Post-doc position

Biophysical modeling of PML nuclear condensates

Job application portal: https://bit.ly/30Ske8k **Deadline: Jan 31th 2022**

Possible starting date: Feb 15th - Mar 1st 2022

Place: Collège de France
Center for Interdisciplinary Research in Biology
11, place Marcelin Berthelot, 75005 Paris, FRANCE

Team: *Multiscale Physics of Morphogenesis* www.turlierlab.com

Supervision: Hervé Turlier, team leader herve.turlier@college-de-france.fr
Phone: +33.1.44.27.14.10

Duration: 12 months contract - that will then be extended to 24 months

Salary: between € 2,200 and € 2,500 net monthly depending on experience

Application: please send 1 CV, 1 motivation letter and 2 recommendation letters to herve.turlier@college-de-france.fr

Mission: This project aims to extend the theoretical framework of liquid-liquid phase transitions to describe the formation of liquid condensates with a core-shell architecture[1] and their regulation by biochemical reactions. The research will focus on the growth and coarsening dynamics[2] of PML nuclear bodies, which are stress-regulated membrane-less organelles controlling multiple biological functions in the nucleus, such as metabolism or senescence. It will be performed in the theoretical physics team *Multiscale Physics of Morphogenesis* led by Hervé Turlier, and in tight collaboration with the experimental biology team *Nuclear Organization and post-translational control in physio-pathology* led by Prof. H. De Thé & Dr. V. Lallemand at Collège de France, who are worldwide specialists of the biochemistry and cellular biology of PML, and its role in cancer.

Activities: The successful candidate will develop non-equilibrium physical models and numerical simulations of nuclear condensate dynamics, going beyond recent developments in the field of biological phase transitions. The work will also involve image analysis, and may include data analysis using on physics-informed deep learning techniques. She/he will work closely with biologists in the host Institute and will have daily interactions with other members of the team. She/he will have to present her/his results at scientific conferences, to write scientific articles and to actively participate in the scientific and social life of the team and host Institute.

Expected profile: The candidate should hold a PhD in theoretical physics and demonstrate very good analytical skills. She/he should have already demonstrated the ability to publish in international peer-reviewed scientific journals. Previous experience in physical modelling of biological phase transitions will be a strong asset, and a proved capacity to collaborate with biologists will be particularly appreciated. A great autonomy in work, and research initiative will be necessary. Proficiency in English and good communication skills are expected.

Working environment: The successful candidate will work in the interdisciplinary team "Multiscale physics of morphogenesis" led by Hervé Turlier composed of 10 scientists from various backgrounds (physics, applied mathematics, computer science, biology). The team is located at the Collège de France, in the heart of the Latin Quarter in Paris. Integrated within the PSL University, and close to other major institutions such as Ecole Normale Supérieure and Institut Curie, the Collège de France constitutes an exceptional and unique scientific environment in the world. The successful candidate will be provided an individual workstation in renovated premises, a powerful laptop and will have access to a high performance computing cluster (CPU+GPU) fully dedicated to the team.

1. M. Le-Verge-Serandour & H. Turlier* (2021). A hydro-osmotic coarsening theory of biological cavity formation. ***PLoS Computational Biology*** **17**(9): e1009333.

2. H. Borja da Rocha, J. Bleyer, & H. Turlier*. (2021) A viscous active shell theory of the cell cortex. arXiv:2110.12089, in revision.