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Job offer

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[Aix-Marseille University, INSERM](#) | Posted on: 21 October 2024

Postdoc in Biophysics, Marseille (France)

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21 Oct 2024

Job Information

Organisation/Company	Aix-Marseille University, INSERM
Department	DyNaMo
Research Field	Physics » Biophysics
Researcher Profile	Recognised Researcher (R2)
Positions	Postdoc Positions
Country	France
Application Deadline	15 Dec 2024 - 23:59 (Europe/Paris)
Type of Contract	Temporary
Job Status	Full-time
Hours Per Week	38.5
Is the job funded through the EU Research Framework Programme?	Not funded by a EU programme
Is the Job related to staff position within a Research Infrastructure?	No

Offer Description

A postdoctoral position in biophysics is available for two years at DyNaMo (INSERM, Aix-Marseille University, Marseille, France). This is part of a funded ANR-NSF consortium that aims to decipher the nature of heterogeneity in biomolecular systems. The tasks involve the combination of novel theoretical developments and high-speed atomic force microscopy (HS-AFM) with improved control algorithms applied to various biomolecular systems, first, on purified model systems and, finally, on living cells.

We are looking for a motivated researcher with a PhD degree preferentially in Physics and a strong background in biophysics. Previous experience in AFM applied to diverse biological systems is beneficial.

The successful candidate will be integrated in a truly interdisciplinary and international group working on the development of new force microscopy nanotools to probe the mechanics of biomolecular systems (protein unfolding, receptor-ligand unbinding and lipid membrane piercing). Good level of English (oral and written) is requested. Women, non-binary, and other underrepresented groups are strongly encouraged to apply. Applications should include a cover letter, a curriculum vitae, a list of publications and the contact details of two references.

The BioHETER project

Every biological system, whether it is a protein, a lipid bilayer, a nucleic acid or a receptor-ligand bond, can exist in several different forms or states. Therefore, a biological system is heterogeneous in nature. The origin of this heterogeneity is still under debate. Single molecule techniques allowed us to directly explore and quantify this heterogeneity by observing molecules one at a time. The aim of this project is to decipher the nature of this heterogeneity. To reach this goal, we will measure the forces required to perturb individual biological systems. The force signature will provide information about the state of the system, allowing us to quantify heterogeneity. We will use nanotools to probe the forces required to unfold proteins, break bonds and punch membranes at high temporal resolution, first on isolated systems and then on living cells. This will require state-of-the-art nanotechnology with advanced control techniques and novel data analysis and mining algorithms. Theoretical modelling and simulations will allow us to interpret the results and re-configure the experiments to better understand the origins of the heterogeneity of each system. The expected results will shed light on almost all biological processes, from immune recognition during infection to pathologies involving protein aggregation.

Research group

DyNaMo is a recently created research laboratory specialized in AFM at the INSERM, Aix-Marseille University (AMU). The lab is one of the international leaders in the application of AFM, in particular of high-speed AFM, to biological samples, from single molecules to cells and tissues. The lab is attached to the Life Sciences and Physics doctoral schools of AMU. INSERM is a public institution devoted exclusively to human health and biomedical research. Aix-Marseille University is the largest French university and is dedicated to education and research. The lab is part of the Centuri Institute, an interdisciplinary consortium of 16 research groups, supporting collaborative research and mentoring projects within the labs through a common interest to quantitative biology. The Luminy campus provides access to multiple facilities and techniques such as electron microscopy, focused ion beam, and advanced optical microscopy among many others within an optimal academic environment.

Eroles et al. *Nanoscale*, 2023

Rico et al. *PNAS*, 2019

Rico et al. *Science*, 2013

Redondo-Morata, *Langmuir* 2012

The project will be in collaboration with theoretical biophysicist Michael Hinczewski (Case Western Research University, USA) and engineer Qingze Zou (Rutgers University, USA).

Candidates should send their CV and references to felix.rico@inserm.fr and lorena.redondo@inserm.fr

Where to apply

E-mail

felix.rico@inserm.fr

Requirements

Research Field

Physics » Biophysics

Education Level PhD or equivalent

Skills/Qualifications

We are looking for a motivated researcher with a PhD degree preferentially in Physics and a strong background in biophysics. Previous experience in AFM applied to diverse biological systems is beneficial.

Languages ENGLISH

Level Excellent

Additional Information

Work Location(s)

Number of offers available 1

Company/Institute Aix-Marseille University/Inserm

Country European Union

State/Province France

City Marseille

Postal Code 13009

Street 163 avenue de Luminy

Contact

City Marseille

Website <https://sites.google.com/view/fm4b-lab/home>

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