Photonic Instruments 2013

Zürich, 11.09.2013

Dr. Nicolas Blanc

Vice-President, Head of Space Program CSEM SA, Zurich
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Dr. Nicolas Blanc holds a PhD in physics from the EPFL (Switzerland) and an Executive MBA from the Robert H. Smith School of Business, University of Maryland (USA).

Nicolas Blanc has more than 20 years of experience in various R&D management functions, in particular in the development of optoelectronics components and systems for a wide range of applications in the automotive, consumer, industrial control, medical, security and space markets.

He is member of the IEEE, SPIE and OSA, as well as member of the *Technopark Beratungsausschuss* and board member of the association *sensors.ch*. He has co-authored more than 50 papers and 2 book chapters.

Labtour: CSEM und Photonic Instruments

Dr.
Christoph Harder

President Swissphotonics, Schindellegi SZ
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Dr. Christoph S. Harder received the Electrical Engineering Diploma from the ETH in 1979 and the Master and PhD in Electrical Engineering in 1980 and 1983 from Caltech, Pasadena, USA. He is co-founder of the IBM Zurich Laser Diode Enterprise which pioneered the first 980nm high power pump laser for telecom optical amplifiers.
He has been managing during the last few years the high power laser diode R&D effort in Zurich expanding, working closely with a multitude of customers, the product range into 14xx pumps as well as 808 and 9xx multimode pumps for industrial applications. 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.

Moderation

Prof. Dr.
Ursula Keller

Physics Department, ETH Zurich and Director NCCR MUST
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Ursula Keller joined ETH as a tenured professor of physics in 1993 currently serves as a director of the NCCR MUST started in 2010. She received the PhD in Applied Physics from Stanford University in 1989 and the Physics *Diplom* from ETH in 1984. She was a Member of Technical Staff (MTS) at AT&T Bell Laboratories in New Jersey from 1989 to 1993.

NCCR MUST and leading edge photonics instruments

During this brief welcome talk a short overview of NCCR MUST is given. Updates on our research and outreach programs can be found on our webpage *www.nccr-must.ch*. Leading edge photonics instrumentations are widely used and are newly developed in our NCCR MUST supporting measurements at new frontiers such as attosecond sience and femtosecond hard X-ray measurements with the future SwissFEL at PSI.

Dr. Rafael Abela

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Education
University of Karlsruhe, Germany (1971-1976)
Diploma (1976): Vorbereitende Messungen zu paritätsverletzenden Effekten in myonischen Atomen
University of Basel, Switzerland (1976-1980)
PhD Thesis (1980): Polarization of the 2p and 1s states in muonic atoms and the helicity of the muon in pion decay

Professional Experience

2009-	SwissFEL Project Leader Photonics and Research, PSI
2000-2008	Head of the Laboratory for Synchrotron Radiation LSYI
1998-2000	Scientific Leader, SLS Project
1994-1998	Deputy Scientific Leader, SLS Project
1984-1994	Head of Particle Beamline Group, PSI
1980-1984	Research Scientist, PSI
1976-1980	Research Assistant, Department of Physics, University of Basel

The SwissFEL X-Ray Laser Project
X-ray free electron laser facilities producing fs pulses of coherent x-rays in a wide wavelength range, with extremely high peak brightness, are in operation and planning stage. The brightness, the coherence and the short pulses provide opportunities for performing novel science in chemistry, solid state physics, biochemistry and materials science. The presentation will focus on the characteristics of the facility, the so far achieved goals and challenges in instrumentation and experimental techniques.

Dr. Luigi Bonacina

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Luigi Bonacina obtained a master at the University of Milan in 1999. Successively he moved to EPFL where he completed a PhD in 2004 with a project on ultrafast spectroscopy. He is now working as senior researcher in the Biophotonics group at the University of Geneva. His main research interests include the development of nonlinear and coherent optical techniques for spectroscopy and imaging of biologically relevant samples.

Spectral phase and amplitude modulation from ultraviolet to infrared with a reflective MEMS pulse shaper

We present a reflective temporal pulse shaper based on a MEMS chip realized in collaboration with the IMT/SAMLAB. The device is capable of modulating the spectral phase and amplitude of fs laser pulses in a large frequency span, from the XUV to the near infrared. The MEMS approach will be compared to alternative shaping technologies and its optical implementation will be discussed in the context of various spectroscopy applications.

Dr. Tom T. A. Lummen

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Tom T. A. Lummen received both his M.Sc. (2005) and PhD degree (2009) from the University of Groningen in The Netherlands. After a postdoctoral stay at the Pennsylvania State University (USA, 2010-2013), he recently joined the LUMES laboratory at the EPFL to establish the new ultrafast PINEM technique in Europe.

Direct spatio-temporal imaging of evanescent fields using ultrafast Photon-Induced Near-field Electron Microscopy (PINEM)

Very recently, the LUMES laboratory at EPFL has built the first functional ultrafast electron microscope in Europe. Here we describe the customized experimental system and its capacity to image photo-induced evanescent waves in nanostructures with both nm and few-hundred-fs resolution. Present and future plans to exploit this new technique will be discussed.

Dr. Kurt Weingarten

CEO Time Bandwidth Products AG, Zürich
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Kurt received his PhD and Masters in Electrical Engineering at Stanford University, where he developed ultrafast electro-optical measurements on integrated circuits using ps lasers, and a BSEE at Georgia Tech in Atlanta. Kurt founded Time-Bandwidth Products in 1995 to develop simple, robust ultrafast mode-locked lasers for scientific and industrial applications. He founded the VC-funded telecom start-up GigaTera in 2000, which was later acquired by TBP in 2003.

New perspectives on high-speed material processing with ultrafast lasers

We present the new PicoBlade – a full-featured system-ready ps laser system for precision micromachining, and discuss key requirements necessary for high-speed galvo and line-scanner beam delivery approaches. Scan speeds >100 meters per second are demonstrated.

Dr. Christian Brönnimann

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Christian Brönnimann studied experimental physics at the University of Zuerich and completed his PhD in physics at PSI in 1996. After the approval of the Swiss Light Source in 1997 he was responsible for the development of high speed detectors for x-ray diffraction beamlines. In 2006 he decided to commercialize the developments and founded Dectris together with 3 partners.

Single Photon Counting X-ray Detectors

Hybrid CMOS Pixel Detectors operated in single photon counting mode are established as a standard in scientific and industrial x-ray detection because of their extremely high sensitivity and the very high frame rates. Micro-and Nanotechnology is a prerequisite for the micro-bump bonding of CMOS ASIC's to solid state sensors and for the future developments of the detector technology.

Dr. Martin Forrer

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Martin Forrer is leading the research and development team at FISBA OPTIK since 2006. During the industrial engagement at FISBA he has developed successful customer products based on micro-optical designs and innovative fabrication technologies. His latest focus is the selection and implementation of the technologies needed for glass precision molding and for the design and production of miniaturized optical systems. He received the academic education as experimental physicist in laser physics and polymer physics from ETH. He performed his PhD thesis in the laser physics group at the University of Berne and his research postdoc work at the EPFL for medical laser applications.

Optical microsystems

FISBA OPTIK is leading in optical design and system engineering for precision optical systems and serves the customers from feasibility studies through to series production. Based on challenging market requirements, FISBA OPTIK is succeeding in the trend for miniaturization with various high end micro-optical systems ranging from applications such as high power diode laser collimation, laser modules for CTP printing and more recent innovations such as chip on the tip technology for flexible endoscopic imaging application and RGBeam diodelaser combining several diode-laser wavelengths for customer applications such as micro-endoscopic illumination, sensing and displays.

Dr. Thomas Metzger

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Education

2004-2009	PhD studies at the Laboratory for Attosecond Physics of Prof. Ferenc Krausz in Garching, Max-Planck-Institute of Quantum Optics, Germany
2002-2004	PhD studies Vienna University of Technology, Dept. of Electrical Engineering, Prof. Ferenc Krausz, Austria
1992-2001	Study of mechanical engineering at the University Stuttgart

Professional Experience

Since 2012	CTO at TRUMPF Scientific Lasers GmbH + Co. KG
2009-2012	Postdoctoral researcher at the Laboratory for Attosecond Physics of Prof. Ferenc Krausz in Garching, Max-Planck-Institute of Quantum Optics, Germany

Picosecond thin disk lasers for pumping parametric amplifiers

Short-pulse-pumped optical parametric chirped pulse amplifiers (OPCPA) as high harmonic driver sources for as spectroscopy require ps-lasers with kHz repetition rates, high pulse energies and as a result high average powers. The talk presents thin-disk laser based amplifiers especially tailored for pumping OPCPAs delivering up to 50 mJ, more than 200 W and pulse durations below 2 ps.

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