



Portland Skyline - Mt. Hood in the Background¹

CALL FOR PAPERS

Conference Dates:

Tuesday, June 7 - Thursday, June 9, 2005

Abstracts Due: October 15, 2004

2005 SEM Annual Conference & Exposition on Experimental and Applied Mechanics

Portland Marriott Downtown
Portland, Oregon USA

**Technical Theme: Experimental Mechanics Applied to
Advanced Material Systems**

2005 SEM Annual Conference Tracks and Symposia:

Structural Integrity and Damage Mechanisms

Applications of Optical Methods

Advanced Composite Materials and Systems

Multifunctional Nanostructured Polymeric Materials and Corresponding Technologies

Experimental and Applied Mechanics

Failure of Heterogeneous Materials Symposium

6th International Symposium on MEMS and Nanotechnology



Organized by the
Society for Experimental Mechanics, Inc.
7 School Street, Bethel, Connecticut 06801 USA
(203) 790-6373; Fax (203) 790-4472; sem@sem1.com

www.sem.org

Track 1: Structural Integrity and Damage Mechanisms

Organizers: José Freire and Arthur Braga, Catholic University of Rio de Janeiro, PUC-Rio; Ashok Ghosh, New Mexico Tech; Tim Miller, Sandia National Laboratories; Carl Popelar, CarboMedics Inc.

Structural integrity and damage mechanisms encompass a broad multidisciplinary field of research and application where methods of stress analysis, studies on material behavior, damage mechanisms identification, accumulated damage detection, prediction and measurement of damage rate, effectiveness of inspection, NDE, sensor development and monitoring techniques play an important role. Topics that this track will include are as follows:

- Damage Mechanics
- Damage Mechanisms
- Materials Aging
- Diagnostics of Damage
- Fatigue and Fracture Analysis
- Metal Loss and Thinning Mechanisms
- Creep of Structures
- Applications of EM to: Civil Structures, Pipelines, Pressure Vessels, Tanks, Rotating, and other Equipment
- Health Monitoring
- Risk Based Inspection, Fitness-for-purpose, and Experimental Mechanics
- EM and Forensic Aspects of Structural Integrity
- Failure Analysis and EM
- Efficiency in Stress Prediction for Failure Analysis, Estimation of Residual Life and Life Extension of Structures
- EM in the Repair and Reinforcement of Structures
- EM & Limit Load Analysis
- Existing and New Sensors to Predict Damage and Residual Life
- Testing of New and Existing Structures
- Structures in Extreme Environment
- Similitude in Engineering and Model Testing
- Modal Testing and Dynamic Behavior of Structures

Track 2: Applications of Optical Methods

Organizers: Archie T. Andonian, Goodyear Tire & Rubber; John Tyson and Tim Schmidt, Trilion Quality Systems

Optical methods are fast becoming a primary method for the measurement of materials and structures. This track focuses on the application of optical methods in all disciplines of experimental mechanics to quantify geometric attributes, displacements (motion), deformation and strain, as well as measure parameters such as temperature and pressure. Optical methods typically provide a full-field material response so this information is used as a powerful tool to verify and iterate finite element models of materials and structures from nanostructures to entire vehicles.

- Optical Methods for MEMS and Nanotechnology
- Optical Methods for Microelectronics & Photonics
- Optical Methods for Biomechanics & Biometrics
- Optical Methods for Composites
- Optical Methods for High Speed Events
- Optical Methods to Validate Finite Element Modeling
- Applied Photoelasticity
- Image Correlation and Photogrammetry
- Fiber Optic Sensors
- Moiré Interferometry
- Holography and Electronic Speckle Pattern Interferometry (ESPI)
- Shearography

Track 3: Advanced Composite Materials and Systems

Organizers: Peter Ifju, University of Florida; Hugh Bruck, University of Maryland, College Park

Advancements in composites are being made by structuring materials at the nanoscale, combining materials with multiple functionality, and by looking to natural composite materials for inspiration. In order to develop these composites, experimental measurements are needed to characterize composites at the nanoscale, to characterize the multifunctional nature of the composite material system, and to develop a new understanding of nature to develop composites based on biological principles materials. The complex nature of these experiments are requiring new approaches that often take advantage of hybrid experimental-analytical-numerical approaches as well as advanced instrumentation such as nanoindentation and Atomic Force Microscopy. In addition, the knowledge ascertained from these experiments must then be used to help guide the development of new techniques for processing these materials and structures that control the organization of material in the composite down to the nanoscale.

The development of advanced composites presents exciting and dynamic problems with benefits that have significant economic and societal impact. In this track, sessions have been organized that reflect the diversity of experimental research being conducted on advanced composites, as well as their benefits. Examples of experimental research issues that will be addressed in this track include:

- Nanoindentation
- Microscopic Characterization
- Nanoscale and Microscale Metrology
- Multiscale Processing of Advanced Composite
- Self-assembly Techniques
- Characterization of Functionally Graded Materials
- Development of Biological Inspired Composite Materials
- Mechanics of Biological Composite Structures and Materials
- Design of Multifunctional Composite Structures and Materials

Track 4: Multifunctional Nanostructured Polymeric Materials and Corresponding Technologies

Organizers: Igor Emri, University of Ljubljana, Slovenia; Ioannis Chasiotis, University of Virginia

Nanostructured polymers and their composite systems can be characterized by modifications of the original material properties as a result of alterations in the thermomechanical behavior of the polymeric phase at the nanoscale. Such nanostructured materials present a unique combination of properties impossible to achieve with classical blends as they benefit from changes in the nanoscopic properties rather than the extended interphases encountered in traditional micro and macroscale composites.

Among characteristic examples are polymer nanocomposites where the organic matrix properties have been modified because of the (organic or inorganic) interphase resulting into a completely new time-dependent behavior, confined crystallization and nanostructured topographies that allow for unique multifunctionality and enhanced mechanical behavior, thermodynamically stable self-assembled nanostructures characterized by molecular polydispersity that is inherent to the fabrication method, continuous phase polymer blends with improved high-temperature creep resistance, fracture toughness and strength. A major challenge is the production of well nanodispersed systems that retain the original commodity polymer component. Such polymer-based nanomaterials are expected to generate some of the most innovative applications in aerospace and transportation, energy production, biomedical applications, etc. Papers are solicited in the following general areas:

- Multifunctional Nanostructured Polymers and Nanocomposite Materials
- Self-organized Block Copolymers
- Design and Nanostructuring of Polymeric Systems with Enhanced Complexity that Follows a Bottom-up Approach (Synthesis, Self-assembly, and Self-organization), or Top-down Methods (Nanolithography, Nanoimprinting, etc.)
- Experimental and Modeling Methods to Characterize Morphology
- Structure and Properties of Nanostructured Polymers
- Structure-properties Relations in Nanophased Polymeric Systems
- Biomimetics of Cellular and Subcellular Macromolecular Structures

Track 5: Experimental and Applied Mechanics

Organizers: Masahisa Takashi, Aoyama Gakuin University, Japan; Thomas Carne, Sandia National Laboratories; Ryszard J. Pryputniewicz, Worcester Polytechnic Institute

Experimental and Applied Mechanics covers the wide variety of subjects that are related to the broad field of experimental or applied mechanics. Both research and application papers are requested. Papers will be organized into sessions based on a specific discipline.

- Acoustoelasticity
 - Applications
 - Applied Photoelasticity
 - Biological Systems and Materials
 - Composite Materials
 - Dynamic Behavior
 - Education
 - Electronic Packaging
 - Experimental Fluid Mechanics
 - Fiber Optic Sensors
 - Fracture and Fatigue
 - Hybrid Techniques
 - Inverse Problems
 - MEMS and Nanotechnology
 - Modal Analysis/Dynamic Systems
 - Model Validation
 - Numerical and Finite Element Solutions
 - Optical Methods
 - Research in Progress
 - Residual Stresses
 - Smart Structures
 - Strain Gages
 - Structural Testing
 - Thermal Methods
 - Time Dependent Materials
 - Transducers and Sensors
 - Uncertainty Quantification
 - Wood and Wood Based Composites
- * Please check other tracks and symposia to better allocate your abstract.

Location

Portland Marriott Downtown

1401 SW Naito Parkway, Portland, Oregon 97201
(800) 228-9290 in US/Canada
(503) 226-7600; Fax (503) 221-1789

Hotel Rates:

\$135.00 per night for Single, Double, Triple OR Quad, plus applicable taxes

Hotel Reservation Deadline: May 17, 2005

- 20 minutes from Portland International Airport (PDX)
- Located downtown on the west bank of the Willamette River
- Easy access to shopping, restaurants, theatre, opera, sports, and area attractions

Important Note: Due to the popularity of the Rose Festival, which is held throughout June each year in Portland, it is strongly advised that you make your hotel and flight reservations early. Accommodations fill up quickly and the Portland Marriott is in a prime location for all of the festivities of the Rose Festival.

General Location Information: With majestic views of Mount Hood and Mount St. Helens, Portland offers a scenic backdrop to SEM's 2005 Annual Conference. Attendees and guests will find plenty to occupy their free time in Portland. Popular attractions include:

- Rose Festival is on throughout June. This is a major event. Make your hotel and airline reservations **EARLY!**
- Oregon Zoo, Portland, Oregon
- Japanese Garden
- Portland Rose Gardens - including the International Test Garden

Visit Portland's Website for details: www.travelportland.com



Steel Bridge and McCall Waterfront Park



Portland Brewery Company



Dragon Boats at Portland Rose Festival

SEM Symposium on Failure of Heterogeneous Materials

Organizers: Yapa Rajapakse, Office of Naval Research; Ares J. Rosakis, California Institute of Technology; Arun Shukla, University of Rhode Island; Hareesh V. Tippur, Auburn University

Heterogeneous material systems are used in many modern engineering applications for their outstanding structural and functional attributes. Failure characterization and modeling of these materials is essential for successful mechanical design and for developing next generation material systems. This symposium is aimed towards providing a forum for discussing latest developments on static and dynamic failure and damage of various heterogeneous material systems such as

- Fiber Reinforced and Sandwich Composites
- Textile Composites
- Particulate Composites
- Layered Materials
- Micro-/Nano-structured Materials
- Self-healing Materials
- Structural Foams

Papers dealing with experimental, experimental-numerical, or experimental-analytical aspects are invited. Topics of interest include (but not limited to) confinement and friction effects, scale effects, blast loading, tailoring of properties, multifunctional behavior, interfacial separation, novel techniques to study fracture, etc.

6th International Symposium on MEMS and Nanotechnology

Sponsored by the SEM MEMS and Nanotechnology Division

Organizers: Ryszard J. Pryputniewicz, Worcester Polytechnic Institute; Anthony D. Challoner, Boeing Company; Wendy C. Crone, University of Wisconsin, Madison

Today, developments in MEMS and nanotechnology are being made at an unprecedented rate, driven by both technology and user requirements. These developments depend on micromechanical and nanomechanical analyses, and characterization of structures comprising nanophase materials.

The 2005 Symposium will be the sixth in the series to address pertinent issues relating to design, analysis, fabrication, testing, optimization, and applications of MEMS and nanotechnology, especially as these issues relate to experimental mechanics of the microscale and nanoscale structures. Papers or poster presentations are sought in the following and related areas:

- MEMS and NEMS for Extreme Environments and Homeland Security
- RF MEMS
- Bio-MEMS
- Optical-MEMS
- Sensors: Temperature, Pressure, Humidity, Flow, Motion, etc.
- MEMS Applications in Telecom. and Wireless Systems
- MEMS in Flight and Aerospace Applications
- Composite MEMS
- Microfluidics and Biofluidics
- Micromechanics and Nanomechanics of High-density Data Storage Technology, e.g., Millipede System
- MEMS Packaging
- Influence of Design and Fabrication Methods on Reliability and Durability of MEMS and NEMS
- Fatigue and Fracture in MEMS and NEMS
- Novel Materials, Their Characterization and Applications
- Scale Effects on Nanostructured Materials
- Nanomechanics Including Mech. Prop. Characteriz. of Thin Film Materials by Nanoindentation
- Nanosimulation and Comput. Methods
- Design, Analysis, and Fabrication Methods
- Metrology Including Full Field and Local Testing and Characterization Based on Electrical, Mechanical, Optical, and Other Methods
- Deformation and Damage at the Nanoscale
- Nanoscale Strain and Stress Measurements
- Novel Applications of MEMS and Nanotechnology
- Integration of MEMS and Nanotechnology into Systems
- Standardization at the Microscale and Nanoscale
- Education in MEMS and Nanotechnology

2005 SEM Annual Conference Poster Session

Organized by the SEM Research Committee

The 2005 SEM Annual Conference will include a poster session dedicated to work in progress, or completed work, in any of the technical areas relating to this Call for Papers. The intention is to provide a forum for attendees to display preliminary investigations or other work in progress without the requirement to generate abstracts or other written documentation to be published in the Conference Proceedings.

A suitable display area will be provided along with appropriate boards, etc. to allow mounting of the poster information. You will be contacted at a later date with posting details and times and location for viewing. Size of the display will be determined based upon the interest and needs of attendees.

Electronic Submissions

SEM will only accept electronic submissions for the 2005 SEM Annual Conference. Details about submitting abstracts and the electronic submission form are on the SEM website:

www.sem.org

All abstracts will be received electronically. No copies are required for electronic submission. Do not fax. Do not send duplicate submissions. Authors will receive an automatic reply indicating their abstract was received. If you do not receive a reply within 2 hours of submission, please contact Jen Proulx at abstract@sem1.com. Accepted papers will also be received electronically, per guidelines on the SEM website, and only a CD-ROM Proceedings will be available for the 2005 SEM Annual Conference.

Please submit a short abstract of the paper (not more than 200 words) electronically by October 15, 2004. Do not include photos or equations in your abstract. Abstract submissions for the MEMS Symposium must include 5 keywords.

If the abstract is accepted, authors will be notified by January 15, 2005. The author will be required to submit the finished paper electronically by March 15, 2005.

Oral presentation slots in the final program are guaranteed only for authors who submit a written paper by March 15, 2005.

Keep checking the SEM website for more details: **www.sem.org**

Important Dates

October 15, 2004	Abstracts due to SEM
January 15, 2005	Authors notified of acceptance/rejection
March 15, 2005	Accepted authors are required to submit a complete paper to SEM Headquarters.
June 7 - 9, 2005	2005 SEM Annual Conference & Exposition on Experimental and Applied Mechanics



SEM Contact Information

Society for Experimental Mechanics, Inc.
7 School Street, Bethel, CT 06801
(203) 790-6373; Fax (203) 790-4472
sem@sem1.com
www.sem.org
[ftp.sem.org](ftp://ftp.sem.org)

Thomas Proulx Executive Director	director@sem1.com
Katherine M. Ramsay Conference Manager	meetings@sem1.com
Jennifer Proulx Conference Assistant	abstract@sem1.com
Shari Matthews Registration Manager	reg@sem1.com
Joni Normandin Exhibit Manager	joninormandin007@aol.com

Upcoming SEM Events

2004

October 27 - 29

15th International Invitational Symposium on Unification of Analytical, Computational, and Experimental Solution Methodologies (UACEM), Sheraton Springfield Hotel, Springfield, MA

2005

January 27 - 30

IMAC-XXIII Preconference Courses

- Modal Analysis: Theory & Application
- Vibration Testing: Theory & Practice
- Nonlinear Systems Techniques & Applications
- VXI Programming for Noise and Vibration Analysis
- Using Matlab™ for Noise and Vibration Analysis

Rosen Plaza Hotel, Orlando, FL

January 31 - February 3

IMAC-XXIII: A Conference & Exposition on Structural Dynamics
Rosen Plaza Hotel, Orlando, FL

June 7 - 9

SEM Annual Conference & Exposition on Experimental and Applied Mechanics, Marriott Portland Downtown, Portland, OR

SEE THE SEM WEBSITE FOR DETAILS: **www.sem.org**

2005 SEM Exposition

A comprehensive exhibit of testing and analysis equipment will be a highlight of the 2005 SEM Annual Conference and Exposition. Please contact Joni Normandin to reserve your booth today, (860) 274-4518, joninormandin007@aol.com.

Following is a list of exhibitors from the SEM X International Congress Exposition held in Costa Mesa, California, June 7 - 9, 2004:

- Allied Engineering & Consultant, Inc.
- Cambridge University Press
- Capacitec, Inc.
- Center for Tribology, Inc.
- Correlated Solutions, Inc.
- DRS Data & Imaging Systems, Inc.
- HBM Inc.
- HITEC Corporation
- HPI - Hitec Products, Inc.
- Hysitron, Inc.
- LaVision Inc.
- MTS Systems Corporation
- MetroLaser, Inc.
- PCB Piezotronics, Inc.
- Polytec Inc. ****2005 Social Event Sponsor****
- Precision Filters, Inc.
- SPIE
- Sage Science Press
- SOLTEC Corporation
- Stress Photonics Inc.
- Texas Measurements, Inc.
- Trilion Quality Systems
- Vishay Micro-Measurements