Master's Research Internship
Targeting Pathological Condensates using AI-driven design and Cell Biology
(ENS, Paris, France).

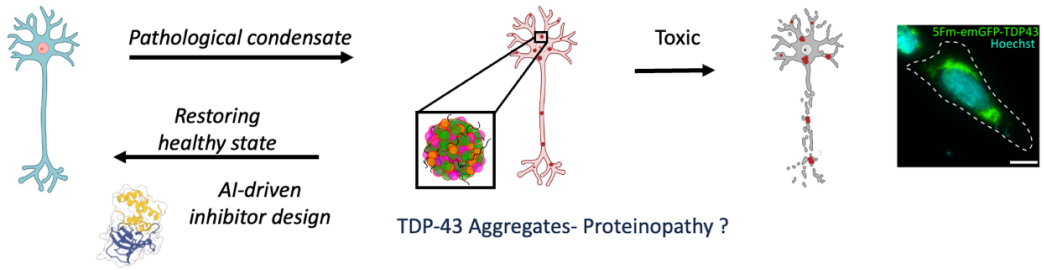
Key words: Synthetic biology and AI, Cell biology, Biophysics

Our laboratory at the École Normale Supérieure (ENS), CPCV, Department of Chemistry, Paris, is seeking a motivated Master's student for a research internship at the interface of biophysics, synthetic biology, and cell biology.

Research project

Biomolecular condensates are dynamic, membrane-free assemblies formed through multivalent interactions between proteins and nucleic acids. They play important roles in cellular organization but can also undergo abnormal transitions toward pathological assemblies and aggregates, particularly in age-related and neurodegenerative diseases.

The main goal of this project is to **develop and test new engineered proteins capable of interfering with the formation and properties of pathological protein assemblies in living cells**.



The student will combine synthetic biology and cell biophysics approaches to generate and characterize novel proteins with tailored functions. These proteins will then be tested in cellular models to determine their ability to recognize, remodel, inhibit, or eliminate pathological biomolecular condensates and protein aggregates.

The project will be carried out in close collaboration with researchers with expertise in cell biology, and computational structural biology, providing an interdisciplinary environment bridging molecular design and quantitative experiments in living cells.

The project will involve:

- Engineering and characterization of novel protein candidates;
- Human cell culture and transfection;
- Quantitative fluorescence microscopy and live-cell imaging, FRAP (Fluorescence Recovery After Photobleaching);
- Quantitative image analysis and cell-based functional assays;
- State-of-the-art computational protein design tools

The student will therefore have the opportunity to connect protein design with quantitative measurements of biomolecular self-organization and function in living cells.

Candidate profile

The project is particularly suited to Master's students with a background in biophysics, physical chemistry, synthetic biology, or quantitative cell biology.

We are particularly interested in candidates who are motivated to work across disciplinary boundaries and combine quantitative and biological approaches.

Research environment
The internship will be performed within the AIV team at CPCV, Department of Chemistry, École Normale Supérieure (ENS-PSL). Our laboratory provides a highly collaborative and multidisciplinary environment with expertise in synthetic biology, biophysics, protein engineering, and cell biology.

Level: Master 2 or equivalent
Duration: 5–6 months
Expected start date: January/February 2027. Applications should be addressed to: **zoher.gueroui@ens.psl.eu**

References
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