Wednesday, November 22, 2023

BIOPHOTONICS
BRINGING LIGHT TO THE LIFE SCIENCES®
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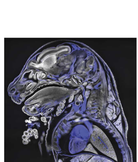
Monthly newsletter focusing on how light-based technologies are being used in the life sciences. Includes news, features and product developments in lasers, imaging, optics, spectroscopy, microscopy, lighting and more. Manage your Photonics Media membership at Photonics.com/subscribe.

Multiphoton Microscopy Evolves with the Aid of Laser Systems

Multiphoton excitation (MPE) microscopy has successfully transitioned from the demonstration of its potential that took place more than 30 years ago to a powerful imaging method used throughout the life sciences. This breadth is reflected in a range of modern techniques, including two-photon or three-photon excitation fluorescence microscopy, coherent anti-Stokes Raman scattering, and harmonic generation microscopy. This technology has been applied to a range of applications from research in fields such as neuroscience to analytical assessments of cell vitality for pharmaceutical development and preclinical purposes. And the continued evolution of ultrafast laser systems is helping to bring MPE into new realms.



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Illuminating the Unseen: Data at Depth with Light-Sheet Fluorescence Microscopy

Light-sheet fluorescence microscopy, also called single plane illumination microscopy (SPIM) is a noninvasive 3D imaging method that employs a sheet of light to illuminate a thin plane of a specimen. This technique reduces out-of-focus light and allows deep tissue imaging with reduced photodamage. This means that SPIM is particularly well suited for in vivo observation at subcellular resolutions that yield only minimal photoxicity and fluorophore bleaching. Due to these properties, SPIM has become widely used for dynamic studies with time-lapse imaging of live biological samples over extended periods of time (hours to days).

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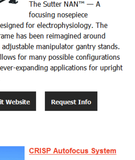
Nobel Prize in Chemistry Recognizes Quantum Dot Pioneers

Moungi Bawendi, Louis Brus, and Alexei Ekimov have been awarded the 2023 Nobel Prize in chemistry for the discovery and development of quantum dots, which are nanoparticles small enough that their size determines their properties. These discoveries have led to advancements in nanotechnology that are now used in products such as televisions, LED lamps, QLED screens, and technology that allows biochemists and doctors to map biological tissue.



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.: Featured Products & Services

LS850 Fully Automated Microscope

Etaluma Inc.

The LS850 Microscope is the latest generation of our fully automated three-channel flagship model and offers the latest advances in optics, cameras, throughput, and user flexibility delivering image quality, motion speed, illumination, and software flexibility.

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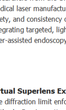
Nucleus™ Automated Microscopes

Zaber Technologies Inc.

Customize your own fluorescence microscope online with a range of hardware modules and software tools. Configure one to scan 96 well plates in just 3.8 seconds or one to simultaneously scan 6 microplates. Prices start at $25,000.

Visit Website | Request Info



Custom Optical Assemblies

Rocky Mountain Instrument Co. (RMI)

Custom optical assemblies for your life science applications including microscopy, spectroscopy, and biotech imaging. Proven technologies in fast prototyping, design consultation, and vertically integrated manufacturing.

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NAN Open-Design Upright Microscope

Sutter Instrument Company

The Sutter NAN™ — A focusing nosepiece microscope designed for electrophysiology. The microscope frame has been reimagined around highly stable, adjustable manipulator gantry stands. This design allows for many possible configurations to match the ever-expanding applications for upright microscopes.

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Custom Fiber Optic Solutions

Armadillo SIA

Armadillo SIA offers a comprehensive line of optical fibers, cables, bifurcated assemblies, patch cords, bundles, and more — all custom designed to your specifications. Assemblies can be made from any of our high-quality fibers and your choice of sheathing, cabling, and Jacketing. In addition, we offer all standard connectors or custom-designed ferrules to suit applications from deep UV to MIR.

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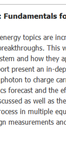

CRISP Autofocus System

Applied Scientific Instrumentation Inc.

The Continuous Reflection Interface Sampling and Positioning system (CRISP) is designed to maintain focus over time. It substantially eliminates focus drift in high-power microscopy applications by sensing minute changes between the objective lens and the sample's cover slip.

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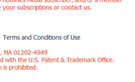
.: In Case You Missed It

Integrating Light-based Techniques Improves Phototherapy for Cancer

Researchers from the University of Maryland, in collaboration with medical laser manufacturer Modulight, demonstrated that the efficacy, safety, and consistency of photoimmunotherapy can be improved by integrating targeted, light-based techniques for drug delivery with laser-assisted endoscopy and fluorescence-guided treatment planning.



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Virtual Superlens Exceeds Diffraction Limit Without Image Distortion

The diffraction limit enforces physical restrictions on how closely an object can be examined using traditional optical methods. Previous attempts to develop superlenses that image beyond the diffraction limit have met with extreme visual losses, to the point of making the lenses opaque. A virtual superlensing approach developed by researchers at the University of Sydney has broken through the diffraction limit by a factor of nearly four times. The researchers' innovative approach to superlensing could improve superresolution microscopy for fields as varied as medical imaging, archaeology, and forensics.

Read Article

Quasiparticle Light Source Could Rival Super-Brightness of FELs

An international team of scientists is rethinking the principles of radiation physics, with the goal of creating super-bright light sources that are compact and relatively convenient to use. Coherent light sources such as free-electron lasers provide super-bright beams for studying biological, chemical, and physical phenomena. Although these super-bright sources can enhance the imaging for many applications from drug development to chip-making, their massive size and scarcity make them impractical for most laboratories, hospitals, and businesses.

Read Article

.: Upcoming Webinars

Quantum Efficiency Measurements: Fundamentals for Solar Cell Research, Part 1

Tue, Dec 5, 2023 1:00 PM - 2:00 PM EST

In today's energy-challenged world, clean energy topics are increasingly important, particularly with solar cell designs reaching new efficiency breakthroughs. This webinar series shares the fundamental measurements for a quantum efficiency system and how they apply to the research and design of a solar cell. Representatives from MKS Newport present an in-depth discussion of internal quantum efficiency (IQE), external quantum efficiency (EQE), and incident photon to charge carrier efficiency (IPCE). They also share a brief overview of clean energy demand, including the photovoltaics forecast and the effect on solar cell design. Specific requirements that are needed to take these measurements are discussed as well as the key challenges researchers run into during experimentation. Finally, they touch on a typical testing process in multiple equipment configurations. Join MKS Newport experts to learn and dig into the world of solar cell design measurements and how to set up a lab for success. Presented by MKS Newport.

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Features

Virtual Staining of Tissue, Raman Photothermal Microscopy, Medical Sensors in fNIRS, and Optical Filters in Raman Spectroscopy

Photonics Media is currently seeking technical feature articles on a variety of topics for publication in our magazine *BioPhotonics*. Please submit an informal 100-word abstract to Senior Editor Doug Farmer at Doug.Farmer@Photonics.com, or use our online submission form www.photonics.com/submitfeature.aspx.

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