Organisation/University
FZJ – Forschungszentrum Jülich / Heinrich-Heine University

Research Field
Biophysics, Structural Biology

Researcher Profile
First stage researcher (R1)

Application Deadline
01/05/2026 23:00 Europe/Brussels

Location
Jülich - Germany (39 months)
Paris-Saclay - France (6 months)
Munich - Germany (Schrödinger) (3 months)

Type of contract
Temporary

Job Status
Full-time

Hours per week
40

Offer Starting Date
01/09/2026

EU Research Framework Programme
HORIZON-MCSA-2024-DN

Marie Curie Grant Agreement Number
101227450

LipAgg Doctoral Network project

The LipAgg project seeks to unravel the structural complexities of amyloid protein-lipid aggregates and investigate their role in pathological aggregation, cellular toxicity, and intercellular spread. Focusing on key human amyloid proteins —amylin (IAPP), amyloid beta (Aβ), and α-synuclein (αS)—linked to type 2 diabetes (T2D), Alzheimer's disease (AD), and Parkinson's disease (PD), respectively, the project builds on recent discoveries made by the consortium. These findings highlight the critical role of free lipids in membrane damage through the formation of stable lipid-amyloidogenic protein complexes, leading to the lipid-chaperone hypothesis.

LipAgg Doctoral Network program

The selected PhD candidate will participate in the EU-funded HORIZON-MSCA-DN-2024-01 project LipAgg. The LipAgg network brings together partners from 6 European countries and comprises 11 academic or research institutions and 12 industrial partners. The consortium is committed to delivering an outstanding training programme for 15 Doctoral Candidates (DCs) aimed at elucidating the role of lipids in the toxicity and propagation of protein aggregation.

Supervisors

Prof. Gunnar Schröder - *gu.schroeder@fz-juelich.de*
Prof. Sandrine Ongeri - *sandrine.ongeri@universite-paris-saclay.fr*

Involved Company

Schrödinger - *https://www.schrodinger.com/*

Title

Lipid-Driven α-Synuclein Aggregation: Cryo-EM Structure Determination and Structure-Based Inhibitor Design

Objectives

The first goal of this project is to determine the atomic structure of lipid-bound α-synuclein fibrils by cryo-EM and identify the specific lipid–protein interactions that drive membrane-mediated amyloid formation. The second goal is to exploit this structural information for the rational design and evaluation of peptide mimetics that block the lipid-binding interface, thereby inhibiting both fibril formation and associated membrane disruption.

The Position

The Doctoral candidate key tasks will be to manage and carry out the assigned research project, participate in the LipAgg training and network activities, take PhD courses, write scientific articles and your PhD thesis, participate in national and international congresses and scientific meetings, undertake a research stay at an external research laboratory within the LipAgg network, and disseminate the obtained scientific results.

In particular, the DC enrolled in this position, will be working on high-resolution cryo-electron microscopy to determine the structures of lipidic alpha-synuclein (αSyn) amyloid fibrils. The aggregation of αSyn as well as its interaction with lipid membranes play a key role in Parkinson's disease. The high-resolution cryo-EM structures will show in molecular detail which αSyn-lipid interactions are responsible for driving the formation and stabilization of these amyloid fibrils. With this understanding, the DC will develop inhibitors capable of disrupting these specific αSyn-lipid interactions. This includes testing known aggregation inhibitors and using the cryo-EM structures to rationally design new peptide mimetics targeting the relevant interaction sites. This work will be performed in close collaboration with several other groups in the LipAgg network.

The Doctoral Candidate (DC15) will be enrolled as PhD student at the Heinrich-Heine University of Düsseldorf and will be working at the Forschungszentrum Jülich at the Ernst-Ruska-Centre (ER-C) under the supervision of Prof. Gunnar Schröder. The ER-C is Germany's national infrastructure for high-resolution electron microscopy, which is currently expanding through the ER-C 2.0 project with five globally unique next-generation instruments representing a major federal investment into electron microscopy infrastructure.

The project includes a 6-month secondment in design and synthesis of peptidomimetics at the University Paris-Saclay under the supervision of Prof. Sandrine Ongeri, as well as a 3-month secondment at the company Schrödinger (tentatively in Munich).

The expected start date is 1 September 2026.

The Candidate

The ideal candidate for this position is a highly motivated and talented researcher holding a Master’s degree (MSc or equivalent) in Physics, Biology, Chemistry or a loosely related field.

The candidate should enjoy the challenge of novel scientific concepts and have a highly motivated, persistent and result-driven attitude. The candidate should be able to work well both independently and in an interdisciplinary team.

Excellent oral and written communication skills in English are required. Strong organisational and planning skills are also necessary.

Eligibility rules

This position is subject to the mobility and eligibility rules of the Marie Skłodowska-Curie Actions. In particular, the candidate must not have resided or carried out their main activity (work, studies, etc.) in Germany for more than twelve months during the three years immediately prior to the recruitment date, unless as part of a procedure for obtaining refugee status under the Geneva Convention. At the date of recruitment, the candidate must be a Doctoral Candidate, *i.e.*, in the first five years (full-time equivalent research experience) of their research career and must not have been awarded a doctoral degree.

Required documents

CV - including methodological skills
Motivation letter
Copy of Master's degree (or proof of expected completion)
Master thesis (if available)
All academic transcripts
Contact information for at least two references

Please send your application including all required documents by email to Prof. Gunnar Schröder (gu.schroeder@fz-juelich.de).

Contact information

For questions about the position, the project, or the application process, write to *gu.schroeder@fz-juelich.de* and *sandrine.ongeri@universite-paris-saclay.fr*

Publications by the supervisors relevant for the project:

Zielinski M, Peralta Reyes FS, Gremer L, Sommerhage S, Pagnon de la Vega M, Röder C, Heidler TV, Syvänen S, Willbold D, Sehlin D, Ingelsson M, **Schröder GF**. *Cryo-EM studies of amyloid-β fibrils from human and murine brains carrying the Uppsala APP mutatio (delta690-695).*
Acta Neuropathol Commun 13(1):209 (**2025**)

Benedikt Frieg*, Mookyoung Han*, Karin Giller, Christian Dienemann, Dietmar Riedel, Stefan Becker, Loren B. Andreas, Christian Griesinger, and **Gunnar F. Schröder**. *Cryo-EM structures of lipidic fibrils of amyloid-β (1-40)*
Nat Commun 15(1):1297 (**2024**)

Mara Zielinski*, Fernanda S. Peralta Reyes*, Lothar Gremer, Sarah Schemmert, Benedikt Frieg, Luisa U. Schäfer, Antje Willuweit, Lili Donner, Margitta Elvers, Lars N. G. Nilsson, Stina Syvänen, Dag Sehlin, Martin Ingelsson, Dieter Willbold, **Gunnar F. Schröder**. *Cryo-EM of Aβ fibrils from mouse models find tg-APPArcSwe fibrils resemble those found in patients with sporadic Alzheimer's disease*
Nat Neurosci 26:2073–2080 (**2023**)

D. DiLorenzo, N. Bisi, J. Kaffy, L.M. Ramirez, M. Zweckstetter, O. Lequin, I. Garfagn ini, J. Luo, Y. Hannappel, I. Ennen, V. Dodero, N. Sewald, M.L. Gelmi, N. Tonali, R. Brandt, **S. Ongeri**. *Synthetic chaperone based on Hsp90-Tau interaction inhibits Tau aggregation and rescues physiological Tau-Microtubule interaction.*
Nat Commun. **2025**, *16*, 8756 doi: 10.1038/s41467-025-63824-1

N. Bisi, J. Kothuis, J. Kaffy, H. Pérez Peña, C. Schulz, CMG De Luca, A. Ciullini, IL Dellarole, L. Radal, F. Moda, G. Cappelletti, D. Horvath, S. Pieraccini, W. Hoyer, F. Halgand, N. Tonali, **S. Ongeri**. *2- Peptidomimetics Inspired by α-Synuclein or Its Chaperone αB-Crystallin Differentially Modulate α-Synuclein Aggregation.*
J Med Chem. **2026,** 69, 4059. doi: 10.1021/acs.jmedchem.5c02716