



59th CIRP General Assembly
August 23-29, 2009
Boston, MA, USA

Program

Contents

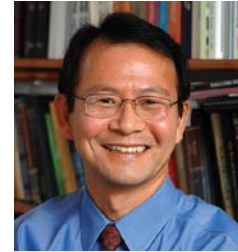
| | |
|---|----|
| Welcome | 3 |
| Acknowledgements | 4 |
| CIRP Council | 5 |
| Liaison Committee | 5 |
| Editorial Committee | 5 |
| Organizing Committee | 6 |
| Venue | 8 |
| Venue & City Map | 9 |
| General Information | 10 |
| 2009 General Assembly Program Part I | 20 |
| 2009 General Assembly Program Part II | 21 |
| Conference Floor Plan | 22 |
| Session Program | 26 |
| CMAG - Corporate Members Advisory Group Meeting | 50 |
| Social Program | 52 |
| Accompanying Persons Program | 53 |

Dear Colleagues and Friends,

On behalf of the U.S. CIRP members, it is our pleasure to welcome you to the 59th CIRP General Assembly in Boston, Massachusetts, one of the most scenic and historic cities of United States. The General Assembly will be held at the Westin Copley Place, winner of the AAA Four Diamond Award®, in the heart of trendy Back Bay.



Nam Pyo Suh



Jung-Hoon Chun

Boston is the home of outstanding research universities and hospitals, including MIT, Harvard University, and Massachusetts General Hospital. Because of these institutions, Boston has been a magnet for some of the world's most talented and skilled people, who have not only contributed to research and education but also helped to make this region a vibrant and dynamic cultural and technological center. During the past six decades, the New England area — which consists of six states, including Massachusetts — has transformed itself from being the capital of shoe manufacturing in the 1950's to a hub of computers and software in the 1970's and 1980's, and now one of the world's major biotechnology centers.

The Westin Copley Place is located in downtown Boston, in the heart of the city where people of all ages can wander around for days without running out of things to do and see. In addition to renowned art and science museums, there is Fenway Park, home to baseball's Boston Red Sox; Faneuil Hall Marketplace, a collection of boutiques, eateries and pushcart vendors housed in converted 18th century warehouses; Swan Boats in the Public Garden, the oldest public park and botanical garden in the country; and a grand variety of restaurants to please the most sophisticated palates.

Our Accompanying Persons Program will feature historic and educational sites, including Plymouth, MA and Newport, RI. Attendees will enjoy Boston's cultural resources, fine dining, and beautiful countryside.

Of course, the CIRP meeting itself will offer a most interesting and challenging agenda, with impressive speakers and productive discussion.

We hope you enjoy your stay in Boston and wish you a successful 59th CIRP General Assembly.

Nam Pyo Suh

Jung-Hoon Chun

Chairpersons of the Organizing Committee

Acknowledgements

The Organizing Committee wishes to thank the following organizations and individuals, who contributed in preparing the 59th CIRP General Assembly:

CIRP President Professor Robert Hocken

CIRP Office Professor Didier Dumur, Secretary General
 Treasurer
 Ms. Chantal Timar-Schubert, Assistant
 Secretary General
 Ms. Agnès Chelet, Accountant



DP Technology Corporation



DTL Corporation



MIT Laboratory for Manufacturing and Productivity



MIT Park Center for Complex Systems



National Science Foundation



Parametric Technology Corporation

Professor David and Mrs. Barbara Dornfeld, for creating a wonderful Post-Conference Tour, which was unfortunately cancelled due to low participation.

CIRP Council 2009

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Professor F. van Houten
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Professor D. Lucca
Professor L. Monostori
Professor A. Nee
Professor K. Ueda

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| C | K. Bouzakis | B. Denkena | M. Davies |
| D | L. Laperrière | G. Reinhart | G. O'Donnell |
| Dn | A. Nee | P. Gu | A. Bernard |
| E | M. Kunieda | B. Lauwers | A. Malshe |
| F | J. Jeswiet | P. Bariani | J. Alwood |
| G | J. Oliveira | F. Hashimoto | J. Aurich |
| M | S. Smith | M. Mitsubishi | C. Brecher |
| O | N. Duffie | K. Ueda | R. Teti |
| P | T. Estler | A. Weckenmann | W. Knapp |
| S | A. Balsamo | H. Hansen | H. Haitjema |

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Professor Jung-Hoon Chun, *Fellow*, Massachusetts Institute of Technology, USA

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Mrs. Dene Hocken

Mrs. Soah Kim

Mrs. Joyce Lucca

Mrs. Young Suh

Dr. Sigrid Weinmann

Logistics Team

Mr. David Rodriguera

Ms. Rachel Russell



Badges and Tickets

Name badge colors indicate the attendee type and program chosen.

| Attendee Type | Badge Color |
|----------------------------------|-------------|
| Member, Part I & II | Dark Blue |
| Member, Part I Only | Light Blue |
| Member, Part II Only | Light Blue |
| Invited Guest | Yellow |
| Accompanying Person, Part I & II | Green |
| Accompanying Person, Part I Only | Light Green |
| Exhibitor | Grey |
| Organizer | Red |

Admission to the CIRP meetings, accompanying persons program and social events are only for persons wearing official CIRP 2009 **name badges** and in possession of **valid tickets**.

Coffee Breaks

Monday: America Ballroom Foyer, 4th Floor
Tuesday – Saturday: Essex Foyer, 3rd Floor

Lunch

Monday – Wednesday: America North/Center Ballroom, 4th Floor
Thursday – Saturday: Staffordshire, 3rd Floor



Climate

In August, the average temperature in Boston is 80° F/ 27° C. Sunglasses, hats and sun block are beneficial at this time of the year. Due to the proximity to the ocean, humidity is quite high and there may be a chance of rain.

Currency

The currency of the United States is the U.S. dollar. The U.S. dollar is normally abbreviated as the dollar sign, \$, or as USD. It is divided into 100 cents. Money can be exchanged at Logan International Airport, ATMs, banks, and at hotels. Credit cards are widely accepted in area restaurants, shops, and hotels.

Taxes

The general sales tax in Boston is 6.25% and is applied to meals, durable goods and services. It is also added to the price of clothing in excess of \$175. Hotel occupancy tax is 12.45% including state, city and convention tax.

Tipping

Tipping is a widely practiced social custom in the United States. Gratuities are given as a reward for services rendered in hotels, bars, restaurants and taxi transportation. The amount of the tip is at the discretion of the customer.

Guidelines:

Hotels: Bellman, housekeeping, and room service is usually a few dollars

Bars: \$1 per drink

Restaurants: 15% – 25% of total bill before tax

Taxi: 15% of fare

Restaurant Suggestions

Breakfast

| | | |
|--|--|---|
| Thornton's Restaurant (Across from Prudential Shopping Mall) 150 Huntington Avenue Boston, MA (617) 267-6336 | Starbucks (Westin Copley Place lobby) 10 Huntington Avenue Boston, MA (617) 867-0491 | Au Bon Pain (Copley Place Mall) 100 Huntington Avenue Boston, MA (617) 247-9467 |
| Paradise Bakery & Café (Prudential Center Food Court) 800 Boylston Street Boston, MA (617) 267-3335 | Swan's Café (Boston Park Plaza) 64 Arlington Street Boston, MA (617) 457-2357 | Brasserie Jo 120 Huntington Avenue Boston, MA (617) 425-3240 |
| The Huntington (Westin Copley Place) 10 Huntington Avenue Boston, MA (617) 424-7429 | Asana (Mandarin Oriental Hotel) 776 Boylston Street Boston, MA (617) 535-8800 | Azure 61 Exeter Street Boston, MA (617) 933-4800 |
| Oak Room (The Fairmont Copley Plaza) 138 St. James Street Boston, MA (617) 267-5300 | Stanhope Grille (The Back Bay Hotel) 350 Stuart Street Boston, MA (617) 532-3827 | Charlie's Sandwich Shoppe 429 Columbus Avenue Boston, MA (617) 536-7669 |
| Appleton Bakery 123 Appleton Street Boston, MA (617) 859-8222 | Amsterdam Café 517 Columbus Avenue Boston, MA (617) 437-6400 | Finagle a Bagel 535 Boylston Street Boston, MA (617) 266-2500 |

Restaurant Suggestions

Dinner

| | | |
|--|--|---|
| Turner Fisheries Restaurant & Bar (Westin Copley Place) 10 Huntington Avenue Boston, MA (617) 424-7425 | The Palm Restaurant (Westin Copley Place) 10 Huntington Avenue Boston, MA (617) 867-9292 | Bar 10 (Westin Copley Place) 10 Huntington Avenue Boston, MA (617) 424-7446 |
| Osushi (Westin Copley Place) 10 Huntington Avenue Boston, MA (617) 266-2788 | Bonfire (Boston Park Plaza) 50 Park Plaza Boston, MA (617) 262-3473 | McCormick & Schmick's 34 Columbus Avenue Boston, MA (617) 482-3999 |
| M.J. O' Connor's Irish Pub 27 Columbus Avenue Boston, MA (617) 482-2255 | Smith & Wollensky 101 Arlington Street Boston, MA (617) 423-1112 | The Melting Pot (Boston Park Plaza) 76 Arlington Street Boston, MA (617) 357-7007 |
| Sorellina 1 Huntington Avenue Boston, MA (617) 412-4600 | Azure Restaurant 65 Exeter Street Boston, MA (617) 933-4800 | Douzo Japanese Restaurant & Lounge 131 Dartmouth Street Boston, MA (617) 859-8885 |
| Skipjack's Seafood Emporium 199 Clarendon Street Boston, MA (617) 536-3500 | Morton's 699 Boylston Street Boston, MA (617) 266-5858 | Sasso Restaurant 116 Huntington Avenue Boston, MA (617) 247-2400 |
| Abe & Louie's 793 Boylston Street Boston, MA (617) 536-6300 | Atlantic Fish Company 761 Boylston Street Boston, MA (617) 267-4000 | Sel de la Terre 774 Boylston Street Boston, MA (617) 266-8800 |
| Top of the Hub 800 Boylston Street Boston, MA (617) 536-1775 | Legal Sea Foods 800 Boylston Street Boston, MA (617) 266-6800 | PF Chang's China Bistro 8 Park Plaza Boston, MA (617) 573-0821 |
| Fleming's Prime Steakhouse & Wine Bar 217 Stuart Street Boston, MA (617) 292-0808 | Pigalle 75 Charles Street South Boston, MA (617) 423-4944 | Grill 23 and Bar 161 Berkeley Street Boston, MA (617) 542-2255 |

Transportation

Public Transportation

The Massachusetts Bay Transit Authority (MBTA) operates subways, buses, commuter trains and commuter boats. It is the fourth largest mass transit system in the U.S., serving 1.4 million riders each weekday on its buses, rapid transit and commuter boat lines.

Boston's subway (the T) is the backbone of the city's transit system. There are five color-coded lines — Red, Green, Orange, Blue and Silver. The T runs inbound (toward downtown) and outbound. Maps are located at each subway stop. Trains run Monday through Saturday approximately 5:00 am – 1:00 am. On Sunday, service begins about 40 minutes later, and the last trains leave downtown at 12:45 am. Fare is US\$2 for adults and riders can purchase CharlieCards in the subway terminals.

Bus lines link subway stations to neighborhoods not directly served by the subways. Fare is US\$0.90 (exact change required or CharlieCards may be used). You also can pay the US \$2 fare on a bus and ask for a subway transfer.

Commuter trains serve outlying areas as far as Worcester, Lowell, Rockport and Providence, Rhode Island (their routes are indicated by the purple lines on the MBTA map). Trains heading north connect to the subway system at North Station, trains to the south and west at South Station or Back Bay station. Tickets may be purchased at North Station, South Station and Back Bay Station. Tickets also are sold onboard, but there is a surcharge.

If you plan to use the public transportation system, you can save money and time by buying a Boston Passport Visitors Pass, which provides unlimited use of all MBTA transportation. One – and seven – day passes are available (US\$9 and US\$15, respectively).

For more information visit mbta.com.

Taxi

Taxis can be hailed on the street by whistling or waving your arm. All active cabs, whether engaged or not, have their lights lit. Hotel staff can also call cabs upon request. The cabs are metered.

Estimated rides:

Logan International Airport to/from The Westin Copley Place \$17

Logan International Airport to/from Boston Park Plaza Hotel \$15

Conference Transportation

Boston is known as “America's Walking City,” however, shuttle service will be provided to the Opening Session, to and from the social events, and before and after the Accompanying Persons Program.



Emergency and Medical Assistance

For emergency medical assistance please dial 911.

Insurance

Registration fees do not include insurance of any kind. The organizers cannot accept any responsibility or liability for injuries or losses sustained as a result of any cancellations, accidents, illness or other occurrences that may arise in connection with the 59th CIRP General Assembly functions and Accompanying Persons Program. Participants are advised to procure appropriate travel and health insurance themselves.



Conversion of U.S. Customary Units and Metric Equivalents

Length

| | |
|---------------------|-----------------|
| 1 Inch | 2.5 Centimeters |
| 1 Foot (12 Inches) | 0.3 Meters |
| 1 Yard (3 Feet) | 0.9 Meters |
| 1 Mile (5,280 Feet) | 1.6 Kilometers |

Volume, Capacity or Liquid Measure

| | |
|---------------------------------|----------------|
| 1 Ounce | 30 Milliliters |
| 1 Pint (16 Ounces) | 0.5 Liters |
| 1 Quart (2 Pints or 1/4 Gallon) | 0.9 Liters |
| 1 Gallon (8 Pints) | 3.8 Liters |

Weight

| | |
|---------|-----------|
| 1 Ounce | 28 Grams |
| 1 Pound | 454 Grams |

Temperature

| | | |
|-------------------------|------------------|--------------|
| A Mild Day | 68° Fahrenheit | 20° Celsius |
| A Hot Day | 86° Fahrenheit | 30° Celsius |
| Normal Body Temperature | 98.6° Fahrenheit | 37° Celsius |
| A Very Hot Day | 104° Fahrenheit | 40° Celsius |
| Boiling Point of Water | 212° Fahrenheit | 100° Celsius |

Area

| | |
|--------|---------------------|
| 1 Acre | 4,047 Square Meters |
|--------|---------------------|

2009 General Assembly Program Part I

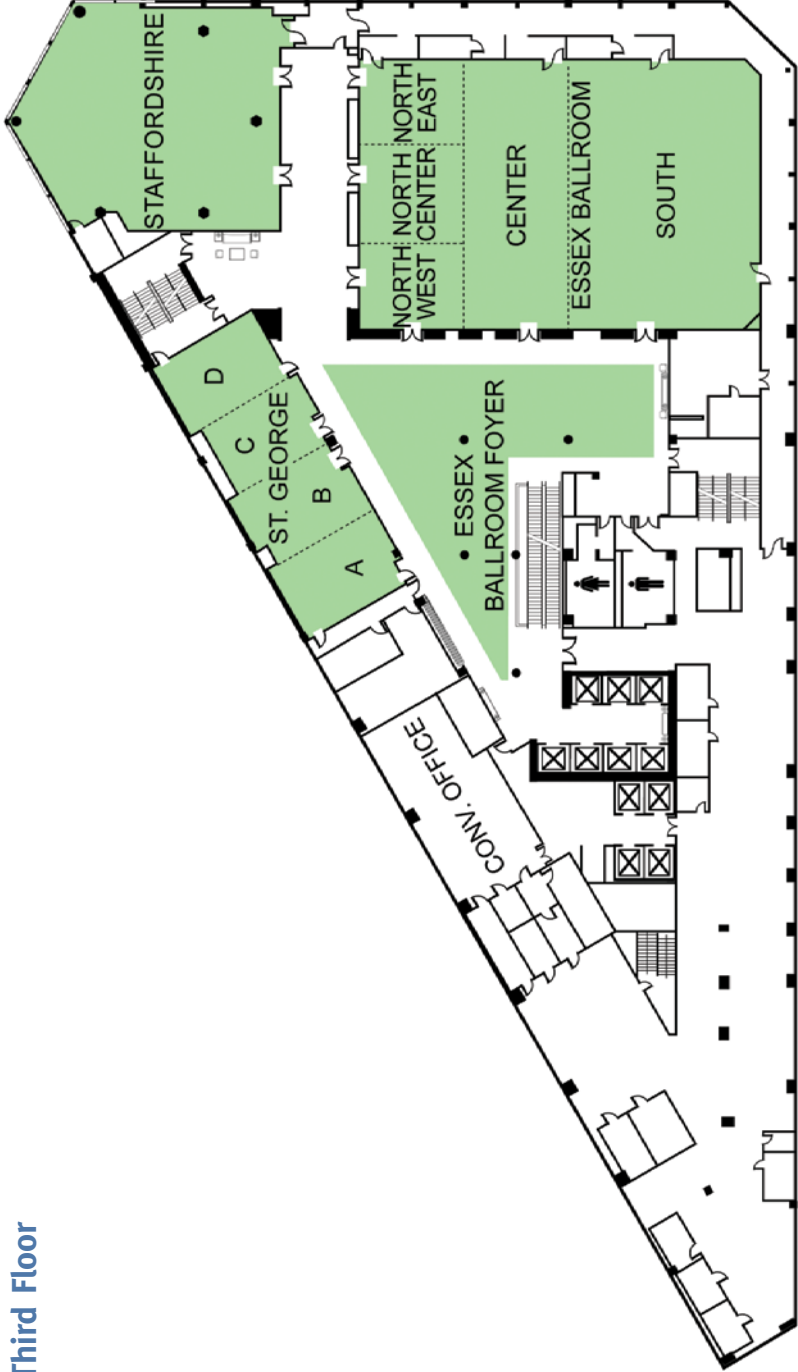
| | Sunday, August 23, 2009 | Monday, August 24, 2009 | Tuesday, August 25, 2009 | Wednesday, August 26, 2009 | |
|-------------------|--|---|---|----------------------------|-------|
| 8:30 - 9:00AM | Registration | Registration | P4 | O5 | |
| 9:00 - 9:30AM | | | P5 | O6 | |
| 9:30 - 10:00AM | | | P6 | O7 | |
| 10:00 - 10:30AM | Board Meeting | Opening Session | Coffee Break | | |
| 10:30 - 11:00AM | | | P7 | O8 | |
| 11:00 - 11:30AM | | | P8 | O9 | |
| 11:30AM - 12:00PM | | | P9 | O10 | |
| 12:00 - 2:00PM | | | Lunch | | Lunch |
| 2:00 - 2:30PM | Credential Committee | Keynote Paper F | Okn C1 | Okn C13 | |
| 2:30 - 3:00PM | | Keynote Paper M | Okn C2 | Okn C14 | |
| 3:00 - 3:30PM | Nomination Committee | Keynote Paper S | O1 | O13 | |
| 3:30 - 4:00PM | | Coffee Break | | Coffee Break | |
| 4:00 - 4:30PM | | Editorial Committee | Pkn G1 | O2 | O14 |
| 4:30 - 5:00PM | Pkn G2 | | O3 | O15 | |
| 5:00 - 5:30PM | P1 G3 | | O4 | O16 | |
| 5:30 - 6:00PM | P2 G4 | | Senate Meeting | A11 | |
| 6:00 - 6:30PM | P3 | Assembly Dinner Westin Copley Place America Ballroom, 4th Floor 7:00 - 11:00pm | Coffee Break | | |
| | Welcome Reception Westin Copley Place Staffordshire, 3rd Floor 7:00 - 10:00pm | | Presentation of the 60th General Assembly (Pisa, Italy) Staffordshire, 3rd Floor | | |

| | Thursday, August 27, 2009 | Friday, August 28, 2009 | Saturday, August 29, 2009 |
|-------------------|---------------------------|-------------------------|---|
| 8:30 - 10:00AM | STC Dn | STC F | Liaison Committee Meeting |
| 10:00 - 10:30AM | STC D | STC C | Coffee Break |
| 10:30AM - 12:30PM | STC Dn | STC F | Council Meeting |
| 12:30 - 2:00PM | Lunch | | Lunch |
| 2:00 - 4:00PM | STC S | STC G | General Meeting Part I: Fellows, Honorary, Emeritus 2:00 - 3:00pm General Meeting Part II: All Members 3:00 - 4:30pm |
| 4:00 - 4:30PM | STC S | STC G | Coffee Break |
| 4:30 - 6:00PM | STC S | STC G | Farewell Dinner Prudential Center Skywalk Observatory 7:00 - 11:00pm |

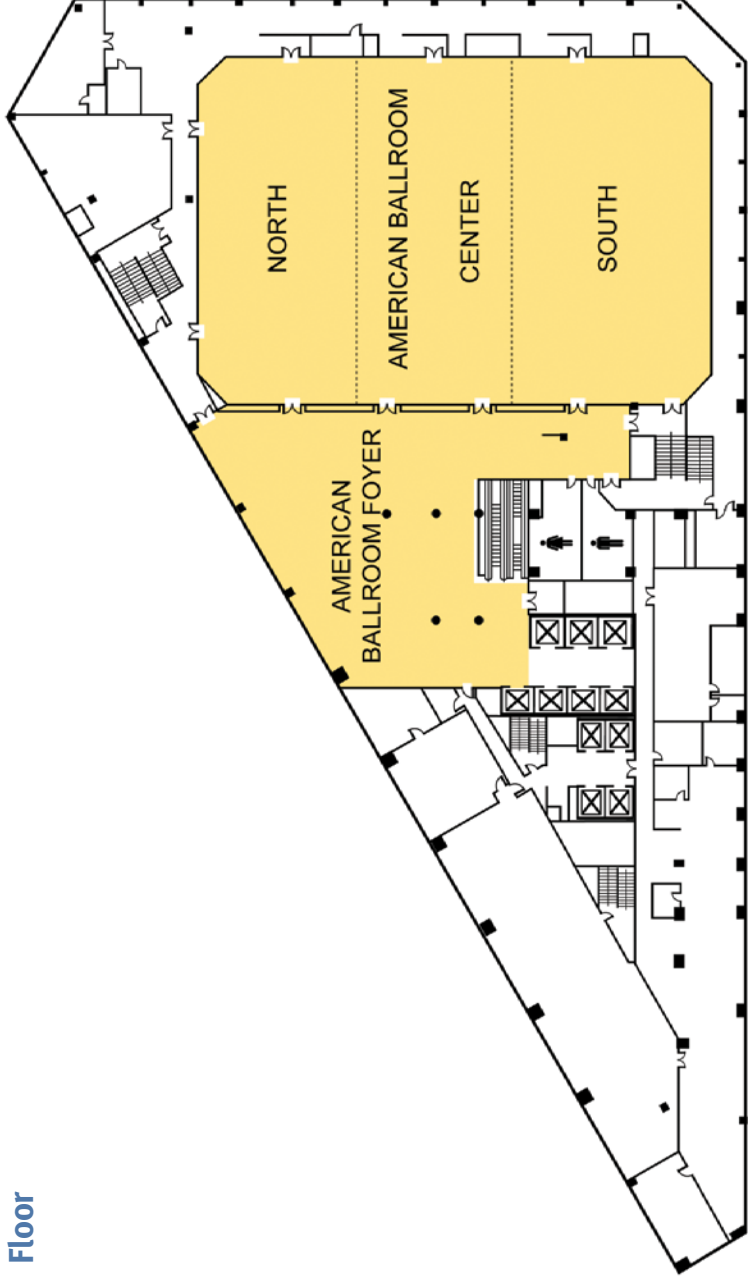
2009 General Assembly Program Part II

Conference Floor Plan

Third Floor

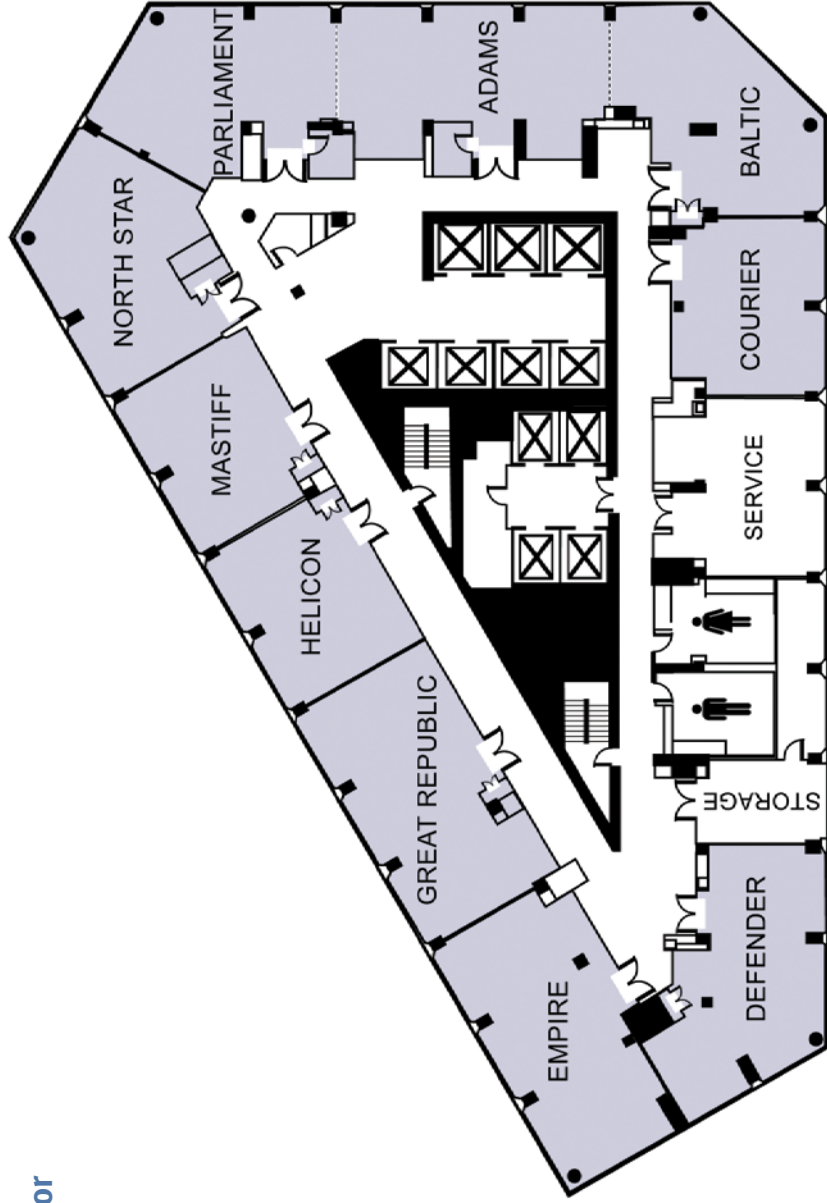


Fourth Floor



Conference Floor Plan

Seventh Floor



Accessibility

The Westin Copley Place has a bank of seven passenger elevators. There are escalators connecting the second (Lobby), third and fourth floors.

August 24, 2009

Westin Copley Place, America Ballroom, 4th Floor

Opening Session

- 9:00 am Middlesex County Volunteers Fifes & Drums**
- 9:10 am Opening Address by the CIRP President**
Professor Robert Hocken
- 9:20 am Welcome Address by the Chairman of the Organizing Committee**
Professor Nam Pyo Suh
- 9:30 am Everybody's Business: Science and Engineering Policy for a New Economy**
*Dr. Arden L. Bement, Jr., Director
National Science Foundation*
- 9:50 am Thinking Outside of the Box**
*Dr. George N. Hatsopoulos, Chairman & CEO
Pharos, LLC*
- 10:10 am Presentation of the Taylor Medal and General Nicolau Award**
Professor Robert Hocken
- 10:25 am Announcements**
- 10:30 am Coffee Break**

Accompanying Persons Program
Welcome Meeting
Staffordshire Room, 3rd Floor

August 24, 2009

Westin Copley Place, America Ballroom, 4th Floor

Opening Session Keynote Papers

- 11:00 am Keynote C**
Burrs - Analysis, Control and Removal
*J.C. Aurich (2), D. Dornfeld (1), P.J. Arrazola (3),
V. Franke, L. Leitz, S. Min (2)*
- 11:30 am Keynote Dn**
Design Methodologies: Industrial and Educational Applications
*T. Tomiyama (1), P. Gu (1), Y. Jin, D. Lutters (2),
Ch. Kind, F. Kimura (1)*
- 12:00 pm Lunch**
- 2:00 pm Keynote F**
Size Effects in Manufacturing of Metallic Components
*F. Vollertsen (1), D. Biermann,
H.N. Hansen (1), I.S. Jawahir (1), K. Kuzman (2)*
- 2:30 pm Keynote M**
Interaction of Manufacturing Process and Machine Tool
C. Brecher (2), M. Esser, S. Witt
- 3:00 pm Keynote S**
Surface Technology for Automotive Engineering
*K. Bewilogua, G. Bräuer, A. Dietz, J. Gäbler,
G. Goch (1), B. Karpuschewski (1), B. Szyszka*
- 3:30 pm Coffee Break**
- 4:00 pm Paper Sessions** on STCs Dn, E, F, G and P
(Refer to STC Session schedule)

Chairman: Professor M. Hauschild

August 26, 8:30 am – 9:30 am, Staffordshire Room, 3rd Floor

Keynote Paper: Cooperation of Humans and Machines in Assembly Lines

J. Krüger (2), T.K. Lien (2), A. Verl (2)

August 26, 9:30 am – 10:00 am, Staffordshire Room, 3rd Floor

A1 Evaluation of Scenario-Based Modularization for Lifecycle Design

Y. Umeda (2), S. Fukushige, K. Tonoike

August 26, 10:30 am – 12:00 pm, Staffordshire Room, 3rd Floor

A2 Recycling Process Planning for the End-of-Life Management of Waste from Electrical and Electronic Equipment

S. Rahimifard, M.S. Abu Bakar, D.J. Williams (1)

A3 Environmental Impact Analysis of Composite Use in Car Manufacturing

J.R. Duflou (2), J. De Moor, I. Verpoest, W. Dewulf

A4 Effects of Globalisation on Carbon Footprints of Products

I.T. Herrmann, M.Z. Hauschild (2)

August 26, 2:00 pm – 3:30 pm, Staffordshire Room, 3rd Floor

A5 Experimental and Numerical Appraisal of Self-Piercing Riveting

E. Atzeni, R. Ippolito, L. Settineri (2)

A6 Grasping Leather Plies by Bernoulli Grippers

G. Dini (1), G. Fantoni, F. Failli

A7 Automatic Programming of Robot-Mounted 3D Optical Scanning Devices to Easily Measure Parts in High-Variant Assembly

G. Reinhart (1), W. Tekouo

August 26, 4:00 pm – 6:00 pm, Staffordshire Room, 3rd Floor

A8 Opportunistic Maintenance Based on Fuzzy Modelling of Component Proximity

W. Derigent, E. Thomas, E. Levrat, B. lung (2)

A9 Maximizing Utilization Rate of Office Automation Equipment by Intraoffice Circulation

S. Takata (1), K. Tsubouchi

A10 Functional Process Adjustments to Reduce No-Fault-Found Product Failures in Service Caused by In-Tolerance Faults

Prakash, L.E. Izquierdo, D. Ceglarek (1)

A11 Mill-Knurling as an Alternative to Laser Welding for Automotive Drivetrain Assembly

H. Coban, A.K.M. De Silva (2), D.K. Harrison

Chairman: Professor K. Bouzakis

August 24, 11:00 am – 11:30 am, America Ballroom, 4th Floor

Keynote Paper: Burrs - Analysis, Control and Removal

*J.C. Aurich (2), D. Dornfeld (1), P.J. Arrazola (3),
V. Franke, L. Leitz, S. Min (2)*

August 25, 2:00 pm – 3:30 pm, St. George C & D, 3rd Floor

C1 Laser Assisted Micro-Milling of Hard-to-Machine Materials

S. Melkote, M. Kumar, F. Hashimoto (1), G. Lahoti (1)

C2 Mechanistic Modeling and Accurate Measurement of Micro End Milling Forces

S.S. Park, M. Malekian / T. Hoshi (1)

C3 6-Axis Control Ultraprecision Microgrooving on Sculptured Surfaces with Non-Rotational Cutting Tool

Y. Takeuchi (1), Y. Yoneyama, T. Ishida, T. Kawai

August 25, 4:00 pm – 5:30 pm, St. George C & D, 3rd Floor

C4 Wear and Thermal Behaviour of CVD α -Al₂O₃ and MTCVD Ti(C,N) Coatings During Machining

R. M'Saoubi (2), S. Ruppi

C5 Application in Milling of Coated Tools with Rounded Cutting Edges after the Film Deposition

*K.-D. Bouzakis (1), S. Gerardis, G. Katirtzoglou,
S. Makrimalakis, A. Bouzakis, R. Cremer, H.-G. Fuss*

C6 CVD Diamond Coatings on Geometrically Complex Cutting Tools

E. Uhlmann (1), J. Koenig

August 26, 8:30 am – 10:00 am, St. George C & D, 3rd Floor

C7 Digital Microscope Observation of the Initial Stage of Cutting Monocrystalline Silicon

T. Inamura (2), Y. Shishikura, N. Takezawa

C8 Improving Surface Integrity in Orthogonal Machining of Hardened AISI 52100 Steel by Modeling White and Dark Layers Formation

D. Umbrello, L. Filice (2)

C9 A Finite Element Modeling Approach to Predicting White Layer Formation in Nickel Superalloys

S. Ranganath, C. Guo (2), P. Hegde

August 26, 10:30 am – 12:00 pm, St. George C & D, 3rd Floor

C10 A Novel Hybrid Predictive Model and Validation of Unique Hook-Shaped Residual Stress Profiles in Hard Turning

Y.B. Guo, S. Anurag, I.S. Jawahir (1)

C11 Analysis of the Influence of Tool Type, Coatings, and Machinability on the Thermal Fields in Orthogonal Machining of AISI 4140 Steels

P.J. Arrazola (3), I. Arriola, M.A. Davies (2)

C12 Process Adapted Structure Optimization of Deep Hole Drilling Tools

D. Biermann, M. Kersting, N. Kessler / K. Weinert (1)

August 26, 2:00 pm – 3:30 pm, St. George C & D, 3rd Floor

C13 Model for Surface Topography Prediction in Peripheral Milling Considering Tool Vibration

*M. Arizmendi, F. J. Campa, J. Fernández (3),
L.N. López de Lacalle, A. Gil, E. Bilbao, F. Veiga,
A. Lamikiz / L. De Chiffre (1)*

C14 Temperature Control and Machine Dynamics in Chip Breaking Using CNC Toolpaths

S. Smith (1), B. Woody, W. Barkman, D. Tursky

C15 Tool Path Optimization for Free Form Surface Machining

I. Lazoglu (2), C. Manav, Y. Murtezaoglu

August 26, 4:00 pm – 5:30 pm, St. George C & D, 3rd Floor

C16 Characterization of the Dry High Speed Drilling Process of Woven Composites Using Machinability Maps Approach

S. Rawat, H. Attia (2)

C17 Optimum Process Parameters to Produce Green Ceramic Complex Parts

*T. El-Wardany, R. Barth, J. Holowczak, W. Tredway,
L.J. Chen (2)*

C18 A New Cutting Method for Bone Based on its Crack Propagation Characteristics

N. Sugita, T. Osa, R. Aoki, M. Mitsuishi (1)

Chairman: Professor A. Nee

August 24, 11:30 am – 12:00 pm, America Ballroom, 4th Floor

Keynote Paper: Design Methodologies: Industrial and Educational Applications

*T. Tomiyama (1), P. Gu (1), Y. Jin, D. Lutters (2),
Ch. Kind, F. Kimura (1)*

August 24, 4:00 pm – 6:00 pm, Essex NW & NC, 3rd Floor

Dn1 An Integrated Knowledge Reference System for Product Development

A. Bernard (1), Y. Xu

Dn2 Evolutionary Product Line Design Balancing Customer Needs and Product Commonality

S.L. Chen, R.J. Jiao, M.M. Tseng (1)

Dn3 A Platform for Facilitating Mass Collaborative Product Realization

M. Fathianathan, J.H. Panchal, A.Y.C. Nee (1)

Dn4 Focussing Product Innovation and Fostering Economies of Scale Based on Adaptive Product Platforms

G. Schuh (2), M. Lenders, J. Amoscht

August 25, 8:30 am – 10:00 am, Essex NW & NC, 3rd Floor

Dn5 Virtual Prototyping Enhanced by a Haptic Interface

S. Ha, L. Kim, S. Park, C. Jun, H. Rho (1)

Dn6 A Mixed Reality Environment for Collaborative Product Design and Development

S.K. Ong (2), Y. Shen

Dn7 New Potentials for Virtual Product Creation by Utilizing Grid Technology*R. Stark, H. Hayka, D. Langenberg / F.-L. Krause (1)***August 25, 10:30 am – 12:00 pm, Essex NW & NC, 3rd Floor****Dn8 Axiomatic Functional and Object-Oriented Product Design Framework***M.C. Leu (1), J.C. Wu, X.F. Liu***Dn9 A Synthetic DNA Based Approach to Design of Adaptive Systems***Y. Jin, G.E. Zouein, S.C-Y. Lu (1)***Dn10 Complexity in Design of Technical Systems***S.C-Y. Lu (1), N.P. Suh (1)***August 25, 2:00 pm – 3:30 pm, Essex NW & NC, 3rd Floor****Dn11 A Design Method for Systematic Safety Integration***R. Ghemraoui, L. Mathieu (1), N. Tricot***Dn12 Three Typical Failure Scenarios of the Mind Process of Design from the Axiomatic Design Perspective***M. Nakao (2), K. Tsuchiya, K. Iino***Dn13 Evolutionary Multi-objective Design Optimisation with Real Life Uncertainty and Constraints***R. Roy (2), Y.T. Azene, D. Farrugia, C. Onisa, J. Mehnen***Chairman: Professor M. Kunieda****August 25, 10:30 am – 11:30 pm, Staffordshire Room, 3rd Floor****Keynote Paper: Ion Beam, Focused Ion Beam, and Plasma Discharge Machining***D.M. Allen (1), P. Shore (2), R.W. Evans, C. Fanara, W. O'Brien, S. Marson, W. O'Neill***August 24, 4:00 pm – 6:00 pm, Staffordshire Room, 3rd Floor****E1 Electrochemical Superabrasive Machining of a Nickel-Based Aeroengine Alloy Using Mounted Grinding Points***D.T. Curtis, S.L. Soo, D.K. Aspinwall (2), C. Sage***E2 Electrochemical Micromachining of Microstructures of Micro Hole and Dimple Array***D. Zhu (1), N.S. Qu, H.S. Li, Y.B. Zeng, D.L. Li, S.Q. Qian***E3 Micro Electrochemical Machining for Complex Internal Micro Features***C.H. Jo, B.H. Kim, C.N. Chu (2)***E4 Shaped Tube Electrochemical Drilling of Good Quality Holes***S. Ali, S. Hinduja (1), J. Atkinson, M. Pandya***August 25, 8:30 am – 10:00 am, Staffordshire Room, 3rd Floor****E5 Experimental Study Aiming to Enhance the Surface Finish of Fused Deposition Modeled Parts***L.M. Galantucci (1), F. Lavecchia, G. Percoco***E6 Designing Direct Printing Process for Improved Piezoelectric Micro-Devices***S.P. Bathurst, S.-G. Kim (1)*

E7 Quantifying the Degree of Particle Melt in Selective Laser Sintering®

N. Hopkinson, C.E. Majewski, H. Zarringhalam / T.H.C. Childs (1)

August 25, 11:30 am – 12:00 pm, Staffordshire Room, 3rd Floor

E8 On the Formation of Laser Induced Self-Organizing Nanostructures

G.R.B.E. Römer, A.J. Huis in't Veld (3), J. Meijer (1), M.N.W. Groenendijk

August 25, 2:00 pm – 3:30 pm, Staffordshire Room, 3rd Floor

E9 Laser Droplet Generation: Application to Droplet Joining

E. Govekar (2), A. Jerič, M. Weigl, M. Schmidt (3)

E10 Computational Fluid Dynamics Analysis of Working Fluid Flow and Debris Movement in Wire EDM Kerf

A. Okada (2), Y. Uno, S. Onoda, S. Habib

E11 High Aspect Ratio Micro-Hole Drilling Aided with Ultrasonic Vibration and Planetary Movement of Electrode by Micro-EDM

Z.Y. Yu (2), Y. Zhang, J. Li, J. Luan, F. Zhao, D. Guo

August 25, 4:00 pm – 5:00 pm, Staffordshire Room, 3rd Floor

E12 Influence of the Pulse Shape on the EDM performance of Si₃N₄-TiN Ceramic Composite

K. Liu, D. Reynaerts, B. Lauwers (1)

E13 Sinking EDM Simulation by Determining Discharge Locations Based on Discharge Delay Time

K. Morimoto, M. Kunieda (2)

Chairman: Professor J. Jeswiet

August 24, 2:00 pm – 2:30 pm, America Ballroom, 4th Floor

Keynote Paper: Size Effects in Manufacturing of Metallic Components

F. Vollertsen (1), D. Biermann, H.N. Hansen (1), I.S. Jawahir (1), K. Kuzman (2)

August 24, 4:00 pm – 6:00 pm, Essex Center, 3rd Floor

F1 Investigation into a New Hybrid Forming Process: Incremental Sheet Forming Combined with Stretch Forming

B.T. Araghi, G.L. Manco, M. Bambach, G. Hirt (2)

F2 Single Point Incremental Forming of Polymers

P.A.F. Martins, L. Kwiatkowski, V. Franzen, A.E. Tekkaya (2), M. Kleiner (1)

F3 Increasing the Part Accuracy in Dieless Robot-Based Incremental Sheet Metal Forming

H. Meier (2), B. Buff, R. Laurischkat, V. Smukala

F4 Numerical and Experimental Investigation into Cold Incremental Rolling of Doubly Curved Plates for Process Design of a New LARS (Line Array Roll Set) Rolling Process

D.S. Shim, D.Y. Yang (1), K.H. Kim, M.S. Han, S.W. Chung

August 25, 8:30 am – 10:00 am, Essex Center, 3rd Floor

F5 A New Lubricant Carrier for Metal Forming

M. Arentoft (2), N. Bay (1), P.T. Tang, J.D. Jensen

F6 Evaluation of Coefficients of Friction in Hot Stamping by Hot Flat Drawing Test

A. Yanagida, A. Azushima (1)

- F7 Strip-on-Cylinder Test Apparatus for Die Wear Characterization**
J. Cao (2), R. Zhou, Q. Wang, Z. C. Xia / K. Weinmann (1)

August 25, 10:30 am – 12:00 pm, Essex Center, 3rd Floor

- F8 Modelling of the Mannesmann Effect**
A. Ghiotti, S. Fanini, S. Bruschi (2), P.F. Bariani (1)
- F9 A New Approach to Study Material Bonding in Extrusion Porthole Dies**
E. Ceretti (2), L. Fratini (2), F. Gagliardi, C. Giardini
- F10 Bending-Rolling Combinations for Strips with Optimized Cross-Section Geometries**
P. Groche (2), J. Ringler, T. Abu Shreehah

August 25, 2:00 pm – 3:30 pm, Essex Center, 3rd Floor

- F11 Prevention of Oxidation in Hot Stamping of Quenchable Steel Sheet by Oxidation Preventive Oil**
K. Mori (2), D. Ito
- F12 Deformation of Oxide Scale on Steel Surface During Hot Rolling**
*H. Utsunomiya, S. Doi, K. Hara, T. Sakai,
 S. Yanagi / M. Kiuchi*
- F13 Investigation on Induction Heating for Hot Stamping of Boron Alloyed Steels**
R. Kolleck (3), R. Veit, M. Merklein, J. Lechler, M. Geiger (1)

August 25, 4:00 pm – 5:30 pm, Essex Center, 3rd Floor

- F14 Sheet Metal Forming of Piezoceramic-Metal-Laminar Structures – Simulation and Experimental Analysis**
*W.-G. Drossel (3), S. Hensel, B. Kranz, M. Nestler,
 A. Goeschel (3) / R. Teti (1)*
- F15 Autonomous On-Line System for Fracture Identification at Incremental Sheet Forming**
A. Petek, K. Kuzman (2), B. Suhač
- F16 Closed-Loop Feedback Control of Product Properties in Flexible Metal Forming Processes with Mobile Tools**
J.M. Allwood (2), O. Music, A. Raithathna, S.R. Duncan

Chairman: Professor J. Oliveira

August 25, 8:30 am – 9:30 am, St. George C & D, 3rd Floor

Keynote Paper: Industrial Challenges in Grinding

*J.F.G. Oliveira (1), E.J. Silva, C. Guo (2),
F. Hashimoto (1)*

August 24, 4:00 pm – 6:00 pm, St. George C & D, 3rd Floor

G1 Characterization and Modelling of the Grinding Process of Metal Matrix Composites

A. Di Ilio, A. Paoletti, D. D'Addona (2)

G2 Magneto-Abrasive Machining for the Mechanical Preparation of High-Speed Steel Twist Drills

B. Karpuschewski (1), O. Byelyayev, V.S. Maiboroda

G3 Specific Energy in Grinding of Tungsten Carbides of Various Grain Sizes

Y.H. Ren, B. Zhang (2), Z.X. Zhou

G4 An Integrated Monitoring Method to Supervise Waterjet Machining

D.A. Axinte (2), M.C. Kong

August 25, 9:30 am- 10:00 am, St. George C & D, 3rd Floor

G5 Factors Affecting Wheel Collapse in Grinding

J. Badger / J. Webster (1)

August 25, 10:30 am – 12:00 pm, St. George C & D, 3rd Floor

G6 Micro Grinding Tool for Manufacture of Complex Structures in Brittle Materials

J.C. Aurich (2), J. Engmann, G.M. Schueler, R. Haberland

G7 Engineered Wheels for Grinding of Optical Glass

C. Heinzl, K. Rickens / H. Trumpold (1)

G8 Continuous Workpiece Speed Variation (CWSV): Model Based Practical Application to Avoid Chatter in Grinding

*D. Barrenetxea, J.I. Marquinez, I. Bediaga, L. Uriarte (3) /
R. Bueno (1)*

Chairman: Professor S. Smith

August 24, 2:30 pm – 3:00 pm, America Ballroom, 4th Floor

Keynote Paper: Interaction of Manufacturing Process and Machine Tool

C. Brecher (2), M. Esser, S. Witt

August 25, 4:00 pm – 5:30 pm, Essex NW & NC, 3rd Floor

M1 Rotary-Axial Spindles for Ultra-Precision Machining

X.-D. Lu, M.P. Paone, I. Usman, B. Moyls, K. Smeds, G. Rotherhofer, A.H. Slocum / W.T. Estler

M2 A Study on the Development of a Multi-Purpose Spindle System for Quality Productive Machining

M. Soshi, H. Ishiguro, K. Yamazaki (1)

M3 Design Optimization and Development of CNC Lathe Headstock to Minimize Thermal Deformation

M. Mori (2), H. Mizuguchi, M. Fujishima (3), Y. Ido, N. Mingkai, K. Konishi

August 26, 8:30 am – 10:00 am, Essex NW & NC, 3rd Floor

M4 Dynamic Stiffness Enhancement of Direct-Driven Machine Tools Using Sliding Mode Control with Disturbance Recovery

Y. Altintas (1), C.E. Okwudire

M5 Energy Optimized Jerk-Decoupling Technology for Translatory Feed Axes

B. Denkena (1), P. Hesse, O. Gümmner

M6 A Method for Direct Evaluation of the Dynamic 3D Path Accuracy of NC Machine Tools

B. Bringmann (2), P. Maglie

August 26, 10:30 am – 12:00 pm, Essex NW & NC, 3rd Floor

M7 Modeling and Simulation of 5-Axis Milling Processes

E. Budak (2), E. Ozturk, L.T. Tunc

M8 Analytical Prediction of Chatter Stability in Ball End Milling with Tool Inclination

E. Shamoto (2), K. Akazawa

M9 Five-Axes Accuracy Enhancement by Compact and Integral Design

C. Brecher (2), P. Utsch, C. Wenzel

August 26, 2:00 pm – 3:30 pm, Essex NW & NC, 3rd Floor

M10 Fast Reacting Maintenance of Forming Tools with a Transportable Machining Unit

H.-C. Möhring / H.K. Tönshoff (1)

M11 A High Performance Tilting Platform Driven by Hybrid Actuator

H. Shinno (2), H. Yoshioka, M. Hayashi

M12 Numerical and Experimental Analysis of Transient State Micro-Bounce of Aerostatic Guideways Caused by Small Pores

T. Aoyama (2), K. Koizumi, Y. Kakinuma, Y. Kobayashi

August 26, 4:00 pm – 5:00 pm, Essex NW & NC, 3rd Floor

M13 Design Method for Machine Tools with Bionic Inspired Kinematics

R. Neugebauer (1), W.-G. Drossel (3), S. Ihlenfeldt, Ch. Harzbecker (3)

M14 Sensorless Automated Condition Monitoring for the Control of the Predictive Maintenance of Machine Tools

A. Verl (2), U. Heisel (2), M. Walther, D. Maier

Chairman: Professor N. Duffie

August 25, 2:00 pm – 3:00 pm, St. George A & B, 3rd Floor

Keynote Paper: Value Creation and Decision-Making in Sustainable Society

*K. Ueda (1), T. Takenaka, J. Vancza (1),
L. Monostori (1)*

August 25, 3:00 pm – 3:30 pm, St. George A & B, 3rd Floor

O1 A Unified Representation Scheme for Effective PSS Development

Y. Shimomura, T. Hara, T. Arai (1)

August 25, 4:00 pm – 5:30 pm, St. George A & B, 3rd Floor

O2 Changeability of Strategic and Tactical Production Concepts

P. Schönsleben / H.-P. Wiendahl (1)

O3 A Strategic Framework for Firm Networks in the Manufacturing Industry: An Empirical Survey

E. Mazzola, M. Bruccoleri, G. Perrone (2)

O4 Designing the Reverse Network for WEEE in Denmark

M. Grunow, C. Gobbi / L. Alting (1)

August 26, 8:30 am – 10:00 am, St. George A & B, 3rd Floor

O5 Autonomously Controlled Production Systems—Influence of Autonomous Control Level on Logistic Performance

B. Scholz-Reiter (2), M. Görges, T. Philipp

O6 Maintaining Constant WIP-Regulation Dynamics In Production Networks with Autonomous Work Systems

N.A. Duffie (1), L. Shi

O7 Manufacturing Capacity Planning Strategies

O. Ceryan, Y. Koren (1)

August 26, 10:30 am – 12:00 pm, St. George A & B, 3rd Floor

O8 Progressive Modeling - An Enabler of Dynamic Changes in Production Planning

M.A. Ismail, H. ElMaraghy (1)

O9 Producer Decision-Making in Markets with Network Externalities

K. Ueda (1), N. Nishino, T. Takenaka

O10 Increased Transparency Within and Beyond Organizational Borders by Novel Identifier-Based Services for Enterprises of Different Size

L. Monostori (1), E. Ilie-Zudor, Zs. Kemény, M. Szathmári, D. Karnok

August 26, 2:00 pm – 3:30 pm, St. George A & B, 3rd Floor

O11 Machine Tool Capability Profile for Intelligent Process Planning

S.T. Newman, A. Nassehi / A.N. Bramley (1)

O12 The Machine Tool Model - A Core Part of the Digital Factory

T. Kjellberg (1), A. von Euler-Chelpin, M. Hedlind, M. Lundgren, G. Sivard, D. Chen

O13 Optimization of Preventive Maintenance and Spare Part Provision for Machine Tools Based on Variable Operational Conditions

G. Lanza, S. Niggeschmidt, P. Werner / H. Weule (1)

August 26, 4:00 pm – 5:30 pm, St. George A & B, 3rd Floor

O14 Holonic Quality Control Strategy for the Process Chain of Bearing Rings

G. Goch (1), M. Dijkman

O15 Modelling the Complexity of Manufacturing Systems Using Nonlinear Dynamics Approaches

N. Papakostas, K. Efthymiou, D. Mourtzis (2), G. Chryssolouris (1)

O16 Managing Variations in Products, Processes and Manufacturing Systems

H. ElMaraghy (1), A. Azab, G. Schuh (2), C. Pulz

Chairman: Professor T. Estler

August 24, 4:00 pm – 5:00 pm, St. George A & B, 3rd Floor

Keynote Paper: Multisensor Data Fusion in Dimensional Metrology

*A. Weckenmann (1), X. Jiang (2), K.-D. Sommer,
U. Neuschaefer-Rube, J. Seewig, L. Shaw, T. Estler (1)*

August 24, 5:00 pm – 6:30 pm, St. George A & B, 3rd Floor

P1 Uncertainty of Reference Frames Characterized by Real Time Optical Measurements: Application to Computer Assisted Orthopaedic Surgery

J.M. Linares, J.M. Sprauel, P. Bourdet (1)

P2 Precision and Fast Measurement of 3D Cutting Edge Profiles of Single Point Diamond Micro-Tools

W. Gao (2), T. Asai, Y. Arai

P3 Fabrication and Configuration of Carbon Nanotube Probes in Atomic Force Microscopy

F.Z. Fang (2), Z.W. Xu G.X. Zhang (1), X.T. Hu

August 25, 8:30 am – 10:00 am, St. George A & B, 3rd Floor

P4 Low-Cost Interferometric Compensation of Geometrical Errors

A. Balsamo (1), P. Pedone, E. Ricci, M. Verdi

P5 Uncertainty Determination for CMMs by Monte Carlo Simulation Integrating Feature Form Deviations

J-P. Kruth (1), N. Van Gestel, P. Bleys, F. Welkenhuyzen

P6 Applications of Dimensional Micro Metrology to the Product and Process Quality Control in Manufacturing of Precision Polymer Micro Components

G. Tosello, H.N. Hansen (1), S. Gasparin

August 25, 10:30 am – 12:00 pm, St. George A & B, 3rd Floor

P7 Vibration-Desensitized Fiber-Diffraction Interferometer for Industrial Surface Measurements

J. Park, J. You, S.-W. Kim (2)

P8 On-the-Fly Calibration of Linear and Rotary Axes of Machine Tools and CMMs Using a Tracking Interferometer

*H. Schwenke (2), R. Schmitt (2), P. Jatzkowski,
C. Warmann*

P9 Position and Contour Detection of Spatially Curved Profiles on the Basis of a Component-Specific Scale

J. Fleischer (2), C. Munzinger, G. Lanza, D. Ruch

Chairman: Professor A. Balsamo

August 24, 3:00 pm – 3:30 pm, America Ballroom, 4th Floor

Keynote Paper: Surface Technology for Automotive Engineering

*K. Bewilogua, G. Bräuer, A. Dietz, J. Gäbler,
G. Goch (1), B. Karpuschewski (1), B. Szyszka*

August 26, 8:30 am – 10:00 am, Essex Center, 3rd Floor

S1 Chemical and Mechanical Balance in Polishing of Electronic Materials for Defect-Free Surfaces

H.S. Lee, H.D. Jeong (2)

S2 Removal Mechanisms in Polishing of Silicon Based Advanced Ceramics

F. Klocke (1), R. Zunke

S3 Performance of Water-Soluble Fullerenol as Novel Functional Molecular Abrasive Grain for Polishing Nanosurfaces

Y. Takaya (2), H. Tachika, T. Hayashi, K. Kokubo, K. Suzuki

August 26, 10:30 am – 12:00 pm, Essex Center, 3rd Floor

S4 Electrochemical Dissolution of Biomedical Grade Ti6Al4V: Influence of Stress and Environment

A. Chandra (2), J.J. Ryu, P. Karra, P. Shrotriya, T. Weik

S5 Surface Generation of Superior Hydrophilicity for Surgical Steels by Specific Grinding Parameters

*H. Ohmori (2), K. Katahira, J. Komotori, Y. Akahane,
M. Mizutani, T. Naruse*

S6 Prediction of Shape Deviations in Machining

E. Brinksmeier (1), J. Sölter

August 26, 2:00 pm – 3:00 pm, Essex Center, 3rd Floor

S7 Application of Strength Properties Determined by Nanoindentations to Describe the Material Response in Micro- and Macro-Indentation

N. Michailidis (2), M. Pappa

S8 Pneumatic Non-Contact Roughness Assessment of Moving Surfaces

D. Grandy, P. Koshy (2), F. Klocke (1)

Chairman: Professor F. Klocke
Co-Chairman: Dr. J. Barry

August 25, 10:30 am – 3:30 pm, Parliament & Adams, 7th Floor

10:30 am **Session I: Technical Presentations**
 – 12:30 pm

Opening Remarks

Professor F. Klocke, CMAG Chairman

**Excellence in Production- A Perspective from
 Machine Tool Design**

Professor C. Brecher

*WZL, RWTH Aachen University and Fraunhofer
 IPT, Germany*

**Trends in Optics Manufacturing by Precision Glass
 Moulding - A Machine Supplier's Perspective**

Dr. Y. Tohme

Moore Nanotechnology Systems, USA

Interferometric Metrology

Dr. C. Evans

Zygo Corporation, USA

**Industrial Collaborations with the Center for
 Precision Metrology at UNC Charlotte**

Dr. K.S. Smith

UNC Charlotte, USA

12:30 pm **Corporate Members Lunch in Helicon, 7th Floor**
 – 2:00 pm

2:00 pm **Session II: Continuations of Presentations and
 Discussion**
 – 3:30 pm

Challenging Automation Solutions

Professor A. Sharon

*Fraunhofer Center for Manufacturing Innovation,
 USA*

Optics Manufacturing - Challenges and Solutions

Professor F. Klocke

*WZL, RWTH Aachen University and Fraunhofer
 IPT, Germany*

**CIRP Activities - Present and Future
 General Update of CIRP Activities**

Professor R. Hocken, CIRP President

**Challenges in Production Engineering
 Results of Letters to Corporate Members**

Professor F. Klocke, CIRP Past President

**Review of Previous Minutes and Ongoing
 Activities within CMAG**

*Dr. J. Barry / Dr. C. Martinsen, CMAG Co-Chair /
 Secretary*

Open Forum for Corporate Members

Closing Remarks

Professor F. Klocke, CIRP Past President

Social Program

Sunday, August 23, 2009

Welcome Reception 7:00 pm

Westin Copley Place, Staffordshire, 3rd Floor

CIRP Members, Invited Guests, and Accompanying Persons are invited to a reception to reunite with old friends while enjoying classical music performed by *Quartetto Serioso*.

Suggested Attire: Business Casual

Wednesday, August 26, 2009

Assembly Dinner 7:00 pm

Westin Copley Place, America Ballroom, 4th Floor

The 59th General Assembly Dinner will feature a three-course meal, performances by the *Massachusetts Institute of Technology Ballroom Dance Team* and music by *Beantown Swing Orchestra*.

Suggested Attire: Business Formal

Saturday, August 29, 2009

Farewell Dinner 7:00 pm

Prudential Center, Skywalk Observatory

Bring the 59th CIRP General Assembly to a memorable close at the Prudential Center, Skywalk Observatory. Enjoy a three-course meal and musical performance by *Unity* while saying goodbye to CIRP friends and colleagues.

Suggested Attire: Business Formal

Accompanying Persons Program

Monday, August 24, 2009 10:30 am – 11:00 am

Staffordshire, 3rd Floor

Accompanying Persons Program Welcome Meeting

This year's Accompanying Persons Program will begin with a brief introduction to the CIRP Logistics Team, U.S. Accompanying Persons, staff and student volunteers. An overview of the week's events will be presented and useful information will be shared.

Monday, August 24

Boston Revealed

An introduction to the city of Boston by bus and boat. Learn about Boston neighborhoods and visit landmarks. Guests will enjoy an Italian lunch and visit Cambridge to take a cruise along the Charles River.

11:15 am Depart Westin Copley Place

4:00 pm Arrive Westin Copley Place

Tuesday, August 25

Plimoth Plantation

A visit to Plimoth Plantation, a living history museum portraying New England's native and colonial past. Guests will experience a Thanksgiving lunch and view a reproduction of the famous ship that traveled from England with the Pilgrims in 1620, the Mayflower.

9:00 am Depart Westin Copley Place

4:30 pm Arrive Westin Copley Place

Wednesday, August 26**Aristocratic Boston**

A tour of Boston's historic Beacon Hill district and a visit to the Isabella Stewart Gardner Museum. Guests will dine at the Museum of Fine Arts for lunch.

9:30 am Depart Westin Copley Place

3:30 pm Arrive Westin Copley Place

Thursday, August 27**JFK Library and Faneuil Hall**

A visit to the John F. Kennedy Library and the famous Faneuil Hall and Quincy Market of downtown Boston. Guests will enjoy lunch at Cheers Restaurant and Bar.

9:30 am Depart Westin Copley Place

4:00 pm Arrive Westin Copley Place

Friday, August 28**Newport & The Gilded Age**

Tours of two of Newport, Rhode Island's famous mansions, the extravagant summer homes of some of the nineteenth century's wealthiest families. Guests will be able to walk through The Breakers and Marble House on guided tours. A breathtaking ride along Ocean Drive will conclude the day.

8:00 am Depart Westin Copley Place

5:00 pm Arrive Westin Copley Place

There will be a bus pickup in the morning and drop-off in the afternoon at The Westin Copley Place, Boston Park Plaza and Boston Hostelling International Monday through Friday.

Chairpersons

Professor Nam Pyo Suh

Professor Jung-Hoon Chun



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