PROGRAM
9TH INTERNATIONAL WORKSHOP ON TERAHERTZ TECHNOLOGY AND APPLICATIONS
March 3rd – 4th, 2020, Fraunhofer-Center, Fraunhofer-Platz 1, Kaiserslautern
Terahertz technology has proven to be a valuable tool for applications in diagnostics, measurement, and testing. The industrial use of this technology, however, raises a lot of challenging questions. The “International Workshop on Terahertz Technology and Applications” fosters the exchange of knowledge and experience between academics and industry in this exciting and rapidly developing field. The following renowned experts have confirmed their participation and will give invited lectures to the forum:

- Martina Havenith-Newen, Ruhr-Universität Bochum, Germany
- Peter Uhd Jepsen, Technical University of Denmark, Denmark
- Christoph Lange, Universität Regensburg, Germany
- Tadao Nagatsuma, Osaka University, Japan

The ninth workshop will address primarily the topics:

- Industrial Applications
- Homeland Security
- Communications
- New Terahertz System Technologies

Chairmen
Georg von Freymann, Technische Universität Kaiserslautern, Germany
Joachim Jonuscheit, Fraunhofer Institute for Industrial Mathematics ITWM, Germany
PROGRAM
Wednesday, March 4th, 2020

SESSION 3: COMMUNICATION

9:00 Recent Progress and Future Prospect of THz Communications Research enabled by Photonics
Tadao Nagatsuma, Osaka University, JP

9:30 Photonic Sampling for the Metrology of THz Wireless Communications
Ranjan Das, Technische Universität Braunschweig, DE

9:50 Diffuse Scattering in Terahertz Wireless Channels
Jianjun Ma, Beijing Institute of Technology, CN

10:10 True Time Delay Beamforming for THz Wireless Communications based on Photonic Chip and Photoconductive Antennas
Alvaro Morales, Eindhoven University of Technology, NL

10:30 Coffee Break

SESSION 4: SPECTROSCOPY

10:50 It is Water what matters – Solvation probed by THz spectroscopy
Martina Havenith-Newen, Ruhr-Universität Bochum, DE

11:10 All-electronic THz Nanoscopy: Local Permittivity Mapping of Bacteria
Anna Katharina Wigger, University of Siegen, DE

11:30 Application of Terahertz-/Millimeter-Wave Gas Spectroscopy for Detection of Volatile Organic Compounds in Gases
Nick Rothbart, German Aerospace Center (DLR), Köln, DE

11:50 Ultra-long Carrier Recombination Processes for Hot Carriers in Undoped Graphene/hBN Heterostructures
P. Huang, Sorbonne Université, FR and East China Normal University, Shanghai, CN

12:10 Lunch

SESSION 5: APPLICATION

13:00 Comparison of optoelectronic Time and Frequency Domain Systems for Multilayer Thickness Determination
Lars Liebermeister, Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Berlin, DE

13:20 Layer-thickness Measurements with Incoherent Terahertz Light
Daniel Molter, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

13:40 Examination of Wax-resin-resin lining Condition of Oil Paintings by using THz time-domain Imaging
Kaori Fukunaga, National Institute of ICT, Tokyo, JP

14:00 Sensor Fusion of Ultrasound Excitation and Terahertz Detection to Image Concealed Impact Damage within Carbon Fiber Composites
David Zimdars, TeraMetrix, Ann Arbor, Michigan, USA

14:20 Analysis of Pore Structure in Pharmaceutical Tablets using THz TDS
Mira Naftaly, National Physical Laboratory, Teddington, UK

14:40 Mobile Handheld Imaging System for Nondestructive Testing with Millimeter Waves
Fabian Friedrich, Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, DE

15:00 Closing remarks, Georg von Freymann, Fraunhofer ITWM

15:15 Coffee Break

15:15 Laboratory tour at Fraunhofer ITWM

17:00 End of workshop
Posters in alphabetical order of the first authors:

**Injection Locked Electronic Sources for Efficient THz Generation**  
K. Arzi, University of Duisburg-Essen, DE

**Unique Absorbers for THz Microbolometers**  
B. Atik, METU MEMS Center, Ankara, TR

**THz- and Mid IR Fourier Transform Spectroscopy on Photolytically and Thermally Destructed High Molecular Polyethylene**  
J. Beckmann, BAM Federal Institute for Materials Research and Testing, Berlin, DE

**Initial Estimation for Fast Layer Thickness Determination Based on Terahertz Time-domain Spectroscopy**  
I. Busboom, Düsseldorf University of Applied Sciences, DE

**High-power MM/SubMM-wave Sources**  
O. Cojocari, ACST GmbH, Hanau, DE

**Electro-optical Generation of Terahertz Dual-combs with Er:AsIn(Al)GaAs Photoconductors and its Application to Non-contact Thickness Measurement**  
A. D. J. Fernandez Olvera, Technische Universität Darmstadt, DE

**Bayesian Optimisation of THz Quantum Cascade Laser Operating above 200 K**  
M. Franckie, ETH Zürich, CHE

**Fully Automated Terahertz Sensor System for Industrial Non-contact Layer Thickness Measurements**  
B. Globisch, Technische Universität Berlin and Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Berlin, DE

**Comparisons of the Main Hollow-core Terahertz Waveguides and Best Waveguide Improvement towards Effective Single Mode Propagation**  
G. Humbert, XLIM Research Institute, UMR CNRS Université de Limoges, FR

**Homodyne Spectroscopy with Broadband Terahertz Power Detector Based on 90-nm Silicon CMOS Transistor**  
K. Ikamas, Vilnius University and General Jonas Žemaitis Military Academy of Lithuania, Vilnius, LT

**Electrically Reconfigurable Micromirror-gratings for Spatial Light Modulation of Terahertz Waves**  
J. Kappa, Technische Universität Kaiserslautern, DE

**Comparison of PTB’s Power Scales of Free-space and Waveguide-based Electro-Magnetic Waves**  
M. Kehrt, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig und Berlin, DE

**Signal to Noise Improvement for THz Imaging System Comparing Amplitude and Frequency Modulation**  
T. Krmac, University of Ljubljana, SI

**THz excitation Spectroscopy of Photoexcited Semiconductor Surfaces and Heterointerfaces**  
A. Krotkus, Center for Physical Sciences and Technology, Vilnius, LT

**3D Printing of Cyclic Olefin Copolymer for THz Transparent Devices**  
E. Mavrona, Empa, Dübendorf, CHE

**Quasi-instantaneous Switch-off of Deep-Strong Light-matter Coupling**  
J. Mornhinweg, University of Regensburg, DE

**Two-colour Y-branch Laser for THz Applications**  
J. O’Gorman, Sensor Photonics GmbH, Marburg, DE

**Terahertz Signal and Image processing for enhancement of Air Voids Detection**  
N. Palka, Military University of Technology, Warsaw, PL

**Polarimetry Determination by Polarimetric MMW Radiometry**  
M. Zhai, Georgia Tech-CNRS IRL2958, Georgia Tech Lorraine, Metz, FR

**An Efficient Terahertz Rectifier on the SiC/Graphene Platform**  
M. Schlecht, FAU Erlangen-Nürnberg, DE

**Ge Based Photoconductive Terahertz Emitters**  
A. Singh, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, DE

**Design and Simulation of a Metasurface Enhanced THz Sensor**  
H. Tugay, Middle East Technical University, Ankara, TR

**Function of Human Fingerprint as Capillary Channel to Prevent Slipping When Gripping**  
S.-M. Yuma, Seoul National University, KR

**Matched-filter-bank Approach to Terahertz Thickness Measurement of Thick Plastic Sheet**  
M. Zhai, Georgia Tech-CNRS IRL2958, Georgia Tech Lorraine, Metz, FR

**Nondestructive Multilayer Coating Terahertz Thickness Measurement Based on Autoregressive Extrapolation**  
M. Zhai, Georgia Tech-CNRS IRL2958, Georgia Tech Lorraine, Metz, FR

**Polarized THz Time Domain Spectroscopy for the Analysis of Anisotropic Properties of Wood and Artificial Cellulose Materials**  
P. Zolliker, Empa, Dübendorf, CHE