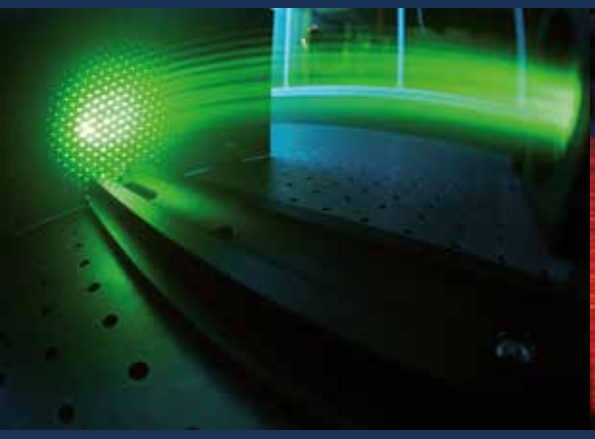
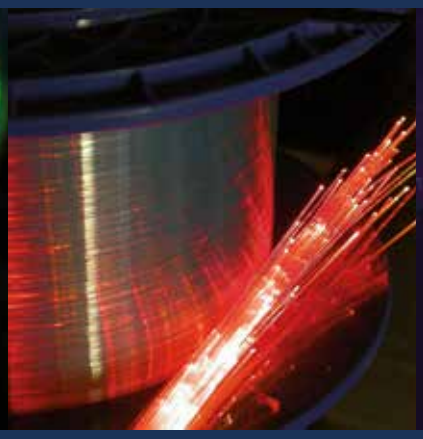
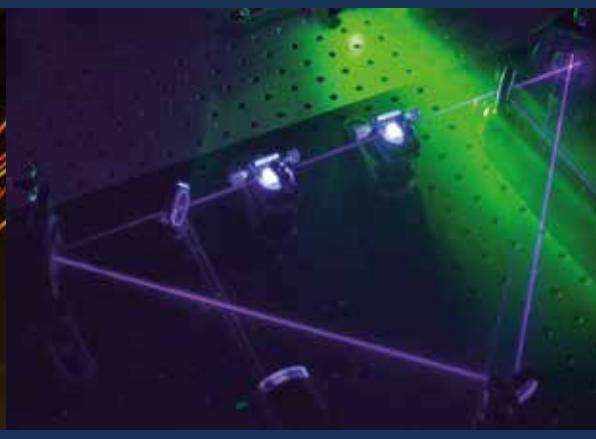
SAOT
erlangen
graduate school in
advanced optical technologies

International Conference

on Advanced Optical Technologies

March 13-15, 2019

www.saot.fau.de

The 2019 SAOT International Conference on Advanced Optical Technologies takes place at

University of Erlangen-Nürnberg
Felix-Klein-Building
Cauerstraße 11
91058 Erlangen

March 13-15, 2019

Meeting Point
Get Together (see page 6)

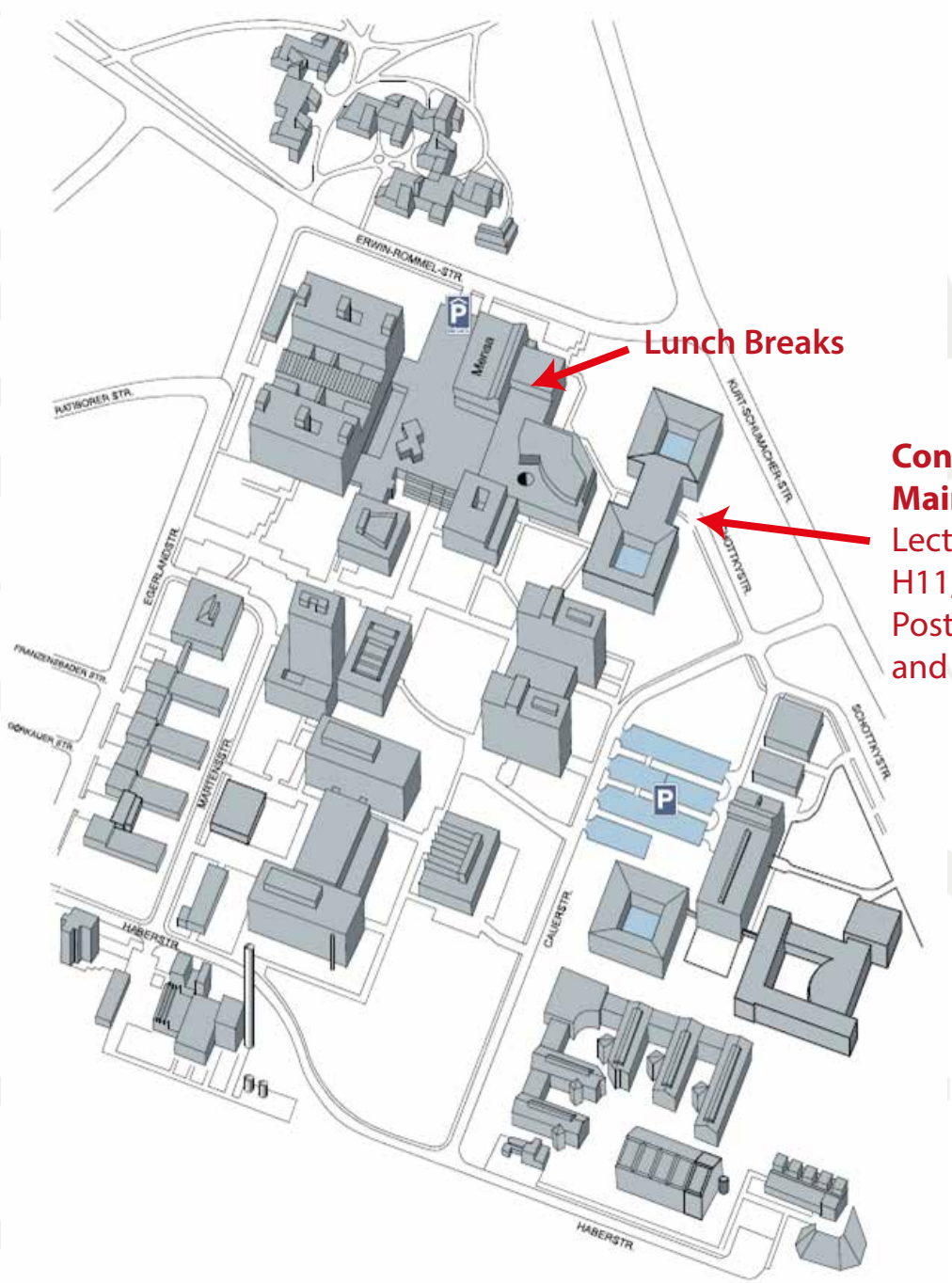
E-mail: saot-administration@fau.de
URL: www.saot.fau.de/international-conference/

Conference Website

Scientific Program

Social Program

Table of Contents



Conference Organization

Conference Chairs

Prof. Dr.-Ing. Michael Schmidt
Institute of Photonic Technologies
FAU Erlangen-Nürnberg

Prof. Dr.-Ing. Stefan Will
Institute of Engineering Thermodynamics
FAU Erlangen-Nürnberg

Conference Office

Dr. Johannes Knorr

Technical Support

Joana Stümpfig Barrinho

Dr. Jürgen Großmann

Looking forward to assisting you at the **REGISTRATION DESK**

Martina Hofmann

Annika Kern

Vanessa Möritz

Preface

Welcome to Erlangen and to the
SAOT International Conference on Advanced Optical Technologies

Dear Conference Participant,

In 2006, the Erlangen Graduate School in Advanced Optical Technologies (SAOT) at the Friedrich-Alexander Universität Erlangen-Nürnberg was established within the framework of the German Excellence Initiative. From that point on, SAOT started to bring together an interdisciplinary group of researchers and students sharing a common interest in science and technology at the frontiers of Advanced Optical Technologies.

To mark this ongoing success, the International Conference on Advanced Optical Technologies highlights scientific achievements from international experts and research groups at FAU working in the six working areas of SAOT: Optical Metrology, Optical Material Processing, Optical Materials and Systems, Optics in Medicine, Optics in Communication and Information Technology, and Computational Optics. The conference features more than 80 oral and poster contributions over two and a half days. In our opinion, the presentations are exceptional in their scientific quality and range of topics.

We hope that you will enjoy the program and the opportunity to spend time with colleagues from around the globe.

Sincerely,

Prof. Dr.-Ing. Michael Schmidt
Prof. Dr.-Ing. Stefan Will
Conference Chairs

Scientific Program - March 13

11:30-13:00: Registration

13:00-13:10: Welcome Remarks (Lecture Room H11)

13:10-14:30: SAOT Presentation and Plenary Talk (Lecture Room H11)

Session Chair: Prof. Dr.-Ing. Michael Schmidt

- 13:50-14:30: **Piestun, R.** (Plenary Talk): "Wavefront Control in Linear and Nonlinear Multimode Fibers"

14:30-15:00: Coffee Break

15:00-16:20 (Lecture Room H11): **Optical Metrology 1** Session Chair: Dr.-Ing. Lars Zigan	15:00-16:00 (Lecture Room H12): **Optics in Medicine 1** Session Chair: Prof. Dr. Maximilian Waldner
• 15:00-15:40: **Berrocal, E.** (Keynote) - "Simulation of light propagation through spray systems using a novel open-access software "Multi-Scattering"" • 15:40-16:00: **Münsterjohann, B.** - "Wide-Angle Light Scattering for droplet and particle analysis in a Spray Flame Synthesis process" • 16:00-16:20: **Barakat, I.** - "On the Investigation of the reduction of Phase Singularities in Speckles Interferometry"	• 15:00-15:40: **Contag, C.** (Keynote) - "Advances in Optics are Redefining Health and Disease" • 15:40-16:00: **Lengenfelder, B.** - "Ex-vivo, remote photoacoustic sensing using speckle-analysis"

16:20-16:50: Coffee Break

16:50-18:10 (Lecture Room H11): **Optical Metrology 2** Session Chair: Dr.-Ing. Franz Huber	16:50-17:50 (Lecture Room H12): **Optical Materials and Systems 1** Session Chair: apl. Prof. Dr. Norbert Lindlein
• 16:50-17:30: **Meyer, T. R.** (Keynote) - "Advances in Optical Diagnostics for Extreme Aerothermal Flows" • 17:30-17:50: **Bahr, L.** - "Investigation of temperature and composition in a laminar flat-flame burner based on rotational shifted excitation Raman difference spectroscopy" • 17:50-18:10: **Popp, A.** - "Towards high spatial resolution temperature sensing in an optical fiber amplifier"	• 16:50-17:30: **Wegener, M.** (Keynote) - "3D Laser Nanoprinting" • 17:30-17:50: **Almora, O.** - "Light Induced Capacitance in Silicon and Perovskite Solar Cells: Dielectric, Chemical and Ionic Natures"

18:30-22:00: Get Together (Max Planck Institute for the Science of Light)

Note: Starting from the conference venue, the "Get Together" event can be reached by foot.
We meet outside the conference building on March 13, **18:15** (see meeting point shown on page 2).

Scientific Program - March 14

SAOT erlangen graduate school in advanced optical technologies

9:00-10:00 (Lecture Room H11): **Optical Materials and Systems 2** Session Chair: apl. Prof. Dr. Norbert Lindlein	9:00-10:00 (Lecture Room H12): **Optics in Medicine 2** Session Chair: Prof. Dr. Oliver Friedrich	9:00-10:20 (Lecture Room H13): **Optical Metrology 3** Session Chair: Dr.-Ing. Thomas M. Koller
• 9:00-9:40: **Jesacher, A.** (Keynote) - "Programmable and Computational Microscopy" • 9:40-10:00: **Daun, K.** - "Non-incandescent emission in laser-induced incandescence measurements of metal nanoparticles"	• 9:00-9:40: **Housley, G. D.** (Keynote) - "Advanced optical imaging incorporating genetically encoded sensors and effectors underpins translational neurotherapeutics applications" • 9:40-10:00: **Kreiß, L.** - "Integration of Raman spectroscopy to multiphoton microscopy for label-free optical diagnostics of biological tissue"	• 9:00-9:20: **Bioucas, F. E.** - "Characterization of Nanofluids by Dynamic Light Scattering" • 9:20-9:40: **Kerscher, M.** - "Thermal and Mass Diffusivities of 1-Alcohols Containing Dissolved Gases by Dynamic Light Scattering" • 9:40-10:00: **Merten, A. L.** - "Imaging of live cells during application of mechanical stress" • 10:00-10:20: **Simon, N.** - "Drug resistances of the malaria parasite Plasmodium falciparum monitored with the fluorescent substrate Fluo-4 of the multi-drug resistance transporter PfMDR1"

10:20-10:50: Coffee Break

10:50-12:30 (Lecture Room H11): **Optical Material Processing 1** Session Chair: Oliver Hentschel	10:50-12:30 (Lecture Room H12): **Optics in Communication 1** Session Chair: Prof. Dr.-Ing. Bernhard Schmauß	10:50-12:30 (Lecture Room H13): **Optical Metrology 4** Session Chair: Dr. Cédric Giraudet
• 10:50-11:30: **Booth, M.** (Keynote) - "Dynamic optics for laser material processing" • 11:30-11:50: **Blasczyk, A.** - "Polymer Nanocomposite Powders for Laser Additive Manufacturing" • 11:50-12:10: **Hagen, J. F.** - "Geometry dependent microstructures in powder bed fusion of metals" • 12:10-12:30: **Kolb, T.** - "Influences, challenges and possibilities of coaxial melt pool monitoring in laser powder bed fusion"	• 10:50-11:30: **Zibar, D.** (Keynote) - "Application of machine learning to photonic systems" • 11:30-11:50: **Mehrpoor, G.** - "Electronic Photonic Integrated Circuits for Data Center Interconnects" • 11:50-12:10: **Pakala, L.** - "Code Aided Extended Kalman Filtering for Mitigation of Transmission Impairments in Coherent Optical Communication Systems" • 12:10-12:30: **Khanna, G.** - "Pre-distortion of Coherent Transmitter Components Using Feedback from Far End Receiver"	• 10:50-11:10: **Knoll, M. S. G.** - "Simultaneous Study of Molecular and Micelle Diffusion in Microemulsions by Dynamic Light Scattering" • 11:10-11:30: **Piszko, M.** - "Mass Diffusivities of Mixtures Related To a Surrogate Biofuel at High Temperatures and High Pressures by Dynamic Light Scattering" • 11:30-11:50: **Labus, M.** - "Development of a tunable solid state laser for temperature measurement in combustion processes" • 11:50-12:10: **Palazzo, N.** - "Laser-based investigation of sooting combustion of additized Diesel fuel" • 12:10-12:30: **Baer, M.** - "Modelling Thermal Behaviour and Static Chirp of a Quantum Cascade Laser"

12:30-13:30: Lunch Break

13:30-15:10 (Lecture Room H11): **Computational Optics 1** Session Chair: Prof. Dr. Christoph Pflaum	13:30-15:10 (Lecture Room H12): **Optical Material Processing 2** Session Chair: Oliver Hentschel	13:30-15:10 (Lecture Room H13): **Optical Metrology 5** Session Chair: Dr. Cédric Giraudet
• 13:30-14:10: **Horstmeyer, R.** (Keynote) - "Using Machine Learning to Optimize how Microscopes Detect Infectious Disease" • 14:10-14:30: **Gebrekidan, M.** - "Vector casting based spectra de-noising" • 14:30-14:50: **Rall, P. L.** - "Ray tracing model for solid-state laser crystals" • 14:50-15:10: **Springer, R.** - "Gauss-BPM: An accurate Beam Propagation Method for Gaussian Beam Amplification"	• 13:30-14:10: **Katayama, S.** (Keynote) - "Present State and Trend of Laser Welding Technology" • 14:10-14:30: **Bergler, M.** - "Influence of selected laser parameters on the densification of picosecond pulsed laser structured objects" • 14:30-14:50: **Kohl, S.** - "The Optical Properties of Copper - Analysis of the Wavelength and Temperature Dependence and their Impact on Laser Material Processing" • 14:50-15:10: **Späth, L.** - "Towards a better understanding of dynamics in metal processing with ultrashort laser pulses - numerical simulations"	• 13:30-13:50: **Aßmann, S.** - "Comprehensive morphological characterization of industrial nano-aerosols by optical measurement methods" • 13:50-14:10: **Fendt, P.** - "Supercontinuum absorption spectroscopy: Theory, optical design and application for high-speed multiparameter diagnostics" • 14:10-14:30: **Hertle, E.** - "Temperature measurements using laser-induced phosphorescence of luminescent particles" • 14:30-14:50: **Kelm, K.** - "Visualization of the Transient Fluid Dynamics of a Dense Particulate Liquid-Solid System" • 14:50-15:10: **Sharma, S.** - "Electro optic MWLI distance sensor for faster distance measurement"

15:10-16:40: Poster Session (see page 8)

19:30-22:30: Conference Dinner (Kreuz + Quer)

15:10-16:40: Poster Session

Optical Metrology

- P1: **Bollmann, J.** - "Influence of Fluid and Seeding Properties on Phosphor Thermometry in Liquid Flows"
- P2: **Holzammer, C.** - "Investigation of the Effect of Aqueous Salt Solutions on the Inhibition of Carbon Dioxide Gas Hydrates by Raman Spectroscopy"
- P3: **Retzer, U.** - "High-speed measurement of temperature and fuel distribution at IC engine conditions using tracer-LIF"
- P4: **Stehle, S.** - "Raman- and partial molar Raman spectroscopy for the detection of nanostructured systems"
- P5: **Voigtländer, C.** - "MORN1 - a moonlighting protein with a possible role in the nuclear division cycles of Plasmodium falciparum"
- P6: **Koch, H.** -"Enantioselective interactions: basis for differentiation between D- and L-enantiomers using Raman spectroscopy"
- P7: **Fond, B.** - "Temperature and velocity imaging in a confined low-temperature gas flow using thermographic phosphor tracer particles"

Optical Material Processing

- P8: **Ackermann, L.** - "Laser Beam Shaping for Material Processing"
- P9: **Bartels, D.** - "Development of an assessment scheme for the identification of potential applications for additive manufacturing"
- P10: **Döring, M.** - "Eutectic Al-Ni alloy for laser powder bed fusion"
- P11: **Heberle, J.** - "Ultrashort pulsed laser cutting of polymer intraocular lens implants"
- P12: **Hentschel, O.** - "Processing of nanoparticle-enhanced tool steels by means of Laser Metal Deposition (LMD) for the additive manufacturing of customized bulk forming tools"
- P13: **Huber, F.** - "Manufacturing and heat-treatment of Ti-6Al-4V hybrid parts by combining Laser Beam Melting and sheet metal forming"
- P14: **Vorndran, M.** - "Laser based techniques to adapt the tribological conditions in dry deep drawing"
- P15: **Rasch, M.** - "Increasing the robustness of the laser powder bed fusion by integrating diffractive optical elements"
- P16: **Staudt, T.** - "Employing Hyperspectral Imaging for Temperature Determination in Laser Materials Processing"

Optics in Medicine

- P17: **Chen, C.** - "An elastomer-based Skin-on-a-chip microfluidic as validation tool for translational studies in multi-modal angiographies"
- P18: **Hohmann, M.** - "Connection of the statistical microscopic optical properties to the Random Laser spectra for the measurement of the scattering coefficient"
- P19: **Schöler, U.** - "Monitoring of Stretch Activated Ca2+ Signaling in Human Endothelial Cells using Fluorescent Calcium Indicators"
- P20: **Thoma, O.-A.** - "Determination of cell state in ulcerative colitis patients by real-time deformability cytometry"
- P21: **Späth, M.** - "Laser-Induced Breakdown Spectroscopy (LIBS): An immerging modality for revealing elemental distribution in tissues"

Optical Materials and Systems

- P22: **Butt, M.-A.** - "Microscopic Müller Matrix Analysis"

Computational Optics

- P23: **Eschner, E.** - "Image Processing as a Tool for Data Reduction in the Context of High-Speed Imaging of Laser Materials Processing"

Vote for **Best Poster Award**
• find ballot card inside your name badge • voting box at the registration desk
• the winner will be announced at the end of the conference

Scientific Program - March 15

9:00-10:40 (Lecture Room H11) **Computational Optics 2** Session Chair: Prof. Dr. Christoph Pflaum	9:00-10:40 (Lecture Room H12) **Optics in Communication 2** Session Chair: Prof. Dr.-Ing. Bernhard Schmauß	9:00-10:40 (Lecture Room H13) **Optical Metrology 6** Session Chair: Dr.-Ing. Thomas M. Koller
• 9:00-9:40: **Jirauschek, C.** (Keynote) - "Modeling of quantum cascade lasers for mode-locking and frequency comb generation" • 9:40-10:00: **Syben C.** - "Precision Learning – A new Concept to unite Computational Imaging and Deep Learning" • 10:00-10:20: **Lu, X.** - "Simulation of autofluorescence effect in microscopic lenses" • 10:20-10:40: **Cai, D.** - "Higher Order Aberrations of Alvarez Lenses"	• 9:00-9:40: **Schmalen, L.** (Keynote) - "Communicate to the Limit – A Journey Towards Reliable Optical Communications and Beyond" • 9:40-10:00: **Azendorf, F.** - "High-accuracy latency measurement to support radio beamforming for 5G applications" • 10:00-10:20: **Jaksch, K.** - "Free-space quantum key distribution at a wavelength of 10.6 µm using continuous variables" • 10:20-10:40: **Otterpohl, A.** - "Generation of non-classical light in a nonlinear crystalline whispering gallery mode resonator"	• 9:00-9:20: **Bauer, F. J.** - "Determination of various absorbing species in sooting flames using UV-VIS-absorption-spectroscopy" • 9:20-9:40: **Koegl, M.** - "Improved instantaneous droplet sizing in automotive sprays using the LIF/Mie ratio and structured illumination" • 9:40-10:00: **Higgoda, U. A.** - "Fick Diffusivity of Binary Fluid Mixtures Consisting of Methane, Propane, and Carbon Dioxide by Optical and Theoretical Methods" • 10:00-10:20: **Klein, T.** - "Interfacial Tensions and Viscosities in Multiphase Systems by Surface Light Scattering (SLS)" • 10:20-10:40: **Wu, W.** - "Simultaneous Determination of Multiple Transport Properties from the Analysis of Non-Equilibrium Fluctuations by Shadowgraphy"

10:40-11:10: Coffee Break

11:10-12:30: Plenary Talk, Best Poster Award, and Closing Remarks (Lecture Room H11)

Session Chair: Prof. Dr.-Ing. Michael Schmidt

- 11:10-11:50: **Huckauf, A.** (Plenary Talk): "Gaze Mechanics"

12:30: Lunch Break

Status quo on March 5, 2019. Short-term changes in the program may occur, please note ongoing announcements on-site and see updated online program.

Social Program

March 13, 2019: Get Together

Beginning: 18:30, End: 22:00
Max Planck Institute for the Science of Light
Staudtstraße 2, 91058 Erlangen

Music by Feuerbach Quartett
(www.feuerbachquartett.de)

March 14, 2019: Conference Dinner

Exclusive dinner at
Kreuz + Quer – Haus der Kirche Erlangen

Beginning: 19:30, End: 22:30
Bohlenplatz 1, 91054 Erlangen

WiFi

Please ask at the registration desk for login data

Bus Stops

Nearest Bus Stop Cauerstr.:
„Technische Fakultät“ in Egerlandstraße (bus lines 280, 287, and 293)
or „Technische Fakultät“ in Erwin-Rommel-Straße (bus line 20)

Nearest Bus Stop Max Planck Institute:
„Erlangen Friederikanum“ in Sebaldusstraße (bus lines 281 and 293)
or Staudtstraße (bus lines 20 and 280)

Nearest Bus Stop Kreuz + Quer:
Krankenhausstraße (bus lines 289, 293, and 294)
or Obere Karlstraße (bus lines 284, 285, and 294)

For timetable, see: **www.vgn.de/en/**

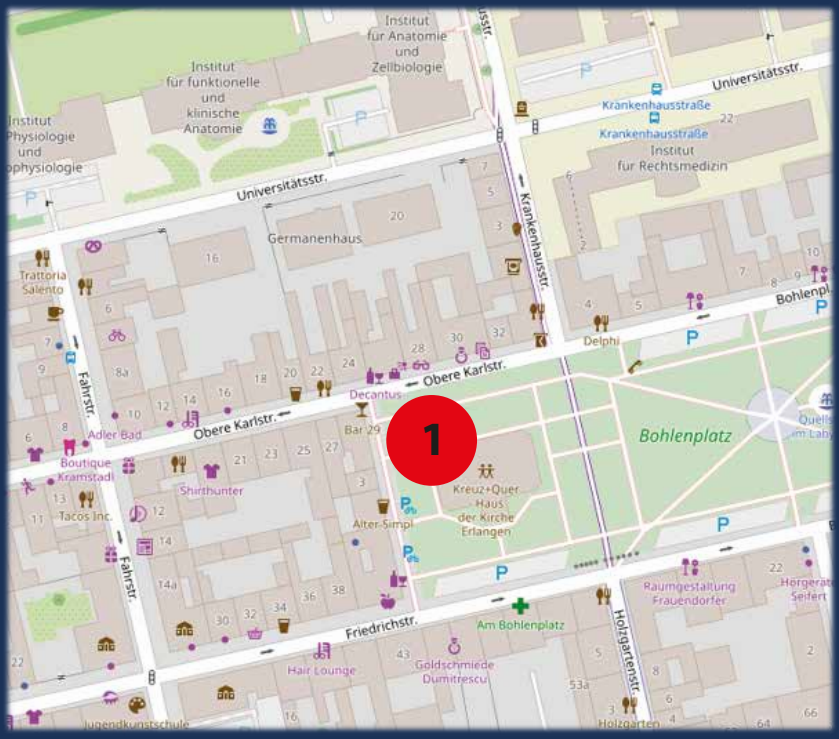
Taxi Call Erlangen

Please ask at the registration desk or call:
+49 (0)9131 / 19410 (Taxi-Zentrale Erlangen) or
+49 (0)9131 / 1236633 (Taxi Malik Buckenhof)

Conference Hotline

March 13-15, 2019
+49 (0)172 / 6182798

SAOT
erlangen
graduate school in
advanced optical technologies



1 **Conference Dinner**
Kreuz + Quer
Bohlenplatz 1
91054 Erlangen

2 **Get Together**
Max Planck Institute for the Science of Light
Staudtstraße 2
91058 Erlangen

3 **Conference Venue**
Felix-Klein-Building
Cauerstraße 11
91058 Erlangen

www.saot.fau.de