

## Competition for a research scholarship for a Master's student as part of the NCN project 2022/45/P/ST3/00467.

**Project title:** *Interacting networks of liquid light*

**Project manager:** dr. Helgi Sigurðsson

**Project website:** <https://www.liquid-light.fuw.edu.pl>

**Name of the unit:** University of Warsaw, Faculty of Physics

**Number of positions:** 1

**Duration of the scholarship:** 13 months.

**Start of the scholarship:** 01/03/2024

**Salary of the scholarship:** The total cost of the scholarship: PLN 2,000 per month for one person (the amount may include public and legal charges in accordance with applicable regulations, e.g. ZUS)

The scholarship is awarded in accordance with the rules contained in the Regulations of NCN scholarships in research projects financed by the National Science Center introduced by the resolution of the Council of the National Science Center No. 25/2019 of 14 March 2019

### **Task description:**

We are seeking a responsible and driven individual for a position of a MSc physics student (theory) at the Faculty of Physics, University of Warsaw as part of the NCN project “*Interacting Networks of Liquid Light*” in the field of condensed matter physics, quantum light-matter physics, and cavity polaritonics (project no: 2022/45/P/ST3/00467).

The MSc student will be registered in physics within the Institute of Experimental Physics at the University of Warsaw. They will be working at the institute under the supervision of Dr. Helgi Sigurðsson, adiunkt. The work is also done in close collaboration with the Exciton-Polariton Group at the institute, co-led by prof. Barbara Piętka and prof. Jacek Szczytko.

The student's work will focus on semiconductor nanostructures and microcavities which host hybrid light-matter quasiparticles known as exciton-polaritons. The overarching aim of the project is to underpin the quality and advantages of optically programmable large-scale networks of exciton-polariton Bose-Einstein condensates as a platform to explore many body physics in quantum fluids driven far from equilibrium.

The student will work on a project workpackage titled „*Liquid light neuromorphic computing*”. The work involves development of novel theoretical frameworks on coupled exciton-polariton Bose-Einstein condensates, analysis on their dynamical properties, and providing numerical modeling for experimental partners in the project. The student will explore and characterize the role of networks of coupled polariton condensates in nature-inspired analogue and oscillatory based neural-networks. The project involves identifying key degrees of freedom of polariton condensates which can serve as memory placeholders and process input information in a brain-like manner.

**Requirements:**

- Good familiarity with classical and quantum mechanics, condensed matter physics, electrodynamics and optics.
- Familiarity with the propagation of light in waveguides and optical microcavities is ideal but not necessary.
- Numerical modeling skills in solving ODEs and PDEs.
- Programming skills (Matlab, Mathematica, or Python software preferred).
- Ability to analyze and visualize data.
- Participation in the research of optical cavities will be an advantage.
- Proficiency in written and spoken English and ability to work in a team.
- The candidate should be a final year bachelor or master student.

**The application should include:**

- cover letter with information on the processing of personal data - information clause and consent clause - form attached to the advertisement. In the case of an e-mail application in PDF format, it should contain a scanned signature.
- curriculum vitae containing information on previous scientific activity, achievements and awards
- list of publications (also sent) and conference presentations
- copies of diplomas obtained
- copy of bachelor's or engineer's thesis (if the student is on master's studies)
- contact to a researcher who can confirm the declared experience in laboratory and/or theoretical work.
- a student can attach a copy of reports from student classes (workshops, projects, etc.) documenting the experience in laboratory or theoretical work.

**Deadline for submission of documents:** 9/02/2024

**Interview date:** 12/02 – 14/02/2024

Form of submitting offers: e-mail to the following address: Helgi Sigurdsson – [helgi.sigurdsson@fuw.edu.pl](mailto:helgi.sigurdsson@fuw.edu.pl).

Selected candidates will be notified individually about the date of a possible interview.

In the event of resignation of the selected candidate, the right to indicate the next candidate from the ranking list is reserved.

## Information relating to personal data processing

### 1. Personal Data Controller

Pursuant to Article 13 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 (General Data Protection Regulation) (hereinafter referred to as "GDPR"), the Controller of your personal data is the University of Warsaw, 26/28 Krakowskie Przedmieście, 00-927 Warsaw.

You may contact the Controller in one of the manners provided at:

<https://www.uw.edu.pl/kontakt/>.

### 2. Data Protection Officer (DPO)

The Controller has appointed a Data Protection Officer (DPO who may be contacted about matters concerning your personal data via e-mail at: [iod@adm.uw.edu.pl](mailto:iod@adm.uw.edu.pl). You may contact the DPO in all the matters regarding the processing of your personal data by the University of Warsaw and executing your rights related to personal data processing.

However, the DPO's duties shall not include other matters, such as current matters related to the concluded contract, receipt of documents related to the performance of the contract, etc.

### 3. Objectives, legal basis and processing period

Your personal data will be processed for the purposes of:

- conclusion and performance of the scholarship contract – for the term of the agreement (legal basis: Article 6(1)(b) of the GDPR);
- establishment, enforcement or defense of potential contractual claims – for a period of three years from the expiry of the contract (legal basis: Article 6(1)(f) of the GDPR);
- the performance of accounting and tax obligations – for the period of five years from the end of the calendar year (legal basis: Article 6(1)(c) of the GDPR).

For the purpose of performance of the concluded contract, your personal data shall be processed within the scope necessary to perform the concluded contract. All other personal data shall be processed if necessary for the purposes of exercising rights and duties resulting from a legal provision, and/or other applicable regulations.

All your other personal data shall be processed in specific cases after you have given your separate consent to its processing (Article 6(1)(a) of the GDPR), which you have the right to withdraw at any time. Please also be reminded that your withdrawal of consent shall not affect the lawfulness of processing based on your consent before its withdrawal (Article 7(3) of the GDPR).

#### 4. Data recipients

Your personal data may also be shared with parties authorized pursuant to the provisions of law, .e.g. the National Science Center. Access to your personal data shall also be granted to authorized employees of the Controller who must process your personal data as part of their professional tasks and duties.

Other entities that the Controller commissioned to perform certain activities, e.g. providers of services of personal and property protection, postal and courier services, transport services etc., entailing the necessity to process personal data may be data recipients.

You professional data may also be provided to parties to the contracts concluded by the Controller, if it is necessary for the performance of these contracts and results from the contracts concluded.

#### 5. Data transfers outside of the European Economic Area (EEA)

Your personal data may also be processed by Google, our G-Suite for education service provider at their data processing centers.<sup>1</sup>

#### 6. Rights of data subjects

According to the principles specified by the GDPR, you have the right to:

- access your data and receive its copy,
- rectify (correct) your personal data;
- restrict personal data processing;
- erase personal data (subject to Article 17(3) of the GDPR);
- object.

You also have the right to lodge a complaint with the President of the Personal Data Protection Office if you believe that the personal data processing violates the law.

#### 7. Information on the data provision requirement

Provision of your personal data within the scope resulting from the legal and other regulations in order to allow the performance of tasks under the contract concluded is necessary to conclude a contract with you. Providing other personal data is voluntary.

.....  
(Place and date)

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(Candidate's signature)

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1 <https://www.google.com/about/datacenters/locations/index.html>