

HIGHLIGHTS and TRENDS

5th WORKshop on Infrared Technologies

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TOPICS

- **Previous attendees project updates.**
Chair: Jana Jágerská, Norway
- **Detectors.**
Chair: Jane Hodgkinson, UK
- **NIR-MEMS and its applications.**
Chair: Robert Rehm, Germany
- **Applications and instruments.**
Chair: Jens Mondry, Germany
Bernd-Michael Dicks, Germany
- **Integrated optics and MEMS.**
Chair: Werner Mäntele, Germany

SPEAKERS

- Keller HCW GmbH, Infrared Temperature Solutions ITS
- Max-Planck Institute of Quantum Optics
- IHP (Frankfurt (Oder))
- Institute of Solid State Electronics and Center for Micro- and Nanostructures, TU Wien
- Xenics nv
- LASER COMPONENTS Pyro Group, Inc.
- Institut für Biophysik, Goethe-Universität Frankfurt
- Vienna University of Technologies
- imec
- Microstructure Technology, Institute of Applied Physics, Friedrich Schiller University, Jena
- Fraunhofer-Institute for Applied Solid State Physics IAF
- Department of Electronics and Electrical Engineering, The University Of Sheffield
- LASER COMPONENTS Detector Group, Inc.
- MIRTH+ Photonics Sensing Center, Princeton University
- Carl Zeiss Spectroscopy GmbH
- Applied Spectroscopy, Food & Agri Solutions (FAS), Bruker Optik GmbH
- SiWare Systems
- Microsensor Technology LLC
- Spectral Engines
- HiperScan GmbH
- Fraunhofer Heinrich-Hertz-Institut
- Thorlabs GmbH
- Beamagine SL
- Kongsberg Maritime Contros GmbH
- MIREll Photonics GmbH
- Instrument Systems GmbH
- Olythe SAS
- Draegerwerk AG & Co. KGaA
- Faculty of Engineering Science, Universität Bayreuth
- CiS Forschungsinstitut für Mikrosensorik GmbH
- IRUBIS GmbH
- Technical University of Munich
- Goethe University Frankfurt
- Department of Physics and Technology, UiT The Arctic University of Norway
- Department Micro Dosing Systems, Fraunhofer Research Institution for Microsystems and Solid State Technologies EMFT
- School of ECEE, Arizona State University
- Institute for Analytical and Bioanalytical Chemistry, Ulm University
- Dräger Safety AG & Co. KGaA
- CNR-INO
- Engineering Photonics, Cranfield University
- Research Center for Non Destructive Testing (RECENDT) GmbH
- Department of Electrical Engineering, Princeton University
- DiaMonTech GmbH
- Institut für Laserphysik, Universität Hamburg

Introduction

LASER COMPONENTS hosted nearly 80 attendees from 13 countries and 4 continents at its Olching headquarters, November 12 – 13, 2018. At a high rate of 43 presentations, the purpose of this event is to first monitor state-of-the-art infrared technologies and secondly trigger commercial breakthrough. The talks are short and to the point with the advantage that more in-depth discussions are possible during interactive break-out sessions. The basic idea behind this concept is to connect research with industry, and to stimulate knowledge sharing to advance new developments. After all, a new instrument cannot be better than its weakest component. Following is a reflection of the main areas and key topics discussed. ■

Opening Talk

The opening talk was given by U. Arit from Keller HCW, Germany. He reported fundamental progress in the oldest IR application, i.e. non-contact temperature measurement. He proved experimentally that a semiconductor photodiode can measure the temperature of a target being colder than the detector. According to our knowledge, this has never been proven before. The measurement effect is a reduced dark current in the order of 5 pA (uncooled 2.4 μm InGaAs photodiode @ 30°C, target @ 24°C).

Infrared Detectors

We do see promising work going on at the development of thermal based infrared detectors with smart readout, because uncooled longwave infrared detection with semiconductor detectors remains a challenge. However, researchers in infrared have become more and more self-confident and start to challenge existing mainstream technologies: S. Schmid from Technical University Vienna, Austria, reported that he is able to detect single molecules with his "infrared orchestra", i.e. nanomechanical strings and drums.

NIR MEMS

Near infrared spectroscopy does have a realistic chance to become a mainstream, and even consumer type technology within the near future. A. Niemoeller from Bruker Optics, Germany, reviewed the challenges like temperature effects, sample inhomogeneity, calibration transfer and decreasing NIR expertise and knowledge in the field. His presentation was followed by Spectral Engines from Finland, SiWare from Egypt, and HiperScan from Germany. It became clear that the miniaturized technology is definitely good enough to take spectra with sufficient quality and that this technology will very likely make its way. Feasibility for smartphone integration has been proven. Note: At PW 2019 the "Schwarzkopf Professional SalonLab Analyzer" has been shown which consists of a FT-NIR (<http://salonlab.bplustd-interactive.de>)

Speakers from all around the world!

