JUNE 22–25, 2015, MESSE MÜNCHEN

22nd International Congress on Photonics in Europe—co-located with LASER World of PHOTONICS 2015

www.photonics-congress.com
Application panels—Lasers and photonics in actual practice

The application panels are now a permanent part of the World of Photonics Congress. The series of lectures that are held in the Forums of the LASER World of PHOTONICS 2015 exhibition halls bridge the gap between science and practical application.

Well-known speakers from industry and research institutes report on the latest industrial and medical application findings in the sector for optical technologies and discuss current challenges with you. Lectures deal with cutting-edge megatrends such as additive manufacturing (3D printing), laser processing of glass and using lasers in automobile headlights.

For scientific topics, don’t miss the Congress

Anyone who wants to gain insights into the latest research projects and upcoming technologies that go beyond actual practice will find the right answers in the eight conferences at the World of Photonics Congress. Be sure not to miss the entire world of photonics research and practice at a single location! Visit the World of Photonics Congress and LASER World of PHOTONICS 2015 in Munich from June 22–25, 2015.

Additional information about the World of Photonics Congress and the LASER World of PHOTONICS exhibition is available at www.photonics-congress.com
ABSTRACTS

BIOPHOTONICS AND MEDICAL APPLICATIONS

Laser-Advanced New Methods for Diagnostics and Therapeutics

Monday, June 22, 2015, 12:20–14:40

Chairmen: Dr. Carsten Philipp, Elisabeth-Klinik Berlin, DGLM e. V.,
Dr. Ronald Sroka, Laser-Forschungslabor in LIFE-Centre at Hospital of University Munich, DGLM e.V.

To transform a laser into a successful medical device requires intense and careful cooperation between industry and research paired with commitment and the sense for the right moment. Evaluation of medical and social benefits, the power of competing techniques, rules and regulations, financing and reimbursement issues play their role in the development and placement of a medical-approved device or procedure. Furthermore, all medical procedures need continuous reconsideration with respect to competing techniques and with regard to usefulness and outcome. This panel focuses on the ways of cooperation to make biophotonic innovations work, from bench to bedside by views of clinicians, researchers, engineers and industry. Medical, scientific and industrial representatives will provide information about their specific tasks and efforts to launch a specific device or procedure.

12:30–12:50
Photoacoustics: Basic Principles, Clinical Potential, and a European Effort to Clinical System Development
Prof. Dr. Wiendelt Steenbergen
Chair of Biomedical Photonic Imaging, University of Twente

12:50–13:10
Latest Developments in Pulsed Diode Laser Technology, and its Integration in a Medical Ultrasound Scanner
Dr. Andreas Kohl
Head of Operations Diode Lasers, Quantel Lasers

13:10–13:30
Translation of the Research on Photoacoustic Imaging into a Portable Photoacoustic/US Scanner
Dr. Peter Brands
Coordinator Advanced Projects, ESAOTE Europe

13:30–13:50
A New Approach in Laser Machining of Optical Fibres to Manufacture Diffusors for Medical Therapy
Manuela Schwagmeier
Laser- und Medizin-Technologie GmbH

13:50–14:10
Optical Fiber Solutions for Laser Ablation of Soft Tissue and imILT
Cristina Pantaleone
Clinical Laserthermia Systems AB

14:10–14:30
Clinical Requirements on Optical Fibers for Endovenous Energy Application
CA PD Dr. med. Claus-Georg Schmedt
Diakonie-Klinikum Schwäbisch Hall

14:30–14:40
Speakers Corner
This panel presents revolutionary innovations in the fields of refractive and cataract surgery, retinal diagnostics/treatment, and optical coherence tomography. Vortex beams allow for a precise creation of LASIK flaps, femtosecond lasers are employed for flapless refractive surgery and revolutionize cataract surgery. Opto-acoustic measurements enable implementing an online temperature control of retinal photocoagulation, molecular and 2-photon fluorescence real-time imaging improves the diagnostics of degenerative diseases, and laser-based induction of heat shock proteins may enhance the stress resistance of the retinal pigment epithelium. A dramatic increase of data acquisition speed in OCT opened up new possibilities for intra-operative OCT monitoring as well as for ultra-wide-field recording of the ocular fundus, and speckle evaluation allows for OCT-based angiography.
ABSTRACTS

BIOPHOTONICS AND MEDICAL APPLICATIONS

Visions for Future Diagnostics—Infectious Diseases

Tuesday, June 23, 2015, 10:00–12:20

Chairmen: Prof. Dr. Jürgen Popp, Leibniz Institute of Photonic Technology, Prof. Dr. Michael Bauer, Center for Sepsis Control & Care, University Hospital, Jena

The multidisciplinary field of infectious disease diagnostics is both a highly innovative research area and a fast-growing market. Its broad range of disciplines and combined know-how involved can be a handicap for straightforward solutions. Transformation of scientific knowledge into components, systems and innovative products is hindered due to a lack of early communication between the different disciplines and industry. This panel of infection specialists will bring together end-users with technology-owners and developers to match their requirements. Accordingly, a physician will start the session to define unmet medical needs. Speakers from industry and academia will break down medical requirements into defined demands and present technological solutions like lasers and detectors.

10:00–10:20
Spectroscopic Point-of-Care Approaches for Medical Diagnosis
Prof. Dr. Jürgen Popp
Scientific Director, Leibniz Institute of Photonic Technology

10:20–10:40
The Unmet Medical Need
Prof. Dr. Michael Bauer
Assistant Director of Anesthesiology and Intensive Care, University Hospital Jena

10:40–11:00
Fast Detection of Pathogens with Molecular Biological Methods
Dr. Marc Lehmann
Managing Director, Moldiax GmbH

11:00–11:20
Towards True Point-of-Care of Infectious Diseases
Stephan Hubold
Project Manager / R & D, Alere Technologies GmbH

11:20–11:40
System Solutions for Pathogen Diagnostics
N.N.
Analytik Jena AG

11:40–12:00
Comprehensive Mobile In-Vitro Diagnostic System for the Early Diagnosis of Sepsis
Dr. Bernhard Gerstenecker
Senior Scientist, Market Development, QIAGEN Lake Constance GmbH

12:00–12:20
Speakers Corner
Lasers represent the single most important sensing tool in life sciences. A tool that enables cutting research through clinical diagnostics; with applications ranging from neuroscience to personalized medicine. Recent laser-powered innovations include superresolution microscopy, optogenetics, higher throughput flow cytometry, as well as faster and lower cost DNA sequencing. These application innovations are in turn being supported by vigorous innovation in laser light sources tailored for life sciences. This workshop will examine the links between specific innovations in life sciences and parallel advances in these light sources. Important innovations include higher power, new wavelengths and improvements in beam delivery systems – both fiber delivery and beam shaping. It will also include a discussion of the relative merits of lasers in comparison to the implementation of LEDs that continue to gain traction in some niche applications.
Ultrashort pulsed lasers provide outstanding capabilities with respect to accuracy, independence of material and highest flexibility. It is extremely precise, uses enormously strong bundled energy, and it is ideally suited for the extremely delicate tasks that it performs. With this characteristic, ultrashort pulsed lasers have been successfully proven for numerous industrial applications, especially in display manufacturing for medical technology and electronics. However, due to the increase of average power, also applications on large components will be possible and show the way for future emerging markets. New scanning systems and multiple-beam approaches are necessary to provide high productivity and high quality at the same time. With these new optical systems, outstanding applications have been realized for glass and sapphire cutting, micro drilling, 3D-ablation as well as thin-film structuring without any thermal issues.
3D-Printing: Laser-Based Additive Manufacturing for the Production of Metal Parts

Tuesday, June 23, 2015, 10:00–12:20

Chairmen: Dr. Dieter Schwarze, SLM Solutions GmbH, Dr. Wilhelm Meiners, Fraunhofer Institute for Lasertechnology ILT

The additive manufacturing processes most commonly used for metallic components are Selective Laser Melting (SLM) for producing new parts, and Laser Metal Deposition (LMD) for repairing and modifying existing components. Since they manufacture without tools and offer a great freedom of geometry, these additive processes enable functionally optimized components to be produced, e.g. in automobile, tools as well in aviation and turbine construction. In addition, the industry expects, above all, a significant increase in resource and energy efficiency during the entire life cycle of a product thanks to the use of functionally optimized components as well as to flexible repair strategies. For this reason, these processes are increasingly making their way into industrial manufacturing chains. In this panel, practical examples from industrial applications will be presented in addition to a process overview.
Ultrafast Laser Beam Deflection and Transportation

Tuesday, June 23, 2015, 14:40–17:00

Chairmen: Dr. Marwan Abdou-Ahmed, Institut für Strahlwerkzeuge (IFSW), Dr. Lutz Aschke, CEO, IVAM

Ultrafast laser sources at picosecond and femtosecond regimes have experienced great progresses in the last decade leading to the availability of laser systems with several hundred watts of average power on the market and higher than 1kW in the laboratory. Consequently, significant efforts are needed for beam-shaping, beam-guiding and beam-deflection optical systems in order to address the required beam characteristics and fast processing times on the work piece. The present panel will be dedicated to the different beam-shaping and beam-scanning technologies for efficient and high-throughput material processing. The panel will combine this with expertise in the field of laser-based manufacturing technologies to discuss highly innovative beam-shaping and beam-steering devices and applications.
Lasers in Microelectronics: The Smart World Approaching

Wednesday, June 24, 2015, 10:00–12:20

Chairmen: Rainer Pätzel, Coherent LaserSystems GmbH, Dr. Dietmar Kracht, Laser Zentrum Hannover

Today, we can no longer imagine the modern world without the myriad miniature electronic systems and devices that put the “smart” into our homes such as televisions, smartphones, tablets, touch-interfaces and many other multi-functional gadgets and devices. The cost-effective manufacturing of these devices is an ongoing challenge for the industry, and laser processing is at the heart of innovation, be it in display manufacturing, in advanced packaging or in solid-state lighting. Lasers serve many tasks, from high-precision structuring, drilling, cutting, marking and metallization of a multitude of materials, to large-area processing of thin films. This workshop will provide insight into latest laser applications that are related to microelectronic devices and have shown to be the driver for rapid innovation in manufacturing technologies.

10:00–10:20
Tailoring DPSSLs Towards Ultrastable, High-Repetition Rate Industrial Laser Tools for Microelectronics Processing
Dr. Martin Paster
Sales Manager, InnoLas Photonics

10:20–10:40
Lasers for Electronics
Dr. Ing. Roman Ostholt
VP Technology Management, LPKF

10:40–11:00
Dynamic Focus Control in Laser Micro-Machining: Methods, Guidelines and Limitations
Dr. Adam Weiss
President, Wise Device Incorporated

11:00–11:20
Excimer Laser Ablation—A Novel Patterning Technology in Semiconductor Packaging Applications
Dr. Ralph Zoberbier
General Manager Exposure and Laser Processing, SUSS MicroTec Lithography GmbH

11:20–11:40
Laser Applications in the Display Industry
Dr. Bukuk Oh
Chief Research Engineer, LG Electronics PRI

11:40–12:00
Advanced Packaging Challenges and their Impact on Laser Specifications
Dr. Dirk Mueller
Director of Marketing, Coherent Inc.

12:00–12:20
Speakers Corner
Increased Automotive Efficiency Enabled by Laser Technology

Wednesday, June 24, 2015, 14:40–17:00

Chairmen: Dr. Rüdiger Brockmann, Director Industry- and Product-Management, TRUMPF Laser- und Systemtechnik GmbH, Dr. Hans-Joachim Krauß, Head of Services, Bayerisches Laserzentrum GmbH

During the past decade, the laser was established as a standard tool for welding, cutting, brazing and many other applications in the automotive industry. However, new concepts for both e-driven mobiles as well as conventional vehicles, which are driven by combustion engines, require new solutions for higher efficiency. In the body area, increased efficiency can be reached by a light-weight approach. Therefore, new materials as well as new design concepts are introduced. The laser technology enables innovative production processes for this approach. It can be used for joining of dissimilar materials (e.g. copper and aluminum or plastic and metal). Furthermore, processes for cutting, joining and structuring of fiber-reinforced plastics are developed. In the power-train area, the laser is used to increase or reduce friction, or to allow new designs which save weight. This application panel shows an overview about the latest applications and developments of laser-based production technologies and laser technology itself.

14:40–15:00
Application Examples how Laser Technology Enables Automotive Efficiency
Dipl.-Ing. Ralf Kimmel, Head of Industry Management Automotive, TRUMPF Laser- und Systemtechnik GmbH

15:00–15:20
Prof. Dr. Peter Weidinger
Director Materials Laboratory, Brose Fahrzeugteile GmbH & Co. KG

15:20–15:40
Laser Beam Remote Welding of Aluminum Hang-on Parts
Dr. Jan-Philipp Weberpals
Technical Developer, Audi AG

15:40–16:00
Seam-tracked Laser Beam Remote Welding of Fillet Welds with Automated Gap Bridging
Dr. Florian Albert
Director of Application Department, Scansonic MI GmbH

16:00–16:20
Tailor-Welded Coils—A Unique Laser Welding Process
Dr. Christian Both
Head of R + D, WISCO Tailored Blanks GmbH

16:20–16:40
Laser Surface Treatment of Composite Structures for Improved Adhesion
Dr. Tobias Mertens, Engineer Metallic Technologies & Surface Department, Airbus Group

16:40–17:00
Speakers Corner
Laser Processing of Glass

Thursday, June 25, 2015, 10:00–12:20

Chairmen: Christof Siebert, TRUMPF Laser- und Systemtechnik GmbH, Dr. Edgar Willenborg, Fraunhofer Institute for Lasertechnology ILT

Laser radiation can be used for glass processing in many different ways to significantly improve established processes or to create completely new ones. Especially laser cutting of chemically strengthened glass is a process with huge impact in the mobile phone industry. Here, glass is a key component and determines how users interact with the devices. But also other laser-based processes for glass are under development or already in industrial usage. Examples are laser polishing and laser-based optics manufacturing or laser-based structuring of surfaces, or even in-volume structuring. A wide range of laser sources, from ultrashort pulse lasers to CW CO2 lasers, are used for the different processes. In this application panel, an overview on the state of the art of laser processing of glass will be given.

10:00–10:20
Ultrashort Pulse Laser Processing of Glass—Fundamentals and Challenges
Jan Wieduwilt
TRUMPF Laser- und Systemtechnik GmbH

10:20–10:40
Industrial Femtosecond Lasers for Highest Quality, Fast Processing of Transparent, Brittle Materials
Dr. Victor Matylitsky
Business Development Manager, Newport Spectra-Physics GmbH

10:40–11:00
Innovative Laser Technologies for Cutting, Drilling and Structuring of Glass and Other Transparent, Brittle Materials
Dr. Roland Mayerhofer
Rofin-Baasel Lasertech GmbH & Co. KG

11:00–11:20
Laser Polishing of Optics and Edge Rounding
Christian Weingarten, Scientist / Project Manager, Fraunhofer Institute for Lasertechnology ILT

11:20–11:40
SLE: A New Way for 3D Micro Machining of Glass
Martin Hermanss, CEO
LightFab UG

11:40–12:00
Industrial Processing of Brittle Materials Using Ultrashort Pulsed Laser Sources
Dr. Dmitrij Walter
Head of R & D Laser & Optical Devices, Manz AG

12:00–12:20
Speakers Corner
Sources of ultrashort and high-peak power optical pulses have become extremely important for numerous applications in science and industry. Considerable progress has been made over the last decade to realize reliable and highly efficient femtosecond and picosecond sources based on diode-pumped solid state and fiber technology. Using novel laser geometries, output powers exceeding the kW level have been demonstrated for these systems even in femtosecond pulse operation. This panel provides an overview about the recent progress in performance scaling. The panel enables you to compare state-of-the-art laser concepts for operation in industrial environments. The presentations will be given by selected speakers of international market leaders in the field of ultrafast lasers.
Diode-pumped solid state lasers and fiber lasers have established themselves as attractive laser concepts for various applications in science and industry. This panel presents recent developments and current trends in the field of high-power lasers for industrial applications. Central topics are significant improvements in efficiency as well as robustness and reliability. The presentations cover CW lasers, pulsed lasers in the microsecond and nanosecond range, and the generation of green and ultraviolet light at high average power. The panel enables you to get an overview and to compare state-of-the-art laser concepts for operation in industrial environments. The presentations will be given by selected speakers of international market leaders in the field of high power lasers.
High-power diode lasers have become well established as pump sources for solid state and fiber lasers, for material processing and medical applications. Significant progress in output power, brightness and production technology is still extending their range of applications. Their major advantages, compared to solid state and gas lasers, are high wall-plug efficiency, compact size, low cost, high reliability and low maintenance. Innovative diode laser designs, i.e. those based on dense spectral beam combining (SBC) as well as the diode manufacturing technology, show this technology’s potential to reach applications which were so far dominated by SSL. In addition, edge emitters, vertical emitters (VCSEL) and their applications will be discussed. The presentations will be given by selected speakers of international market leaders in the field of high-power diode lasers and cover beam sources for a wide range of applications from automotive lighting to materials processing.
ABSTRACTS

OPTICAL METROLOGY AND IMAGING

Contact-Free 3D Measurement Methods Ranging from Laser-Scanning to Imaging

Monday, June 22, 2015, 14:40–17:00

Chairmen: Dr.-Ing. Gerhard Holst, Head of Science & Research, PCO AG, Prof. Dr.-Ing. Gerd Hirzinger, Former Head of Institute, DLR Institute of Robotics and Mechatronics

The panel shows state-of-the-art contact-free 3D measuring technologies in the range of imaging and laser scanning. It will give an overview of the different technologies with their inherent characteristics, to measure precise three-dimensional data from industrially relevant objects up to airborne measurements of historical buildings. Furthermore, it will show how the different methods can compete or complement each other, with applications from a variety of fields.

14:40–15:00
3D Laser Scanning: Development from the Beginning until Today
Dr. Christoph Fröhlich
CEO, Zoller & Fröhlich GmbH

15:00–15:20
Photogrammetry—Precise and Fast Optical 3D Coordinate Measurement with High-Resolution Digital Cameras
Dr.-Ing. Andreas Rietdorf
R & D, AICON 3D Systems GmbH

15:20–15:40
New Developments in Photogrammetric Matching Approaches for 3D Surface Reconstruction
Prof. Dr.-Ing. habil. Thomas Luhmann
Head of Institute, Institute for Applied Photogrammetry and Geoinformatics, Jade University of Applied Sciences

15:40–16:00
Multi-Scale, Multi-Sensor 3D Documentation of Courtly Ceremonial Rooms
Bernhard Strackenbrock
R & D, DLR / Illustrated Architecture

16:00–16:20
3D Measurements Based on Light Field Acquisition
Prof. Dr. Bernd Jähne
Director, HCI Heidelberg Collaboratory for Image Processing

16:20–16:40
Light Field Cameras for Metric 3D-Measurements
Dr. habil. Christian Perwaß
CEO, Raytrix GmbH

16:40–17:00
Speakers Corner
High-Coherence Metrology from Long-Distance to Nanoscale Dimensions

Tuesday, June 23, 2015, 10:00–12:20

Chairmen: Dr. Patrick Leisching, TOPTICA Photonics AG, Dr. Christian V. Poulsen, NKT Photonics A/S

This panel presents the state of the art of non-contact metrology techniques employing high-coherence laser systems. The presentations introduce selected applications along with the enabling laser technology. The session also explores the strategies for next-generation applications and elucidates the corresponding requirements for future laser systems. Highlighted use-cases range from long-distance metrology employed in space-borne or geoscience applications, to large-volume metrology for intermediate-sized objects such as aircrafts, on to small-volume metrology, e.g., for high-precision metal working, thin film metrology on scales of 1 to 100 mm, and finally to nanometrology that accurately measures critical dimensions of semiconductor devices.
Terahertz radiation is very attractive for non-destructive testing because many industrially relevant materials like synthetics, polymers, textiles, paper and cardboard are transparent here. In addition, many gases and organic solids—including toxic or explosive substances—show characteristic absorption lines. New laser-based technologies now enable the generation and detection of Terahertz radiation without cryogenic temperatures or complex RF electronic devices. This enables Terahertz to migrate from lab settings to industrial environments as a tool for measurement of layer thickness, humidity, chemical composition or hidden defect structures. Experts from laser and component manufacturers, as well as solution providers for plastic inspection, paper industry, medical industries and homeland security will report about the latest developments on Terahertz technology.
EVENT VENUE:

The “Application Panels—Lasers and Photonics in Actual Practice” are being held at the forums in exhibition halls A2, A3 and B3, depending on the topic.

ADMISSION:

You must purchase an admission ticket to LASER World of PHOTONICS 2015 to gain admission to the halls. The trade show is the perfect opportunity to combine expanding your knowledge with making new business contacts. A separate ticket is needed to attend the conferences at the World of Photonics Congress. For additional information, refer to: www.photonics-congress.com

LANGUAGE:

All application panels will be held in English.

NETWORKING:

Take advantage of the Application Panels for networking and to expand your expertise. After the series of Application Panels is over, the speakers will be available in the Speakers’ Corner of the forum to answer questions.
CLEO®/Europe – EQEC 2015

Sunday, June 21 to Thursday, June 25, 2015

CLEO®/Europe 2015 Topics
- Solid State Lasers
- Semiconductor Lasers
- Terahertz Sources and Applications
- Applications of Nonlinear Optics
- Optical Materials, Fabrication and Characterization
- Ultrafast Optical Technologies
- High-Field Laser Physics and Attosecond Technologies
- Optical Sensing and Metrology
- Optical Technologies for Communications and Data Storage
- Fiber and Guided Wave Lasers and Amplifiers
- Micro- and Nano-Photonics
- Biophotonics and Applications
- Materials Processing with Lasers
- Photonics in Defense and Security

EQEC 2015 Topics
- Quantum Optics
- Quantum Information, Communication, and Simulation
- Atom Optics and Quantum Matter
- Precision Metrology and Frequency Combs
- Ultrafast Optical Science
- Nonlinear Phenomena, Solitons and Self-Organization
- Light-Matter Interactions at the Nanoscale
- Plasmonics and Metamaterials
- Theoretical and Computational Photonics

Joint Symposia
- Light Management in Photovoltaics
- Photonics Lab-on-a-Chip Biosensors
- Laser-Driven Acceleration
- Optics in Graphene and Other Two-Dimensional Materials
- Integrated Quantum Optics

European Conferences on Biomedical Optics

Sunday, June 21 to Thursday, June 25, 2015

- Advanced Microscopy Techniques and Applications
- Clinical and Biomedical Spectroscopy and Imaging
- Diffuse Optical Imaging
- Opto-Acoustic Methods and Applications in Biophotonics
- Novel Biophotonics Techniques
- Optical Coherence Imaging Techniques and Imaging in Scattering Media
- Medical Laser Applications and Laser-Tissue Interactions
- Neurophotonics

LiM 2015

Monday, June 22 to Thursday, June 25, 2015

Macro Materials Processing
- Joining (Welding and Brazing)
- Cutting
- Surface Treatment and Cladding
- Additive Manufacturing
- Fundamentals and Process Simulation
- System Technology
- Process Monitoring and Control
- CFRP

Micro Materials Processing
- Micro-Joining (Welding and Brazing)
- Ablation, Drilling and Micro-Cutting
- Surface Functionalization
- Processing of Transparent Materials
- Fundamentals and Process Simulation
- System Technology
- Process Monitoring and Control

EOSMTOC / EOSLE / EOSOF / EOSOME

Monday, June 22 to Wednesday, June 24, 2015

- June 22–24, 2015
  EOS Conference on Manufacturing and Testing of Optical Components (EOSMTOC)
- June 24, 2015
  EOS Conference on Light Engineering (EOSLE)

SPIE Optical Metrology

Monday, June 22 to Thursday, June 25, 2015

- Optical Measurement Systems for Industrial Inspection
- Modeling Aspects in Optical Metrology
- Optics for Arts, Architecture, and Archaeology
- Videometrics, Range Imaging, and Applications
- Optical Methods for Inspection, Characterization, and Imaging of Biomaterials
- Automated Visual Inspection and Machine Vision
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