

NEW PRODUCTS

Focus on biotechnologies, biomedical optics, and microscopy

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. For all new products submissions, please send to Rnanna@aip.org.

Andreas Mandelis

Color fluorescence microscope camera



Olympus has released its DP74 color and monochrome microscope camera for real-time and fluorescence imaging

in life sciences and industry. According to the company, the DP74's wide field of view, high live speed, and well-calibrated colors provide an onscreen experience that closely matches the traditional ocular view. A frame rate of up to 60 fps minimizes jitter to provide smooth images of specimens even if they or the stage are moving, and images are delivered with a resolution of up to 1200 p. The camera's intelligent imaging analyzes the live image to automatically reduce processing time and produce quality images of even dim and challenging samples. Optimized for fluorescence color imaging, the DP74 has a cooled CMOS sensor to help provide clear, bright fluorescence images. Multi-frame noise reduction lets users capture sharp images, even with a weak signal. **Olympus Corporation of the Americas**, 3500 Corporate Pkwy, Center Valley, PA 18034-0610, www.olympus-lifescience.com

Neuroscience software

Bitplane, an Oxford Instruments company, has released version 8.4 of its Imaris microscopy image analysis software, which has a novel approach to tracing neuron structures in 3D images. Imaris 8.4 addresses the challenge of tracing dendrites and spines in dense neuronal networks, often found in very large—even terabyte-sized—data sets. The patent-pending Torch tool intuitively highlights structures close to the cursor while darkening the rest of the image to help users accurately trace individual neurons in dense and thick samples. The company has updated its Autopath and Autodepth features. Autopath, which automatically calculates the best-fitting path along a filament, can now begin tracing immediately after a start point is chosen, pause calculations, and restart them again from the same point. It may be particularly useful for examining long filaments inside complex structures. Autodepth—automatic depth detection for 3D filament drawing—has been given auto-snap functionality that provides consistently fast, efficient tracing. **Bitplane USA**, 300 Baker Ave, Ste 150, Concord, MA 01742, www.bitplane.com

Femtosecond optical parametric amplifier



Calmar Laser has added its Bodega femtosecond optical parametric amplifier (OPA) to its fiber-laser-based chirped pulse amplifier platform. The integration of the OPA with the high-energy, ultrafast fiber laser provides high beam quality, less than 200 fs, and more than 200 nJ output pulses at either 1300 nm or 1700 nm with megahertz repetition rates. Because those wavelengths have low water absorption and low scattering properties, they are suitable for deep tissue penetration and three-photon brain imaging. The pulse width, pulse energy, and repetition rate are useful for nonlinear imaging applications. The pulse energy is higher than that from titanium:sapphire lasers and optical parametric oscillators at repetition rates higher than Ti:sapphire amplifiers and OPA systems. Optimal signal levels and imaging speed can be achieved without excessive sample heating and at lower cost than with conventional Ti:sapphire-based OPA systems. **Calmar Laser**, 951 Commercial St, Palo Alto, CA 94303, www.calmarlaser.com

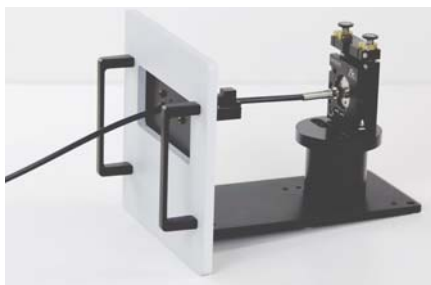
Ultrastable microscope stages

Physik Instrumente (PI) has introduced two compact, very stable XY microscope stages: Model U-761 provides 25 × 25 mm translation and has linear encoders with 10 nm of resolution; model U-780 provides 135 × 85 mm. The stages are based on PI's ultrasonic piezo direct-drive motors, which feature millisecond responsiveness; a wide dynamic range with jerk-free, smooth motion; and velocities from less than 1 μm/s to 120 mm/s. They can provide stable images because of their drift-free, self-locking design that clamps the stage down once a target position has been reached. A large aperture and many adapter plates allow for the use of microscope slides, well plates, and petri dishes. Applications include tiling and superresolution, confocal, and automated scanning microscopy. Optional PInano Z and XYZ piezo flexure stages can be added for applications such as fast focusing, single-molecule tracking, and optical trapping. **Physik Instrumente LP**, 16 Albert St, Auburn, MA 01501, www.pi-usa.us



Fiber-coupling sample holder

PicoQuant has added a new fiber-coupling sample holder to its modular time-resolved spectrometer, the Fluo-Time 300, to interface with microscopes such as the company's MicroTime 100. Users can record time- and space-resolved emission spectra from any sample mounted in the microscope.



According to PicoQuant, expanding the capabilities of a spectrometer with a microscope's ability to probe and scan small areas can facilitate the investigation of the spatial dependence of luminescence behavior in various samples. For example, structural defects in semiconductor materials such as copper indium gallium (di)selenide used in solar cell research could be localized and characterized. With accessories such as a hybrid detector, a time-correlated single-photon counting card, and a pulsed laser, the setup can meet high temporal, spectral, or spatial resolution requirements for many applications in the life, materials, and environmental sciences. **PicoQuant**, Rudower Chaussee 29, 12489 Berlin, Germany, www.picoquant.com

Microvolume spectrophotometer



Molecular Devices has launched its SpectraMax QuickDrop microvolume spectrophotometer to address the needs of life-sciences users who quantify very small amounts of DNA, RNA, oligonucleotides, and proteins. With the microvolume sample port, users can work with samples as small as 0.5 μL , and with the standard 10 mm cuvette port, they can quantify larger samples. The microvolume sample port features a horizontal light beam and a fixed path length for reliable results regardless of sample viscosity. A large, high-resolution touchscreen interface lets researchers use preconfigured analysis methods, easily set up customized experiments, and export data to a USB flash drive for additional analysis. The economical, stand-alone QuickDrop spectrophotometer has a small footprint, offers a 4 s read time, and does not require a dedicated computer to operate. **Molecular Devices LLC**, 1311 Orleans Dr, Sunnyvale, CA 94089, www.moleculardevices.com

Scientific CMOS camera for biomedical instrumentation

Photometrics and QImaging have jointly announced the QI400BSI scientific CMOS camera for manufacturers of biomedical instrumentation for life-sciences imaging and detection. According to the companies, the camera has the first scientific-grade, backside-illuminated CMOS sensor and offers the highest quantum efficiency (QE) currently available, so it can deliver performance similar to that of an electron multiplying CCD. With its combination of high sensitivity, low noise, and high frame rates, the QI400BSI is suitable for low-light imaging. Its near-perfect QE allows for the collection of nearly all available light and maximizes the measurable signal from an experiment or assay while minimizing cellular photo damage. The camera captures 41 fps with 16-bit images and 82 fps with 12-bit images. Applications include single-molecule fluorescence and superresolution, confocal, and light-sheet microscopy. **Photometrics**, 3440 E Britannia Dr, Ste 100, Tucson, AZ 85706, www.photometrics.com



Laser-beam combiners

BrightLine multiphoton LaserMUX beam-combining filters from Semrock, a division of IDEX Health & Science, offer wavefront performance optimized for deep-tissue and *in vivo* imaging in optogenetics and other life-sciences applications. According to the company, the beam combiners produce excellent contrast in multicolor and multimodal fluorescence microscopy. They are suitable for combining two femtosecond pulsed laser beams. When the polarizations of the two beams are aligned with the spectral performance of the filters, high transmission, high reflection, and low group delay dispersion can be achieved over a wide wavelength range while maintaining minimal wavefront distortion. **Semrock Inc**, 3625 Buffalo Rd, Ste 6, Rochester, NY 14624, www.semrock.com

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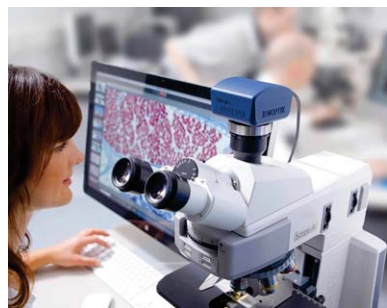
<http://cremat.com>

Cremat's low noise charge sensitive preamplifiers (CSPs) can be used to read out pulse signals from **p-i-n photodiodes**, **avalanche photodiodes (APDs)**, **SiPM photodiodes**, semiconductor radiation detectors (e.g. Si, CdTe, CZT), ionization chambers, proportional counters, surface barrier/PIPS detectors and **PMTs**.

When used with shaping amplifiers, you can detect visible light pulses of a couple femto-joules using common p-i-n photodiodes. Our amplifiers are small plug-in modules, but we also sell evaluation boards for them.

cremat

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Microscope cameras

According to Jenoptik, the microscope cameras added to its Progres Gryphax USB 3.0 series for life-sciences and other scientific applications will help users who work with poorly illuminated or weakly transmitting samples. The cameras are equipped with CMOS sensors that have wide-ranging capabilities and offer high quantum efficiency, considerable dynamic range, and very low noise. Active sensor cooling is no longer required for exposure times of up to two minutes. According to the company, the Progres Gryphax Kapella, a sensitive color camera for use with challenging samples and lighting conditions, offers superior image dynamics and highly resolved detail. Its monochrome counterpart, the Progres Gryphax Rigel, is the most sensitive camera in the portfolio. The versatile Progres Gryphax Prokyon features image resolution of 2.3–20.7 megapixels and is suitable for all aspects of microscopy. **Jenoptik Optical Systems Inc**, 16490 Innovation Dr, Jupiter, FL 33478, www.jenoptik.com

High-brightness monochromator

McPherson offers its model 207A spectrometer for life-sciences users who need versatile high brightness as a tunable light source for diagnostic or analytical spectroscopy. It has a 670 mm focal length, is optically fast with an f/4.7 monochromator, and is available with off-axis parabolic mirrors, which provide both low f-number and stigmatic monochromator performance. With their highly polished, smooth surfaces, the mirrors are especially suitable for work in the deep UV and vacuum regions. According to McPherson, stigmatic monochromators are somewhat unusual, since many monochromator designs use spherical optics and exhibit astigmatism to some degree. Model 207A features coincident sagittal and tangential foci that provide a high degree of collimation and focusing. It preserves high brightness with no chromatic aberrations. **McPherson Inc**, 7-A Stuart Rd, Chelmsford, MA 01824-4107, www.mcphersoninc.com



Multiphoton imaging in neuroscience

Broker offers its NeuraLight 3D all-optical stimulation and imaging platform as an option for its new Ultima multiphoton systems and as an upgrade to earlier systems. Mated to an Ultima microscope optical port, the NeuraLight 3D module can help users conducting multicell brain research to decode neural networks and connectivity. Bruker's spatial light module technology works in conjunction with multiphoton microscopy to map neural networks with respect to stimulation frequency and spatial resolution on *in vivo* and *in vitro* experimental models. Users can create a 3D laser hologram to simultaneously stimulate cells in three dimensions; the number of targets is limited only by the peak power of the laser used for stimulation. With a comprehensive software toolkit, NeuraLight 3D can generate and rapidly switch—at rates of 300–500 Hz—between 3D activation patterns while imaging, recording electrical signals, and triggering behavioral and electrical stimuli. **Bruker Nano Surfaces Division**, 112 Robin Hill Rd, Santa Barbara, CA 93117, www.bruker.com



High-speed confocal microscope

Caliber Imaging & Diagnostics designed its RS-G4 modular confocal microscope to deliver high resolution and clean contrast while scanning large areas at high speed. It may reduce the time required to study large-format samples such as brain slices, plant cross sections, and large fields of cells and tissue. The RS-G4's ability for high-speed strip mosaic imaging with multiple wavelengths enables it to image very large areas rapidly. Continual stage movement is coordinated with the resonant scanning of the confocal microscope. Simultaneously, a proprietary stitching algorithm assembles and aligns mosaic strips with pixel-level resolution. Adding a new laser opens opportunities for fluorescence excitation at 405 nm, 488 nm, 561 nm, 640 nm, and, critical for deep-tissue neuroscience, 785 nm. The RS-G4 can collect large-area 3D image stacks that can be imported by a processing package such as ImageJ or Imaris. **Caliber Imaging & Diagnostics Inc**, 100 Burt Rd, Ste 203, Andover, MA 01810, www.caliberid.com



Automated life-sciences research platform

According to Zeiss, its Celldiscoverer 7 combines automation with the image quality and flexibility of a classic inverted research microscope. Its optical design and advanced automatic calibration routines can help users achieve high-quality data even from complex, long-term, time-lapse imaging experiments. Various incubation and detection options, including a range of microscope cameras for demanding live-cell experiments and rapid time-lapse recordings, allow the system to be tailored to individual research needs. Specialty hardware finds and retains the focus automatically after detecting the thickness and optical properties of the sample carrier. The information is then used to adapt the novel Autocorr objectives for optimal image quality by adjusting the objective correction ring to compensate for spherical aberrations. Integrated incubation options provide a suitable environment for living cells. **Carl Zeiss Microscopy GmbH**, Carl-Zeiss-Promenade 10, 07745 Jena, Germany, www.zeiss.com



High-speed video camera

Fastec Imaging's IL5 5-megapixel camera can easily be mounted on a microscope to record high-speed video for slow-motion analysis. Spatial and temporal magnification can clarify understanding in such applications as microfluidics, in which particles can quickly move through the field of view. Four models produce crisp, clean video from 2560×2048 at 230 fps to 800×600 at 1650 fps. All models record more than 3200 fps at video-graphics-array resolution and more than 18 000 fps at smaller resolutions. The IL5 can save images to an SSD or SD card while recording high-speed bursts of hundreds or thousands of images at a time. With the long-record (LR) option, the camera can record at high speed for many minutes at high resolutions or many hours at reduced resolutions. The LR FasCorder mode allows the camera to be operated as a regular camcorder that can record, pause for review, and append additional footage. **Fastec Imaging Corporation**, 17150 Via Del Campo, Ste 301, San Diego, CA 92127, www.fastecimaging.com

Gas chromatography-mass spectrometry system



Shimadzu Scientific Instruments has unveiled its GCMS-TQ8050 triple quadrupole gas chromatograph mass spectrometer. The new instrument, part of the company's GC-MS product line, has a highly sensitive detector

that enables monitoring of femtogram-level concentrations of trace components. With improved long-term stability from high amplification levels and reduced noise levels, the GCMS-TQ8050 delivers reliable trace analysis results. Applications include the analysis of extremely small quantities of dioxin in foods and the environment, persistent organic pollutants, and endocrine-disrupting chemicals. The system features a new turbomolecular pump and a high-efficiency collision cell to enable various high-sensitivity analyses. Because the pump has high evacuation efficiency, the system can maintain high vacuum levels even when using a collision gas to monitor and analyze multiple reactions. **Shimadzu Scientific Instruments Inc**, 7102 Riverwood Dr, Columbia, MD 21046, www.ssi.shimadzu.com

Neural probe positioner

The MPM multiprobe micromanipulator system from New Scale Technologies provides convenient, automated positioning of multiple neural probes for acute *in vivo* recording of upright and inverted experiments. The compact system is simple to set up and operate with integrated motion-control software. A single PC application controls 15 axes of motion with absolute position measurement by using five four-axis manual arms and five three-axis automated micromanipulators—precision linear stages with position sensors, embedded closed-loop controllers, and the company's piezoelectric Squiggle motors. The MPM system is compatible with probes such as tetrodes and silicon probes with hundreds of channels. It can be used to simultaneously position optical waveguides or optical fibers for research that combines electrophysiology with optogenetic stimulation. **New Scale Technologies Inc**, 121 Victor Heights Pkwy, Victor, NY 14564, www.newscaletech.com

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