



HTW Chur



Hochschule für Technik und Wirtschaft
University of Applied Sciences

Industrial 3D Vision

3D Laserscanning, LiDAR, TOF

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Dr. Christoph Harder

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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.

Moderation








Prof. Jürg Kessler

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Jürg Kessler is the first President of the merged HTW Chur and is a professor for corporate management. As President of the Teaching Commission of the Chamber of Universities of Applied Sciences and as a delegate of the Teaching department of swissuniversities for nine years, he is committed to representing the interests of education at a national level. Jürg Kessler graduated as a qualified surveyor (MSc ETH) from the Swiss Federal Institute of Technology Zurich (ETH) and subsequently worked as an engineer in the industry for several years before completing a lic. oec. publ. Master's degree in Economics (MA UZH) at the University of Zurich. After his studies, he was employed at Zurich Insurance for eleven years, finally as a member of the management. Wanting to return to a role that was more related to the 'direct application of engineering', he joined Zurich Airport and managed the construction division as a member of the Executive Board. Among other tasks, Jürg Kessler was the project manager in charge of leading the expansion of the airport with a volume of CHF 2.1 billion. During the grounding of Swissair, he was able to contribute his great experience in dealing with people, for example as head of one of the four task forces responsible for crisis management activities at the time. During his military career, he most recently served as General Staff Colonel (Generalstabsoberst) in various commanding office functions ranging up to Regimental Commander in the Graubünden units. In his last position, he acted as deputy of a General Major of the Territorial Region 3. He is currently a member of the think tank of the Armed Forces Senior Cadre Training (SCT) and a member of the future development of the Swiss Army (Begleitgruppe WEA).

Welcome from the HTW

 <p>Dr. Udo Birk</p>	<p>Image Processing Lecturer & Researcher, University of Applied Sciences HTW Chur, 7004 Chur GR udo.birk@htwchur.ch www.htwchur.ch</p> <p>Udo Birk obtained his PhD in 2004 at the University of Heidelberg. As Marie Curie Fellow he developed optical imaging devices at King's College, London, UK and at FORTH, Heraklion, Greece. He worked on tissue imaging and spectroscopy at Roche Diagnostics and at the Medical Laser Center Lübeck, and obtained his venia legendi in Experimental Physics from the University of Mainz in 2017. He is lecturer on Image Processing at Chur University of Applied Sciences (Switzerland) and in Physics at University of Mainz (Germany). His research focuses on image processing for various optical and acoustooptical imaging technologies, in particular on super-resolution imaging and on 3D optical tomography.</p> <p>Introduction to the Workshop</p>
 <p>Jacques Cochard</p>	<p>Tematys's partner, Tematys, 75009 Paris, France jcochard@tematys.com Https://tematys.fr</p> <p>After a degree received from the École des Mines of Nancy, Jacques managed in OPTICSVALLEY, the photonics cluster of Paris, technology transfer actions for French Photonics Labs. He founded TEMATYS in 2010 to develop sourcing and transfer at the European level, always focused on photonics technology. Jacques has run more than 100 marketing and technological studies for European players.</p> <p>LiDAR technologies for the Automotive Industry: Technology Benchmark, Challenges and Market Forecast</p> <p>The automotive industry is changing as new mobility schemes are emerging: car/ride sharing, carpooling, peer-to-peer car rentals. The development of the autonomous vehicle meets these new mobility models, including 3D surrounding mapping technology. Automotive LIDARs currently attract huge investments but among the several available technologies - mechanical scanning, flash, MEMS, Optical Phased Array - which one is the best suited?</p>
<p>Christian Erik Thoeny</p>	<p>CEO Cedes Group, 7302 Landquart GR christian.thoeny@cedes.com https://cedes.com</p> <p>Christian-Erik Thoeny, CEO of CEDES, the WW leading group in optically based sensors. He graduated as a Master of Science from mechanical fine precision and software engineering and did additional studies in advanced management and economics in INSEAD, Fontainebleau. He has experiences in semi-conductor automation, elevator, automotive and construction machinery. He is member of industrial associations, and non-profit organizations.</p> <p>3D Sensors for Transportation Systems</p> <p>The latest state-of-the-art "time of flight technology" or TOF, has reached maturity. It enables an entirely new approach to monitoring and controlling of applications such as elevator doors or other mechanically-moving elements. In a disruptive way, e.g. light curtains will be replaced by a sensor much smaller yet simultaneously adding a completely new intelligent dimension.</p>
 <p>Dr. Markus Rossi</p>	<p>CIO Heptagon member of the ams group, 8803 Rüschlikon ZH markus.rossi@hptg.com http://hptg.com</p> <p>Studied physics at ETHZ, PhD in micro-optics from university Neuchatel, started Heptagon as spin-off from CSEM Zurich in 2000. Jan 2017: acquisition of Heptagon by ams AG. Now senior Vice President Innovations.</p> <p>3D Cameras for Consumer Application</p> <p>Review of 3D sensing concepts for consumer applications: typical requirements and challenges, hardware, software and system solutions.</p>

<p>Dr. Julien Boucart</p>	<p>Director R&T ii-vi Laser Enterprise GmbH, 8045 Zürich julien.boucart@ii-vi.com www.laserenterprise.com</p> <p>Dr. Julien Boucart obtained his PhD in 1997 working on long wavelength VCSELs for telecommunication application. Since joining Laser Enterprise in 2006 he has worked in several functions as R&D manager, marketing manager and product engineer manager on various semiconductor lasers type in the consumer electronics application space. Since 2017 he is leading the product line of laser for consumer applications with an emphasis on lasers for 3D sensing.</p> <p>Laser Diodes for Sensing Edge Emitting and Vertical Cavity Surface Emitting Laser Diodes are the key enablers for 3D sensing applications due to their unique combination of narrow line width, fast modulation speed, high power and high efficiency over a wide temperature range with the ease of integration and scalable manufacturability required for high volume manufacturing</p>
<p> Lucio Carrara</p>	<p>CTO and R&D manager at Fastree 3D SA, 1024 Ecublens VD lucio.carrara@fastree3d.com www.fastree3d.com</p> <p>He is currently the R&D manager at Fastree3D where he leads a team of engineers designing a Time of Flight camera module, including System on Chip for single-photon detectors. He formerly worked at ESPROS Photonics and has over 9 years of experience in IC design, test and fabrication, of 3D sensors. He holds an MSc. from EPFL and Institut National Polytechnique de Grenoble.</p> <p>New Health and Safety Issues about Occupational Particle Exposure During Metal Additive Manufacturing The considerable growth of AM must go hand in hand with the addressing of occupational risks and their reduction to the lowest possible level. In the context of metal AM, exposure to very small metal dusts (< 100 nm), which are by-products of the laser beam melting, is one of the main issues.</p>
<p> Dieter Kaegi</p>	<p>Senior Product Manager ESPROS Photonics AG, 7320 Sargans SG dieter.kaegi@espros.com www.espros.ch</p> <p>Dieter Kaegi is Senior Product Manager. He joined 2010 the product management of ESPROS Photonics AG. After graduating 1983 as electronics engineer of ETH Zurich university and before ESPROS, he worked as design engineer, group leader, head of development and also as a director of sales for different companies in the fields of optical and electrical measurement and automation.</p> <p>3D Facial Scanning Facial scanning hurries up in markets e.g. for mobile devices to unlock them. Whereas 2D based systems have problems to identify persons uniquely or faked data, 3D TOF scanning overcomes these gaps. ESPROS demonstrates building such scanners based on their high-sensitive TOF technology. Beside the benefit of 3D TOF data, the cameras have low power operation and full ambient-light tolerance.</p>
<p>Alexandre Pollini</p>	<p>Senior Project Manager at CSEM SA, 2002 Neuchâtel alexandre.pollini@csem.ch www.csem.ch</p> <p>Alexandre Pollini has a MSc. in Electrical Engineering from EPFL and a MBA from Lausanne HEC. He started his career at the Swatch R&D group on high-frequency electronics. He then moved to CSEM, worked for a while in the United Arab Emirates, on the project Solar Island. When he came back in Switzerland, he took over the CSEM LiDAR programme.</p> <p>Sensors for LiDAR and TOF Presentation of two flash imaging LiDAR demonstrators. One is based on a Single Photon Counting architecture designed to match highly demanding requirements for descent and landing on Mars. The second one is using an indirect time-of-flight detector. It was designed, tested and manufactured in an extremely limited time frame for a space development with strong limitation on cost.</p>



**Dr. phil.-nat.
Hannes Merbold**

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Hannes Merbold studied Physics in Freiburg, Sydney, and Copenhagen and obtained his PhD from the University of Bern. From 2011 to 2016 he was Senior Scientist at ABB's Corporate Research Center in Baden and the Los Gatos Research business unit in the Silicon Valley. Since 2017 he is Head of Research at the University of Applied Sciences in Chur.

3D TOF Imaging in Underwater Settings

Time-of-flight (ToF) cameras have emerged as a reliable way to provide 3D range imaging. Here, we describe the implementation of the technology for underwater settings. The challenge is that liquid water strongly absorbs the near-IR wavelengths typically employed. We show that using LED light sources at visible wavelengths, distance sensing with ranges on the meter level can be realized.



**Dr. Philipp
Roebrock**

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Philipp Roebrock is an electrical engineer and computer scientist. He has a background in embedded software development, mathematical modeling as well as robotics and computer vision. Since March 2018 he works as a lecturer and researcher at the Institute for Photonics and ICT at the HTW Chur University of Applied Sciences.

3D Image Processing

3d imaging sensor technology and 3d image processing recently profited from public attention to autonomous cars and mobile robotics as computer vision applications. In this talk we take a look at recent methods in 3d image processing and their applications.



**Dr. Reto
Wyss**

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Reto Wyss is Director of Software Engineering at Cognex. After studying Physics he received his PhD from the Institute of Neuroinformatics. Starting in 2006 he developed a new technology for visual inspection at the CSEM. In 2012, he co-founded ViDi Systems to commercialize this Deep Learning based inspection technology. The startup was acquired in 2017 by Cognex, the world leader in machine vision.

Deep Learning based image analysis for factory automation

In today's factories, many visual inspection tasks are still done by human operators due to their high complexity. Ever varying appearances of objects make an automated solution based on traditional machine vision often difficult. New technologies based on Deep-Learning change this - computers can now learn from examples outperforming humans both in terms of speed and accuracy. However, challenges specific to factories need to be properly addressed.



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Moderation of the Discussion