



American Society of Mechanical Engineers

## 2007 Manufacturing Science and Engineering Conference (MSEC)

### Technical Program

#### Monday, October 15

9:00am – 5:00pm Pick up from Georgia Tech Global Learning Center entrance at 9am  
**Optional Golfing and Hunting Activities**

2:00pm – 5:00pm Pick up from Georgia Tech Global Learning Center entrance at 2pm  
**Georgia Tech Research Laboratory Tours**

6:00pm – 8:00pm 1<sup>st</sup> and 2<sup>nd</sup> Floors, Georgia Tech Global Learning Center  
**Reception and Registration**

#### Tuesday, October 16

8:00am – 5:00pm 2<sup>nd</sup> Floor, Georgia Tech Global Learning Center  
**Registration**

8:00am 2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center  
**Breakfast**

8:30am – 10:00am Room 236 Georgia Tech Global Learning Center  
**Opening Session**

*Track Chair: **Steven Liang**, Georgia Institute of Technology, USA*

*Track Co-Chair: **Shreyes Melkote**, Georgia Institute of Technology, USA*

8:30am – 9:10am Room 236 Georgia Tech Global Learning Center  
**Welcoming Remarks**

***Michael Molnar**, Chair, ASME Manufacturing Engineering Division, USA*

***Wayne Clough**, President, Georgia Institute of Technology, USA*

***Ward Winer**, Chair, G. W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, USA*

***Steven Danyluk**, Director, Manufacturing Research Center, Georgia Institute of Technology, USA*

9:10am – 10:00am Room 236 Georgia Tech Global Learning Center  
**Conference Keynote Speech**

***James D. Waters Jr.**, Vice President, Caterpillar Production System, Caterpillar Inc., USA*

Moderated by **Dean Beutel**, *Caterpillar Inc., USA*

**10:00am – 10:30am** Georgia Tech Global Learning Center  
**Refreshment Break – sponsored by General Motors R&D Center**

**SYMPOSIUM 1 Advances in Rapid Manufacturing Technologies for Metallic Parts**

*Track Chair: Kevin Chou, University of Alabama at Tuscaloosa, USA*

*Track Co-Chair: Mary E. Kinsella, W Research Laboratory, WPAFB, USA*

**10:30am - 12:15pm** Room 334 Georgia Tech Global Learning Center

**1-1 Metal Additive Processing Development**

*Session Chair: Brent Stucker, Utah State University, USA*

*Session Co-Chair: Jack Zhou, Drexel University, USA*

**MSEC2007-31003: Part Repairing Using a Hybrid Manufacturing System**

*Ian Ren, University of Missouri, USA, Kunnayut Eiamsa-ard, Kasetsart University, Thailand, Jianzhong Ruan, University of Missouri, USA, Frank Liou, University of Missouri, USA*

**MSEC2007-31030: Manufacture of Production Quality Injection Mold Tools Using SLS and HSM**

*Chris Taylor, University of Sheffield, UK, Ismet Ilyas, University of Leeds, Leeds, UK, Kenneth Dalgarno, University of Newcastle upon Tyne, UK, John Gosden, FlowHow Aps, Denmark*

**MSEC2007-31089: Numerical and Analytical Modeling of Laser Deposition with Preheating**

*Zhiqiang Fan, Jacquelyn Stroble, Jianzhong Ruan, Todd Sparks, Frank Liou, University of Missouri, USA*

**MSEC2007-31202: Effect of Friction on Ultrasonic Consolidation**

*Chunbo Zhang, Leijun Li, Utah State University, USA*

**SYMPOSIUM 3 Miniaturization of Molding and Casting Processes**

*Track Chair: Donggang Yao, Georgia Institute of Technology, USA*

*Track Co-Chairs: Allen Yi, Ohio State University, USA, Wally Cruz, Wallyco Micro Molding, Puerto Rico*

**10:30am - 12:15pm** Room 331/330 Georgia Tech Global Learning Center

**3-1 Micro Molding – I**

*Session Chair: Donggang Yao, Georgia Institute of Technology, USA*

*Session Co-Chair: Wally Cruz, Wallyco Micro Molding, Puerto Rico*

**MSEC2007-31035: Surface Replication and Structural Development in Micromolding for Micro/Nanocomposites**

*Hiroshi Ito, Yamagata University of Yamagata, Japan, Kunihiko Kazama, Takeshi Kikutani, Tokyo Institute of Technology, Japan*

**MSEC2007-31059: Close-Die Embossing of Multichannel Waveguides**

*Pratap Kumar Nagarajan, Donggang Yao, Georgia Institute of Technology, USA, Thomas S. Ellis, Reza Azadegan, Delphi Research Labs, USA*

**MSEC2007-31082: Process Monitoring in Micro-Injection Molding**

*Soon-Chun Kuek, David Angstadt, Clemson University, USA*

**MSEC2007-31108: Characterization of Polymer Flows in Very Thin Gaps**

*Rahul Panchal, David Kazmer, University of Massachusetts, USA*

**MSEC2007-31210: Manufacturing of Glass Diffractive Optical Elements by Use of Precision Compression Molding Process**

**Yang Chen, Allen Yi**, *Ohio State University, USA*, **Fritz Klocke, Guido Pongs**, *Fraunhofer Institute for Production Technology, Germany*

**SYMPOSIUM 9 Diagnostics, Performance Prediction and Decision Making for Intelligent Maintenance of Manufacturing Systems**

*Track Chair: Dragan Djurdjanovic, University of Texas at Austin, USA*

*Track Co-Chair: Haixia Wang, University of Cincinnati, USA*

**10:30am - 12:15pm** Room 324 Georgia Tech Global Learning Center

**9-1 Sensing, Detection and Classification**

*Session Chair: Yoshiharu Mutoh, Nagaoka University of Technology, Japan*

*Session Co-Chair: Su Hao, Northwestern University, USA*

**MSEC2007-31091: A New Method for Feature Selection and Gear Defect Detection**

**Yan Chen, Haixia Wang, Jay Lee**, *University of Cincinnati, USA*

**MSEC2007-31196: Robust Machine Vision-based Parts Inspection: Intelligent Neuro-fuzzy versus Threshold-based Classification**

**Jonathan Killing, Brian Surgenor, Chris Mechefske**, *Queen's University, Canada*

**MSEC2007-31058: Estimation of Fatigue Strength of Fabricated Component**

**Duangporn Ounpanich, Yoshiharu Mutoh**, *Nagaoka University of Technology, Japan*, **Kenji Yoshii**, *Topy Industries, LTD., Japan*

**MSEC2007-31084: The Impact of Surface Integrity by Hard Turning VS. Grinding on Rolling Contact Fatigue**

**A.W. Warren, Y.B. Guo**, *University of Alabama at Tuscaloosa, USA*

**SYMPOSIUM 20 Student Manufacturing Design Competitions - I**

*Track Chair: Bin Wei, GE Global Research, USA*

**10:30am - 12:15pm** Room 323 Georgia Tech Global Learning Center

**Student Project Presentations**

*Session Chair: Mike Molnar, Cummins, USA*

*Session Co-Chair: Larry Yao, Columbia University, USA*

**System for the Evaluation of Respiratory Function (SERF)**

**Ziyad Aljarboua, Arvind Gururjan, Riyan Westphal, John Aiton, Jim Holte (Faculty Advisor)**, *University of Minnesota, USA*

**Experimental Media & Performing Arts Center Desk Ornament**

**Judd Rattner, Jeff Moss, Jason Couture, and Patrick Carey, Sam Chiappone (Faculty Advisor)**

**Daniel Walczyk (Faculty Advisor)**, *Rensselaer Polytechnic Institute, USA*

**Project Title: Design of an Off-axis Nozzle Assembly for Blown-powder Laser Cladding with a High-power Direct Diode Laser (HPDDL)**

**Kevin Schoeffel, Yung C. Shin (Faculty Advisor)**, *Purdue University, USA*

**12:15pm – 1:30pm** 1<sup>st</sup> floor Atrium, Georgia Tech Global Learning Center

**Lunch – sponsored by Caterpillar Inc.**

## **SYMPOSIUM 1 Advances in Rapid Manufacturing Technologies for Metallic Parts**

Track Chair: **Kevin Chou**, University of Alabama at Tuscaloosa, USA

Track Co-Chair: **Mary E. Kinsella**, Air Force Research Laboratory, WPAFB, USA

**1:30pm - 3:15pm**

Room 334 Georgia Tech Global Learning Center

### **1-2 Rapid Manufacturing Using Metal Additive Technologies: Applications, Challenges, and Directions (Panel Session)**

Session Chair: **Frank Liou**, University of Missouri-Rolla, USA

Session Co-Chair: **Kevin Chou**, University of Alabama at Tuscaloosa, USA

### **MSEC2007-31227: Air Force Research Laboratory Projects in Metal Additive Manufacturing (Panel)**

**Mary E. Kinsella**, Air Force Research Laboratory, WPAFB, USA

### **MSEC2007-31231: Metal Rapid Manufacturing Technologies (Panel)**

**Brent Stucker**, Utah State University, USA

### **MSEC2007-31234: Additive Metallic Processes: Approaches, Trade-Offs, and Future Challenges (Panel)**

**Kevin Slattery**, The Boeing Company, USA

## **SYMPOSIUM 3 Miniaturization of Molding and Casting Processes**

Track Chair: **Donggang Yao**, Georgia Institute of Technology, USA

Track Co-Chairs: **Allen Yi**, Ohio State University, USA, **Wally Cruz**, Wallyco Micro Molding, USA

**1:30pm - 3:15pm**

Room 331/330 Georgia Tech Global Learning Center

### **3-2 Micro Molding – II**

Session Chair: **Allen Yi**, Ohio State University, USA

Session Co-Chair: **Wally Cruz**, Wallyco Micro Molding, Puerto Rico

### **MSEC2007-31226: Micro and Nano Injection Molding (Symposium Keynote)**

**John Coulter**, Lehigh University, USA

### **MSEC2007-31083: Micro-feature Replication via Polymer Molding at Ambient Pressure**

**Varun Thakur, peiman mosaddegh, David Angstadt**, Clemson University, USA

### **MSEC2007-31046: Production of Micro-Molding Tools by Hot Embossing**

**Mr. Matthew Dirckx, Aaron D. Mazzeo, David E. Hardt**, Massachusetts Institute of Technology, USA

### **MSEC2007-31049: Constant-Temperature Embossing of Amorphous Polyethylene Terephthalate Films**

**Donggang Yao, Pratapkumar Nagarajan, Ramasubramani K.R.T.**, Georgia Institute of Technology, USA

## **SYMPOSIUM 9 Diagnostics, Performance Prediction and Decision Making for Intelligent Maintenance of Manufacturing Systems**

Track Chair: **Dragan Djurdjanovic**, University of Texas at Austin, USA

Track Co-Chair: **Haixia Wang**, University of Cincinnati, USA

**1:30pm - 3:15pm**

Room 324 Georgia Tech Global Learning Center

### **9-2 Diagnostic and Prognostic Methods and Case Studies**

Session Chair: **Murali M Sundaram**, University of Nebraska, USA

Session Co-Chair: **Dragan Djurdjanovic**, University of Texas at Austin, USA

MSEC2007-31144: **Endmill Condition Monitoring and Failure Forecasting Method For Curvilinear Cuts of Non-constant Radii**  
*Christopher A. Suprock, John T. Roth, Larry Downey, Pennsylvania State University at Erie, USA*

MSEC2007-31183: **Intelligent Fault Diagnosis of Rolling Element Bearing Based on SVMs and Statistical Characteristics**  
*Junyan Yang, Youyun Zhang, Yongsheng Zhu, Qinghua Wang, Xi'an Jiaotong University China*

MSEC2007-31222: **Identification and Anomaly Detection for PLC Controlled Automatic Tool Changer Using Timed Petri Nets**  
*Jianbo Liu, General Motors, USA, Dragan Djurdjanovic, University of Texas at Austin, USA, Jun Ni, University of Michigan, USA*

MSEC2007-31017: **Development of a Highly Miniaturized PQT-Sensor for Monitoring and Diagnosing of Pneumatic Systems**  
*Christoph Sosna, Rainer Buchner, Walter Lang, Wolfgang Benecke, IMSAS University of Bremen, Germany, Christian Boehm, Festo Corporation, Hauppauge, USA, Josef Binder, Festo AG & Co., Germany*

**3:15pm – 3:45am**  
**Refreshment Break**

2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center

**SYMPOSIUM 1 Advances in Rapid Manufacturing Technologies for Metallic Parts**

*Track Chair: Kevin Chou, University of Alabama at Tuscaloosa, USA*

*Track Co-Chair: Mary E. Kinsella, Air Force Research Laboratory, WPAFB, USA*

**3:45pm - 5:30pm**

Room 334 Georgia Tech Global Learning Center

**1-3 Rapid Manufacturing for Metal Parts**

*Session Chair: V. Blake Slaughter, The Boeing Company - Phantom Works, USA*

*Session Co-Chair: Leijun Li, Utah State University, USA*

MSEC2007-31045: **Nonlinear Feed Effect in Machining Chatter Analysis**

*Robert Landers, University of Missouri, USA, Galip Ulsoy, University of Michigan, USA*

MSEC2007-31047: **Empirical Dynamic Modeling of Friction Stir Welding Processes**

*Xin Zhao, Prabhanjana Kalya, Robert Landers, K. Krishnamurthy, University of Missouri, USA*

MSEC2007-31187: **Fractal Geometry Based Model for a Musical Cymbal Design and Rapid Manufacturing**

*Jack Zhou, Ananth Vas, Drexel University, USA, Denis Blackmore, New Jersey Institute of Technology, USA, Rafael Mulero, Drexel University, USA*

**SYMPOSIUM 6 Micro-Manufacturing and Fabrication of Sensors**

*Track Chair: Ru-Min Chao, National Cheng Kung University, Tainan*

*Track Co-Chair: Peter Chang, Industrial Technology Research Institute, Taiwan*

**3:45pm - 5:30pm**

Room 331/330 Georgia Tech Global Learning Center

**6-1 Micro-Manufacturing and Fabrication of Sensors**

*Session Chair: Ru-Min Chao, National Cheng Kung University, Taiwan*

*Session Co-Chair: Peter Chang, Industrial Technology Research Institute, Taiwan*

MSEC2007-31041: **Full Field Displacement Measurements of AFM Cantilevers during Loading**

*Lee Kumanchik, Tony L. Schmitz, University of Florida, USA Jon Pratt, National Institute of Standards and Technology, USA, John C. Ziegert, Clemson University, USA*

MSEC2007-31131: **Characteristic Evaluation of Silicon-based MEMS Acoustic/Acceleration Sensor**

*Ru-Min Chao, Sie-Yu Li, Chih-Chao Hsu, National Cheng Kung University, Taiwan, Steven Liang, Georgia Institute of Technology, USA*

MSEC2007-31163: **Design and Fabrication of Micro Photonic Sensors for Manufacturing**

*Xugang Zhang, Xiaochun Li, University of Wisconsin-Madison, USA*

**SYMPOSIUM 9 Diagnostics, Performance Prediction and Decision Making for Intelligent Maintenance of Manufacturing Systems**

*Track Chair: Dragan Djurdjanovic, University of Texas at Austin, USA*

*Track Co-Chair: Haixia Wang, University of Cincinnati, USA*

**3:45pm - 5:30pm**

Room 324 Georgia Tech Global Learning Center

**9-3 Intelligent Maintenance Decision-Making**

*Session Chair: Lin Li, University of Michigan, USA*

*Session Co-Chair: Haixia Wang, University of Cincinnati, USA*

MSEC2007-31092: **Monitoring and Model Generation for Intelligent Optimization and Control of Grinding Processes**

*Radu Pavel, Anil Srivastava, TechSolve, USA*

MSEC2007-31115: **Development of a Decision Support System for Unscheduled Maintenance MRO Component Safety Stock**

*Dimitris Tsakatikas, Michael Sfantsikopoulos, National Technical University of Athens, Greece*

MSEC2007-31150: **Maintenance Task Prioritization Using Data Driven Bottleneck Detection and Maintenance Opportunity Windows**

*Lin Li, Dragan Djurdjanovic, University of Texas at Austin, USA, Jun Ni, University of Michigan, USA*

**SYMPOSIUM 20 Student Manufacturing Design Competitions - II**

*Track Chair: Bin Wei, GE Global Research, USA*

**3:45pm – 5:30pm**

Room 323 Georgia Tech Global Learning Center

**Student Project Presentations**

*Session Chair: Jian Cao, Northwestern University, USA*

*Session Co-Chair: Matt Bement, Los Alamos National Laboratory, USA*

**The Magic Cube**

*William Ziomeck, Daniel Solorzano, Daniel Walczyk (Faculty Advisor), Rensselaer Polytechnic Institute, USA*

**Automatically Indexing Insert Cutting Toolholder**

*Jeremy Rickli, Jonathan Granstrom, Casey Coolich, Andrew Fenderbosch, and John Armstead, Jaime Camelio (Faculty Advisor), Michigan Technological University, USA*

**5:30pm – 6:30pm**

Room 236 Georgia Tech Global Learning Center

**ASME Membership Meeting**

**7:00pm – 10:00pm**

Georgia Tech Hotel Ballroom

**ASME Manufacturing Engineering Division Banquet – sponsored by Georgia Tech Manufacturing Research Center**

Presentation by **George Hazelrigg, National Science Foundation, USA**

## Wednesday, October 17

**8:00am – 5:00pm**

**Registration**

2<sup>nd</sup> Floor, Georgia Tech Global Learning Center

**8:00am**

**Breakfast**

2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center

### **SYMPOSIUM 4 Hybrid Macro/Meso/Micro Manufacturing Processes**

*Track Chair: **Tugrul Ozel**, Rutgers University, USA*

*Track Co-Chair: **Andrew Trimmer**, GE Global Research, USA*

**8:15am - 10:00am**

Room 334 Georgia Tech Global Learning Center

#### **4-1 Micro/Nano-Machining**

*Session Chair: **Tugrul Ozel**, Rutgers University, USA*

*Session Co-Chair: **Andrew Trimmer**, GE Global Research, USA*

#### **MSEC2007-31009: Integrated Hybrid Micro/Nano-Machining**

***Mustafizur Rahman**, **ABMA Asad**, National University of Singapore, Singapore, **Takeshi Masaki**, Tohoku University, Japan, **Y S Wong**, National University of Singapore, Singapore, **H.S. Lim**, Mikrotools Pte Ltd, Singapore*

#### **MSEC2007-31013: State of the Art in Nano-Turning**

***Michael Schmittziel**, **Rodolfo Haber**, Instituto de Automática Industrial, Spain, **Ángel Escribano**, **Javier Escribano**, Mecanizados Escribano Ltd., Spain*

#### **MSEC2007-31068: Laser Micro-Machining of Spherical and Elliptical 3-D Objects using Hole Area Modulation Method**

***Tugrul Ozel**, **Wen-Hui Lee**, Rutgers University, USA*

#### **MSEC2007-31078: Generation of High Aspect Ratio Micro Holes by a Hybrid Micromachining Process**

***Murali M Sundaram**, **Sridevi Billa**, **Kamlakar Rajurkar**, University of Nebraska, USA*

### **SYMPOSIUM 10 Advances in Quality Control in Multistage Manufacturing Systems**

*Track Chair: **Dragan Djurdjanovic**, University of Texas at Austin, USA*

*Track Co-Chair: **Charles Sheridan**, Intel Ireland, Ireland*

**8:15am - 10:00am**

Room 331/330 Georgia Tech Global Learning Center

#### **10-1 Inspection and Metrology**

*Session Chair: **Jaime Camelio**, Michigan Technological University, USA*

*Session Co-Chair: **Darek Ceglarek**, University of Wisconsin-Madison, USA*

#### **MSEC2007-31103: Implementing Point Assignment using Octrees and GPU**

***Koushik Aravalli**, **Thomas Kurfess**, Clemson University, USA, **Thomas M. Tucker**, Tucker Innovations, USA*

#### **MSEC2007-31126: Stochastic Flow Model-Based Representation of System-Level Manufacturing Quality**

***Guillaume Graton**, **Martin Guay**, **Patrick Egbunonu**, Queen's University, Canada, **Jorge Arinez**, General Motors, USA*

#### **MSEC2007-31206: A Hull Normal Approach for Determining the Size of Cylindrical Features**

***Steven Turek**, **Sam Anand**, University of Cincinnati, USA*

MSEC2007-31211: **Theoretical and Experimental Substantiation of Angle Orientation of Rolling Bushings of Roller and Bushing Chains**

*Petro Kryvyy, Petro Kryvinskyy, Volodymyr Bodnar, Iryna Sotnyk, Andriy Senyk, Ternopil State Technical University, Ukraine*

**SYMPOSIUM 11 Bottom-up Nanomanufacturing**

*Track Chair: Brian K. Paul, Oregon State University, USA*

*Track Co-Chairs: Daniel Palo, Pacific Northwest National Laboratory, USA, Susana Lai-Yuen, University of South Florida, USA*

**8:15am - 10:00am**

Room 324 Georgia Tech Global Learning Center

**11-1 Nanomanufacturing**

*Session Chair: Nicholas Fang, University of Illinois, USA*

*Session Co-Chair: Brian K. Paul, Oregon State University, USA*

MSEC2007-31093: **Fabrication of TiO<sub>2</sub> and SiO<sub>2</sub> Thin Films by Room Temperature Liquid Phase Deposition**

*Santosh Tiwari, Brian K. Paul, Oregon State University, USA*

MSEC2007-31098: **Comparison of Mixing Approaches in the Synthesis and Deposition of Ceria Nanoparticles**

*Chih Heng Tseng, Brian K. Paul, Oregon State University, USA*

MSEC2007-31145: **Augmented Reality Enhanced nanomanipulation by Atomic Force microscopy with Local Scan**

*Guangyong Li, University of Pittsburgh, USA, Lianqing Liu, Shenyang Institute of Automation, China, Ning Xi, Michigan State University, USA*

MSEC2007-31151: **Step-and-Grow Approach for Precisely Positioned Nanowire Array Structure Fabrication**

*Wook Jun Nam, Hector Carrion, Pilyeon Park, Pranav Garg, Sanjay Joshi, Stephen J. Fonash, Penn State University, USA*

**SYMPOSIUM 14 Development and Applications of Micro Manufacturing Equipment**

*Track Chair: Shihming Wang, Chung Yuan Christian University, Taiwan*

*Track Co-Chair: Jong-Kweon Park, Korea Institute of Machinery & Materials, Korea*

**8:15am - 10:00am**

Room 323 Georgia Tech Global Learning Center

**14-1 Equipment and System Design**

*Session Chair: Bo Li, nScript inc, USA*

*Session Co-Chair: Jian Cao, Northwestern University, USA*

MSEC2007-31036: **Rapid Reconfiguration and part Repositioning with an Intelligent Fixturing System**

*Thomas N. Papastathis, Marco Ryll, Svetan M. Ratchev, University of Nottingham, UK*

MSEC2007-31037: **Robust Direct-Write Dispensing Tool and Solutions for Micro/Meso-Scale Manufacturing and Packing**

*Bo Li, Patrick A Clark, Kenneth H Church, nScript, USA*

MSEC2007-31097: **A Miniature Linear Slide with Air Bearings and Its Implementation in a Mesoscale Precision Turning Machine**

*Seung-Kook Ro, Byung-Sub Kim, Jong-Kweon Park, Korea Institute of Machinery & Materials, Korea*

MSEC2007-31189: **Design Analysis of A Spherical Magnetic Bearing For Multi-Dof Rotational Stage Applications**

*Kok-Meng Lee, Hungsun Son, Georgia Institute of Technology, USA, Jong-Kweon Park, Korea Institute of Machinery & Materials, Korea*

**10:00pm – 10:30am** 2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center  
**Refreshment Break – sponsored by General Motors R&D Center**

**SYMPOSIUM 4 Hybrid Macro/Meso/Micro Manufacturing Processes**

*Track Chair: Tugrul Ozel, Rutgers University, USA*

*Track Co-Chair: Andrew Trimmer, GE Global Research, USA*

**10:30am - 12:15pm** Room 334 Georgia Tech Global Learning Center

**4-2 Meso/Micro Manufacturing Processes**

*Session Chair: Xiaochun Li, University of Wisconsin-Madison, USA*

*Session Co-Chair: Rhett Mayor, Georgia Institute of Technology, USA*

MSEC2007-31155: **Grain Boundary Response of Aluminum Bicrystal Under Micro Scale Laser Shock Peening**

*Sinisa Vukelic, Jeffrey W. Kysar, Y. Lawrence Yao, Columbia University, USA*

MSEC2007-31028: **High Precision Hybrid Technology using Dual-stage of Linear Motor and Piezo-actuator for Milling Machine**

*B.M. Chung, T.J. Ko, I.J Yeo, Yeungnam University, Korea, Jong-Kweon Park, Korea Institute of Machinery & Materials, Korea*

MSEC2007-31029: **Characterization of Pressure Welding Process of Thin Sheet Metals in Cold and Warm Temperature Conditions**

*Sasawat Mahabunphachai, Muammer Koc, Virginia Commonwealth University, USA, Jun Ni, University of Michigan, USA*

MSEC2007-31164: **Applications of Micro Sensors for Fundamental Study of Manufacturing Processes**

*Xudong Cheng, Hongseok Choi, Xiaochun Li, University of Wisconsin-Madison, USA*

**SYMPOSIUM 10 Advances in Quality Control in Multistage Manufacturing Systems**

*Track Chair: Dragan Djurdjanovic, University of Texas at Austin, USA*

*Track Co-Chair: Charles Sheridan, Intel Ireland, Ireland*

**10:30am - 12:15pm** Room 331/330 Georgia Tech Global Learning Center

**10-2 Design and Root Cause Identification for Quality Control in Multistage Manufacturing Systems**

*Session Chair: Thomas Kurfess, Clemson University, USA*

*Session Co-Chair: Charles Sheridan, Intel Ireland, Ireland*

MSEC2007-31075: **Monitoring and Diagnosis of Assembly Fixtures Faults using Modified Multivariate Control Charts and Surface Scanning Content**

*Jaime Camelio, Jeremy Rickli, Michigan Technological University, USA*

MSEC2007-31095: **Assembly Faults Diagnosis using Neural Networks and Process Knowledge**

*Jaime Camelio, Qiangsheng Zhao, Michigan Technological University, USA*

MSEC2007-31139: **Fault Location Analysis for Multiple Fault Diagnosis in Multi-Station Assembly Systems**  
*Posheng Tsai, Kamal Mannar, Darek Ceglarek, University of Wisconsin-Madison, USA*

MSEC2007-31192: **Process Yield Improvement through Optimum Design of Fixture Layouts in 3D Multi-station Assembly Systems**  
*Tirawat Phoomboplab, Darek Ceglarek, University of Wisconsin- Madison, USA*

**SYMPOSIUM 14 Development and Applications of Micro Manufacturing Equipment**  
*Track Chair: Shihming Wang, Chung Yuan Christian University, Taiwan*  
*Track Co-Chair: Jong-Kweon Park, Korea Institute of Machinery & Materials, Korea*

**10:30am - 12:15pm** Room 323 Georgia Tech Global Learning Center

**14-2 Process Development and Analysis**

*Session Chair: Fu-Chuan Hsu, Metal Industries Research & Development Centre, Taiwan*  
*Session Co-Chair: Tugrul Ozel, Rutgers University, USA*

MSEC2007-31053: **An on-machine Error Measurement System for Micro-machining**  
*Shihming Wang, Han-Jen Yu, Y. H. Liu, Da-Fun Chen, Chung Yuan Christian University, Taiwan*

MSEC2007-31063: **A RSS Method for Estimating Hole Dimension Error in a Batch Micro-EDM Process**  
*J.-J. Wang, J. L. Hou, National Cheng Kung University, Taiwan, Fu-Chuan Hsu, Metal Industries Research & Development Center, Taiwan, Y. Y. Liao, National Cheng Kung University, Taiwan, Steven Liang, Georgia Institute of Technology, USA*

MSEC2007-31113: **Effect of Micro Manufacturing Processes on Surface Behavior**  
*Tiffany A. Davis, Wei Chen, Q. Jane Wang, Jian Cao, Northwestern University, USA, Cedric Xia, Rajesh Talwar, Richard Lederich, The Boeing Company, USA*

MSEC2007-31034: **Analysis of the Scale Effect for Microscale Machine Tools**  
*Hyung Wook Park, Steven Liang, Georgia Institute of Technology, USA*

MSEC2007-31070: **Micromilling Process Planning and Modeling for Micromold Manufacturing**  
*Atul Dhanorker, Rutgers University, USA, Xinyu Liu, University of Illinois at Urbana-Champaign, USA, Tugrul Ozel, Rutgers University, USA*

**SYMPOSIUM 16 Advances in Metal Forming**

*Track Chair: Kuniaki Dohda, Nagoya Institute of Technology, Japan*  
*Track Co-Chair: Guosong Lin, University of Michigan, USA*

**10:30am - 12:15pm** Room 324 Georgia Tech Global Learning Center

**16-1 Computational Methods and Microforming**

*Session Chair: Y.B. Guo, University of Alabama at Tuscaloosa, USA*  
*Session Co-Chair: Wayne Cai, General Motors, USA*

MSEC2007-31020: **Forming of Porous Micro-Features using Hot Compaction**  
*Peng Chen, Gap-Yong Kim, Jun Ni, University of Michigan, USA*

MSEC2007-31107: **Characterization and Investigation of Deformation during Microextrusion using X-ray Texture Analysis**  
*Sunal Parasiz, Brad Kinsey, University of New Hampshire, USA, Neil Krishnan, Jian Cao, Northwestern University, USA*

MSEC2007-31121: **Application of Simulation Technology to Hollow Die Extrusion**  
**Norio Takatsuji**, University of Toyama, Japan, **Toshiyuki Inagaki**, **Satoshi Murakami**, Aisin Keikinzoku Co., Ltd, Japan, **Kenji Matsuki**, University of Toyama, Japan

MSEC2007-31203: **Coupled Multifield Finite Element Analysis Model of Upsetting under an Applied Direct Current**  
**Thomas J. Kronenberger**, **David H. Johnson**, **John T. Roth**, Pennsylvania State University at Erie, USA

**12:15pm – 1:30pm** 1<sup>st</sup> floor Atrium, Georgia Tech Global Learning Center  
**Lunch – sponsored by Cummins, Inc.**

**SYMPOSIUM 7 Communication Systems and Distributed Control in Manufacturing Enterprises**

Track Chair: **Laine Mears**, Clemson University, USA  
Track Co-Chair: **Jeannie Falcon**, National Instruments, USA

**1:30pm - 3:15pm** Room 331/330 Georgia Tech Global Learning Center

**7-1 Distributed Control for Manufacturing**

Session Chair: **Laine Mears**, Clemson University, USA  
Session Co-Chair: **Jeannie Falcon**, National Instruments, USA

MSEC2007-31039: **Fuzzy Logic-based Drilling Force Control In A Network-based Application**  
**Rodolfo Haber**, Institute of Industrial Automation-IAI. (CSIC), Spain, **Rodolfo Haber-Haber**, Universidad de Oriente, Cuba, **Angel Alique**, Institute of Industrial Automation-IAI. (CSIC), Spain, **Agustín Jiménez**, Universidad Politécnica de Madrid, Spain

MSEC2007-31214: **Collaborative Haptic Interfaces and Distributed Control for Product Development and Virtual Prototyping**  
**Yuan-Shin Lee**, **Shiyong Lin**, North Carolina State University, USA, **Roger Narayan**, University of North Carolina at Raleigh, USA

MSEC2007-31244: **Rapid Control Prototyping and Hardware-in-the-Loop Simulation (Tutorial)**  
**Jeannie Falcon**, National Instruments, USA

**SYMPOSIUM 14 Development and Applications of Micro Manufacturing Equipment**

Track Chair: **Shihming Wang**, Chung Yuan Christian University, Taiwan  
Track Co-Chair: **Jong-Kweon Park**, Korea Institute of Machinery & Materials, Korea

**1:30pm - 3:15pm** Room 323 Georgia Tech Global Learning Center

**14-3 Control Algorithm and Application**

Session Chair: **Seung-Kook Ro**, Korea Institute of Machinery & Materials, Korea  
Session Co-Chair: **Chen-Chun Kao**, University of Michigan, USA

MSEC2007-31050: **Internal Model Control using EWMA for a Wedge-type Piezoelectric Motor**  
**YUNG TING**, **Hui-Yi Feng**, **Han-Chih Hsieh**, **Li-Yen Wang**, **Chun-Chung Li**, **Yuan Kang**, **Shihming Wang**, Chung Yuan Christian University, Taiwan

MSEC2007-31066: **Design and Implementation of a High Bandwidth Servo Controller for Micro-Machining Center**  
**Roy Chih-Lung Ko**, National Yunlin University of Science and Technology, Taiwan, **Wang-Lin Liu**, Precision Machinery Research and Development Center, Taiwan

MSEC2007-31069: **Adaptive Digital Control based on Reduced Order Parameter Identification and Disturbance Observer for Linear Motor**  
*Chin-Sheng Chen, Shih-Chieh Lin, National Taipei University of Technology, Taiwan, Shihming Wang, Chung Yuan Christian University, Taiwan, Yong-Ming Hong, National Taipei University of Technology, Taiwan*

MSEC2007-31193: **Fuzzy Logic Control System for Micro-Hole Electrical Discharge Machining**  
*Chen-Chun Kao, Scott Miller, Albert Shih, University of Michigan, USA*

**SYMPOSIUM 16 Advances in Metal Forming**

*Track Chair: Kuniaki Dohda, Nagoya Institute of Technology, Japan*

*Track Co-Chair: Guosong Lin, University of Michigan, USA*

**1:30pm - 3:15pm**

Room 324 Georgia Tech Global Learning Center

**16-2 Tribology and Applications of Coatings**

*Session Chair: Brad Kinsey, University of New Hampshire, USA*

*Session Co-Chair: Kuniaki Dohda, Nagoya Institute of Technology, Japan*

MSEC2007-31016: **Experimental Investigations on Development of Rapid Die Wear Tests for Stamping of Advanced High Strength Steels**

*Omer Necati Cora, Yusuf Usta, Muammer Koc, Virginia Commonwealth University, USA*

MSEC2007-31038: **Research on Bonding Peel Properties of Galvannealed Coatings**

*Chun Xu, Shanghai Institute of Technology, China, Shuhui Li, Shanghai Jiaotong University, China*

MSEC2007-31062: **Damage Behavior and Tribo-characteristics of DLC-Si Coating for Forming Die**

*Yoshinari Tsuchiya, Toyota Central R&D Labs., Inc., Japan, Hiroyuki Kubota, Gifu University, Japan, Kuniaki Dohda, Kazuhiko Kitamura, Nagoya Institute of Technology, Japan*

**SYMPOSIUM 19 Panels - Challenges in Micro and Nanomanufacturing**

*Track Chair: Xiaoping Yang, Cummins Inc., USA*

*Track Co-Chairs: Gloria Wiens, University of Florida, USA, Mark Jackson, Purdue University, USA*

**1:30pm - 3:15pm**

Room 334 Georgia Tech Global Learning Center

**19-1 Challenges in Micro and Nanomanufacturing (Panel Session)**

*Session Chair: Xiaoping Yang, Cummins Inc., USA*

*Session Co-Chairs: Gloria Wiens, University of Florida, USA, Mark Jackson, Purdue University, USA*

MSEC2007-31228: **Metrology for Micro-Components (Panel)**

*Thomas Kurfess, Clemson University, USA*

MSEC2007-31232: **Industrial Applications and Industrial Needs Of Micro/Nano Manufacturing (Panel)**

*Wenwu Zhang, GE Global Research Center, USA*

MSEC2007-31233: **Heterogeneous Integration and Manufacturing at Nanoscale (Panel)**

*Placid Ferreira, University of Illinois, Urbana-Champaign, USA*

MSEC2007-31235: **Micro/Meso-Scale Machine Tools for Small, Precision Parts (Panel)**

*Andrew Honegger, Microlution Inc., USA*

MSEC2007-31236: **Value of Metrology and Role of Standards to Facilitate Product Realization (Panel)**

*Kevin Lyons, National Institute of Standards and Technology, USA*

MSEC2007-31245: **A European Perspective on the Micro and Nanomanufacturing Challenges for the Microfactory (Panel)**

*Irene Fassi, Institute of Industrial Technologies and Automation - National Research Council, Italy*

**3:15pm – 3:45pm**

2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center

**Refreshment Break**

**SYMPOSIUM 4 Hybrid Macro/Meso/Micro Manufacturing Processes**

*Track Chair: Tugrul Ozel, Rutgers University, USA*

*Track Co-Chair: Andrew Trimmer, GE Global Research, USA*

**3:45pm - 5:30pm**

Room 334 Georgia Tech Global Learning Center

**4-3 Analysis and Simulation of Machining Processes**

*Session Chair: Y.B. Guo, University of Alabama at Tuscaloosa, USA*

*Session Co-Chair: Santosh Ranganath, United Technologies Research Center, USA*

MSEC2007-31087: **The Use of Internal State Variable Plasticity Model via a User Subroutine to Evaluate the Effect of Materials Testing Modes on Hard Machining Simulation**

*S. Anurag, Y.B. Guo, University of Alabama at Tuscaloosa, USA, M.F. Horstemeyer, Mississippi State University, USA*

MSEC2007-31111: **Multi-phase Modeling for Machining of Unidirectional Fiber Reinforced Composites**

*Chinmaya Dandekar, Yung C. Shin, Purdue University, USA*

MSEC2007-31171: **Specification of Shear Zone Characteristics In Achieving Desired Residual Stress Profile**

*Carl Hanna, Steven Liang, Georgia Institute of Technology, USA, Ru-Min Chao, National Cheng Kung University, Taiwan*

MSEC2007-31218: **Comparison of Tangential Force Models for Feedrate Selection in Milling**

*Barry Fussell, Cuneyt Yalcin, Robert Jerard, University of New Hampshire, USA*

**SYMPOSIUM 8 Collaborative and Digital Manufacturing for Advancing Product Quality**

*Track Chair: Weiming Shen, National Research Council, Canada*

*Track Co-Chairs: Yunfeng Zhang, Jerry Fuh, National University of Singapore, Singapore*

**3:45pm - 5:30pm**

Room 331/330 Georgia Tech Global Learning Center

**8-1 Collaborative and Digital Manufacturing**

*Session Chair: Weiming Shen, National Research Council, Canada*

*Session Co-Chair: Jerry Fuh, National University of Singapore, Singapore*

MSEC2007-31148: **E-Collaboration in a Multiple Engineering Projects Environment: A Facilities Development Approach**

*F.J. Pereda, Nicolas Penaranda, Guillermo Jimenez, Arturo Molina, Tecnologico de Monterrey, Mexico*

MSEC2007-31177: **Agent-based Integration of Collaborative Mobile Environment and Smartboard**

*Abdou Al-Rahim Kadri, Mohammad Mozaffari Kermani, Hamada Ghenniwa, University of Western Ontario, Canada, Weiming Shen, National Research Council, Canada*

**MSEC2007-31179: Collaborative Workflow Technology for Design and Manufacturing Coordination: An Overview**

*Qi Hao, Integrated Manufacturing Technologies Institute, Canada, Weiming Shen, National Research Council, Canada*

**SYMPOSIUM 12 Biomedical Manufacturing**

*Track Chair: Wei Li, University of Washington, USA*

*Track Co-Chair: Biaoyang Lin, Institute for Systems Biology, USA*

**3:45pm - 5:30pm**

Room 323 Georgia Tech Global Learning Center

**12-1 Advances in Biomedical Manufacturing**

*Session Chair: Wei Li, University of Washington, USA*

*Session Co-Chair: Biaoyang Lin, Institute for Systems Biology, USA*

**MSEC2007-31085: An Experimental Study on the Relationship between Heat Transfer Rate during Fabrication and 3D Pore Architecture of Alginate Scaffolds**

*W.M. Parks, Y.B. Guo, University of Alabama at Tuscaloosa, USA*

**MSEC2007-31153: Thermal-Electric Finite Element Analysis of Electrosurgical Cautery Process**

*Robert Dodde, Scott Miller, James Geiger, Albert Shih, University of Michigan, USA*

**MSEC2007-31166: Vessel Sealing Using the Bipolar Electrosurgical Method (Technical Publication)**

*Matthew Chastagner, Scott Miller, James Geiger, Albert Shih, University of Michigan, USA*

**MSEC2007-31184: A Parametric Study on Selective Ultrasonic Foaming of Porous Polymer for Biomedical Applications**

*Hai Wang, Wei Li, University of Washington, USA*

**MSEC2007-31185: A Concentration-Dependent Diffusion Model for Selective Ultrasonic Foaming**

*Hai Wang, Wei Li, University of Washington, USA*

**SYMPOSIUM 16 Advances in Metal Forming**

*Track Chair: Kuniaki Dohda, Nagoya Institute of Technology, Japan*

*Track Co-Chair: Guosong Lin, University of Michigan, USA*

**3:45pm - 5:30pm**

Room 324 Georgia Tech Global Learning Center

**16-3 Material Characterization and Formability**

*Session Chair: Wayne Cai, General Motors, Warren, USA*

*Session Co-Chair: Ying Huang, Northwestern University, USA*

**MSEC2007-31088: Dynamic Mechanical Behavior of Titanium Ti-6AL-4V at Transient Large Deformation Manufacturing Processes**

*Jie Sun, Shandong University, China, Y.B. Guo, University of Alabama at Tuscaloosa, USA*

**MSEC2007-31129: Prediction of Forming Limit in Single Point Incremental Forming with the Ductile Fracture Criterion**

*Ying Huang, Y. J. Wang, Jian Cao, Northwestern University, USA, Ming Li, Alcoa, USA*

**MSEC2007-31137: Estimation of Metal Hardening Models at Large Strains**

*Wayne Cai, John Carsley, Daniel B. Hayden, Louis G. Hector, Thomas Stoughton, General Motors, USA*

MSEC2007-31138: **A Fundamental Investigation on the Formability of a Commercially-Pure Titanium Sheet-Metal in the Incremental Forming and Stamping Processes**  
**G. Hussain, L Gao, Wang Hui**, Nanjing University of Aeronautics & Astronautics, China, **N.U Dar**, UET Taxila, Pakistan

**6:00pm – 10:00pm** Pick up from Georgia Tech Global Learning Center entrance at 6:00pm  
**Dinner at Host's Residence – sponsored by Georgia Tech George W. Woodruff School of Mechanical Engineering**  
Presentation by **Ward Winer**, Georgia Institute of Technology, USA

## Thursday, October 18

**8:00am** Breakfast 2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center

**8:00am – 5:00pm** Registration 2<sup>nd</sup> Floor, Georgia Tech Global Learning Center

### **SYMPOSIUM 2 Solid Freeform Fabrication for Biomedical and Tissue Engineering**

Track Chair: **Wei Sun**, Drexel University, USA

Track Co-Chairs: **David W. Rosen**, Georgia Institute of Technology, USA, **Stephen Schmitt**, Dental Implant Technologies, USA

**8:15am - 10:00am** Room 334 Georgia Tech Global Learning Center  
**2-1 Bioprinting of Cells and Soft Tissue**

Session Chair: **Kenneth Dalgarno**, University of Newcastle upon Tyne, UK

Session Co-Chair: **Stephen Schmitt**, Dental Implant Technologies, USA

MSEC2007-31023: **Precision Printing of Cells and Biomaterials onto 3D Matrices**  
**Thomas Boland, Xiaofeng Cui, Aditya Chaube, Richard Groff, Timothy Burg, Karen JL Burg**, Clemson University, USA

MSEC2007-31064: **Fabrication of 3D Cell Supporting Structures with Multi-Materials Using the Bio-Printer**

**Yuichi Nishiyama**, Kanagawa Academy of Science and Technology, Japan, **Makoto Nakamura, Chizuka Henmi, Kumiko Yamaguchi, Shuichi Mochizuki, Hidemoto Nakagawa, Koki Takiura**, Kanagawa Academy of Science and Technology, Japan

MSEC2007-31074: **A Robust True Direct-Print Technology for Tissue Engineering**  
**Bo Li, Tithi D Roy, Cindy M Smith, Patrick A Clark, Kenneth H Church**, nScript, USA

MSEC2007-31127: **PVA-based Scaffolds for the Repair of Musculoskeletal Soft Tissue**  
**Lorenzo Pio Serino, Maria Grazia Cascone, Luigi Lazzeri**, University of Pisa, Italy, **Peter A. Torzilli, Suzanne A. Maher**, Hospital for Special Surgery, USA

MSEC2007-31169: **Effect of Oxygen-Radio Frequency Plasma Treatment on Three Dimensional Polyepsilon-Caprolactone Scaffolds**  
**Eda D. Yildirim, Selçuk Güçeri, Wei Sun**, Drexel University, USA

### **SYMPOSIUM 5 Thermally-Enhanced Manufacturing**

Track Chair: **Frank Pfefferkorn**, University of Wisconsin-Madison, USA

Track Co-Chair: **Jay Rozzi**, Creare, Inc, USA

**8:15am - 10:00am** Room 331/330 Georgia Tech Global Learning Center

**5-1 Thermally-Enhanced Machining**

Session Chair: **Shuting Lei**, Kansas State University, USA

Session Co-Chair: **Jay Rozzi**, Creare, Inc, USA

**MSEC2007-31246: An Indirect Cooling System for the High-Speed Machining of Advanced Materials (Symposium Keynote)**

**Jay Rozzi**, Creare, Inc, USA

**MSEC2007-31014: Laser Heating and Thermally Enhanced Deformation of Silicon**

**John Patten**, Western Michigan University, USA, **Lei Dong**, University of North Carolina at Charlotte, USA

**MSEC2007-31096: A Review on Thermally Assisted Machining**

**Shuting Lei**, Kansas State University, USA, **Frank Pfefferkorn**, University of Wisconsin-Madison, USA

**MSEC2007-31101: Pulsed Laser-Assisted Micromilling for Die/Mold Manufacturing**

**Tugrul Ozel**, Rutgers University, USA, **Frank Pfefferkorn**, University of Wisconsin-Madison, USA

**MSEC2007-31215: Force Modeling for Laser Assisted Micro-Grooving**

**Ramesh Singh**, **Shreyes Melkote**, Georgia Institute of Technology, USA

**SYMPOSIUM 15 Design and Operations of Manufacturing Systems for Responsiveness**

Track Chair: **Jack Hu**, University of Michigan, USA

Track Co-Chair: **Sam Marin**, General Motors, USA

**8:15am - 10:00am** Room 324 Georgia Tech Global Learning Center

**15-1 Manufacturing System Design and Operations - I**

Session Chair: **Sam Marin**, General Motors R&D Center, USA

Session Co-Chair: **Jack Hu**, University of Michigan, USA

**MSEC2007-31081: Concurrent Design of Product Families and Assembly Systems**

**April Bryan**, **Jack Hu**, **Yoram Koren**, University of Michigan, USA

**MSEC2007-31090: Manufacturing System Design Considering Generational Product Evolution and Task Recurrence**

**Jeonghan Ko**, University of Nebraska, USA, **Jack Hu**, University of Michigan, USA

**MSEC2007-31205: Extension-Based Clustering Method: An Approach to Support Adaptable Design of The Products**

**Yanwei Zhao**, **Huijun Tang**, **Nan Su**, **Wanliang Wang**, Zhejiang University of technology, China

**SYMPOSIUM 18 Advances in Synergistic Effects of Materials and Processing**

Track Chair: **Katsuhiro Maekawa**, Ibaraki University, Japan

Track Co-Chair: **Desiderio Kovar**, University of Texas at Austin, USA

**8:15am - 10:00am** Room 323 Georgia Tech Global Learning Center

**18-1 Advances in Synergistic Effects of Materials and Processing - I**

Session Chair: **Hitomi Yamaguchi**, University of Florida, USA

Session Co-Chair: **Desiderio Kovar**, University of Texas at Austin, USA

**MSEC2007-31086: The Synergistic Effect of Tool Geometry and Hard Turning vs. Grinding Processes on 3D Surface Micro Topography**

**R.A. Waikar**, **Y.B. Guo**, University of Alabama at Tuscaloosa, USA

MSEC2007-31170: **Pressure-Assisted Sintering of Nanocrystalline Silver Lines Produced by Laser Ablation of Microparticle Aerosols**  
*Desiderio Kovar, Andre Albert, Michael Becker, John Keto, University of Texas at Austin, USA*

MSEC2007-31191: **Development of Spherical Magnetic Abrasive Made by Plasma Spray**  
*Hitomi Yamaguchi, University of Florida, USA, Kotaro Hanada, National Institute of Advanced Industrial Science and Technology, Japan*

**10:00am – 10:30am** 2<sup>nd</sup> and 3<sup>rd</sup> Floors, Georgia Tech Global Learning Center  
**Refreshment Break – Sponsored by General Motors R&D Center**

**SYMPOSIUM 2 Solid Freeform Fabrication for Biomedical and Tissue Engineering**

*Track Chair: Wei Sun, Drexel University, USA*

*Track Co-Chairs: David W. Rosen, Georgia Institute of Technology, USA, Stephen Schmitt, Dental Implant Technologies, USA*

**10:30am - 12:15pm** Room 334 Georgia Tech Global Learning Center

**2-2 Tissue Scaffold Fabrication**

*Session Chair: David W. Rosen, Georgia Institute of Technology, USA*

*Session Co-Chair: Stephen Schmitt, Dental Implant Technologies, USA*

MSEC2007-31011: **Fabrication of Biomimetic Scaffolds with Well-Defined Pore Geometry by Fused Deposition Modeling**

*Esmail Jabbari, David Rocheleau, Weijie Xu, Xuezhong He, University of South Carolina, Columbia, USA*

MSEC2007-31031: **Manufacture and Characterization of Bioceramic Tissue Engineering Scaffolds Produced by Selective Laser Sintering**

*Kun Xiao, Jennifer Dyson, University of Leeds, Leeds, UK, Kenneth Dalgarno, University of Newcastle upon Tyne, UK, Paul Genever, University of York, UK, David Wood, University of Leeds, UK, Ruth Goodridge, Loughborough University, UK, Chikara Ohtsuki, Nagoya University, Japan*

MSEC2007-31056: **Development of Three-Dimensional Alginate Encapsulated Chondrocyte Hybrid Scaffolds Using Microstereolithography**

*Seung-Jae Lee, Byung Kim, Geunbae Lim, Pohang University of Science and Technology, Korea, Jong-Won Rhie, The Catholic University of Korea, Korea, Hyun-Wook Kang, Dong-Woo Cho, Pohang University of Science and Technology, Korea*

MSEC2007-31219: **Bone Scaffold Fabrication System Study**

*Lin Lu, Drexel University, USA, David Wootton, Cooper Union, USA, Peter Lelkes, Jack Zhou, Drexel University*

**SYMPOSIUM 5 Thermally-Enhanced Manufacturing**

*Track Chair: Frank Pfefferkorn, University of Wisconsin-Madison, USA*

*Track Co-Chair: Jay Rozzi, Creare, Inc, USA*

**10:30am - 12:15pm** Room 331/330 Georgia Tech Global Learning Center

**5-2 Thermally-Enhanced Manufacturing**

*Session Chair: Yung C. Shin, Purdue University, West Lafayette, IN, United States*

*Session Co-Chair: Marion Grant, Caterpillar, USA*

MSEC2007-31071: **Metallurgical Phases Distribution Detection through Image Analysis for Simulation of Laser Hardening of Carbon Steels**

*Alessandro Ascari, Giovanni Tani, University of Bologna, Italy, Leonardo Orazi, University of Modena and Reggio Emilia, Italy*

MSEC2007-31072: **3D Transient Simulation Model for Laser Micromilling Processes**  
**Giovanni Tani**, University of Bologna, Italy, **Leonardo Orazi**, University of Modena and Reggio Emilia, Italy, **Alessandro Fortunato**, University of Bologna, Italy, **Gabriele Cuccolini**, University of Modena and Reggio Emilia, Italy

MSEC2007-31112: **Laser Cladding of Two Hardfacing Alloys onto Cylindrical High-Carbon Steel Substrates with a High Power Direct Diode Laser: Effect of Process Parameters on Clad Geometry and Microstructure**  
**Kevin Schoeffel**, **Yung C. Shin**, Purdue University, USA

MSEC2007-31167: **Experimental Investigations of Metal using Micro Thin Film Thermocouples**  
**Hongseok Choi**, **Xiaochun Li**, University of Wisconsin-Madison, USA

MSEC2007-31173: **Micromelting for Laser Micro Polishing of Meso/Micro Metallic Components**  
**Tyler Perry**, **Dirk Werschmoeller**, **Xiaochun Li**, **Frank Pfefferkorn**, **Neil Duffie**, University of Wisconsin-Madison, USA

#### **SYMPOSIUM 15 Design and Operations of Manufacturing Systems for Responsiveness**

Track Chair: **Jack Hu**, University of Michigan, USA

Track Co-Chair: **Sam Marin**, General Motors, USA

**10:30am - 12:15pm** Room 324 Georgia Tech Global Learning Center

#### **15-2 Manufacturing System Design and Operations - II**

Session Chair: **Jeonghan Ko**, University of Nebraska, USA

Session Co-Chair: **Yhu-tin Lin**, General Motors, USA

MSEC2007-31161: **Production Validation of Agile Machining Fixture, a Machine-Automated Reconfigurable Tooling**

**Yhu-tin Lin**, **Chi-Hung Shen**, General Motors, USA, **Pulak Bandyopadhyay**, General Motors, India

MSEC2007-31220: **Comparing Energy and Other Measures of Environmental Performance in the Original Manufacturing and Remanufacturing of Engine Components (Technical Publication)**

**Dan Adler**, Caterpillar, USA, **Vishesh Kumar**, Michigan Technological University, USA, **Patricia A. Ludewig**, Caterpillar, USA, **John W. Sutherland**, Michigan Technological University, USA

MSEC2007-31221: **Quality and Inspection of Machining Operations: Review of Condition Monitoring and CMM Inspection Techniques – 2000 to Present**

**John T. Roth**, Pennsylvania State University at Erie, USA, **Laine Mears**, Clemson University, USA, **Dragan Djurdjanovic**, University of Texas at Austin, USA, **Xiaoping Yang**, Cummins Inc., USA, **Thomas Kurfess**, Clemson University, USA

#### **SYMPOSIUM 18 Advances in Synergistic Effects of Materials and Processing**

Track Chair: **Katsuhiro Maekawa**, Ibaraki University, Japan

Track Co-Chair: **Desiderio Kovar**, University of Texas at Austin, USA

**10:30am - 12:15pm** Room 323 Georgia Tech Global Learning Center

#### **18-2 Advances in Synergistic Effects of Materials and Processing - II**

Session Chair: **Kevin Chou**, University of Alabama at Tuscaloosa, USA

Session Co-Chair: **Katsuhiro Maekawa**, Ibaraki University, Japan

**MSEC2007-31043: Cutting Edge Radius Effects on Diamond Coated Cutting Tools: From Deposition to Machining**

**J. Hu, Kevin Chou**, *University of Alabama at Tuscaloosa, USA*, **R. Thompson**, *Vista Engineering, USA*

**MSEC2007-31060: Some Investigations into Multi-objective Optimization of Wire Electro-Discharge Machining of Al/SiCp composites**

**Nilesh Patil**, *Marathwada Institute of Technology, India*, **Prakash Brahmanekar, Babasaheb Ambedkar**, *Technological University, India*, **Laxman Navale**, *MES College of Engineering, India*

**MSEC2007-31165: Study on Mechanical Properties and Microstructure of Mg/SiC Nanocomposites Fabricated by Ultrasonic Cavitation Based Solidification Processing**

**Guoping Cao, Hiromi Konishi, Xiaochun Li**, *University of Wisconsin-Madison, USA*

**12:15pm – 1:30pm**

**Light Lunch**

1<sup>st</sup> floor Atrium, Georgia Tech Global Learning Center

**1:30pm**

**Adjourn**