

table of contents preview

Special Section: Aberration-Corrected Electron Microscopy

Introduction: Opportunities, Artifacts and Interpretation of Aberration-Corrected Electron Microscopy Data

Philip E. Batson and David J. Smith

The First Years of the Aberration-Corrected Electron Microscopy Century

Philip E. Batson

Novel MEMS-Based Gas-Cell/Heating Specimen Holder Provides Advanced Imaging Capabilities for *In Situ* Reaction Studies

Lawrence F. Allard, Steven H. Overbury, Wilbur C. Bigelow, Michael B. Katz, David P. Nackashi, and John Damiano

Data Processing for Atomic Resolution Electron Energy Loss Spectroscopy

Paul Cueva, Robert Hovden, Julia A. Mundy, Huolin L. Xin, and David A. Muller

Operation of TEAM 1 in a User Environment at NCEM

Peter Ercius, Markus Boese, Thomas Duden, and Ulrich Dahmen

Environmental Transmission Electron Microscopy in an Aberration-Corrected Environment

Thomas W. Hansen and Jakob B. Wagner

Challenges to Quantitative Multivariate Statistical Analysis of Atomic-Resolution X-Ray Spectral Images

Paul G. Kotula, Dmitri O. Klenov, and H. Sebastian von Harrach

Tuning Fifth-Order Aberrations in a Quadrupole-Octupole Corrector

A.R. Lupini and S.J. Pennycook

Ad-Hoc Autotuning of Aberrations Using High-Resolution STEM Images by Autocorrelation Function

Hidetaka Sawada, Masashi Watanabe, and Izuru Chyo

On-Column 2p Bound State with Topological Charge ± 1 Excited by an Atomic-Size Vortex Beam in an Aberration-Corrected STEM

Huolin L. Xin and Haimei Zheng

Determining On-Axis Crystal Thickness with Quantitative Position-Averaged Incoherent Bright-Field Signal in an Aberration-Corrected STEM

Huolin L. Xin, Ye Zhu, and David A. Muller

Special Section: Seventh Omaha Imaging Symposium

Introduction: Modern Imaging in Biology and Medicine

Richard Hallworth and Michael G. Nichols

Two-Photon Imaging of Microbial Immunity in Living Tissues

Jasmin Herz, Bernd H. Zinselmeyer, and Dorian B. McGavern

Neuron–Glial Interactions in the Developing Cerebellum

Anna Dunaevsky

High-Resolution Optical Imaging of Zebrafish Larval Ribbon Synapse Protein RIBEYE, RIM2, and CaV 1.4 by Stimulation Emission Depletion Microscopy

Caixia Lv, Travis J. Gould, Joerg Bewersdorf, and David Zenisek

Swept Field Laser Confocal Microscopy for Enhanced Spatial and Temporal Resolution in Live-Cell Imaging

Manuel Castellano-Muñoz, Anthony Wei Peng, Felipe Salles, and Anthony Ricci

Metabolic Imaging Using Two-Photon Excited NADH Intensity and Fluorescence Lifetime Imaging

Jorge Vergen, Clifford Hecht, Lyandysha V. Zhuludeva, Meg M. Marquardt, Richard Hallworth, and Michael G. Nichols

Single Molecule Imaging Approach to Membrane Protein Stoichiometry

Richard Hallworth and Michael G. Nichols

Biological Applications: Techniques, Software, and Equipment Development

Video-Based Tracking of Single Molecules Exhibiting Directed In-Frame Motion

M. Yavuz Yüce, Alexandr Jonáš, Alper Kiraz, and Alper T. Erdoğan

Distinguishing Positional Uncertainty from True Mobility in Single-Molecule Trajectories That Exhibit Multiple Diffusive Modes

Mark Kastantin and Daniel K. Schwartz

Comparison and Validation of Visual Assessment and Image Processing Algorithms to Quantify Morphology Dynamics of *Euglena gracilis*

Anand Krishnan, Ian Watson, Roger Parton, and James Sharp

Deconvolution of Calcium Fluorescent Indicator Signal from AFM Cantilever Reflection

Gabriela M. Lopez, David J. Oliver, Peter H. Grutter, and Svetlana V. Komarova

On-Chip Open Microfluidic Devices for Chemotaxis Studies

Gus A. Wright, Lino Costa, Alexander Terekhov, Dawit Jowhar, William Hofmeister, and Christopher Janetopoulos

Calcium Carbonate Mineralization: Involvement of Extracellular Polymeric Materials Isolated from Calcifying Bacteria

Claudia Ercole, Paola Bozzelli, Fabio Altieri, Paola Cacchio, and Maddalena Del Gallo

Staining Characteristics of *Lonchocarpus cyanescens* Leaf Extract on the Testis of Sprague-Dawley Rats

Rosemary B. Bassey, Airat A. Bakare, Innocent A. Edagha, Abraham A.A. Osinubi, and Ademola A. Oremosu

Materials Applications

α , ω -Dihexylsexithiophene Self-Assembled Nanostructures on Mica: Atomic Force Microscopy Study

Li Wang, Shuhong Ye, Huizhen Yuan, Yonghai Song, Haozhi Zhu, Haoqing Hou, and Pengcheng Li

Combined Major and Trace Element LA-ICP-MS Analysis of Compositional Variations in Simple Solid Solutions through Cross Correlation with an EPMA-Characterized Working Standard

Georg F. Zellmer, Peter Dulski, and Yoshiyuki Iizuka

Review Article

Cross-Section and Staining-Based Techniques for Investigating Organic Materials in Painted and Polychrome Works of Art

I.C.A. Sandu, S. Schäfer, D. Magrini, S. Bracci, and A.C.A. Roque

Application of Electron Backscattered Diffraction for Crystallographic Characterization of Tin Whiskers

Joseph R. Michael, Bonnie B. McKenzie, and Donald F. Susan

Scanning Tunneling Microscopy Study of α , ω -Dihexylsexithiophene Adlayers on Au(111): A Chiral Separation Induced by a Surface

Yonghai Song, Yu Wang, Lingli Wan, Shuhong Ye, Haoqing Ho, and Li Wang

EDS Measurements of X-Ray Intensity at WDS Precision and Accuracy Using a Silicon Drift Detector

Nicholas W. M. Ritchie, Dale E. Newbury, and Jeffrey M. Davis

Chemical Vapor Deposition of Porous GaN Particles on Silicon: Green Technology to Produce Porous GaN

Joan J. Carvajal, Oleksandr V. Bilousov, Dominique Drouin, Magdalena Aguiló, Francesc Díaz, and J. Carlos Rojo

High-Resolution Electron Diffraction: Accounting for Radially and Angularly Invariant Distortions

Daniel Carvalho and Francisco M. Morales



Dear Abbe

Dear Abbe,

I am having a lot of trouble while getting my images focused. The image moves dramatically while focusing; it moves quite a bit even at low focus steps and at low magnifications! I am very frustrated and hope you can resolve this problem.

Ravi from Rochester

Dear Ravi,

Ach! I understand your vexation. I hate it when my images jump around regardless of the parameters, usually after several Kalyani Black Labels. I also despise kimchee and butter beans. It sounds as if your microscope has been abusing its computer internet access, watching Fred Astaire movies on YouTube, and is now trying to mimic dance steps. You will eventually catch it auditioning for “Dancing with the Stars” and posting its routine on YouTube. If you let it continue, you may find it doing impersonations and cameos for Sergio Leone westerns. I don’t envision a happy ending over this. My suggestion is to unplug the poor microscope from the ether and only allow supervised internet access. Tough love is hard to do, but I know you have the *Hodens* for it. In the end, you’ll have a happier, more productive microscope again.

Dear Abbe,

We have a researcher who would like to see his cultured swine and chicken cells on the TEM. He grew the cells on Thermanox[®] plastic coverslips. I prepared these cultured cells for transmission electron microscopy and eventually embedded and polymerized them in an epoxy resin. After polymerization I could not separate the coverslip from the resin. I’ve not had this problem before! Please help if you can.

Andrea from Wooster

Dear Andrea,

I am surprised your colleague could find cultured swine and chickens from which to derive the cells! Most swine and chickens I have encountered have been highly uncouth and boorish. I would like to know how he accomplished this. Was there some societal refinement process he could send them to—something along the lines of “Perfectly Polished for Livestock”? I can just see them now; puckish thugs crashing the cotillion of the more proper farm animals, accosting the feathered debutantes, wearing their knickers too low on their hips, and listening to P. Diddy rather than Mozart. I know it is a general concern: I have friends that routinely deal with nasty, brutish little cells derived from *C. elegans* and *Drosophila* with no sense of refinement. I’ll bet the little *Verbrechers* misbehaved and became addicted to the surface of the chemically treated coverslip like trailer park meth heads. I’m sorry, but separation can only be accomplished now by harsh intervention.

Have a vexing dilemma? A troublesome lab mate? Send your problems to Herr Abbe in care of his able assistant at jpshield@uga.edu. He may even come up with a solution!

MT