



GNeuS Programme is proud to introduce you to its Fellows, selected within Call 3



Few words about you and your research project

I am a neutron physicist, and broadly speaking my field of interest is neutron scattering and its implementations, from fundamental sector to condensed matter and neutron sources.

My GNeuS project is devoted to the **optimization of para-hydrogen cold moderator assemblies for neutron research reactors**. Cold neutron moderator that provide a high cold neutron flux at neutron scattering instruments are at the core of almost all neutron scattering facilities. Its core element is a moderator, and a deuterium moderator is conventional for research reactors, providing high cold neutron intensity. However, its brightness is much less than that of flattened para-hydrogen moderators (developed at the European Spallation Source) whose operating principle is based on different cross-section values of cold and thermal neutrons. While they provide significantly enhanced brightness, their lower intensity poses a serious disadvantage. A recently developed concept of chessboard and staircase-like moderator assemblies, however, offers the potential to achieve high intensity while maintaining the elevated brightness characteristic of flattened moderators. **My goal is to optimize such assemblies for using them at research reactors, using Monte-Carlo simulations.**

I'm going to have secondments at **Mirrotron Ltd.** to study flat cold moderator utilized at the compact neutron source, at **Budapest Neutron Centre** to study cold moderators exploited at the research reactor and to work at the **Cold Moderator Test Facility**, constructed for purposes of moderator testing, and also at **ESS** to study flat cold moderators at where they were initially developed and are currently exploited.

What is your background?

How have you heard about GNeuS?



I've got my bachelor's and master's degree at the department of Nuclear Physics Research Method of Saint-Petersburg State University.

I did my PhD at **Saint-Petersburg State University** as well, it was devoted to the application of neutron powder diffraction for the search of new short-range forces.

I also worked at **Petersburg Nuclear Physics Institute in Gatchina (Russia)** and at **Institute of Nuclear Physics in Almaty (Kazakhstan)**.

I've heard about GNeuS due to **neutron Laboratory Course, organized by JCMS**. I've attended this course during my master's degree, and several years later I've obtained an email as a part of their mailing list, which invited former course participants to apply for a GNeuS postdoc program.



Why did you apply specifically on GNeuS?

The project will give me an **opportunity to work in a world-leading neutron centre** in collaboration with scientists who are recognised experts in neutron physics. This is an invaluable experience for my evolution as a neutron scientist.

I will **study more closely Monte-Carlo simulations which is a very valuable skill for a neutron scientist.**

I will have **secondments** to organizations (Mirrotron Ltd., Budapest Neutron Center, ESS) with a **real long-term experience in development, investigation and utilising of neutron technique**, in particular cold moderators. This will allow me to get more familiar with cold neutron physics in all its aspects.

Presentation of project results will improve my communication skills and may help to make new useful contacts.

This project is a perfect first step in my scientific career.

What impacts do you expect from the GNeuS fellowship?



The project will contribute to **design and construction of high-performance universal cold neutron source with both high brightness and intensity at research reactors.**

It may be used not only as the **primary component at new reactor neutron sources** but also as upgrading alternatives for already existing reactor neutron sources. This approach allows for an **increase in neutron beam brightness and intensity** without needing completely replace or rebuild existing neutron guide systems. This in turn will result in the opportunity of **performing neutron scattering experiments** not feasible at present (small samples or weak effects).

Development and maintaining of the project, keeping an eye on deadlines and on objectives achievement will make me a **better manager**. Presenting the results of the research project will improve my **communication and language skills**. Telling students about the research will help to evaluate me as a **lecturer** and a **teacher**. Conversation of the research work with my colleagues will **expand my contacts' network**.

