

SCANNING 2008

# Call for Papers

**Deadline for Abstracts – Closed**  
**All Registration Closes:**  
**Wednesday April 9**

NIST, Gaithersburg, Maryland • April 15–17, 2008

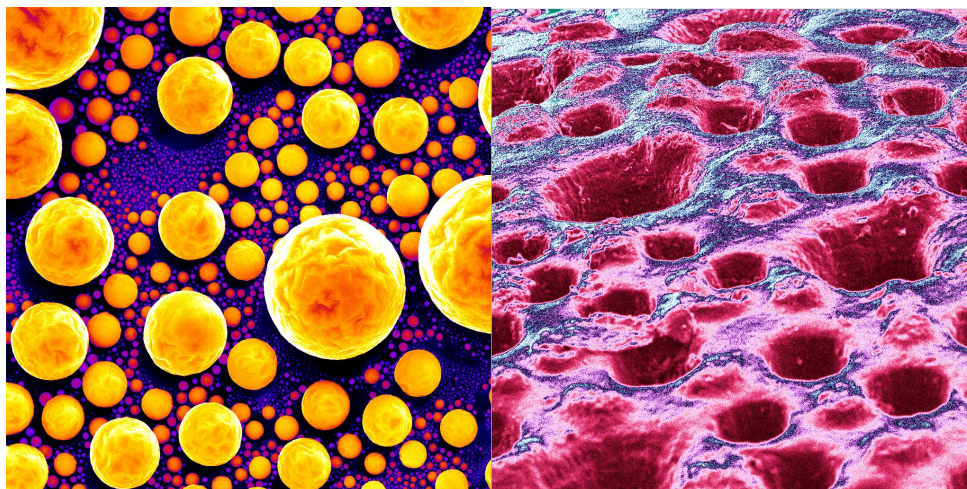


and

## Advancements in Electron Microscopy

Hitachi Nanotechnology Series  
NIST, Gaithersburg, Maryland  
April 14, 2008

# SCANNING 2008 - Call for Papers



Spring conferences on scanning microscopy have a history going back to 1967 with the “Scanning Electron Microscopy” series started by Om Johari, after whose retirement the SCANNING conferences organized by Tony Bourgholtzer of the Foundation for Advances in Medicine and Science (FAMS) continued this tradition. Many of you are aware that following the sale of the SCANNING journal to Wiley, FAMS has decided not to sponsor future SCANNING meetings. Since the FAMS announcement following SCANNING 2007, a substantial amount of work has been done in the background to find a solution to keep the meeting alive and one has appeared. SCANNING or a similarly named meeting will be organized through SPIE (the International Society for Optical Engineering) starting in 2009. As a bridge to the future of SCANNING we are organizing a spring scanning microscopy meeting to be held at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, April 15 – 17, 2008 (Tuesday-Thursday), with a one-day pre-meeting **Advancements in Electron Microscopy** which is a Hitachi High Technology America, Inc., National Nanotechnology Seminar on Monday, April 14, 2008 organized by Hitachi High Technology (see below). As a special feature of this conference, NIST as host will provide tours of selected technical facilities related to conference topics, including the Helium Ion Microscope, High Speed X-ray Mapping with the Silicon Drift Detector on a Thermal FEG, micro-X-ray Fluorescence X-ray Spectrum Imaging, and others.

**Major technical topics for SCANNING 2008 include, but are certainly not limited to the following:**

- Forensic Applications of SEM
- Scanning ion microscopy (FIB and HIM)
- Quality assurance in SEM and micro characterization
- Silicon Drift Detectors: The New EDS
- Biological Environmental/Variable Pressure SEM: successes and limitations
- Modeling for Critical SEM and Microanalysis Applications
- Scanned probe microscopies
- Scanned optical microscopies

# Call for Papers

**Closed**

We invite you to submit an abstract for SCANNING 2008 (two pages maximum; please use Microsoft WORD format, with tables and figures embedded).

Electronic submission of titles and Abstracts to: [scanningjournal@wiley.com](mailto:scanningjournal@wiley.com)

Abstracts will be posted electronically, and participants will be encouraged but not required to submit manuscripts to the SCANNING journal. For at least some topics, the possibility exists to present live demonstrations in NIST microscopy laboratories. If you have questions or need clarification, please call:

Michael Postek (NIST) 301-975-3463  
Frank Platek (FDA) (513) 679-2700 x254  
Dale Newbury (NIST) 301-975-3921

## Scanning 2008 Registration Information

*(see below for [Advancements in Electron Microscopy registration](#))*

### Important -- Please note:

**NIST is a closed site; all participants of either conference MUST be pre-registered or they will not be permitted on the site.**

**There will be no on-site registrations**  
**All Registration Closes: Wednesday April 9**

### Types of Registration:

**Full Fee: \$300** (Includes reception, dinner, lunches and breaks)

**Student Fee: \$100** (a student is defined as an undergraduate, or graduate student pre-Masters or Doctoral Degree – written advisor confirmation may be required)

**Full Fee + 1 day Forensic Short course: \$400**

### On-line Registration and NIST Visitor Information:

- [Registration](#)
- [Directions to NIST](#)
- [Transportation](#)

**Lodging:**

A block of rooms has been reserved at the **Hilton Washington DC North/Gaithersburg** (at \$149 per nite).

**Hilton Washington DC North/Gaithersburg**

620 Perry Parkway, Gaithersburg, Maryland, United States 20877

Tel: 1-301-977-8900 Fax: 1-301-869-8597

[http://www1.hilton.com/en\\_US/hi/hotel/GAIGHHF-Hilton-Washington-DC-North-Gaithersburg-Maryland/index.do](http://www1.hilton.com/en_US/hi/hotel/GAIGHHF-Hilton-Washington-DC-North-Gaithersburg-Maryland/index.do)

Additional rooms can be found at other area hotels:

[http://www.nist.gov/public\\_affairs/visitor/hotels.htm](http://www.nist.gov/public_affairs/visitor/hotels.htm)

**Gaithersburg Holiday Inn:** A NIST rate of \$113/night is usually available at the Gaithersburg [Holiday Inn](#) 2 Montgomery Village Ave., Gaithersburg, Md.. 20879 (301) 948-8900 Fax: (301) 258-1940

**Transportation:**

NIST will provide a bus to and from the Gaithersburg Hilton

**Official visitors must present photo identification upon arrival.**

Visitors driving an automobile must access the Gaithersburg campus from the main gate at W. Diamond Ave. and Bureau Drive only.

Visitors must wear a visitor badge at all times while on the NIST campus.

**Program Committee - SCANNING 2008**

**Biological Session(s)**

Robert Becker  
Tim Maugel

**Forensics Session(s) and Workshop**

Frank Platek  
David Howitt

**High Resolution SEM Session(s)**

David Joy  
Oliver Wells  
Rich Fiore

**Laboratory Demonstrations**

Dale Newbury

**Dual Beam Session(s)**

Lucille Giannuzzi  
John Small  
Bin Ming

**Modeling Workshop**

John Villarrubia  
Andras Vladar

**Helium Ion Microscope Session(s)**

Bin Ming  
Clarke Fenner  
John Notte

**SEM Quality Control Workshop**

Andras Vladar  
Dale Newbury

**AFM**

Vladimir Ukraintsev  
John Kramar  
John Dagata

**Environmental SEM**

Scott Wight  
Ralph Knowles  
Brad Thiel

**Optics**

Stephen Stranick

**Manufacturers Display**

Mark Armitage

**Manufacturers Sponsor**

Mark Armitage

## **Current Descriptions:**

### **TUESDAY, APRIL 15**

#### **Scanning Microscopy in Forensic Science – Short Course**

Chairs: S. Frank Platek, US DHHS, FDA, Forensic Chemistry Center, Cincinnati, OH; Michael T. Postek, US DOC, NIST, Gaithersburg, MD, Michael A. Trimpe, Hamilton County Coroner's Office, Cincinnati, OH, USA, and more!

This short course is devoted to scanning microscopy analysis of many types of forensic samples. Specific topics to be covered include particulate trace evidence analysis, gunshot residue (GSR) analysis and instrument calibration concerns and procedures. A trace evidence section in forensic sample processing will be presented. Topics discussed include collection, handling, embedding, polishing, sectioning, mounting, storage and micro-manipulation of fine particles. With the increased efforts of most forensic laboratories to be certified, a portion of this short course will be devoted to SEM/EDX calibration issues and discussion among course attendees. A final segment is currently planned to consist of a variety of actual sample-related applications of scanning microscopy over a number of forensic cases. The short course will be instructed by forensic scientists and microscopists, each a specialist in his respective area of expertise. Course format will include a group question-and-answer session.

### **WEDNESDAY - THURSDAY, APRIL 16-17**

**Applications of Scanning Microscopy in Forensic Science** –Chairs: S. Frank Platek, Forensic Chemistry Center, U.S. Food and Drug Administration; M.A. Trimpe, Hamilton County Coroner's Office, Cincinnati, OH, USA

This session will convene for two days and will include one full day of invited and contributed forensic papers, case reports and research from forensic laboratories and agencies from around the world, all devoted to the use of scanning microscopy and energy dispersive X-ray spectrometry analyses.

Day two will continue with one half day of invited and contributed forensic papers. In addition, a special session, the Forensic Forum, including gun shot residue (GSR) analyses initiated at SCANNING 2004, will again convene.

### **WEDNESDAY, APRIL 16**

**Electron Beam/Specimen Interaction Workshop** - Chair: Drs. John Villarrubia and Andras Vladar, National Institute of Standards and Technology, Gaithersburg, MD, USA

The Electron Beam/Specimen Interaction Workshop has brought experimentalists and modeling experts together for nearly a decade to share information on this exciting topic. This workshop has contributed to an enhanced understanding of the signal generation and imaging process in electron beam instrumentation. Signal formation in the scanning electron microscope represents a complex interaction between the instrument and the 3-dimensional sample. The primary beam also consists of electrons distributed within a 3-dimensional volume. The scope of this workshop includes developments in the measurements and modeling of this interaction from electron generation to formation of the electron beam and focusing of it upon the sample to scattering of electrons and generation

of signals within the sample and finally to collection and detection of those signals that produce the image (secondary electrons, transmitted electrons, x-rays, etc.). It also includes the use of such models for reduction of artifacts and uncertainty in SEM measurement results. Mechanisms of 3-D data input and export including methods of inputting 3-D structural information as well as 3-D graphical representations of the data obtained will be discussed. Other issues of interest include the effects of finite scattering volume of electrons within the sample, sample charging, modeling of the environmental SEM, charge-compensation methods, interactions with materials (e.g., photoresists) of particular scientific or technological interest, and behavior of electron scattering at energies much lower (<500 eV) or much higher (>20 keV) than those typically used in laboratory instruments. Anyone interested in electron beam modeling, electron beam interactions and their effect on the signals collected in a scanned beam instrument are welcome to submit papers to this workshop.

### **THURSDAY, APRIL 16**

**Quality Assurance for Measurements in the SEM** – Chair, Drs. Dale Newbury and Andras Vladar, National Institute of Standards and Technology, Gaithersburg, MD 20899

The scanning electron microscope has evolved into a sophisticated measurement system incorporating morphological, compositional, and crystallographic characterization methods. The measurement science that forms the foundation of these characterization techniques is often overlooked, but careful attention to the individual measurement process is critical for achieving robust results with a meaningful error budget. This session seeks contributions describing efforts to bring SEM measurements in their wide diversity into satisfactory control, including specific applications such as linewidth measurement, particle analysis, etc.

### **TUESDAY - THURSDAY, APRIL 15-17**

**Industrial Semiconductor and Nanotechnology Applications of SPM** - Chairs, Vladimir Ukrainsev, VEECO, John Dagata and John Kramar, NIST, Gaithersburg, MD 20899

This session is concerned about the relatively slow acceptance of SPM by the semiconductor manufacturing, and we are also interested in exploring how the SPM is beginning to be used in the commercialization of nanomanufacturing. It is also interested in the future of dimensional metrology using SPM (including reference metrology) and long-term research in this area. This conference could be a good place to pull the various forces together, and to review and coordinate industrial SPM activities, including long-term research.

Papers are specifically solicited in the following areas:

- In-line process control (critical dimensions (CD) and roughness)
- Process engineering
  - Process development (3-dimensional accurate metrology)
  - Metrology development and verification (scatterometry, interferometry, CDSEM, etc.)
  - Process and process tool qualification and release to production
- Dimensional reference metrology (internal standards calibration)

- OPC and RET model setup and verification (as a support for CDSEM)
- Use of SPM for novel manufacturing or process control applications in a nanomanufacturing production environment

We expect status reports and reviews on the following topics:

- Use of CD AFM for OPC and RET model setup and verification
- New challenges in overlay and need for absolute calibration
- Ideas and prospective of combining powers of optics and SPM
- New ideas in a nanometer scale optical microscopy and spectroscopy
- High-resolution stress measurements for advanced SC manufacturing.
- SPM long-term research program at PTB (Germany)
- Reference metrology development program at AIST (Japan)
- Use of SPM for in-line process control in memory manufacturing
- Use of SPM in semiconductor R&D
- Progress and challenges of SPM in dimensional reference metrology
- Use of SPM in high-volume semiconductor manufacturing
- Advances and plans in 3D probe shape extraction
- Progress and plans in CNT probe manufacturing and application
- Development of reference metrology at ISMT advanced metrology group

#### **THURSDAY, APRIL 16**

**Discussion on Global Collaboration in Reference Metrology Development** – Chairs, Vladimir Ukrainsev, VEECO, John Dagata and John Kramar, NIST, Gaithersburg, MD 20899

The latest semiconductor technology nodes require sub-nanometer measurement uncertainty. Measurement uncertainty or measurement bias variation consists of four major components: precision, tool matching, sampling uncertainty and “other.” A major contributor to the “other” component is sample-to-sample bias variation or inaccuracy. To evaluate accuracy one must know true dimensions and, therefore, use reference dimensional metrology. Development and manufacturing of reference metrology tools are time consuming and very costly. Yet the corresponding market, and hence return on investment, are limited. Metrology companies and venture capitalists invest in reference metrology with great caution. In this situation, semiconductor manufacturers around the globe are becoming increasingly concerned about the current state and the future of reference metrology. Nanotechnology is another growing area where an accurate reference metrology is a vital element of the business. This round table discussion on global collaboration in reference metrology will look into the possibility of combining and coordinating our efforts in the long-term research of reference metrology, standards and probes. We believe that the industry and reference metrology will benefit from the collaboration. Should sufficient interest in and support for the project to be revealed, we may think about organizing a small initiative group to continue regular activities in global collaboration in reference metrology, under the sponsorship of SPIE and the Scanning conference. We encourage a diversity of opinions and points of view. Please contact the organizers of the SPM sections if you would like to contribute to the discussion. Brief, single foil presentations are welcome.

Please send your responses, suggestions and comments to [vukraintsev@veeco.com](mailto:vukraintsev@veeco.com).



# Advancements in Electron Microscopy

Hitachi High Technology America, Inc., National Nanotechnology Seminar

Monday – April 14

## Tentative Agenda

Time	Speaker	Institution	Subject
8:00-9:00 am	Registration		
9:00-9:15 am	Welcome		
9:15-10:00 am	David Joy	UTK	How big is that doggie in the window? - Calibrating SEMs and STEMs for nano-metrology
10:00-10:45 am	Donovan Leonard	ASU	Getting Younger Students Stoked About Microscopy: Nanotechnology Outreach with a Tabletop SEM
10:45-11:15 am	Break		
11:15-12:00 pm	Phil Russell	ASU/NCSU	Analytical Techniques for Materials & Device Analysis
12:00-1:00	Lunch		
1:00-1:45 pm	Konrad Jarauch	Hitachi	Applications in a new FIB/FESEM system
1:45-2:30 pm	Dale Batchelor	NCSU	Low voltage STEM applications
2:30-3:00 pm	Break		
3:00-3:45 pm	Xiaofeng Zhang	Hitachi	Environmental cell applications in 300kV TEM
3:45-4:30 pm	Dale Newbury	NIST	Energy Dispersive Spectrometry-Silicon Drift Detector (EDS-SDD) X-ray Spectrum Imaging (XSI): the New Paradigm in X-ray Compositional Mapping

Contact your local Hitachi High Technologies representative if you are interested in attending or e-mail [Elisa Merendino](mailto:elisa.merendino@hitachi-hta.com) at:

[elisa.merendino@hitachi-hta.com](mailto:elisa.merendino@hitachi-hta.com)

There is room for only 100 people for this Hitachi sponsored seminar. First come, first served.

NIST is a closed site; all participants MUST be pre-registered or they will not be permitted on the site. All participants attending SCANNING 2008 must also register for that meeting

There will be no on-site registrations.

**SCANNING 2008**  
**National Institute of Standards and Technology**  
**April 15-17, 2008**

**Final Program**

**Tuesday - April 15, 2008**  
**NIST Administration Building - Green Auditorium**

7:30 AM: Coffee

8:00 AM: Welcome and Opening - NIST Green Auditorium  
Michael Postek and Dale Newbury, National Institute of Standards and Technology

Plenary Session - NIST Green Auditorium

Chaired by: Michael T. Postek and Dale Newbury, National Institute of Standards and Technology

8:30 - 9:10AM: Backscattered electron imaging in the scanning electron microscope

O.C.Wells (Emeritus, IBM), L.M.Gignaci, S.H.Boettcher, J.Brulley, A.Bishof, C.E.Bohenkamp, and B. A. Ek, IBM T.J. Watson Research Center, Yorktown Heights, NY 10598 Microelectronics Division, Hopewell Junction, NY, 12533

9:10 - 9:50AM: Scattered Helium for Imaging and Elemental Analysis.

John Notte, ALIS/Zeiss Corporation, Peabody, MA

9:50 - 10:30AM: Energy Dispersive X-ray Spectrometry with the Silicon Drift Detector: Remarkable Performance Enables New Capabilities

Dale E. Newbury, National Institute of Standards and Technology, Gaithersburg, MD

10:30 - 11:00AM: Break

**BOLD Track: Scanning Microscopies**  
**(Tuesday through Thursday)**

**Tuesday - April 15, 2008**

**Session 1a - General SEM - NIST Green Auditorium**

Chaired by: Tim Maugel, University of Maryland and David Joy, University of Tennessee and Oak Ridge National Laboratory

**11:00 - 11:20AM: Diffusion of the Metal Catalyst during the Growth of Zinc Oxide Nanowires**

Susie Eustis, Douglas Meier, and Babak Nikoobakht, Surface and Microanalysis Science Division, National Institute of Standards and Technology, 100 Bureau Dr., Mail Stop 8372, Gaithersburg MD 20899

**11:20 - 11:40AM: Contamination Reduction in the Scanning Electron Microscopy**

Purushotham K. P., András E. Vladár and Michael T. Postek, National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, MD 20899-8212, USA

**11:40AM - 12:10PM: Chemical Imaging in Pharmaceutical Development**

Robert A. Carlton, GlaxoSmithKline, 709 Swedeland Road, UW2950, King of Prussia, PA, 19406

**12:10 - 12:30PM: New Imaging Method with Adaptive Averaging of Super-Fast SEM Images**

Petr Cizmar, András E. Vladár, Martin Oral, and Michael T. Postek, National Institute of Standards and Technology, 100 Bureau Dr, Gaithersburg, MD 20899

**12:30 - 1:30PM: Lunch - NIST Cafeteria**

**Session 2a: General SEM - NIST Green Auditorium**

Chaired by: Scott Wight, National Institute of Standards and Technology and Tim Maugel, University of Maryland

**1:30 - 1:50PM: Effective Data Mining of Particle Data Sets Through Diluvian Clustering**

Nicholas W. M. Ritchie, Jeff Davis, Surface and Microanalysis Division, National Institute of Standards and Technology, Gaithersburg, MD 20899

**1:50 - 2:10PM: Meniscus effects, a new model for ink transport in dip-pen nanolithography**

Brandon Weeks, Mark Vaughn, Omkar Nafday, Department of Chemical Engineering Texas Tech University Lubbock, TX 79409

2:10 - 2:30PM: Scanning in time: High-speed videography of micro-particle suspension for aerosol research and materials characterization

Wayne Smith Chemical Science and Technology Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899

2:30 - 2:50PM: Investigation of Capillary Corrosion Using Environmental SEM

K. P. Purushotham, N. Pradeep, J. Grobelny, D.-I. Kim, W. K. Haller A. E. Vladar and M. T. Postek National Institute of Standards and Technology, Gaithersburg, MD 20899-8212 USA

3:00 - 3:30PM: Break

### Session 3a: Microanalysis - NIST Green Auditorium

Chaired by: Dale Newbury and John Small, National Institute of Standards and Technology

3:30 - 4:00PM: Review of sample preparation methods of inorganic particles for microanalysis (Invited)

C. J. Zeissler, Surface and Microanalysis Science Division, National Institute of Standards and Technology Gaithersburg, MD 20899

4:00 - 4:20PM: Comparison of Si(Li) and Silicon Drift Detectors for SEM/EDS Analysis

N. C. Barbi, E. T. Dobi, S. D. Davilla, and R. B. Mott, PulseTor, LLC, 1816 Saint John's Bluff Road, Suite 305, Jacksonville, FL 32246 USA, SEMTech Solutions, Inc., 6 Executive Park Drive, N Billerica, MA 01862 USA, and 4pi Analysis Inc., 3500 Westgate Drive, Suite 403, Durham, NC 27707 USA

4:20 - 4:50PM: Cluster SIMS Imaging of Materials in Next-Generation Applications

Christopher Szakal, Surface and Microanalysis Science Division, National Institute of Standards and Technology Gaithersburg, MD 20899

4:50 - 5:10PM: Contrast in Ga<sup>+</sup> FIB Induced SE Images

Lucille A. Giannuzzi and Mark Utlaut, FEI Company, 5350 NE Dawson Creek Drive, Hillsboro, OR USA 97124 and Department of Physics, University of Portland, Portland, Oregon USA 97203

5:10 - 5:30PM: Scanning Electron and Ion Microscopy of Spark Eroded Particles

Virgil C. Solomon, David J. Smith, Jung-Il Hong, and Ami E. Berkowitz, Institute of Materials Science, University of Connecticut, Storrs, CT 06269-3136, Department of Physics and Astronomy, Arizona State University, Tempe, AZ 85287, Center for Magnetic Recording Research, University of California - San Diego, La Jolla, CA 92093, Center for Magnetic Recording Research and Physics Department, University of California - San Diego, La Jolla, CA 92093

5:30 - 7:00PM: RECEPTION - NIST Hall of Flags (*Sponsored by FEI Company, Wiley Publishing and SPIE*)

7:00PM: Bus Back to the Hotel

## **Wednesday - April 16, 2008**

7:30 AM: Coffee

### Session 4a: Helium Ion Microscopy - NIST Green Auditorium

Chaired by: Clarke Fenner, ALIS, Zeiss and Bin Ming, National Institute of Standards and Technology

8:30 - 9:00AM: Helium Ion Microscopy: Potential New Technology for Semiconductor Metrology?

Michael T. Postek, Andras E. Vladar, National Institute of Standards and Technology, Gaithersburg, MD, 20899

9:00 - 9:20AM: The Helium Ion Microscope in the University Environment; Imaging Nanoscale Materials

David C. Bell, Louis A Stern, William F. DiNatale and Lou Farkas, School of Engineering and Applied Sciences, and the Center for Nanoscale Systems, Harvard University, Cambridge, MA, ALIS Business Unit, Carl Zeiss SMT, Peabody, MA

9:20 - 9:40AM: Scattered Helium for Imaging and Elemental Analysis

John Notte, Sybren Subrandij, Bill Ward, and Nicholas P. Economou, ALIS Business Unit, Carl Zeiss SMT, 1 Corporation Way, Peabody, MA 01960

9:40 - 10:00AM: An Initial Study of Helium ion induced Secondary Electron Emission

David C Joy, Ranjan Ramachandran, and Brendan Griffin, University of Tennessee, Knoxville, TN 37996, Oak Ridge National Laboratory, Oak Ridge, TN, 37831, and University of Western Australia, Perth

10:00 - 10:30AM: Break

### Session 5a: Modeling - NIST Green Auditorium

Chaired by: John Villarrubia and Andras Vladar, National Institute of Standards and Technology

10:30 - 11:00AM: A Monte Carlo Modelling of Electron Signals in SEM Imaging (Invited)

Z.J. Ding, Y.G. Li, S.F. Mao, H.M. Li, Z.M. Zhang, Hefei National Laboratory for Physical Sciences at Microscale and Department of Physics, University of Science and Technology of China, Hefei, Anhui, China; USTC-HP Laboratory of High Performance Computing,

University of Science and Technology of China, Hefei, Anhui 230026, China; and  
Department of Astronomy and Applied Physics, University of Science and Technology of  
China, Hefei, Anhui 230026, China

**11:00 - 11:20AM: Modular Monte Carlo Simulation Program for Various SEM  
Applications**

D. Grieser, C.G. Frase, H.Bosse, Physikalisch-Technische Bundesanstalt, Bundesallee,  
100, 38116 Braunschweig, Germany

**11:20 - 11:40AM: Application of SEM Model-Based Library Approach to  
Hardmask Metrology**

Maki Tanaka, Chie Shishido, Wataru Nagatomo, and Kenji Watanabe, Research and  
Development Division, Hitachi High-Technologies Corporation, Ibaraki, Japan, Production  
Engineering Research Laboratory, Hitachi, Ltd., Kanagawa, Japan, Naka Application  
Center, Hitachi High-Technologies Corporation, Ibaraki, Japan

**11:40 - 12:00AM: Blind Deconvolution of SEM Images**

William E. Vanderlinde and James N. Caron, Laboratory for Physical Sciences, College  
Park, Maryland and Research Support Instruments, Lanham, Maryland

**12:00 - 12:20PM: The Modeling of SEM Images of Relief Structures**

M.N. Filippov, Yu. A. Novikov, A.V. Rakov, P.A. Todua, N.S. Kurnakov General and  
Inorganic Chemistry Institute of the Russian Academy of Sciences, 31 Leninsky prospect,  
Moscow 119991, Russia. A.M. Prokhorov General Physics Institute of the Russian  
Academy of Sciences, 38, Vavilov str., Moscow 119991, Russia, Center for Surface and  
Vacuum Research, 40 Novatorov str., Moscow 119421, Russia

**12:30 - 1:30PM: Lunch - NIST Cafeteria**

**Session 6a: Metrology - NIST Green Auditorium**

Chaired by: Andras Vladar and John Villarrubia, National Institute of Standards and  
Technology

**1:30 - 1:50PM: High performance of Hitachi mask CD-SEM S-9380M**

Noriaki Arai, WANG Zhigang, SEET Kock Khuen, Ritsuo Fukaya, Yasuhiro Kadowaki,  
Makoto Ezumi and Hidetoshi Satoh. Hitachi High-Technologies Corporation, Japan

**1:50 - 2:10PM: NIST Pitch Measurement Application for SEM Magnification  
Calibration**

Martin Oral, Petr Cizmar, András E. Vladár, and Michael T. Postek, National Institute of  
Standards and Technology, 100 Bureau Dr, Gaithersburg, MD 20899, USA

**2:10 - 2:30PM: The Measurement of Linewidth in SEM**

M.N. Filippov, Yu. A. Novikov, A.V. Rakov, P.A. Todua, N.S. Kurnakov General and  
Inorganic Chemistry, Institute of the Russian Academy of Sciences, 31 Leninsky prospect,  
Moscow 119991, Russia, A.M. Prokhorov General Physics Institute of the Russian

Academy of Sciences, 38, Vavilov str., Moscow 119991, Center for Surface and Vacuum Research, 40 Novatorov str., Moscow 119421, Russia

**2:30 - 2:50PM: Russian Standards for Dimensional Measurements for Nanotechnologies**

M.N. Filippov, V.P. Gavriilenko, Yu A. Novikov, A.V. Rakov, P.A. Todua, N.S. Kurnakov  
General and Inorganic Chemistry Institute of the Russian Academy of Sciences,  
31, Leninsky prospect, Moscow 119991, Russia. Center for Surface and Vacuum  
Research, 40 Novatorov str., Moscow 119421, Russia, A.M. Prokhorov General Physics  
Institute of the Russian Academy of Sciences, 38, Vavilov str., Moscow 119991

**2:50 - 3:10PM: Test objects for automatized dimensional measurements at the nanoscale level using a scanning electron microscope and an atomic force microscope**

V.P. Gavriilenko, Yu A. Novikov, A.V. Rakov, P.A. Todua. Center for Surface and Vacuum  
Research, 40, Novatorov str., Moscow 119421, Russia, A.M. Prokhorov General Physics  
Institute of the Russian Academy of Sciences, 38, Vavilov str., Moscow 119991, Russia

3:10 - 3:30PM: Break

3:30 - 5:30PM: NIST Laboratory Tours (See separate schedule; sign-up required)

5:30PM: Bus Back to Hotel

5:45PM: Reception (*Sponsored by Zeiss SMT*)

6:30PM: Dinner

## **Thursday - April 17, 2008**

7:30AM: Coffee

**Session 7a: Scanning Probe Microscopy - NIST Green Auditorium**

Chaired by: Vladimir Ukraïnev, Veeco and John Kramar, National Institute of Standards and Technology

8:00 - 8:30AM: Carbon Nanotube SPM probe for semiconductor processes  
Shigenobu Yamanaka, DAIKEN CHEMICAL CO., LTD

8:30 - 9:00AM: AFM probe tip characterizer for Si and carbon nanotube probes (Invited)

Hiroshi Itoh, Cunmei Wang, Te-Wei Chiu, National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, 1-1 Umezono 1-Chome, Tsukuba-shi, Ibaraki-ken, 305-8568 Japan

9:00 - 9:30AM: A hysteresis correction method for SPM scanning

Wei Chu\*, Joseph Fu, and Theodore Vorburger, School of Mechanical and Electrical Engineering, Harbin Institute of Technology, Harbin 150001, China and National Institute of Standards and Technology, Gaithersburg, MD 20899, USA

9:30 - 10:00AM: Applications of Mathematical Morphology to AFM (Invited)

J.S. Villarrubia, National Institute of Standards and Technology, Gaithersburg

10:00 - 10:30AM: Break

### Session 8a: Scanning Probe Microscopy - NIST Green Auditorium

Chaired by: John Kramar and Ron Dixon National Institute of Standards and Technology

10:30 - 11:00AM: Advanced Scanning Probe Microscope for Integrated SPM - Optical Spectroscopy Solutions (Invited)

Sergey Bashkirov, Alexey Belyaev, Dmitry Evplov, Vasily Gavriluk, Vladimir Ivanov, Andrey Krayev, Alexey Temiryazev, Vladimir Zhizhimontov and Sergey Saunin, AIST-NT Inc.

11:00 - 11:30AM: Developments in scanning probe metrology at the PTB (Invited)

H.-U. Danzebrink, L. Koenders, G. Wilkening, Th. Dziomba, G. Dai, F. Pohlenz, C.G. Frase, Physikalisch-Technische Bundesanstalt, Bundesallee, 100, 38116 Braunschweig, Germany

11:30AM -12:00PM: A Characterization of Probe Dynamic Behaviors in Critical Dimension Atomic Force Microscopy

Shaw C. Feng, Che Bong Joung, Theodore V. Vorburger, National Institute of Standards and Technology, Gaithersburg MD 20899

12:00 - 12:30PM: Characterization of Sisal Fibers using Dynamic Atomic Force Spectroscopy (DAFS)

F. L. Leite, E. C. Ziemath, P.S.P. Herrmann, Embrapa Instrumentação Agropecuária, Instituto de Física de São Carlos, Universidade de São Paulo (USP), Instituto de Geociências e Ciências Exatas, Universidade Estadual Paulista (UNESP)

12:30 - 1:30PM: Lunch

### Session 9a - Scanning Probe Microscopy - NIST Green Auditorium

Chaired by: Johann Foucher, CEA/LETI-Minatec and John Dagata, National Institute of Standards and Technology



1:30 - 2:00PM: NIST-SEMATECH CD-AFM Based Reference Measurement System (Invited)

N.G. Orji and R. G. Dixson, National Institute of Standards and Technology

2:00 - 2:30PM: Influence of room temperature control system on AFM imaging

Joseph Fu, Wei Chu, and Theodore Vorburger, National Institute of Standards and Technology, and School of Mechanical and Electrical Engineering, Harbin Institute of Technology

2:30 - 3:00PM: Progress and challenges of AFM based dimensional reference metrology

V. Ukraintsev, Veeco Instruments, Inc.

3:00 - 3:15PM: Break

### Session 10a: Scanning Probe Microscopy - NIST Green Auditorium

Chaired by: John Dagata, National Institute of Standards and Technology, and Vladimir Ukraintsev, Veeco Instruments, Inc.

3:15 - 3:45PM: The viability of the AFM3D technique for the semiconductor industry (Invited)

J. Foucher, M. Martin, and E. Pargon, P. Faurie, CEA/LETI-Minatec, LTM/CNRS, France

3:45 - 4:10PM: Properties Investigation by Scanning Probe Recognition Microscopy

V.M. Ayres, Q. Chen, Y. Fan and L. Upda, Department of Electrical and Computer Engineering, Michigan State University, East Lansing, MI 48824

4:10 - 4:35PM: Influence of Thermal Treatment on the Morphology of Nanostructured Hydroxyapatite

F.L. Leite, M. Mir, A.M. Rossi, E.L. Moreira, Y.P. Mascarenhas, P.S.P. Herrmann, Dept de Ciências Exatas, Universidade Federal de Alfenas (Unifal-MG),; Instituto de Física de São Carlos, Universidade de São Paulo (USP); Centro Brasileiro de Pesquisas Físicas (CBPF); Embrapa Instrumentação Agropecuária

4:35 - 5:00PM: Study of Brazilian Latosols by Atomic Force Microscopy

F.L. Leite,, P.S.P. Herrmann, Y.P. Mascarenhas, M.E. Alves, Embrapa Instrumentação Agropecuária, Instituto de Física de São Carlos, Departamento de Ciências Exatas

5:00 - 5:25PM: CDAFM Measurements of Lines and Spaces Ranging from 50nm to 5nm

Hiroshi Itoh<sup>\*</sup>, Vladimir Ukraintsev<sup>\*\*</sup>, Max Ho<sup>\*\*</sup>, Sean Hand<sup>\*\*</sup> and Bernard Liu<sup>\*\*\*</sup>

National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, 1-1 Umezono 1-Chome, Tsukuba-shi, Ibaraki-ken, 305-8568 Japan; <sup>\*\*</sup> Veeco Instruments, Inc., Santa Barbara, California, USA

**ITALIC Track: SEM in Forensics**  
**(Tuesday through Thursday)**

**Tuesday - April 15, 2008**

Session 1b: Forensic Short Course (Part 1) - Lecture Room - C

12:30 - 1:30PM: Lunch - NIST Cafeteria

Session 2b - Forensic Short Course (Part 2) - Lecture Room - C

3:00PM: Break

Session 3b: Forensic Short Course (Part 3) - Lecture Room - C

5:30 - 7:00PM: RECEPTION - NIST Hall of Flags (Sponsored by FEI Company, Wiley and SPIE)

7:00PM: Bus Back to the Hotel

**Wednesday - April 16, 2008**  
**NIST Administration Building - Lecture Room C**

7:30AM: Coffee

Session 4b: Applications of SEM in Forensic Science - Lecture Room D

Chaired by: David Howitt, UC – Davis, S. Frank Platek, US FDA – Forensic Chemistry Center and Michael A. Trimpe, Hamilton County Coroner's Office

8:30 - 9:15AM: An overview of firearms examination and the criteria for validation

Robert Thompson, ATF, Ammendale, MD

9:15 -10:00AM: Automated Firearm Identification Using Surface Topography  
Al M. Hilton, Jun-Feng Song, Susan M. Ballou, Richard M. Silver, Thomas B. Renegar,  
and Martin G. Ols, National Institute of Standards and Technology, Gaithersburg, MD  
20899, USA

10:00AM: Break

Session 5b: Applications of SEM in Forensic Science - Lecture Room C

*10:30 - 11:15AM: Application of the confocal microscope and the consecutive line concept for a bullet data base.*

*David Howitt, Univ. of CA, David, CA*

*11:15AM - 12:00PM: NIST Standard Bullets and Casings Project.*

*J. Song, T. Vorburger, S. Ballou, T. Renegar, A. Zheng, L. Ma, E. Whittendon, D. Kelley, R. Silver, M. Ols National Institute of Standards and Technology, Gaithersburg, MD 20899, Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), Ammendale, MD*

*12:00- 12:30PM Optimize Gaussian Regression Filter Long Wavelength Cutoff to Improve Identification of Cartridge Case Firing Pin Topography Measured by Confocal Microscopy*

*L. Ma, J. Song, S. Ballou, National Institute of Standards and Technology, Gaithersburg, MD 20899*

*12:30PM: Lunch - NIST Cafeteria*

*Session 6b: Applications of SEM in Forensic Science - Lecture Room C*

*1:30 - 2:00PM: Investigation of Foreign Substances in Food*

*James E. Charbonneau, Grocery Manufacturers Association, Washington, DC, USA*

*2:00 - 2:30PM: The ENFSI GSR Particle Standard – A Reference Material for the Quality Assurance in Automated Microanalysis of Particulate Matter*

*L. NIEWÖHNER, Bundeskriminalamt, Forensic Science Institute, D-65173 Wiesbaden, Germany*

*2:30 - 3:00PM: Database Primer Cap Composition and Weapon Memory*

*Sara Rafferty, Elana Foster, A.J. Schwoeble, Allison Murtha, RJ Lee Group, Inc., 350 Hochberg Road, Monroeville, Pa 15146*

*3:00 - 3:30PM: Break*

*3:30 - 5:30PM: NIST Laboratory Tours*

*5:30 PM: Bus Back to Hotel*

*5:45 - 6:30PM: Dinner Reception (Sponsored by Zeiss SMT)*

*6:30PM: Dinner*

**Thursday - April 17, 2008**

*7:30 AM: Coffee*

Session 7b: Applications of SEM in Forensic Science - Lecture Room C

Chaired by: David Howitt, UC – Davis, CA, S. Frank Platek, US FDA - Forensic Chemistry Center, Cincinnati, OH, and Michael A. Trimpe, Hamilton County Coroner's Office

**8:30 - 9:00AM: An Introduction to Milli X-ray Fluorescence X-ray Spectrum Imaging (mXRF-XSI) for Forensic Applications**

Jeffrey M. Davis, Nicholas W.M. Ritchie, Dale E. Newbury, National Institute of Standards and Technology, Gaithersburg, MD 20899-8371

**9:00 - 9:30AM: The Fluorescence of Gunpowder - A New Approach to Distance Determination**

A.J. Schwoeble, Allison Murtha, Sara Rafferty, and Elana Foster, RJ Lee Group, Inc., 350 Hochberg Road, Monroeville, Pa 15146

**9:30 - 10:00AM: The use of automated fluorescence microscopy for particle collection efficiency**

Jessica Coleman, Surface and Microanalysis Science Division, National Institute of Standards and Technology Gaithersburg, MD 20899

**10:00 - 10:30AM: Break**

Session 8b: Applications of SEM in Forensic Science - Lecture Room C

**10:30 - 11:00AM: Surface morphology characterization of polymer microspheres containing high explosives**

Matthew Staymates Chemical Science and Technology Laboratory, National Institute of Standards and Technology, Gaithersburg, MD 20899, USA

**11:00 - 11:30AM: High-Speed Analysis of GSR and other Particles with the Silicon Drift Detector**

Robert Anderhalt, EDAX Inc., 91 McKee Drive Mahwah, NJ 07430

**11:30AM - 12:00PM: Missing Paper - Tescan**

**12:00 - 12:30PM: Forensic Forum (Discussion)**

**12:30 - 1:30PM: Lunch**

**1:30 - 3:00PM Forensic Forum (Discussion) Lecture Room C**

**Special Forensics Lab Tour of MXRF and ASPEX (if requested)**

**3:00 - 3:30PM: Break**

## Exhibitors

### **Instrument manufacturers and suppliers are encouraged to attend and display at SCANNING 2008**

- All exhibitors must register individually and in advance using the on-line website
- All who are planning to exhibit must inform meeting planners by **April 1**
- Exhibitors are to contact Mark Armitage - [micromark@juno.com](mailto:micromark@juno.com) (with a copy to Dale Newbury [newbury@nist.gov](mailto:newbury@nist.gov) informing them that they wish to exhibit at SCANNING 2008.
- A table or equivalent space (for a free standing display) will be provided (relative to availability) to each of the pre-registered exhibitors on a first come basis
- Requirements for electrical or other utilities that require NIST Physical Plant involvement may incur additional charges to the exhibitor.
- Exhibitors are encouraged to bring extension cords and multi-strips as needed.
- Equipment demonstrations utilizing the NIST Laboratories are to be coordinated at least 2 weeks in advance of the meeting through Dale Newbury

The exhibitor fee for the table (or space) is \$200.

Please make checks out to: **NIST Precision Engineering Division**

Checks will be collected by Mark Armitage