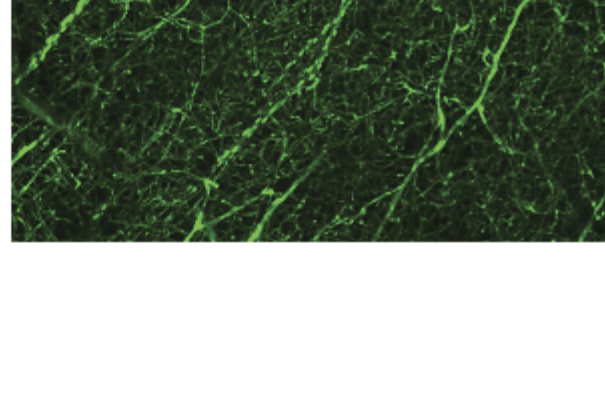


Monthly newsletter focusing on how light-based technologies are being used in the life sciences. Includes news, features and product developments in lasers, imaging, optics, spectroscopy, microscopy, lighting and more. Manage your Photonics Media membership at [Photonics.com/subscribe](http://Photonics.com/subscribe).



## NIR Spectroscopy Captures the Impacts of Stroke

Every year, approximately 5.5 million people worldwide lose their lives to stroke. According to the Centers for Disease Control and Prevention, stroke-related costs in the U.S. total nearly \$50 billion annually<sup>1</sup>. Stroke is the fifth leading cause of death and a major cause of serious disability in adults in the U.S. Because of its impact on the health of those stricken and on society as a whole, several health agencies are committed to funding research to enrich our understanding of its causes and effects. This research, which incorporates a number of imaging modalities, is aimed at answering several key questions: What risk factors contribute to the likelihood of stroke? What is the core mechanism that causes it? What determines prognosis? How does the brain recover?



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## Two-Photon Imaging Monitors Brain Synapses During Prolonged Anesthesia

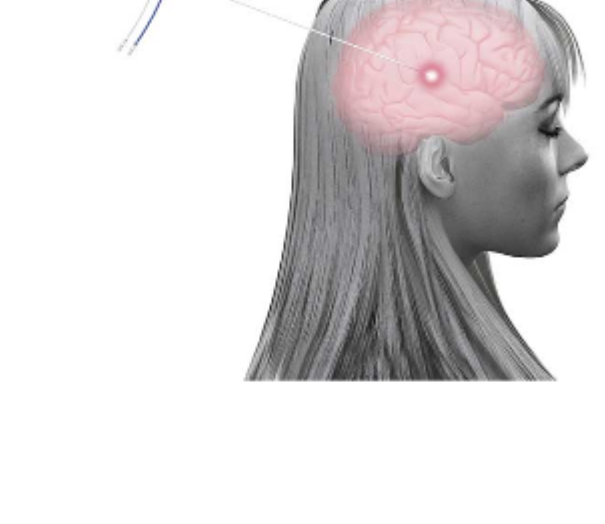
The formation of synapses in the circuitry of the brain, and especially the solidification and disappearance of synaptic structures, mediates how people learn, memorize, and forget. Since the introduction of two-photon imaging to neuroscience in the 1990s, it has been used to image synaptic connections in the brains of living animals. Two-photon imaging has also revealed changes in neural functioning that underlie neuropsychiatric diseases such as epilepsy, multiple sclerosis, and schizophrenia. A recent study of two-photon synaptic imaging of mouse brain during prolonged anesthesia revealed major structural changes in synapses<sup>1</sup>, highlighting the utility of two-photon microscopy to provide data that could justify shifts in patient care, specifically in intensive care medicine.



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## Laser Therapy Reaches Hard-to-Treat Epilepsy

For decades, the most commonly used treatments for epilepsy were pharmaceuticals or resection surgery, which involves removing a segment of brain tissue from where the patient's seizures originate. These remedies can work well and continue to be the best treatment option in many cases, but they can also cause debilitating side effects. For some patients, drug therapy has proven ineffective, leaving them searching for another solution. Modern laser therapy has been shown in both clinical and proof-of-concept studies to be potentially helpful or even curative for many, because of its unique ability to precisely target affected brain tissue and stop or at least minimize the erratic signals emanating from it.



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## .: Featured Products



### KeyLight™ OEM Microscopy Light Source

**Phoseon Technology Inc.** KeyLight™ illumination sources for fluorescence microscopy are the perfect

solution to integrate into your equipment. Phoseon's proprietary LED solutions offer intense, broad-spectrum wavelengths for various colors from UV through visible into the infrared.

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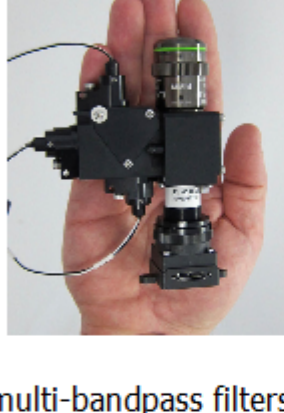


### Light Sheet for Cleared Tissue

**Applied Scientific Instrumentation Inc.** The ct-dSPIM is a flexible and easy-to-use light sheet microscopy configuration optimized for imaging large cleared tissue samples. The sample is mounted on a motorized XYZ stage and imaged via stage scanning. Two multi-immersion or other objective lenses are held in an upright "V" geometry for light sheet illumination and detection.

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### Compact Fluorescence Imaging Modules for your Instrumentation Project

**Etaluma Inc.** Our powerful commercial-ready fluorescence microscope modules use modern LED excitation, multi-bandpass filters, and CMOS cameras to solve your custom imaging needs. We provide easy integration in the minimum space for analytical and clinical instrumentation development.

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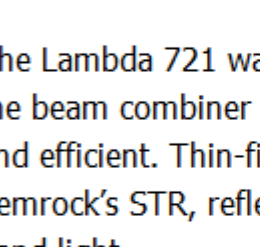


### Lumencor's New CELESTA quattro

**Lumencor Inc.** The CELESTA quattro Light Engine delivers four lasers with brightness, stability, and longevity. It's designed to provide high performance solid-state laser lighting with which our CELESTA is synchronous, yet it has been refined from seven to four outputs for enhanced value.

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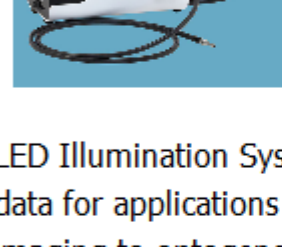
### Lambda 721 - Optical Beam Combining System

**Sutter Instrument Company**

The Lambda 721 was designed to keep the size of the beam combiner small and the optical path short and efficient. Thin-film bandpass filters, such as Semrock's STR, reflect greater than 90% of out-of-band light.

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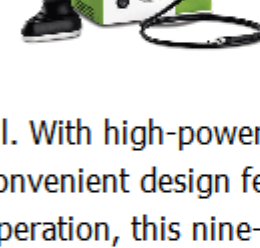


### Lighting-Fast LED Illumination

**CoolLED Ltd.** Backed by CoolLED's world-renowned support and warranty, the pE-800 Series LED Illumination Systems deliver the highest quality data for applications ranging from calcium and pH imaging to optogenetics, ratiometric measurements, and everyday fluorescence. The pE-800 Series includes two sophisticated yet easy-to-use...

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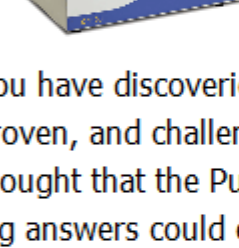
### X-Cite® NOVEM LED Illuminator

**Excelitas Technologies Corp.**

The X-Cite NOVEM™ has it all. With high-power output, a wide spectral range, convenient design features, and whisper-quiet operation, this nine-channel LED illuminator does everything but compromise. Whatever wavelength your application requires, from Fura-2 to IR800, the X-Cite NOVEM has you covered.

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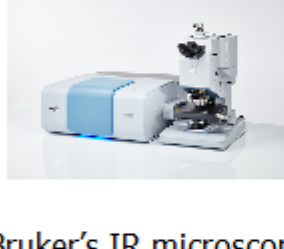
### Think BIG; Go Small with XENON's X-1100 Benchtop Research System

**XENON Corp.**

You have discoveries to make, theories to be proven, and challenges to overcome. Who'd have thought that the Pulsed Light tool to provide such big answers could come in such a small package. The X-1100 Benchtop Pulsed Light System is XENON's ground-breaking research tool...

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### NEW from Bruker - HYPERION II - FPA/FTR/IR Laser Imaging Microscope

**Bruker Optics Inc.**

A Bruker's IR microscope HYPERION has always been synonymous with sensitivity and versatility. For more than 20 years, it has pioneered FT-IR imaging and left its mark in countless high-profile publications. With the new HYPERION II Laser Imaging Microscope, we remain true to our reputation as an innovation leader.

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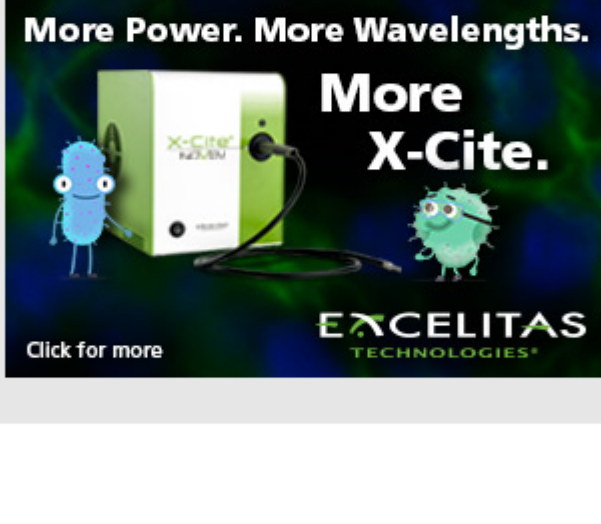
### 1938-R/2938-R Optical Power Meters

**MKS/Newport**

The all new 1938-R and 2938-R power meters inherited most of the advanced functions available in the x936-R series, as well as an up-to-date CPU, touch screen, Android OS, and high-bandwidth electronics design. Ideal for high speed, modulated light measurements, these new power meters are powerful, fast, and versatile.

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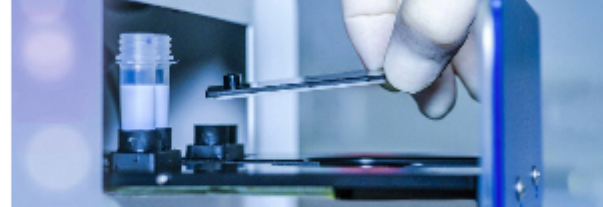
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## .: In Case You Missed It

### Optofluidic Device Enables Detection of Single Molecules

Citing increased resistance to antibiotics on the rise globally, researchers from Fraunhofer Institute for Physical Measurement Techniques (Fraunhofer IPM), working alongside those from the Ludwig Maximilian University of Munich, have developed a process for rapidly detecting multidrug-resistant pathogens. The method is sensitive enough to be able to use a single molecule of DNA for pathogen detection.



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### Photonic Crystal Microscope Quickly Detects Biomarkers for P-O-C Diagnostics

A compact photonic resonator absorption microscope (PRAM) instrument, developed by a team at the University of Illinois Urbana-Champaign, provides fast, selective detection of cancer biomarkers for diagnostics at the point of care. The instrument takes advantage of the optical coupling between plasmonic gold nanoparticle tags and a photonic crystal surface to provide the contrast users need to observe and count gold nanoparticles that are linked to proteins or other biomarkers.

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### Microscope Slide Increases Contrast to Distinguish Cells, Speed Diagnoses

A microscope slide that is compatible with any optical microscope could hold implications for the future of cancer detection. The tool, called the NanoMSlide, was developed by researchers at La Trobe University. Brian Abbey and Eugeniu Balaur, with Belinda Parker of the Peter MacCallum Cancer Centre, spent a five years developing the technology to serve as a medical diagnostic tool for the detection of cancer cells.

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## .: Upcoming Webinars

### Si/SiN-Integrated Photonics for Lidar, Quantum, and Sensing

Wed, Jan 19, 2022 10:00 AM - 11:00 AM EST

In this webinar, Amin Abbasi, business development manager at imec, presents imec's recent collaborative progress on using integrated photonics for emerging applications such as on-chip lidar, quantum computing, and sensing. The added value of using integrated photonics-based solutions is a higher level of integration capacity, compactness, and scalability. Presented by imec.

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Multiphoton Imaging, Optical Filters in PCR Testing, NIR Spectroscopy, and more.

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