

# BIOPHOTONICS



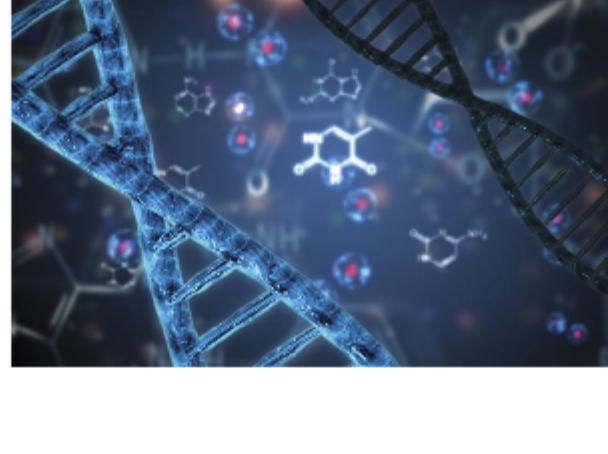
BRINGING LIGHT TO THE LIFE SCIENCES®

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).

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### Smart Probe Captures Biomarker Sequence

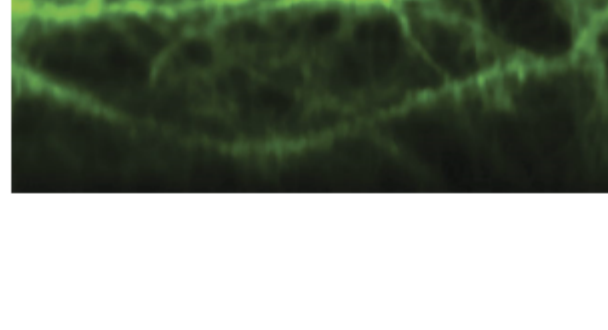
A smart probe is a hairpin oligonucleotide, essentially a string of nucleic acids, that is labeled with a fluorophore on one end and tethered with successive guanosine residues on the other end. Extrinsic dye labels with suitable absorption are typically used for fluorescence quenching, which signals a reaction. But recent research has shown that guanosine moieties can provide effective fluorescence quenching for common fluorescent dyes due to guanosine's low oxidation potential. Thus, guanosine is used as a quencher in smart probes, which can detect biomarkers of cancer and other conditions.



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### Multiplex Imaging Captures Cellular Processes

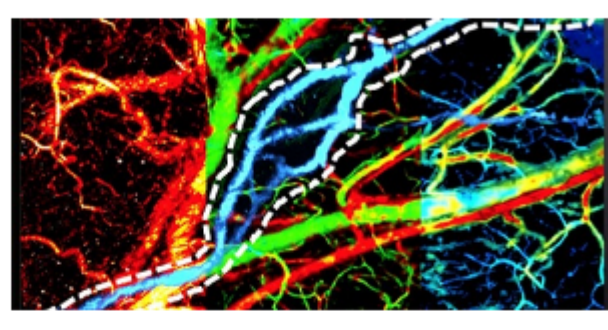
Ongoing innovations in optical microscopy have fueled life science research, allowing scientists to visualize how complex biological systems work and break down. These developments have required specifications beyond the need for high-resolution views of cells, tissues, organs, and organisms. There is also an ongoing search for new microscopy tools that are fast enough to capture high-speed motion pictures of biological dynamics and to have a high enough throughput to interrogate large populations of cells for unravelling the intricate cellular heterogeneity. Most importantly, the tools need to be gentle enough to ensure minimal risk of photodamage for monitoring long-term biological processes.



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### Laser-based Photoacoustic Method Provides Subcellular Insights

City University of Hong Kong researchers developed a multiwavelength optical resolution photoacoustic microscopy system based on a single laser source. The system enables simultaneous multicontrast imaging of hemoglobin concentration, blood flow speed, blood oxygen saturation, and lymphatic concentration. Information, at the level the new system is able deliver, provides subcellular insights useful for the study of disease models, such as in cancer research.



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## .: Featured Products



### C-FLEX C8: Up to 8 Lasers Combined!

**HÜBNER Photonics**

HÜBNER Photonics announces an expansion of the C-FLEX laser combiner family with the introduction of the C8. The C-FLEX C8 is designed to integrate up to 8 Cobolt lasers making it ideal for solutions in bioimaging, Raman spectroscopy and holography.

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### 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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### TracePro Optics and Illumination Software

**Lambda Research Corp.**

TracePro combines a graphical user interface with solid modeling, Monte Carlo ray tracing, analysis features, CAD import/export, optimization methods, and a complete and robust macro language to solve a wide variety of problems in illumination design and optical analysis.

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### 1938-R Advanced Optical Power Meter

**MKS/Newport**

The all new 1938-R Single Channel High Performance Optical Power and Energy Meter is one of the fastest optical meters available on the market. Up-to-date Android based OS and 7" high brightness touch screen add great improvements on the user interface. With the high bandwidth electronics design and high speed digital...

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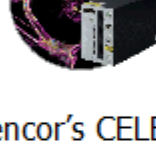
### Multi-Immersion Objectives

**Applied Scientific Instrumentation Inc.**

ASI and Special Optics have developed two dipping objective lenses designed for light sheet microscopy of cleared tissue samples, including ASI's ct-dSPIM. These objectives work in any refractive index media without a correction collar because of a unique curved first surface.

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### Lumencor's NEWest Laser Light Engine

**Lumencor Inc.**

Lumencor's CELESTA quattro Light Engine is a turnkey illuminator designed to support imaging applications with bright, stable, long-lived lasers. Four solid-state outputs, ~1000 mW/laser, from a common fiber are available in off-the-shelf and OEM configurations.

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### Optical Biomedical Imaging

**Photonics Media**

At last, a reference work has been compiled that offers in one place a broad survey of technologies, applications and markets for optical

biomedical imaging, as only Photonics Media could produce it.

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## .: In Case You Missed It

### Light-Controlled Nanoparticles Support Noninvasive Nanomedicine

Scientists from ITMO University have developed a production method for bio-integrated optical nanoparticles based on Mie-resonant silicon nanoparticles. The nanoparticles used in the work are covered by biopolymer shells and can be controlled by heat. With light irradiation, the particles change their shape and color. The discovery is poised to support nanophotonic and nanomedicine applications and the development of noninvasive biosensors, signal systems, and nontoxic dyes.



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### Virginia Tech Lands \$2.4M Grant to Optically Measure Brain Activity

Researchers at the Fralin Biomedical Research Institute at Virginia Tech Carilion School of Medicine received a \$2.4 million National Institutes of Health grant to use optically pumped magnetometry to explore neural activity during face-to-face human interactions. The researchers will optically measure the brain's magnetic signals in two research volunteers simultaneously as the volunteers interact, capturing the nuances of the brain's signaling in real time.

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### Nanoflashlight Could Turn Mobile Devices into Powerful Biosensors

The MIT team's nanoflashlight shines a beam of light on a material, analyzes the light after it has passed through the material at several wavelengths, and captures the interactions of light with the material for each color.

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## .: Upcoming Webinars



### Freeform Optics for Imaging: Manufacturing Methods

Thu, May 27, 2021 1:00 PM - 2:00 PM EDT

In this talk Matt Davies, Ph.D., of UNC Charlotte, and John Lambropoulos, Ph.D., of the University of Rochester, discuss the current methods employed for manufacturing freeform optics, as well as those methods' comparative strengths and the limitations. In particular, they examine the need for post-processing (finishing) and its interactions with other manufacturing steps and methods. Part 2 of the 2021 Freeform Optics Series.

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## .: Next Issue:

### Features

Optical Coherence Tomography, Liquid Sensors, Quantum Cascade Lasers, and more.

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