, University of Stuttgart, West Germany

F-3-9: "An Investigation of the Heat Transfer and Friction in Hot Forging of 304 Stainless and Ti-6Al-4V," P.R. Barry, Delco Moraine Division of General Motors, S.L. Sennett, Battelle Memorial Institute and T. Altan, Ohio State University

**SESSION M-3**

Co-Chairmen: D. Dornfeld, University of California-Berkeley and K. Ehmann, Northwestern University

**SESSION M-2**

Co-Chairmen: R. Komanduri, Oklahoma State University and T.C. Ramani, Tennessee Technological University


M-2-6: "A New Approach to Estimating the Cutting Process Damping under Wobbing Conditions," S.C. Lin, National Tsing-Hua University, ROC, R.E. DeVor and S.G. Kapoor, University of Illinois at Urbana-Champaign, and J.W. Sutherland, PDC, Inc.

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**COFFEE BREAK**

**SESSION F-3**

Co-Chairmen: R.A. Kehler, University of Missouri-Rolla and C. Ried, Pennsylvania State University

F-3-7: "The Significance of the Elastic Deformation of the Workpiece Sample in the Strip-Tension Friction Test," S.R. Stonesh and R.J. Weisman, Michigan Technological University

F-3-8: "A New Approach to the Evaluation of High Strain Flow Curve Data Using the Tensile Test," M. Koorn, Ohio State University, A. Greber and K. Pohlmi, University of Stuttgart, West Germany

F-3-9: "An Investigation of the Heat Transfer and Friction in Hot Forging of 304 Stainless and Ti-6Al-4V," P.R. Barry, Delco Moraine Division of General Motors, S.L. Sennett, Battelle Memorial Institute and T. Altan, Ohio State University

**SESSION M-3**

Co-Chairmen: D. Dornfeld, University of California-Berkeley and K. Ehmann, Northwestern University

M-3-8: "Shear Angle Model for Contact Contact Machining of Aluminum and Brass," P.C-H Lin and J.T. Black, Auburn University


3:30 p.m.-5:00 p.m.
SESSION S-3 502 Keller
Co-Chairmen: G. Chikasawa, Massachusetts Institute of Technology and D.J. Medero, Pennsylvania State University
S-3-1: "Eliminator of Adjustment on Machining," D.S. Cochran, Ford Motor Company
S-3-2: "A New Control Method and System for FMS Job Scheduling," M. Zhou and Z. Hong, Tsinghua University, China
S-3-3: "In-Process 100% Measurement and Statistical Analysis for an Automotive Body Assembly Process," S. Hu and S.M. Wu, University of Michigan

6:00 p.m.-7:00 p.m.
COCKTAIL RECEPTION (Cash Bar) Days Inn Penn State

7:00 p.m.-9:00 p.m.
CONFERENCE BANQUET Days Inn Penn State

THURSDAY, MAY 24

8:30 a.m.-10:00 a.m.
SESSION F-4 506 Keller
Co-Chairmen: K.J. Weinmann, Michigan Technological University, and D. Pennebaker, Ford-New Holland
F-4-10: "Study on the Ratios of the Axial Forces in Rotary Forging Flankers with a Shaft," X. Pei, X. Xin and M. Xiao, Harbin Institute of Technology, China, and X. Zhaun, British Commission of Foreign Economic Relations and Trade, China
F-4-11: "Determination-Informed Residual Stresses and Stress Corrosion in Deep-Drawn Components of Brass Materials," K. Lange and L. Bouldner, University of Stuttgart, West Germany
F-4-12: "Blocker Forging Preform Design by Solid Modelling Primitive Modification," Y. Zhang and W.A. Knight, University of Rhode Island

8:30 a.m.-10:00 a.m.
SESSION M-4 501 Keller
Co-Chairmen: K. Breuer, Rensselaer Polytechnic Institute and R. Lindhold, Cleveland State University
M-4-1: "A Non-Contact Sensing Technique for Measuring the Gripping Forces in Lathe Chuck," K. Niyazide and M. Srinivas, Auburn University
M-4-11: "Neural Network Approach for Representation and Simulation of 3D Cutting Dynamics," Z. Tanem, Tufts University
M-4-12: "Effect of Scalloping Flaws on Surface Integrity of Cast Iron," D. Zhang, Shanghai Jiao Tong University, China

8:30 a.m.-10:00 a.m.
SESSION S-4 502 Keller
Co-Chairmen: M.C. Lau, New Jersey Institute of Technology and S. Joshi, Pennsylvania State University
S-4-10: "A Prototype of a Next-Generation Control Environment," P.K. Wright, L. Greenfield and L. Mayes, New York University
S-4-11: "Simulation Study of an Improved Scheme for Forecasting Cooperator Control (IFCC)," H.Q. Zhang, Southwestern Jiao Tong University, China, J. Ni and S.M. Wu, University of Michigan
S-4-12: "Development of a Hybrid Table System (Rolling Guideway with Variable Friction Force)," T. Ayazama and I. Jansaki, Keio University, Japan

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

10:30 a.m.-12:00 Noon
SESSION F-5 506 Keller
Chairman: T. Aitken, Ohio State University
Panel Discussion on "Near Net Shape Forming"
Panel Members: A. Macc, Weirghouse Electric Corporation
Sd. Ol, Battelle Memorial Institute
S.M. Schroth, Eaton Corporation
K.J. Weinmann, Michigan Technological University

10:30 a.m.-12:00 Noon
SESSION M-5 501 Keller
Chairman: J. Mayer, Jr., Texas A & M University
Panel Discussion on "Machining of Ceramics"
Panel Members: G. Chrysouhlos, MIT
M. Marzous, Flow Research, Inc.
S. Mutf, University of Massachusetts
R. Suhramman, Norton Co.

10:30 a.m.-12:00 Noon
SESSION S-5 502 Keller
Chairman: J. Mason, Xerox Corporation
Panel Discussion on "Concurrent Design"
Panel Members: R. Nagel, Cognitive Corporation
G. Shumaker, WROCMTR, WPAFB
D. Whitney, Charles Stark Draper Lab
C. C. Wilson, University of Tennessee
1:20 Noon-1:30 p.m.
NAMRI/SME LUNCHEON  Nittany Lion Inn, Colonial Room

1:30 p.m.-2:30 p.m.
SESSION F-6  506 Keller
Co-Chairmen: G.D. Lahoti, Timken Co. and A. Bayoumy, Washington State University
F-6:14: "Mathematical Simulation of Complex Asymmetrical Rolling of Clad Sheets and Sandwich Sheets," M. Xuanchi and Y-M. Hyung, University of Tokyo, Japan
F-6:15: "Combining Finite Element Methods and the Cockcroft and Latham Criteria to Predict Free Surface Workability of Cast Forgings," J.L. Frater and G.J. Petroos, Cleveland State University

1:30 p.m.-3:30 p.m.
SESSION M-6  501 Keller
Co-Chairmen: S. Malhotra, University of Massachusetts and R. Goddard, American Starlifter Co.
M-6:14: "Observations of the Effect of Diamond-Like Carbon Coating on Aluminum Tool Flank Wear," S. Kim, W.J. Yeh and D. Durham, University of Vermont
M-6:15: "Practical Implementation of Tertiary Cutter Motions for the Improvement of 3-D Sculptured Surface Characteristics in Milling," M.S. Hong and M.F. Romano, Northwestern University
M-6:16: "Improving Cutting Performance by Using Boring Bar with Tor-sionally Compliant Head," E. Rives and H. Kang, Wayne State University

1:20 p.m.-2:30 p.m.
SESSION S-6  502 Keller
Co-Chairmen: D. Koening, Steelway and B. Wang, SUNY Buffalo
S-6:15: "The Enhanced Hitachi Assembler/Assembler Evaluation Method (AEM)," S. Miyakawa, Y. Ohishi, and M. Isota, Hitachi Ltd., Japan

3:30 p.m.-4:00 p.m.
COFFEE BREAK

4:00 p.m.-5:00 p.m.
TOUR OF MANUFACTURING LABORATORIES
A tour of the Department of Industrial and Management Systems Engineering including Computer Integrated Manufacturing (SIMS Laboratory), Electronics Assembly Laboratory, Computer Aided Design Laboratory, Precision Measurement Laboratory, and Artificial Intelligence Design Laboratory. Tours of Pennsylvania State's Materials Research Laboratory and Applied Research Laboratory may also be arranged.

5:00 p.m.-6:00 p.m.
WINE AND CHEESE RECEPTION  Nittany Lion Inn, Fireside Lounge

6:00 p.m.
NAMRI/SME MEMBERSHIP MEETING  501 Keller

7:00 p.m.
ASME PRODUCTION ENGINEERING DIVISION MEETING  501 Keller
(please note that this meeting will start immediately following the NAMRI/SME Membership Meeting)

DINNER ON YOUR OWN

FRIDAY, MAY 25

8:30 a.m.-10:00 a.m.
SESSION F-7  500 Keller
Chairman: L. Arad, National Science Foundation
"Recent Developments and Trends in Forming Research and Technology"
This session will feature informal presentations on recent progress and future trends in forming research and technology interested participants from academic and industry are encouraged to present their research and ideas. Please contact Professor P.H. Cohen (814) 865-2357 if you are interested in participating.

8:30 a.m.-10:00 a.m.
SESSION M-7  501 Keller
Co-Chairmen: L. Rup, McGill University and C. Goss, MANTECH
M-7:17: "Experimental Study of Die-Sinking by Electrochemical-Dissolution Machining," A.B.E. Khury, Sultan Qaboos University, Sultanate of Oman
M-7:18: "Improvement in EDM Tool Wear Ratio and Material Removal Rate with Modified R.F. Control Unit," W.M. Wang and K.P. Rajdhar, University of Nebraska-Lincoln
M-7:19: "Aspects of Surface Quality for Laser Machining of Composite Materials," G. Chirissouris and P. Sheng, Massachusetts Institute of Technology
SESSION S-7  502 Kelley
Co-Chairmen: R. Weil, Technica, Israel and A. Leibholz, Pennsylvania State University

S-7-17: “Tolerance Primitives for Composition and Synthesis,” R.G. Wilhelm and S. C-T. Lu, University of Illinois at Urbana-Champaign

S-7-18: “Selection of Dimensions, Tolerances and Precision for Automated Assembly of Pegs and Holes,” C. Doymum and N. Duke Perreira, Lehigh University


S-7-20: “Analysis of Optimal Machining Conditions for Flow-Type Automated Manufacturing Systems Under Maximum Production Rate,” K. Hiron, Kyoto University, Japan

10:00 a.m.-11:00 a.m.

COFFEE BREAK

ADJOURNMENT