

INDUSTRY NEWS

Editor's Note: Starting in this issue, on a space-available basis, we will place one photo per company, when they are made available, in Industry News for current advertisers in the magazine. Plus a color tint for 6X insertion advertisers.

Hitachi High Technologies America, Inc. today announced the release of its latest **high-resolution in-lens Field Emission Scanning Electron Microscope (FE-SEM), the new Model S-5500**. As the only in-lens FE-SEM on the market, the S-5500 is the highest performance scanning electron microscope in the world, guaranteeing 4 angstrom (0.4nm) image resolution in secondary electron (SE) mode. This system features complete control of generated signals using the "Super E-cross-B" filter and secondary/backscattered (SE/BSE) electron signal mixing. The In-lens design offers stability and an environment for 2,000,000 times magnification. The S-5500 is available with the new Hitachi "Duo-STEM" detector, which incorporates both a phase contrast (brightfield) and z-contrast (darkfield) collection ability in an innovative new scanning transmission electron microscope (STEM) detector. The diverse capabilities of the instrument bridge many research fields, from silicon-based device design and characterization to biological applications with high throughput and fast sample exchange. This allows the user to achieve high quality results quickly and easily. The unit is suitable for the biological applications, imaging of 2nm colloidal gold labeling, transmitted electron imaging of polymers, MR Head imaging with a highly sensitive YAG-BSE detector, Cryo stage capabilities for pharmaceutical, biological, and food industry research and a nanomanipulation device for advanced carbon nanotube research. For further information, visit <http://www.hitachi-hta.com>.



During recent years a novel trend in optical spectroscopy techniques has emerged that makes use of the particular properties of nanometer scale objects. Of particular interest is the interaction of an AFM tip with a sample within an external optical field. Special attention has been devoted to surface (tip) enhanced Raman spectroscopy and to the manipulation of single molecules and particles with simultaneous single molecule fluorescence. **JPK Instruments** addresses this matter introducing the **Tip Assisted Optics (TAO) module as an add-on to the NanoWizard® AFM**. The NanoWizard® AFM is especially designed for the combination with optical techniques on the basis of inverted optical microscopes. As a three-axis closed loop system it allows the sample to stay fixed within the optical focus at all times. Furthermore, the use of an infrared light source (850nm) and special filters eliminates cross talk between optical experiment and AFM. First applications are in the area of Raman spectroscopy of biological materials with highest spatial resolution and the manipulation of quantum dots and dye molecules with single molecule fluorescence. JPK Instruments AG, eMail: bagordo@jpk.com, web: www.jpk.com

Princeton Gamma-Tech today announced the **launch of their new web site at www.pgt.com**. The new site has been completely re-designed, with simplified navigation and a wealth of new in-

formation and features. The new site contains complete information on the full range of PGT Products including downloadable brochures, training course and event schedules, and applications information. To learn more about the complete line of X-Ray Microanalysis systems and detectors offered by PGT, visit our website at www.pgt.com, email us at sales@pgt.com, or call us at (609) 924-7310.



QImaging® has announced the release of the **Retiga™ 4000R**.

This new **CCD camera** line combines the features afforded by QImaging's Retiga 2000R camera line with a larger pixel array to deliver the same exceptional performance with a bigger field of view. Available in monochrome or color models, either with or without cooling, the 12-bit, high-QE Retiga 4000R utilizes 4.19 million pixels (7.4 μm each) to yield high-quality brightfield and fluorescence images. The Retiga 4000R's spatial resolution and field of view are perfectly matched to many industrial and machine vision applications, as well as to life science applications such as pathology, histology, and simultaneous imaging of multiple cells. QImaging® has announced the release of the **Rolera-XR**. The new Rolera™ provides near-infrared sensitivity, high frame rates, and superb system performance for IR-DIC microscopy, live-cell imaging, lowlight fluorescence, and surveillance. An IEEE 1394 FireWire® digital interface facilitates easy camera installation for both systems; only a single wire is required to connect each camera to a computer or laptop. The expense, installation problems, and inconveniences associated with framegrabbers and bulky external power supplies are eliminated! Every Both systems ship with software that enables real-time image preview and capture for both Microsoft® Windows®- and Mac OS-based systems. The new cameras can be seamlessly integrated with all leading life science software packages to provide high-performance imaging capabilities for a wide variety of applications. For more information, please contact: Sales and Marketing Department, QImaging, 604.708.5061, INFO@QIMAGING.COM WWW.QIMAGING.COM

Carl Zeiss SMT – Nano Technology Systems Division has released the new **SUPRA™ 40 series of ultra high resolution field emission scanning electron microscopes (FESEM)**, which replaces the previous SUPRA™ 35 and SUPRA™ 50 FESEM models. The new nano tool is based on the latest version of the well renowned and unique ZEISS GEMINI® FESEM column, which delivers nanoscale high resolution imaging over the entire voltage range without the need for adjustments. The SUPRA™ 40 has been developed as an extremely versatile workhorse FESEM capable of delivering high quality imaging solutions for the many demanding applications in the field of nano technology. The new SUPRA™ 40 FESEM series comprises 3 models; SUPRA™ 40 for standard ultra high resolution applications; SUPRA™ 40VP variable pressure for real topography imaging of non conducting specimens; SUPRA™ 40WDS nano



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High Definition Digital TEM Cameras

AMT's XR60 & XR100

**TEM
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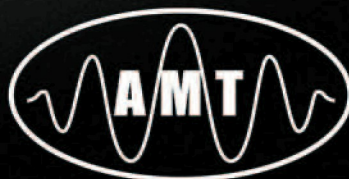
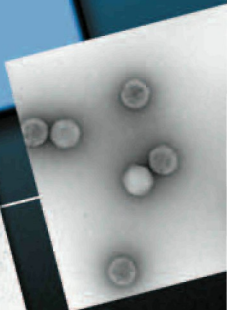
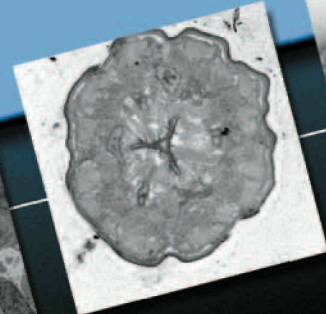
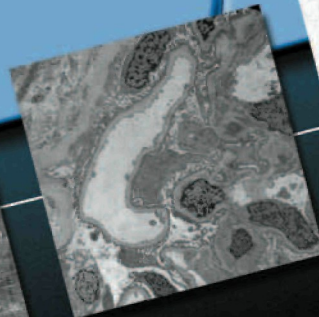
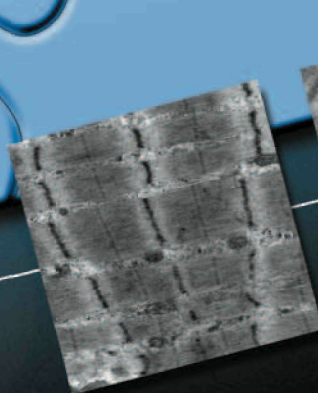
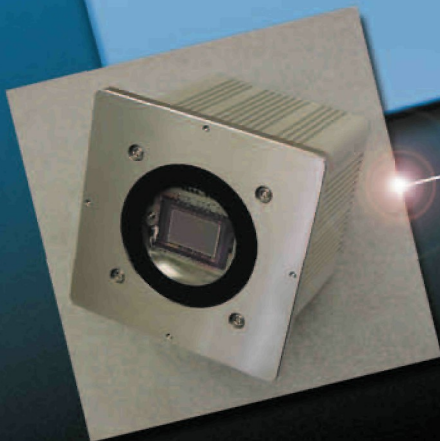
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analytical tool with a dedicated specimen chamber to accommodate both fully focussing wavelength dispersive and energy dispersive spectrometers. Customers benefit from an overall 20% increase in resolution both for high and for low voltage applications. The new SUPRA™ 40 offers higher stability, a new large (130mm) fully motorised eucentric versatile specimen stage and the option to install the high current module to explore analytical capabilities for EDS, WDS and EBSD. The SUPRA™ 40 with the large stage and high current module is ideally suited for material science analysis, geology and semiconductor applications. Life science applications benefit from the variable pressure mode which enables rich surface detail imaging in of non conducting specimens. Carl Zeiss MicroImaging, Inc. is pleased to announce a major redesign and **re-launch of its E-Commerce site – www.ShopZeiss.com**. The latest information on the more than 800 products, including catalog numbers, is available around the clock. Ordering accessories, consumables and spare parts is just as easy as ordering microscopes, since every single item is classified, thus providing a clear overview. Microscopes for biological and industrial applications are displayed in pre-configured packages based on a specific application. For more information contact Carl Zeiss MicroImaging, Inc., www.zeiss.com/micro.

Thermo Electron Corporation announces the release of **version 7.2 of the OMNIC Professional Software Suite** for laboratory FT-IR and Raman spectrometers. This update adds significant new features providing enhanced capabilities for advanced spectroscopy, image analysis, high-throughput chemistry and regulatory compliance in research, routine analysis and QA/QC environments. New SpectraCorr software in the OMNIC suite enables two-dimensional correlation spectroscopy (2DCOS) with new algorithms and advanced imaging graphics. SpectraCorr software addresses the most demanding spectroscopic analysis of dynamic chemical processes such as perturbation, reactions, temperature-dependant behaviors and photoacoustic depth profiling. OMNIC's Atlas imaging software, with its microscopic visualization and spectral analysis capabilities, now includes advanced image analysis. This provides chemically qualitative or quantitative answers from complex image maps using techniques such as principal component analysis (PCA) and multivariate curve resolution (MCR). By combining Atlas software with Thermo's Continuum XL FT-IR imaging microscope, it is now possible to perform chemical imaging with infrared spectroscopy. OMNIC's Array Automation software is designed for high-throughput chemical screening applications using FT-IR and Raman. The software provides screening tools that enable data processing capabilities in parallel, high-throughput data collection activities. Automated tools rapidly process spectral data and analysis tools such as cluster analysis produce results in vivid graphical representations OMNIC's Array Automation software reduces data evaluation time from hours to minutes. In this OMNIC release, Thermo extends its ValPro instrument qualification package to FT-IR, Raman and sampling modules. ValPro provides a flexible interface for running a wide variety of spectrometer, accessory or software qualification tests.



For the first time in the industry, qualification procedures have been implemented for commonly used sample compartment accessories, such as ATR and diffuse reflectance, as well as FT-Raman and dispersive Raman systems. Thermo's whole-system approach represents a breakthrough in qualification tools that allows owners to put their instrument into commission quickly and efficiently. For more information please call +1 800-532-4752, e-mail analyze@thermo.com or visit www.thermo.com/spectroscopy

Infinitesima Ltd. announced today that it will be debuting the **VideoAFM™, the world's first video-rate atomic force microscope**. The VideoAFM™ is the first atomic force microscope that is capable of delivering real-time images at video frame rates. With imaging rates up to 1000 times faster than conventional AFM's, the VideoAFM™ allows users to view and interact with molecular processes in real time. It can deliver full video at frame rates of 15 and 25 frames per second. The VideoAFM™ can view areas of 3µm by 3µm, with the viewing area able to be scanned across a surface in real-time. The VideoAFM™ works in conjunction with existing AFM's without affecting their functionality. The VideoAFM™ also allows large surface areas to be explored before selecting features of interest for a more detailed investigation. Research in areas such as polymer processes and biotechnology will be transformed by the VideoAFM™. Researchers will be able to view processes not previously observed. Additional information about Infinitesima Ltd. can be found at www.infinitesima.com.

Pacific Nanotechnology, Inc. announces the dates for their **next two training courses for users of atomic force microscopes (AFMs)**. As AFMs become more commonly used in laboratories around the world, the need for good quality training programs has increased. This is addressed by PNI in the courses taught by their experienced applications and technical staff. This on-going series of courses are held at the Pacific Nanotechnology headquarters located in Santa Clara, CA., and registrations are now being taken for the next two which will be held during the weeks of August 8-12 and November 7-11. The course agenda is split into two sections. The first half of the week covers the fundamental principles, operation and the application of the atomic force microscope. The second half of the week looks into the potential applications emphasizing some of the more advanced techniques such as using the AFM as a tool for lithography or making imaging studies of materials using an environmental cell. This section can accommodate the interests of attendees and is extremely popular to users wanting to unlock the capabilities for their new microscope. With places limited, potential participants are encouraged to contact PNI as soon as possible. The program can be viewed at <http://pacifnanotech.com/trainingschedule.html> or call (408) 982-9492 to reserve a place on the next course.

BudgetSensors® a Bulgarian manufacturer of silicon and silicon nitride probes for Atomic Force Microscopes (AFM) has **launched a new improved website**. Since the acquisition of Innovative Solutions Bulgaria Ltd. by NanoWorld Holding AG (Switzerland) in April, BudgetSensors®, which is part of Innovative Solutions Bulgaria, has worked hard to update all its marketing and information materials. The new website is a first step to assist

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customers to find their way through the continuously growing product range. The BudgetSensors website (www.budgetsensors.com) describes in detail the different AFM tips that are currently available and now also offers a gallery of images made with the increasingly popular products.

The **iTEM Diffraction extension** makes it possible to automatically index, evaluate, measure and analyze diffraction patterns. As with all other extensions, iTEM Diffraction is fully integrated with iTEM, the **Soft Imaging System** transmission electron microscopy image analysis platform. The base-level version offers numerous functions for processing, analysis, visualization and archiving of images and other data as well as for automation and report generation. With its solution-oriented software extensions, iTEM's range of functions can be precisely expanded according to the user's needs. Electron diffraction provides important information on the microstructure of crystalline materials. This TEM method of investigation is of particular significance for very small sample areas, and thus, especially fine-grain structures can be examined. In addition, alongside diffraction, high resolution images of the same sample area can be generated in the TEM. The diffraction image and FFT of the HREM image can be analyzed using iTEM Diffraction. Calibrating diffraction patterns (camera length) is done via iTEM Diffraction. This means that all diffraction images acquired thereafter are thus immediately calibrated. After the user has defined the position of the central spot (manually or automatically), analysis work can begin right away. Via iTEM Diffraction, diffraction patterns (SAD) of both single crystalline and polycrystalline samples can be indexed. After the crystal structure and lattice parameters have been defined, indexing is conducted via threshold detection (automatically) or via definition of the two g vectors (manually). Alongside the Miller indices, the zone axis is shown as the indexing result within the image overlay. The related lattice distances may be listed in a sheet automatically as needed. All data, including the image information is saved with the diffraction image. The Diffraction iTEM Solution offers easy analysis of diffraction patterns. Lattice plane distances are simple to measure as well as the angles between two different planes. The integrated snap function - which can be switched on and off - ensures the greatest possible precision. The snap function locates the brightest ambient point automatically and then uses this as a point of measurement. The corresponding image is just a click away: <http://www.soft-imaging.net/rd/english/3794.htm>. Do not hesitate contacting us in case of further questions: <mailto:marketing@soft-imaging.net>

JEOL USA, a leading supplier of scanning electron microscopes (SEMs), and **QuantomiX™**, the developer of specially-designed capsules for imaging wet samples in the vacuum chamber of the high magnification SEM, held a hands-on training workshop at JEOL's SEM demonstration facility during the first week of May. The combination of JEOL's Scanning Electron Microscopes and QuantomiX wetSEM™ technology enables scientists to directly image wet samples or liquids at room temperature and at atmospheric pressure. This opens the door to a wide range of samples that could not be analyzed in a conventional high vacuum or field emission SEM without extensive sample preparation. Applications can be found in Life Sciences, Medicine, and Industry. Scientists attending the workshop

were able to closely examine prepared samples of cells stained in various ways to highlight accumulation of lipids (products of digestion of fats and oils)!, immunogold labeled cells to detect antigens in biological samples, kidney and spinal cord tissue, personal care products such as deodorant and toothpaste, botanical specimens, and mineral suspensions. The QuantomiX QX capsule is uniquely designed for high resolution, high magnification SEM imaging of liquid or wet materials in their natural state without the need to utilize low vacuum SEM technology, ESEM or Cryo techniques. Hydrated samples that can be imaged in this way include food, emulsions or suspensions (cosmetics, ink, particles in oil), human, animal, plant, and microbial cells, tissues, and fluids. The capsule combines the function of a specimen holder, cell culture dish, or a tissue specimen holder with an electron-transparent, vacuum-tight window. This unique receptacle permits electron microscopy of samples held in water, buffer or other types of liquids at atmospheric pressure. Visit our web site at: <http://www.jeolusa.com>

JEOL will showcase two **Automatic Defect Review (ADR) Scanning Electron Microscopes (SEMs)** for 150mm, 200mm, and 300mm wafer inspection at Semicon West 2005. The JWS series of ADR tools offer high resolution, high throughput, and high tilt angles that enable imaging and detailed analysis of both bare and patterned wafers without the need for cleaving. Furthermore, these advanced systems enable comprehensive and automated wafer edge review. The JWS series of defect review SEMs from JEOL help identify the source of wafer contamination and fractures with full 360 degree wafer edge review at unprecedented resolution. The depth of focus and high resolution of the JEOL JWS-2000 and new JWS-3000 enable observation of the wafer edge, where defects such as peeling films, residual slurry, embedded defects, cracks, chips, and particles are more difficult to image using conventional optical tools. JEOL's unique column geometry allows the wafer bevel and exclusion zone areas to be in focus at the same time. The JWS-3000, designed for 300mm wafer inspection, features a new conical lens that achieves 3nm resolution ideal for high precision auto defect review of micro-defects in 65nm design rule processes. A high-throughput tool, the JWS-3000 can examine 300 to 400 defects per hour (DPH) in this high-sensitivity mode, or 600 to 750 DPH in high-speed mode for 90nm design rule processes. The JWS-2000, a 150mm and 200mm ADR tool with resolution of 5nm at 1kV and magnification range of 100 to 200,000X, offers a tilt angle range is from 0° to 60°. Both models feature an automatic energy dispersive X-ray analysis function.



JEOL will also present a suite precision sample preparation to ultrahigh resolution imaging at the nanoscale. JEOL's **new cross section polisher for scanning electron microscope (SEM)** sample prep. The JEOL CP slices and polishes difficult composite samples and coatings. These include solder bumps, PWBs, amalgams, thin films, intermetallics, and wire bonds. Using an argon ion beam, the CP preserves structures, voids and adhesions, interfaces, and coatings without deformation. It allows observation of crystalline

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structures and produces large area samples. Samples are ideal for EBSD observation with the SEM. Both cross section samples and full-size wafers can be imaged using JEOL's ultrahigh resolution SEM, the JSM-7401F, which produces high contrast, high clarity images—1.5nm resolution at 1kV - at magnifications up to one million times. The new cold field emission SEM introduced this year features a unique Gentle Beam method that decelerates incident electrons, enhancing observation of nanometric structures.

For advanced cross section analysis requiring the highest performance TEM technology, the **JEM-2500SE scanning transmission electron microscope (STEM)** is simpler to use than an in-lens SEM, yet produces images with ultrahigh resolution - 0.2nm - up to five times the resolution of SEM tools. The JEM-2500SE is used to investigate the internal structures of devices with advanced power and optics. The STEM's compact footprint and ergonomic design make it an ideal choice for the semiconductor fab.

For rapid production of cross section specimens for the STEM, JEOL represents the **Seiko SIINT fully-automated focused ion beam (FIB) system** that prepares and finalizes multi-point specimens at specified locations on 150, 200, or 300mm wafers without operator attendance. Using a gallium ion beam, the SMI 3050, 3200, and 3300 model FIBs rapidly and precisely converts the specified cross section area into a 100nm layer without destroying the wafer. For more information about JEOL USA, Inc. or any JEOL products, visit www.jeolusa.com, or call 978-535-5900.

Researchers at **Lawrence Livermore National Laboratory (LLNL)** in California **have set a new world record resolution in energy-loss spectroscopy—0.07eV energy resolution at a one second exposure time.** The LLNL research team achieved the results on a 200kV transmission electron microscope, the FEI Tecnai™ F20 electron microscope with patented monochromator and improved HT stability, combined with the special Gatan Model 866 GIF Tri-diem ERS Imaging Filter/Spectrometer. This performance record for energy-loss spectroscopy opens a whole new level of chemical analysis at the nanometer scale by probing bonding states, bandgap and valence band transitions of known and unknown materials. The overall spatial resolution is an order of magnitude below spatial resolution results that can be obtained on a Synchrotron and is extremely complimentary to that technique. View www.gatan.com and www.feicompany.com for more information.

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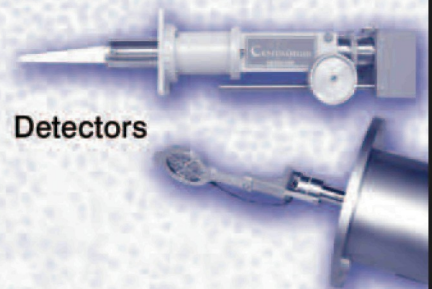
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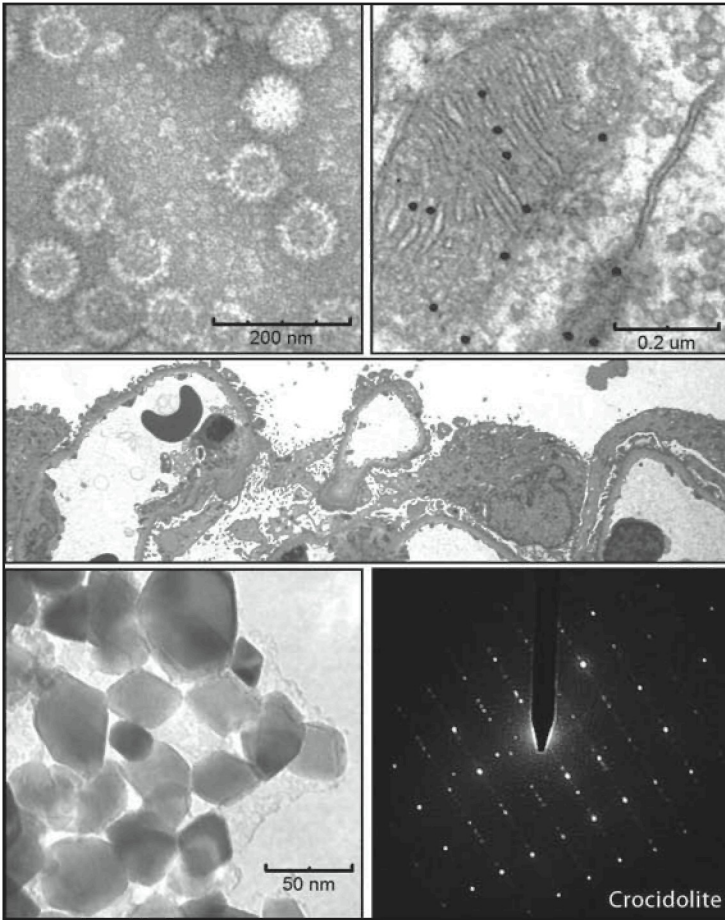
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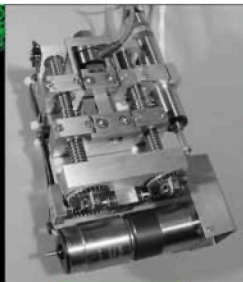


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