

INSTITUTION: The National Centre for Nuclear Research



CITY: Otwock / Świerk

POSITION: **PhD candidate - Assistant Research (PL form “Asystent”) - dual-doctorate programme (ADI UPSaclay 2025, cotutelle programme) - Novel Radiopharmaceuticals for Medical Applications**

DISCIPLINE: chemistry, organic chemistry

POSTED: 13|01|2025

EXPIRES: 21|02|2025

WEBSITE: <https://nomaten.ncbj.gov.pl/phd-student-position-frame-dual-doctorate-programme-adi-upsaclay-2025-co-tutelle-programme>

KEY WORDS: chemistry, organic chemistry, radiopharmaceuticals

NOMATEN Centre of Excellence (CoE) is formed through a scientific partnership between the National Centre for Nuclear Research (NCBJ, Poland), the French Alternative Energies and Atomic Energy Commission (CEA, France) and the Technical Research Centre of Finland (VTT, Finland) with joint financial support from the Foundation for Polish Science (FNP) and the European Commission. NOMATEN CoE focuses research on the development and assessment of innovative multifunctional materials for industrial and medical applications.

Currently, we are looking for a candidate on

a PhD student position

A candidate should be a person:

- with a strong expertise in organic chemistry
- an excellent scientific background,
- highly motivated person who is passionate for organic chemistry and developing of novel diagnostic and therapeutic radiopharmaceuticals. Currently, we are looking for a candidate on

Topic of the doctorate thesis is related to the development of macrocyclic cage-molecules named bambusurils (BU[4,6]), a family of neutral cavitands with a jigger-like conformation that are prepared via a cheap and easy synthesis. BU[6] are 6-glycolurils membered rings able to strongly stabilize anions of various sizes (particularly iodides) in their cavity, that makes them the most efficient complexing agents currently known for iodides in organic solvent and in aqueous media. Such binding properties could be interesting for anion transport, diagnosis and treatment when using radioactive halides (^{125}I , ^{124}I , ^{131}I , ^{211}At).

When chemistry and radiochemistry are concerned, the PhD student will develop sydnone derivatives bearing chemical functions allowing facile anchoring into antibodies (or antibody fragments). In particular, novel pyridazinedione-sydnes will be synthesized, allowing their attachment through rebridging of disulfide bonds, whereas activated esters will allow attachment to lysine derivatives of the antibody. In parallel, cyclooctynes will be coupled to DOTA chelator in order to complex radionuclides like the beta-emitter Lu-177. An alternative strategy will be to use antibodies attached to a solid support through a sydnimine linker. Addition of the radiolabelled cyclooctyne will allow both the radiolabelling of the antibody and its detachment from the solid support. For initial studies we propose to use Trastuzumab as a model antibody that targets Human Epidermal Growth Factor Receptor type 2 (hEGFR/ERBB2/HER2) overexpressed on breast, ovarian and gastric cancer cells.

Once radiolabelled, the PhD student, in collaboration with biologists will test the ability of the radioimmunoconjugates to bind HER2 receptor on cancer cells (SKOV3 / HER2 positive and MDA-MB-231 / HER2-negative control). Specificity and binding affinity will be determined, and internalization assays will be performed to evaluate the capacity of the radioimmunoconjugates to kill cancer cells by using various standard toxicity and viability bioassays, e.g. clonogenic and MTS. Last, antibodies derivatized by sydnone moieties will also first be incubated with cancer cells and then the radiolabeled cyclooctyne will be added after various period of time and various temperatures. These experiments will allow the PhD student to evaluate the capacity of the newly synthesized reagents to click with derivatized-Trastuzumab not only at the membrane side but also inside of the cancerous cells, to determine toxicity of thus formed radioimmunoconjugates, finally validating our pretargeting strategy using the developed ultra-fast ligation reactions.

PhD thesis will be done in the frame of a dual-doctorate programme (ADI UPSaclay 2025, co-tutelle programme, not published yet on the website of University Paris-Saclay) between the two laboratories of the Frédéric Joliot Institute for Life Sciences (Medicines and healthcare technologies department, Molecular labeling and bio-organic chemistry unit CEA, Saclay, France) and the Novel Radiopharmaceuticals Group at the NOMATEN CoE (NCBJ, Poland).

Description of tasks:

- Conducting research – in the field of:
 - Developing novel radiolabelling methods of various biomolecules (e.g. monoclonal antibodies, their fragments and peptides) through prosthetic groups;
 - Performing preclinical in vitro and in vivo evaluation studies demonstrating diagnostic potential or therapeutic efficacy of developed radiopharmaceuticals;
- PhD candidates are required to timely fulfil all the obligations connected with the process of obtaining the Doctoral degree in the chosen scientific discipline (such as evaluation, passing exams, participating in lectures and other activities);
- Timely preparation of the doctoral dissertation research and study, in accordance with the state requirements and the plan prepared jointly with the Doctoral Supervisor;
- Assisting in participation in competitive programs to acquire R&D funding;
- Writing articles and scientific publications;
- Contributing to the scientific atmosphere of NOMATEN Center of Excellence / MAB / IRAP.

Requirements:

- Master of Science or equivalent (by the time appointments starts)

Preferred background: chemistry, organic chemistry.

We offer:

- ✓ 3 years employment in the frame of dual-doctorate programme (ADI UPSaclay 2025, co-tutelle programme): 24 months spend at the CEA (Saclay, France) and 12 months spend at the NOMATEN CoE (Otwock-Swierk, Poland) laboratories.
- ✓ Work in the international network with research institutes and industrial companies.
- ✓ Access to the research potential of NOMATEN's three partners between NCBJ (Poland), CEA (France) and VTT (Finland).
- ✓ Travel funds for participation in conferences and collaboration, attractive working conditions, atmosphere of teamwork, family-friendly environment with flexible working hours, support of an experienced local team in legal, financial and organisational issues as well as logistic support and advice related to working in France and Poland - enabling smooth relocation and equal opportunities.

Required documents:

- ✓ cover letter that explains the motivating factors for considering the position (max. 1 pp),
- ✓ CV with complete publication list,
- ✓ brief description of important scientific achievements and scientific outlook,
- ✓ a list of 2 reference persons including their positions and contact details (name, surname, e-mail address),
- ✓ MSc diploma copy/scan.

The recruitment is open also to candidates who, at the time of submitting their applications, do not have a diploma confirming MSc, but who have a fixed date for obtaining this title before the planned date of employment. In this case, it is necessary to provide documents which proves that. Excellence of the candidate is expected within this competitive co-tutelle programme (ADI UPSaclay 2025).

Applications in electronic form should be submitted in English to: magdalena.jedrkiewicz@ncbj.gov.pl.

Contact: dr hab Marek Pruszyński e-mail: Marek.Pruszynski@ncbj.gov.pl

All applications should be sent by e-mail: magdalena.jedrkiewicz@ncbj.gov.pl

As an attachment to your application please sign & enclose the following declarations:

I agree for my personal data included in the application documents to be processed by National Centre for Nuclear Research with its registered office in Otwock, 7 Andrzej Sołtan Street, 05-420 Otwock, for a period of 12 months from their submission, in order to carry out future recruitment processes.

Others information:

We reserve the right to contact only selected candidates & the right to inform about the decision to fill the post only to the selected candidate.

At NCBJ there is the internal procedure for the report of breaches of law. Anyone interested in its content can access it at any time on the website: <https://www.ncbj.gov.pl/sites/default/files/prasa/INTERNAL%20NOTIFICATION%20PROCEDURE.pdf>

Information in accordance with Article 13 RODO on the processing of personal data:

1. The Personal Data Controller of your personal data is the National Centre for Nuclear Research (hereinafter referred to as Controller or NCBJ) with its registered office in Otwock, 7 Andrzej Sołtan Street, 05-400 Otwock.
2. Your personal data will be processed for recruitment purposes on the basis of applicable law, including the Labour Code. Data not required by law, provided by you in your documents, will be processed on the basis of your consent. Your consent is given by the transfer of this data.
3. The full content of the information clause of Article 13 RODO is available at <https://www.ncbj.gov.pl/en/gdpr>

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HR EXCELLENCE IN RESEARCH

The National Centre for Nuclear Research is awarded by [HR Excellence in Research](#)". Recruitment in NOMATEN is based on OTM-R system (Open, Transparent and Merit-based recruitment practices in Research Performing Organisations).



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