

# LCMD - Development of droplet-based millifluidic platform for the screening of industrial micro-organisms - CDD 1 an

<https://wwwdev.espci.fr/fr/espci-paris-psl/emploi/archives/2012/lcmd-development-of-droplet-based-3912>

## CONTEXT

L'École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris is both engineers' Grande école and a research institute (20 laboratories) of international reputation having an excellent scientific culture (6 Nobel prizes). Teaching and research are in-between the knowledge and the know-how in physics, chemistry and biology.

## POSITION DESCRIPTION

### Missions

Goals of the project - To develop :

- 1. New bioprotection culture systems for phytopathogenic micro organisms, in order to reduce the use of chemical treatments that damage the environment.
- 2. New production processes for bio-fuels.
- 3. New ways to use agro-resources, especially in human and animal nutrition.

**Droplet-based millifluidics** In the Laboratoire de Colloïdes et Matériaux Divisés at ESPCI we develop millifluidic tools for the control of droplets dispersed in an oil phase (water/oil emulsion) within tubing. Each droplet is used as an independent microreactor with a volume of 500 nL. Individual operations on droplets are performed in elementary modules. The modules allow droplet production, droplet splitting, incubation, fluorescent detection, and sorting of the droplets. These modules can be integrated to allow complex operations to be performed, including the screening of micro-organisms in droplets. In a single experiment, we can reliably encapsulate 1000 micro-organisms in droplets (single organisms in each droplet) and measure their individual enzymatic activities. This technology allows the selection of the most efficient organisms among a population of variants. For this project we aim to screen organisms for activities permitting the transformation of a range of agro-resources, including the conversion of biomass to bioethanol.

## CANDIDATE PROFILE

### Knowledge required

The candidate will take part in various steps of the development of a millifluidic system dedicated to the screening of micro-organisms, in collaboration with the members of the laboratory already involved in the project :

- 1. Setting-up a new detection system for biomass measurement and integration on a droplet-based millifluidic instrument.
- 2. Integration of multiple modules droplet-processing. (sorting, adding new compound to the drops).



- 3. Programming for data acquisition and data processing in real-time : development of a program – on the basis of an existing one (Labview NI) – to control all the elements of the microfluidic platform (detections, flow control, electric actuation, image capture...).
- 4. Final step will be to install a microfluidic system in Soufflet center based on project development

### Training level (diploma) required

The candidate should be a PhD with expertise in one or more of the following fields : optics, hydrodynamics, and engineering. The project is highly multidisciplinary so the candidate should be ready to work and interact with chemists and biologists from both academia and industry. Additional experience or interest in programming (Labview, Matlab), instrument development, or microbiology would be advantageous but not essential.

### Modalities(Methods) of recruitment

Date limite de candidature : 31/10/2012 Laboratoire d'accueil : LCMD Contrat : CDD Durée : 1 year (renewable)  
Lieu de travail : Paris, Ile-de-France, France Salaire : niveau post-doc Industrial partnership between ESPCI (<http://www.lcmd.espci.fr>) and Soufflet S.A., the leading French agri-food company (<http://www.soufflet-group.com/>).

#### Contacts

Prénom et NOM : Laurent BOITARD Fonction : Enseignant-chercheur (Associate Professor) Téléphone : +33 (0)1 40 79 51 68 Applications, including a CV and the names of at least 2 referees, should be addressed to : [laurent.boitard@espci.fr](mailto:laurent.boitard@espci.fr)

#### Accès

Métro ligne 7 (Place Monge/Censier Daubenton) RER B (Luxembourg) Bus 21, 27 & 47 3 stations Vélib proches