
ASPE Tutorials

Sunday and Monday, October 4 and 5, 2009

The fee for each half-day tutorial is \$200.00 (\$100.00 for full-time students), and \$400.00 for full-day tutorials (\$200.00 for students). Please refer to the ASPE website at www.aspe.net for tutorial times, descriptions and tutors. Some sample tutorials from past years are:

Control/Design Interactions in Precision Machines – Part 1: Modeling & Part 2: Synthesis
Design Considerations of Electro-Mechanical Modules in Precision Systems
Design, Fabrication and Implementation of Kinematic Coupling Technology
Displacement Measuring Interferometry System Design
Fundamentals of Single Point Diamond Turning
Fundamentals of Transducers and Instrumentation for the Precision Engineer
Introduction to Displacement Measuring Interferometry
Measuring and Managing Dynamics of Precision Machines
Mechatronics and Dynamic Error Budgeting – Part 1 & Part 2
Overview of Exact Constraint Machine Design
Passive Vibration Isolation
Precision Engineering Principles
Precision Flexure Mechanisms – Part 1 & Part 2
Precision Spindle Metrology
Self-Calibration: Reversal, Redundancy, Error Separation and Absolute Testing
Spectral Shifting – a Signal to Noise Enhancer

Poster Papers

Tuesday and Wednesday, October 6 and 7, 2009, 3:30 to 5:00 p.m.

Nearly 90 poster papers will be presented, with ample opportunity for discussion with the authors. Titles, authors and short abstracts can be found on the ASPE website.

Exhibition

Tuesday-Thursday, October 6-8, 2009, 10:00 a.m. to 6:00 p.m.

Over 30 industry-focused commercial exhibits, where representatives from tool manufacturers, suppliers, and research institutions will be showcasing their products and services. Current and past exhibitors can be found on the ASPE website.

Tours

Friday, October 9, 2009

Technical Tours will be offered on the Friday after the conclusion of the conference. For times and tour details, please refer to the ASPE website.

Registration Information and Deadlines

Log onto the ASPE website at www.aspe.net to print a registration form. The deadline for early registration is September 4, 2009. After that date, the registration fee will be higher.

Hotel Information

The Meeting will be held at the Monterey Marriott and the Monterey Conference Center in Monterey, California. Please make your reservations by using the hotel links provided on the ASPE website at www.aspe.net. The group room rate reservation deadline is September 4, 2009 (after that date room availability and group rates cannot be guaranteed).

Technical Sessions

Tuesday through Thursday, October 6 to 8, 2009, 8:30 a.m. to 5:00 p.m.

Session I – Commodization of Precision - Challenges and Opportunities

1. Advances in Areal Density for Disk Drives (Invited Paper)
2. A Short History of Diamond Machining (Invited Paper)
3. From Semiconductors to Photovoltaics (Invited Paper)
4. Carbon Nanotubes – Challenges to Bring to the Market (Invited Paper)

Session II – Design of Precision Machines and Instruments I

1. Development of a Novel, Ultra-precision Spindle
2. Design of a Six Degree of Freedom Nanopositioner for Use in Massively Parallel Probe-based Nanomanufacturing
3. Improving the Accuracy of a 6-DOF Displacement/Orientation Sensor
4. Prototype of a Planar Guided Milling Machine for High Precision Applications
5. Elastic Element Showing Low Stiffness Loss at Large Deflection

Session III – Dimensional Metrology

1. Volumetric Error Mapping Techniques for the NIST M48 Coordinate Measuring Machine
2. Realization of Isara 400: A Large Measurement Volume Ultra-precision CMM
3. The Measurement of Dimensional Metrology
4. The Spherical Profilometer Polaris 3D
5. Full Five Degree-of-freedom Error Characterization of Ultra-precision Spindles Using the Multiprobe Method

Session IV – Applications of Precision Engineering in Manufacturing I

1. Design of a Precision Transfer Line for Dip-pen Nanolithography
2. Manufacturing of Freeforms with Well Defined Reference Structures
3. MEMS Kinematic Clamp for Repeatable Precision Alignment
4. Ultra-planar Electrostatic Chucks Based on CTE Materials for Lithography and Metrology

Session V – Optics and Interferometry

1. Compact, Multi-channel, Fiber-based Absolute Distance Measuring Interferometer System
2. A Study of Modulated Interference Laser Encoder – New Approach for a High Resolution and High Stability Position Measurement System
3. Interferometric System for High Precision Measurements of Flatness, Thickness and Parallelism of Mechanical Parts
4. Real-time Periodic Error Compensation with Low/Zero Velocity Parameter Updates
5. Compact, Nanometer-resolution, Fiber-optic Encoder

Session VI – Grinding, Polishing and Lapping

1. Testing Quantum Dots as a Means of Assessing Subsurface Damage in Polished Glasses
2. Creating Extreme Subsurface Integrity by Laser-induced Material Self-organization
3. Cross Crown Nanogrinding of a Chiplet for a Slider with an Integrated Microactuator (SLIM)
4. Flexible Polishing with Bounded Grains for Complex Ceramic Endoprostheses

Session VII – Novel Technologies

1. Dynamic Design for Improved Control
2. Thermal-elastic Compensation Models for Position Control
3. MR Fluid Activated Spherical Joint for Precision Orientation Control
4. Magnetic Levitation for Precision Motion with Only Two Off-the-shelf Linear Motors and a Novel Passive Magnetic Bearing Design: Modeling and Control Challenges
5. Validation of the Performance of a High-accuracy Compact Interferometric Sensor

Session VIII – Design of Precision Machines and Instruments II

1. Synthesis of Multi-Axis Serial Flexure Systems
2. Noise Reduction and Disturbance Rejection at the Sub-nanometer Level
3. Cardanic Joints with Axis Offset in Singularity Free Hexapod Structures for Nanometer Range Resolution
4. Calculating “Thermal Location and Component Errors” on Machine Tools
5. Mechanical Design and Practice of Artificial Channel-cut Crystal Stages for Bonse-Hart USAXS Instrument with 10-Nanoradian-scale Resolution and Stability

Session IX – Applications of Precision Engineering in Manufacturing II

1. Optical and Fiducial Fabrication with a Fast Long Range Actuator
2. The Milling Dynamics “Super Diagram”: Combining Stability, Surface Location Error, Tool Wear, and Uncertainty
3. Machine Tool Performance Requirements Associated With Modulated Tool-path Chip Breaking
4. Influence of Machining Parameters and Tool Geometry on the Quality of Information Carrying Microstructures
5. Burrs formation in Machining with a Micro-size Single Crystalline Diamond Tool

For complete program information check our web site at: www.aspe.net
To request a printed program, send your complete mailing address to erika_layne@aspe.net



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ASPE 24th Annual Meeting
October 4 to 9, 2009
Monterey Marriott Hotel and
Monterey Conference Center
Monterey, California

Plan Now to Attend!

Tutorials • Technical Talks •
Invited Speakers • Exhibits •
Poster Sessions • Tours •

ASPE 24th Annual Meeting

A Premier Precision Engineering Meeting

October 4 to October 9, 2009

Monterey Marriott Hotel and Monterey Conference Center, Monterey, California

The 2009 American Society for Precision Engineering Annual Meeting will provide a forum for the presentation and discussion of the latest technical information and achievements in precision engineering. The meeting will introduce new concepts, processes, equipment, and products while highlighting recent advances in precision measurement, design, control, and fabrication.

As the premier precision engineering meeting in the USA, the dynamic conference format will offer:

- Two days of **technical tutorials** presented by experts in each field.
- A series of **invited papers and oral presentations** on precision engineering topics introducing the latest technology, products and process innovations.
- Nearly **90 poster papers**, presented in two late afternoon sessions, offering ample opportunities for personal interaction and in-depth topical discussions.
- A **Commercial Session** where company representatives will make presentations on new products associated with precision engineering. This provides participants with the opportunity to receive timely information on new technologies that have been commercialized into products and services, as well as information on advances that can be expected in the near future.
- Three days of industry focused **commercial exhibits**, where representatives from tool manufacturers, suppliers, and research institutions will be showcasing their products and services.
- **Technical Tours** will be offered on the Friday after the conclusion of the conference, including visits to local industrial facilities.

Keynote Address

Edward I. Moses, Ph.D.

Lawrence Livermore National Laboratory NIF

Monday, October 5, 2009, 7:00 p.m.



Dr. Ed Moses is the Director for the National Ignition Facility and the Principal Associate Director at Lawrence Livermore National Laboratory (LLNL) in Livermore, California responsible for photon science and applications. Dr. Moses was responsible for completing construction and activation of the National Ignition Facility (NIF), the world's largest and most energetic laser system and transforming into an experimental platform for the broad national and international scientific user community.

LIFE: A Path for Sustainable, Carbon-Free Energy Future

The National Ignition Facility (NIF), the world's largest and most powerful laser system for inertial confinement fusion (ICF) and for studying high energy density science, is now operational at Lawrence Livermore National Laboratory. NIF will reach conditions never before achieved in the laboratory (temperatures of ~100 million K, radiation temperatures >3.5 million K, and densities of 1,000 g/cm³). In March 2009, NIF achieved a 1.1-MJ shot. This achievement made it clear that NIF is not only operational, but is an ignition-capable facility.

Successful demonstration of ignition and net energy gain on NIF will be a major step towards determining the feasibility of ICF and will focus the world's attention on the possibility of laser fusion energy options. Achieving ignition will be enabling for Laser Inertial Fusion Energy (LIFE), a promising laser fusion-driven energy option that we have been exploring.

This talk will focus on NIF's scientific potential and introduces an LLNL-developed approach to generating carbon-free, safe, sustainable and economically competitive power that builds on NIF technologies. The LIFE engine provides a neutron-rich fusion source and can be integrated into a system capable of generating several thousand megawatts of power that is passively safe and minimizes proliferation concerns associated with the nuclear fuel cycle. As such, LIFE can provide a sustainable, carbon-free energy generation solution in the 21st century.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.