

# BIOPHOTONICS

BRINGING LIGHT TO THE LIFE SCIENCES®

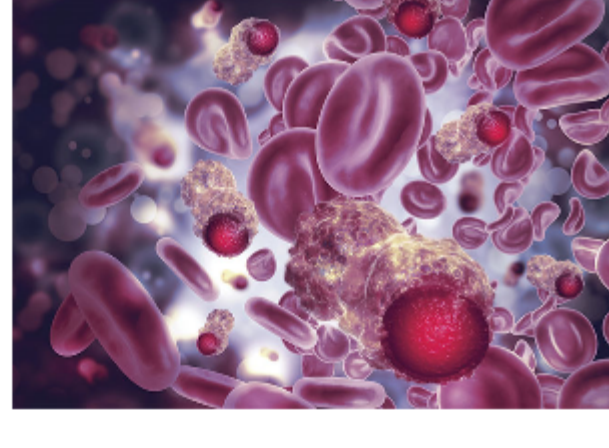
www.BioPhotonics.com

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](https://www.photonics.com/subscribe).



## Optical Photothermal IR Spectroscopy Targets Single-Cell Metabolomics

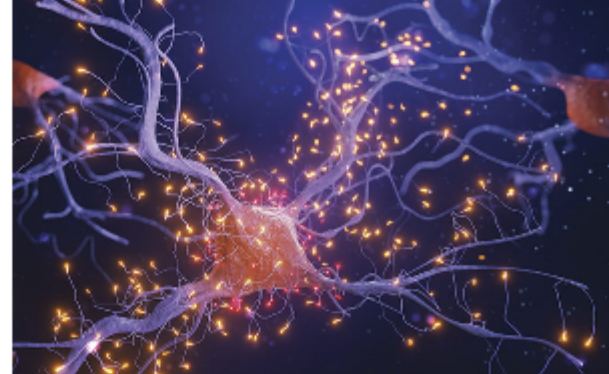
Due to its unique molecular fingerprinting capability, infrared spectroscopy has been widely used to interrogate the overall biochemistry of biological systems. Over the years, this capability has proved the technique's worth as a powerful physicochemical method with broad applications within the life sciences. A novel far-field pump-and-probe technique called optical photothermal infrared (O-PTIR) spectroscopy has recently been developed to acquire infrared chemical images from samples quickly. The technique's impacts and limitations, as well as its future potential in biomedical research, can be projected, along with its potential applications as a tool for single-cell microbial metabolomics and for studying tissue diseases.



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## Advanced Holography Efficiently Illuminates Neuronal Patterns

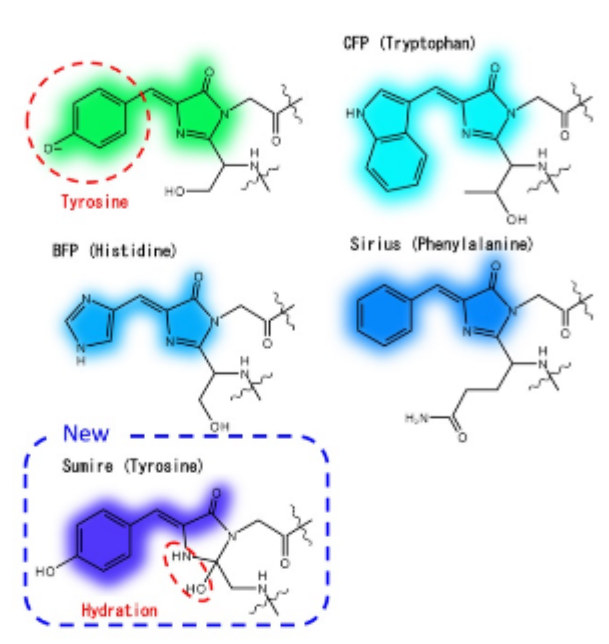
Demystifying the complexity of the human brain is one of the last frontiers in diagnostics and therapeutics. When the brain is sufficiently understood by clinicians, the benefits for human well-being — in the form of cures and treatments for neurodegenerative diseases — will be profound. Such knowledge, gained by using sophisticated illumination patterns in conjunction with artificial intelligence and advanced algorithms, could forever change the way that medical treatment for many conditions is dispensed.



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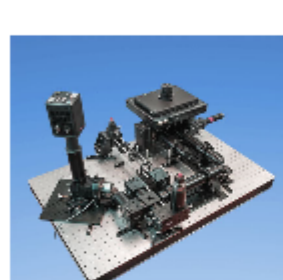
## Fluorophore Modified to Expand Monitoring of Cell Dynamics

A genetically modified fluorescent protein has exhibited the shortest fluorescence emission wavelength to date, researchers at Osaka University reported. The fluorophore, named Sumire, emits 414-nm violet fluorescence from a hydrated chromophore. The development of Sumire will make it possible for scientists to track a larger number of biomolecules at the same time, increasing their ability to simultaneously monitor a cell's many dynamic processes.



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## :: Featured Products & Services



### Single-Objective Light Sheet

**Applied Scientific Instrumentation Inc.**  
Based on the OPM and SCAPE technologies and

developed in collaboration with Leica Microsystems, 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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### 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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### Bring Your Next Product to Market

**Optikos Corporation**

Optikos engineering services will help bring your next medical device or diagnostic product from design to market. Optics makes amazing things possible in life sciences, and Optikos makes it happen.

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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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67<sup>th</sup> Biophysical Society Annual Meeting  
Feb 18-22, San Diego Booth #621

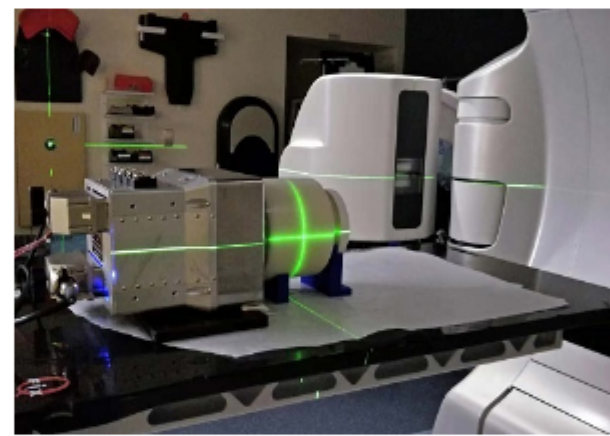
**flexible 4D fluorescence imaging of biological samples at high speed and low light dose**

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## :: In Case You Missed It

### Acoustic Imaging Aims to Reduce Tissue Damage from Radiation Therapy

The need to deliver the intended, optimal radiation dose to a tumor while sparing the healthy tissue surrounding the cancer is critical to cancer treatments using radiation therapy. Now, with a real-time, 3D imaging system developed at the University of Michigan, doctors and other medical professionals may be able to direct radiation with more precision, limiting the exposure of adjacent tissue.



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### Hydrogel Improvements Expand Utility of Expansion Microscopy

Collaborators from Carnegie Mellon University, the University of Pittsburgh, and Brown University have described a microscopy technique and set of protocols that overcome a bottleneck to the expansion microscopy method. The collaborators developed "Magnify" as a variant of expansion microscopy that uses a hydrogel that retains a spectrum of biomolecules, offers a broader application to a variety of tissues, and increases the expansion up to 11x times linearly or approximately 1300 folds of the original volume.

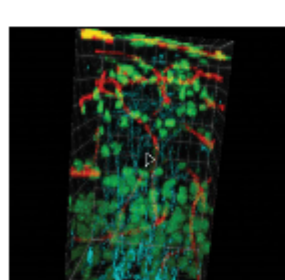
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### Laser-Induced Protein Detection Speeds Disease Diagnosis

Researchers at Osaka Metropolitan University have developed an optical alternative to immunoassays and other methods used for protein analysis. The alternative method provides rapid, highly sensitive detection of proteins through laser irradiation.

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## :: Upcoming Webinars



### Quantitative Stimulated Raman Scattering Microscopy: From Molecules to Animals

Tue, Feb 14, 2023 1:00 PM - 2:00 PM EST

Dan Fu, Ph.D., from the University of Washington highlights the capability of stimulated Raman scattering (SRS) microscopy in imaging various molecules in heterogenous samples from simple mixtures to living cells and animals. He then shares the challenges in quantitative analysis with SRS imaging due to scattering, as well as potential solutions in leveraging water as an internal standard.

With continuous improvement in imaging resolution, sensitivity, and specificity, SRS is poised to play an important role in biomedical imaging.

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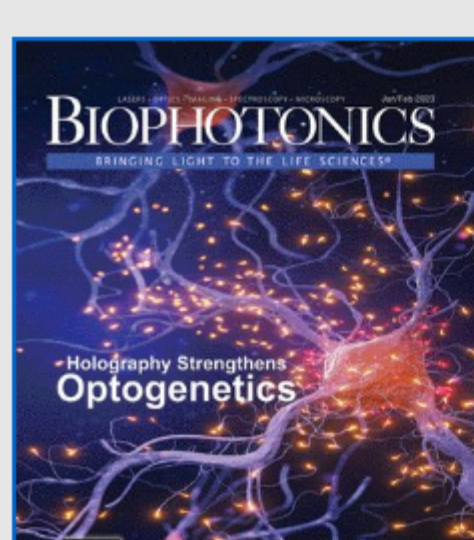
## :: Next issue:

### Features

Photoacoustic Microscopy, Raman Spectroscopy, Dynamic Light Scattering & Alzheimer's, Aptamer Molecular Photonic Beacons

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