Volume 4, Supplement I EXPO: Microscopy & Microanalysis '98 Atlanta, Georgia, July 12-16, 1998

THE OFFICIAL JOURNAL OF

ND

Microscopy Society of America Microbeam Analysis Society Microscopical Society of Canada Mexican Microscopy Society Brazilian Society for Microscopy and Microanalysis



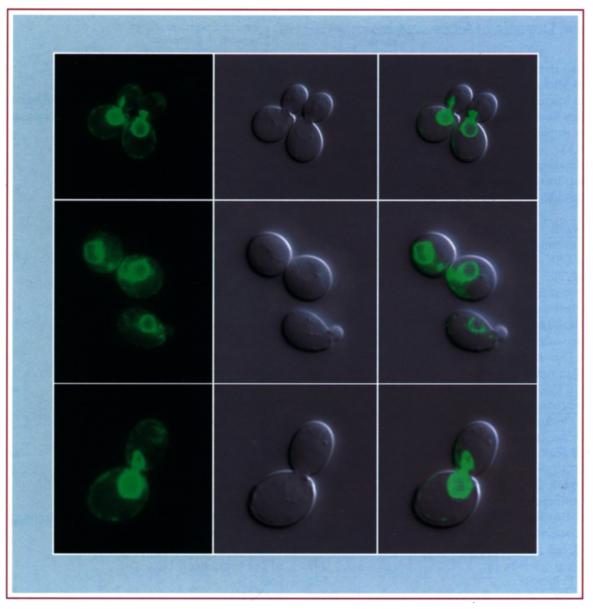
Springer

Now available online

Is this what you're looking for in your SEM?

Find it with a Backscattered Electron Detector

GW Electronics, Inc. Norcross, GA Phone (770) 449-0707 Fax (770) 449-0284 Toll Free (800) 325-5556 www.gwelectronics.com



BUDDING YEAST CELLS EXPRESSING A FUSION OF GFP (S65T, V163A) TO THE ENDOPLASMIC RETICULUM MEMBRANE PROTEIN SEC63P. CHROMA FILTER SET 41012 PHOTO: JASON A. KAHANA AND PAMELA A. SILVER

CHROMA TECHNOLOGY CORP

We invite you to stop by booth 32 h and talk with us about your filter applications and pick up a copy of our poster.

AN EMPLOYEE-OWNED COMPANY PRODUCING THE WORLD'S FINEST OPTICAL FILTERS AND FLUORESCENCE FILTER SETS

72 COTTON MILL HILL, UNIT A-9, BRATTLEBORO, VT 05301 USA 800.824.7662 (800.8 CHROMA) 802.257.1800 Fax 802.257.9400 E-mail: sales@chroma.com

CHROMA FILTER SETS ARE ALSO AVAILABLE FROM MICROSCOPE DISTRIBUTORS WORLDWIDE

OMEGA OPTICAL incorporated

OPTICAL FILTERS FOR FLUORESCENCE MICROSCOPY Filter excellence coupled with application know-how, make Omega Optical the best choice for your most demanding applications:

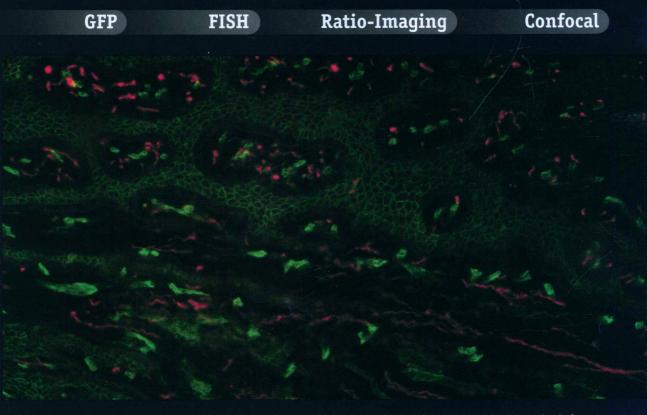


Photo Caption: Sensory and autonomic nerve innervation in normal human gingival tissue. This section stained with biotinylated L-fucose binding lectin Ulex europaeus bound to FITC-Avidin, and a rabbit polyclonal antibody to PGP9.5 visualized with a Texas Red-goat antirabbit secondary antibody. Photographed using an Omega XF53 FITC/Texas Red dual bandpass filter set. Photo contributed by: Jeffrey C. Petruska with assistance from Sapna Chandra, Dr. Kathy Karpinia, Dr. Paul Heins, and Dr. Richard Johnson.

OMEGA OPTICAL OFFERS:

An extensive stock selection of single and multi-dye filter sets VIVID[™] sets for low-level fluorescence applications Custom-engineered filters made to specification

Voice: 802/254-2690

Fax: 802/254-3937

E-mail: inquiries@omegafilters.com

OMEGA OPTICAL

Providing the highest quality optical filters to fluorescence microscopists.

www.omegafilters.com

For more information, and to discuss your applications, please visit out booth: #407. Also, attend our tutorial on filter selection at the EXPO.

ORCA, a big splash in imaging.

The ORCA-100 Digital Camera has it all. It offers high-speed scanning, high dynamic range, high signal to noise, and high resolution, all at one time...all in one camera.

As if that weren't enough, you can count on features like software and frame grabber compatibility, no mechanical shutter, a progressive scan interline CCD, and application flexibility including GFP. Add it all up and you'll see... it's a whale of a deal. Like everything in nature, species evolve. So naturally, ORCA is now available in both 10and 12- bit versions, offering additional flexibility to meet all your application needs.

PIK1 cell pseudo-colored and combined in Photoshop. Photo courtesy of the Salmon Lab, Dept. of Biology, University of North Carolina at Chapel Hill.

C4742-95

Hamamatsu's new ORCA Digital Camera. It delivers all the features you're looking for... without swallowing up your budget. For further details, call (908) 231-1116.



360 Foothill Road, P.O. Box 6910, Bridgewater, NJ 08807, Phone (908) 231-1116. FAX (908) 231-0852. E-mail: usa@hamamatsu.com Japan: (81) 53 431 0124 Germany: (49) 8152 375 0 UK: (44) 181 367 3560 France: (33) 1 69 53 71 00 Italy: (39) 2 935 81733 Spain: (34) 3 582 4430 Sweden: (46) 8 703 29 50 All trademarks are the property of their respective holders.

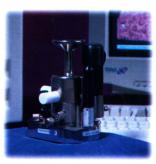
TopoMetrix AFMs Get Rid of the Limits To Nano-World Research.



esterday, there were finite limits to angstromand nanometer-level research. But today, those limits are gone.

Whether you're examining the structure of complex composites or the interaction of biomolecules in solution, TopoMetrix' complete line of scanning probe microscopes (SPM) knows no boundaries. Think about topography, thermal conductivity, chemistry, electro-chemistry,

and magnetic fields. Or near-field optical and optical contrast mechanisms, like polarization, fluoroscopy and spectroscopy. These are just some of the impressive capabilities of TopoMetrix SPMs. And they certainly help get rid of limits, don't you think?



But can a TopoMetrix SPM really help you in your research? There's a good chance one can, if you're involved in biotechnology, materials research, microelec-

tronics, chemistry, mass data storage, or any of the basic or applied research disciplines where observing microstructures is the key to understanding.

Unlimited is a good description of TopoMetrix SPMs. But infinite might be even better. For example, TopoMetrix' unique open architecture applies to both hardware and software. This industry-exclusive capability provides scientific investigators just like you with infinite possibilities to configure their systems and their experiments any way they desire.

2.8µm scan of NIST Standard SRM-209A with 200nm pitch.

Hundreds of organizations throughout the world use TopoMetrix SPMs, every day. Top industrial companies. Leading universities. Major government laboratories. And respected independent researchers. Organizations and scientists worldwide who have learned to work without limits.



Sound promising? Just call, e-mail, fax or write today. We'll show you why so many scientists in so many industries engaged in so many different branches of science select TopoMetrix SPMs. You'll see that their reasons are...well, unlimited.

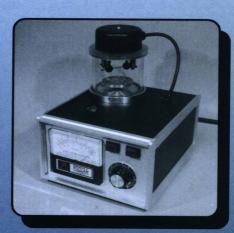


5403 Betsy Ross Drive Santa Clara, CA 95054-1162 Tel: 408.982.9700 Fax: 408.982.9751 E-mail: inquiry@topometrix.com Web: www.topometrix.com

Cambridge University Press

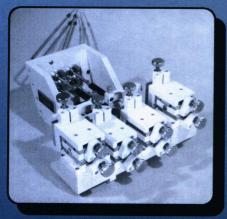


EffaCoater





CCD Imaging System



Micromanipulators

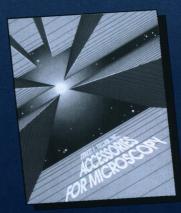
Carbon Coater



• Tensile Substages

From EffaCoaters to epoxies and Tensile Substages to tweezers, we have what you need to make your job easier. To see our complete line of microscopy accessories and laboratory supplies, send for our full catalog. Custom accessories also available. Visa and MasterCard accepted.

For a complete product listing, please visit our web site at: http://www.fullam.com/



Accessories & Lab Supplies



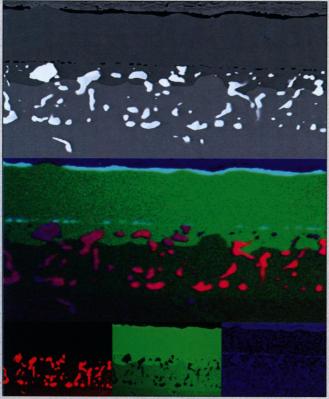
ERNEST F. FULLAM, INC.

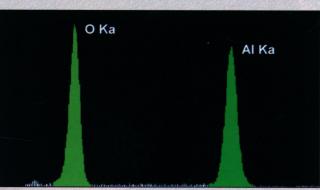
900 Albany Shaker Road, Latham, NY 12110 (800) 833-4024 FAX: (518) 785-8647 E-mail: sales@fullam.com

Serving science since 1953

ANS Redefines Value COMPLETE MICROANALYSIS SYSTEMS

The value leader in Microanalysis Upgrades announces complete systems from under \$40,000





Ultimate light element performance with 20,000:1 peak to background.

Value Configuration Detector – Light element detector with 139 eV resolution

- System 4004 spectrometer Pulse processor, bias, 4000 channel MCA
- Quantum eXcalibur Windows based quantitative analysis software
- digiPict Imaging Active scan control, video, WDS or EDS X-ray maps
- Dell Pentium 233 MMX computer system with HP color printer
- Under \$40,000

Performance Configuration

- Detector Ultra-thin window detector with 130 eV resolution
- System 8004 spectrometer Pulse processor, bias, 4000 channel MCA
- Quantum eXcalibur Windows based quantitative analysis software
- Imagemaster High Resolution 64K x 64K, video rate, multiple simultaneous image acquisition, WDS, EDS X-ray maps
- Optional Tagged Image Capability
- Dell Pentium II 300 MHz computer system with high resolution printer
- Under \$55,000



1010 Commerce Park Dr. • Suite G Oak Ridge, TN 37830 (800) 980-9284 • FAX (423) 482-6253 Email: sales@ansxray.com

Visit our web site: www.ansxray.com for complete details and free demo software https://doi.org/10.1017/51431927 Visit ushat: Microscopy & Microanalysis '98, Booth #205



You Need It Right & You Need It Now. . .

That's why you need Polysciences—your dependable source for quality chemical materials. For over 35 years our customers have been relying on us for—

- consistent product quality
- product innovation and competency

Royal Microscopical Society MICROSCOPY HANDBOOKS 17

Colloidal Gold: A New Perspective for Cytochemical Marking

technical support and guidance that helps avoid costly mistakes immediate delivery from our vast inventory of several thousand products

custom synthesis.

With today's tight funding, Polysciences can make the difference you need. Call us today TOLL FREE at

1-800-523-2575

Techniques in

Immunocytochemistry

Now ordering is even easier with our on-line catalog. Visit our website at **www.polysciences.com**

edited by **GRBullne** and P.Petrusz AP) Academic Press Polysciences, Inc. 1-800-523-2575 📕 Fax: 1-800-343-3291 📕 e-mail: polysci@tigger.jvnc.net In Europe: (49) 6221-765767 📕 Fax: (49) 6221-764620

Superior Materials for Science & Research . . . Since 1961. Visit us at Booth #428

Microscopy and Microanalysis

THE OFFICIAL JOURNAL OF	MICROSCOPY SOCIETY OF AMERICA MICROBEAM ANALYSIS SOCIETY MICROSCOPICAL SOCIETY OF CANADA / SOCIÉTÉ DE MICROSCOPIE DU CANADA MEXICAN MICROSCOPY SOCIETY BRAZILIAN SOCIETY FOR MICROSCOPY AND MICROANALYSIS					
			PUBLISHED IN AFFILIATION WITH	ROYAL MICROSCOPICAL SOCIETY GERMAN SOCIETY FOR ELECTRON MICROSCOPY		
				MICROSCOPY SOCIETY OF SOUTHERN AFRICA		
				Editor in Chief	Editor, Computers and Image	Editor, Microanalysis
			Editor, Electron and	Analysis	Charles E. Lyman	
Scanning Probe	Michael A. O'Keefe	Materials Science and Engineering				
Microscopies	Lawrence Berkeley Laboratory	Lehigh University				
Dale E. Johnson	Building 72	5 East Packer Avenue				
Graduate School	Berkeley, California 94720	Bethlehem, Pennsylvania				
University of South Florida		18015-3195				
4202 E. Fowler Avenue, FAO 126		Editor, Optical and Confocal				
Tampa, Florida 33620-7900		Microscopy				
		P.C. Cheng				
Editor, Biological Applications	Editor, Materials Applications	Advanced Microscopy and Imaging Laboratory				
A. Kent Christensen	Ray W. Carpenter	Department of Electrical and				
Anatomy and Cell Biology	Center for Solid State Science,	Computer Engineering				

Anatomy and Cell Biology University of Michigan Medical School Ann Arbor, Michigan 48109-0616

Expo Editor

William T. Gunning Pathology Department Medical College of Ohio Toledo, Ohio Ray W. Carpenter Center for Solid State Science, PSB-234 Arizona State University Tempe, Arizona 85287-1704

News and Commentary Editor Barbara Reine Botany Department University of Washington Seattle, Washington **Proceedings Editor** G. W. Bailey Baton Rouge, Louisiana

Buffalo, New York 14260

Buffalo

State University of New York at

Editorial Board

James Bentley Metals and Ceramics Division Oak Ridge National Laboratory Oak Ridge, Tennessee

Carlos Bustamente Institute of Molecular Biology University of Oregon Eugene, Oregon

Patricia G. Calarco Department of Anatomy University of California San Francisco, California

Jean-Pierre Chevalier CECM-CNRS Vitry, France

Wah Chiu Department of Biochemistry Baylor College of Medicine Houston, Texas

John Cowley Department of Physics and Astronomy Arizona State University Tempe, Arizona

Alwyn Eades Department of Materials Science and Engineering Lehigh University 'Bethlehem, Pennsylvania

Ray Egerton Physics Department University of Alberta Edmonton, Alberta, Canada

Mark H. Ellisman Department of Neuroscience School of Medicine University of California San Diego, California

O. Hayes Griffith Institute of Molecular Biology University of Oregon Eugene, Oregon

Linn W. Hobbs Massachusetts Institute of Technology Cambridge, Massachusetts Colin Humphreys University of Cambridge Cambridge, United Kingdom

Sumio Iijima NEC Corporation Fundamental Research Labs Tsukuba, Ibaraki, Japan

Michael Isaacson Applied and Engineering Physics Cornell University Ithaca, New York

David Joy EM Facility, Department of Zoology University of Tennessee Knoxville, Tennessee

Morris Karnovsky Department of Pathology Harvard Medical School Boston, Massachusetts

Janos Kirz SUNY Stony Brook Stony Brook, New York

Paul Lauterbur College of Medicine University of Illinois at Ùrbana-Champaign Urbana, Illinois

Lee Makowski Institute of Molecular Biophysics Florida State University Tallahassee, Florida

J. Richard McIntosh Department of MCD Biology University of Colorado Boulder, Colorado

Ronald A. Milligan Department of Cell Biology Scripps Research Institute La Jolla, California

F.P. Otensmeyer Ontario Cancer Institute Toronto, Canada

Giulio Pozzi Department of Physics University of Bologna Bologna, Italy Michael P. Sheetz Department of Cell Biology Duke University Medical Center Durham, North Carolina

John Silcox Applied and Engineering Physics Cornell University Ithaca, New York

Guillermo Solórzano Department of Materials Science and Metallurgy Catholic University of Rio de Janeiro Rio de Janeiro, Brazil

Andrew P. Somlyo Department of Physiology School of Medicine University of Virginia Charlottesville, Virginia

Gareth Thomas Department of Material Science and Engineering University of California Berkeley, California

James N. Turner New York State Department of Health Albany, New York

Dirk van Dyck University of Antwerp Antwerp, Belgium

Watt Webb School of Applied Physics Cornell University Ithaca, New York

David B. Wittry Department of Material Science University of Southern California Los Angeles, California

Nestor J. Zaluzec Materials Science Division Argonne National Laboratory Argonne, Illinois

Founding Editor

Jean-Paul Revel Division of Biology California Institute of Technology Pasadena, California

QUEST.

A journey to find the answers.

For today's research your quest requires imaging power that extends the temporal and spatial resolution limits of microscopy. Olympus specializes in providing precision systems that excel in the world of advanced microscopy.

Systems like the universally acclaimed **BX50WI** microscope which provides exceptional stability and unsurpassed specimen access for whole brain slice imaging and electrophysiology.

Or the **Fluoview** Confocal Laser Scanning microscope, which combines the highest optical resolution with intuitive operation and modular design, for truly neuroscience-dedicated system configurations.

The **MERLIN** Digital Imaging System provides ultra-high resolution single or multiple wavelength ratio imaging; and with the new Olympus digital CCD cameras, delivers up to 1536x1024 pixel resolution.

The new two-in-one **PhoCal**/ **PhoClamp** system enables highspeed ratiometric recording of multiple wavelength fluorescence and luminescence probes at up to 2,000 samples/sec., together with electrophysiology at even faster speeds up to 40,000 samples/sec., all combined with powerful data analysis and archiving.

Quest.

It's what you do. And Olympus helps you do it best.

To learn more about these and other Olympus products call **1-800-455-8236.**

Photo by: Dr. Shelley Halpain and Ms. Ariene Hipolito, Dept. Cell Biology, he Scripps Research Institute.



Fluoview



PhoClamp



OLYMPUS[®]

OLYMPUS AMERICA INC., TWO CORPORATE CENTER DRIVE, MELVILLE, NY 11747-3157. 1-800-455-8236 FAX: 516-844-5112 internet: http://www.olympus.com

AFM – BECAUSE THINGS ARE DIFFERENT WHEN THEY'RE WET

Observation of the solid-liquid interface at high spatial resolution has represented one of the greatest barriers to improving microscopic techniques for biological materials – *until now.* Now, Atomic Force Microscopy (AFM) lets you image *in the native liquid environment* with 100 to 1000 times the resolution of optical microscopy and comparable or better resolution than electron microscopy (EM). AFM also lets you image dynamic processes in progress, while eliminating the tedious, time consuming, and often *damaging* sample prep for EM and other techniques.

Quantitative 3D Microscopy in Biologically Relevant Fluids

With our AFMs, you get the best 3D resolution available – up to 6Å lateral and <1Å vertical. You can image your specimens directly in air or biological fluids – no vacuum, dehydration, staining, or metal coating. And you can combine AFM measurements with optical measurements, including brightfield, fluorescence, Raman spectroscopy, DIC, phase contrast, confocal imaging and more.

Our rigid design and patented TappingMode[™] technology ensure that you get superior images for your delicate specimens without sample damage. And our proprietary Phase Imaging and Force Volume

imaging techniques let you explore the mechanical, physical, and chemical properties of your samples – like elasticity, adhesion, and electrostatic forces. You can even directly measure intermolecular binding forces.

From protein/DNA interactions to cellular morphometry to biomaterials surfaces, our MultiMode[™], Dimension[™], and BioScope[™] AFMs can help you see the difference with the best application support anywhere – from the world leader in AFM.

Digital Instruments

Santa Barbara, CA, 800-873-9750, 805-967-1400, www.di.com

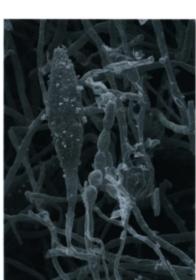
Background: Anti-parallel arrangement of head/tail connectors from Φ29 bacteriophage. Left-handed vorticity and twelve-fold symmetry of substructure are resolved. 208x95nm scan courtesy D. Mueller and A. Engel. DNA condensate structure for gene delivery, 167nm

Inset images courtesy (clockwise from left) Z. Shao, J. Geibel, and D. Dunlap and A. Maggi.

8Å heptameric crowns (purple) ot GroES prolein structure, 18nm

Microscopy Microanalysis

Volume 4, Supplement I	EXHIBITOR DIRECTORY AND EXHIBIT	2
EXPO: Microscopy and	HALL MAP	2
Microanalysis 1998	EXPO FACTS	17
Atlanta, Georgia	MSA and MAS Sustaining Members	25
July 12-16, 1998	Program Committee	27
	Society Officers	27
	Local Arrangements Committee	29
C BERL	MEETING ROOMS AND REGISTRATION AREA MAP	41
1 ASSA	Meeting Week at a Glance Calendar	42
	Blank Calendar	43
And The	Advances in Instrumentation and	
MON PRO	TECHNIQUES SYMPOSIA	45
	SCIENTIFIC PROGRAM	51
	MICROSCOPY & MICROANALYSIS VENDOR	
	DIRECTORY-JULY 1998	94
r: <i>Microsporum canis</i> (dermato-). ×4075. Digital image created	Company Listing	94
etector color-synthesizing scan- microscope (U.S. Patent No.	Listing by Product	112
The photograph was kindly pro- id Scharf of Scharf Microscopy, CA. Copyright © by David	Author Index	126
All rights reserved.)	Index to Advertisers	144



On the Cover: Microsporum canis (dermatophyte fungus). ×4075. Digital image created with multi-detector color-synthesizing scanning electron microscope (U.S. Patent No. 5,212,383). (The photograph was kindly provided by David Scharf of Scharf Microscopy, Los Angeles, CA. Copyright © by David Scharf, 1994. All rights reserved.)