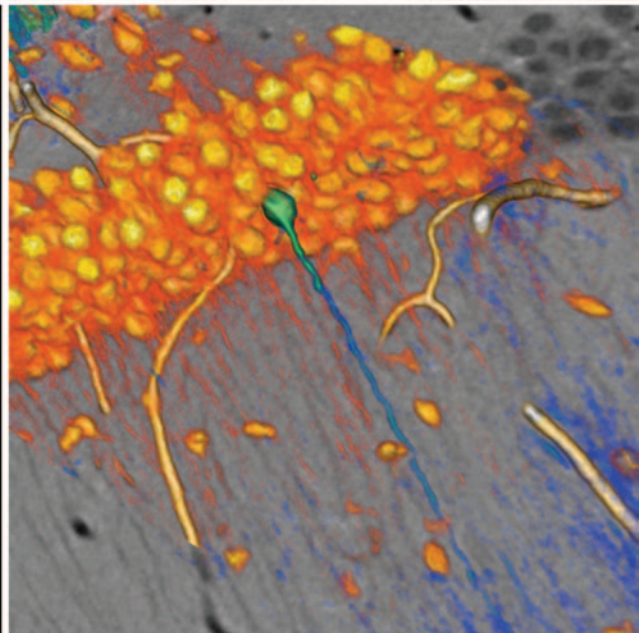
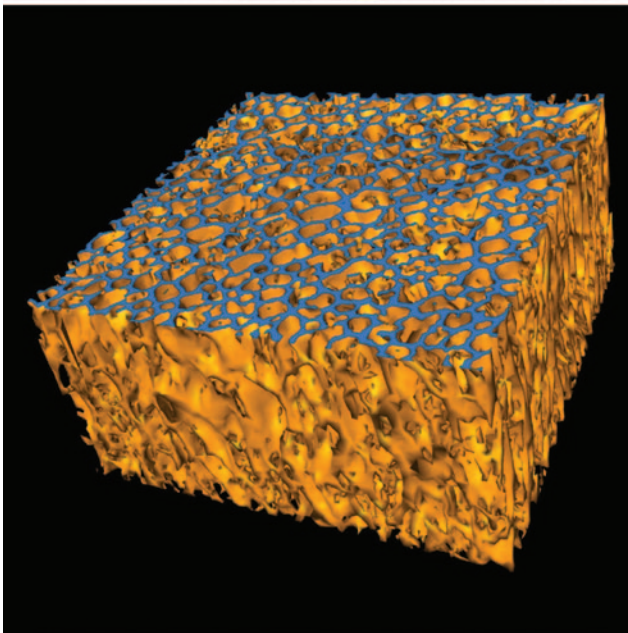
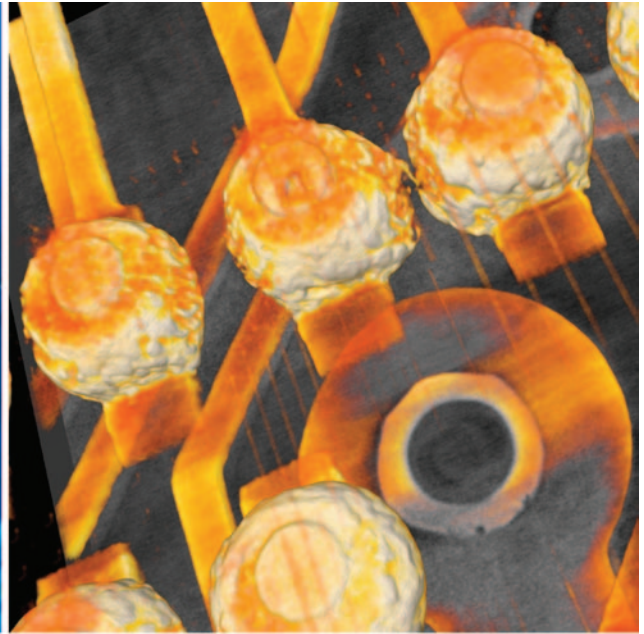
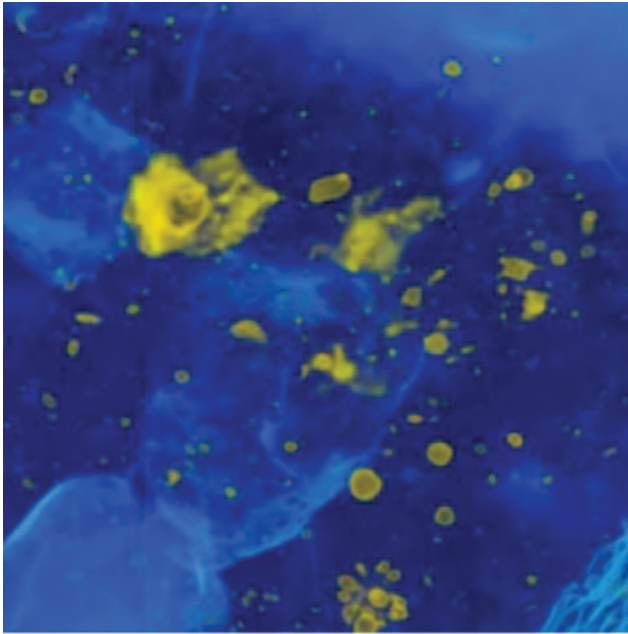


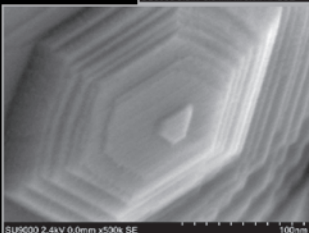
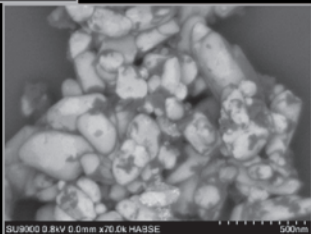
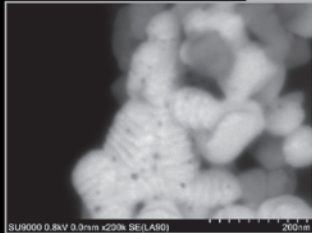
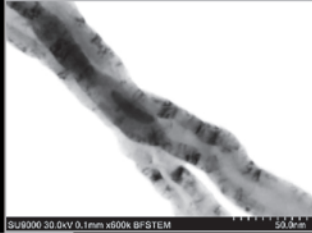
Microscopy TODAY

Volume 21 Number 2 2013 March



Explore the Future

The NEW Hitachi SU9000 Ultra-High-Resolution Field Emission Scanning Electron Microscope



*All new Hitachi SEMs, TEMs, and FIBs are now offered with a 3-year parts warranty!**

Hitachi's latest FE-SEM system, Model SU9000, is designed for ultra-high-resolution imaging, even for beam-sensitive specimens and advanced semiconductor devices that require stable observation at magnifications up to 3,000,000 times.

When it counts, think Hitachi

* Consumables and non-Hitachi accessories excluded. Offer valid in the United States only. Requires acceptance of additional Terms & Conditions. Hitachi High Technologies America reserves the right to terminate the 3-year parts warranty program at any time. Contact us for details.

Hitachi High Technologies America, Inc.
toll free: 800-548-9001 (US & Canada)
email: sales-LS@hitachi-hta.com

www.hitachi-hta.com/su9000
www.youtube.com/HitachiHT?A

HITACHI
Inspire the Next

M&M 2013 MICROSCOPY & MICROANALYSIS

August 4 – 8 • Indianapolis, IN

Register
now—save
\$100!

SHARE

information and
techniques

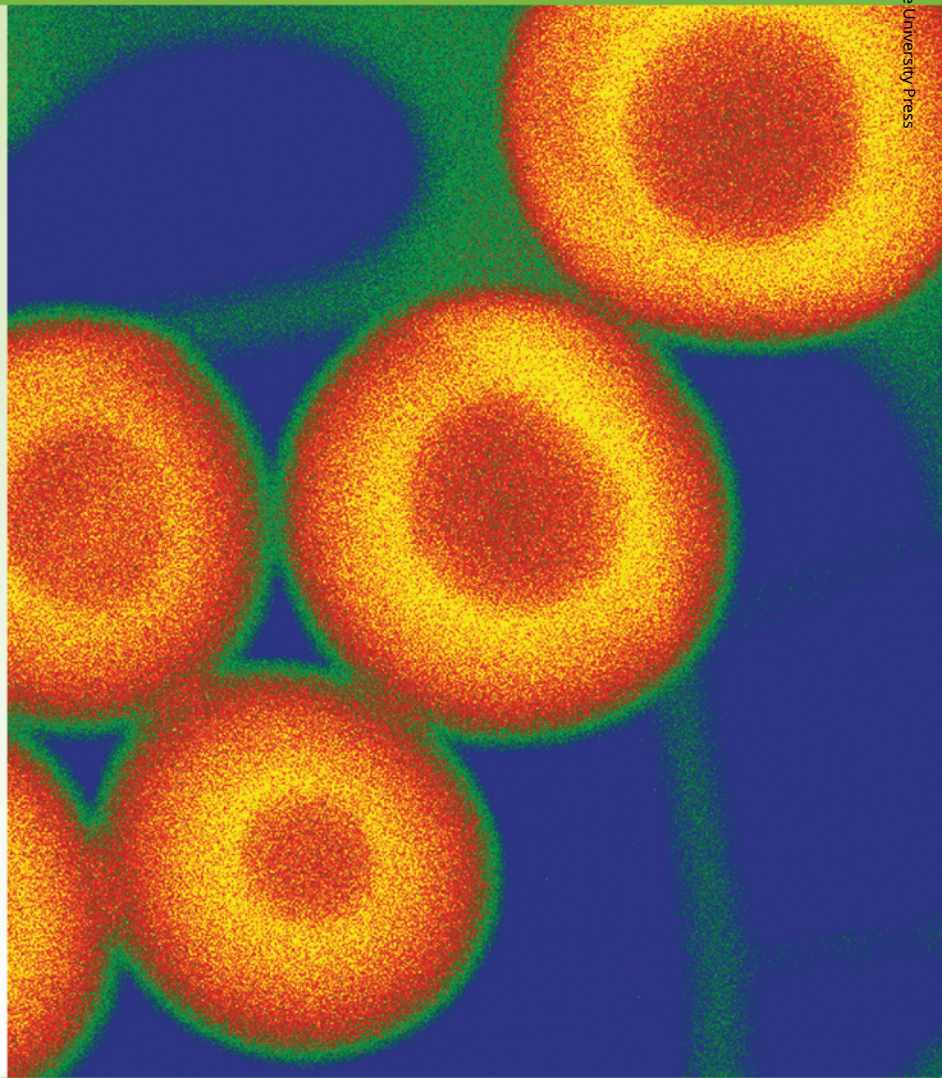
LEARN

about cutting-edge
technology

EXPAND

your professional
network

GROW and
SOLIDIFY
your career!



Register Online: <http://microscopy.org/MandM/2013>

Visit M&M website often for detailed program information,
registration & hotel info.



Raise your confidence

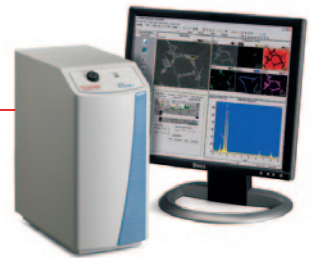
Spectral imaging on the **Thermo Scientific NORAN System 7** creates new opportunities to discover what is truly in your sample. Our UltraDry detector and analyzer electronics ensure that you collect as much data from the sample as possible. Go beyond simple elemental EDS map analysis; our exclusive COMPASS™ software processes spectral imaging data using principal component and statistical analyses to reveal unique phases and enrich your understanding of materials.

See what's really in your sample

• Discover more: thermoscientific.com/microanalysis



UltraDry EDS Detector
Fastest Collection, Most Accuracy



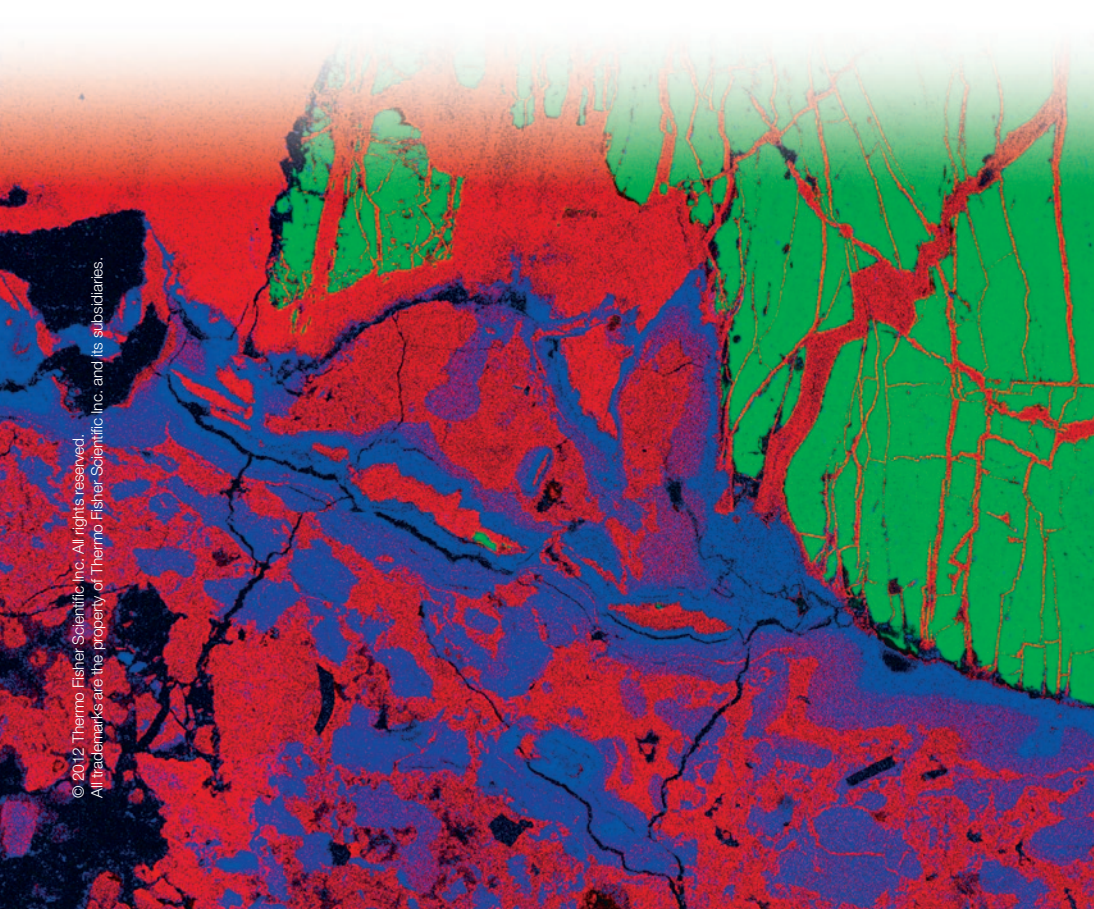
NORAN™ System 7
Integrated X-ray Microanalysis System



QuasOr EBSD
Simultaneous EDS. Better data.



MagnaRay WDS
Resolution with EDS Ease of Use



Contents

X-ray Microscopy

- 10 The Ascent of 3D X-ray Microscopy in the Laboratory**
Arno P. Merkle and Jeff Gelb
- 16 Micro/Nano-CT for Visualization of Internal Structures**
Anjali Singhal, James C. Grande, and Ying Zhou
- 24 X-ray Nano- and Micro-tomography in an SEM**
Bart Pauwels and Alexander Sasov

Instrumentation and Technique

- 30 Precision Local Electrical Probing: Potential for the Analysis of Nanocontacts and Nanointerconnects**
B. Guenther, J. Koeble, J. Chrost, M. Maier, C. M. Schneider, A. Bettac, and A. Feltz
- 34 Long-Travel Piezomotors for Microscopy Applications**
Scott Jordan and Stefan Vorndran
- 40 Using the TEM Condenser Lens to Switch between Image and Diffraction Modes**
Lydia Rivaud

Microscopy Education

- 42 NanoGrande: Electron Microscopy Education and Outreach Through a Collaboration of Scientists and Artists**
P. Catravas, K. Bubriski, M. D. Frey, M. E. Hagerman, B. Cohen, J. J. McGee, and S. S. Bowser

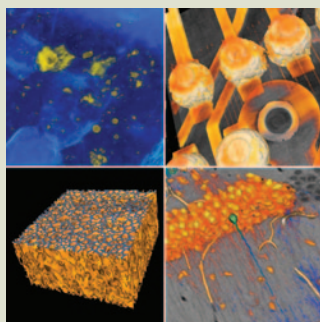
Microscopy Pioneers

- 48 Pioneers in Optics: Étienne-Jules Marey and Paul Gottlieb Nipkow**
Michael W. Davidson

Platform Transcripts

- 52 Equipment Funding Opportunities and Strategies for Success (Part 4)**
Isabel Cárdenas-Navia

About the Cover



X-ray microscopy in the laboratory: (clockwise from upper left) Sutter's Mill meteorite, microelectronic device, neuron cells, porous polymer.

See article by Merkle and Gelb.

Departments

- | | |
|--------------------------------------|--------------------------------|
| 7 Editorial | 60 NetNotes |
| 8 Carmichael's Concise Review | 70 Calendar of Meetings |
| 56 Industry News | 73 Dear Abbe |
| 58 Product News | 74 Index to Advertisers |



Systems smart enough to help you strengthen steel.

At EDAX, we understand how you see the world. That's why we design materials analysis systems smart enough to help you push the limits of science—no matter where you want to take it.

Power your next insight with EDAX.
EDAX.com

AMETEK[®]
MATERIALS ANALYSIS DIVISION

EDAX[®]

Smart Insight.