

Postdoctoral position (H/F) PMMH-ESPCI

Bacterial penetration of intestinal mucus layers

<https://emploi.cnrs.fr/Offres/CDD/UMR7636-FREAUG-038/Default.aspx?lang=EN>

General information

Job title: Post doctoral position at the PMMH-ESPCI (M/F)

Working place : PARIS 05

Type of contract : Scientific CDD

CN Section: 10

Contract duration: 18 months, eventually extendable 24 months

Starting date : from 1/11/2013

Working hours : Full time

Salary : between 2696 and 3800 euros gross

Level of education required: PhD in Physical or in Biological Sciences

Desired experience: doctoral and/or post-doctoral experience in biophysics would be a plus.

Missions

This post-doctoral project is part of the ANR-supported *PushPull* project, which involves studies at the interface between physics and biology/medicine.

The overall aim of the project is to investigate the transport the exploration and the organization properties of model biological micro-swimmers, namely flagellate bacteria and ciliated algae in complex environments. These two species present two different swimming strategies, which have a direct impact on their exploration and organization properties in environments with complex rheology or constraining geometries. A conceptual understanding of these swimming properties as well as the different exploration characteristics will be evaluated, based on reliable and quantitative modeling.

In this context, the post-doc will work specifically on important medical and biological questions, namely the penetration of intestinal mucus by flagellated bacteria, under different micro-environmental biological conditions. The post-doctoral assignment will be carried out at the interface between ESPCI's PMMH laboratory and the INSERM/Sorbonne Université "NutriOmics" laboratory working in the field of metabolic diseases.

Activities

The PMMH laboratory has developed a 3D Lagrangian tracking system suited for various microorganisms, as well as micro-fluidic techniques for creating controlled geometrical and rheological environments. Using this original experimental system, the post-doctoral fellow will monitor and model the swimming performance of flagellated bacterial in different mucosal environments obtained either from purified mucin, or from extracts of native porcine mucus, modified by dilution or chemical attack. The level of penetrability of the biological barrier will be quantified and put into perspective with rheological measurements.

He/she will be responsible for conducting standardized experimental tests to measure bacterial penetration as a probe of mucus "health" under different biological conditions (more or less inflammatory, for example). He/she will be in charge of systematically analyzing the data produced using appropriate statistical tests.

Skills

- Science thesis in physics/biophysics, with knowledge of chemistry or physical chemistry
- Statistical skills applied to complex data
- Prior knowledge of the Matlab software would be appreciated
- Include recommendation letters from PhD mentor and/or senior scientific collaborators

Working context

Scientific work at the interface between a physics research laboratory and a medical biology research laboratory.