

# NCN RESEARCH SCHOLARSHIP - JOB OFFER

OPUS-29 National Science Centre, Poland (NCN), proposal no. 2024/55/B/ST5/02894

**Position code:** OPUS-29 / PhD-2 / EN

**Position:** PhD student (NCN scholarship holder)

**Principal Investigator:** Dr. hab. Michał Wójcik

**Host institution:** Laboratory of Synthesis of Organic Nanomaterials and Biomolecules, Faculty of Chemistry, University of Warsaw

## Project title:

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*Advanced structural control and long-range organization of magnetic and magnetically doped nanoparticles in liquid crystal systems for adaptively tuned, multi-stimuli responsive reconfigurable materials*

## About the project

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The RESPO-MAG project addresses the synthesis and study of a new class of hybrid magnetic materials in which magnetic nanoparticles (including SPIONs, Fe, Co, Mn-doped ZnO) are coated with functional organic ligands: pro-mesogenic (liquid-crystalline), photoswitchable (spiropyrans) and supramolecular (crown ethers). The goal is to obtain long-range ordered thin-film systems capable of reversible reconfiguration under temperature, UV light and chemical stimuli — with applications in spintronics, quantum technologies and optomagnetic materials. The project is carried out in collaboration with the group of Prof. Vasily Temnov (Institut Polytechnique de Paris, CNRS).

## About the position

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We are seeking a candidate for a PhD project focused on the synthesis of magnetic nanoparticles (superparamagnetic, ferromagnetic and dilute magnetic semiconductors), their functionalization with organic ligands and structural/magnetic characterization. The position is part of the materials core of RESPO-MAG (work packages M2, M4, M5, M6, M7).

**Scholarship amount:** PLN 3,000 per month (NCN research scholarship)

**Funding period:** up to 36 months (contract granted for periods of up to 12 months with possibility of extension, total maximum 36 months within the project)

## Scope of duties

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- synthesis of superparamagnetic iron oxide nanoparticles (SPIONs) using the Park and Sun methods based on iron oleate;
- synthesis of ferromagnetic Fe and Co nanoparticles (3-5 nm in diameter) under inert atmosphere (glove box);
- synthesis of dilute magnetic semiconductor (DMS) nanoparticles (Mn- or Co-doped ZnO, 3-6 nm);
- surface modification of nanoparticles (silica coating, ligand exchange, functionalization with pro-mesogenic and photoswitchable ligands provided by the first PhD student);

- structural and morphological characterization: TEM, HRTEM, SEM, AFM, TGA;
- structural characterization of thin-film systems: SAXS, WAXD, powder XRD;
- preliminary magnetic measurements (SQUID, MFM) and preparation of samples for advanced measurements at the partner site (École Polytechnique, Paris);
- investigation of thermotropic self-organization, photoswitching and chemoswitching behaviour of the resulting hybrid systems;
- formation of host-guest complexes with crown ethers and analysis of their impact on system properties;
- collaboration with the postdoc and the second PhD student to correlate structural and magnetic properties;
- co-authorship of peer-reviewed publications and presentation of results at national and international conferences.

## Mandatory requirements

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- MSc degree in chemistry (physical, structural, materials) or physics (with a specialization in nanomaterials) - obtained before the start of the scholarship;
- status of a PhD student in a doctoral school in chemistry or physics, or candidate status accepted to start doctoral education in the academic year 2026/2027 (mandatory under the NCN Regulations for awarding research scholarships);
- documented hands-on experience in the synthesis and characterization of nanomaterials (BSc/MSc thesis, internships, student projects);
- practical familiarity with at least several of: TEM/SEM, XRD, TGA, SQUID/VSM, FT-IR, UV-Vis, DLS;
- ability to work independently in the laboratory and analyze experimental data;
- good command of English (oral and written).

## Preferred qualifications (additional assets)

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- experience in colloidal nanoparticle synthesis (thermal decomposition of precursors, microemulsion, metal reduction);
- ability to work under inert atmosphere (Schlenk line, glove box);
- experience in SAXS/WAXD data analysis (e.g. interpretation of lamellar, columnar, BCC phases);
- basic knowledge of nanomagnetism (superparamagnetism, anisotropy, coercivity);
- documented scientific achievements (publications, conference contributions, awards).

## What we offer

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- place of work: Faculty of Chemistry, University of Warsaw, Pasteura 1;
- NCN research scholarship of PLN 3,000 per month;
- funding period: up to 36 months within the project;
- scholarship start: from 1 July 2026;
- funding for participation in national and international conferences and research visits to the partner group (Institut Polytechnique de Paris);

- access to state-of-the-art instrumentation at the Faculty of Chemistry, UW (SAXS/WAXD, TEM, SQUID, MFM, glove box) and at the partner site (advanced magnetometry and ultrafast pump-probe);
- work in a team with a strong publication record in functional hybrid nanomaterials (ACS Nano, Adv. Mater., Angew. Chem. Int. Ed., Small, among others);
- opportunity to develop a PhD thesis at the interface of nanomaterials chemistry and magnetism.

## Required documents

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- cover letter (max. 1 page) explaining motivation and interest in the project topic;
- academic CV including educational background and prior research experience;
- summary of scientific achievements (publications, conference contributions, awards, internships, participation in research projects);
- confirmation of student/PhD student status (certificate from the dean's office or doctoral school) - may be provided before signing the scholarship agreement;
- signed consent for processing personal data for recruitment purposes [Klauzula-informacyjna-przy-rekrutacji-do-pracy\\_11\\_2019\\_EN.docx](#) .

## Deadline and submission procedure

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Application deadline: **17 May 2026 (end of day)**.

Applications should be submitted electronically to: [mwojcik@chem.uw.edu.pl](mailto:mwojcik@chem.uw.edu.pl) with the position code and the candidate's surname in the subject line, e.g. "OPUS-29 [CODE] - Smith".

All documents should be combined into a single PDF file.

## Recruitment procedure and evaluation criteria

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The competition is conducted in accordance with the NCN Regulations for awarding research scholarships in research projects funded by the National Science Centre, Poland (Council of NCN Resolution no. 25/2019 of 16 May 2019, as amended).

Applications are evaluated in two stages: (1) formal evaluation - completeness of documents and fulfilment of formal requirements; (2) substantive evaluation by a recruitment committee appointed by the PI (committee of at least three members including the PI and two persons indicated by the PI, holding a PhD or higher academic degree, with research experience relevant to the project area).

Substantive evaluation criteria: (1) scientific achievements of the candidate, including publications, conference contributions, awards, prior research work (50%); (2) substantive and technical competences relevant to the position (30%); (3) prior research scholarships, awards and distinctions (10%); (4) the cover letter and a possible interview (10%).

Selected candidates may be invited to an interview (in person or remotely).

Candidates will be informed of the results of the competition by e-mail within 14 days of the application deadline.

The competition may be cancelled without giving reasons or may be left without a final selection.