Wednesday, May 24, 2023

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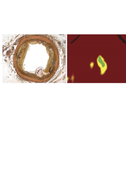
Monthly newsletter focusing on how light-based technologies are being used in the life sciences. Includes news, features and product developments in lasers, imaging, optics, spectroscopy, microscopy, lighting and more. Manage your Photonics Media membership at Photonics.com/subscribe.

Pulsed Lasers Make Headway in Treating Cardiovascular Disease

Patients with heart disease often face a daunting journey from diagnosis to treatment. They may learn, after experiencing chest pains or shortness of breath, that they have arteriosclerosis, or damaged arteries, through a test such as a coronary angiogram, which shows via x-rays whether blood vessels are restricted. In extreme cases, coronary artery bypass surgery is performed, which is a highly invasive procedure with a lengthy recovery time. But due to the specificity made possible by laser-based techniques, shorter and more effective diagnostics and therapeutics are becoming increasingly viable in clinical settings.



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Intravascular Near-Infrared Spectroscopy Predicts Heart Attacks

Lipoproteins carry cholesterol through the closed-looped vascular hematological highway of the human body. This cholesterol can embed itself into the artery walls at varying rates, depending on a multitude of factors, such as anatomical influences or genetic predispositions. Cholesterol vascular wall infiltration triggers the body's immune response to multiply collagen and muscle cells in these specific regions of vascular tissue, forming a fibrous cap over the lipid deposit. A progression of optical technologies has been put to work to capture these deposits — most recently, near-infrared spectroscopy, in conjunction with other modalities.

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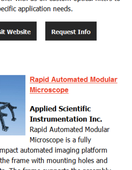
Intravital Multiphoton Microscopy Captures Dynamics of the Beating Heart

Most people know the heart pumps blood to the body, but they may not realize that the blood that fills the four chambers of the heart provides no sustenance to the myocardium, or the heart muscle, itself. Instead, a separate blood supply, the coronary circulation, runs along the surface of the heart, penetrates the tissue, and branches into a network of capillaries. Blockages that decrease blood flow in the coronary circulation are the cause of heart attacks, which affect one American approximately every 39 seconds. Although the coronary arteries have been well studied, blood flow through the microscopic myocardial capillaries remains poorly understood. Fortunately, new techniques in multiphoton microscopy are helping to change this.



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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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Step Through the Spectrum with Nanopede™ Filters

IDEX Health & Science - Semrock Optical Filters

The Nanopede™ filter family, designed specifically for flow cytometry, provides a value approach to optical performance for your application. We understand each flow cytometry instrument is different; partner with us on custom optical filters to meet your specific application needs.

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Optikos Contract Manufacturing

Optikos Corporation

Optikos is ready, bring your next optical product to market, from design through manufacture, starting from any point in the product development process. And at the end of the process, you own the design. Certified to ISO 13485:2016 and 9001:2015.

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Rapid Automated Modular Microscope

Applied Scientific Instrumentation Inc.

Rapid Automated Modular Microscope is a fully functional compact automated imaging platform mounted on the frame with mounting holes and support points. The frame supports the assembly and the stage in a manner that ensures coupling between sample and objective.

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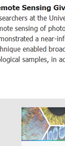

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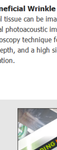

KeyLight™ by Phoseon Technology

Phoseon Technology Inc.

KeyLight™ is a compact light source that supports 3-7 channel fluorescence microscopy systems. It brilliantly illuminates your results by delivering intense, broad-spectrum UV and visible wavelengths for a wide variety of colors between 340 nm and 760 nm.

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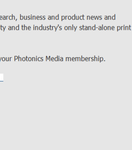
.: In Case You Missed It

Coated Guidewire Boosts Intravascular Assessment Accuracy

Although intravascular near-infrared fluorescence (NIRF) and intravascular ultrasound, when used in tandem, provide a powerful technique for detecting conditions like plaque buildup in arteries, variable attenuation of blood inside vessels can interfere with the accuracy of NIRF measurements. An approach developed by researchers at the Technical University of Munich uses a fluorophore-coated guidewire to steer an imaging probe and obtain a measure of blood attenuation, in real time, during an intravascular NIRF examination. The method also corrects signal intensities to allow accurate measurement of blood attenuation in the form of correction factors, on a frame-by-frame basis.



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Paper-Based Test Scans for Multiple Biomarkers

Researchers led by UCLA professor Aydogan Ozcan developed a deep learning-enabled biosensor for multiplexed, point-of-care (POC) testing of disease biomarkers. The UCLA-developed POC sensor includes a paper-based fluorescence vertical flow assay to simultaneously detect three biomarkers of acute coronary syndrome from human serum samples. The assay is processed by a mobile reader that quantifies the target biomarkers through trained neural networks.

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Remote Sensing Gives Photoacoustic Microscopy a Beneficial Wrinkle

Researchers at the University of Hong Kong showed that biological tissue can be imaged with greater sensitivity through remote sensing of photoacoustic signals than through conventional photoacoustic imaging techniques. The researchers demonstrated a near-infrared, photoacoustic remote sensing microscopy technique for noncontact imaging of lipids. The technique enabled broad detection bandwidth, deep penetration depth, and a high signal-to-noise ratio for the imaging of biological samples, in addition to enabling noncontact implementation.

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.: Upcoming Webinars

Photonic Crystal Fibers: Three Decades of Novel Science

Thu, Jun 1, 2023 10:00 AM - 11:00 AM EDT

Since they first appeared in the 1990s, photonic crystal fibers (PCFs), which are thin strands of glass with an intricate array of hollow channels running along their length, have ushered in a new era of linear and nonlinear fiber optics. As well as permitting unprecedented control over dispersion and birefringence, PCFs offer guidance in both solid glass and hollow cores. Curiosity-driven research into the light-matter interactions in PCF has inspired many potential applications. After a brief introduction, Philip Russell of the Max-Planck Institute for the Science of Light shares several recent developments in the field of PCFs.

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Features

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