

**Teacher Schedule
for
National Science Foundation (NSF) Funded
Museum of Science
Materials Research Society (MRS) Symposium PP**



Saturday, November 27:

12:00 PM - 5:00 PM Teachers' Hospitality Room 101 at the Hynes Convention Center

- Nev and Kevin to meet teachers
 - Teachers to obtain guest badges and MRS Program book

Sunday, November 28:

**Museum of Science (MOS)
Funded by National Science Foundation
Communicating Materials Science –
Education for the 21st Century**

7:15 AM – 7:40 AM Shuttle Service from Sheraton Hotel Lobby to Museum of Science

- Remaining teachers to obtain guest badges and MRS Program book

8:00 AM – 9:00 AM Museum of Science (MOS)

Breakfast at The d'Arbeloff Suite

9:00 AM – 10:25 AM: Hands-on Session

Teacher Group A: Go to Hornblower Room:

Make an LED Flashlight—hands on tests making and using light emitting diodes

Joan Redwing, Pennsylvania State University

Teacher Group B: Go to Suit Cabot Room:

Nanotech in the HS Laboratory includes a suite of laboratory experiments appropriate for labs that illustrate the emerging field of nanotechnology

Wendy Crone, University of Wisconsin

9:00 AM – 12:00 PM: Hands-on Session

Teacher Group C: Go to Classroom A:

Dustbusting by Design—applying the engineering design process and designing a motor

Steven Leeb, Massachusetts Institute of Technology

Teacher Group D: Go to Technology Learning Center (Inventor's Workshop):

Hands on activities in materials science for HS teachers

Brain Sheldon, Brown University

10:30 AM – 12:00PM Hands-on Session

Teacher Group A: Remain in Hornblower Room:

Envisioning Science—Cameras in the Classroom, communicating complex ideas in science and technology and imagery

Felice Frankel, Massachusetts Institute of Technology

Teacher Group B: Remain in Cabot Room:

Hands-on inquiry including “sneaker science, laser pool, marble launch math challenge, robotics challenge, polymers”

Daniel Steinberg, Princeton University

12:00 – 1:30 PM

Lunch at The d'Arbelloff Suite

1:30 – 3:00 PM Hands-on Workshops

Teacher Group A: Remain in Hornblower Room: Continue with:

Envisioning Science—Cameras in the Classroom, communicating complex ideas in science and technology and imagery

Felice Frankel, Massachusetts Institute of Technology

Teacher Group B: Remain in Cabot Room:

Andrew Greenberg, Pennsylvania State University

Teacher Group C: Remain in Classroom A:

Hands-on inquiry including “sneaker science, laser pool, marble launch math challenge, robotics challenge, polymers”

Daniel Steinberg, Princeton University

Teacher Group D: Remain in Technology Learning Center (Inventor's Workshop):

Nanotech in the HS Laboratory includes a suite of laboratory experiments appropriate for labs that illustrate the emerging field of nanotechnology

Wendy Crone, University of Wisconsin

3:00 – 5:00 PM Public Talk Series (Cahners Theater)

Teacher Enhancement with Summer Research Internships

Chuck Wade, IBM Almaden

Nanotechnology

Arthur B. Ellis, National Science Foundation

Wendy Crone, University of Wisconsin

The Nano-scale: Communicating the Uniqueness and Opportunities

Steve Fonash, Pennsylvania State University

Materials and You!

Shenda Baker, Harvey Mudd College

5:00 PM Adjourn

5:00 – 6:00 PM Shuttle Service from Museum of Science to Sheraton Hotel lobby

- Opportunity to freshen up and get ready to return to Museum of Science for evening reception with MRS President
- Suggested for reception: Semi-formal business wear (e.g.: Suit and Tie)

7:15 – 8:00 PM Shuttle Service from Sheraton Hotel lobby to Museum of Science

7:30 – 9:30 PM at the Museum of Science (Featuring “Strange Matter”), Blue Wing President's Reception: Howard E. Katz 2004 MRS President

- Food to include: Carved meats, hors d'oeuvres, and drinks

9:00 – 10:00 PM: Shuttle Service from Museum of Science to Sheraton Hotel lobby

Monday, November 29:

SESSION PP1: Education, Curriculum and Reaching Students
Chair: Fiona Goodchild
Monday Morning, November 29, 2004
Back Bay Ballroom B (Sheraton)



Breakfast on your own and opportunity to meet with your mentors

8:30 AM *PP1.1

Citizen Scientists - Advocate Educator

Dennis M. Bartels, President, TERC, Cambridge, Massachusetts

9:00 AM PP1.2

Materials Science and Technology: A Curriculum That Works

Tom Stoebe¹ and John Rusin²; ¹Materials Science and Engineering, University of Washington, Seattle, Washington; ²Engineering, Edmonds Community College, Lynnwood, Washington.

9:15 AM PP1.3

Exploring Constructionist Learning Environments for Middle-School Science Students: Problem-based Scientific Inquiry Using Electron Microscopy

Andrea J. Harmer and Sujata Jagota; Materials Science, Lehigh University, Bethlehem, Pennsylvania

9:30 AM PP1.4

Teaching Materials Science and Engineering through the Writing and Use of "The World of Materials" Essays

Paul R. Howell, Materials Science and Engineering, Pennsylvania State University

9:45 AM BREAK

10:15 AM *PP1.5

National Science Teachers Association unrivaled professional learning network, Building a Presence for Science, a Communication solution for time-starved teachers

Caroline Goode, Building a Presence for Science, National Science Teachers Association, Arlington, Virginia

10:45 AM PP1.6

New Approach Application to Classroom Teacher Activity

Boris N. Kodess^{1,2}, Polina Kodess¹ and Sergey A. Kononogov¹; ¹Crystals Metrology, VNIIMS, Moscow, Russian Federation, ²ICS&E, Aurora, Colorado

11:00 AM SPECIAL PRESENTATIONS BY HIGH SCHOOL TEACHERS:

Education, Curriculum and Reaching Students

(Back Bay Ballroom D)

11:00 AM

Minds-On Science

David Ruth, South Seneca High School, Ovid, New York

11:12 AM

Computation and Science in High School

Charles Powell, Wheat Ridge High School, Wheat Ridge, Colorado

11:24 AM

Wind Tunnel for use in High School Classroom Activities

Dean Walker, Lewistown Area High School, Lewistown, Pennsylvania

11:36 AM

Teaching Nanoscience in Classrooms using TransIESTA-c Software and Graphics Package

Manju Prakash, School Plus, SUNY Stonybrook, Stonybrook, New York

11:48 AM

Returning to learning and the benefits to be gained that are imparted through your teaching

Woodward Maxwell, Ventura High School, Ventura, California

12:00 – 1:30PM Lunch on your own: Opportunity to meet with your mentor

❖ 12:00 – 1:30 PM Other Technical Talks with Pizza, Grand Ballroom (Sheraton)

Symposium X Frontiers of Materials Research-Innovations to Impact
SESSION X1: Materials Innovations to Impact: Established and Novel Optics
Chairs: Julia W. P. Hsu and Richard A. Vaia

❖ 12:05 PM *X1.1

Optical Fiber: A Materials Innovation

Donald B. Keck, State University of New York, Big Flats, New York.

❖ 12:45 PM *X1.2

Holography -- Lighting the Way to the Next Generation of Storage

Lisa Dhar, Sharon Smith and Leslie D. Kramer; Media Development, InPhase Technologies, Longmont, Colorado.

SESSION PP2: Creating Materials Science Connections

Chair: Wendy Crone

Monday Afternoon, November 29, 2004

Back Bay Ballroom B (Sheraton)

1:30 PM *PP2.1

The 'ABCs' of Nanotechnology: Atoms, Bits, and Civilization

Arthur B. Ellis, Division of Chemistry, National Science Foundation, Arlington, Virginia

2:00 PM *PP2.2

A New Type of Partnership for Science Outreach: Princeton Center for Complex Materials, Strange Matter and the Liberty Science Center

Daniel Steinberg, Princeton Center for Complex Materials, Princeton University, Princeton, New Jersey

2:30 PM PP2.3

Materials Matter: Demonstrating Material Science to the General Public

Beth Tinker², Andrew Greenberg^{1,3} and Ronald D. Redwing^{1,4}; ¹Center for Nanoscale Science, Penn State University, University Park, Pennsylvania; ²The Franklin Institute, Philadelphia, Pennsylvania; ³Department of Chemistry, The Pennsylvania State University, University Park, Pennsylvania; ⁴Department of Physics, The Pennsylvania State University, University Park, Pennsylvania.

2:45 PM BREAK

3:00 PM *PP2.4

The NanoKids Project

James M. Tour, CNST, Rice University, Houston, Texas

3:30 PM PP2.5

Exploring Materials Science with LEGO® Brick Models

Dean James Campbell, Chemistry and Biochemistry, Bradley University, Peoria, Illinois

3:45 PM ***SPECIAL PRESENTATIONS BY HIGH SCHOOL TEACHERS:**

Creating Materials Science Connections

(Back Bay Ballroom D)

3:45 PM

Summer Research Experience at Drexel University

Steven Fine; Dr. Charles E. Brimm Medical Arts High School, Camden, New Jersey

3:57 PM

Nanotechnology Research at Northwestern University

Caroline Makere; Curie Metropolitan High School, Chicago, Illinois

4:09 PM

Research experiences for middle and High school leaders at IBM and Cornell University : back to the classroom

Stephen Zielinski¹ and Ann Phinney-Foreman²; ¹South Seneca Middle School, Ovid, New York, ²Waverly High School, Waverly, New York.

4:21 PM

Teacher information, involvement and rewards for internships at Carnegie Mellon University

Robert Wesolowski; Taylor Alderice High School, Pittsburg, Pennsylvania

4:33 PM

Scientific Method Leads to Successes in the Lab

Christine Talbot; Manchester Memorial High School, Manchester, New Hampshire

4:45 PM

Research Experience for Science Teachers at Northwestern University

Harry Kyriazes; Niles North High School, Skokie, Illinois

5:00 PM Dinner on your own: Opportunity to meet with your mentor

❖ 6:00 PM Grand Ballroom, Sheraton Hotel

Plenary Session Speaker: Addressing Grand Challenges Through Advanced Materials.

Mildred S. Dresselhaus Massachusetts Institute of Technology

<http://www.mrs.org/meetings/fall2004/plenary.html>

❖ 8:00 – 11:00PM Technical Poster Sessions

Evening poster sessions will be held Monday through Thursday in Exhibition Hall D of the Hynes Convention Center.

❖ **Optional highly suggested sessions**

* **Back Bay D room in the Sheraton**

Please refer to the MRS Fall Meeting Program book for additional Technical Talks and Exhibits

Tuesday, November 30:

SESSION PP3: Coupling Materials Science Education with Research and Technology
Chair: Susan Rosevear
Tuesday Morning, November 30, 2004
Back Bay Ballroom D (Sheraton)

8:00 AM Breakfast on your own: Opportunity to meet with your mentor

8:30 AM *PP3.1

Research Experience for Teachers at MIT: From the Laboratory to the Classroom

Michael F. Rubner, Materials Science and Eng., MIT, Cambridge, Massachusetts; Center For Materials Science and Engineering, MIT, Cambridge, Massachusetts

9:00 AM PP3.2

Scienceline: A Tale of Three Perspectives

Fiona Goodchild and Martina Michenfelder; University of California, California NanoSystems Institute (CNSI), Santa Barbara, California

9:15 AM PP3.3

Turning Cutting-Edge Research into Secondary Curriculum

Greta M. Zenner¹, Wendy C. Crone¹, J. Aura Gimm¹, Ken W. Lux¹, Paul M. Voyles², Anthony P. Cina³, Ann Pumper Comins⁴, Johan Tabora⁹, Pamela Tuchscherer⁵, Tyson Tuchscherer⁶, P. John Whitsett⁷ and Cindy G. Widstrand⁸; ¹Engineering Physics, Univ. of Wisconsin - Madison, Madison, Wisconsin; ²Materials Science and Engineering, University of Wisconsin-Madison, Madison, Wisconsin; ³O'Keefe Middle School, Madison, Wisconsin; ⁴Madison Memorial High School, Madison, Wisconsin; ⁵Gearhart School, Gearhart, Oregon; ⁶Daly Middle School, Lakeview, Oregon; ⁷Fond du Lac High School, Fond du Lac, Wisconsin; ⁸Stoughton High School, Stoughton, Wisconsin; ⁹Northside College Preparatory High School, Chicago, Illinois

9:30 AM PP3.4

Research Experiences for Teachers in Materials Science: Building an Apparatus for Making Magnetic Fluids

Michelle Strand² and Diandra Leslie-Pelecky^{1,3}; ¹Department of Physics, University of Nebraska, Lincoln, Nebraska; ²Pius X High School, Lincoln, Nebraska; ³Center for Materials Research & Analysis, University of Nebraska, Lincoln, Nebraska.

9:45 AM PANEL DISCUSSION WITH HIGH SCHOOL TEACHERS:

Coupling Materials Science Education with Research and Technology
(Back Bay Ballroom D)

9:45 AM

Writing Effective and Engaging Science Modules that Work

Peter Ozimba; Perkiomen School, Pennsburg, Pennsylvania.

9:57 AM

Curricular Design Considerations for Science Course Restructuring and New Course Proposals

Nathan Unterman; Glenbrook North High School, Northbrook, Illinois.

10:09 AM

Employing Microfluidics in the Demonstration of Cell Encapsulation for HS Biology Students

Rebekah Ravgiala; Merrimack high School, Merrimack, New Hampshire.

10:15 AM BREAK

10:30 AM ***PP3.5**

Multilevel Education Activities in Polymer Science and Chemistry: Multimedia Materials, Teacher Workshops, Undergraduate Research Center and NSF IGERT Program

Lon J. Mathias, Department of Polymer Science, University of Southern Mississippi, Hattiesburg, Mississippi.

11:00 AM **PP3.6**

Conducting Interactive, On-line, Web-Based SEM Lessons Around the World

Scott Chumbley¹, Amy Chumbley¹, Gary Casuccio² and Heidi Barron²; ¹Iowa State University, Ames, Iowa; ²RJ Lee Group, Monroeville, Pennsylvania.

11:15 AM **PP3.7**

On the Use of "Flash Movies" for Instruction and Assessment in High School Science Curricula

Ralph H. Locklin², Andrew J. Wiesner², Michael W. Fleck¹, Ian R. Harrison¹, Eric J. Spielvogel³ and Paul R. Howell^{1,3}; ¹Materials Science and Engineering, Penn State University, University Park, Pennsylvania; ²Schreyer Institute for Teaching Excellence, The Pennsylvania State University, University Park, PA 16802, Pennsylvania; ³E-Education Institute, College of Earth and Mineral Sciences, The Pennsylvania State University, University Park, PA 16802, Pennsylvania.

11:30 AM **PP3.8**

Enhancing Science Teaching through Business/Education Outreach Programs based on High-Technology Instrumentation

Gary S. Casuccio¹, Hank P. Lentz², Stephen K. Kennedy¹ and L.Scott Chumbley³; ¹RJ Lee Group, Inc, Monroeville, Pennsylvania; ²RJ Lee Group, Inc., Phoenix, Arizona; ³Metals and Ceramics, Iowa State University, Ames, Iowa.

11:45 AM **PP3.9**

Long Term Integration Plan of Nanotechnology and Materials Science into Fourth and Fifth Grade Science Curriculum

Gary S. Zekri¹, L. Clayton², Ashok Kumar¹, G. Okoogba³ and L. Martin-Vega³; ¹Department of Mechanical Engineering, University of South Florida, Tampa, Florida; ²Department of Chemistry, University of South Florida, Tampa, Florida; ³Department of Industrial and Management Systems, University of South Florida, Tampa, Florida.

12:00 – 1:30PM Lunch on your own: Opportunity to meet with your mentor

❖ 12:00 – 1:30 PM Other Technical Talks with Pizza, Grand Ballroom (Sheraton)

Symposium X: Materials Innovations to Impact: Medicine and Sports
Chairs: Shefford P. Baker and Bethanie J. Hills Stadler

❖ 12:05 PM ***X2.1**

Innovations in Biomaterials: Achievements and Opportunities

Rebecca Bergman, Medtronic Inc., Fridley, Minnesota.

❖ 12:45 PM ***X2.2**

Metallic Liquids and Glasses - Science and Applications

William Johnson, Corporate Office, Liquidmetal Technologies, Lake Forest, California.

SESSION PP4: Demonstrations of Materials Science for Outreach in Secondary Schools--Mini Tutorial

Chair: Shenda Baker

Tuesday Afternoon, November 30, 2004

Room 200 (Hynes)

1:30 PM *PP4.1

Improving Materials Science Education with Demonstrations

Ainissa G. Ramirez¹ and Amy Moll²; ¹Mechanical Engineering, Yale University, New Haven, Connecticut; ²Dept. of Mechanical Engineering, Boise State University, Boise, Idaho

SESSION PP5: Materials Science Education: Ties with Industry/Focus on Middle School

Chairs: Shenda Baker and Fiona Goodchild

Tuesday Afternoon, November 30, 2004

Room 200 (Hynes)

3:00 PM *PP5.1

Materials Education for the Twenty First Century Workforce: A Report on the 18th Biennial Conference on National Materials Policy, Washington D.C.

Aris Christou, Materials Science and Engineering, University of Maryland, College Park, Maryland.

3:30 PM PP5.2

NSF Sponsored Academic/Industrial Research Programs for Undergraduates and Teachers

Charles G. Wade¹, Dolores C. Miller¹, Joseph Pesek², Maureen A. Scharberg², Marni Goldman³ and Curtis W. Frank⁴; ¹Materials Analysis and Characterization, IBM Almaden Research Center E1, San Jose, California; ²Department of Chemistry, San Jose State University, San Jose, California; ³Center for Polymer Interfaces and Macromolecular Assemblies, Department of Chemical Engineering, Stanford University, Stanford, California; ⁴Department of Chemical Engineering, Stanford University, Stanford, California.

3:45 PM PP5.3

Integrating Materials Science into the Uruguayan Curricula

Laura Fornaro, Hector Espinosa and Gustavo Laborde; Compound Semiconductors Group, Faculty of Chemistry, Montevideo, Uruguay

4:00 PM *PP5.4

Development of Computer Game Based Instruction: The Periodic Table Game

Martin Gerard Bakker^{1,4}, Garry W. Warren^{1,2}, Nancy Earnest³, Timothy M Bryant³, Brenda O'Neal¹, Amos Newsome¹ and Peggy Wallace¹; ¹Center for Materials for Information Technology, The University of Alabama, Tuscaloosa, Alabama; ²Department of Metallurgical and Materials Engineering, The University of Alabama, Tuscaloosa, Alabama; ³Center for Communication and Educational Technology, The University of Alabama, Tuscaloosa, Alabama; ⁴Department of Chemistry, The University of Alabama, Tuscaloosa, Alabama

4:30 PM PP5.5

Broadening Middle-School Student Images of Science and Scientists

Diandra Leslie-Pelecky^{1,4}, Shirley J Mills² and Gayle A. Buck³; ¹Department of Physics, University of Nebraska, Lincoln, Nebraska; ²Department of Teaching, Learning and Teacher Education, University of Nebraska, Lincoln, Nebraska; ³Project Fulcrum, University of Nebraska, Lincoln, Nebraska; ⁴Center for Materials Research & Analysis, University of Nebraska, Lincoln, Nebraska

4:45 PM PP5.6

"Advanced Potions: A Journey Into the Nanoworld." A Nanoscience Camp for 5th-8th Grade Students

Andrew Greenberg^{1,2}, Jackie Bortiatynski² and Dan Sykes²; ¹Center for Nanoscale Science, The Pennsylvania State University, University Park, Pennsylvania; ²Department of Chemistry, The Pennsylvania State University, University Park, Pennsylvania

5:00 PM Dinner on your own: Opportunity to meet with your mentor

- ❖ **6:00 – 7:00 PM Government Funding Seminars**, Room 207, Hynes Convention Center
Clare M. Allocca and Douglas T. Smith
Materials Science and Engineering Laboratory, NIST
Topic: *Instrumentation and Metrology for Nanomechanics: A Roadmap*
http://www.mrs.org/meetings/fall2004/government_seminars.html

 - ❖ **8:00 – 11:00PM Technical Poster Sessions**
Evening poster sessions will be held Monday through Thursday from 8:00-11:00 p.m. in Exhibition Hall D of the Hynes Convention Center.

 - ❖ **Optional highly suggested sessions**
 - * **Back Bay D room in the Sheraton**
- Please refer to the MRS Fall Meeting Program book for additional Technical Talks and Exhibits**

Wednesday, November 30:

Meals on your own: Opportunity to meet with your mentor

Morning Sessions: Please refer to the MRS book for Technical Talks and Exhibits

- ❖ **Session X3: Materials Innovations to Impact: On-Chip Magnetic and Thermal Control**
Chairs: Shefford P. Baker and Bethanie J. Hills Stadler
Wednesday Afternoon, December 1, 2004
Grand Ballroom (Sheraton)

- ❖ **12:05 PM *X3.1**
Magnetic Spin Devices: 7 Years from Discover to Product. Where now?
Jim Daughton, NVE Corporation, Eden Prairie, Minnesota.

- ❖ **12:45 PM *X3.2**
From Concept to Commercialization: Multilayer Foils as Rapid Heat Sources for Soldering and Brazing
Timothy P. Weihs, Department of MS&E, Johns Hopkins University, Baltimore, Maryland;
Reactive NanoTechnologies (RNT), Hunt Valley, Maryland.

8:00 – 11:00PM Technical Poster Sessions

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- ❖ **Optional highly suggested sessions**

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Please refer to the MRS Fall Meeting Program book for additional Technical Talks and Exhibits