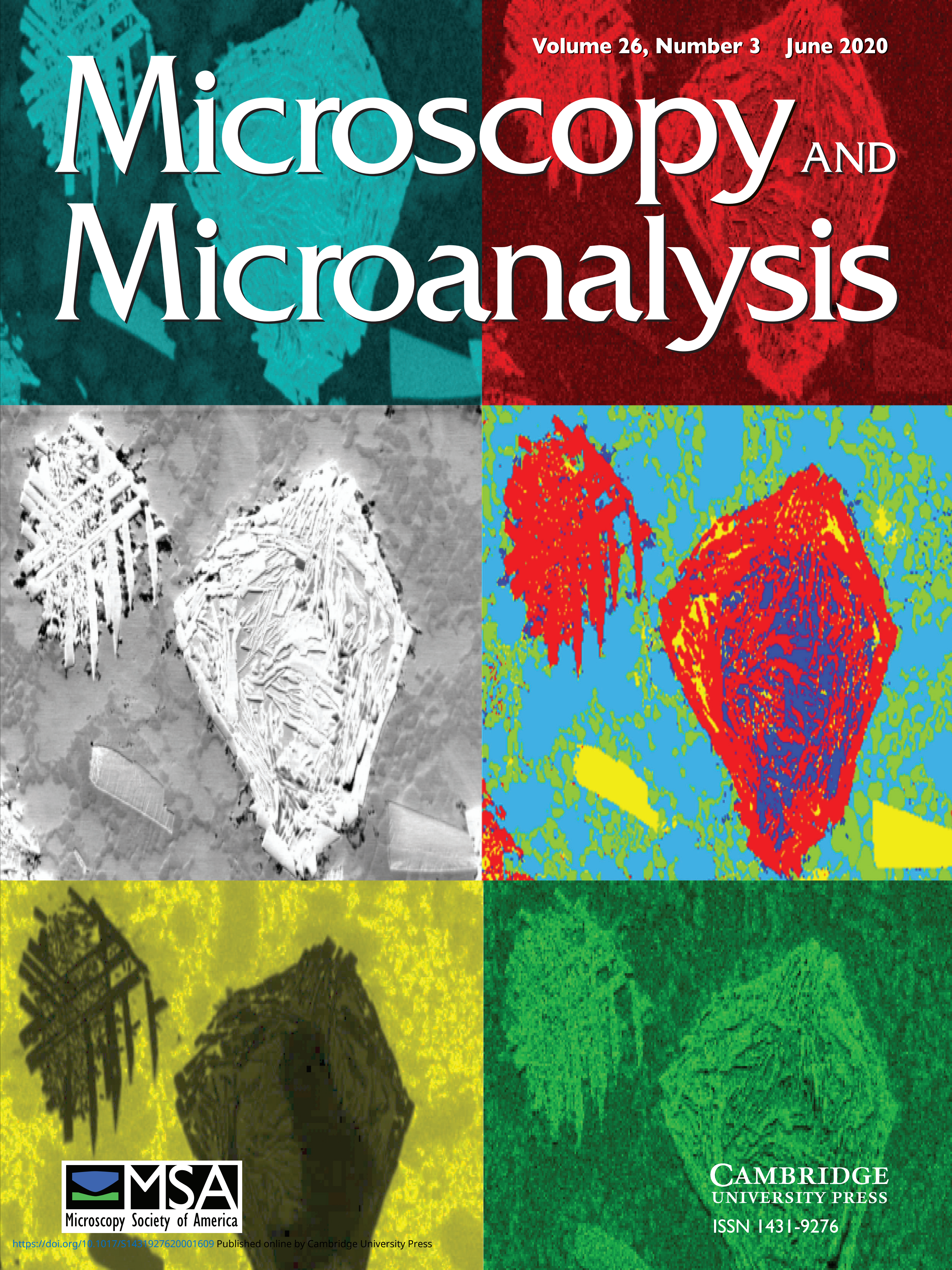
Volume 26, Number 3 June 2020

Microscopy AND Microanalysis



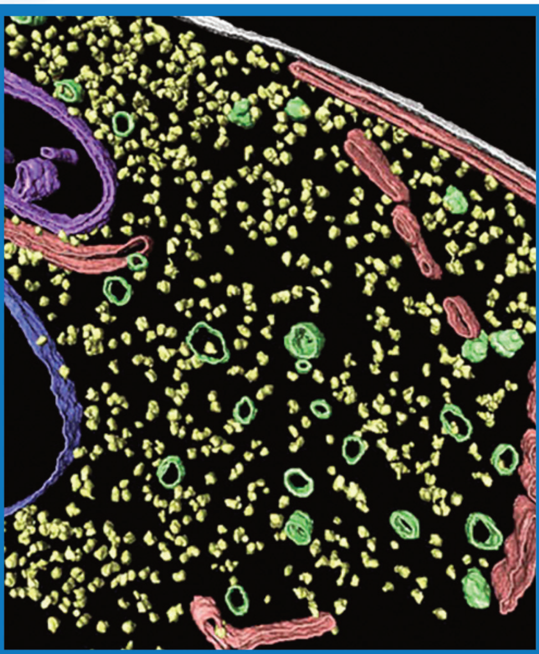
Microscopy Society of America

CAMBRIDGE
UNIVERSITY PRESS
ISSN 1431-9276

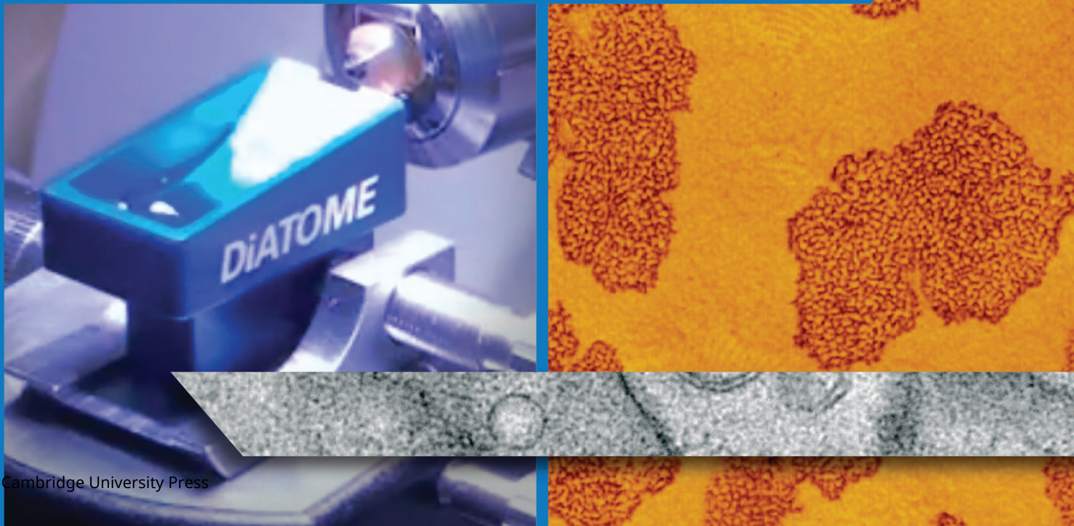
https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

unsurpassed & unmatched...

Ultra-Wet 35° • Ultra-Dry 35°
Ultra-Semi 35° • Ultra Maxi 35°
Ultra Jumbo 35° • Ultra Sonic 35°
Ultra ATS 35° Ultra-AFM 35°
Ultra-Wet 45° • Ultra Jumbo 45°
Cryo 25° • Cryo Immuno 35°
Cryo-Dry 35° • Cryo-Wet 35°
Cryo-Dry 45° • Cryo-Wet 45° Cryo-AFM
Histo 45° • Histo Jumbo 45°
Histo-Cryo Dry 45° • Histo-Cryo Wet 45°
Trimtool 20 • Trimtool 45 • Static Line II



Shown: DiATOME Histo Diamond Knife producing thick sections



compatible with all microtomes

for more information, please
visit our website at...

www.emsdiasum.com

DiATOME U.S.

P.O. Box 550 • 1560 Industry Rd.
Hatfield, PA 19440
Tel: (215) 412-8390 • **Fax:** (215) 412-8450
email: info@emsdiasum.com
or stacie@ems-secure.com

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

Microscopy AND Microanalysis

An International Journal for the Biological and Physical Sciences

THE OFFICIAL JOURNAL OF

MICROSCOPY SOCIETY OF AMERICA
MICROANALYSIS SOCIETY
MICROSCOPICAL SOCIETY OF CANADA /
SOCIÉ TÉ DE MICROSCOPIE DU CANADA
MEXICAN MICROSCOPY SOCIETY
BRAZILIAN SOCIETY FOR MICROSCOPY AND MICROANALYSIS
VENEZUELAN SOCIETY OF ELECTRON MICROSCOPY
EUROPEAN MICROBEAM ANALYSIS SOCIETY
AUSTRALIAN MICROSCOPY AND MICROANALYSIS SOCIETY
PORTUGUESE SOCIETY FOR MICROSCOPY
ELECTRON MICROSCOPY SOCIETY OF INDIA

PUBLISHED IN AFFILIATION WITH

ROYAL MICROSCOPICAL SOCIETY
GERMAN SOCIETY FOR ELECTRON MICROSCOPY
BELGIAN SOCIETY FOR MICROSCOPY
MICROSCOPY SOCIETY OF SOUTHERN AFRICA

Editor-in-Chief
John Mansfield
4304 Spring Lake Blvd.
Ann Arbor, MI 48108-9657
e-mail: thejfmjfm@me.com

Administrative Editor
John Shields
University of Georgia
Athens, GA 30602
e-mail: jpshield@uga.edu

Biological Sciences Applications Editors
W. Gray (Jay) Jerome
Department of Pathology, Microbiology and Immunology
U-2206 MCN
Vanderbilt University
Nashville, TN 37232-2561
e-mail: jay.jerome@vanderbilt.edu

Heide Schatten
Department of Veterinary Pathobiology
University of Missouri-Columbia
Columbia, MO 65211
e-mail: SchattenH@missouri.edu

Rosemary White
CSIRO Plant Industry
Canberra, ACT 2601, Australia
e-mail: Rosemary.white@csiro.au

Elizabeth Wright
Department of Biochemistry
College of Agricultural and Life Sciences
University of Wisconsin
Madison, WI 53706-1544
e-mail: erwright2@wisc.edu

Deborah Kelly
Department of Biomedical Engineering
College of Engineering
Pennsylvania State University
University Park, PA 16802-4400
e-mail: debkelly@psu.edu

Cultural Heritage Applications Editor
Edward P. Vicenzi
Smithsonian Institution, Museum Conservation Institute
4210 Silver Hill Rd., Suitland, MD 20746
e-mail: VicenziE@si.edu

Materials Sciences Applications Editors
Vinayak Dravid
Materials Science and Engineering
Northwestern University
Evanston, IL 60208-3105
e-mail: v-dravid@nortwestern.edu

Georg E. Fantner
Interfaculty Institute for Bioengineering
École Polytechnique Fédéral de Lausanne
Lausanne 1015, Switzerland
e-mail: georg.fantner@epfl.ch

David J. Larson
CAMECA
5500 Nobel Drive
Madison, WI 53711
e-mail: david.larson@ametek.com

Ian MacLaren
Materials and Condensed Matter Physics
School of Physics and Astronomy
University of Glasgow
Glasgow G12 8QQ, UK
e-mail: Ian.MacLaren@glasgow.ac.uk

Ross Marceau
Institute for Frontier Materials
Deakin University
Geelong, VIC 3216, Australia
e-mail: r.marceau@deakin.edu.au

Joseph Michael
Sandia National Laboratories
P.O. Box 5800, Albuquerque, NM 87185
e-mail: jrmicha@sandia.gov

Stephen R. Niezgoda
Materials Science and Engineering
Mechanical and Aerospace Engineering
The Ohio State University
Columbus, OH 43210
e-mail: niezgoda.6@osu.edu

Yoosuf N. Picard
Materials Science & Engineering
Carnegie Mellon University
Pittsburgh, PA 15213
e-mail: ypicard@cmu.edu

Daniel Ruscitto
GE Research
Niskayuna NY 12309
e-mail: dan.ruscitto@gmail.com

Masashi Watanabe
Dept. of Mater. Sci. & Eng.
Lehigh University, Bethlehem, PA 18015
e-mail: masashi.watanabe@lehigh.edu

Special Issues and Reviews Editor
David J. Smith
Department of Physics
Arizona State University, Tempe, AZ 85287-1504
e-mail: david.smith@asu.edu

Book Review Editor
Cynthia Goldsmith
Centers for Disease Control, Atlanta, GA 30333
e-mail: csg1@cdc.gov

***M&M Program Guide* Editor**
Richard L. Martens
1013 Bevill Building
Box 870164, Tuscaloosa, AL 35487-0164
e-mail: rmartens@caf.ua.edu

***Proceedings* Editor**
Gail Celio
University of Minnesota, St. Paul, MN 55108
e-mail: celio001@umn.edu

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

Microscopy AND
Microanalysis

© MICROSCOPY SOCIETY OF AMERICA 2019

Editorial Board

Ralph Albrecht	*University of Wisconsin, Madison, Wisconsin*
Ilke Arslan	*Argonne National Laboratory, Lemont, Illinois*
Mary Grace Burke	*University of Manchester, Manchester, UK*
Barry Carter	*University of Connecticut, Storrs, Connecticut*
Wah Chiu	*Baylor College of Medicine, Houston, Texas*
Marc De Graef	*Carnegie Mellon University, Pittsburgh, Pennsylvania*
Niels de Jonge	*INM Institute for New Materials, Saarbrücken, Germany*
Elizabeth Dickey	*North Carolina State University, Raleigh*
Mark Ellisman	*University of California at San Diego, San Diego, California*
Pratibha Gai	*University of York, United Kingdom*
Marija Gajdardziska-Josifovska	*University of Wisconsin-Milwaukee, Milwaukee, Wisconsin*
Paul Kotula	*Sandia National Labs, Albuquerque, New Mexico*
William Landis	*University of Akron, Akron, Ohio*
Charles Lyman	*Lehigh University, Bethlehem, Pennsylvania*
Dale Newbury	*National Institute of Standards and Technology, Gaithersburg, Maryland*
Robert Price	*University of South Carolina, Columbia, South Carolina*
Jean-Paul Revel	*California Institute of Technology, Pasadena, California*
David Smith	*Arizona State University, Tempe, Arizona*
Nan Yao	*Princeton University, Princeton, New Jersey*
Nestor Zaluzec	*Argonne National Laboratory, Argonne, Illinois*

Editorial Board Representatives from Affiliated Societies

Donovan Leonard	*Oak Ridge National Laboratory (MAS)*
Gautam Kumar Dey	*Bhabha Atomic Research Centre (EMSI)*
Gema Gonzalez	*Venezuelan Institute for Scientific Investigation (Venezuela)*
Michael Robertson	*Acadia University, Wolfville, Nova Scotia (Canada)*
Brendan Griffin	*University of Western Australia (AMMS)*
Guillermo Solorzano	*Pontificia Universidade Catolica, Rio de Janeiro (Brazil)*
Mike Matthews	*Atomic Weapons Establishment, Reading, Great Britain (EMAS)*
Miguel Yacaman	*Mexico Institute for Nuclear Research (Mexico)*
Henrique Almeida	*Universidade do Porto (Portugal)*

Founding Editor

Jean-Paul Revel	*California Institute of Technology, Pasadena, California*

Previous Editors-in-Chief

Dale Johnson	*University of South Florida, Tampa, Florida*
Charles Lyman	*Lehigh University, Bethlehem, Pennsylvania*
Robert L. Price	*University of South Carolina, Columbia, South Carolina*

This journal is part of the **Cambridge** Core service. Access to online tables of contents and article abstracts is available to all researchers at no cost. Access to full-text articles online is provided to those with online subscription. Online subscriptions must be activated. Once your subscription is activated, free access to past, present, and forthcoming articles is available at:

***Microscopy and Microanalysis* website: cambridge.org/MAM**.

Instructions for authors submitting manuscripts may be found at cambridge.org/MAM. Select "Further Information" then select "Instructions for Contributors."

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

Microscopy and Microanalysis

Aims and Scope

Microscopy and Microanalysis publishes original research papers dealing with a broad range of topics in microscopy and microanalysis. These include articles describing new techniques or instrumentation and their applications, as well as papers in which established methods of microscopy or microanalysis are applied to important problems in the fields of biology or materials science. Microscopy and microanalysis are defined here in a broad sense, and include all current and developing approaches to the imaging and analysis of microstructure. The criteria for acceptance of manuscripts are the originality and significance of the research, the quality of the microscopy or microanalysis involved, and the interest for our readership.

Four types of communications are published in the Journal. **Regular Articles** are of substantial length and describe the findings of an original research project that satisfies the aims and scope of the Journal, described above. **Review Articles** summarize the current status of an important area within the aims and scope of the Journal. **Letters to the Editor** usually contain comments on recent articles that have appeared in the Journal. **Book Reviews** are also published, but these are solicited only through the Book Review Editor.

Instructions for Contributors

Instructions for authors contributing manuscripts may be found at http://mc.manuscriptcentral.com/mam under "Resources: Instructions and Forms." Authors may also visit cambridge.org/mam, select "Information," and then select "Instructions for Contributors."

Copyright Information

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the Microscopy Society of America; that the manuscript will not be published elsewhere in any language without the consent of the copyright holders; and that written permission of the copyright holder is obtained by the authors for material used from other copyrighted sources.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names lack protection by the relevant laws and regulation.

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Cambridge University Press, provided that the appropriate fee is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA [Tel: (508) 750-8400], stating the ISSN (1431-9276), the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Disclaimer

The Microscopy Society of America, the other societies stated, and Cambridge University Press cannot be held responsible for errors or for any consequences arising from the use of the information contained in this journal. The appearance of scientific reports and/or workshops, or any other material in *Microscopy and Microanalysis* does not constitute an endorsement or approval by The Microscopy Society of America of the findings, data, conclusions, recommendations, procedures, results, or any other aspect of the content of such articles. The appearance of advertising in *Microscopy and Microanalysis* does not constitute an endorsement or approval by The Microscopy Society of America of the quality or value of the products advertised or any of the claims, data, conclusions, recommendations, procedures, results, or any other information included in the advertisements.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made.

Subscription Information

Microscopy and Microanalysis is published bimonthly in February, April, June, August, October, and December by Cambridge University Press (1 Liberty Plaza, New York, NY 10006). Three supplements (*Meeting Guide, Program Guide, and Proceedings*) are published in June and August.

Society Rates: Members of the Microscopy Society of America should contact the MSA Business Office for all subscription inquiries: Microscopy Society of America, 11130 Sunrise Valley Dr, Suite 350, Reston, VA 20191, Tel.: (703) 234-4115, Email: associationmanagement@microscopy.org, URL: www.microscopy.org. Members of other affiliated societies should contact their respective society business offices for all subscription inquiries.

Subscription Rates: Institutions print and electronic: US $2465.00 in the USA, Canada, and Mexico; UK £1483.00+VAT elsewhere. Institutions online only: US $1599.00 in the USA, Canada, and Mexico; UK £968.00 + VAT elsewhere. Individuals print plus online: US $721.00 in the USA, Canada, and Mexico; UK £438.00+VAT elsewhere. Prices include postage and insurance.

USA, Canada, and Mexico: Subscribers in the USA, Canada, and Mexico should send their orders, with payment in US dollars or the equivalent value in Canadian dollars, to: Cambridge University Press, Customer Services Department (Journals), 1 Liberty Plaza, New York, NY 10006, USA. Tel: (845) 353-7500. Fax: (845) 353-4141. Orders may be phoned direct (toll free): (800) 872-7423. E-mail: journals_subscriptions@cup.org.

Outside North America: Subscribers elsewhere should send their orders, with payment in sterling, to: Customer Services Department (Journals), Cambridge University Press, University Printing House, Shaftesbury Road, Cambridge CB2 8BS, UK. Tel: +44 (0)1223 326070. Fax: 44 (0) 1223 325150. E-mail: journals@cambridge.org

Change of address: Allow six weeks for all changes to become effective. All communications should include both old and new addresses (with postal codes) and should be accompanied by a mailing label from a recent issue. Society members should contact their respective society business offices to inform them of address changes.

Editorial Office

John Mansfield, Editor in Chief, 4304 Spring Lake Blvd., Ann Arbor, MI 48108-9657, USA; Tel: (734) 994-3096; Fax: (734) 763-2282; E-mail: thejfmjfm@me.com.

Office of Publication

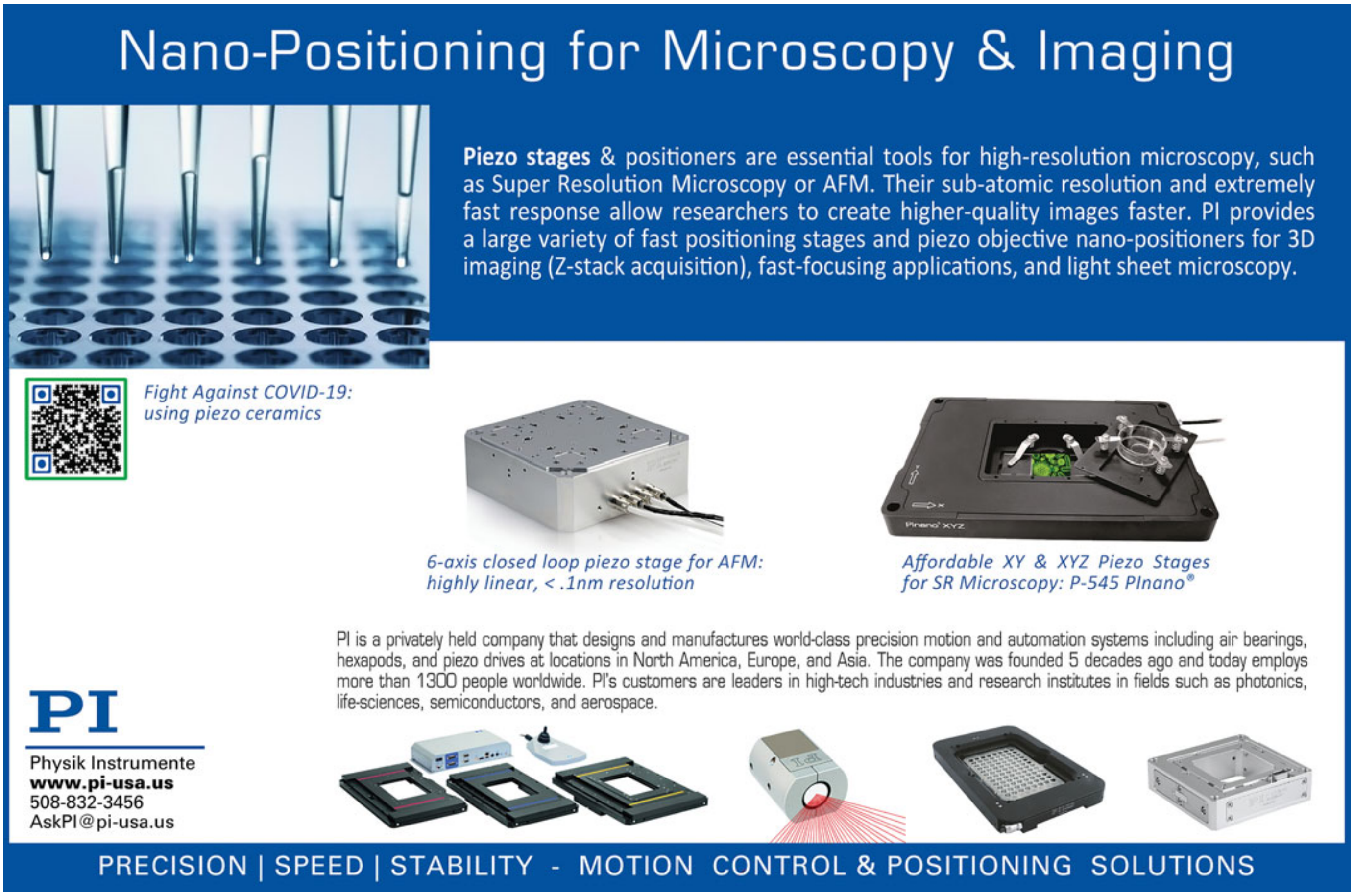
Cambridge University Press, 1 Liberty Plaza, New York, NY 10006, USA; Tel: (212) 337-5000; Fax: (212) 337-5959.

Advertising Sales & Production

Kelly Miller, M.J. Mrvica Associates, Inc., 2 West Taunton Avenue, Berlin, NJ 08009, USA; Tel: (856) 768-9360; Fax: (856) 753-0064.

© 2020 by Microscopy Society of America. Printed in the United States on acid-free paper. Periodicals postage paid at New York, NY, and additional mailing offices. Return postage guaranteed. Postmaster: Send address changes in the U.S.A. and Canada to *Microscopy and Microanalysis*, Subscription Department, Cambridge University Press, 1 Liberty Plaza, New York, NY 10006.

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press



Nano-Positioning for Microscopy & Imaging

Piezo stages & positioners are essential tools for high-resolution microscopy, such as Super Resolution Microscopy or AFM. Their sub-atomic resolution and extremely fast response allow researchers to create higher-quality images faster. PI provides a large variety of fast positioning stages and piezo objective nano-positioners for 3D imaging (Z-stack acquisition), fast-focusing applications, and light sheet microscopy.

Fight Against COVID-19: using piezo ceramics

6-axis closed loop piezo stage for AFM: highly linear, < .1nm resolution

Affordable XY & XYZ Piezo Stages for SR Microscopy: P-545 PInano®

PI is a privately held company that designs and manufactures world-class precision motion and automation systems including air bearings, hexapods, and piezo drives at locations in North America, Europe, and Asia. The company was founded 5 decades ago and today employs more than 1300 people worldwide. PI's customers are leaders in high-tech industries and research institutes in fields such as photonics, life-sciences, semiconductors, and aerospace.

PI

Physik Instrumente
www.pi-usa.us
508-832-3456
AskPI@pi-usa.us

PRECISION | SPEED | STABILITY - MOTION CONTROL & POSITIONING SOLUTIONS

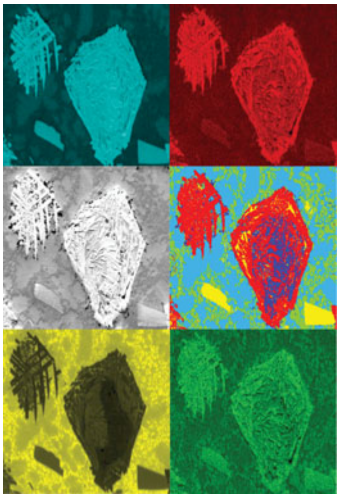
https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

Microscopy and Microanalysis

An International Journal for the Biological and Physical Sciences

Volume 26, Number 3

June 2020



On the Cover: Demonstration of electron backscattered diffraction (EBSD) phase mapping via machine learning using a convolutional neural network (CNN). The sample is a Ni-W-B-carbide metal matrix composite shown in the left side of the middle row. The right side image in the middle row is a phase map generated from the CNN-based model's analysis of each diffraction pattern individually, classified for crystal structure of the pattern. There are 89,280 total EBSD patterns collected for this map. The two top row images and two bottom row images are x-ray EDS maps (blue-W, red-C, yellow-Ni, green-B) of the analyzed region. The classification of the patterns to crystal structure can be performed autonomously, with no user selected phases involved in the process. Image appears in "Phase Mapping in EBSD Using Convolutional Neural Networks," by Kevin Kaufmann, Chaoyi Zhu, Alexander S. Rosengarten, Daniel Maryanovsky, Haoren Wang, and Kenneth S. Vecchio, p. 458, doi: 10.1017/S1431927620001488.

MATERIALS SCIENCE APPLICATIONS

In Situ EBSD Study of Stable Cube Texture in an Advanced Composite Substrate Used in YBCO-Coated Conductors
Yaotang Ji, Hongli Suo, ZiLi Zhang, Lin Ma, Jiazhi Li, Chenxi Zhang, Xinyu Wu, Shaheen Kausar, Jin Cui, Min Liu, Yi Wang and Qiuliang Wang 365

Analysis of Electron Transparent Beam-Sensitive Samples Using Scanning Electron Microscopy Coupled With Energy-Dispersive X-ray Spectroscopy
Anders Brostrøm, Kirsten Inga Kling, Karin Sørig Hougaard and Kristian Mølhave 373

SOFTWARE AND INSTRUMENTATION

Automatic Fiber Length Measurements with a Multi-Stencil Fast Marching Method on Microscopy Images
Chanjuan Liu, Menno Bergmeijer, Sébastien Pierrat and Olivier Guise 387

Direct Observation of the Surface Topography at High Temperature with SEM
Renaud Podor, Xavier Le Goff, Joseph Lautru, Henri-Pierre Brau, Mathias Barreau, Xavier Carrier, Jerôme Mendonça, Dorian Nogues and Antoine Candeias 397

Sparse Scanning Electron Microscopy Data Acquisition and Deep Neural Networks for Automated Segmentation in Connectomics
Pavel Potocek, Patrick Trampert, Maurice Peemen, Remco Schoenmakers and Tim Dahmen 403

An Economical, Portable Manual Cryogenic Plunge Freezer for the Preparation of Vitrified Biological Samples for Cryogenic Electron Microscopy
Jamie S. Depelteau, Gert Koning, Wen Yang and Ariane Briegel 413

Semi-Supervised Nonnegative Matrix Factorization of Wide-Field Fluorescence Microscopic Images for Tissue Diagnosis
Shania M. Soman, Charuvil Radhakrishna Pillai Rekha, Hema Santhakumar, Uttamchand Narendrakumar and Ramapurath S. Jayasree 419

Simulation-Trained Sparse Coding for High-Precision Phase Imaging in Low-Dose Electron Holography
Satoshi Anada, Yuki Nomura, Tsukasa Hirayama and Kazuo Yamamoto 429

Atomic-Resolution Cryo-STEM Across Continuously Variable Temperatures
Berit H. Goodge, Elisabeth Bianco, Noah Schnitzer, Henny W. Zandbergen and Lena F. Kourkoutis 439

Deep Neural Network Enabled Space Group Identification in EBSD
Kevin Kaufmann, Chaoyi Zhu, Alexander S. Rosengarten and Kenneth S. Vecchio 447

Phase Mapping in EBSD Using Convolutional Neural Networks
Kevin Kaufmann, Chaoyi Zhu, Alexander S. Rosengarten, Daniel Maryanovsky, Haoren Wang and Kenneth S. Vecchio 458

Embracing Uncertainty: Modeling the Standard Uncertainty in Electron Probe Microanalysis—Part I
Nicholas W. M. Ritchie 469

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

Secondary Fluorescence of 3D Heterogeneous Materials Using a Hybrid Model
Yu Yuan, Hendrix Demers, Xianglong Wang and Raynald Gauvin 484

BIOLOGICAL APPLICATIONS

Combined Anastrozole and Antiplatelet Therapy Treatment Differentially Promotes Breast Cancer Cell Survival
Kutlwano Xulu, Raquel Duarte and Tanya Augustine 497

Tramadol Promotes Oxidative Stress, Fibrosis, Apoptosis, Ultrastructural and Biochemical alterations in the Adrenal Cortex of Adult Male Rat with Possible Reversibility after Withdrawal
Amany Mohamed Shalaby, Adel Mohamed Aboregela, Mohamed Ali Alabiad and Dina Fouad El Shaer 509

MICROGRAPHIA

Structural and Functional Characterization of the Tongue and Digestive Tract of *Psammophis sibilans* (Squamata, Lamprophiidae): Adaptive Strategies for Foraging and Feeding Behaviors
Ahmed A. El-Mansi, Mohamed A. Al-Kahtani, Mohamed M. A. Abumandour and Ahmed E. Ahmed 524

Interaction of Epididymal Epithelia and their Secretions with Spermatozoa Supports Functional and Morphological Changes During Long-Term Storage in the Chinese Soft-Shelled Turtle (*Pelodiscus sinensis*)
Imran Tarique, Mansoor Tariq, Xuebing Bai, Qu Wenjia, Ping Yang, Yufei Huang, Yang Sheng, Waseem Ali Vistro and Quisheng Chen 542

Morphological and Histochemical Characterization of the Dermal Plates of Pleco (*Hypostomus plecostomus*)
Soha A. Soliman, Basma Mohamed Kamal, Alaa S. Abuo-Elhmad and Hanan H. Abd-Elhafeez 551

Spatial Distribution of Heterochromatin Bodies in the Nuclei of *Triatoma infestans* (Klug)
Carlos Henrique L. Imperador, Vanessa B. Bardella, Eli Heber M. dos Anjos, Vera L.C.C. Rodrigues, Diogo C. Cabral-de-Mello and Maria Luiza S. Mello 567

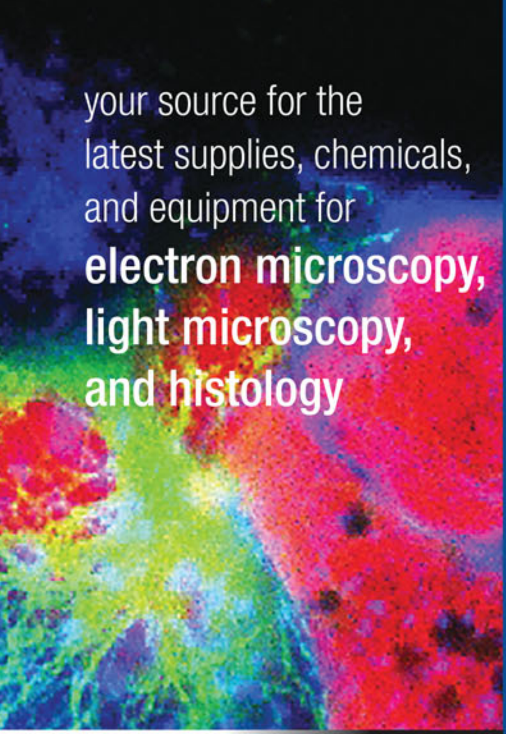
Telocytes in Different Organs of Vertebrates: Potential Essence Cells of the Meridian in Chinese Traditional Medicine
Shi Yonghong, Wu Ruizhi, Zhang Yue, Bai Xuebing, Imran Tarique, Liang Chunhua, Yang Ping and Chen Qiusheng 575

Architecture and Cellular Composition of the Spleen in the Japanese Quail (*Coturnix japonica*)
Fatma El-Zahraa A. Mustafa and Sara M.M. El-Desoky 589

Microanalysis of Fish Ovarian Follicular Atresia: A Possible Synergic Action of Somatic and Immune Cells
Doaa M. Mokhtar and Marwa M. Hussein 599

Mucilaginous Secretions in the Xylem and Leaf Apoplast of the Swamp Palm *Mauritia flexuosa* L.f. (Arecaceae)
Alessandra Flávia Silveira, Maria Olívia Mercadante-Simões, Leonardo Monteiro Ribeiro, Yule Roberta Ferreira Nunes, Lucienir Pains Duarte, Ivana Silva Lula, Mariana Guerra de Aguilar and Grasiely Faria de Sousa 609

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press


your source for the
latest supplies, chemicals,
and equipment for
**electron microscopy,
light microscopy,
and histology**


FlowVIEW Aquarius
"Liquid" Scanning EM Kit

citifluor
A Division of EMS Aquisition Corp. Electron Microscopy Sciences


Antifadent Mountant Solutions

EMS has it!


BeadBug™ 6
Microtube Homogenizer


Space Saver
Steel File Cabinet System


ideal-tek
Precision Hand Tools and Instruments


Portable Slide Storage System

**PLEASE CONTACT US
FOR MORE INFORMATION...**
OUR MAIN INTERACTIVE WEBSITE:
www.emsdiasum.com

**Electron
Microscopy
Sciences**

P.O. Box 550 • 1560 Industry Rd.
Hatfield, Pa 19440
Tel: (215) 412-8400 • Fax: (215) 412-8450
email: info@emsdiasum.com
or stacie@ems-secure.com

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press

HITACHI
Inspire the Next

The Ultimate Solution for Efficiency

The SU7000 Ultra-High Resolution Variable-Pressure Analytical Schottky FE-SEM

High-Resolution Imaging

- 0.9 nm resolution at 1 keV
- 0.8 nm resolution at 15 keV

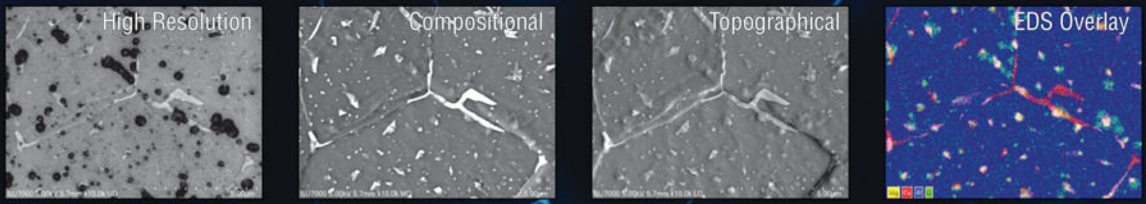
Enhanced Versatility

- Large chamber handles samples 200 mm Φ or 80 mm tall
- 18 accessory ports for analytical options

Fast Data Collection

- 200 nA beam current
- Synchronized working distance for imaging and analysis
- Fully integrated sample navigation camera
- Simultaneous 6-signal acquisition

All data collected ***simultaneously at 6 mm WD!***



Sample: Heat-treated aluminum alloy

Innovation ◆ Synergy ◆ Solutions

Science for a better tomorrow

Hitachi High-Tech America, Inc.
www.hitachi-hightech.com/us Tel. 800-253-3053 E-mail: microscopy@hitachi-hta.com

© 2020 Hitachi High-Tech America, Inc. All rights reserved.

https://doi.org/10.1017/S1431927620001609 Published online by Cambridge University Press