



Wrocław University  
of Science and Technology



XX-th International Student Conference

**OPTO 2025**

*Wrocław, 7-11 July 2025*

# Conference Program



**Mode-locked  
Technology**

**X I L<sup>®</sup>**



|       | Day 1  | Day 2   | Day 3   | Day 4  | Day 5   |
|-------|--|---|---|--|---|
| 09:00 | Monday<br>July 7, 2025                             | Tuesday<br>July 8, 2025                                     | Wednesday<br>July 9, 2025                                 | Thursday<br>July 10, 2025                          | Friday<br>July 11, 2025                         |
|       | 9:00 - 10:00<br>Registration                       |   |   |  |   |
| 10:00 | 10:00 Conference opening                           |   |   |  |   |
|       | 10:15 - 11:15<br>Invited lecture<br>Anna Musiał    | 10:15 - 11:15<br>Invited lecture<br>Manuel F. Ferrer Garcia | 10:00 - 11:00<br>Invited lecture<br>Karen Volke-Sepúlveda | 10:00 - 11:00<br>Invited lecture<br>Clara Saraceno | 10:00 - 11:00<br>Invited lecture<br>Yazhou Wang |
| 11:00 | 11:15 - 11:45<br>Coffee break                      | 11:15 - 11:45<br>Coffee break                               | 11:00 - 11:30<br>Coffee break                             | 11:00 - 11:30<br>Coffee break                      | 11:00 - 11:30<br>Coffee break                   |
|       |  |   | 11:30 - 12:00<br>Session IV:<br>Astronomical Instruments  |  |   |
| 12:00 | 11:45 - 13:00<br>Session I:<br>Sensing and imaging | 11:45 - 13:00<br>Session II:<br>Pulsed lasers               | 12:00 - 13:00<br>Invited lecture<br>Grzegorz Soboní       | 11:30 - 13:00<br>Poster session                    | 11:30 - 13:00<br>Session VI:<br>Materials       |
| 13:00 |  |   |   |  |   |
|       | 13:00 - 14:00<br>Lunch break                       | 13:00 - 14:00<br>Lunch break                                | 13:00 - 14:00<br>Lunch break                              | 13:00 - 14:00<br>Lunch break                       | 13:00 - 14:00<br>Lunch break                    |
| 14:00 | 14:00 - 16:00<br>Lab tour                          | 14:00 - 15:00<br>Invited lecture<br>Šárka Němcová           | 14:00 - 16:00<br>Lab tour                                 | 14:00 - 15:00<br>Invited lecture<br>Daniel Urrego  | 14:00 Conference closing                        |
| 15:00 |  | 15:00 - 16:15<br>Session III:<br>Optical fibers             |   | 15:00 - 15:45<br>Session V:<br>ML and Adaptive     |   |
| 16:00 |  |   |   |  |   |
| 17:00 |  |   |   |  |   |
| 18:00 |  | 18:00 - 21:00<br>City tour                                  |   | 18:30 - 22:30<br>Conference dinner                 |   |
| 21:00 |  |   |   |  |   |

**Monday, 7 July 2025**



10:15 – 11:15

## Invited Lecture

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**Dr Anna MUSIAŁ**

Department of Experimental Physics, Wrocław University of Science and Technology

*Non-classical light sources for quantum cryptography and quantum communication*

11:45 – 13:00

## Session I: Sensing and imaging

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11:45 **Maciej BARNA**

*Real-time clustering of hyperspectral data in multiphoton microscopy*

12:00 **Mateusz BETKE**

*Spectral tomography analysis of transverse modes in VCSELs with broken symmetry apertures*

12:15 **Rafał KOSTUREK**

*Refractive index sensor utilizing long tapered side-hole optical fiber*

12:30 **Wiktor KROKOSZ**

*Terahertz frequency comb mapping with Rydberg atom sensors*

12:45 **Jakub WRÓŃSKI**

*Beam displacement detection using spatial mode projection*

14:00 – 16:00

## Lab tour

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**A-1, Wybrzeże Stanisława Wyspiańskiego 27, Wrocław**

*To be announced...*

**L-1, Na Grobli 15, Wrocław**

*Optical fibers, fiber characterization, gas sensing, fiber optical amplifiers*

**Tuesday, 8 July 2025**



10:00 – 11:00

## Invited Lecture

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**Manuel F. FERRER GARCIA, PhD**

Department of Physics, University of Ottawa

*Bragging... a story of diffraction and unitary operations*

11:45 – 13:00

## Session II: Pulsed lasers

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**11:45 Adrian CHLEBOWSKI**

*Interferometric characterization of optical pulses in Fabry-Pérot laser diodes*

**12:00 Jakub JAWORSKI**

*Carrier-envelope offset frequency stabilization in a Cr:ZnS mode-locked laser*

**12:15 Mikołaj KRAKOWSKI**

*Analysis of input pulse parameters influence on gain managed nonlinear amplification regime*

**12:30 Aleksander KUBECZEK**

*Dual beam laser sintering – closed loop PA12 reuse*

**12:45 Michał PIETRZAK**

*Methods for generating few-cycle laser pulses in the near- and mid-infrared spectral bands*

14:00 – 15:00

## Invited Lecture

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**Šárka NĚMCOVÁ, PhD**

Faculty of Mechanical Engineering, Czech Technical University in Prague

*Designing a custom ophthalmoscope: from optical simulation to functional prototype*

15:00 – 16:15

## Session III: Optical fibers

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**15:00 Rafał CICHOWSKI**

*Depolarization of Raman solitons in birefringent photonic crystal fibers: mechanisms and modeling*

**15:15 Szymon MATCZAK**

*Design and simulation of a side-pump fiber combiner for high-power lasers and amplifiers*

**15:30 Aleksandra MERCHEL**

*Controllable optical fibre coupler with liquid crystal cladding*

15:45 **Magdalena ZATORSKA**

*Doped fiber amplifiers in laser spectroscopy of methane: performance, benefits and effects on signal quality*

16:00 **Andrija DJORDJEVIC**

*Comparing the optical properties of ZBLAN fibers produced using an experimental compact draw tower and a standard draw tower*

## Wednesday, 9 July 2025

10:00 – 11:00

### Invited Lecture

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**Karen VOLKE-SEPÚLVEDA, PhD**

Institute of Physics, National Autonomous University of Mexico

*Structured waves and their interaction with matter*

11:30 – 12:00

### Session IV: Astronomical Instruments

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11:30 **Piotr MARUSZAK**

*GRoMiT – Galinstan Rotating Mirror Telescope with an Off-Zenith Observation System*

11:45 **Paweł RUKAT**

*Construction of a laboratory model of an adaptive optics module for an amateur telescope*

12:00 – 13:00

### Invited Lecture

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**Dr hab. Grzegorz SOBÓŃ**

Department of Field Theory, Electronic Circuits and Optoelectronics, Wrocław University of Science and Technology

*Ultrashort laser pulses from a lunchbox - how to make femtosecond laser simple, robust and affordable*

14:00 – 16:00

### Lab tour

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**C-4, Janiszewskiego 11, Wrocław**

*Fiber lasers, terahertz spectroscopy, semiconductor lasers, gas spectroscopy, optical frequency combs*

**Thursday, 10 July 2025**



10:00 – 11:00

## Invited Lecture

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**Prof. Clara SARACENO**

Faculty for Electrical Engineering, Ruhr University Bochum

*High average power terahertz sources for time domain spectroscopy*

11:30 – 13:00

## Poster session

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**Agnieszka BEDNAREK**

*Hydrostatic pressure and temperature cross-sensitivity in Rayleigh scattering-based distributed fiber measurements*

**Piotr BIAŁUCHA**

*The effect of cleaning on the transmission properties of blue-control lenses*

**Uliana FINAEVA**

*Simple and effective tissue attenuation measurement*

**Patrycja GRONOWICZ**

*Micro modifications of hollow-core fibers using femtosecond laser pulses and focused ion beam*

**Adrian KAIM**

*Not only plasmonics: how metal nanoparticles influence the performance of ferro-pyro-phototronic detectors*

**Aleksandra K. KORZENIEWSKA**

*Optical vortex trajectories as indicators of wavefront aberrations*

**Magdalena ŁUKOWICZ**

*Wavefront sensing with optical vortices leads to improved shot noise resistance*

**Karolina NIETUBYĆ**

*Investigation of light illumination effects on electrical properties of WSe<sub>2</sub> and MoS<sub>2</sub> – analysis of current-voltage characteristics*

**Przemysław NOWAKOWSKI**

*3D-print nanowaste: multiscale investigation of nano-/microplastic formation, composition, and toxicity in polymer-based additive manufacturing*

**Piotr PEREHINIEC**

*Development of a mirror inside anti-resonant hollow core fiber*

**Antoni SKOCZYPIEC**

*Design of fiber-based dispersive elements for quantum information science*

14:00 – 15:00

## Invited Lecture

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**Daniel URREGO, PhD**

ICFO – The Institute of Photonic Sciences, Barcelona

*Demonstration of experimental schemes for imaging and sensing: from quantum to classical and back*

15:00 – 15:45

## Session V: Machine learning & adaptive

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15:00 **Przemysław CHMIELOWSKI**

*Laser-base gas sensing – using neural networks to speed-up and simplify data analysis*

15:15 **Tomasz JANKOWSKI**

*Adaptive spiral phase plates for generation of optical vortices*

15:30 **Alicja KWAŚNY**

*Optimization of femtosecond fiber laser pulses with selected metaheuristic algorithms*

Friday, 11 July 2025



10:00 – 11:00

## Invited Lecture

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**Yazhou WANG, PhD**

DTU Electro, Technical University of Denmark

*Synthesis of mid-infrared fiber laser spectral lines for multi-gas detection*

11:30 – 13:00

## Session VI: Materials

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**11:30 Uliana FINAEVA**

*Temperature effect on cracking behavior of flat glass under local heating*

**11:45 Rafat KOMAR**

*Enhanced probing of coherent magnons with spectroscopy on higher-energy excitonic states in A-type antiferromagnet CrSBr*

**12:00 Monika SALAMAGA**

*Verification of twisted nematic liquid crystals utility in system to measure the birefringent media*

**12:15 Piotr SIERADZKI**

*Characterization of a spatially homogeneous polariton condensate in a high-Q GaAs/AlGaAs microcavity*

**12:30 Zuzanna ŚNIOCH**

*Role of chlorine substitution in tailoring the optical and magnetic properties of CrSBr*