PROCEEDINGS OF SPIE

Scanning Microscopies 2013: Advanced Microscopy Technologies for Defense, Homeland Security, Forensic, Life, Environmental, and Industrial Sciences

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30 April –1 May 2013
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 8729

Proceedings of SPIE 0277-786X, V. 8729

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Scanning Microscopies 2013: Advanced Microscopy Technologies for Defense, Homeland Security, Forensic, Life, Environmental, and Industrial Sciences, edited by Michael T. Postek, Dale E. Newbury, S. Frank Platek, Tim K. Maugel, Proc. of SPIE Vol. 8729, 872901 · © 2013 SPIE · CCC code: 0277-786X/13/$18 · doi: 10.1117/12.2031983

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Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Scanning Microscopies 2013: Advanced Microscopy Technologies for Defense, Homeland Security, Forensic, Life, Environmental, and Industrial Sciences*, edited by Michael T. Postek, Dale E. Newbury, S. Frank Platek, Tim K. Maugel, Proceedings of SPIE Vol. 8729 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 0277-786X
ISBN: 9780819495204

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

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Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

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Introduction

The Scanning Microscopies 2013: Advanced Microscopy Technologies for Defense, Homeland Security, Forensic, Life, Environmental, and Industrial Sciences (Conference 8729) 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.

The Scanning Microscopies Conferences have been typically instrument and technique intensive, as opposed to other DSS Conferences which are generally more applied. With that in mind, a joint session with Conference 8725 Micro- and Nanotechnology Sensors, Systems, and Applications V was continued this year entitled Scanning Probe-Based Nanopatterning and Dip-Pen Nanolithography was held in order to "cross-pollinate" between the two Conferences. In addition, a number of general tutorial-like invited presentations such as: "Scanning electron microscopy/energy dispersive spectrometry fixed-beam or overscan x-ray microanalysis of particles can miss the real structure: x-ray spectrum image mapping reveals the true nature" (8729-1) and "Does your SEM really tell the truth? Part 2" (8729-2) discussed some of the basics of measurement and energy dispersive x-ray microanalysis in the scanning microscope. This year, Scanning Microscopies 2013 awarded Dr. Michael T. Postek the 2013 Professor Sir Charles Oatley Memorial Award: "In recognition of his many years of dedication to and work in the field of scanning electron microscopy including research, instruction, publications, and metrology, industrial and nanomanufacturing applications."

The Scanning 2013 conference was quite successful. Sessions encompassed papers covering forensics applications, scanning electron microscopy, helium ion microscopy, scanned probe microscopy, scanned optical microscopy and particle beam microscopy. The workshop introduced at DSS 2012 "Microscopy for STEM Educators" continued in 2013. The session consisted of presentations on the successful implementation of microscopy in the classroom. In a follow-on session, teachers were able to use a Hitachi table-top scanning electron microscope and an Agilent 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, and 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 Hitachi High Technologies (HTA) educational outreach program and their participation in Change the Equation. HTA provides table-top scanning electron microscopes to grade

schools and high schools all across the United States. As a global company they also provide instruments to similar programs across the world. A second presentation entitled "Bringing students to the mountain: developing partnerships to introduce students to cutting-edge research," by Anne Lynn Gillian-Daniel, of the University of Wisconsin-Madison discussed how they were able to develop a program with the manufacturers to interest students in nanotechnology research. The fourth presentation discussed the use of a scanning electron microscope and its impact on students within the Montgomery County School System, and Carolyn Holcomb reported on the impact of high tech instrumentation on disadvantaged students in a high school in western Maryland. The final presentation was a stirring example of how a successful high technology program can be developed and supported within a high school environment which can also be utilized for research in collaboration with local industries.

Following the microscopy for STEM Educators workshop, teachers had the opportunity to visit the Exhibit Hall where nearly 500 suppliers of optics, lasers, image processing, spectroscopy, infrared systems, and optoelectronic components were present. Teachers were encouraged to ask questions and take advantage of the handouts.

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