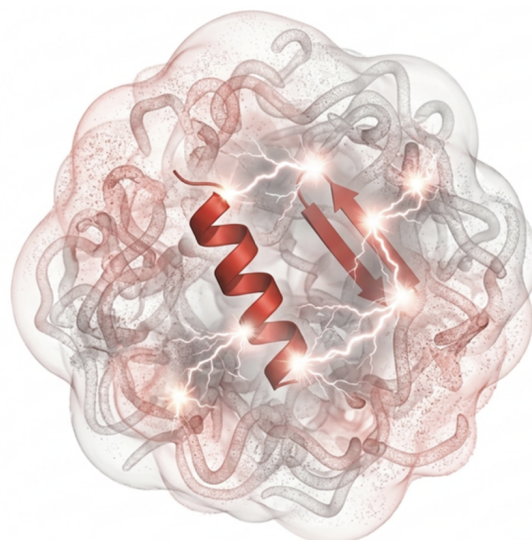


PhD STUDENT

PhD student offer within the OPUS-30 scientific project **“Molecular Mechanisms Driving the Transition of Protein Condensates into Amyloid Fibrils: Implications for Neurodegenerative Disease”**

Institution:	Institute of Fundamental Technological Research, Polish Academy of Sciences
City:	Warsaw
Position in the project:	PhD Student
Scientific discipline:	Computational Biophysics
Deadline:	December 30, 2026
Position starts on:	March 1st, 2027
Project duration:	42 months
Project Leader:	dr. hab. Adolfo Poma
Level of education:	Master's degree



 NARODOWE
CENTRUM
NAUKI



Project description

This research will focus on the molecular mechanisms governing the transition of intrinsically disordered protein (IDP) condensates into amyloid-like fibrils, a process implicated in the early stages of neurodegenerative diseases. Here we plan to investigate the conformational rearrangements of individual protein chains, the nucleation of ordered β -strand-rich assemblies, and their spatial organization within biomolecular condensates. For this work, we will employ Martini 3 simulations adapted for IDPs together with an extended **GōMartini 3** model that will enable controlled stabilization of sequence-specific secondary structure. The selected person will participate in ongoing research on the molecular biophysics of protein phase separation and aggregation, as well as in the development of advanced coarse-grained models for IDPs. Microscopy data will drive model parametrisation and validation, illuminating early aggregation pathways linked to neurodegeneration.

Scope of work in the position

- Testing GōMartini 3 model for IDP and biomolecular condensates in MD packages, including enhanced sampling approaches and biomechanical characterization.
- Performing large-scale coarse-grained simulations to investigate liquid-to-solid transitions, amyloid fibril formation, and aggregation processes in biomolecular condensates.
- Developing software tools using python and analysis workflows
- Manuscript preparation and presentation of results at international conferences.

- Enrollment in the doctoral school and completion of doctoral training requirements.

Profile of candidate/Requirements

- Document confirming the award of a master's degree (or equivalent).
- Background in computational biophysics, computational chemistry, or related fields.
- Knowledge of coarse-grained and all-atom methods, including Martini 3, protein condensate modelling, IDP, and force-field development.
- Familiarity with alternative coarse-grained force fields such as *CALVADOS* or related methodologies for IDP simulation.
- Reported computational/programming skills, MD engines (*GROMACS*, *NAMD*), Python (3.x), C++ and/or Fortran and high-performance computing.
- Ability to publish in peer-reviewed journals; good command of English.

We offer

- Doctoral scholarship: 5000 PLN gross-gross per month
- Possibility to participate in scientific conferences
- Support in grant preparation and a great environment to work
- A position at one of the highest-ranked research institutes in Europe
- Work in a friendly atmosphere within an interdisciplinary research team.

Required documents

- Cover letter
- CV including list of publication and conferences
- Master's diploma in physics/biophysics or a related branch of science
- Recommendation letter and an additional referee that we can contact
- Signed statement: "I agree to the processing of personal data contained in my job offer for the needs necessary to carry out the recruitment process conducted by IPPT PAN with headquarters in Warsaw, ul. A. Pawińskiego 5B, according to art. 13 para. 1 and 2 of Regulation (EU) 2016/679 of the Parliament and of the Council of 27 April 2016 on the protection of individuals with regard to the processing of personal data and the free movement of such data and the repeal of Directive 95/46 / EC (RODO)."

Applications

More information visit: pomalab.ippt.pan.pl/web/positions/

Please send your documents to: apoma@ippt.pan.pl.

