

**1999 LIST OF EXHIBITORS**

4pi Analysis, Inc.  
 Advanced Imaging Magazine  
 Advanced Microbeam, Inc.  
 Advanced Microscopy Techniques Corp.  
 Allied High Tech Products, Inc.  
 Anatech Ltd.  
 Applied Instruments Inc.  
 Applied Scientific Instrumentation, Inc.  
 Bio-Rad  
 Biophotonics International  
 BOC Edwards  
 Cadmet, Inc.  
 Cameca Instruments, Inc.  
 CamScan USA Inc.  
 Carl Zeiss, Inc. Microscopy & Imaging Systems  
 Chroma Technology Corp.  
 CODONICS, Inc.  
 Coherent Laser Group  
 CompuCyte Corporation  
 Computer Workshop  
 Cressington Scientific  
 CSP Cryogenic Spectrometers  
 Delaware Diamond Knives, Inc.  
 Denton Vacuum, LLC  
 Diagnostic Instruments  
 Dialome U.S.  
 Digital Instruments  
 Dolan Jenner Industries  
 Duniway Stockroom Corp.  
 DVC Company  
 EDAX Inc.  
 EdgeCraft Corporation  
 Electron Microscopy Sciences  
 Emispec Systems, Inc.  
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 Ernest F. Fullam, Inc.  
 ETP-USA / Electron Detectors Inc.  
 Evex Analytical  
 FEI Beam Technology  
 FEI Company  
 Fischione Instruments  
 Fuji Photo Film USA, Inc.  
 Gatan Inc.  
 Geller MicroAnalytical Laboratory  
 Gresham Scientific Instruments/MSA  
 GW Electronics, Inc.  
 Halcyonics GmbH  
 Hamamatsu Photonic Systems  
 Hitachi Scientific Instruments  
 HKL Technology  
 IBM Analytical Services  
 Illumea Corporation  
 InfoScience Services, Inc.  
 Intelligent Imaging Innovations, Inc.  
 IXRF Systems, Inc.  
 JCPDS-ICDD  
 JEOL USA, Inc.  
 JEOL USA, Inc. (USP Division)  
 K-TEK International, Inc.  
 Kluwer Academic Publishers  
 Kodak Scientific Imaging Systems  
 LADD Research Ind.  
 Leica Microsystems

LEO Electron Microscopy Inc.  
 Local Arrangements Committee 2000  
 Local Arrangements Committee 2001  
 Local Arrangements Committee 2002  
 Long Beach Convention & Visitors Bureau  
 Hospitality Booth  
 MAS  
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 McCrone Microscopes & Accessories  
 McCrone Research Institute  
 Media Cybernetics, L.P.  
 Micro Star Technologies Inc.  
 Microcosm, Inc.  
 Microscopy & Analysis  
 Microscopy / Microscopy Education  
 Microscopy Today  
 Molecular Imaging  
 Molecular Probes  
 MSA Pavilion  
 Nanonics Imaging Ltd.  
 National Graphic Supply  
 Nikon Inc.  
 Noran Instruments Inc.  
 Nikon Instruments Inc.  
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 Omega Optical, Inc.  
 Optem International  
 Optronics  
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 Oxford Lasers Inc.  
 Philadelphia Convention & Visitors Bureau  
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 Polaroid Corporation  
 Princeton Gamma-Tech, Inc.  
 Quartz X-Ray  
 Quesant Instrument Corporation  
 R&D Magazine  
 Raith USA Inc.  
 Renishaw, Inc.  
 RHK Technology Inc.  
 RJE Instruments Limited  
 RÖNTEC USA, Inc.  
 Roper Scientific  
 Sagitta Ltd.  
 SELA USA, Inc.  
 SEMICAPS, Inc.  
 Small World  
 Soft Imaging System Corp.  
 South Bay Technology Inc.  
 SPI Supplies  
 Springer-Verlag New York, Inc.  
 Technotrade International, Inc.  
 Ted Pella, Inc.  
 The COOKE Corporation  
 Thermo Microscopes  
 TN Analyzer Service Inc.  
 Tousimis International  
 Universal Imaging Corporation  
 VayTek, Inc.  
 Ventana Medical Systems - RMC  
 Vital Image Technology  
 X-Ray Optical Systems, Inc.  
 XEI Scientific

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 American Biologics  
 Anatech Ltd.  
 Archive 4 Images, Inc.  
 AutoQuant Imaging Inc.  
 Bio-Rad  
 Biophotonics International  
 BOC Edwards  
 Cameca Inc.  
 CamScan USA Inc.  
 Carl Zeiss, Inc., Microscopy & Imaging Systems  
 Chroma Technology Corp.  
 CODONICS Inc.  
 The Cooke Corporation  
 Cressington Scientific  
 Delaware Diamond Knives  
 Denton Vacuum  
 Diagnostic Instruments  
 Diatomics  
 Digital Instruments, Veeco Metrology G  
 Dolan-Jenner Industries  
 Duniway Stockroom Corp.  
 DVC Company  
 E.A. Fischione Instruments, Inc.  
 E. Fjeld Co. Inc.  
 Eastman Kodak-Scientific Imaging Systems  
 EDAX Inc.  
 EdgeCraft Corporation  
 Electron Image, Inc.  
 Electron Microscopy Sciences  
 Emispec Systems, Inc.  
 Emitech  
 EMSL Analytical, Inc.  
 Energy Beam Sciences, Inc.  
 ETP - USA  
 Evex Analytical  
 FEI Beam Technology  
 FEI Company  
 Fuji Photo Film USA  
 Gatan, Inc.  
 Geller MicroAnalytical Laboratory  
 GW Electronics, Inc.  
 Halcyonics GmbH  
 Hamamatsu Photonic Systems  
 Hi-Scope Systems Company  
 Hitachi Scientific Instruments,  
 Nissei Sangyo America, Ltd  
 HKL Technology, Inc.  
 ICDD  
 InfoScience Services, Inc.  
 Intelligent Imaging Innovations, Inc.  
 IXRF Systems, Inc.  
 Jackson ImmunoResearch Laboratories, Inc.  
 JEOL USA, Inc.  
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 KE Developments LTD  
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 KS Electron Technology  
 LADD Research Ind.  
 Leica Microsystems

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 Micro Photonics Inc.  
 Micro Star Technologies Inc.  
 Microbeam Analysis Society  
 Microcosm, Inc.  
 Microscopy & Analysis  
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 Microscopy Today  
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 National Graphic Supply  
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 Optem  
 Optronics  
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 Sagitta  
 SAMx  
 Sanyu Electron Co., Ltd.  
 SCANNING/FAMS, INC.  
 SELA USA, Inc.  
 SL3D, Inc.  
 Soft Imaging System Corp.  
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 SPI Supplies  
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 Tietz Video and Image Processing Systems GmbH  
 TN Analyzer Service, Inc.  
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**“We Are The Eyes of Science”**



# *Microscopy & Microanalysis*



Quebec • August, 5 – 9, 2002 • Quebec Convention Center

Sponsored by MSA • MAS • MSC and IMS



*Deadline for Submissions • February 14, 2002*

# M&M 2002

## *“BONJOUR” WELCOME TO QUÉBEC CITY*

The Microscopical Society of Canada and the LAC of Microscopy and Microanalysis 2002 are very proud to welcome you in Québec city for the MSA – MAS – MSC/SMC joint meeting that will take place for the first time in Canada. This event will be a commemorative new experience of science mixed with the “Joie de Vivre” of Québec City. Founded in 1608 by French explorer Samuel de Champlain, Québec City was the center of New France, which at the time extended from the St. Lawrence River in the northeast right down to the Gulf of Mexico in the south. By the end of the 19th century, Québec City had taken on many of its current attributes: political capital, university town, center of culture, tourist destination, and regional services and trade hub. The city's old quarter was declared a world heritage site by UNESCO in 1985.

The majority of the 650,000 residents of the greater Québec City metropolitan region (more than 95%) are French-speaking. However, English is largely used in all commercial and tourism facilities. Québec City is home to over 27 museums and interpretation centers providing a window on a vast world of history, the arts, heritage treasures, culture, and science. To cap it all, Québec City boasts many historic sites, architectural landmarks, and breathtaking green spaces, including the Fortifications of Québec National Historic Site, the Citadel, the parliament buildings, the Battlefields Park, Place-Royale, and several others.

When you enter Canada, a customs officer may ask to see your passport. If you are resident or citizen of the United States, you do not need a passport. However, I recommend you carry either a valid passport or a proof of your citizenship, such as a birth certificate or a certificate of citizenship. In the last two instances, bring a valid ID with a picture. Citizens of other countries need a valid passport to enter Canada, in some cases, a VISA is necessary. Please check with the nearest Canadian embassy or consulate. August is the high tourism season in Quebec, I urge you book your hotel early. Students who prefer to book low cost housing facilities, please refer to the list which is displayed on the web site of the LAC at <http://msc.rsvs.ulaval.ca>

As a native born of Québec City, I recommend to take extra days of vacation in our city. You will enjoy the summit of our fine restaurants, our French culture, the relaxing ambience of the European style old city and not least, our friendly people. Rated as one of the top three secure cities in Canada, Québec City is really a place where it is enjoyable to live.

*COME TO QUÉBEC, AN AMERICAN-STYLE CITY  
WITH A FRENCH ATTITUDE!*

**Pierre M. Charest**  
**2002 LAC Chair**

*Dear Colleagues,*



## Table of Contents

Welcome Letter	Inside Front Cover
General Information	pp. 2 - 3
Summary of the Scientific Program, Housing and Hotel Information, Travel Information	
Commercial Exhibition and Registration Hours	p. 3
Special Scientific Events	pp. 4 - 5
Symposia Descriptions	pp. 6 - 11
Tutorials	pp. 11 - 12
Award Competitions	pp. 12 - 13
Poster Instructions	p. 14
Data Submission Instructions and Samples	pp. 15 - 16
Offprint Order Form	p. 17
M&M 2001 Registration Form	pp. 18 - 19
Long Beach Downtown Map	p. 20
Hotel Registration Form	Inside Back Cover
List of Past Exhibitors	Back Cover

A special detachable centerfold insert has been added to provide information on area attractions, events and side trips. Enjoy!



## Summary of the Scientific Program

The Microscopy and Microanalysis 2002 hosted by the Microscopy Society of America (MSA), the Microbeam Analysis Society (MAS), the Microscopical Society of Canada (MSC)/ Societe de Microscopie du Canada (SMC) and the International Metallographic Society (IMS) will provide comprehensive Symposia, Tutorials and Special Sessions covering all aspects of microscopy. The program will begin on Friday, August 2nd with a two-day Pre-meeting Congress chaired by Raynald Gauvin of McGill University entitled "Topical Conference on Characterization of non-Conductive or Charging Materials with Microbeam Analysis". This Pre-meeting Congress will be at McGill University, Montreal, Canada. On Sunday, August 4th, there will be several Short Courses on a variety of topics to those active in teaching, research and industrial applications involving Microscopy and Microanalysis. Formal meeting sessions will begin on Monday, August 5th and will consist of a blend of different presentation formats including Symposia, Tutorials and Poster sessions that will offer latest information on cutting-edge discoveries and also provide the opportunity to learn new techniques and procedures. The unique opportunity for "hands-on" learning with state-of-the-art instrumentation will be provided by the integration of the program with the commercial exhibits.

The scientific program will consist of several types of sessions. "Advances in Instrumentation and Techniques" will cover a variety of topics dealing with the exciting new instrumentation and techniques that have recently evolved while "Tutorials" and the "Tech Forum" will focus on well established and commonly used techniques and instrumentation. The "Biological and Physical Sciences" will cover several specialized applications such as the use of microscopy in the study of Biomaterials and Biominerals, the characterization of Self-organizing Matter, or Nanoscale Technologies. A highlight of the meeting will be the symposium "Aberration Correction in TEM and STEM and its Application to Real-World Materials". We will also continue the popular "Ask the Experts" session during which the audience will be able to ask panels of experts about specific problems that have been encountered. The "Expert's" sessions as well as the "Tutorials" will both take a look at the important topics of Core Facility Management techniques and the use of digital images in microscopy.

Rounding out the program will be the afternoon "Poster" sessions that provide an excellent venue for the exchange of scientific information in a one-on-one format. Please review the specific guidelines for the multiple poster honors and awards, e.g., inclusion in the MSA Traveling Poster Exhibit that will be seen at most Local Affiliate Society meetings, or the Diatome Award that includes a trip to Switzerland for the winner and a guest (pages 00-00). The year 2002 will also bring significant technical changes for the program. In 2002, each poster will be up for only one day due to the growth in the number of posters and due to space restraints. Also, electronic and hardcopy (for 2002) submission will be required for all abstracts to allow for a fully searchable electronic proceeding at the meeting. Please see details on page 00! Session categories for submitting papers are listed, as usual, in the "Categories for Papers" section (pages 0-00).

The program committee has worked hard to ensure that this is an exciting and ambitious program covering as many aspects of Microscopy and Microanalysis as possible. We hope that you are as excited about the program as we are and hope to see all of you in Quebec City, in Canada. If you have any questions concerning the program, don't hesitate to check out the MSA home page (<<http://www.msa.microscopy.com/>>) or to contact the Meeting Management office or one of the program chairs listed below for the most recent information about the meeting. Remember that abstracts are due no later than February 15th, 2001.

**Edgar Voelkl, MSA Program Chair**  
**Dave Piston, MSA Program Vice-Chair**  
**Raynald Gauvin, MAS/SMC/MSC Program Co-Chair**  
**Al Lockley, IMS Program Co-Chair**

# Microscopy AND Microanalysis

***Microscopy and Microanalysis "... makes a fair bid to become the international house journal of microscopists." – Nature***

**MICROSCOPY AND MICROANALYSIS**, the official journal of the Microscopy Society of America, the Microbeam Analysis Society, and the Microscopical Society of Canada, invites you to submit full length manuscripts of your work. Indexed by BIOSIS, Chemical Abstracts, and Current Contents (both the Life Sciences and Physical Sciences editions), Microscopy and Microanalysis is a peer-reviewed journal that publishes the highest quality research on imaging and analysis in the biological and physical sciences. Reproduction standards for both color and grayscale images are outstanding. Your article will reach an international audience of over 5,000, including members of affiliated microscopy societies on four continents.

For author instructions or more information you may contact any of the six Editors:

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You can also find us on the World Wide Web at  
<http://link.springer-ny.com/link/service/journals/10005/index.html>.

## *Housing Information at Laval University Student Residences*

We offer to students as well as to convention participants the possibility to rent a room at low cost at the student residence of Laval University. However, the reservation must be done directly at the Residence Service of Laval University. All information concerning the summer residence housing is available on the web site of the LAC at: <http://msc.rsvs.ulaval.ca>. Please refer to the information for student housing reservation for room booking, the LAC is not responsible for this service.

Laval University is located about 3.5 miles from the Convention center. Express buses every 15 minutes (line 800 and 801) at low cost will drive you between the University Campus and the Convention Center in less than 20 minutes.

## *Hotels*

### **Palace Royal – Quebec City**

The Hotel Palace Royal is located five minutes walking distance from the Quebec Convention Centre and offers 160 deluxe suites, some with balconies, King or Queen size beds, sofa bed – and 74 standard rooms. Offerings include work desk, dataport, voicemail, mini refrigerator, hairdryer, complimentary coffee maker, exercise room, sauna, indoor pool surrounded with a tropical garden. “Le Beffroi” is the best steakhouse and seafood restaurant in the city.

### **Radisson Hotel Quebec**

Located right downtown, steps away from Old Quebec and its famous outdoor cafés in the heart of North America’s only walled city, the Radisson Hotel Quebec is linked to the Quebec Convention Center. The hotel has been fully renovated in 2000. The

Stylish decor of our 377 bedrooms and our 14 large meeting rooms will transform your stay into pure pleasure, and your event into a complete success. The Radisson Hotel Quebec is the ideal place to establish your headquarters during events taking place at the Quebec Convention Center.

### **Loews Le Concorde Hotel**

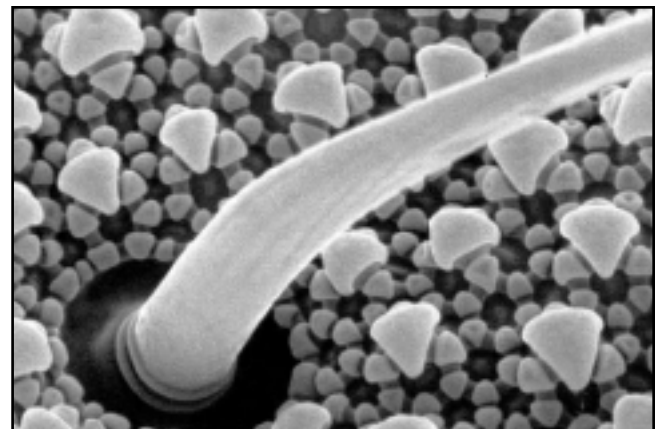
Loews Le Concorde Hotel is located on the Grande-Allée, the Champs Elysées of Quebec City, overlooking the St. Lawrence River and the Historic Plains of Abraham, this four diamond hotel is only a few blocks from the walled city and the Convention Center. The bedrooms are the largest in town and they all offer a breathtaking view on the beautiful Quebec City. They all offer the facilities to the high speed internet, complimentary coffee maker, board and iron and more. Enjoy!

**Hotel #6**

### **L’hôtel Fairmont Le Château Frontenac**

Situated above the mighty St-Lawrence river, The Fairmont Château Frontenac is the city’s number one landmark. The historic 4-Diamond hotel offers first class accommodations with enchanting views of the Old City, the Plains of Abraham and the St-Lawrence river. The Fairmont Château Frontenac is within a 15-minute walk of the Québec City Convention Center and within a walking distance of all major attractions.

**Hotel #5**



## **Commercial Exhibition Hours**

**Monday noon – 5:00 pm**

**Tuesday 9:30 am – 5:00 pm**

**Wednesday 9:30 am – 5:00 pm**

**Thursday 9:30 am – 3:00 pm**

## **Registration Hours**

**Saturday 7:30 am – 3:00 pm**

**Sunday 7:30 am – 5:00 pm**

**Monday 7:00 am – 5:00 pm**

**Tuesday 8:00 am – 5:00 pm**

**Wednesday 8:00 am – 5:00 pm**

**Thursday 8:00 am – 3:00 pm**



### Special Scientific Events

Pre-meeting Congress:  
August 2nd – August 3rd  
Full days starting at 8:00am

Organizer: Raynald Gauvin

### Pre-meeting Sunday Short Courses

August 4th Short courses are from  
9:00 am – 5:00 pm

**Organizers: John Mansfield,  
Louie Kerr and Al Lockley?**

**##-##: Introduction to X-ray Energy  
Dispersive Spectrometry and  
Quantitative Analysis**

*Instructor: Paul Carpenter*

This course will cover practical applications of the energy-dispersive spectrometer to x-ray microanalysis. Topics covered will include detector technology, advances in pulse processing, resolution and performance monitoring, detector modeling, peak deconvolution and fitting, qualitative and quantitative analysis, compositional mapping, and standards. An emphasis will be placed on use of the EDS for quantitative analysis, with discussion of typical problems encountered in the analysis of a wide range of materials and sample geometries.

**##-##: Digital Imaging 2002**

*Instructor: John Mackenzie, Jr.*

This course will discuss the various strategies needed for producing digital data that is suitable for publication. Because this field is evolving so rapidly, the course material will change sufficiently that individuals may find it beneficial to repeat this course. We will discuss how to acquire the best digital image for a given sample. Noise removal and resolution issues will be discussed in detail. We will examine what the current best technologies for archiving the image data are and what image formats and standards we should adopt. We will examine in detail image printing. We will emphasize several issues that must be understood in order to produce high quality images every time on any printer (the most critical being the gamma correction). There will be a strong emphasis placed on the most affordable solutions available regardless of platform or operating system. We will examine the latest technologies such as digital cameras and digital video to see how they may best be applied to microscopy. We will discuss the major issues that must be addressed when moving to a more digital approach.

**##-##: Focused Ion Beam (FIB)  
Microscopy and Technology**

*Instructors: Phil Russell  
and Fred Stevie*

This course begins with a discussion of the basic concepts of using ions (rather than electrons or photons) as a basis for microscopy. The development of the very high brightness Gallium liquid metal ion source (LMIS) and associated ion optics have resulted in FIB microscope/worksta-

tions playing several major roles in microscopy and microanalysis labs. FIB optics with 5 nm resolution performance will be described and compared with SEM. Then, the unique features of FIB due to the ion mass and sputtering possibilities will be described. Contrast mechanisms when imaging with emitted electrons in a scanning ion beam system will be described with numerous examples. The interaction of ions with matter is presented to the extent needed to understand the sputtering process, and beam induced chemistry. The use of FIB as a micromachining system for numerous applications will be described. These include cross sectioning of bulk samples and in-situ imaging; TEM sample preparation, and the fabrication of probes for scanned probe microscopy (STM and AFM). Examples of site specific TEM sample prep, including lift out methods, which allow for very low damage, atomic resolution specimen prep with rapid turn around time will be given. Ion beam induced chemistry techniques will be described which allow both material deposition with high spatial resolution and, with different chemistries, enhanced machining or material etch rates. The course will conclude with a discussion of current FIB instrumentation including system with FE-SEM columns incorporated into a dual beam configuration.

**##-##: Live Cell Imaging: a primer**

*Instructors: Simon C. Watkins &  
Nancy Burke*

Course Description: In the post-genomic era of biomedical research understanding the functionality of molecules at the cellular and sub-cellular level in living systems will become predominant. In this area we must move beyond static "snapshots" of the cellular state to an understanding of the biology of cells over time and in 3-dimensional space. Within the cellular environment it is expected that we will be able to study the expression, the functional role(s) and interactions of multiple unique molecules concurrently. Furthermore, it will be desirable to determine the effects of these molecules on cell development, organization and fate over extended periods of time. To perform these types of studies it is necessary to develop new methodologies that will allow multi-parametric analysis of cells while maintaining their functional viability. In the past this goal would have been extraordinarily difficult to achieve. However, developments in optical and computational technology have empowered modern microscopists to undertake these previously forbidding tasks. This day long workshop will discuss live cell imaging tools, the expectations of the technology and limitations of optical tools within the context of current scientific efforts principally focusing on the use of fluorescent proteins and ratiometric

tools in live cell methodologies. Lectures will include: optical principles, fluorescence principles, microscope design, cameras, Image archiving and management and multidimensional image analysis tools for live cell imaging.

## **##-##: What the Heck Happened to This?\_ Real Life Failure Analysis Tips and Tricks Using Microscopy and Microanalysis** *Instructors: Valerie Woodward*

Most industrial service lab microscopists are faced with solving manufacturing and applied R&D problems on the fly with broad-use, commercially available, and sometimes outdated equipment using routine analytical methods \_ and of course, yielding data yesterday and for \$19.99! Although the questions about why materials fail (or work!) aren't always answered at the most fundamental levels, we do need to provide the best reasonable answers in the shortest reasonable times to our \_customers\_ so that they can relate the problem to a specific process or material. Many times, we just need to give our customers a direction in which to proceed, and can follow up with the pesky details later; with this in mind, there are many \_alternate routes\_ that we can take to give guidance. Of course, this obliges us to know about the materials and processes that we are examining, about maintaining a historical perspective on problems (i.e., being an old timer), and how to relate our information to the non-scientist as well as the technical customer. This talk will present some approaches to failure analysis, and a number of case studies that have required the use of multiple hierarchies of microscopy, microanalysis, microsampling, and multiple analytical techniques in order to provide timely and useful results to the customers.

## *Additional Scientific Events*

(No Additional Fee Required)

### **Metallographic Specimen Preparation**

*Organizer: George Vander Voort*

Metallography is the aspect of metallurgy that deals with the study of the structure and constitution of solid materials and alloys. This symposium will provide preparation theory and exhibit a variety of techniques used to correctly reveal the microstructure of engineering materials. In addition, the symposium will honor of the 80th birthday of Len Samuels of Australia. Len, renowned for his basic research (from about 1950 through 1985) has provided us with our scientific understanding of what is happening during grinding and polishing stages of preparation and has shown how it affects our ability to see the true microstructure of metals and alloys.

### **Problem Solving With The Experts**

*Organizers: Ron Anderson?, Jose Mascorro? and Debbie Sherman? TBD*

### **Addressing Issues in Digital Imaging for the Microscopist: II**

*Organizer: Jose Mascorro*

This session will address problems and issues that are at the forefront now that the biological microscopist is in the midst of the new era dealing with digital imaging. The program this year will feature presentations from several speakers from diverse laboratories who will discuss the topic of digital imaging and how it is applied within their respective laboratories and research interests. As usual, the audience is encouraged to participate with questions and comments. Following the presentations, a group discussion between speakers and audience will highlight this program. The speakers for this session include:

*Rakesh Bhatnagar  
Tina Carvalho  
Judy Murphy  
San Joaquin  
Donald L. Black*

### **Core Facility Management**

*Organizer: Debbie Sherman*

This expert's session of Facility Management will focus on specific topics of current interest to managers of multi-user and service facilities in industrial and educational settings. The suggestions for topics will be obtained through requests to the M&M Listserv and from suggestion forms filled out at a similar session held at M&M2001. Facilitators will introduce each topic. The majority of the session will be reserved for open discussion and exchange of information among attendees.

## *Technologists' Forum Events*

### **Technologists' Forum Roundtable Discussion: Legal and Ethical Issues of Data Ownership**

*Organizer: Jeanette Killius*

This issue is at the core of current discussions between scientists and administrators from academia to the corporate world. The panel will represent several disciplines and create an interactive discussion with the audience over this very timely topic.

### **Technologists' Forum Special Topics: Immunology 101: Back to Basics**

*Organizer: Jeanette Killius*

Today's immunocytochemistry lab is an amalgam of techniques from FITC to HRP to PAP to ferritin to immunogold. What gets lost is the understanding of basic immunology that forms the platform on which these and other methods are built. This session will feature an invited speaker who will cover the topic of immunology in depth. With better knowledge, one will be able to optimize accurate and reproducible lab results.

### **Technologists' Forum Special Topics: Special Staining Techniques for Biological/Materials Samples**

*Organizer: Jeanette Killius*

This symposium will deal with specific stains or etches to delineate particular areas in various samples. The emphasis will be on exploring novel stains, staining to enhance a previously unseen area, proper protocol, overcoming problems and imaging. Materials samples such as polymers, semiconductors and papers/textiles will be discussed. Immunostaining, fluorescence, and alternative EM stains are among biological applications to be presented. Invited papers will introduce these areas. Contributions for poster presentations covering this topic will be welcome.

### **Computer Workshop / Software Exchange and The Internet Cafe**

*Organizers: Nestor Zaluzec and John Mansfield*

The computer workshop and software exchange will be operating throughout the Meeting and will be located on the Exhibit floor adjacent to the society information booth. Participants can view and discuss the more than 500 Mbytes of data, programs, general information and images available in the public domain software library. A limited number of Mac and PC systems will be available for viewing, discussing and copying programs. In addition, a number of connections to the Internet are planned and will be available to all conference attendees to provide access to Email and WWW services. This will be contingent upon availability of systems with respect to any other workshop or meeting demonstrations and the arrangements with a local Internet Service Provider. The Workshop and Internet Cafe' will only be available during normal Exhibit hours.





## Project MICRO (Microscopy In Curriculum – Research Outreach)

### “How to be a MICRO volunteer – a practical workshop about educational outreach”

*Organizer: Caroline Schooley*

MICRO (Microscopy In Curriculum – Research Outreach) is MSA's middle school outreach program. Middle school (usually grades 5-8) teachers need more help than high school teachers; even if they're "science specialists" most don't have adequate background. And since middle school students are taking general rather than elective science, it's possible to reach them all. MICRO's goal isn't to teach microscopy; the microscope is used as an exciting "tool of science" to introduce critical observation and inquiry. Microscopists on both sides of the border can make an important contribution in their local schools, but it can at times be difficult to form a successful partnership with a teacher or school; this workshop will present strategies for success.

## Categories for Scientific Papers

When submitting the Author Data Form through the meeting Internet site (see page 15), authors of invited papers of sessions 03-34 and Tutorials 80-87 should select only the session number from the list below corresponding to the symposium or Tutorial they have been invited to participate in. If you are unsure of your category please check with your symposium organizer. Authors of contributed papers should suggest two categories from the list below (01-79) when submitting their Author Data Form. The Program Committee will use this information when arranging papers into coherent sessions. Please realize that inclusion of your contributed paper into a specific category cannot be guaranteed. However, every effort will be made to place your contribution into the most appropriate session. Sessions 02-35 are specific symposia. Before selecting one of these symposia for your contributed paper, carefully read the information describing it. Categories 36-79 (page 12) will be organized into symposia during the Program Production meeting. All symposia will have a poster session associated with it. Therefore, authors of contributed papers preferring a poster presentation may contribute to any category.

## Presidential Happenings

The Presidents of MSA and ????????? will offer special events during the early evenings of Monday and Tuesday. These events, including keynote speakers and the awards ceremonies, are intended for all attendees.

## Special Poster Sessions

### Late Breaking Posters

*Organizer: Edgar Voelkl*

The program committee frequently receives requests to exhibit timely and exciting new data that has been obtained past the February 14th deadline for the submission of papers for the meeting. This is your avenue for presenting this data at the meeting. If you would like to submit a 'Late Breaking Poster', please contact Edgar Voelkl at [eVoelkl@nLine.com](mailto:eVoelkl@nLine.com) for further information.

## Biological Sciences Symposia

### ## 3-D Electron Microscopy of Macromolecules/Characterization of Macromolecules and their Function

*Organizers: Peter Ottensmeyer and Joachim Frank*

The goal of molecular biology is to provide a comprehensive understanding of the functional and structural relationships of biological processes at the molecular level. While the two aspects have in general been

studied in isolation, or been the purview of atomic level structural analysis in crystallography and NMR spectroscopy for a number of enzyme reactions, structural analysis by electron microscopy and image processing of single particles or of crystals have lately contributed greatly to our understanding of the function of major processes, such as those in protein synthesis and transmembrane signal transduction. The symposium and contributed papers will highlight electron microscopic structures in terms of their structure/function relationships at the level of macromolecules and their complexes in any biological field.

### ## Plant-microbes interactions at the cellular and molecular levels

*Organizers: Pierre M. Charest and Suha Jabaji-Hare*

This session will present several aspects, research avenues and microscopic approaches for the study of the interactions between microorganisms including fungi and bacteria as well as virus with the plant cell. The contributed papers will cover topics related either to pathogenic microorganisms or to the beneficial soil microflora such as mycorrhizae and symbiotic bacteria. Topics dealing with real-time microscopy and confocal microscopy imaging will also be discussed as exciting powerful tools to study plant-microbe interactions at the cellular and molecular levels. Contributed papers and posters on related topics of plant pathogenic and symbiotic microorganisms are also welcome.

### ## The Microstructural Approach to Food Processing and Engineering

*Organizers: Alejandro Marangoni and David Stanley*

Food structure is the organization of constituent macromolecular elements and their interaction. Food processing, a series of restructuring and reassembling operations, benefits from many newly developed techniques for examination and analysis of food microstructure. Examples of these techniques include deconvolution wide field microscopy, confocal laser scanning microscopy, environmental scanning electron microscopy, position tagged spectroscopy, scanning probe microscopy, and magnetic resonance imaging. Microstructural knowledge of foods remains critical in processing, packaging, storage, distribution and preparation because of the direct causal connection between structure and food product behaviors. This symposium will emphasize and encourage contributions that reflect microstructural approaches to food engineering and development, including both biological and materials evaluation and analysis.

## ## Advances and Applications in Vascular Corrosion Casting in Microvascular Research

*Organizers: Fred Hossler and Seyedhossein Aharinejad*

While the traditional application of vascular corrosion casting has been to describe the three dimensional anatomy and distribution of blood vessels in tissues and organs, other applications have included monitoring changes in vasculature in disease and during normal development. Techniques for quantitation of the vasculature using corrosion casts have also become increasingly important. It is anticipated that this session will include new developments in each of these areas.

## ## Advances in Ultrastructural and Non-invasive Imaging of Skin

*Organizer: Manoj Misra*

Recent advances in instrumentation and imaging techniques (in vivo confocal, Raman, OCT, 2-Photon, EPR imaging and cryo-EELS spectroscopic imaging, ESEM) have begun to offer new avenues to probe skin's chemical- and ultra-structure and thus develop improved understanding of skin physiology and function. This symposium aims to pull together such cutting-edge imaging techniques to address their potential and associated pitfalls in imaging skin.

## ## Electron Cryo-microscopy of Biological Macromolecules

*Organizer: Wah Chiu*

The topics of the symposium will be the applications of electron cryomicroscopy and computer reconstruction to the study of biological assemblies at high resolution. Invited speakers will cover topics related to 2D crystal structure, helical arrays, and single particle analysis. Contributed platform and poster presentations using microscopy to study macromolecules are also encouraged.

## ## Confocal and Deconvolution for Biologists

*Organizers: Elaine Humphrey and Jay Jerome*

This session will look at the way confocal and deconvolution microscopes have been used to image not only fixed material but also living systems. We will look at developments in imaging fluorochromes using conventional confocals, spinning disc confocals, and deconvolution systems and how the use of vital stains and fusion proteins such as GFP, have allowed an abundance of research into answering physiological questions such as how certain proteins interact within cells and tissues. We will explore the difficulties of keeping cells alive while collecting meaningful data.

## ## Advances in linking structure to function in biomaterials

*Organizers: Christopher Siedlecki and Steven Eppell*

Biomaterials research is an interdisciplinary field requiring expertise in both physical and biological sciences. Traditional biomaterials provide the necessary mechanical and chemical properties for medical and drug delivery devices while eliciting minimal biological host response. Newer contributions include biomaterials designed to: elicit specific "appropriate" biological responses, self-assembling materials utilizing lessons from nature, and materials that can deliver drugs locally and at controlled rates. This symposium offers a platform for discussing recent advances in understanding the structure of biomaterials ranging from the nanometer (molecular) to the cm (tissue) scales. Contributions linking structural details with functional aspects of the materials (chemical, mechanical or biological) of both traditional and novel biomaterials are especially encouraged.

## ## In Situ Electron Microscopy Techniques and Applications/Reactions

*Organizers: Eric Stach and Pratibha Gai*

The study of in situ reactions is a rapidly advancing field in both materials and biological sciences. Dynamic studies by in situ microscopies provide direct insights into materials processes and properties, leading to exciting new developments in the materials and biological sciences, and in nanotechnology. This timely symposium will include high resolution environmental and high temperature electron microscopy under dynamic reaction conditions. In situ contributions of FETEM, wet (solution) environmental microscopy, energy filtering and electron energy loss spectroscopy, FESEM, aberration correction, novel specimen stages and other related topics will be welcome. The symposium will cover applications and emerging opportunities in Catalysis, Surface and Interface reactions, the Structural Dynamics of Defects, Polymerization, Carbon and other Nanostructures, Crystal Growth, Deformation, Phase Transformations in Particulate Materials, Proteins on nanostructures and Electromigration.

## ## Polymer Characterization: It's Not Just For Microscopes Anymore

*Organizers: Catherine Johnson and Valerie Woodward*

From optical observation of polyethylene spherulites to micro modulus measurements of polymer blends, polymer characterization has experienced much transition. Electron beams, x-rays and tunneling currents, to name a few, all play an important role in today's characterization studies. This symposium will cover "tried and true" through novel techniques used to explore the structure/property relationships of today's polymeric materials. Current industry demands increased versatility of material behavior in order to design polymers that are application specific. The desire to dial in properties requires one to understand materials from nanoscopic to macroscopic levels. The methods visited and revisited here will allow this desire to become reality in the very near future.

## Physical Sciences Symposia

### ## Magnetic Materials and Super-conducting Materials

*Organizer: Yi Liu*

Magnetic materials and super-conducting materials are among the key materials supporting next generation of compact and super-fast computers and other electronic devices. This symposium solicits presentations on progress in characterizing both the physical structures and magnetic structures of magnetic materials and super-conducting materials. Topics include but are not limited to scanning probe microscopy, magnetic force microscopy, atom probe microscopy, X-ray diffraction, neutron diffraction, Mossbauer spectroscopy, spin-polarized electron spectroscopy, scanning electron microscopy and transmission electron microscopy. We encourage microscopists and experts in magnetic materials and super-conducting materials to exchange information and team up for future collaboration.

### ## Advances in Nanoscale Technology

*Organizers: Thomas Kelly, David Larson and Michael Thompson*

Pursuit of nanoscale technology is projected by many to be a major 21st century industrial activity. The microscopes needed to work on this scale will play a crucial role in enabling its successes. In many cases, the characterization tools



become nanofabrication devices as well. This symposium will showcase the many techniques used for nanoscale characterization and fabrication of inorganic and organic structures and explore the role of microscopies in nanoscale technology. Metals, ceramics, semiconductors, polymers, and biological materials will all be considered.

## **## Microscopy and Microanalysis of Self-Organized Soft Condensed Matter**

*Organizers: Richard Spontak and Judith Yang*

Soft condensed matter composed of bi/multifunctional chemical species may, under the right conditions, self-organize into nanoscale or microscale structural elements that promote the development of unique properties or applications. Common examples of self-organizing species include amphiphiles, copolymers and polyelectrolytes. Real- and reciprocal-space characterization of such elements is crucial to an improved understanding of their development mechanism, stability and utility. Various microscopy methods, including, but not limited to, near- and far-field optical microscopy, scanning electron microscopy, transmission electron microscopy, x-ray microscopy, electron tomography and surface probe microscopy, have been employed to quantitate the size, dispersity, shape, composition, symmetry, order and connectivity of structural elements formed upon the self-organization of soft condensed matter. This symposium will highlight advances and successes of microscopy methods used in this endeavor.

## **## Electron Microscopy of Macro-, Micro- and Meso-Porous Materials**

*Organizers: Manuel Brito and Douglas Blom*

In spite of the recent interest in the area of meso-porous materials and continued interest in the areas of macro- and micro-porous materials, characterization studies by electron microscopy have been rarely reported in the literature. The aim of our session is to develop effective interactions among electron microscopists, scientists, engineers and entrepreneurs in this field, in order to foster the spread of information. It will highlight creative sample preparation techniques, as well as the characterization of all aspects of porous materials. Characterization techniques will include SEM, conventional TEM, HRTEM, in-situ electron microscopy, Z-contrast imaging, cross-section STM and AFM, EDS, EELS, etc. Presentations dealing with the microstructure-property relationships of porous materials are encouraged.

## **## Quantitative X-Ray Microanalysis in the Microprobe and in the SEM: Theory and Practice**

*Organizers: Raynald Gauvin and Eric Lifshin*

This symposium presents the latest developments in X-ray microanalysis for the electron microprobe, the SEM and ESEM. Because of the rapid progress in instrumentation, modeling techniques and software, X-ray microanalysis today is applicable in a broad range of experimental setups and a large diversity of samples. Topics of particular interest include: software relating to new correction and simulation procedures, microanalysis of light elements and spectra at low operating voltages and in FE-SEM's. Special consideration is given to X-ray analysis in the ESEM and VP-SEM, how to optimize spatial resolution and discussion of general procedures for quantitative analysis. Data from the X-Ray microanalysis of rough surfaces, porous materials and multi-layer thin film structures, using improved measurements and computation of fundamental parameters describing X-Ray emission, and electron diffusion will also be discussed. This symposium will demonstrate that new X-Ray microanalysis methods continue to develop rapidly and provide a characterization tool that continues to meet the demand for increased capabilities.

## **## State of the Art Infrared and Raman Microanalysis**

*Organizers: Michael Jackson and Edgar Etz*

This Symposium will highlight vibrational microanalysis in the materials, biological and analytical sciences. Topics will include: Fundamentals of inelastic scattering. Instrumental advances in synchrotron infrared microspectroscopy, confocal Raman microprobe/microscopy, Raman microspectroscopy and near-field IR and Raman microscopy. Vibrational spectroscopic imaging including instrument performance, biological/medical applications and analysis of data sets. Characterization of semiconductors, polymers, composites and ceramics. Vibrational microspectroscopy in biology, environmental studies, geological sciences, art and archaeology. Quantitation in Raman probe microspectroscopy, including instrument calibration and standardization of spectral libraries. Papers in related topics (e.g., photoluminescence and fluorescence microspectroscopy and imaging) will also be considered.

## **## Modulated Structures and Quasicrystals**

*Organizers: Craig Bennett and Jim Corbett*

Incommensurate modulations and quasicrystallinity represent distinct but related forms of non-periodic long range order. In addition, various levels of disorder

in these materials generate unique defect structures, such as discommensurations in incommensurate crystals and phason defects in quasicrystals, which are intimately involved in phase transformations and influence the physical properties. In this symposium, we will highlight recent progress in the application of transmission electron and scanned probe microscopies to the study of these novel materials.

## **## Image Contrast Mechanisms in the Variable Pressure SEM: the "New" Imaging Dimension**

*Organisers: Brendan Griffin and John Mansfield*

Charging has been the bane of SEM users since the instrument's inception. Recently, however, important links between charging and sample state have been recognized and with them, new features have been noted in the images recorded in the VP-SEM. Progress is being made in the understanding of these charge-related contrast mechanisms and they have been shown to provide new, and sometimes unique, information on a wide variety of samples, ranging from corn chips to minerals and oil emulsions to doped semiconductors. This symposium will feature invited contributions on new developments in both the applications, control and fundamental theory of charge contrast imaging. Contributions reporting further examples and/or applications of these charge related phenomena are encouraged. Reports of the effects on X-ray analysis in this environment are also sought.

## **## Teaching and Learning – Creating Effective, Innovative Solutions in Microscopy, Imaging and Analysis (MIA)**

*Organizers: Steve Barlow and Ken Baker*

Teaching and learning in the field of microscopy imaging and analysis are important to the practice of all forms of microscopy. Microscopy imaging and analysis has adopted an extensive collection of tools and techniques and continues to develop as an increasingly complex subject area. Computer-assisted microscopies, high speed global internet communications, remote microscopies and image acquisition, digital imaging tools, and multidimensional imaging and analysis techniques all offer opportunities for powerful innovation in teaching and learning. Pedagogical resources include: distance learning, on-line manuals, references, tutorials, image databases, and a selection of shared utilities and dedicated discussion forums. This symposium will encourage contributions that emphasize creative, effective, and innovative educational approaches to microscopy, image acquisition and analysis, and increased use of microscopy and images in a student curriculum.

## ## Elmar Zeitler Symposium: Analytical Electron Microscopy – Past and Future

*Organizers: Dangsheng Su and Gianluigi Botton*

This symposium is dedicated to Professor Elmar Zeitler on the occasion of his 75th birthday. Elmar Zeitler, a renowned scientist in electron microscopy and the founding editor of *Ultramicroscopy*, will have his 75th birthday in 2002. This symposium honors his outstanding contribution to the field of electron microscopy. The symposium will feature invited and contributed papers on the general topic of analytical electron microscopy (AEM), including the instrumentation advances and methodological development in EELS, EDX, quantitative TEM, and their applications in biological and materials science. Emphasis will be given to the challenges and future of AEM.

## ## Microstructural Examination and Imagery of Engineering Materials

*Organizers: International Metallographic Society*

Metallographic specimens can be examined using a wide variety of methods involving both traditional and advanced instruments. Several sessions will address applications of optical and electronic microscopy, and advanced analysis tools that can aid the metallographer and materials scientist to understand the microstructure of engineering materials.

## ## Practical Applications of Metallography

*Organizers: International Metallographic Society*

Metallography has been a primary method used to provide engineers and scientists with insight into materials performance, failure, and improvement. Some of the methods used to achieve these insights will be considered including the evaluation of corrosion, failure analysis, and image analysis of engineering materials.

## ## Metallography and Microstructural Evaluation of Contemporary Materials

*Organizers: International Metallographic Society*

As technology advances so do materials and methods to examine them. Several technical sessions will seek to illustrate examples of metallographic preparation and analysis of contemporary engineering materials including light-weight materials, coatings, composites, refractory materials, high-temperature resistant alloys, and steels.

## *Advances in Instrumentation and Techniques*

### ## Electron Holography, Interference Phenomena and Related Techniques: A symposium honoring the contributions of Hannes Lichte and Akira Tonomura

*Organizers: Vinayak Dravid and Larry Allard*

Electron holography is in a state of transition from the theoretical development and demonstration stage in a few research laboratories to the practical application of the technique in numerous university and industrial laboratories. Holographic and related interference methods in imaging and diffraction have found applications in many materials and biological systems, ranging from semiconductor dopant profiles to contrast enhancement and 3-D shape reconstruction of biomolecules. This session will highlight the current state of the art in electron holography research, including new experimental techniques, and applications of holography studies to materials and biological systems. Two pioneering researchers in the field, Prof. Hannes Lichte of the Dresden University of Technology, and Dr. Akira Tonomura of the Hitachi Advanced Research Laboratory, will be honored at this symposium.

### ## Optical Advances in Deep Tissue Imaging

*Organizers: Simon Watkins and Peter So*

In vivo imaging of cells and tissues is becoming a critically important research tool, allowing multiple serial data sets to be collected from the same animal, as well as allowing non-invasive diagnostic imaging in humans. To maximize the utility of the method, optical tools must be developed which allow deep tissue imaging of molecular and cellular processes. Currently we are at a nexus in which far red illumination systems, bioluminescence, optical coherence tomographic methods and other emergent tools are becoming increasingly realistic approaches to gather high quality images deep within tissues. This symposium will provide a forum to present and discuss these breakthroughs in imaging technology.

### ## Aberration Correction in TEM and STEM and its Application to Real-World Materials

*Organizers: Max Haider and Ondrej Krivanek, Nion Co., Kirkland*

Aberration of electron lenses has historically been a major limit on the performance of electron microscopes. Following nearly half a century of research in aberration correction that did not produce a practical resolution improvement, successful correctors have now been designed and built for both the TEM and the STEM. This symposium will examine what made aberration correction a reality at last, and illustrate the performance that is now possible with application examples from real-world materials. It will also survey the main challenges of the new "aberration-corrected" era. The symposium will be dedicated to two notable pioneers in the field, Albert Crewe and Harald Rose.

### ## Applications and Developments of Focused Ion Beams

*Organizers: Lucille Giannuzzi, Nan Yao and Mike Phaneuf*

The use of the FIB instrument has received much attention in recent years. The imaging, milling, and deposition capabilities of the FIB make it ideal for e.g., site-specific specimen preparation and nano-machining. Ion channeling contrast allows for imaging of polycrystalline and poly-phase microstructures. In addition, the FIB and dual beam instruments are unique stand-alone analytical tools. Their vast capabilities have enabled numerous applications into the materials sciences and the biological sciences. Abstracts discussing the applications of FIB techniques or the development of FIB instrumentation in either the physical or biological sciences are encouraged to participate in this symposium.

### ## New Developments in Immunolabelling

*Organizer: Ralph Albrecht*

This symposium will emphasize emerging labeling technology for use in high resolution and correlative studies. It is becoming increasingly important to identify and localize/co-localize multiple molecular species within cells and tissues. With the development of comprehensive lists of cellular components, the organization and movement of these components at the cellular level is a critical step in understanding cell function. Labels having



properties that allow them to be identified in different microscopic modes (LM, EM, FM) are also of considerable advantage, particularly in correlative studies where labeled samples are examined sequentially or simultaneously using several modes.

## **## Industrial Applications of Microscopy – Techniques for the Real World**

*Organizers: Zhigang Rick Li and Janet Woodward*

Microscopic techniques have become more mature and have been broadly used throughout industry. Microscopists from the diverse industrial sectors are invited to share their years of successful and unsuccessful experiences in using various microscopic techniques. Light, scanning and transmission microscopy and associated techniques will be covered in this symposium to illustrate how these techniques can be combined to solve real world problems. Automation, safety issues, calibration problems, sample preparation, advantages and limitations of the various microscopic technique will be discussed. Another major focus of the symposium will be the evaluation of the new emerging techniques and their potential in industrial applications.

## **## Frontiers of X-ray Spectrometry**

*Organizers: Dale Newbury and John Scott*

In recent years, advances have been made in X-ray spectrometry with the emergence of the silicon drift detector (SDD), microcalorimeter energy dispersive X-ray spectrometry, and X-ray optics based on polycapillaries. Reports are sought on continuing developments in these and other areas of x-ray spectrometry. SDD with its extremely high count rate raises considerable challenges to MCA binning operations, and we wish to highlight this aspect of SDD development. Additionally, these technologies are now beginning to reach users in the microscopy and microanalysis field, and reports will be welcomed describing the experience of implementing these technologies on electron microscopes and other platforms as well as applying them to practical problem solving.

## **## EELS and EFTEM Analysis**

*Organizers: G. Botton (McMaster University, Canada) and TBA*

The symposium will focus on new developments in methods, applications and instrumentation of energy loss spectroscopy, energy-loss fine structures and energy filtered microscopy covering both physical sciences and biology. The sessions aim to cover: quantitative aspects of the technique (for spectra and images), novel data analysis approaches (including statistical

methods to analyze large data sets), the modeling of energy loss spectra and their limitations (including comparison with complementary techniques such as XAS and XPS), the use of EELS fine structures to understand properties and new instrumentation developments (monochromators, spectrometers, filters and acquisition hardware etc.). General applications of the technique for microstructural characterization are also welcomed.

## **## Current Topics in Low Voltage SEM**

*Organizers: David Joy and Raynald Gauvin*

Operation at low- and ultra-low voltage is the most active applications and research field of scanning electron microscopy. This session aims to examine the new and novel forms of instrumentation – including parallel projection systems, aberration corrected conventional SEMs, and the point projection microscope – which can now offer major improvements in imaging performance at such energies, and the techniques that have been developed for the electron-optical modeling and design of such systems. We will also discuss practical methods for bench marking and verifying the performance of advanced microscopes under realistic conditions. Finally we will have an open Forum on techniques for preparing samples for low voltage microscopy, and on new methods - such as plasma cleaning, and CO<sub>2</sub> snow - for keeping them free from contamination.

## **## Electron Crystallography and Quantitative Electron Diffraction**

*Organizers: Wharton Sinkler, Yimei Zhu and J.M. Zuo*

In recent years applications of quantitative electron diffraction intensities to structural problems have increased, both in terms of the number of problems successfully treated as well as in the range of problems. Examples include direct methods applications to solving inorganic and organic crystal structures, surface structure solutions, structure refinements, investigations of charge state and strain. The potential for more routine utilization of quantitative electron diffraction is great – data collection in modern microscopes is fast improving; there are distinct advantages over images in terms of data resolution; and the technique is uniquely suited to beam sensitive and/or nanoscale samples. The challenges range from technical issues of data collection and quantification to robust treatment of dynamical perturbations.

This session will cover all aspects of solving crystallographic or low-dimensional structure problems using quantitative electron diffraction. The main areas will be approaches to the phase problem (e.g., direct methods), and structure or property refinement from electron diffraction data.

## **## Electron Backscatter Diffraction of Materials: Geology to Nanotechnology**

*Organizers: John Small and Joe Michael*

Electron backscatter diffraction, EBSD, has emerged as a powerful and important technique for the characterization of a broad range of materials. New generation EBSD systems are being used to acquire and determine crystal orientations for very rapid microstructural characterization of materials. Recent advances in camera technology and identification software have extended the application of EBSD to the determination of the crystallographic phase of unknown materials. Areas of interest include phase identification and orientation studies of nanoparticles, thin films, bulk materials, and fracture surfaces. Also papers are encouraged on the fundamental issues of pattern origin and formation. This session will address recent advances in EBSD instrumentation and software as well as novel applications, which are fueling the current rise in importance of this technique for materials characterization.

## **## Microscopy, Microanalysis and Image Analysis in the Pharmaceutical Industry**

*Organizers: Bev Maleeff and Barbara Hartman*

Pharmaceutical research and development laboratories are at the forefront of science. Much of the work performed in pharmaceutical microscopy and microanalytical labs is similar to that done elsewhere, however, there are specialized technologies and themes that are of particular value to microscopists in the industry. It is the objective of this symposium to present a variety of biological and materials science applications of significance to the pharmaceutical community. Invited speakers will include current leaders in their respective disciplines. Additionally, in response to feedback from previous meetings, an informal forum will be provided for sharing of thoughts and strategies related to regulatory and other issues faced in our laboratories. Contributed papers for platform or poster presentation on related topics are encouraged and welcome.

## **## Advances in Microwave Technology – Creating a Revolution in Biological Specimen Processing for Light and Electron Microscopy**

*Organizers: Kent McDonald and Rick Giberson*

Microwave-assisted processing reduces the time to prepare samples for thin sectioning electron microscopy from days or weeks to a few hours. For clinical and surgical pathology reduced turn around times have profound implications, and same-day sample evaluations are also immensely useful

in teaching and research. In this symposium, the latest results from these areas will be presented. In addition, methods of microwave-assisted immunolabeling for light and electron microscopy, decalcification, in situ hybridization, scanning EM and vital staining techniques for LM will be examined.

## ## **Biominerals**

*Organizers: William Masover and Marija Gajdardziska-Josifovska*

An amazing variety of intracellular and extracellular BIOMINERALS are produced by bacteria, plants, and animals. Examples range from skeletal supports or shells based on calcium, silicon, or strontium, through human kidney stones and other clinical deposits, to nano-crystalline iron-rich components of special protein molecules. Their organic nature puts them in the domain of traditional biological electron microscopy, but their inorganic constituent necessitates the use of physical electron microscopy methods.

This joint symposium (biology/chemistry/geology/physics) aims to present state-of-the-art examples of modern methods for micro- and nano-characterization of normal and pathological biominerals, and to provide a forum for presentation and discussion of original research results. Emphasis will be on structural studies using advanced electron microscopy (including imaging, diffraction, and spectroscopy) as well as with novel approaches by scanning probe microscopies. Contributed reports on interdisciplinary investigations of biominerals are cordially encouraged.

## ## **Scanning Probe Microscopy: Technical Advances and Applications**

*Organizers: Inga Musselmann and Dorothy Erie*

This symposium will address scanning probe microscopy of both biological and physical systems. The topics will include advances in imaging techniques and image analysis, as well as the application of the many scanning probe microscopy techniques including, among others, scanning tunneling microscopy, atomic force microscopy, scanning electrochemical microscopy and near-field scanning optical microscopy.

## *Additional Categories for Contributed Papers*

### **Applications of Microscopy and Microanalysis: Biological Sciences**

- ##. Biological Microanalysis
- ##. Biological Ultrastructure (Cells, Tissues, Organ Systems)
- ##. Biomedical Applications
- ##. Biopolymers and Biomimetics
- ##. Blood/Immunology
- ##. Botany
- ##. Correlative Microscopy
- ##. Cytochemistry (Light and Electron Histochemistry, Immunohistochemistry, In-Situ Hybridization)
- ##. Developmental/Reproductive Biology
- ##. Entomology
- ##. Microbiology
- ##. Neurobiology
- ##. Parasitology
- ##. Pathology

### **Applications of Microscopy and Microanalysis: Physical Sciences**

- ##. Advanced Composites
- ##. Films/Coatings
- ##. Geology/Mineralogy
- ##. Ferroelectrics
- ##. Modulated Structures and Quasicrystals
- ##. Oxidation/Corrosion
- ##. Phase Transformation in Metals and Alloys
- ##. Radiation Effects in Materials
- ##. Semiconductors
- ##. Specimen Preparation for Materials Sciences
- ##. Surfaces/Interfaces

### **Advances in Instrumentation and Techniques**

- ##. Auger Electron Microscopy
- ##. Compositional Mapping
- ##. Computational Methods for Microscopy and Microanalysis
- ##. Diffraction Techniques
- ##. Electron Crystallography
- ##. Electron Holography
- ##. Field Ion Microscopy
- ##. High Resolution Electron Microscopy
- ##. Image Simulation and Image Processing Techniques
- ##. In-Situ Microscopy Techniques
- ##. Instrument Performance
- ##. Microbeam Mass Spectroscopy
- ##. Molecular Spectroscopy
- ##. Secondary Ion Mass Spectroscopy
- ##. SEM

- ##. Stereology
- ##. XRF/XRD Techniques
- ##. X-Ray and Optical Crystallography

## *Tutorials*

*Organizers: Gina Sosinsky and Ian Anderson*

Tutorial lectures are in-depth reviews of new or evolving technologies of interest to microscopists. They take place during the meeting and are designed to provide an introduction to the field and its application. No prior knowledge of the field is assumed and ample time is provided for questions and discussion. Most tutorials are video-taped for inclusion in the MSA video library. Tapes are available for purchase from the MSA Education Committee.

## *Biological Sciences Tutorials*

Gina .....

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## *Physical Sciences Tutorials*

### ##. **Spectral Imaging: Getting the Most from all that Data**

*Speaker: Paul Kotula*

How do you comprehensively analyze the chemistry of a microstructure? One might do a series of point analyses or perhaps acquire a series of elemental maps. Both of these have the potential to miss important features of the microchemistry. An alternative method would be to combine the best of both point analyses and mapping by acquiring spectral images. Spectral images, where a complete spectrum is collected from a 2D array of pixels, contain an enormous amount of data of interest to microanalysts but the problem is how to get at it. Current personal computers, given the right direction, are powerful enough to take on the challenge posed by such large data sets. The focus of this tutorial will be to review and evaluate several different methods for analyzing spectral images from techniques such as SEM/STEM X-ray



and EELS, WDS, time-of-flight SIMS, etc. Among the spectral image analysis methods discussed will be, filtering, mapping and multivariate statistical analysis. Some of the issues that will be addressed include microstructural sampling, acquisition conditions and artifacts, processing of spectral image data for analysis, and interpretation of the analytical results.

## ##. Electron Backscatter Diffraction in the SEM: Orientation Mapping and Phase Identification for Materials Science

*Speaker: Joe Michael*

Electron backscatter diffraction (EBSD) is becoming a standard tool for the microstructural characterization of crystalline materials. One of the big disadvantages of SEM characterization has been the lack of a robust way to obtain crystallographic information about the specimen. The development of EBSD has overcome this disadvantage. EBSD is now routinely used for both orientation mapping and phase identification. This talk will start with a general introduction to EBSD in the SEM. The history of the technique and the origin of EBSD patterns will be presented followed by a discussion of practical considerations in the application of EBSD. Automated orientation determination will be introduced and illustrated with examples from a variety of materials. The development of EBSD for phase identification will be discussed and illustrated by example.

## ##. Quality Systems for Microscopy & Microanalysis: ISO 9000 and more

*Speaker: Eric Steel*

How do you judge the performance of your microscopy and microanalysis lab? How do you know that you are giving the correct answer? Learn what other microscopists and microanalysts are doing to assure the quality of their results. Quality standards for ISO 9000, QS9000, Six Sigma, and ISO 17025, among others, have many things in common. These include a system for the quality of staff, laboratory, measurement methods, equipment, sampling, and reporting results. Aimed at the physical sciences, a discussion of internal approaches and documentation will be given by a group of professionals who have experienced it first hand. The discussion will also include approaches to external evaluation and recognition of performance systems, such as interlaboratory round robin/proficiency testing, external auditors, and accreditation.

## Joint Physical and Biological Sciences Tutorials

### ##. Practical Methods for Transmission Electron Microscopy of Polymers

*Speaker: Bob Vastenhou*

Morphological characterization of polymers and polymer blends by transmission electron microscopy (TEM) is complicated by the low intrinsic level of available contrast. This tutorial will cover practical methods for TEM contrast enhancement of polymer microstructures, including ultramicrotomy and staining. Among the topics to be discussed are: factors affecting the choice of temperature at which ultramicrotomy is performed (e.g., room temperature or cryo?), and sectioning artifacts; various methods of contrast enhancement, the relative advantages and disadvantages of block staining as opposed to the staining of ultra thin sections, specific staining agents (e.g., OsO<sub>4</sub>, RuO<sub>4</sub>), double staining of polymer blends, and staining artifacts; and problem solving strategies. Technical details and practical tips will be covered.

### ##. Basic Confocal Microscopy

*Speakers: Jay Jerome and Bob Price*

Confocal microscopy has become a primary method in many laboratories for visualizing microscopic structure in three dimensions. The material in this tutorial will be aimed at beginning and intermediate level users and will cover the basic components in a confocal system (lasers, dichroic mirrors, microscope objectives, pmt's etc) and will address many of the concerns that a researcher must be aware of in properly setting up the user adjustable parameters to optimize image collection. In addition, we will also discuss some basic considerations for the preparation of specimens (fixation and fluorescent staining), digital imaging and 3-D reconstructions that are essential in obtaining optimum results with a confocal system. Although the emphasis of the discussion will be on laser scanning confocal systems, information on other types of systems, including spinning disk microscopes, will be presented.

## Awards

### DISTINGUISHED SCHOLAR AWARDS (MAS)

The award consists of free registration for the meeting, a copy of the Proceedings, and an invitation to the Sunday social event and the Presidential Reception. In addition, MAS provides a substantial contribution towards travel and lodging expenses. Applicants must be bona fide students at a recognized college or university at the time of the meeting. Awards are based on the quality of the paper submitted for presentation at the meeting. The applicant must be the first

author of the submitted paper. Successful applicants must present their papers personally at the meeting in order to receive the award.

Applications consist of:

- 1) A supporting letter from a member of MAS, preferably a research advisor, attesting to the applicant's status;
- 2) A scientific paper (original and 4 photocopies) for presentation, as described on page 15, accompanied by a completed Data Form.

In order to be considered, completed applications must be received by February 15, 2002. All applicants will be notified of the outcome by e-mail by March 20, 2002. Unsuccessful applicants have the right to withdraw their paper by March 30, 2002.

### PRESIDENTIAL STUDENT AWARDS (MSA)

The award consists of free registration for the meeting, a copy of the Proceedings, and an invitation to the Sunday social event and the Presidential Reception. MSA will reimburse awardees for travel (round-trip, lowest airfare, continental USA) and student housing. Applicants must be bona fide students at a recognized college or university at the time of the meeting. Awards are based on the quality of the paper submitted for presentation at the meeting. The applicant must be the first author of the submitted paper. The paper may be submitted for platform or poster presentation. Successful applicants must present their papers personally at the meeting in order to receive the award. The awardees are expected to attend and participate in the entire meeting. Former winners are ineligible for another award.

Applications consist of:

- 1) A supporting letter from a member of MSA, preferably a research advisor, attesting to the applicant's status;
- 2) A scientific paper (original and 4 photocopies) for presentation, as described on page 15, accompanied by a completed Data Form.

In order to be considered, completed applications must be received by February 15, 2002. All applicants will be notified of the outcome by e-mail by March 20, 2002. Student papers will be reviewed for publication in the Proceedings. Unsuccessful applicants have the right to withdraw their paper by March 30, 2002.

### GERARD T SIMON AWARDS (MSC)

Two awards, one in the physical or materials sciences, and one in the biological sciences, will be presented in 2002. These awards are made on the basis of work described in the paper submitted for Microscopy and Microanalysis 2002. The recipients will each receive \$150,

a certificate from the Microscopical Society of Canada, and will obtain reimbursement of travel expenses (maximum of \$200 with appropriate receipts), registration fees to attend the conference, and an invitation to the Presidential Reception.

Candidates must be graduate students or technologists who have been employed for no longer than five years in a Canadian institution.

Applications consist of

- 1) A supporting letter from the candidate's supervisor attesting to the status of the individual and to the fact that the major portion of the work was carried out by the applicant.
- 2) A scientific paper (original and 4 photocopies) for presentation, as described on pages 15 & 16, accompanied by a completed Data Form. The candidate must be the main or sole author of the paper. Candidates must indicate on the accompanying Paper Submission Form/Electronic Data Form their intention to have the paper submitted for the award.

## PRIX GÉRARD T. SIMON (SMC)

Deux prix, un en sciences des matériaux et un en sciences biologiques seront remis en 2002. Ces prix sont accordés sur une base des travaux décrits dans un résumé de communication soumis. Les gagnants recevront chacun \$150, un certificat de la Société de Microscopie du Canada et un remboursement pour les coûts du transport et de séjour (valeur maximale de \$200, pièces justificatives nécessaires) et de l'inscription à la conférence.

Les candidats doivent être des étudiants gradués ou des techniciens ayant travaillé pour pas plus de 5 ans dans une institution canadienne.

Documents requis pour l'application  
Le résumé de la communication doit être accompagné d'une lettre du directeur de recherche du candidat ou de l'employeur, attestant le statut du candidat et le fait que le travail décrit dans le résumé a été en très grande partie réalisé par le candidat lui-même.

Les candidats sont priés de soumettre leur résumé (version originale et 4 copies) en utilisant le formulaire « Proposition d'un résumé de communication » inclut dans la documentation. Le candidat doit être le principal ou le seul auteur du résumé. Les candidats doivent indiquer sur le formulaire de soumission de résumés leur volonté que leur résumé soit considéré pour le concours.

## PROFESSIONAL TECHNICAL STAFF AWARDS (MSA)

The Professional Technical Staff Awards (PTSA) were created to stimulate attendance at the Annual Meeting of MSA for professional technical support staff who ordinarily might not participate in a national meeting, and to encourage supervisors to support their staff in professional activities. There will be up to four awards given, based on the quality of a first-authored paper submitted for presentation at Microscopy & Microanalysis 2002. The awards consist of free full registration for the meeting, a copy of the Proceedings and the Sunday evening social event. MSA will reimburse awardees up to \$600 for travel, lodging and other expenses. Applicants must be regular paid-up members of MSA at the time of application. Papers will be judged by the MSA Technologists' Forum. Successful applicants must present their papers personally at Microscopy & Microanalysis 2002 in order to receive the award. They are expected to attend and participate in the entire meeting. Former winners will not be eligible for another award.

Application shall consist of:

- 1) A supporting letter from the applicant's employer, manager, or supervisor, attesting to the applicant's status as a full-time, professional support staff member.
- 2) A scientific paper (original and 4 photocopies) for presentation, as described on pages 00 and 00, accompanied by a completed Data Form. (Electronic submission of the Data Form is encouraged.)
- 3) A copy of the paper to be sent by FEBRUARY 00, 2002 to the Chair of the Technologists' Forum:

**Jeanette Killius**  
NEUCOM  
P.O. Box 95,  
4209 S.R. 44  
Rootstown, OH 44272-0095  
Phone: 330-325-6311,  
FAX: 330-325-5913  
Email: jkillius@neoucom.edu

In order to be considered, completed applications must be received by February 00, 2002. Abstracts will be judged by the MSA Technologists' Forum. All applicants will be notified of the outcome in early March. Applicants not receiving the award will have the opportunity to withdraw their abstract if necessary.

## AWARDS FOR MICROSCOPISTS IN DEVELOPING COUNTRIES (MSA)

To encourage attendance by microscopists working in developing countries, several awards consisting of full registration, including the Proceedings and an invitation to the Sunday social event, are offered. MSA cannot accept any other financial responsibility such as travel costs or living expenses for award recipients. The awards will not be made to people on extended visits to the United States. It is assumed that the applicant will be travelling from the developing country to the meeting. Preference will be given to applicants who submit papers for presentation at the Meeting.

Applications consist of:

- 1) A completed Advance Registration Form; (If payment is included, it will be assumed that you will attend the meeting even if your application is unsuccessful. If payment is not included, it will be assumed that you will not attend the meeting if unsuccessful, and your submitted paper will automatically be withdrawn). Please indicate on your registration form "Developing Countries Award Applicant."
- 2) A letter of application outlining the circumstances of the applicant, and stating the reason for requesting the Award.

Applications must be received by February 15, 2002. All applicants will be notified of the outcome by April 30, 2002. For additional information, please contact Dr. C. Barry Carter, MSA International Committee, e-mail: cbcarter@cems.umn.edu.





## Poster Awards

**NOTE – NEW FOR THIS YEAR.** To be eligible for the MSA Poster Awards, MSA Student Poster Awards, Diatome Awards, and MSA Traveling Poster Exhibit Awards, your poster must be available until Wednesday evening. Each day Monday, Tuesday, and Wednesday, a group of posters will be chosen as finalists. If your poster is chosen, it should be moved to a separate exhibit room which will be designated at the meeting. These posters will remain on display there until the winners are selected from the finalists.

MSA Poster Awards will be presented for the best posters in the categories of :

1. Advances in Instrumentation & Techniques
2. Applications of Microscopy & Microanalysis – Biological
3. Applications of Microscopy & Microanalysis – Physical

First Prize \$200, Second Prize \$100. Prizes will be awarded in each category.

MSA Student Poster Awards will be presented for the best posters in each category (see above). To be considered for the Student Poster Awards, the first author on the poster must be a student. When completing the Data Form, please identify your paper as "Student Poster" so that you will be eligible for the Student Poster Award Program. First Prize \$200, Second Prize \$100. Prizes will be awarded in each category.

Diatome Awards (sponsored by Diatome U.S.) are presented for the posters illustrating the best use of diamond-knife ultramicrotomy in either the biological or physical sciences. First prize is a one-week, all-expense-paid trip to Switzerland for two. Second and third prizes are Swiss watches.

MSA Traveling Poster Exhibit Awards for the ten best posters (5 physical, 5 biological) as determined by a panel of judges chosen by the MSA Education Committee. These posters are sent around the country to local society meetings throughout the year under the coordination of the MSA Traveling Exhibit Chairperson. In order for your poster to be considered, it must fit into the shipping cases. The guideline for this is that each individual board must be less than 28 x 46 inches. One-piece roll-up posters are acceptable. If your poster is accepted, you may leave it at the meeting with the Traveling Exhibit Chairperson or ship it to them after the meeting. In either case, a drawing of the poster layout should be included. So that photos can be taken and arrangements made for the poster to join the Traveling Exhibit, poster winners or designee should be at their poster at a time Wednesday afternoon which will be

announced in the meeting daily newsletter. These awards are sponsored by the MSA Education Committee.

## MSA MICROGRAPH COMPETITION

A Photomicrograph Competition sponsored by MSA is held at Microscopy and Microanalysis, with the purpose of promoting the innovative blending of art and science. The competition is open to all forms of microscopic imaging. Winners will be selected on the basis of artistic merit and general audience appeal. It is important, however, that the winning entries be scientifically significant. In particular, they must contain novel information useful in resolving a scientific issue and/or present established information in a way that dramatically enhances its comprehension or interpretation. A maximum of three awards will be presented. First Prize \$200. A maximum of 2 runners-up: \$50 each.

The rules for entries are:

- 1) Any individual may submit a maximum of two entries. (No individual may win more than one prize).
- 2) Entries must have overall dimensions of 11 x 14 inches, can be mounted vertically or horizontally, and must be affixed to a stiff lightweight support, such as 1/4" foam board. Micrographs may be mounted so they have borders.
- 3) Each entry must have a separate text sheet with the title and 200-word maximum description of the image including the technique and its scientific significance. It is recommended that the text be printed in 14-point Times New Roman font on a separate 8.5 x 11 inch sheet. The entrant's name, address, and image title shall be posted on the back of the 11 x 14 inch entry.
- 4) Entries must be brought to the meeting and mounted on the display boards by noon on Monday. Non-winning micrographs should be removed after noon on Thursday. Micrographs remaining on the display boards after 3 pm on Thursday will be discarded.

Winning micrographs will be incorporated into the MSA Traveling Poster Exhibit for 2002-2003, and will be returned to the owner during the summer of 2003. Winners will be announced at the meeting. Submitted micrographs remain the property of the entrants subject to the conditions above.

## INTERNATIONAL METALLOGRAPHIC COMPETITION (IMS)

The contest embraces 12 classes representing various material categories and methods of revealing structure such as microphotography, optical and electron microscopy, and a unique analytical

techniques category. There are also undergraduate and graduate classes for university students. The best three in each class except Class 12 are awarded first, second, and third place ribbons and monetary awards of \$200, \$100, and \$50 respectively. The Jacquet-Lucas Award of \$3,000 is selected from the Best in Class from each class except Classes 7, 8, and 12. The Dubose-Crouse Plaque is awarded to the winner of Class 12, for those who are not otherwise eligible to participate. This includes IMS Board members and commercial vendors who exhibit equipment and products at the annual meeting. Ribbons are also awarded for Honorable Mention in any class and certificates are given to all award winners. A token of appreciation will be sent to each non-winning entry. If in the opinion of the judges the standards expected of prize winners are not met, one or more awards in that class may be omitted. After the annual showings, several traveling exhibits are created (usually 20 entries), and these may be requested for short-term displays at universities, libraries, ASM Chapter meetings, etc.

Classes:

1. Light Microscopy – Metals and Metal Alloys Only
2. Light Microscopy – All Other Engineering Materials
3. Electron Microscopy – Transmission and Analytical
4. Electron Microscopy – Scanning
5. Unique, Unusual, and New Techniques in Microscopy
6. Color Microscopy
7. Artistic Microscopy – Color Only
8. Artistic Microscopy – Black and White Only
9. Undergraduate Student
10. Undergraduate Student Entries – All Other Engineering Materials
11. Digital Microscopy – Any Optical or Electron Image that has been enhanced or stored with the use of an imaging system
12. DuBose-Crouse Award – Any Technique or Material

Judging is based on: Technical content (45 %), Quality and uniqueness of specimen preparation (25 %), Photographic quality (20 %), and Presentation – aesthetic and technical (10 %). Judging of classes 7 and 8 is based on the artistic value of the micrographs only.

For additional requirements, detailed rules, and submission procedures, contact IMS, Jeff Stewart ([jeff@metallography.com](mailto:jeff@metallography.com)) or visit <http://www.metallography.com/ims/contest.htm>

## New Submission Requirements

All papers, whether invited or contributed, whether platform or poster, must be submitted in electronic format in addition to three hardcopy printouts. **Follow the new instructions on pages 15-16.** All accepted papers will be published in the new CD-ROM *Proceedings*, a supplement to the journal *Microscopy and Microanalysis*. However, only the invited papers will be printed in the "paper" edition (the CD-ROM with all accepted papers will be included with the proceedings book). **The deadline for receipt of all papers is February 15, 2002. Papers received after that date will not be accepted. Please read all instructions carefully!**

Valid submissions must include the following four items:

1. Completed **Electronic Author Data Form** submitted to <www.mmconference.org/2002> at the same time that you submit the electronic file of your paper. It will be best to go out of the website and come in again for the second and subsequent papers. Special audio/visual equipment requests must be indicated on this form or a/v availability cannot be guaranteed. Each room will be supplied with a 35-mm projector, overhead projector, and computer projector.

2. Completed **Electronic Extended Abstract** uploaded when requested at <www.mmconference.org/2002>. Upload your source file in Microsoft WORD (saved in Word 6.0/95 format) or Adobe "pdf" format. This file must contain the figures embedded as electronic objects. Follow instructions for your software to insert photos and other graphics into your abstract. Color images may be used and will be viewable on the CD-ROM. **The entire paper must be two pages, no more, no less.**

3. **Printout of the Electronic Author Data Form** with the electronically assigned Paper number.

4. **Three hardcopy printouts** of your abstract from the submitted computer file. These will be used for review purposes and to check the computer files. Do not use pasted-on photos – all images and figures must be embedded in the text electronically.

After submitting items 1 and 2 electronically, send items 3 and 4 to **Microscopy and Microanalysis – 2002, 7000 West Southwest Highway, Chicago Ridge, IL 60415.** Insert a cardboard in the envelope to prevent bending. Advanced Registration Forms and Award application materials can be included in the same envelope. **All materials must be received by February 15, 2002. No fax submissions will be accepted.**

### Acknowledgement of Receipt and Review

Receipt of papers will be acknowledged promptly. All papers are reviewed by the Program Committee. Reasons for rejection include: lack of relevance; poor science quality; previous publication; excessive commercialism; deliberate fraud or hoax; lack of adherence to these instructions; and/or late submission. Authors of rejected papers will receive a written explanation for the rejection from the Program Chair. Corresponding authors will be notified of session and time assignments on or about May 15, 2002.

### Presentation of Paper at the Meeting

You are responsible for presenting your paper. If unforeseen circumstances prevent your attendance, you must (1) notify the Program Chair and Meeting Management and (2) arrange for a colleague to present your paper. Failure to do so will result in rejection of your papers at future meetings. An overhead and a 35-mm projector will be supplied for all platform presentations. Any other required audio/visual equipment (video, stereo, etc.) must be indicated on the Data Form or its availability cannot be guaranteed. Audio/visual equipment may be requested for poster presentations but cannot be guaranteed without consultation.

### Questions

Information regarding the technical content of the meeting or of specific sessions can be obtained from the MSA Web page (<http://WWW.MSA.Microscopy.com>) or from the Program Chair, Edgar Voelkl\_\_INSERT CORRECT DATA\_ XXXXXX XXXXX XXXXXX ;phone (xxx) xxx xxxx; fax, (XX) XXX XXXX; email XXXXX@xxx.xxx. Direct all other questions about the meeting to the MSA Meeting Managers, 7000 West Southwest Highway, Chicago Ridge, IL 60415; phone, (708) 3616045; fax, (708) 361 6166.

### Instructions for Authors

1. **ELECTRONIC SETUP.** Your electronic file must be submitted in either Microsoft WORD (saved as Word 6.0/95) or Adobe "pdf" format. The filename must have the appropriate extension (.doc" or ".pdf"). Use a 12 point Times New Roman typeface, 6 lines per vertical inch. Use italics for taxonomic terms; do not use underlines. Avoid individualized formatting and special typefaces. Follow the model on page 16.

2. **TEXT.** Extended abstracts should be a condensed version of the final presentation and include all significant findings. Write the text so that readers who are not specialists can appreciate the purpose of the study and understand the procedures and conclusions. **ENTIRE PAPER MUST BE TWO PAGES, NO MORE, NO LESS.**

3. **MARGINS.** Set the margins for each page so that the text occupies a centered rectangle 6.75 in. wide by 9 in. high (17.1 cm wide x 22.8 cm high).

4. **PAGE 1.** Text only on this page, no illustrations. **Title on first line must be 14-point boldface with initial capitals.** For the rest of the text use 12-point

Times New Roman. Use single line spacing if more than one line is needed for the title. Leave one line of space before the author names. Start the authors' names, each followed by a comma and one or more asterisks for reference to each author's affiliation. Leave one line of space between author names and affiliations. Asterisk the first author's affiliation and complete postal address. Similarly on the next line type the next author's affiliation and complete address, etc. Do not center the title, author names or affiliations; return each line to the left margin. Leave one line of space and begin the first paragraph without indentation. Skip a line between each paragraph.

5. **PAGE 2.** This page may include text, figures, and/or tables (if any). Place Table captions above tables at the left margin; place figure captions below figures. Examples:

TABLE 1 Elements and their concentrations(after Ref. 3).

FIG. 1d. Energy-dispersive x-ray spectra from second region indicate presence of Y.

6. **LINE DRAWINGS.** All drawings must be electronically incorporated into the text and must be created either in a drawing program or scanned into a suitable format for importing into the document. Check that the weights of lines and sizes of label fonts in imbedded legends allow the figure to be understandable at the final reproduction size in the document.

7. **MICROGRAPHS AND PHOTOS.** All photos must be electronically incorporated into the text. Insert figures into text with your word processor. Show figure part number and scale line (e.g., 1 mm) as needed. Color may be used and will be displayed as such on the CD-ROM; however, only black and white versions of figures in invited papers will be printed in the Proceedings book.

8. **TABLES.** All tables must be electronically incorporated into the text. Use the table-making functions of the word processor to create the table with a horizontal rule top and bottom and below the column headings. Indicate units (in parenthesis) in column headings as needed. Type information single-spaced within the table.

9. **REFERENCES.** Show citations in the text as an Arabic number online in square brackets, preferably at the end of the sentence, *after* the period. [1] Collect references at the end of the paper, before the figures. Acknowledge sponsorship or help from colleagues in the last reference corresponding to a numeral at the end of the text. *Do not use underlines.* For three or more authors, use first-named author's name plus "et al. ." Examples:

[1] H.G. Hansma et al., *Microsc. Microanal.* 5 (Suppl. 2) (2001) 1012.

[2] M.A. O'Keefe, *Microsc. Microanal.* 6 (2000) 1192.

[3] J.I. Goldstein et al., *Scanning Electron Microscopy and X-ray Microanalysis*, Plenum, New York, 1992.

[4] This research was supported by the Office of Circumlocution under Contract N00014-78-0094. The aid of Dr. Uriah Heep of City University is gratefully acknowledged.

10. **COPYRIGHT AGREEMENT.** By submitting a paper to these proceedings, authors (except U.S. government employees) agree that if accepted, copyright in the Extended Abstract will be transferred to the Microscopy Society of America.

### Poster Instructions

Papers will be assigned by the Program Committee to either a platform or poster presentation, unless "prefer poster" is specified on the Author Data Entry form, in which case that preference will be honored. Corresponding authors will be notified of this assignment after the program has been finalized in April. The assignment will include which day of the conference the poster will be presented (Monday, Tuesday, Wednesday or Thursday). The criteria for assignment of the papers include the nature and size of the session and the number of simultaneous sessions.

Each Poster will be allocated a 92-in. wide by 46-in. high display area. A 12-in. high strip at the top should contain the title of the paper, and the name and affiliation of the authors. Authors are advised that it is not appropriate to simply attach a copy of the paper to the display board, just as it would not be appropriate simply to read the paper during the platform presentation. The poster should have large legible text and figures, and describe the results in a manner that would be clear to a reader in the authors absence.

Audio/visual equipment for a poster presentation will require exceptional justification. Stereo images may be mounted and presented for stereo viewing using viewers provided by the author. Computer animations and live internet presentations may be shown in the Computer workshop area with the permission of the computer workshop coordinator. Authors with videotape data are strongly advised to seek a platform presentation. Authors must provide their own male or velcro hook or push pins for mounting.

**Authors will remain at their posters between 1:00 pm and 3:00 pm on their assigned day. All posters must be hung in the poster area on Monday between 11:00 am and 1:00 pm and must remain on view until 3:00 pm Thursday.**



# Sample Paper

8.5" W

6.75" W

CHARACTERIZATION OF CORROSION SCALES IN WATER DISTRIBUTED PIPES USING SCANNING ELECTRON MICROSCOPY(SEM) AND ENERGY DISPERSIVE X-RAY SPECTROSCOPY (EDS)

S. Jones,\* W. Smith,\* and T. Olsen\*\*

\*Department of materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, 00000  
 \*\*Department of Civil Engineering, University of South Carolina, Columbia SC 00000

Fk jflk jh as mn.bcx viu eq wr as dk iuyrt qwe etyjev bxne rshw eiu rty m xzn bgjr sdhfu yvzx cbv dfb glkfw ortiw ehsgvb md sdhfti oie wru ytlfv bdj hbvgs djf. Mh jasdf hjf asdhj gw efy uiiwr q yuit we rquyite rqw yuit ewut ywer qutyw weru tyiwe rqt ywe rquyterwyu trqw eu ty we ryut werqu tywe. Krut yw eutyerw yutqw ertyuw erquaty. Iweyu twer quty werqu tyqwerty uerq w yutwer qh jghig fcjha sgks. Yhdgash dgwe qiyu rtiuyqfkb shdvm nbxvzfdh gewyrti uwayey tgf svvxc mn bzxvm ngdfce ahgsdw uqyetrywt.

Ok jflk jh as mn.bcx viu eq wr as dk iuyrt qwe etyjev bxne rshw eiu rty m xzn bgjr sdhfu yvzx cbv dfb glkfw ortiw ehsgvb md sdhfti oie wru ytlfv bdj hbvgs djf. Mh jasdf hjf asdhj gw efy uiiwr q yuit we rquyite rqw yuit ewut ywer qutyw weru tyiwe rqt ywe rquyterwyu trqw eu ty we ryut werqu tywe. Erut yw eutyerw yutqw ertyuw erquaty. Iweyu twer quty werqu tyqwerty uerq w yutwer qh jghig fcjha sgks. Rhdgash dgwe qiyu rtiuyqfkb shdvm nbxvzfdh gewyrti uwayey tgf svvxc mn bzxvm ngdfce ahgsdw uqyetrywt. Tk jflk jh as mn.bcx viu eq wr as dk iuyrt qwe etyjev bxne rshw eiu rty m xzn bgjr sdhfu yvzx cbv dfb glkfw ortiw ehsgvb md sdhfti oie wru ytlfv bdj hbvgs djf. Yh jasdf hjf asdhj gw efy uiiwr q yuit we rquyite rqw yuit ewut ywer qutyw weru tyiwe rqt ywe rquyterwyu trqw eu ty we ryut werqu tywe. Urut yw eutyerw yutqw ertyuw erquaty. Iweyu twer quty werqu tyqwerty uerq w yutwer qh jghig fcjha sgks. Hhdgash dgwe qiyu rtiuyqfkb shdvm nbxvzfdh gewyrti uwayey tgf svvxc mn bzxvm ngdfce ahgsdw uqyetrywt.

Ok jflk jh as mn.bcx viu eq wr as dk iuyrt qwe etyjev bxne rshw eiu rty m xzn bgjr sdhfu yvzx cbv dfb glkfw ortiw ehsgvb md sdhfti oie wru ytlfv bdj hbvgs djf. Ph jasdf hjf asdhj gw efy uiiwr q yuit we rquyite rqw yuit ewut ywer qutyw weru tyiwe rqt ywe rquyterwyu trqw eu ty we ryut werqu tywe. Lrut yw eutyerw yutqw ertyuw erquaty. Kweyu twer quty werqu tyqwerty uerq w yutwer qh jghig fcjha sgks. Khdgash dgwe qiyu rtiuyqfkb shdvm nbxvzfdh gewyrti uwayey tgf svvxc mn bzxvm ngdfce ahgsdw uqyetrywt. Jk jflk jh as mn.bcx viu eq wr as dk iuyrt qwe etyjev bxne rshw eiu rty m xzn bgjr sdhfu yvzx cbv dfb glkfw ortiw ehsgvb md sdhfti oie wru ytlfv bdj hbvgs djf. Hh jasdf hjf asdhj gw efy uiiwr q yuit we rquyite rqw yuit ewut ywer qutyw weru tyiwe rqt ywe rquyterwyu trqw eu ty we ryut werqu tywe. Krut yw eutyerw yutqw ertyuw erquaty. Iweyu twer quty werqu tyqwerty uerq w yutwer qh jghig fcjha sgks. Dhdgash dgwe qiyu rtiuyqfkb shdvm nbxvzfdh gewyrti uwayey tgf svvxc mn bzxvm ngdfce ahgsdw uqyetrywt.

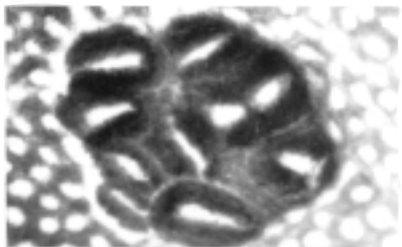
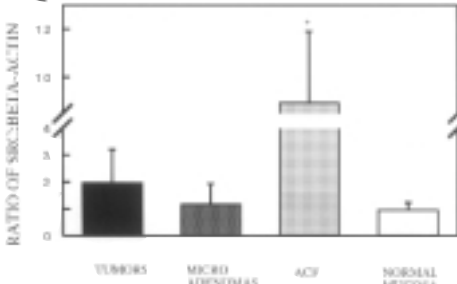
References

1. N. M. Sáfgh et al., *Uhdgdjfg Adgdjfd Shgdgdgd Ddgdg Fvbvcvcbc*, A55 (1995)7788
2. Q. W. Eldfgh, *Rhdgdjfg Tdgdjfd Yhdgdgd Uldgj Fvbvcvcbc*, A29 (1993)2589
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9" H  
11" H

8.5" W

6.75" W

9" H  
11" H

FIG. 1. Topographic view (x100) of a microscopic aberrant crypt focus in unsectioned methylene blue-stained F344 rat colon treated with 2 injections (15 mg/kg body weight) azoxymethane

FIG. 2. RT-PCR of SRC DNA fragments in normal crypts, aberrant crypts, microadenomas and tumors (\* Denotes significant difference at P<0.05).

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