Photonic 4 intelligent processing

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Prof. Dr. Patrik Hoffmann

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Adjunct Professor at The Laboratory for Photonic Materials and Characterization LPMAT, Empa Swiss Federal Institute of Technology Lausanne, EPFL, Switzerland
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 a company in 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 NTN, 8832 Wollerau SZ
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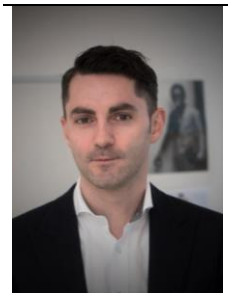
Dr. Christoph S. Harder received the ETH Diploma in 1979 and the Master and PhD in EE in 1980 and 1983 from Caltech, Pasadena, USA. He is cofounder of the IBM Zurich Laser Diode Enterprise which pioneered the first 980nm high power pump laser for telecom optical amplifiers and laser diodes for industrial 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 NTN - presentation of the organization



Dr. Emile Dupont

Head knowledge & technology transfer team, Innosuisse, 3003 Bern
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Emile Dupont received his PhD from the EPFL Lab of Microsystems in 2010. After a couple of years in the private sector, he started working on fostering tech transfer and international collaborations. At Innosuisse, he leads the Technology Transfer team, which manages the Innovation Mentors, the support to Specialised Events, the National Thematic Networks, and the Enterprise Europe Network.

Innosuisse innovation funding and support instruments

Innosuisse is the Swiss Innovation Agency, successor of the CTI. From financial support for collaborative projects, to national and international networking activities, to the participation in international innovation initiatives (and in particular the upcoming Eureka-Photonics 21 call), Innosuisse supports science-based innovation and helps innovative ideas have an impact on the market and on the Swiss society.

Dr. Christian Rathjen

Vice President, Ziemer Ophthalmic Systems AG, 2562 Port BE
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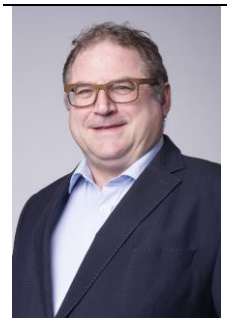
Mechanical engineering (Dipl-Ing.) and applied physics (Dr.-Ing.). Work experience: Teaching & industrial research (University of Hannover), Research Lab (CERN), Industry Ziemer Ophthalmic Systems ZiOS. Current post: VP Technology and Strategy

Imaging assisted femtosecond laser surgery

Femtosecond lasers are in clinical use for more than 15 years. For the first time gentle tissue processing inside the eye with virtually no side effects is possible. However, since each eye is different, cuts have to be placed inside the eye with the help of automated 3d imaging systems.



Prof. Dr. Beat Neuenschwander

Expert Innosuisse, BUAS, 3400 Burgdorf BE
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Beat Neuenschwander studied physics at the University of Bern where he realized 1996 his PhD. From 1997 to 2002 he joined the company Numerical Modelling and since 2000 he is also at the Bern University of Applied Sciences BUAS. There he built up the laboratory for laser surface engineering and became full professor in 2005. His main research topic is laser micromachining with ultra-short pulses and its industrial application. He is also expert for innosuisse, head of the optics section of SSOM and chair of the LASE symposium at Photonics West.

Intelligent strategy for smart manufacturing

In laser micromachining, when changing form ns to ultra-short pulsed systems, the machine concept and the processing strategy are often not adopted restraining the possibility to take full benefit of this new technology. But the combination of new developments in sensor technology, allowing online process monitoring, optimized machining strategies and intelligent control has the potential to bring laser micromachining to a next level for real smart manufacturing in short time.

Markus Danner

Product Line Manager, Coherent Switzerland AG, 3123 Belp BE
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Markus Danner is the product line manager of Coherent Switzerland AG in Belp. Formerly known as Lasag AG and part of the Swatch group until 2010, the company is still dedicated to laser micro processing of various metals, dissimilar metal combinations or hard and brittle materials. In cooperation with EMPA Coherent Switzerland developed a new processing head that allows to reduce the energy input even increasing the cross section of a weld.

Micro welding - A new approach

In micro welding dis-similar material combinations, material thicknesses of below 0.1mm and minimum energy input are constant challenges. SmartWeld+ allows to precisely shape the welds cross section and penetration depth within microns. Joining of aluminum, copper, steel and various combinations in perfection. Energy input is reduced by up to 66% minimizing HAZ, spatter tendency, thermal stress and crack formation.

Dr. Markus Kogel-Hollacher

Head of department R&D projects, Precitec Optronik GmbH, D-63263 Neu-Isenburg, Hessen
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Dr. Markus Kogel-Hollacher started at the Fraunhofer Institute for Laser Technology (Aachen) in 1994. Since then the focus of his work is in the field of monitoring and control of laser processes. In 1996 he joined Precitec, Germany. He is a member of the board of directors at the LIA, of the Board of Stakeholders at Photonics21 and was twice Finalist at the Innovation Award Laser Technology.

Smart solutions for Laser processing – beam delivery and sensor

As the laser is a conventional tool the main topic in production today is headlined with the word digitalization and Industry 4.0. Especially in this context sensor technology is a leading part related to Smart Factory and predictive maintenance and process control. Transforming machine elements into intelligent cyber physical systems involves the integration of smart sensors for condition and process monitoring.

Dr. Yves Emery

CEO and co-founder, Lyncée Tec SA, 1015 Lausanne VD
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Yves Emery, co-founder and CEO of Lyncée Tec, holds a PhD in Physics (Optics), hold a Business Administration Postgraduate certificate (HEC-UNIL). Prior to Lyncée, he has worked several years as Director of R&D and production in two start-ups active in the field of medical devices. After a postdoctoral stay at Texas A&M University, he worked five years as Director of R&D and production in two start-up active in the medical device field. In 2002, he joined the group of founders, brought its experience and network to valorize the DHM technology and since he has conducted the company from a start-up to a SME. He has been honored by several industrial prizes for his work with Lyncée Tec SA, including the De Vigier Price. His main fields of scientific interest are microscopy, optics and lasers applied nano-micro metrology, life cell imaging, medical and environment sensing. He is the author or co-author of about 80 articles published in peer reviewed journals and of five patents.

Vacuum tribometer with in-situ wear measurement by DHM®

Digital Holography Microscopes DHM® are non-scanning 3D profilometers: they grab information instantaneously, without taking time to perform a vertical or a lateral scanning. This unique specification enable not only to characterize in-situ static topography but also dynamical behavior over a large variety of samples. This will be illustrated with the real time measurement of wear of a rotating disk, for tribology testing inside of a vacuum chamber and at high temperature.

Guillaume Nordet

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Graduated from mechatronics at Ecole Normale Supérieur of Rennes, he completed his internship for master's degree in material science at PIMM laboratory about copper fusion by laser. For eight month, he has started his PhD titled: *Optimisation of Additive layer manufacturing of copper by laser* carried out as part of a PIMM – AddUp collaboration.

Study of copper fusion by laser for additive manufacturing processes

How the physical properties of copper can influence copper melting and what problems occure for the Selective Layer Melting SLM process. Development of some solution to improve the laser – material interaction and better the SLM parts.

Dr. Damien Loterie

Researcher, LAPD-EPFL, 1015 Lausanne VD
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Damien Loterie graduated from EPFL in 2017 with a PhD in microengineering. His expertise in light shaping through complex media put him on the track of developing Readily3D's algorithm for volumetric 3D printing. After having secured initial funding for Readily3D, he now works on establishing new business partnerships to foster the commercialization of volumetric 3D printing at Laboratory of Applied Photonics Devices LAPD.

Volumetric 3D printing

At Readily3D, we develop ultra-rapid, user friendly 3D printers. Our volumetric printing technology enables the fabrication of complex devices with rigid or elastic materials in a matter of seconds, with very little manual labor required, thus allowing for in-shop production of customized products.

Dr. Felix Reinert

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Felix Reinert, Head of research at Swiss AM Center SAMC of Switzerland Innovation Park Biel/Bienne SIPBB, CEO ProtoShape GmbH, Co-Founder UrbanAlps AG, did his studies at EPFL in micro-engineering, holds a PhD from University Bern in Laser-Physics and has a certificate of higher education in Physics from ETHZ. Previously he worked as a cluster manager *Novel Manufacturing Technologies* at Alstom.

Advanved Laser Powder Bed Fusion Research with the Open AM Machine at SAMC

Laser Powder Bed Fusion Research is mainly preformed with state-of-the-art production machines or basic lab machines. The new open AM machine at SIPBB combines both worlds and allows interchange of components like Laser, optics and monitoring systems while guaranteeing a buildup like production machines. We present its capabilities and propose collaboration models.

Dr. Yann Tissot

CEO & co-founder, L.E.S.S. SA, 1020 Renens VD
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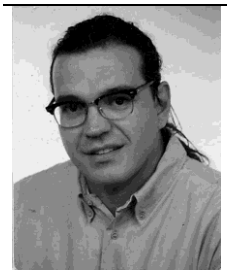
Dr. Yann Tissot is the co-founder and CEO of L.E.S.S. SA and holds a PhD in Photonics from the EPFL. Prior to L.E.S.S. SA, he hold key positions in the field of optics, telecommunication and space technologies in international companies like GN Resound, Oerlikon Space or Optotune. Yann holds or co-hold more than 30 patents internationally.

New photonics illumination devices

L.E.S.S. developed novel distributed lighting systems as an alternative to today's LEDs or discharge tubes. Based on an nano-active optical fiber, the new photonics devices generate high quality light that exhibits both ultra-uniformity and brightness characteristics. These key specifications enable to enhance the performance of demanding inspection processes by providing high contrasted images in a well-defined and robust lighting environment.



Dr. Alexandre Masserey

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Alexandre Masserey, co-founder and CEO of Ycoor Systems SA, holds a PhD in applied mathematics (EPFL), a master in physics (EPFL) and a master in electrical engineering (HES). He has worked on several projects (CTI/KTI) with EPFL, including the *Shallow Laser Surface Melting SLSM for mould industry* research in collaboration with EPFL, EMPA, HE-ARC and Unitechnologies SA. His main fields of scientific expertise are numerical simulation, physical and mathematical modeling applied to industrial processes as well as creation, modification and improvement of simulation software.

3D simulations of Marangoni-driven free surface flows, applied to laser polishing processes

Numerical simulation is now commonly used to reproduce and/or understand physical phenomena involved in industrial processes. In this talk, we present a model designed to simulate, in three dimensions, the coupling between CFD flows (including a free surface) and thermal effects involved in laser polishing. Simulation results are compared with experimental measurements. The work carried out validates the numerical model, provides basic understanding of the difficulties induced by this type of processes and opens a field of simulation for future investigations.

Our next stops:

Apéro at Laser World of Photonics
Tuesday, 25. June 2019, 18:00
Hall B3, Booth 416 of Exalos AG
Messe München

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Innosuisse – Schweizerische Agentur für Innovationsförderung