ESPCI PARIS

LCMD - Post Doct - Development of droplet-based millifluidic platform for the screening of industrial micro-organisms.

https://wwwdev.espci.fr/fr/espci-paris-psl/emploi/archives/2013/lcmd-post-doct-development-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

Development of droplet-based millifluidic platform for the screening of industrial micro-organisms. **ESPCI** (http ://www.lcmd.espci.fr) and **IBPC** (http ://www.ibpc.fr/UMR7141/SiteFr/presentation.htm) Microalgae-based energy capture is at the forefront of the clean energy revolution. This high-yield, low maintenance technology has generated enormous interest from Government, industry and academic groups alike as a favourable technology for sustainable energy production. Despite such momentum, however, the field is severely challenged by a lack of high-throughput experimental techniques that can be applied to basic fundamental questions in order to increase bioenergy production and scalability. By applying a micro/millifluidics platform and systems biology approach to microalgae research, this project will revolutionize the discovery and development of new higher yield strains and growth conditions in order to maximize bioenergy production.

Aims include :

- 1. To establish microfluidic photobioreactors as a novel and high-throughput platform for individual algal cell or small assembly growth.
- 2. Optimize the efficiency of light capture and biomass accumulation between wild type and engineered algal strains.
- 3. To use systems biology approaches to model gene and protein expression network interactions that are unique in high-yield microalgae mutant strains. These data will provide a wealth of information to further enhance bioenergy production either through genetic modification, pathway
- _ inhibition and/or nutrient supplementation

Project success will greatly impact the development of microalgae as a sustainable and renewable energy source. The outcomes from this project have applications in the energy industry where microalgae may serve as an alternative fuel source.

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Role of the candidate

The Fellow will be responsible for :

- a) Developing a microfluidics platform for the capture and analysis of wt and antenna strain mutants to quantify dynamical processes related to cell growth, survival, division, and responses to external stimuli.
- b) A platform for rapid analysis of microalgal wild type and mutants
- d) Characterizing the conversion of light to biomass to identify the genes affected
- by using PCR analysis to quick clusters mutants with similar insertions.
- e) Screening for multiple engineered mutants in parallel to identify those with the most promising phenotype.
- f) Track the replicative and cell volume response to different light conditions and shading effect between different cell layers.
- g) Maintain and cultivation of microalgae mother stock cultures.

Desired skills and qualifications

The candidate should be a PhD with expertise in one or more of the following fields : algal biology, algal physiology, microfluidics. 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, instrument development or microbiology would be advantageous.

Start date and duration of contract

The expected start date is 1st March 2012. The salary will be up to 2,500 Eur/month depending on experience. The project will be for 1 year.

Application procedure 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] before 28th February 2013.

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