



Institute of Physics of the Polish Academy of Sciences

Scholarship for a PhD Student



Job ID: #JOB58/2020

Job Description

Job Title: PhD student – scholarship holder

Job Summary:

Protein folding and aggregation on the ribosome

Job Description:

The student will join the Department of Theoretical Physics under the supervision of Prof. dr hab. Mai Suan Li, working on the NCN funded project “Computational study of protein folding and dimerization on the ribosome”.

Background: Ribosome is a molecular machine for protein synthesis. This process is an area of intense research due to the essential role of proteins to life. For many decades, protein folding research has been dominated by the assumption that thermodynamics determines protein structure and function. However, recently accumulated evidence has supported the emerging paradigm of non-equilibrium control of protein behavior. Namely, speed of synthesis of proteins in the ribosome greatly influences their properties, mRNA sequence evolution, and protein aggregation in bulk related to diseases.

Aim: Changes in codon translation rates have recently been shown to alter a protein’s function but not necessarily its solubility, suggesting that structural changes in the nascent protein must be modest because otherwise aggregation would likely occur. One of the main goals is explore how extensive these structural rearrangements may be by simulating the synthesis of proteins that dimerize and calculating how their binding affinity changes as codon translation rates are altered.

Formation of disulfide bonds is very important for the folding of the protein and its functions. Recent experiments suggested that the speed of synthesis of proteins in the ribosome influences the formation of disulfide bonds in bulk. Therefore, this project is aimed at understanding this interesting phenomenon by using computational modeling.

Requirements

- The project will involve a lot of numerical simulations, and hence good programming skills are needed. A master's degree in physics, chemistry or computer science is required. Knowledge of biophysics, biology or biochemistry will be beneficial. Fluent command of spoken and written English is required.
- To be employed, the candidate must be accepted into the PhD school in which the Institute of Physics participates. Applications for the position are through recruitment to the School, online at <http://warsaw4phd.eu> .

Main research field: Physics

Sub Research Field: Biophysics

Career Stage: Early stage researcher or 0-4 yrs (Post-graduate)

Research Profile ([details](#)): First Stage Researcher (R1)

Type of Contract: Fixed term (36 months)

Status: Full-time

Salary: 5000 PLN per month (grant funding, before subtracting obligatory employer and employee social security contributions (~15%)).

Contact

More information can be obtained from

Mai Suan Li (e-mail: masli@ifpan.edu.pl)

<http://www.ifpan.edu.pl/~masli>

Please make contact.

Application details

Application deadline: 5 January 2021 Later applications will not be considered.

Required materials:

- Scientific CV
- Cover letter
- Scan of MsC diploma or equivalent (or an explanation of when one is expected)
- Academic record (for finalized semesters)
- Recommended: A recommendation letter by an academic, or their contact email.

All materials should be submitted in electronic form by application to the PhD school <http://warsaw4phd.eu>, choosing the project: "*Computational study of protein folding and dimerization on the ribosome*". (The application system will be active from **22 December 2020**).

Results regarding the position will be made available by **10 February 2021**.