Photonics *4* Masterpieces - Speaker

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Dr. Andreas Burn

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Dr. Andreas Burn studied in Bern, Fribourg, and Paris and received his master's degree and PhD from Institute of Applied Physics at University of Bern for his work in the field of Biomedical Photonics, especially the functional imaging and analysis of mucociliary clearance. Andreas subsequently joined BFH ALPS and worked in numerous international and national projects on the development, optimization and industrial application of ultrashort pulsed fiber lasers for thin-film and surface structuring. In 2017, he joined Switzerland Innovation Park Biel/Bienne (SIPBB) where he built up a laser application lab dedicated to the development and application of novel laser sources, tailored beams, and new machine concepts for advancing Laser Powder Bed Fabrication technology. Since 2021 Andreas is the head of Swiss Advanced Manufacturing Center at SIPBB. Andreas is also head of Swissphotonics SNAP, the Swiss National Application laboratory for Photonic tools and manufacturing.

Moderator

Prof. Dr. Patrik Hoffmann

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Patrik Hoffmann, diploma chemist KIT, PhD thesis EPFL. Post-doc IBM (US), Gramm Technik (D), teaching at EPFL since 1997. Heading the Laboratory for Advanced Materials Processing, Empa since 2009, and continues teaching at EPFL. Guest professor in Nagoya Institute of Technology (J) and Shenzhen Technical University (CN). His interest focuses on the fundamental understanding of beam induced materials processing technologies.

Laser 3-D printing: How important is the heat flow? Experiments and Simulations for powder bed and powder feed AM
Dimensional and temporal limits of laser processes are determined by parameters like power, waist, scan speed, powder thickness or feed rate and also by materials transforming dynamics, including phase transformations, segregation, convection, … which are equally important and differ for materials. I call them material's inner watch. Real and fictive impacts of the latter to the final materials properties will be discussed.

Prof. Sylvain Hugon

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Since 2017 - responsible of AddiPole – Advanced manufacturing Center – technopole de de Ste-Croix
Since 2013 – Associated Pr at Heig-VD
Cofounder and seed investor - Distalmotion SA
MSc Ba from IAE - Paris
IFMA/SIGMA Engineer degree for Products and Structures
Master Degree of Design and FEM Calculations – Grenoble joseph Fourier university

Laser multi-material printing feasibility study for industrial applications
Les technologies d'impression multi-matières permettent dans la majorité des cas de mettre en œuvre des matériaux proches ou de la même famille. Dans cette présentation, il s'agit de voir comment l'impression métal/polymère peut être abordée de manière simple et pour envisager quel type d'application.

Edward White

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Edward is the marketing manager for Exaddon AG, based near Zurich. With a background in both digital marketing and scientific copywriting, Edward is focused on delivering informative µAM content to potential customers and collaborators alike. He holds a degree in linguistics from the University of York, UK, and a diploma in digital marketing, new media design and web development from BCIT, Vancouver, Canada.

Additive micromanufacturing of metals and potential use cases in photonics
Exaddon has pioneered additive micromanufacturing (µAM) of metals using a high-precision, localized electrodeposition process. With our unique CERES print system, complex, pure metal geometries with submicrometer resolution are possible, in sizes from 1 µm up to 1000 µm. We present how microscale 3D printed metal structures could be used for the research and development of various photonics applications.

Dr. Maria Averyanova

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In 2011 Maria Averyanova obtained her PhD diploma in Ecole des Mines in France in the field of Additive Manufacturing AM. She continued the specialization in metal powder bed fusion technology working as Project Manager, Customer Service Manager and R&D manager at machines manufacturers companies as Phenix Systems and 3D Systems. Since 2016 Maria has been working at AddUp, JV between Michelin and Fives companies in the field of business development of different metal AM solutions. Currently, Maria is an active office member of France Additive, French national association in 3D Printing.

How AM helps industries to stay competitive?
Today, more and more industries are aware about the basic principles and advantages that bring AM (also calling 3D Printing) like reducing the waste of material, reducing the amount of production steps (without tooling) and controls, reducing the number of parts assembly (part consolidation), providing complex, unmanufacturable by conventional technologies geometries, topological optimization and spare parts manufacturing. Besides, it's crucial to realize a complete analyze at a company side that provides the information where the use of the technology is really required. This analyze should be done from business and technical point of view. The choice of the appropriate material with its thermo-physical and chemical characteristics, as well as, of the propriate technology having an optimum process parameters and strategies with a post-processing is needed. Some important research and developments with different industrial examples will be shown and discussed. The main focus will be done on metal laser powder bed fusion technology that is suitable for watchmaking, jewelry, medical and other industrial applications.

Dr. Andreas Burn

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Moderator

Beat Jäggi

Head Of Technical Department, Lasea Switzerland SA, 2504 Biel / Bienne BE
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Beat Jäggi received his bachelor's degree in mechanical engineering as well as his master's degree in engineering from the Bern University of Applied Sciences in Burgdorf. Since 2010, he has been working in the field of laser micromachining using ultra-short pulses. First as a project engineer at BUAS and since 2017 he has been leading the technical department of the Lasea Switzerland SA in Biel/Bienne.

Surface structuring using fs-lasers for R&D and industrial applications
Ultra-short pulsed lasers enable surface structuring to modify the optical aspect and or the characteristics of surfaces. Possible applications among others are black marking and/or texturing of medical devices, creating laser induced periodic surface structures (LIPSS) for diffractive markings, battery manufacturing, enhance medical implants integration and life cycle, and hydrophobic surfaces for R&D and industrial purposes.

Dr. Silvain Boj

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PhD Sylvain Boj, has obtained his PhD from Lille University France on Matter and Laser interaction in 1995 and has been working in the french national center for telecommunication studies (CNET). He has more than 10 scientific papers on guided optics and non linear crystals. Since 1998, he has decided to create and manage high tech companies such as Highwave Optical Technologies SA, listed on the french market, Zong SA in Geneva, Switzerland on Mobile payment and now Cordouan Technologies SAS in Bordeaux. He has more than 20 years of experience at the head of high tech companies.

A new solution for anisotropic nanoparticles characterization
For now decades, Dynamic Light Scattering is famous for nanoparticle size characterization. This technology is easy to use but limited to spherical nanoparticles. Due to the need of new nanoparticles understanding such as nanorods, DNA, Antibodies, Cordouan has developed a new solution using Depolarized Dynamic Light Scattering allowing to measure length and width of nanoparticles into one simple and easy to use instrument : Thetis.

Dr. Oliver Fähnle

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Oliver Faehnle received his PhD from the Technical University Delft, The Netherlands, in “Optics Fabrication and Testing” in 1998 and has been working and teaching in this field ever since, running projects within both environments: academia and industry. From 1999 to 2020 he was working as Senior Expert Optical Fabrication Technology at FISBA company, St.Gallen, Switzerland. Since 2020, he is heading the “Optical Fabrication Technology” group at the OST- University of Applied Sciences, Buchs, Switzerland. He is senior member OSA, senior member SPIE and chairman of the Industrial Advisory Board of the European Optical Society. Besides that, he has been training and teaching Japanese sword fencing, kendo, for more than 29 years increasing his awareness.

Polishing by Laser Remelting
Among the approximately 360 different high-performance, optical polishing techniques, laser polishing is distinguished by its digitally control, not introducing any contaminants, and its capability to process even the smallest concave radii of curvature without contact and it is extremely fast. We presents first steps towards standardization enabling industrial applications with a.o. in-situ, in-process monitoring of the laserpolishing spot by IRM.

Dr. Romain Rossier

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Romain Rossier is the co-founder and CEO of Innoview. He obtained a master degree (2007) and a PhD (2012) in computer science from Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland. He is co-inventor in several US patents. Since 2012 he started as an entrepreneur for developing and further industrializing decorative and document security technologies.

Level-line moirés by superposition of cylindrical microlens gratings
Moiré images enable the creation of decorative animations by superposing two gratings. One may create rectilinear, circular or spiral-like displacements of Moiré shapes. The animations also comprise the possibility to render images with a surface effect or animating patterns or logos. We’ll show industrialization applications with the usage of laser marking, pvd process and microlenses for synthesizing the Moiré gratings.

Dr. Kilian Wasmer

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Kilian Wasmer received his Ph.D. degree from Imperial College London, Great Britain, in 2003 and received an EMBA from University of Lausanne in 2014 and works at Empa since 2004. Currently, he leads the dynamical processes group in the Laboratory for Advanced Materials Processing. He is in the director committee for additive manufacturing of Swiss Engineering and member of Swiss tribology, EWGAE, and DGZfP.

Round Table Moderator

Prof. Dr. Patrik Hoffmann

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Round Table Panelist

Dr. Maria Averyanova

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Round Table Panelist

Dr. Pierre-Yves Fonjallaz

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Round Table Panelist

Prof. Dr. Beat Neuenschwander

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Moderator

Prof. Dr. Yves Bellouard

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Dr. Yves Bellouard is Associate Professor in Microengineering at EPFL, where he heads the Galatea lab and the Richemont Chair in Multi-Scale Manufacturing Technologies. Before joining EPFL in 2015, he was Associate Professor at Eindhoven University of Technologies (TU/e) in the Netherlands. His current research interests are in advanced manufacturing and more specifically, on laser-based methods to tailor material properties.

On the use of ultrafast laser for permanent precision alignments and fine adjustments
The non-linear matter interaction associated with ultrafast laser exposure provides a unique means to modify transparent materials anywhere in their volumes, and specifically, a method to induce localized in-volume variations. In this talk, we will discuss how this unique property can be used in the context of precision alignment and packaging of optical systems and beyond.

Prof. Dr. Beat Neuenschwander

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Beat Neuenschwander studied physics at the University of Bern and realized his PhD in 1996. Since 2000 he is at the Bern University of Applied Sciences and became full professor in 2005. He is currently leading the laser surface engineering group and heading the institute ALPS. His main research topic is laser micromachining with ultra-short pulses and its industrial application.

Advances in high precision and high-throughput Laser micromachining
Ultrafast pulsed laser micromachining is often considered as not efficient enough for industrial applications. We will present you newest ideas and results from research about approaches high throughput laser micromachining including temporal and spatial multi-spot strategies as well as direct beam forming capabilities.

Dr. Andreas Oehler

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Andreas is working in the laser industry for more than 20 years and has held various positions in laser R&D as well as laser applications. He holds a Ph.D. in Ultrafast Laser Physics from ETH Zurich and is currently heading the Laser Micro Applications department at Lumentum Switzerland (former Time-Bandwidth Products).

Efficient high-quality white engraving of steel using picosecond-lasers with flexible burst-mode
We demonstrate that picosecond-lasers with flexible burst-mode are ideal tools for white-engraving of stainless steel: they provide fast engraving with high detailing which requires minimal to no post-processing to remove burr or spatter, offer full control over the micro-structure to generate various white-marking appearances and ensure optimal overlay between the engraved geometry and the aesthetic surface finish.

Dr. Pierre-Yves Fonjallaz

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Pierre-Yves Fonjallaz obtained his PhD in Physics at EPFL in 1995. He then spent 23 years in Sweden working at KTH and for the Research Institute of Sweden (RISE) in different positions. He founded and led the national platform PhotonicSweden from 2011 to 2018. He is presently working with collaborative projects at the research office of EPFL and for Swissphotonics.

Public Funding Opportunities in Photonics
This presentation will give an overview of public funding opportunities for researchers in companies and academia, from foundations, national, European to non-EU funding. In particular, the situation with the participation of Swiss partners in Horizon Europe will be clarified.