

Project: *[GaboScope] Numerically enhanced lensless Gabor microscopy for high-throughput marker-free investigation of dynamic live biosamples*

Principal Investigator: Maciej Trusiak, PhD

Position in the Project: PhD student in the Faculty of Mechatronics, Warsaw University of Technology.

Institution: Photonics Engineering Division, 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 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 GaboScope we aim at advancing the Gabor lensless holographic microscopy (LHM) in terms of high-throughput label-free bio-imaging of dynamic live cells with algorithmic specificity in hologram low signal-to-noise-ratio regimes.

PhD Student will be responsible mainly for designing, implementing and testing numerical algorithms, assembling experimental setups and 3D printing the optical layout (with help of Post-doc), data collection, testing and modification of the deep learning framework. Detailed responsibilities and scientific involvements include:

- advancing numerical phase/amplitude reconstruction of time-dependent 3D objects in large volumes imaged by LHM (i.e., implementing twin-image reduced and SNR-improved phase/amplitude imaging and proposing numerical propagation engine accounting for multiple-scattering and high illumination angles of spherical wavefronts);
- establishing label-free numerically-driven specificity in LHM imaging of dynamic morphologically-rich objects (i.e., developing supervised and unsupervised deep learning frameworks);
- developing tomographic lensless microscopy and exploring two-source LHM systems;
- conducting application-driven research on imaging of challenging bio-samples in cooperation with The Arctic University of Norway, the Mossakowski Medical Research Center Polish Academy of Sciences, the University of Valencia and the Nanjing University of Science and Technology.

A successful dissemination of results to the scientific community is expected. Moreover, co-supervising Master students will be required. Establishing and expanding international cooperation within the project will be most welcome.

What we offer:

1. Scholarship contract and competitive remuneration package.
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 – ST.

Application deadline: 21.02.2025, 23:59. Results available on 24.02.2025.

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

Conditions of employment:

PhD scholarship: 2333 PLN/month, stipend contract for 9 months.

Preferred time of starting position: 1st March 2025.

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 (deadline 21.02.2025). 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).