PIC - Photonic Integrated Circuits: from telecom to sensing
Speakerlist

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Dr. Christoph S. Harder

President Swissphotonics, 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.

Dr. Christian Bosshard

Manager Swissphotonics, 8832 Wollerau SZ
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Dr. Christian Bosshard received his degree in Physics (1986) and his doctorate (1991, Silver medal award) from ETH. From 2001-2021 he was working at CSEM, first as Section Head and then as Vice President and Head Photonics. Since 2013 he is Managing Director of Swissphotonics. Christian is a Fellow of the Optical Society of America OSA, Board Member of EPIC, and Member of the Board of the University of Basel.

Marco Mayer

Area Manager Hamamatsu Photonics, 4500 Solothurn
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Marco Mayer started as a mechanical engineer and touched from the beginning the optics field.
Worked on night vision and triangulation weapon range finding systems, and then moved into the medical field in Ophthalmology for several years. Then changed side into sales of optoelectronic components and systems. 1990 he entered Hamamatsu Photonics as country manager, trained in the facilities in Hamamatsu Japan. Today he is heading the Hamamatsu Think Tank Europe with responsibilities in Sales and Marketing throughout Europe.

PIC - How to choose between Monolithic and Hybrid
PIC has picked up momentum in the recent years and most examples show very elegant monolithic solutions with all its advantages. Nevertheless, in practice we often see the case that projects can not be started due to either high investments necessary or high volume is required. Hybrid detectors can be the solution to solve these issues and they also have the advantage of easily mix materials and optimize performance separately for the detector and the circuits.

Prof. Dr. Niels Quack

Head Q-Lab EPFL, 1015 Lausanne VD
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Niels Quack is SNSF Assistant Professor at EPFL, leading the research group on Photonic Micro- and Nanosystems. He holds an MSc from EPFL (2005), and a Dr. Sc. from ETH Zürich (2010). Previously, he was Postdoctoral Researcher at UC Berkeley (2011-2015), and Senior MEMS Engineer with Sercalo Microtechnology (2014-2015). He is IEEE senior member, OSA member and SPIE life member.

Enhancing PICs with MEMS
Micro- and nanoscale mechanical systems enable fundamental photonic operations on-chip, such as switching, phase shifting or attenuation, with an exceptional combination of high efficiency, low power consumption, and compact footprint. We will introduce recent advances in the integration of Micro-Electro-Mechanical Systems MEMS technology into Silicon Photonics, and discuss the outstanding scaling opportunities provided by enhancing PICs with MEMS.

Dr. Thomas Hessler

Director Ligentec SA, 1024 Ecublens VD
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Thomas Hessler, studied physics at Uni Constance and Imperial College London. After his PhD in micro-optics with Uni Neuchâtel, he co-started, lead and scaled Axetris AG. In 2019, he joined EPFL Spin-Off Ligentec SA as managing partner, a leading player in low loss integrated photonics for quantum, LiDAR, space and metrology applications.

Silicon Nitride - a versatile, low loss PIC platform
Silicon Nitride, with its wide transparency window, is a perfect light guiding material as based to a versatile PIC platform allowing a wide range of applications from biosensing and metrology to LiDAR and quantum computing. The platform and its building blocks are presented and selected applications discussed.

Prof. Dr. Rachel Grange

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Since 2021, Rachel Grange is an associate professor in integrated optics and nanophotonics in the Department of Physics at ETH Zurich. She has been assistant professor at ETH Zurich since 2015. From 2011 to 2014, she was junior group leader at the Friedrich Schiller University in Jena, Germany. Her research covers top-down and bottom-up fabricated nanostructures with metal-oxides.

An electro-optic integrated platform for telecom and sensing devices
Electro-optic devices are still very bulky, hardly integrable or scalable due to low signal and difficult fabrication. Here I will show several integrated electro-optic systems by engineering the lithium niobate on insulator platform: an intensity modulator operating at 100 Gbit/s, a waveguide Fourier transform spectrometer with a recoverable spectral bandwidth of 500 nm in the near infrared.

Dr. Stefan Abel

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Dr. Stefan Abel is Co-founder and Co-CEO of Lumiphase AG and driving the development and commercialization of Lumiphase's innovative *Pockels* switching technology. Previously, Stefan spent more than 10 years at IBM where he invented new optical phase shifters based on ultra-efficient electro-optical materials for applications in optical communication, novel photonic computing, and sensing with light.

Pockels-enhanced ultra-efficient photonic chips
Controlling light with electrical signals is a critical function in PICs for optical communication, sensors, and switches. Lumiphase builds photonic chips based on a unique Pockels technology. Our chips serve as a new solution to perform electro-optical switching with benefits in cost, speed, transparency, power-consumption, and footprint compared to standard silicon solutions.

Prof. Dr. Tobias Kippenberg

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Tobias J. Kippenberg is Full Professor at EPFL Switzerland / Institute of Physics. His research interests are the Science and Applications of ultra high Q microcavities; in particular with his research group he discovered chip-scale Kerr frequency comb generation and observed radiation pressure backaction effects in microresonators that now developed into the field of cavity optomechanics (Nature and Science).

Nonlinear Hybrid Integrated Photonics
Optical frequency combs provide equidistant markers in the IR, visible and UV and have become a pivotal tool for frequency metrology and as an underlying principle of optical atomic clocks, broadband spectroscopy or low noise microwave generation. Latest advances in chip-scale lasers and nonlinear microresonators have led to impressive demonstration of integrated, low-power consumption microcombs, making these devices promising for replacing state-of-the-art of mode-locked laser-based optical frequency combs.

Dr. Claudia Hössbacher

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Claudia has always been fascinated by light. The Master program in *Optics and Photonics* at KIT, Germany, stimulated her interest in the interaction of light with smallest structures. Following this interest, she researched integrated photonics, plasmonics and electro-optics during her PhD at ETH Zurich. In 2019, she was awarded the ETH Pioneer Fellowship and co-founded Polariton Technologies Ltd.

Plasmonics - a Powerful Platform for Next-Generation Integrated Circuits
Today's information society relies on high-bandwidth optical communication networks, but the ever-increasing data traffic brings the infrastructure beyond its limit. Based on scientific breakthroughs at ETH Zurich, Polariton's PICs rely on plasmonics rather than conventional photonics, thus enabling data transmission at unprecedented speed and quality. The plasmonic modulators are 10 x faster than current photonic modulators (>500 GHz demonstrated), 100 x smaller, and energy-efficient.

Dr. Victor Brasch

Senior R&D engineer CSEM SA, 2000 Neuchâtel
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Victor Brasch arrived in Switzerland to start his PhD on nonlinear PICs in the group of Tobias Kippenberg at EPFL. Laying some of the groundwork for what became the successful start of silicon nitride PICs in Switzerland he finished his PhD and started at CSEM about 4 years ago. There he works in the group Laser & Quantum Tech on different subjects, many including PICs.

Supporting a Swiss PIC ecosystem – services & opportunities at CSEM
As the Swiss PIC ecosystem grew over the last years, CSEM has developed matching capabilities and invested in new facilities. I will present an overview of recent activities at CSEM, ranging from PIC design and fabrication to packaging and testing with applications in sensing, metrology and telecom. I will also highlight, how CSEM will continue to help developing this ecosystem.

Tobias Müller

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Tobias is the technical director and co-founder of AIXEMTEC. He started his career in 2008 with assembly of lasers at Fraunhofer. From 2012 he worked on assembly automation of optical systems. 2016 he took over management of the 10 people R&D group for automated optics assembly. Between 2018 -2020 he managed 75 people in business unit optics at Fraunhofer.

Full-service Automation Technologies for Risk minimization and cost-effective scaling of production
The production ramp-up of photonic systems is often connected to high technical and economic risks. In order to manufacture significant amounts productive high-end equipment is needed. AIXEMTEC and its R&D partners have a solution to this challenge: Make use of the Prototyping service by e.g. CSEM and use our job-shop service to scale fabless on AIXEMTEC's machines.