

**Project:** *[PHOT-OS] Lensless digital holographic microscopy with optical sectioning and chemical specificity for imaging thick, highly scattering samples*

**Principal Investigator:** Maciej Trusiak, PhD, DSc

**Positions in the Project:** 2 part-time PhD students in the Faculty of Mechatronics, Warsaw University of Technology.

**Institution:** Institute of Micromechanics and Photonics, Faculty of Mechatronics, Warsaw University of Technology.

**Requirements:**

1. Master's degree in Physics, Engineering, Optics, Computer Science or Biomedicine. Enrollment to the Doctoral School of WUT.
2. Very good knowledge of Matlab, Python and/or C++ environments. Algorithmic background in optical information processing.
2. Experience in optical measurements (holography, interferometry) and microscopy.
3. Fluent spoken and written English.
4. Strong motivation and passion for scientific work (theoretical, numerical and experimental) both independently and as part of a team in an interdisciplinary environment, with the ability to creatively propose solutions to problems at hand, pay close attention to detail and to meet deadlines.
5. Very good social skills.
6. Experience in dissemination of research results to the scientific community and establishing/participating in international cooperation are welcome.

**General description of responsibilities:**

In the PHOT-OS project we aim at advancing lensless digital holographic microscopy (LDHM) by equipping it with coded optical sectioning for volumetric, large-field-of-view imaging of thick and highly scattering biological samples. The PhD Student will be responsible mainly for developing the coded optical sectioning (COS) branch of the project, including numerical modelling, algorithm development, experimental implementation, validation on calibration targets and biosamples, and optimization of imaging performance in weakly and strongly scattering regimes. Detailed responsibilities and scientific involvement include:

- designing, implementing and testing numerical models and reconstruction algorithms for coded optical sectioning in lensless holography, including coded illumination strategies, multi-slice reconstruction approaches, prior-based optimization and computational acceleration;
- planning, assembling, aligning and optimizing the experimental LDHM-COS setup, including coded illumination control, calibration procedures and systematic monitoring of imaging performance under different acquisition conditions;
- planning and conducting experiments on calibration targets, stacked cell cultures, thin tissue sections and thick tissue samples, followed by quantitative evaluation of axial resolution, reconstruction quality, usable imaging depth and robustness to noise and model mismatch;
- developing and validating imaging approaches for strongly scattering media, including imaging through and within diffusive layers, as well as testing strategies such as optical clearing, refractive-index matching and stronger reconstruction priors to improve sectioning capability;
- contributing to the integration of the coded optical sectioning pathway with the chemical-contrast branch of the project in order to develop the final multimodal platform for co-registered morpho-chemical volumetric imaging;
- conducting application-driven research on biologically relevant samples in collaboration with national and international project partners working in microscopy, histopathology, neurobiology and computational imaging;
- participating in data management, dissemination of results through high-quality publications and conference presentations, and preparation of datasets, software and other open-science outputs.

A successful dissemination of results to the scientific community is expected. Moreover, co-supervising MSc/BSc students and active participation in building and expanding international cooperation within the project will be highly appreciated.

**What we offer:**

1. Scholarship contract.
2. Work in dynamic and competent scientific group with excellent research environment and international cooperation promoting publications in high impact journals.
3. Financial support of abroad scientific visits and attending conferences.
4. Encouragement and support in preparing grant applications and general career development.

**Type of NCN Project:** SONATA BIS – ST.

**Application deadline:** 07.05.2026, 23:59. Results available on 08.05.2026.

**Please submit the following documents to:** maciej.trusiak@pw.edu.pl

**Conditions of employment:**

PhD scholarship: 2500 PLN/month, first stipend contract for 12 months with prolongation option.

Preferred time of starting position: 1st June 2026.

**Additional information required:**

To apply, please send your application, including motivation letter, CV with the list of your publications and achievements, Master degree thesis alongside with contact information to the scientific supervisor and other referees (if available) to the following e-mail address: maciej.trusiak@pw.edu.pl. Incomplete applications will not be considered.

We thank all applicants for their interest; however, only selected candidates may be invited for an interview. Applications will be accepted until the position is filled. If the winner of the competition resigns from signing the contract, we reserve the right to choose the next best person from the ranking list.

*Due to the entry into force of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016, all candidates are requested to provide consent to the processing of his or her personal data by the institution which carries out the recruitment process.*

*Thus, please include in your application the following statement: "I hereby agree to the processing of my data included in the application documents by Warsaw University of Technology, Warsaw, Poland, to carry out the recruitment process."*

*Your personal data is processed on the basis of the Article 6 Part 1 Points (c) and (f) of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (GDPR; Official Journal of the European Union L 119/1).*