

# 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 [BioPhotonics.com/subscribe](https://www.photonics.com/subscribe).

## Nanopositioning for Microscopy



Piezo Focus



Voice Coil



XY Scanning Stages



## Organ-on-a-Chip Technologies Shape the Future of Biotech Functionality

Offering compactness, efficiency, and automation in a single chip-size platform, lab-on-a-chip (LoC) technology has achieved remarkable progress during the last three decades. Applications such as cell screening, cell sorting, and molecular diagnostics show unequivocally that optical and photonic techniques have gained significant traction in the biomedical sector. LoC systems miniaturize and integrate the essential

steps of an analytical assay, from the processing of raw clinical samples to the final isolation and quantification of target analytes, which often exist in trace concentrations. Today, the most advanced of these systems have been established as transformative platforms for both analytical sciences and clinical diagnostics. [Read Article](#)



## Laser-based spectroscopy finds diagnostic answers in breath

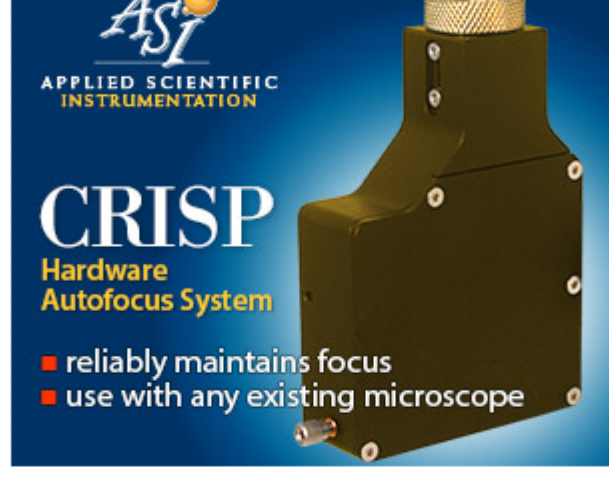
Breath analysis has emerged as a promising noninvasive diagnostic tool for detecting a wide range of diseases by identifying biomarkers in exhaled gases. And advanced optoelectronic systems, particularly those based on mid-infrared (MIR) laser absorption spectroscopy, have been employed to identify these biomarkers. This technology has shown great promise for in vivo glucose sensing and early detection of dental decay. [Read Article](#)



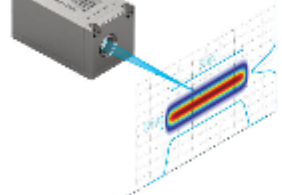
## Quantum Biosensors Take Cues from TV Technology

Putting hypersensitive quantum sensors into a living cell holds high promise for tracking cell growth and diagnosing diseases, as well as cancers, in their early stages. Although many of the best, most powerful quantum sensors can be created in small bits of diamond, it is difficult to place a diamond in a cell and get it to work. People have used diamond nanocrystals as biosensors before, but they

discovered that they perform worse than what we would expect. [Read Article](#)



## Featured Products & Services



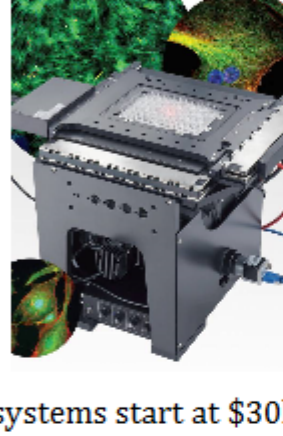
### BioShape Laser

Osela Inc.

The BioShape Laser is an integrated system that projects a Top Hat beam profile for uniform illumination, optimizing fluorescence and scatter in drug development, DNA research, and flow cytometry. Wavelengths range from 375 to 850 nm with customizable beam shaping for diverse applications.

[Visit Website](#)

[Request Info](#)



### Prototype to Production in No Time!

Zaber Technologies Inc.

Iterate quickly with interchangeable microscope hardware modules and free intuitive software. Standalone systems start at \$30k. Get clear, actionable images. Compatible with confocal, TIRF, and FRAP modules.

[Visit Website](#)

[Request Info](#)



### Single-Objective Light Sheet

Applied Scientific Instrumentation Inc.

Based on the OPM and SCAPE technologies and developed in collaboration with Leica Microsystems, this microscope enables fast and gentle volumetric imaging of fluorescent biological samples over many time points and multiple channels, all while using conventional sample mounting.

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[Request Info](#)



### High Performance Microscope Stage

PI (Physik Instrumente) LP,

Motion Control, Air Bearings, Piezo Mechanics

PI's new U-781 inverted microscope stage is designed for democratizing the advantages of ultrasonic piezo motors in fluorescence microscopy. The new stage features 10-nm linear encoders and provides 128 x 86 mm travel. Includes a high-performance motion controller, joystick, and software.

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## More News

### Trinity College to Host Ireland's First "BioBrillouin" Microscope

Trinity College is now home to Ireland's first and only BioBrillouin microscope. The device is expected to enable strides in the fields of inflammation, cancer, developmental biology, and biomedical materials, among other research areas. Cellular and tissue mechanics are potent regulators of disease, dysfunction and regeneration, and understanding them is thus a major focus of biomedical researchers. [Read Article](#)

### Alcon Adds Noninvasive Treatment Solution, Acquires LumiThera

Alcon, a global developer of eye care devices including products for ophthalmic surgery and contact lens solutions, will acquire LumiThera, an ophthalmic medical device company. The deal includes LumiThera's photobiomodulation (PBM) device, which uses low-level light to stimulate mitochondrial energy production to promote retinal cellular health. [Read Article](#)

### Microscopy Method Images Suspended Cells in 3D Using Optical Tweezers

Optical sectioning (OS) enables 3D bioimaging, but it requires non-optical techniques, like sample adhesion and mechanical scanning, to hold and manipulate cells. In situ living cells may lack mechanical attachment or support, and may experience stress from artificial adhesion. A non-contact solution for OS could broaden the use of 3D imaging to include live cells suspended in high-fluidity environments, like water or air. [Read Article](#)

## Latest Webinars

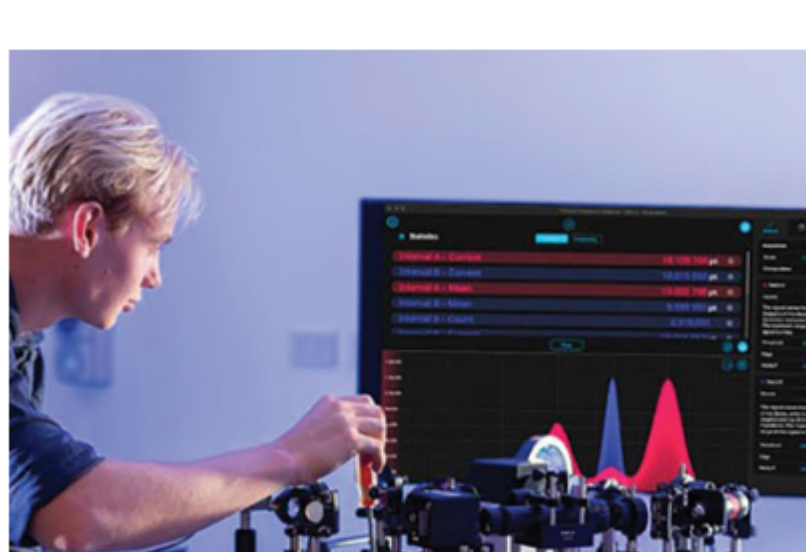


## Photonic Systems for Human Health Care and Biomedical Research

Tue, Jul 22, 2025 1:00 PM - 2:00 PM EDT

Advanced photonics technologies that allow stable, intimate integration with living organisms will accelerate progress in biomedical research. These systems will also serve as the foundations for new approaches for monitoring and treating diseases. This presentation describes the core concepts in optics, optical materials, devices, and systems for two classes of such technologies: 1) colorimetric, wearable microfluidic systems for capture, storage, and quantitative biomarker analysis of eccrine sweat, and 2) cellular-scale optoelectronic probes for neuroscience studies in small animal models.

[Register Now](#)



## Quantum Sensing with Atomic Systems and Reconfigurable Instrumentation

Wed, Jul 23, 2025 1:00 PM - 2:00 PM EDT

Quantum sensing leverages the fundamental quantum behavior of atoms and light to measure weak signals with precision beyond that of classical methods. These measurements make use of trapped ions and cold atoms, and include applications such as magnetic field sensing, optical atomic clocks, and quantum gravimetry. Critical to these techniques are ultra-cold temperatures, coherent quantum control, and sensitive optical readout, which pose significant hardware challenges with regard to laser stabilization, timing, and noise suppression. During this presentation, find out how to generate and detect synchronized RF pulse trains, such as a Ramsey sequence, using a software-defined waveform generator and lock-in amplifier. Plus, see new

ways to stabilize your systems with a laser lock box and measure clock stability with a phasemeter, using a reconfigurable suite of instruments in a single device. Finally, in a live demonstration, learn how to deploy these instruments simultaneously for maximum flexibility, and how to use Python to interface with each. Presented by Liquid Instruments.

[Register Now](#)

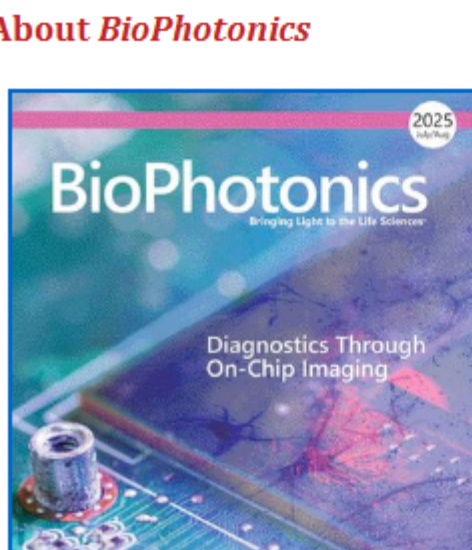
## Next Issue

### Features

Fluorescence Microscopy and Microfluidics, Hyperspectral Imaging, Raman and Laser-Induced Breakdown 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](mailto:Doug.Farmer@Photonics.com), or use our online submission form [www.photonics.com/submitfeature.aspx](https://www.photonics.com/submitfeature.aspx).

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