

NOMATEN

Centre of Excellence in Multifunctional Materials for Industrial and Medical Applications

NOW HIRING

PhD candidates - Assistant Research (PL form "Asystent") Advanced Multifunctional Materials Science National Centre for Nuclear Research (NCBJ), Poland

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 focuses research on the characterization, analysis and development of advanced multifunctional materials, specifically those designed to work in extreme conditions, with primary examples being radiation, high temperature and corrosion.

Multiple positions exist on the PhD student levels in NOMATEN Research Groups. Below are topical projects in the groups:

Functional properties

Mechanical properties and radiation resistance of fcc and bcc type materials. Understanding mechanical and structural properties of complex alloys working closely with structural and numerical groups at the CoE. Second goal of this work will be to understand radiation damage mechanism of these new families of materials.

We know that multiple atoms in random solid solutions are able to effectively reduce the mean free path of electrons, phonons and magnons. In so doing, it is good for delaying the formation of defects at the initial stage of radiation. However, limited amount of information about the nature of such remarkable irradiation tolerance in HEAs (fcc) or bcc type structures exist. PhD candidates will be using variety of methods like SEM/EBSD/EDX/FIB system, nanoindentation platforms, XRD and RBS/C. One of the goals of this work will be to study high temperature nanomechanical properties of binary and ternary systems.

Preferred background: materials science, materials engineering, nuclear engineering, mechanics.

Contact person: Lukasz Kurpaska (lukasz.kurpaska@ncbj.gov.pl)

Materials Characterization:

Understanding and explaining the processes taking place in structural materials under the influence of radiation and high temperature. The PhD student will be engaged in studies on impact of radiation damage and high temperature on the structural properties of materials like: ODS and HEAs, Al₂O₃ coatings, zirconium, nickel alloys and polymers, working closely with functional and numerical groups of the CoE. Specific topics on the development of 3-D structural models of materials and development of methods of materials structure validation using SEM/FIB/EBSD/TEM/Raman/XRD techniques will be proposed.

Preferred background: physics, materials science, materials engineering, nuclear engineering.

Contact person: Iwona Jóźwik (Iwona.Jozwik@ncbj.gov.pl)

Instructions to applicants:

The application must include the following documents in English:

- 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 (max. 2 pp)
- a list of 2 reference persons including their positions and contact details (e-mail address)
- MSc diploma copy/scan

The recruitment is open 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 prove that.

- As an attachment to your application please sign and enclose the following declaration: *I agree to the processing of my personal data included in this application for the needs necessary to carry out the recruitment.*

Applications should be sent before December 14th, 2021 to:
magdalena.jedrkiwicz@ncbj.gov.pl

Materials Structure, Informatics and Function:

Nanoindentation size effects and Digital Image Correlation in in-situ testing (Collaboration with EC Joint Research Center) - for the experimental method development for the elucidation of size effects in metals, in combination with in-situ microscopy data that may be used for digital image correlation purposes.

Materials Discovery, Composition search and machine learning for lightweight Ti-based alloys: An Ab-Initio Approach (cross-industrial project) – the position is focused on the advancement of recently developed machine learning methods for materials discovery through the use of ab-initio data, for targeting light weightness as a key component.

Dimensional reduction in crystal plasticity: Convolutional Neuronal Networks For Strain Maps - focused on the advancement of dimensional reduction approaches for machine learning in crystal plasticity applications, especially through the use of convolutional neural networks.

Preferred background: multiscale modelling, mechanical characterization, applied physics/math, machine learning.

Contact person: Stefanos Papanikolaou (stefanos.papanikolaou@ncbj.gov.pl)

Complexity in Functional Materials:

Understanding materials' deformation with material informatics. Plasticity in metals and metal alloys is a complex phenomenon. In this PhD project we apply imaging techniques and machine learning-like approaches to instabilities on plasticity.

Plasticity in metals and metal alloys depends at the fundamental level on the behavior of individual dislocations. In this project, you will develop the theory of how to understand the depinning and pinning of dislocations in disordered landscapes in complex alloys.

Preferred background: statistical mechanics, computational simulations, machine learning.

Contact person: Mikko Alava (mikko.alava@ncbj.gov.pl)

We offer:

- 7,000 PLN per month (at current exchange rate 1,550 € per month); the details in each case depend on qualifications and experience, and the compensation is composed of the base salary and seniority addition, project bonus).

Read more about contributions in Poland at

<https://www.ncbj.gov.pl/en/hrcareer/contributions-poland>.

- 2 years initial employment with extension after a positive evaluation.
- Work in international networks with research institutes and industrial companies.
- Access to the research potential of NOMATEN's three partners between NCBJ (Poland), CEA (France) and VTT (Finland).
- Some of the positions are for joint collaborative research with NOMATEN partners CEA (France) and VTT (Finland) and thus include extensive visits to the collaborating institution.
- 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 Poland - enabling smooth relocation and equal opportunities.

Read more about positions: nomaten.ncbj.gov.pl/job-vacances