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Scanning Microscopies 2014

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S. Frank Platek
Tim K. Maugel**
Editors

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Contents

vii	<i>Authors</i>
ix	<i>Conference Committee</i>
xiii	<i>Introduction</i>

SESSION 1	INVITED SESSION: JOINT SESSION WITH PHOTOMASK AND SCANNING MICROSCOPIES
9236 02	3D Monte Carlo modeling of the SEM: Are there applications to photomask metrology? (Invited Paper) [9236-1]
SESSION 2	ADVANCED SCANNING MICROSCOPIES I
9236 04	A novel approach for scanning electron microscopic observation in atmospheric pressure [9236-3]
9236 05	Does your SEM really tell the truth? How would you know? part 3: vibration and drift [9236-4]
SESSION 3	ADVANCED SCANNING MICROSCOPIES II
9236 07	Investigations on CMOS photodiodes using scanning electron microscopy with electron beam induced current measurements [9236-7]
9236 08	A novel transmission electron imaging technique for observation of biological samples on a plate [9236-8]
9236 09	Three-dimensional surface reconstruction using scanning electron microscopy and the design of a nanostructured electron trap [9236-53]
SESSION 4	ADVANCED SCANNING MICROSCOPIES III
9236 0A	Shear force microscopy using piezoresistive cantilevers in surface metrology [9236-10]
9236 0B	High throughput data acquisition with a multi-beam SEM [9236-11]
9236 0C	On the limits of miniature electron column technology [9236-12]
SESSION 5	METROLOGY: JOINT SESSION WITH PHOTOMASK AND SCANNING MICROSCOPIES
9236 0E	Assessing the viability of multi-electron beam wafer inspection for sub-20nm defects (Invited Paper) [9236-14]

SESSION 6 SCANNING MICROSCOPIES IN FORENSIC SCIENCE

- 9236 0H **Rigorous quantitative elemental microanalysis by scanning electron microscopy/energy dispersive x-ray spectrometry (SEM/EDS) with spectrum processing by NIST DTSA-II**
[9236-17]
- 9236 0J **First experiences with 2D-mXRF analysis of gunshot residue on garment, tissue, and cartridge cases** [9236-19]
- 9236 0K **Developing a quality assurance program for gunshot primer residue analysis** [9236-20]
- 9236 0L **An electro-conductive organic coating for scanning electron microscopy (déjà vu)**
[9236-21]

SESSION 7 SCANNING STEM SESSION

- 9236 0M **Using the Hitachi SEM to engage learners and promote next generation science standards inquiry** [9236-22]
- 9236 0N **Integrating electron microscopy into nanoscience and materials engineering programs**
[9236-23]
- 9236 0P **Teaching K-12 teachers and students about nanoscale science through microscopy**
[9236-52]
- 9236 0Q **Project NANO (nanoscience and nanotechnology outreach): a STEM training program that brings SEM's and stereoscopes into high-school and middle-school classrooms** [9236-54]

SESSION 8 ADVANCED SCANNED PROBE MICROSCOPIES

- 9236 0R **Design, technology, and application of integrated piezoresistive scanning thermal microscopy (S_{Th}M) microcantilever** [9236-25]
- 9236 0W **Particle deformation induced by AFM tapping under different setpoint voltages** [9236-30]

SESSION 9 ADVANCED OPTICAL MICROSCOPIES I

- 9236 0X **Wavelet transform-based method of compensating dispersion for high resolution imaging in SDOCT** [9236-31]
- 9236 10 **Scan mirrors relay for high resolution laser scanning systems** [9236-34]
- 9236 11 **Using scanning near-field microscopy to study photo-induced mass motions in azobenzene containing thin films** [9236-35]

SESSION 10 ADVANCED OPTICAL MICROSCOPIES II

9236 13 **Nanoscale imaging by micro-cavity scanning microscopy** [9236-37]

SESSION 11 ADVANCEMENTS IN MODELING

9236 18 **A compact physical CD-SEM simulator for IC photolithography modeling applications**
[9236-42]

POSTER SESSION

9236 19 **A tale of three trials: from science to junk science** [9236-44]

9236 1A **Do electron flux and solar x-ray in juxtaposition prior a seismic event make signature?**
[9236-48]

9236 1C **Confirmatory analysis of field-presumptive GSR test sample using SEM/EDS** [9236-51]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Bekaert, Joost, 18	Martinelli, L., 11
Biafore, John J., 18	Meisburger, Dan, 0C
Bian, Haiyi, 0X	Mencarelli, Davide, 13
Blok, Mikel, 0Q	Menshew, D. E., 0M
Boetsch, Guillaume, 0R	Minixhofer, R., 07
Boilot, J.-P., 11	Montgomery, Daniel D., 1C
Bunday, Benjamin, 0E	Muray, Lawrence, 0C
Burnett, Bryan R., 0L, 19	Nakahira, Kenji, 04
Cady, Sherry L., 0Q	Nakajima, Masato, 08
Cizmar, Petr, 05	Newbury, Dale E., 0H
Conte, Sean, 1C	Nguyen, Anh, 0N
Cormia, Robert D., 0N	Niemeyer, Wayne D., 1C
Dagata, John A., 0W	Ominami, Yusuke, 04, 08
Desboeufs, N., 11	Orlando, Giuseppe, 13
Di Donato, Andrea, 13	Oye, Michael M., 0N
Erikson, Gregory S., 1C	Peretti, J., 11
Fabbri, F., 11	Postek, Michael T., 02, 05
Faccinelli, M., 07	Rangelow, Ivo W., 0A
Fang, Chao, 18	Reithmeier, Eduard, 09
Farina, Marco, 13	Ritchie, Nicholas W. M., 0H
Farkas, Natalia, 0W	Robertson, Stewart A., 18
Fu, Wei-En, 0W	Roger, F., 07
Gacoin, T., 11	Rozzi, Tullio, 13
Gao, Wanrong, 0X	Rudek, Maciej, 0R
Gotszalk, Teodor, 0A, 0R	Scheuer, Renke, 09
Grabiec, Piotr, 0A, 0R	Shi, Meng, 0N
Grosse, Keith, 0Q	Sierakowski, Andrzej, 0A, 0R
Hadley, P., 07	Sinha, Madhurendra Nath, 1A
He, Bo-Ching, 0W	Skiver, David, 0N
Healy, Nancy, 0P	Smith, Mark D., 18
Ippoliti, Gianluca, 13	Spallas, James, 0C
Ito, Sukehiro, 04, 08	Stamouli, Amalia, 0J
Janssen, Martin, 0J	Thiel, Brad, 0E
Janus, Paweł, 0A, 0R	Toal, Sarah J., 1C
Kawanishi, Shinsuke, 04	Torres, Yessica, 0N
Keller, Anna Lena, 0B	Ushiki, Tatsuo, 04, 08
Kemen, Thomas, 0B	Vaglio Pret, Alessandro, 18
Kessler, David, 10	Verma, Umesh Prasad, 1A
Kirnstoetter, S., 07	Villarrubia, J. S., 02
Knijnenberg, Alwin, 0J	Vladár, András E., 02, 05
Koehler, Bernd, 0R	Vu, A. D., 11
Kopiec, Daniel, 0A, 0R	Wells, Jennifer, 0Q
Kraxner, A., 07	White, Thomas R., 0K
Lahlil, K., 11	Wu, Chung-Lin, 0W
Lassailly, Y., 11	Zeidler, Dirk, 0B
Lercel, Michael, 0E	
Loeffler, B., 07	
Majstzyk, Wojciech, 0R	
Malloy, Matt, 0E	

Conference Committee

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(United States)

Session Chairs

Keynote Session
Paul W. Ackmann, GLOBALFOUNDRIES Inc. (United States)
Naoya Hayashi, Dai Nippon Printing Company, Ltd. (Japan)
Michael T. Postek, National Institute of Standards and Technology
(United States)

- 1 Invited Session: Joint Session with Photomask and Scanning
Microscopies
Paul W. Ackmann, GLOBALFOUNDRIES Inc. (United States)
Naoya Hayashi, Dai Nippon Printing Company, Ltd. (Japan)
Michael T. Postek, National Institute of Standards and Technology
(United States)

- 2 Advanced Scanning Microscopies I
Tim K. Maugel, University of Maryland, College Park (United States)
Dale E. Newbury, National Institute of Standards and Technology
(United States)

- 3 Advanced Scanning Microscopies II
András E. Vladár, National Institute of Standards and Technology
(United States)
S. Frank Platek, U.S. Food and Drug Administration (United States)

- 4 Advanced Scanning Microscopies III
Dale E. Newbury, National Institute of Standards and Technology
(United States)
Michael T. Postek, National Institute of Standards and Technology
(United States)

- 5 Metrology: Joint Session with Photomask and Scanning Microscopies
Michael T. Postek, National Institute of Standards and Technology
(United States)
Thomas Scherübl, Carl Zeiss SMS GmbH (Germany)

- 6 Scanning Microscopies in Forensic Science
S. Frank Platek, U.S. Food and Drug Administration (United States)

- 7 Scanning STEM Session
Robert Gordon, Hitachi High Technologies America, Inc.
(United States)
Michael T. Postek, National Institute of Standards and Technology
(United States)

- 8 Advanced Scanned Probe Microscopies
Ronald G. Dixon, National Institute of Standards and Technology
(United States)
Aaron Cordes, SEMATECH Inc. (United States)

- 9 Advanced Optical Microscopies I
András E. Vladár, National Institute of Standards and Technology
(United States)
Tim K. Maugel, University of Maryland, College Park (United States)

- 10 Advanced Optical Microscopies II
Tim K. Maugel, University of Maryland, College Park (United States)
Dale E. Newbury, National Institute of Standards and Technology
(United States)

11 Advancements in Modeling

John S. Villarrubia, National Institute of Standards and Technology
(United States)

András E. Vladár, National Institute of Standards and Technology
(United States)

Poster Session

Michael T. Postek, National Institute of Standards and Technology
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Tim K. Maugel, University of Maryland, College Park (United States)

Introduction

The SPIE Scanning Microscopies 2014 symposium (Conference 9236) brought microscopists from all aspects of scanning microscopies, from scanned optics and probes to scanned particle beams, together in a single forum to discuss current research and new advancements in the field. For the first time, in 2014 Scanning Microscopies was co-located with SPIE Photomask Technology in Monterey, California, United States. The co-locating of the two conferences was very synergistic because of the reliance of the photomask industry on scanned microscopies, so two joint sessions were designed to take advantage of potential technology transfer between the two conferences.

The Scanning Microscopies conferences have been typically instrument- and technique-intensive. With that in mind, two joint sessions with the Photomask Technology symposium (Conference 9235) were designed to "cross-pollinate" between the two conferences. Invited presentations of joint conference interest were offered, such as: "3D Monte Carlo modeling of the SEM: Are there applications to photomask metrology?" (9236-1), "Three-dimensional SEM metrology at 10nm" (9236-16), "Assessing the viability of multi-column electron-beam wafer inspection for sub-20nm defects" (9236-14), and "Photomask linewidth comparison by PTB and NIST" (9236-15). In addition, there were a number of general, tutorial-like, invited presentations, such as: "Rigorous quantitative elemental micro-analysis by scanning electron microscopy/energy dispersive x-ray spectrometry (SEM/EDS)" (9236-17) and "Does your SEM really tell the truth? Part 3" (9236-4), which discussed some of the basics of measurement and energy dispersive x-ray microanalysis in the scanning microscope.

This year, Scanning Microscopies 2014 awarded Dr. David C. Joy, Distinguished Professor of the University of Tennessee and Distinguished Scientist of the Oak Ridge National Laboratory, the **2014 Professor Sir Charles Oatley Memorial Award**: *"In recognition of his extraordinary contributions to scanning microscopy (electron and ion), including high resolution SEM, low voltage SEM, helium ion microscopy, electron- and ion-beam- specimen interactions, and SEM applications to semiconductor and magnetic materials. His tireless efforts to educate, inform, and inspire his students and colleagues have enormously advanced the field of microscopy."*

The Scanning Microscopy 2013 conference was quite successful, but this year the number of papers exceeded those from the previous DSS conference by nearly a factor of two. A diverse offering of papers covering forensics applications, scanning electron microscopy, helium ion microscopy, scanned probe microscopy, scanned optical microscopy and particle beam microscopy, and electron beam interaction modeling were presented. The "Microscopy for STEM Educators" workshop, initially introduced at DSS 2012, continued in 2014. The

session consisted of presentations on the successful implementation of microscopy in the classroom. In a follow-up session, teachers were able to use a table-top scanning electron microscope and atomic force microscope to examine material they had brought with them. The "Microscopy for STEM Educators" workshop provided the opportunity for an introduction to analytical techniques traditionally only available in the research laboratory, and to see unprecedented images of everyday materials, to expand teachers' understanding of what is possible in the laboratory and classroom. The workshop was broken into a series of presentations and a laboratory session. The presentations discussed the successful applications of advanced scientific instrumentation to engage the learners and promote next-generation science standards inquiry. Following the "Microscopy for STEM Educators" workshop, teachers had the opportunity to visit the Exhibit Hall, where they were encouraged to ask questions of the manufacturers and take advantage of the handouts.

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