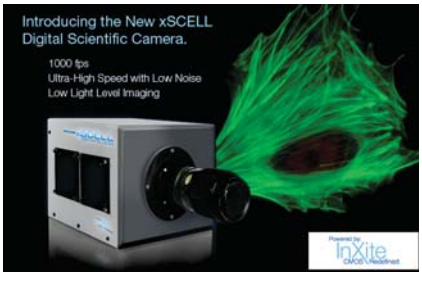
Focus on photonics and biomedical optics

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Digital scientific camera

Photonis USA has designed its new xSCELL digital scientific camera to address the unique combination of high-speed imaging, low light levels, and low dark noise requirements of fluorescence imaging, spinning disk confocal microscopy, high throughput screening, and gene sequencing. The high-performance camera features 1000 frames per second at a 1024 × 1024 resolution. It provides readout noise of



less than 2 e-rms and quantum efficiency of 65%. The xSCELL offers flexible readout modes, in-camera processing, and true pixel binning as part of its standard package. It is powered by InXite, a proprietary CMOS-based technology that the company claims brings greater speed and clarity to scientific imaging. InXite delivers data at a high dynamic range up to 14 bits and is cooled internally to −30 °C to nearly eliminate the effects of dark noise. *Photonis USA, 660 Main Street, Sturbridge, MA 01566, http://www.photonis.com*

Handheld Raman instrument

A new class of small, handheld instruments for materials identification and verification in facilities that are compliant with current good manufacturing practices has been released by B&W Tek. The NanoRam, a compact Raman spectrometer and integrated computing system based on an open systems architecture design, can support a broad range of applications in multiple industries. Designed for use by non-specialists, the NanoRam offers ease of sampling, on-the-spot analysis with no need for quarantine areas, highly selective peaks for both qualitative and quantitative analysis, and the ability to analyze both organic and inorganic compounds over a wide spectral range. Raman spectral libraries using samples certified by US Pharmacopeia are available for pharmaceutical materials. New spectra can be easily generated and added to existing libraries. Raman spectral libraries that have been created on other instruments can be transferred to the NanoRam platform using a library conversion utility. *B&W Tek Inc, 19 Shea Way, Newark, DE 19713, http://www.bwtek.com*

Fused silica wedge prisms

New Techspec fused silica wedge prisms from Edmund Optics may be used individually or in pairs for a wide range of beam-deviation options. They offer superior surface characteristics with 1/10 wave surface accuracy and 20–10 scratch-dig, and they provide a low coefficient of thermal expansion and a high transmittance for optimal performance from the UV to the near-IR range. Used individually, the prisms can refract a laser beam by a specific angle. In pairs, they are suitable for a wide variety of beam-steering applications. Using two Techspec prisms creates a beam-shaping anamorphic pair that can easily correct the elliptical shape of diode outputs. The fused silica wedge prisms are available uncoated in 0.5°, 1.0°, 1.5°, 2.0°, 2.5°, 4.0°, and 5.0° beam deviations. N-BK7 versions are also available. *Edmund Optics Inc, 101 East Gloucester Pike, Barrington, NJ 08007-1380, http://www.edmundoptics.com*

Proteome biophotonic software

Bruker has introduced PRIME, a characterization tool designed to illuminate the true picture of the proteome, complete with biological context. The PRIME features high fidelity in extracted information and data quality. Novel approaches include glycomics, general posttranslational modification (PTM) analysis, and matrix-assisted laser desorption and ionization (MALDI) molecular imaging. They are fully embedded in workflows evolving with the subfields in the overall proteomics arena. For MALDI imaging, PRIME provides a complete workflow for biomarker discovery and identification, from sample preparation to localization, data analysis, and interpretation. The core technology of PRIME is ProteinScape, Bruker's proteomics database system. It enables efficient data analysis for protein identification, quantitation, and PTM characterization. The bioinformatics suite manages and merges data from MALDI with electronically stored information workflows. It has been enhanced with GlycoQuest, a database search engine for glycan structure identification. GlycoQuest complements the conventional peptide database search tools and provides complete glycopeptide identification. *Bruker Daltonics Inc, 40 Manning Road, Manning Park, Billerica, MA 01821, http://www.bdal.com*

Intravascular imaging system

Infraredx has launched its TVC imaging system, an enhanced version of its LipiScan intravascular ultrasound (IVUS) coronary imaging system. It gives users the ability to visualize not only the physical structure of a vessel but also its composition and the potential presence of lipid core plaques of interest. The system allows interventional cardiologists to obtain information that is critical for evaluating vessel structure and composition, also known as true vessel characterization. The system's improved image resolution delivers better clinical detail, which allows for more reliable vessel interpretation and assessment and can potentially improve management of coronary artery disease. The device is a multimodality imaging system that combines IVUS and

near-IR spectroscopy. *Infraredx Inc, 34 Third Avenue, Burlington, MA 01803, http://www.infraredx.com*

Power supply for spectroscopy

McPherson's model 718 power supply is a highly regulated DC power source intended for spectroscopy and other applications. Rated to 250 W, it is capable of powering tungsten–halogen, ceramic, and glowbar IR light sources. The device obtains high performance by using a transistor series-pass regulator circuit. An additional control circuit provides less than 0.05% ripple to the source in use. The power supply's output can be terminated if user-defined external conditions, such as disconnected fan cables, exist. Each power supply can be operated from the front panel controls or remotely via a 0- to 6-V analog input. A front panel local/remote switch allows users to select mode. There are separate connectors on the rear of the unit for the fan, lamp (plus interlock), and remote input. Model 718 power supplies have a US AC power cord and cables that fit the model 621 lamp housing. A fan cable is not required for IR sources. Special cables are available for use with the model 618 100-W tungsten–halogen source. *McPherson Inc, 7A Stuart Road, Chelmsford, MA 01824, http://www.mcphersoninc.com*

Live-cell image stabilization system

The Nano-Cyte LC from Mad City Labs is an image-based, platform-independent stabilization system for live-cell imaging. The instrument minimizes temperature gradients, sample drift, and microscope drift. High stability in the nanometer regime allows longer-term experiments than previously possible. The system's integrated stabilization approach yields image stability within ± 10 nm in X and Y and ± 20 nm in Z. According to the company, the Nano-Cyte LC has proven stability over days. Some of its other advantages over conventional imaging systems are 3D stabilization at the nanometer scale, correction for temperature gradients and drift, simultaneous image acquisition and stabilization, integrated hardware and automated software control, and independence from a microscope platform. *Mad City Labs Inc, 2524 Todd Drive, Madison, WI 53713, http://www.madcitylabs.com*

Ultrafast laser system

Spectra-Physics, a division of Newport Corp, has released the InSight DeepSee ultrafast laser system for multiphoton imaging. Based on patented technology, the new instrument delivers nearly double the tuning range of existing ultrafast lasers and provides seamless access to long IR wavelengths for deepest in vivo imaging. Robust and fully automated, InSight DeepSee provides easy-to-use, hands-off operation. The system features 680- to 1300-nm continuous tuning from a single source, 100-fs pulse widths, and high peak power levels—into the IR—where imaging penetration depth is maximized. Spectra-Physics' integrated DeepSee, a dispersion precompensator, delivers the pulses through a microscope to the sample for maximum fluorescence. It also has high beam pointing stability, beam quality, and output power stability, making it suitable for microscopy. *Newport Corporation, Spectra-Physics Lasers Division, 1791 Deere Avenue, Irvine, CA 92606, http://www.newport.com*

Laser stabilization scheme

Designed for research and engineering, Toptica's new BlueMode laser combines high power (up to 50 mW at 405 nm) and single-frequency laser operation. The established BlueMode wavelengths—405, 445, and 488 nm—are now complemented by new GreenMode (515 nm, 25 mW) and RedMode (638 nm, 30 mW, and 685 nm, 25 mW) models. Blue/green wavelengths are well suited for Raman spectroscopy and quantum cryptography, while red wavelengths are a common choice in interferometry. Applications requiring multiple laser lines will benefit from the option of running two lasers simultaneously with the same set of driver electronics. However, a change in ambient conditions—temperature, air pressure, or humidity levels—could still lead to occasional mode instabilities and incoherent, multimode emission intervals. Toptica therefore has equipped the BlueMode laser with the new coherence-advanced regulation mode stabilization scheme, or CHARM. The scheme employs a field-programmable gate array-based regulator to ensure continuous single-frequency operation and thus reliable long-term stability of the lasing wavelength and output power. Mode-hops and resulting step changes of the laser's power or frequency have thus been eliminated. *Toptica Photonics Inc, 1286 Blossom Drive, Victor, NY 14564, http://www.toptica.com*

Stain-free protein imaging system

Bio-Rad Laboratories has made available its ChemiDoc MP imaging system, an instrument capable of chemiluminescent, multiplex fluorescent, and routine gel imaging. According to the company, the stain-free total-protein-normalization method produces faster results and overcomes the potential errors associated with normalization when housekeeping proteins are used. The system can be integrated with Bio-Rad's V3 Western Workflow, a set of Bio-Rad products that shorten the protein-separation and blot-transfer steps from several hours to 30 minutes. Using the ChemiDoc MP system, researchers can visualize protein separation on Criterion TGX stain-free precast gels, verify successful transfer by imaging the membrane with stain-free detection, and validate the accuracy of western blot results at every step. *Bio-Rad Laboratories, Life Science Research, 2000 Alfred Nobel Drive, Hercules, CA 94547, http://www.bio-rad.com*

Solid-state laser for life sciences

Coherent has expanded its Genesis family of multiwatt visible lasers for life sciences with two new models that offer 2 and 4 W of output power at 514 nm. Based on Coherent's optically pumped semiconductor laser technology, the Genesis CX 514 provides multiple watts of continuous-wave output at that

wavelength. Both the 2- and 4-W models feature low (less than 0.1%) output noise, TEM00 beam quality, and full compliance with Center for Devices and Radiological Health regulations, making them suitable for both OEM and standalone research applications. The Genesis CX 514 offers low cost of ownership with an expected lifetime of more than 20 000 hours, which the company claims is three to four times longer than that of ion laser technology. The output power of the lasers can be smoothly adjusted from 10% to 100% of the maximum value with no effect on beam quality or beam pointing stability, which is less than 2 μrad/°C. The 514-nm output makes the instruments suitable for fluorescence-based applications in life sciences and in bioinstrumentation. The lasers are also useful for pumping dye and solid-state gain media. *Coherent Inc, 5100 Patrick Henry Drive, Santa Clara, CA 95054, http://www.coherent.com*

New literature

Resource for photonics research

Newport Corp has introduced the new *Newport Resource*, a catalog for photonics research products and related applications. It includes products from Newport brands Corion, New Focus, Oriel Instruments, Richardson Gratings, and Spectra-Physics Lasers. Available in English, French, German, and Chinese, *Newport Resource* is designed as a learning tool and product guide for optoelectronics engineers and university and photonics researchers. The 1632-page catalog highlights 2440 new products. More than 202 pages provide technical and application notes and instructive reference information. Included are definitions and characteristics for tunable diode lasers, manual positioning, picomotors, optical measurement devices, and optics. The catalog is free of charge and may be ordered online at http://www.newport.com/NewportResource. *Newport Corporation, 1791 Deere Avenue, Irvine, CA 92606, http://www.newport.com* ■