



HR EXCELLENCE IN RESEARCH



ADAM MICKIEWICZ UNIVERSITY, POZNAN

ANNOUNCES

A COMPETITION

for the position of Postdoctoral Researcher

**at the NanoBioMedical Centre
UMO-2022/47/B/ST5/02288**

Basic information

- 1. Research discipline (research field):**
Physics, Chemistry, Material Science and Engineering
- 2. Number of work hours per week including a task-based work schedule (if applicable):**
Full-time, 40 hours per week in a task-based work time system.
- 3. Type of an employment contract and expected duration of employment,**
Fixed-term contract for **6 month** with the possibility of extension to **2 years**, salary per month **8900 PLN**
- 4. Anticipated job starting date:**
01.09.2024.
- 5. Workplace location:**
NanoBioMedical Centre, Wszchnicy Piastowskiej 3, 61-614 Poznan.
- 6. Application deadline and process:**
Electronic submission to natbab@amu.edu.pl Application deadline: 28.07.2024 Please note that the job reference number should be quoted in the application.
- 7. Required documents**
 - Application form/letter of the candidate (email);
 - *Curriculum Vitae* (max. 5 pages A4);
 - Diplomas or certificates issued by colleges and universities attesting to education and degrees or titles held (in case of academic degrees obtained abroad - the documents must meet the equivalence criteria set out in Article 328 of the Act of 20 July 2018 Law on Higher Education and Science (Journal of Laws of 2023, item 742 i.e. as amended; Polish: Dziennik Ustaw 2023 poz.742);
 - Information on the Applicant's research (publication record and list of conferences attended), teaching and organizational achievements,
 - Two reference letters.
 - Consent to the processing of personal data as follows: *In accordance with Article 6 (1) (a) of the General Data Protection Regulation of 27 April 2016. (OJ EU L 119/1 of 4 May*

2016) I consent to the processing of personal data other than: first name, (first names) and surname; parents' first names; date of birth; place of residence (mailing address); education; previous employment history, included in my job offer for the purpose of the current recruitment.";

- Only complete applications will be considered

Conditions of the competition determined by the competition committee

I) Determination of qualifications: (researcher profile) according to the Euraxess guidelines

(R2) Recognised Researcher (PhD holders or equivalent who are not yet fully independent)

(R3) Established Researcher (researchers who have developed a level of independence)

<https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors>)

II) Job Offer description

The job offer refers to the position in the NCN OPUS 24 project (National Science Center) entitled "Heterostructures for ultrafast scintillation detectors" (Contract number: DEC-2022/47/B/ST5/02288).

This project is dedicated to the development of ultrafast radiation detectors for medicine and high energy physics. Positron emission tomography (PET) scanners are among the most efficient tools for the identification of tumors in the human body. However, the temporal resolution with PET is poor compared to other methods and is limited by both the technique and the metabolism of the tracer molecule. PET is based on the injection of radiopharmaceutical into patient's body, which accumulates in tumors and generates γ -quanta. The tumor location is determined by the time of flight of the γ -quanta to detectors located in opposite directions. If the timing resolution is too low, uncorrelated particles are also collected within each interval, creating false readings. In conventional PET scanners with a time resolution of ~ 500 ps, the imprecision in the localization of the event is ~ 7.5 mm. To increase PET sensitivity, more precise timing information of the detected γ -quanta is needed, enabling a more detailed picture of the disease site by enhancing the signal to noise ratio of the image. According to the estimations, a time resolution of ~ 10 ps is necessary to provide a spatial resolution of 1-2 mm.

Moreover, there is an increasing demand for reducing the radioactive doses injected into the patients without impairing image quality. Fast timing is therefore vitally important for medical imaging. A similar problem is faced in high energy physics experiments at colliders. The further research program at the Large Hadron Collider in CERN requires a significant increase both in the accelerator luminosity, and the frequency of particle collision that requires dedicated detectors. High-speed scintillation detectors are necessary to avoid pile-up and incorrect association of tracks with vertices.

There is no scintillator that meets the requirements to such detectors, as any known materials possess too low light yield, and/or too slow timing of a scintillation response. The idea is to combine in a heterostructure a heavy scintillator, which efficiently absorbs γ -quanta, with a light and fast scintillator, which converts recoil electrons from the heavy scintillator to fast light photons.

The project should clarify the relationships between the compositions of heavy (BGO/BGSO) and fast (CsPbX₃ (X=Br, Cl, I) and ZnO:Ga) scintillators and their design in a heterostructure, and scintillation performance of heterostructures. The work involves the growth of crystals of heavy scintillators, their cutting, and micro-sized patterning of their surface for functionalization with a fast scintillator and testing in CERN.

III) Requirements and qualifications

The competition is open to individuals who meet the requirements specified in Article 113 of the Law on Higher Education and Science of 20 July 2018 (Journal of Laws of 2023, item 742, i.e. Article 113 as amended) and who meet the following requirements:

1. PhD in physical, chemical sciences or materials engineering.

2. Fulfilled formal requirements regarding the date of obtaining the doctoral degree by the regulations of the National Science Center https://www.ncn.gov.pl/sites/default/files/pliki/uchwaly-rady/2021/uchwala81_2021-zal1.pdf.
3. Proven record of productivity and publications in high-impact journals (at least two publications with IF>4 relating to solar water splitting or photoelectrochemistry);
4. Knowledge of the synthesis of materials (nanomaterials, films) using physical and chemical methods, material characterization (microscopy, XRD) or related fields. At least 2 years of experience in material preparation and physicochemical characterization. Knowledge of single crystals, their luminescence and scintillation properties. The experience in laser patterning using, among others, FIB (Focused ion beam), RIE (reactive ion etching) will be an additional advantage. Ability to analyze results and prepare scientific articles and present reports at conferences.

IV) Required languages

Language: English / Fluent

V) Required research, teaching or mixed experience

- Experience in the synthesis and physicochemical characterization of materials.
- Experience in field of single crystals, including single crystals properties.
- Independence, good organization of work, ability to work in a team.
- Experience in writing scientific publications and conference presentations.
- Very good knowledge of software.
- Knowledge of single crystals preparation and characterization will be an additional advantage.

VI) Benefits

- ✓ financial bonuses for high-impact publications
- ✓ an atmosphere of respect and cooperation
- ✓ supporting employees with disabilities
- ✓ flexible working hours
- ✓ funding for language learning
- ✓ co-financing of training and courses
- ✓ additional days off for education
- ✓ life insurance
- ✓ pension plan
- ✓ savings and investment fund
- ✓ preferential loans
- ✓ additional social benefits
- ✓ leisure-time funding
- ✓ subsidizing children's vacations
- ✓ "13th" salary

VII) Eligibility criteria

1. Matching of the candidate's scientific profile with the advertisement.
2. Number, scientific level of the candidate's scientific publications.
3. Number, scientific level and of the candidate's scientific conference presentations.
4. Grade on the diploma.
5. Internships and participation in research projects.

VIIa) Eligibility criteria

1. scientific achievements documented by publications and their compliance with the research area competition requirements (0-20 pts);
2. participation in research projects (0-5 pts);
3. participation in internships (0-5 pts);
4. participation in additional trainings and workshops; participation in conferences and scientific seminars (0-5 pts);
5. professional development (completed courses, trainings, certificates) (0-5 pts).

VIII) The selection process

1. Competition committee begins working no later than 14 days after the deadline for submission of documents.
2. Formal evaluation of submitted proposals.
3. Call to provide additional or missing documents if necessary.
4. Selection of candidates for the interview stage.
5. Interviews for candidates who meet the formal requirements.
6. The chair of the competition committee announces the results and informs the candidates. This information will include justification with a reference to candidates' strengths and weaknesses. Submitted documents will be sent back to candidates.

IX) Prospects for professional development

- supervision in building a scientific profile through the publication in high-impact scientific journals,
- assistance in writing grant applications in domestic (FNP, NCN) and foreign (MSCA) research projects,
- establishing cooperation with renowned research centers in the world.

RODO Information Clause :

Pursuant to Article 13 of the General Data Protection Regulation of 27 April 2016. (Official Journal of the EU L 119 of 04.05.2016) we inform that:

1. The controller of your personal data is Adam Mickiewicz University, Poznań with the official seat: ul. Henryka Wieniawskiego 1, 61 - 712 Poznań.
2. The personal data controller has appointed a Data Protection Officer overseeing the correctness of the processing of personal data, who can be contacted via e-mail: iod@amu.edu.pl.
3. The purpose of processing your personal data is to carry out the recruitment process for the indicated job position.
4. The legal basis for the processing of your personal data is Article 6(1)(a) of the General Data Protection Regulation of 27 April 2016 and the Labour Code of 26 June 1974. (Journal of Laws of 1998 N21, item 94 as amended).
5. Your personal data will be stored for a period of 6 months from the end of the recruitment process.
6. Your personal data will not be made available to other entities, with the exception of entities authorized by law. Access to your data will be given to persons authorized by the Controller to process them in the performance of their duties.
7. You have the right to access your data and, subject to the law, the right to rectification, erasure, restriction of processing, the right to data portability, the right to object to processing, the right to withdraw consent at any time.
8. You have the right to lodge a complaint to the supervisory authority - the Chairman of the Office for Personal Data Protection, ul.Stawki 2, 00 - 193 Warsaw.
9. Providing personal data is mandatory under the law, otherwise it is voluntary.
10. Your personal data will not be processed by automated means and will not be subject to profiling.