

Munich, 4 March 2015

Press release

Lasers in Biophotonics and Medical Engineering Profound Insights into the Building Blocks of Life

Munich. The Nobel Prize for Göttingen-based researcher Stefan Hell and his STED microscopy was a milestone in the microscopic exploration of the nanoworld. Lasers, switchable fluorescent markers and imaging techniques provide profound insights into living cells. Lasers are already in the process of revolutionizing medical research, diagnostics and therapy. Biophotonics and medical engineering will again be center stage at the LASER World of PHOTONICS from 22-25 June at the Messe München site.

Not one but two newly anointed Nobel Prize winners will be speaking at the World of Photonics Congress 2015: the lectures delivered by professors Stefan Hell and Eric Betzig deal with Super-Resolved Fluorescence Microscopy. The innovative microscopic procedure provides researchers with unprecedented insights into the nano building blocks of life. Using switchable fluorescent markers, samples can be successively illuminated in nanometer increments, scanned and assembled into accurate images by software. Biomedical practitioners hope to harness nano microscopy to decipher the molecular characteristics of illnesses such as cancer, AIDS, Alzheimer's, and many others besides, to identify points of attack for more effective therapies.

Microscopy and spectroscopy are helping to explain illnesses

The option of observing living cells with the intelligent use of light in resolutions of only a few nanometers is taking biophotonics into new realms. Developers are using ever new techniques, from two-photon microscopy and laser scanning tomography via the combination of optical microscopy with Raman spectroscopy or of fluorescence microscopes with extremely high temporal and spatial resolution cameras to conquer worlds previously inaccessible to

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the human eye. In each case the key to this is powerful beam sources ranging from extremely shortwave ultraviolet to deep into the infrared spectrum. Laser developers are working hand-in-hand with optics, semiconductor and positioning system developers as well as with medical engineering companies and research institutes. The LASER World of PHOTONICS offers a platform for the latest developments.

Biophotonics and medical engineering in Hall B3

The exhibition focus in Hall B3, numerous [Application Panels](#) and the European Conferences on Biomedical Optics taking place in parallel with the trade fair make the leading trade fair a showcase for the biophotonics sector, which latterly posted a global annual market volume of 65 billion euros. The laser is and remains a driving force behind innovation in medical engineering, benefiting patients and society alike.

One example is the treatment of patients with cataracts (gray star), in which femtosecond lasers play a key role. They make accurate incisions only 1.5 mm in length and shred the cloudy lens in the eye before it is extracted by suction through the minimal aperture and replaced by an artificial lens. Such an outpatient lens replacement takes only 20 minutes. In the scalpel era several days of hospitalization were the norm.

Lasers optimize medical diagnostics and therapy

Many minimally invasive operations rely on fiber lasers. Laser probes introduced through micro-incisions are used nowadays for removing varicose veins, stomach ulcers and fatty pads. Wherever possible, surgeons, dentists and dermatologists, urologists as well as gynecologists use low impact light treatment, which is comfortable for patients, leaves no scars and rarely results in bleeding and infections. The key to this is increasingly better designed fiber optic cables for the various procedures. Miniaturization, a growing range of fiber materials and optical probe tips ensure the required light propagation and intensity in each case. Applications range from the use of lasers to deliver a

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targeted attack on tumors, which are first enriched with light-activatable substances.

Jena researchers are working on making fiber lasers usable for diagnostics as well. The goal is spectroscopic tissue analyses directly within the body instead of the taking of tissue samples with waiting times for laboratory findings. The Jena researchers now want to resolve the issue of which fibers and light wavelengths are suitable for which tissues in the digestive tract, blood vessels and organs. Visitors to the LASER World of PHOTONICS can inquire about the status of this minimally invasive tissue spectroscopy in Hall B3 on the biophotonics research joint stand.

3D printing: yesterday still in the research stage – today already in use

Generative manufacturing is now increasingly used to make implants, such as, the electrodes for cochlear implants for the deaf, metallic substructures for dental crowns or artificial joints, to name just a few applications. Lasers use metal powder to build up the customized implants layer by layer in accordance with CAD blueprints. Patient body scans are often used in the process as a template. The all-digital manufacturing process cuts costs and ensures a perfect fit of the implants and prosthetics. That means each implant is a one-off. The LASER World of PHOTONICS and the World of Photonics Congress being staged in Munich in June will be showcasing the full range of what lasers are capable of in this arena.

This and other press releases and related photos: [here](#)

More on World of Photonics Congress: [here](#)

Photos LASER World of PHOTONICS 2013 and logos: [here](#)

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About LASER World of PHOTONICS

The [LASER World of PHOTONICS](#) is the world's leading get-together of the laser and photonics industry. Europe's largest [World of Photonics Congress](#) will be taking place in parallel with the trade fair. The program comprises five scientific conferences of leading global organizations. Supplementing this [Messe München GmbH](#) will be offering practical lectures on the applications of photonics ("Application Panels"). The combination of trade fair and congress brings together research and application, thereby promoting the use and continued development of optical technologies. In 2013 the trade fair set an exhibitor record with 1,130 exhibitors from 37 countries. A total of 26,582 trade visitors from 72 countries entered the Messe München site.

In 2013 the World of Photonics Congress registered 3,400 participants with an offering of more than 2,800 lectures and presentations including poster presentations.

The LASER World of PHOTONICS has been organized every two years by Messe München International since 1973; the next event will take place in Munich from 22-25 June 2015, the next World of Photonics Congress will take place in parallel from 21-25 June 2015 in the ICM - International Congress Center Munich.

About the LASER World of PHOTONICS global network

The LASER World of PHOTONICS has developed an international network. The [LASER World of PHOTONICS CHINA](#) and the [LASER World of PHOTONICS INDIA](#) are leading regional trade fairs for optical technologies and are staged annually in China (Shanghai) or in India (alternating between Mumbai, Bangalore, New Delhi).

Messe München International

Messe München International is one of the world's leading trade show companies. In Munich alone it organizes around 40 trade shows for capital and consumer goods, and key high tech industries. Each year more than 30,000 exhibitors and around two million visitors take part in the events held at the Messe München exhibition center, the ICM – International Congress Center München, and in the MOC Veranstaltungszentrum München.

The leading international trade fairs of Messe München International are all independently audited.

In addition, Messe München International organizes trade shows in China, India, Turkey and South Africa. With a combination of affiliates abroad – in Europe, Asia and in Africa – and over 60 foreign representatives actively serving over 100 countries, Messe München International has a worldwide business network. The Group also takes a pioneering role as regards sustainability: It is the first trade-fair company to be awarded energy-efficiency certification from the technical inspection authorities TÜV SÜD.

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