

JEOLink

JEOL USA News - Imaging & Microanalysis and More

Issue: #57

May/June 2015

Upcoming Events

[2015 Schedule of Events Online](#)

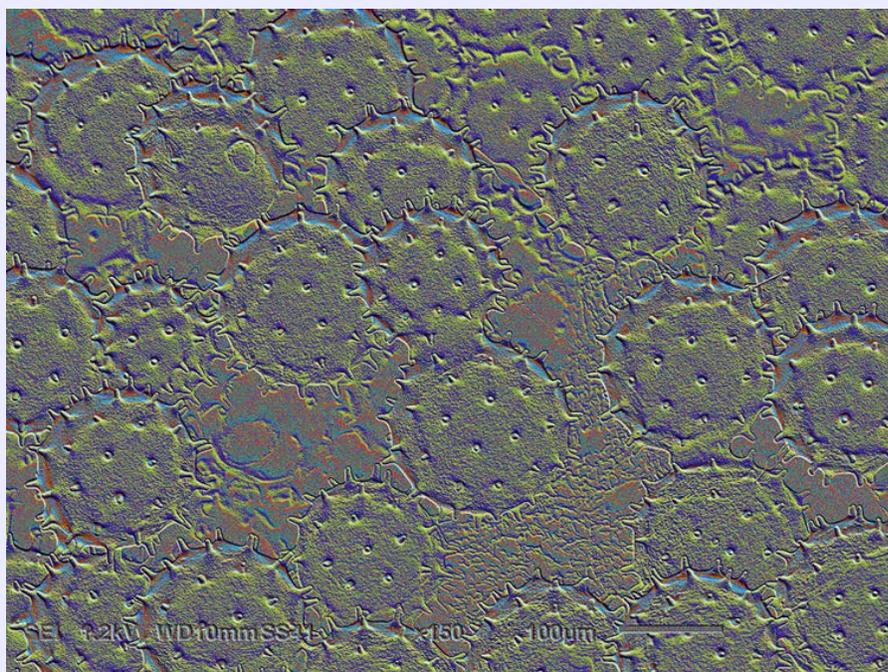
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[2015 Training Schedule at JEOL USA](#)

[Hooke College of Applied Sciences SEM/TEM Training](#)

JEOL in the News and in Publications

2015 Image Contest - Pollen Prevails for April and May Winners



Congratulations to Dr. Howard Berg of the [Donald Danforth Plant Science Center](#), winner of the JEOL Image Contest for April . This SEM image of hibiscus pollen was taken on the JEOL [JSM-6010 InTouchScope](#). The image was then manipulated using the embossing filter in Photoshop and colored for even more dramatic effect and detail.

[Howard Berg](#) established the Danforth Center's Integrated Microscopy Facility in 2001. "As Director of the Integrated Microscopy Facility at the Donald Danforth Plant Science Center (in St. Louis) I collaborate with institute scientists to facilitate their cell biology studies of plant cells, using a variety of microscopy techniques, including confocal microscopy, SEM and TEM. We study an interesting variety of tissues which occasionally includes anthers and pollen inside the anthers - pollen development is sophisticated. Not only is it important for each pollen grain to receive a faithful copy of the male genome, but this must be packaged in a particle that can survive outside the plant for a long time before landing on a stigma, germinating and fertilizing the egg. SEM is perfect for imaging the elaborate



Dr. Masahiro Kawasaki Recipient of MSA Award

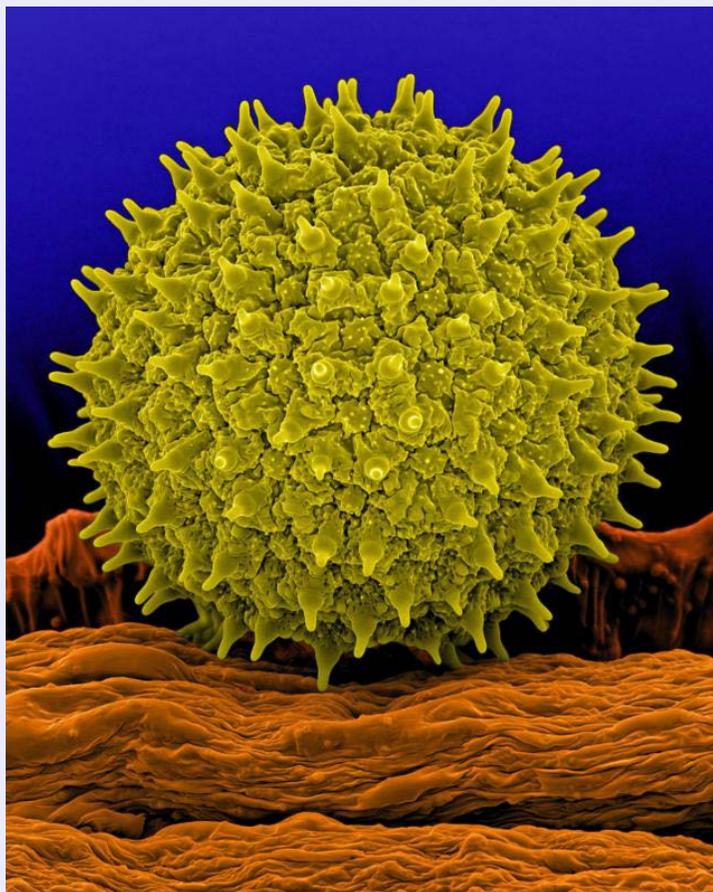
JEOL is pleased to announce that the Microscopy Society of America (MSA) Chuck Fiori Outstanding Technologist Award for Physical Sciences will be presented to [Dr. Masahiro Kawasaki](#) of JEOL USA at a special presentation during M&M 2015. Dr. Kawasaki is the Director of TEM Applications and Business Solutions for the Americas

The MSA nomination letter states: "Dr. Masahiro Kawasaki has made significant contributions to the development of new transmission electron microscope (TEM)/scanning TEM (STEM) techniques, and he has been responsible for introducing and teaching TEM/STEM techniques to countless microscopists.

"As a JEOL specialist, Dr. Kawasaki was mostly responsible for pushing the application of the STEM on a JEOL instrument. He was intimately involved in the development of the system, and he was the applications specialist who worked with customers to help them achieve atomic resolution STEM performance.

"Masahiro Kawasaki is a unique individual who has been able to create a bridge between physicists and biologists for using the state of the art tools in electron microscopy."

wall of the pollen grain, known as the exine. Each species has its distinct pattern of exine and this is used in palynology, the science of pollen species identification. Palynology is used in forensics, study of the fossil record, and in producing your local allergy report. The exine in pollen of some species forms spikes or similar ornamentation that tempts one to think that it is these that irritate our respiratory tract during allergy season, but it is the molecular composition of the pollen wall that is the source of the allergic reaction."

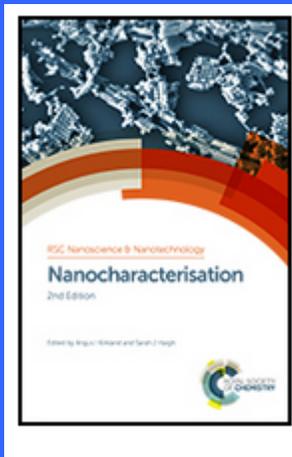


[Congratulations to Stefan Eberhard, Research Professional at the Complex Carbohydrate Research Center, The University of Georgia, for this winning image of Morning Glory pollen selected in May. This image was taken with a JSM-6010 InTouchScope SEM and colorized in Photoshop.](#)

Stefan Eberhard is a member of a research group that is studying the structure and functions of plant cell wall polysaccharides. In addition, he maintains and supervises the microscope facility at the CCRC, and oversees the plant growth facility and our

Nanocharacterization

In print May 28, 2015
Featuring chapter on Scanning
Electron and Ion Microscopy of
Nanostructured Materials - Authors
include Dr. Natasha Erdman of JEOL
USA.

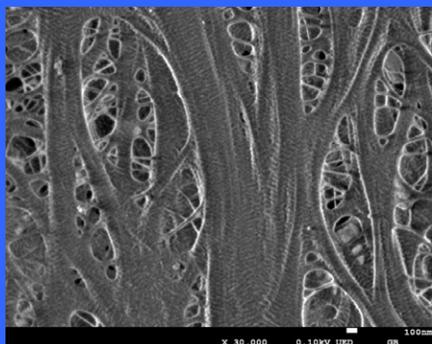


Father-Son Team Fight Crime from Behind Microscopes

*MicroTrace in Elgin, IL uses the
JSM-7100FT Field Emission SEM*

Beyond Light: Characterizing the Molecular World with Scanning Electron Microscopes

featuring an interview with Vern
Robertson of JEOL USA.



*Uncoated polymer battery separator
imaged at 30,000X utilizing a 0.1kV GB
mode upper electron detector.*

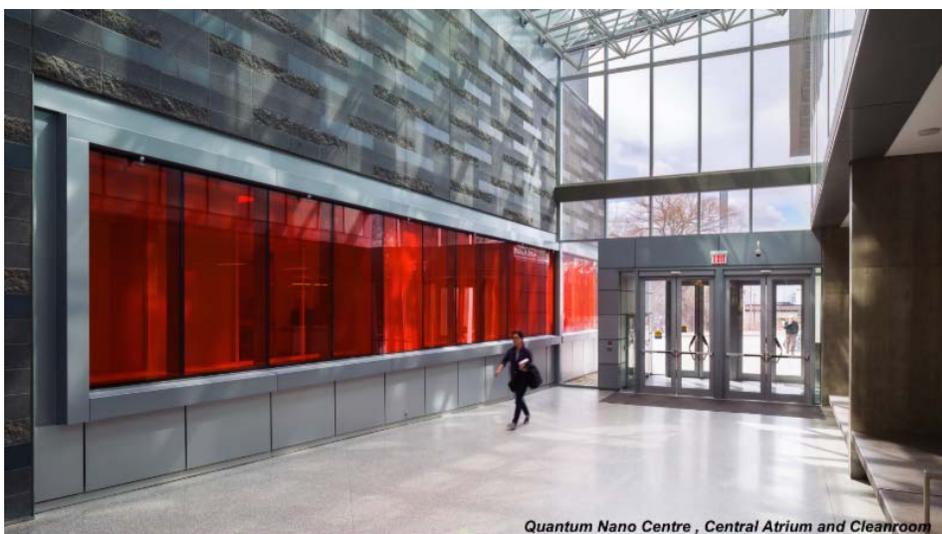
The first ever photograph of light as

greenhouse. "Although I was involved in a project where we were studying the pollen development in Arabidopsis plants, I personally don't work with morning glory plants. A college next to our greenhouse is. (But morning glory pollen are just visually more attractive!!) Whenever I have to capture images, by a light microscope or by the electron microscope, I always try to produce a visually pleasing image.....I like to explore the beauty of art within science, and share this images with a wider audience who does not have access to such wonderful tools. Many of my images have been used at UGA to illustrate general research publications."

Take your best shot and enter the 2015 Image Contest! Learn more about the [image contest details](#) and visit our [image gallery](#) on our website. We select a winner each month, then a Grand Prize SEM and TEM winner at the end of the year.

Entries for June contest due by June 25, 2015.

New JEOL E-Beam Lithography System to Enhance Quantum NanoFab Capabilities



Quantum Nano Centre , Central Atrium and Cleanroom

A state-of-the-art JEOL e-beam lithography system will soon be a new resource for quantum information science researchers that utilize the cutting-edge facilities at the University of Waterloo [Quantum NanoFab](#) located in the [Mike and Ophelia Lazaridis Quantum-Nano Centre](#) in Waterloo, Ontario. The JEOL [JBX-6300FS e-beam system](#) will be used to write circuitry patterns at very high resolution and linewidths as small as 8nm. With accelerating voltage capability to 100kV, high resolution patterns can be written on substrates coated in thick resist.

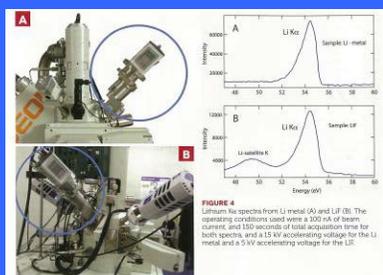
"We're very excited to obtain this 100kV system." said Vito Logiudice, Director of Operations for the Quantum NanoFab. "This opens the lab up for certain types of research where people need to use thick resist all while pushing the limits on minimum feature size." The new system will be an integral part of the Quantum Nanofab's goal of providing the tools needed for next-generation



JBX-6300FS E-beam Direct Write Lithography System courtesy of University of Washington

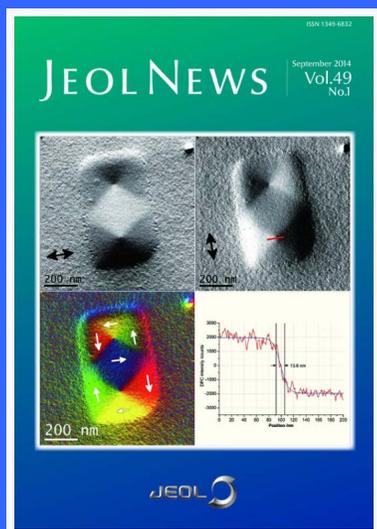
both a particle and wave

A Unique Wavelength-Dispersive
Soft X-ray Emission Spectrometer
for Electron Probe X-ray
Microanalyzers



JEOL News 2014

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Superhigh Resolution EM Stimulate
Progress in Materials Science

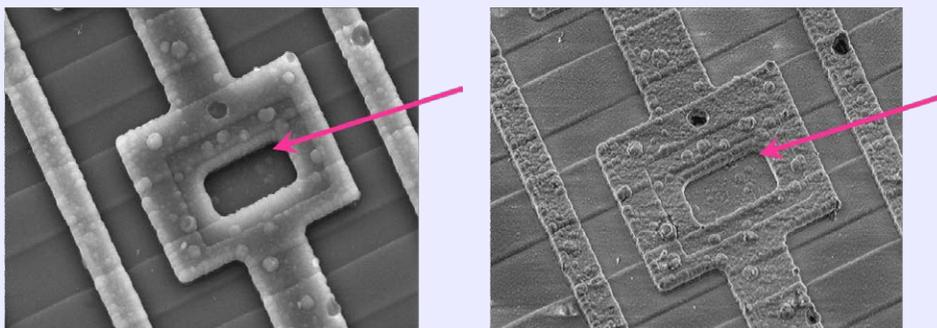


Quick Links

quantum devices.

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Tech Note: Some Thoughts on Low kV



A pair of images of a "Sunken Window" on a transistor. One image is 20 kV (left); the other is 2kV (right). While the 20kV image appears at first to be OK, edge effect washes out all corners and edges and depth of penetration minimizes all surface information. These two factors prevent one from seeing the actual defect (see arrows).

What makes the difference between a good SEM image and a stellar one? Imaging samples at the appropriate conditions, and that often means at very low accelerating voltage (low kV). It's time to give it a try!

Every modern day scanning electron microscope (SEM) from the top of the line, ultra-high resolution field emission SEMs to the most economical entry level tungsten (W) thermionic SEMs has the capability of imaging samples at very low accelerating voltage (Low kV). While it is true that low kV requires a little more effort, the benefits are enormous and worth the effort.

[A detailed explanation and more examples and comparisons are shown in this new Tech Note.](#) The bottom line: Don't revert to heavily coating the samples and running them at 15-20kV. Low kV is the way to go! And... stay tuned for the next installment when we will discuss some new techniques and advantages of low kV microanalysis.

New Microprobe for Carnegie Institution



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In just six weeks, this team completed installation of a new JEOL [JXA-8530F automated field emission electron microprobe](#) in Dr. John Armstrong's Geophysical Lab at Carnegie Institution for Science in Washington, D.C. Shown from left to right are: Kazunori Tsukamoto, designer for EPMA; Masayuki Kawashinima, JEOL Datum service; Dr. John Armstrong, Microbeam Specialist; Dave Videchak, National Service Support Specialist; and Lance Breisch, JEOL service engineer.

The microprobe, which was obtained through a joint effort by the institutions Geophysical Laboratory (GL) and Department of Terrestrial Magnetism (DTM), "will allow scientific staff, postdoctoral fellows, and visiting scientists to conduct automated, high resolution quantitative elemental microanalysis, multi-spectral imaging, and low-energy x-ray emission measurements. The higher resolution and sensitivity of in-situ chemical analysis will enable cutting-edge research across the spectrum of DTM and GL research. Carnegie is now one of only six Earth Science institutions in North America with this latest JEOL 8530F probe," reads the [news from the institution](#).

"We can now look at an order of magnitude smaller analysis spots (0.3 microns) and thereby study smaller minerals, experimental textures, and narrower diffusion profiles," said Armstrong about the new electron microprobe. "It also has other advanced mapping and spectral analysis capabilities that will be useful in creating new scientific results that we can't yet foresee."

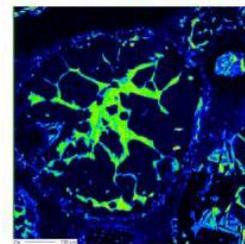
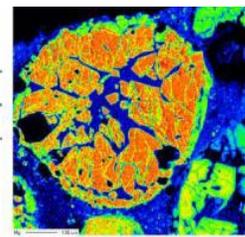
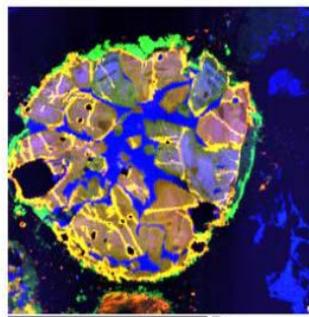
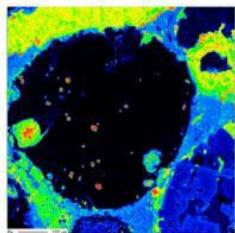
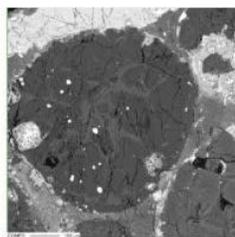
Armstrong has installed, maintained, and operated microprobes at NIST, Caltech, and Proctor & Gamble, and is the former President of the Microbeam Analysis Society.

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Shown is a CL image and element maps of a porphyritic olivine chondrule from Semarkona, an exceptionally pristine meteorite. These chondrules are amongst the earliest-forming objects in our solar system, and crystallized from molten droplets. This one consists mostly of olivine grains (brown to light blue), with glass concentrated in the core (dark blue), and surrounded by a slightly more iron-rich rim (green).



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