

Postdoctoral position

Title: Development of a microfluidic device integrating mechanofluorochromic molecules for the characterization of single cells

Keywords: mechanofluorochromic sensing, surface functionalization, microfluidics, microalgae, bioenergy

Duration: 12 months (with a possibility to extend)

Host institution: ENS Paris-Saclay, Institut d'Alembert, within a laboratory in physics LuMIn. The project will be conducted in collaboration with a research team from the PPSM laboratory at ENS Paris-Saclay.

Location: 4 Avenue des Sciences, Gif-sur-Yvette, 91190

Date of start: as soon as possible

In the context of a collaborative pluridisciplinary research project at the Institut d'Alembert, a microfluidic device was designed and fabricated to evaluate the mechanical properties of microalgae cells. The device is composed of a series of microchannels which were functionalized with molecules sensitive to the mechanical stress (mechanofluochromic molecules). Our preliminary results showed a dense coating with a good fluorescence signal after mechanical stimulation. Through the present project, we will improve the grafting reaction conditions of these molecules on the sensing surfaces of the microfluidic channel. The resulting microfluidic chips will be tested with the microalgae *Chlamydomonas reinhardtii*.

The project implicates two research teams from ENS Paris-Saclay: a team, specialized in microfluidics and microalgae processing ([within BIOMIS group](#), LUMIN), and PPSM team, specialized in the synthesis and studies of mechanofluorochromic molecular materials.

Tasks: The tasks of this post-doc researcher will include the fabrication of the microfluidic device, the culturing of microalgae cells and the optimization of the grafting procedure of the microfluidic channels. Once the microfluidic devices are obtained, experiments on microalgae will be performed, comparing MFC molecule readout to nanoindentation analysis on microalgae on the one hand and to AFM (atomic force microscopy) coupled to fluorescence microscopy experiments on the mechanofluorochromic coatings on the other hand.

Competences: physico-chemistry, photophysics, surface functionalization. A background in microfluidics, in fluorescence microscopy and/or in AFM will be appreciated.

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