



GNeuS Programme is proud to introduce you to its Fellows, selected within Call 2



Few words about you and your research project

I am a GNeuS postdoc fellow from call n.2 working at the Jülich Center for Neutron Science 1 (JCNS-1) in Forschungszentrum Jülich (FZJ). I have a Chemical Engineering background with a **focus on bridging the understanding between molecular interaction and device performance in soft matter materials**.

My GNeuS project with Prof. Dr. Stephan Förster is to **gain fundamental insights into developing improved solid-state block copolymer electrolytes (SPE) for next-generation lithium-ion batteries**. The approach of flattening the charge transport energy landscape with optimal concerted long-ranged charge transfer will enable the design principles for **'atom-to-cell fabrication'** optimization of super-ionic electrolytes. The project's findings will be our endeavour toward building sustainable energy for future generations.

The secondment at company **Morphys** with CEO, **Dr. Joachim Loos**, will help steer our findings to applications for potential collaboration with companies leading the worldwide market of SPEs.

What is your background?

How have you heard about GNeuS?



The research outcomes from my Masters' completed with First Class and Distinction at the Indian Institute of Science, Bangalore, India, and Ph.D. with Summa cum laude and Congratulations from Jury at KU Leuven in Belgium paved my career in **soft matter**. My Ph.D. thesis combined rheology, dielectric spectroscopy and rheo-dielectrics to gain insights into multiscale structure-dynamics-properties relationships in compatibilized polymeric materials to improve their electrical and electrochemical properties.

I pursued a **postdoc research at the NIST Center for Neutron Research (NCNR) in Maryland, USA**, for two years, where I investigated chain end effects on single-chain polymer conformation and developed crystallization-driven self-assembled anisotropic structures in solution. Broadly, I **established a correlation between molecular interactions and hierarchical structure using neutron scattering, modelling, and coarse-grained simulation of liquid theories**.

Subsequently, I worked briefly on an EU-funded project at the University of Chemistry and Technology, Prague, Czech Republic, as a bridge before GNeuS. The findings helped develop improved crosslinked porous polymer aggregates for effective biocatalyst immobilization.

You can find a complete list of my work [here](#)!

I heard about the GNeuS project from a flyer my colleague at NCNR shared.



Why did you apply specifically on GNeuS?

The GNeuS program provides me with an excellent opportunity to work with **cutting-edge neutron-based techniques for battery applications** at JCNS and its outstations abroad.

The **interdisciplinary and intersectoral activities** of the GNeuS program give me the necessary facilities, resources, and infrastructure to forge impactful collaborations with scientists with diverse expertise for exploring new research lines, thereby expanding my scientific portfolio.

The **secondment** and various **trainings** to be undertaken during the GNeuS program augurs well to acquire and diversify my skills in academic and industrial settings, in a big step towards my professional and personal development.

What impacts do you expect from the GNeuS fellowship?



The fellowship findings will be aimed at bridging the understanding of nano-structural design, molecular processes, hierarchical morphology, and macroscopic performance in polymer electrolytes for their targeted integration into cells and, eventually, to improve the performance of current lithium-ion batteries. This objective will be achieved by **employing neutrons for scattering, spectroscopy, and imaging techniques to achieve a broad temporal and spatial resolution of processes during *in situ* and *operando* studies of batteries**.

Working with the scientists at JCNS and outstations as well as actively participating in conferences and workshops, will help me form a **strong collaborative network to perform research at new interfaces** of chemical engineering, material science, and applied physics.

In summary, the program's structure will provide me with the platform to acquire the necessary experience and expertise for a meaningful scientist position. This effort will be directed to continue contributing to soft matter research for building a sustainable future.



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