

# LCMD - Post-doct - Improvement of droplet-based millifluidic platform for microbial diagnostics and validation on clinical cases.

<https://wwwdev.spip.espci.fr/fr/espci-paris-psl/emploi/archives/2013/lcmd-post-doct-improvement-of-droplet-based>

## 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

Improvement of droplet-based millifluidic platform for microbial diagnostics and validation on clinical cases.

## Industrial partnership

ESPCI (<http://www.lcmd.espci.fr>) and bioMérieux (<http://www.biomerieux.com>), the world leader in bacterial diagnostics.

## Scope of the project :

Bacterial infections are a major health problem concerning worldwide more than 1.3 millions people everyday. Appropriate treatments rely strongly on the quality of the diagnostics, that is, the identification of the pathogens and of their resistance profiles. The antibiogram is one of the tools that enables clinicians to determine resistance to antibiotics and thus guides them in their decision-making. The increase in resistant bacteria and in the number of antibiotics necessitates the use of high-throughput solutions. The Laboratoire de Colloïdes et Matériaux Divisés at ESPCI has developed 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. By mixing a bacterial suspension and changing antibiotics concentration within every droplet we demonstrated the measurement of high resolution antibiograms.

## Goals of the project :

The long term objective is to develop an instrument for antibiograms determination that would be superior in term of quality of results and throughput than the gold standards. To reach this goal we first have to :

- 1. improve the performances and integration of the existing technology
- 2. validate its universality across a large spectrum of clinical cases

The first half of project will be dedicated to technological development and the second half to biological studies in strong collaboration with experts from bioMérieux.



## Role of the candidate :

The candidate will take part in various steps of the development of a millifluidic system dedicated to antibiogram automation in collaboration with the members of the laboratory already involved in the project :

- a) Optimize operation of the apparatus and develop new concepts for integration and automation
- b) Test new versions of the apparatus on classical cases and validate quality of results
- c) Demonstrate added value In difficult cases
- d) Write technical synthesis to enable transfer to other experimentalists

Desired skills and qualifications : The candidate should be a PhD with expertise in one or more of the following fields : fluid mechanics, microfluidics, engineering, instrument development. We expect the candidate to have extensive experience in experimental approaches. 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 and microbiology would be advantageous. A good level of english is required.

## Start date and duration of contract :

The expected start date is 1st March 2013. The salary will be up to 2,500 Eur/month depending on experience. The project will be for 1 year.

Applications, including a CV and the names of at least 2 referees, should be sent to : Prof. Jérôme BIBETTE [jerome.bibette@espci.fr] , Dr. Laurent Boitard [laurent.boitard@espci.fr], Dr Patrick Broyer [patrick.broyer@biomerieux.com] before 28th February 2013.

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