SALON INTERNATIONAL
LEADER DE LA HAUTE PRECISION
HORLOGERIE-JOAILLERIE · MICROTECHNOLOGIES · MEDTECH

Photonics 4 Precision Manufacturing

Palexpo Genève, Wednesday 15. Juni 2016

 **Dr. Patrik Hoffmann**	**Head – Laboratory of Advanced Material Processing (LAMP), Epma, Materials Science and Technology, 3600 Thun BE** patrik.hoffmann@empa.ch | www.empa.ch Adjunct Professor at The Laboratory for Photonic Materials and Characterization (LPMAT), Swiss Federal Institute of Technology Lausanne, EPFL, Lausanne VD Chemistry studies at University of Karlsruhe, PhD thesis at EPFL in 1992. Industrial experience at IBM San Jose (USA) and manager of dental section in company (Germany). Since 1997 research and teaching Laser Micro-Processing at EPFL. Since April 2009 heading LAMP at Empa, continuing teaching at EPFL. Author of 111 peer reviewed journal papers and inventor of 6 patents. **Moderation**
 **Dr. Christoph S. Harder**	**President Swissphotonics, 8832 Wollerau SZ** harder@swissphotonics.net | www.swissphotonics.net Dr. Christoph S. Harder received the ETH Diploma in 1979 and the Master and PhD in EE in 1980 and 1983 from Caltech, Pasadena, USA. He is cofounder of the IBM Zurich Laser Diode Enterprise which pioneered the first 980nm high power pump laser for telecom optical amplifiers and laser diodes for industrial and consumer applications with ultrahigh reliability. He is the recipient of a Fulbright scholarship and the OSA Fellow recognition. Christoph is now heading a consulting company and is cofounder of Swissphotonics and has been its president for the last few years. He has published more than 100 papers and 20 patents and has held a variety of staff and management positions at ETH, Caltech, IBM, Uniphase, JDS Uniphase, Nortel and Bookham and has volunteered on society boards and committees. **Introduction – Swissphotonics Presentation of Organisation**
 **Philippe Cordonier**	**Ingénieur méc. EPFL, Responsable Suisse romande – Membre de la Direction, Swissmem, 1006 Lausanne VD** p.cordonier@swissmem.ch | www.swissmem.ch Né en 1964, Ph. Cordonier est ingénieur mécanicien de l'EPFL et Master of Science européen en énergie. Sa carrière professionnelle l'a amené à occuper diverses positions auprès de CSD Ingénieurs SA à Lausanne, Von Roll Environnement SA à Zurich, à la direction de la Centrale Thermique de Vouvry (VS) puis à la direction romande de l'Union Pétrolière (UP) suisse. Depuis 3 ans, Ph. Cordonier a rejoint la Direction de Swissmem afin d'ouvrir le bureau romand de l'association faîtière de l'industrie MEM. **Initiative *Industrie 2025* - la révolution numérique au service de l'industrie suisse**

Dr. Rudolf Weber

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Dr. Weber made his PhD on *x-ray emission from laser produced plasma* 1988 at the Institute of Applied Physics (IAP) of the University of Bern. After heading the *Diode-pumped solid-state lasers* and the *Laser materials processing* group at the IAP, he managed several engineering companies in the field of laser source and application development. Since 2008 he is head of the materials processing department of the IFSW.

High-Quality Laser Processing of CFRP
Laser processing of composite materials and in particular of Carbon Fibre Reinforced Plastics (CFRP) is very promising regarding flexibility and productivity. However, the anisotropic thermal properties of CFRP often lead to significant thermal damage of the matrix material making high-quality processing a challenging task.
In this talk an overview over the major mechanisms leading to thermal damage, and the recipe how to achieve high-quality structures and cuts will be presented.

Jean-Paul Nicolet

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Jean-Paul Nicolet, Laser Business Development and Market Support at GF Machining Solutions, joined the Group in 1989 as EDM application manager. He assumed his current role in 2009. Nicolet earned a Bachelor of Science in mechanics and production engineering from IUT of Nantes (F). Nicolet, a French citizen, holds a MBA from the International Institute of Management, Paris.

GF Laser Texturing : la révolution dans la décoration horlogère
GF Machining Solutions est le leader mondial des fournisseurs de machines, de solutions d'automatisation et de services pour l'industrie de la fabrication d'outils et de moules et les fabricants de composants de précision.
A l'EPMT 2015, nous avons présenté en avant-première, notre nouvelle solution LASER 400 adaptée aux applications du monde horloger pour la Texturation Laser 3D.
A l'EPMT 2016, GF Machining Solutions présente son retour d'expérience, et présente les avantages de la technologie DUAL (laser nano et femto) appliquée à la décoration horlogère.

Thorsten Kramer

Dipl. Phys, Institute for Applied Laser, Photonics and Surface Technologies ALPS, Bern University of Applied Sciences BUAS, Burgdorf BE

05.1993-12.2003	Project Manager Fraunhofer Institute for Laser Technology, Aachen, D
01.2004-09.2007	Project Manager, CoC-Leader Lasertechnology Automotive Electronics, Robert Bosch GmbH, Ansbach, D
10.2007-08.2012	Project Manager, Member of Innovation Steering Committee, ETA SA, Grenchen SO
09.2012-05.2014	CTO, Swiss Micro Laser GmbH, Stallikon ZH
06.2014-today	Project Manager, BUAS Burgdorf

Ultra-high-precision and high speed surface structuring by synchronizing a galvo scanner with an ultrashort pulsed laser system
A conventional galvanometer scanner in synchronized setup is capable of positioning the laser beam with an accuracy and a repeatability in the range of ±1 µm at marking speeds of several m/s. The fundamentally different control of the spot positions offers possibilities to develop machining techniques for highest precision micro-structuring. In addition the high repeatability represents a key factor for precise multilevel processes such as polishing and coloring.

Prof. Dr. Stefan Nolte

Professor für Experimentalphysik/Laserphysik, Head Ultrafast Optics Group, Abbe Center of Photonics, Institute for Applied Physics, Friedrich Schiller University, 07745 Jena D
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Stefan Nolte is professor of laser physics at the Friedrich Schiller University and head of Laser Materials Processing at the Fraunhofer IOF, Jena. His research topic is ultrashort pulse micromachining and materials modification for industrial and medical applications. He has been actively engaged since the field's inception in the mid-1990s.

Ultrashort pulse laser processing – current industrial applications and beyond
Ultrashort laser pulses have shown a tremendous potential for precise microstructuring. Various industrial mass applications have already been realized, including e.g. the drilling of fuel injection nozzles. Apart from processing opaque materials like metals, the possibility to realize three-dimensionally localized modifications within the bulk of transparent materials has attracted increasing interest in the past years. Exploiting nonlinear absorption effects, localized permanent structural changes inside the sample without affecting the surface can be induced. Depending on the processing parameters, different modifications can be generated in the focus. Applications range from cutting to welding.

Céline Bansal

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Céline Bansal is the technical sales engineer for Oxford Lasers since 2010 and is specialised in the sales of high precision laser micromachining systems in different territories such as Europe, Asia and South America. Oxford Lasers design, build high precision laser micromachining systems. We also provide sub-contract laser micromachining services including R&D, process development and job shop for our customers.

Latest Advances in High Precision Laser Micromachining of Transparent Materials
Today, there is a necessity to process both bulk and thin film transparent materials like glass, sapphire, diamond as well as thin films such as transparent conductive oxides. We will present our latest results from a European project called *TiSa TD*. The main goal is to demonstrate laser processing of transparent material of varying thicknesses using high average power fs lasers.

Dr. Sébastian Favre

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After graduating from University of Neuchatel in electronic-physics in 1995, he performed and completed its PhD within the Institute of Applied Optics at the EPFL on Laser Technologies and Applications in 2001.
Since, he travelled around the world to acquire experience (Data Storage Institute – NUS Singapore / Laboratory of Biomedical Photonics – EPFL / National Center of Laser Application – NUIG Ireland) and started as R&D engineer with Medtronic in Switzerland in 2006.

Laser in the Medical Devices Manufacturing World
Thanks to its advantages, the lasers have been introduced already in the 1970s within Medtronic to hermetically seal medical devices. Medtronic is following and developing medical devices products (e.g. pacemaker) using laser processing technology. All kinds of laser processing methods applied by Medtronic are nowadays highly integrated within the production lines of Medtronic that use them for welding, engraving, cutting, etc...
This presentation will give an overview on the advantages of using laser in the medical device world, perspectives and limitations.
Medical Manufacturing processes need to comply with all regulatory requirements and therefore process validation need to establish compliance with a degree of confidence and process key parameters are actively followed with monitoring and other process control strategy.

Prof. Dr. Michael de Wild

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Michael de Wild is a professor at the UAS FHNW. He studied physics at the University of Basel and the University of Utrecht, the Netherlands. Later he joined the company Endress+Hauser AG. After his PhD at the University of Basel, he became a research scientist at Institute Straumann AG in the field of dental implants.

Implant Production using Selective Laser Melting
In this presentation, the design, manufacturing and testing of load-bearing implants produced by selective laser melting will be discussed. Analytical, structural, mechanical, in-silico, in-vitro and in-vivo studies are indispensable to verify the performance of such novel biomaterials. In particular the results from 3D-printed implants out of shape memory alloy, titanium and magnesium will be presented.

Prof. Christoph Meier

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Christoph Meier obtained an engineering diploma degree from School of Engineering, HTL Biel and a master degree in physics of University of Neuchâtel. Since 1991 he has been working at BUAS, as professor of physics and electrical technology. In 2001, he was elected professor of optics and is now head of the optics research group called OptoLab.

Optical Sensing, Optical Coherence Tomography OCT
In a short introduction, some of basic concepts of Optical Coherence Tomography OCT and current state of the art of OCT systems are presented. Differences in OCT systems for medical application and Non Destructive Testing NDT are worked out. The main part of the presentation concerns examples of real time process control in both medical as well as NDT applications.

Dipl.-Ing. Tim Westphäling

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1988 – 1993: Studying Economy Engineering at Nordakademie, Elmshorn, Germany
1993 – 2000: R&D manager at Possehl Electronics, Wedel, Germany, manufacturer of leadframes
2000 – 2006: Sales Manager North Europe for Lasag AG, Thun, Switzerland
Since 2006: Key Account Sales Manager at IPG Laser GmbH.

Industrial Micro-materials Processing Applications with Fiber Lasers
IPG are the world leader in fiber lasers used by industry for material processing. For micro materials processing, pulsed lasers in ns and ps range are used for surface structuring metal parts and ceramics. Single-mode lasers in CW- & QCW- outputs are used for cutting, drilling and micro-welding by industries such as the medical devices and watch-making. This presentation demonstrates IPG's latest developments for micro processing and presents corresponding application examples.