

new products

Focus on bioinstrumentation and biotechnologies

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Andreas Mandelis

Preclinical magnetic particle imaging

Bruker and Royal Philips have developed a novel technique for preclinical imaging. According to Bruker, the magnetic particle imaging (MPI) system may yield new insight into disease processes at the organ, cellular, and molecular levels. The MPI tomographic



imaging technique relies on the detection of the magnetic properties of iron oxide nanoparticles injected into the bloodstream to produce 3D images. Its potential for translational research, drug discovery, and, ultimately, patient care has been demonstrated in several studies. For example, MPI scanning has been used to produce real-time images that accurately capture the activity in a mouse's cardiovascular system. The ability to acquire high-resolution, time-resolved images in a matter of milliseconds will allow for novel applications in which temporal resolution can resolve questions that many existing imaging techniques cannot. *Bruker BioSpin Corporation, 15 Fortune Drive, Billerica, MA 01821-3991, <http://www.bruker.com>*

Medical-grade epoxy

Master Bond UV10TKMed is a higher-viscosity UV system for bonding, seal-

ing, and coating in medical device manufacturing applications. It passes USP class VI testing and meets the requirements of ISO 10993-5 for cytotoxicity. The one-part system is optically clear; its very high glass transition temperature exceeds 140 °C. It resists repeated sterilization by methods that include radiation, ethylene oxide, chemical sterilants, and autoclaving. The epoxy's service temperature ranges from -60 °F to 450 °F. It combines dimensional stability with low shrinkage upon curing. The system is 100% reactive and contains no solvents or diluents. It cures readily in 20–30 seconds when exposed to a UV light source emitting at a wavelength of 320–365 nm with an energy output as low as 20–40 mW/cm². It can cure in sections up to ¼ inch, but sections of a few thousandths of an inch are more than adequate for bonding. *Master Bond Inc, 154 Hobart Street, Hackensack, NJ 07601, <http://www.masterbond.com>*

Piezo positioning stage

Physik Instrumente has made available a new version of its smallest high-speed, motor-driven positioning stage.



The M-663.5U miniature linear positioner can be used in applications for which speed, repeatability, and compact dimensions are critical, but nanometer resolution is not required. Based on a composite design concept, the matchbox-sized M-663 positioning stages integrate a high-speed ceramic linear motor, a precision guiding system, and an optical linear encoder. Pre-

viously only available with a 100-nm encoder, the new, economical M-663.5U targets applications with micron-level precision. This is sufficient for many applications in biotechnology and medical design. It provides a travel range of 18 mm, acceleration of several gs, and a wide velocity range from a few microns/s to 10 inches/s. The ceramic linear motor is self-locking once a position has been reached. *Physik Instrumente LP, 16 Albert Street, Auburn, MA 01501, <http://www.pi-usa.us>*

Fiber-optic pressure-sensing systems

In collaboration with FISO Technologies, Harvard Apparatus has introduced the FISO-LS fiber-optic pressure-sensing system for life sciences research. Offered in 300-, 640-, and 1000-µm diameters and pressure ranges of ±300 mmHg and 0–10 bar, the small sensors are designed for multi-use, nondisposable, preclinical physiological pressure-measurement applications. According to the company, the FISO-LS system provides accuracy in intracranial, gastro-intestinal, respiratory, spinal, intraocular, and other pressure measurements. Because signal transduction does not rely on fluid-filled catheters, users do not need to be concerned about hydrostatic pressure columns, dampening by air bubbles, or the natural dampening of a signal in fluid transduction. *Harvard Apparatus, 84 October Hill Road, Holliston, MA 01746, <http://www.harvardapparatus.com>*

NMR platform

Agilent Technologies has released an NMR spectroscopy platform for use in academic, pharmaceutical, and applied chemical laboratories. The compact ProPulse 500- and 600-MHz system comes with Agilent's VnmrJ software, which the company claims generates high-quality data quickly and simply. According to Agilent, the combination of hardware and software allows users to perform complex NMR experiments with consistent results. Among other tools and



features are the VeriPulse toolkit, which automatically optimizes performance and minimizes maintenance costs. Wireless remote status tablet compatibility lets users monitor the system from anywhere in the laboratory. Software performs high-quality data reduction to amplitude and frequency tables and extends NMR applications into reaction monitoring or metabolomics. The software platform is compatible with existing NMR magnets. *Agilent Technologies Inc, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, <http://www.agilent.com>*

Microspectrometer

The compact, high-performance STS-UV microspectrometer from Ocean Optics is designed for integration into spectroscopy instrumentation, medical devices, process monitoring, and other applications for which a small footprint



is needed. Measuring 40 × 42 mm and 24 mm high, it is suitable for applications in the UV (190–650 nm) that include absorbance measurements, point-of-care diagnostics, emission spectroscopy, and laser characterization. The STS-UV provides full spectral analysis that enables applications for which a range of the spectrum is necessary for proper measurement. The high signal-to-noise ratio and wide dynamic range make the microspectrometer useful for measurements such as determining the absorbance from dilute solutions. A selection of configurations allows users to optimize optical resolution to a specific application. The STS-UV easily integrates into other devices. It can also be set up as part of a laboratory station or next to a process line for quality control measurements. *Ocean Optics Inc, 830 Douglas Avenue, Dunedin, FL 34698, <http://www.oceanoptics.com>*

Intrinsic viscosity measurements

RheoSense's *m*-VROC viscometer has a new measurement capability: It has been equipped with the highest resolution to detect and measure intrinsic viscosity, indispensable for biopharmaceutical and polymer applications. Intrinsic viscosity is a parameter used to determine molecular size, weight, structure, and interactions among proteins, polymers, or macromolecules. Applications pertinent to the polymerization, degradation, interaction, and stability of molecules may benefit; measurement of intrinsic viscosity is considered to be a more reliable method for understanding those complex phenomena than conventional light scattering, according to the company. With *m*-VROC, obtaining intrinsic viscosity measurements is easy and fast; it requires only 20 μ l and just a few minutes. *RheoSense Inc, 2678 Bishop Drive, Suite 270, San Ramon, CA 94583, <http://www.rheosense.com>*

Temperature control system

The Dynaflow Resolve temperature control add-on module from Celectricon enhances the company's Dynaflow Resolve automated perfusion system, which uses microfluidics for rapid and efficient solution-exchange experiments and makes it possible to measure ion-channel current regardless of cell type or compound. The new module offers precise, definable temperature control and complete stability, even for hour-long experiments. According to the company, it enables high speed, control, and flexibility so users can perform patch-clamp experiments at room temperature up to 45 °C to gain true physiological insight. Temperature control during ion-channel research is particularly important when investigating ion-channel kinetics and toxicity screening applications. *Celectricon AB, Flöjelbergsgatan 8C, SE-431 37 Mölndal, Sweden, <http://www.celectricon.com>*

Scientific CMOS camera

The optiMOS scientific CMOS camera for fluorescence microscopy has been launched by QImaging. An alternative to traditional CCD cameras, optiMOS



captures fast cellular dynamic events across a large field of view without compromising sensitivity. Many cellular mechanisms occur on short time scales and emit very low luminescence signals when fluorescently labeled. To sufficiently document those interactions, the imaging device must provide adequate spatial and temporal resolutions while maintaining very high sensitivity. Researchers have long relied on CCD cameras for scientific imaging because of their quantitative performance. However, CCD architecture has inherent limitations that prevent the devices from simultaneously increasing temporal resolution and maintaining spatial resolution. The optiMOS's speed can resolve fast cellular events. Its sensitivity can resolve low luminescence signals due to short exposures, and its resolution can determine small cell structures. *QImaging, 19535 56th Avenue, Suite 101, Surrey, British Columbia, Canada V3S 6K3, <http://www.qimaging.com>*

Superresolution microscopy in 3D

Carl Zeiss has expanded its 3D microscopy portfolio by introducing super-resolution, photoactivated localization microscopy (PALM) in 3D. A new module, the Elyra P.1, enables PALM in 3D for endogenously expressed photo-switchable fluorescent proteins. The module achieves resolutions in the range of 20–30 nm laterally and 50–80 nm axially. Users can capture highly resolved structures in 3D while treating the sample so gently that it remains intact for long-term observation. In PALM, photo-switchable fluorescent molecules are sparsely activated, so that only one out of many will be in its "on" state within a single point spread function. In 3D, the PSF defines codes for the *z*-position. The localizations are plotted in a new image to create the super-resolved image. *Carl Zeiss AG, Carl Zeiss Strasse 22, 73447 Oberkochen, Germany, <http://microscopy.zeiss.com>* ■