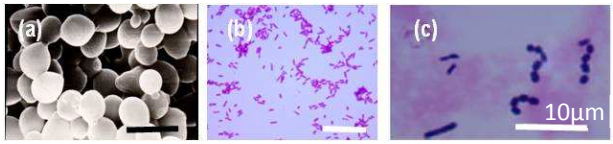
Open Post-doc position (1 year)

Migration of complex shape particles in micro-channels

Project summary:

Analytic processes for micro-organisms detection and identification in fluids (e.g., microbial control in food industry, biological fluids analysis …) are of major interest for society in a large range of contexts from the lab scale to industrial processes. They often require a preliminary step of separation in order to isolate microbial cells, presumed pathogens, from the other particle components and/or to concentrate them before identification. The samples often contain a mixture of suspended particles and several micro-organisms species with different morphologies and sizes. An easy and portable way to achieve preliminary sorting or separation of these micro-organisms can be done based on their migration under flow in micro-channels.



The aim of this project is to build a relevant tool to predict migration of complex-shape particles that mimic micro-organisms (ranging from model spheres to flexible fibers) in given microfluidic geometries (rectangular micro-channels) under hydrodynamic laminar regimes (to prevent cell damage). The work will be focused on numerical development of the Force Coupling Method that accounts for fluid-particle interaction.

Keywords: flow of complex shape particles, lift force, microfluidics, numerical simulations

Academic context and supervisors:

The recruited person will work in a team, including 2 Ph.D. students who will develop specific experimental methodologies for the analysis of the trajectories of single anisotropic particles and their orientation when flowing in rectangular or square micro-channels (of a few tens to a few hundreds of µm in width). Frequent interactions between the experimental and the numerical parts of the projects are foreseen for the validation of the numerical models and the improvement of the experimental set-up accuracy.

The academic supervisors are Micheline Abbas (Laboratoire de Génie Chimique) and Lucien Baldas (Institut Clément Ader). Collaboration with researchers at Laboratoire d'Ingénierie des Systèmes Biologiques et des Procédés will guide scientific convergence between behavior of model particles and micro-organisms.

Profile:

The post-doc fellow will be responsible for numerical developments based on existing code (for spherical particles). He or she should have both a strong background in programming, and a very good understanding of fluid mechanics.

Administrative aspects:

Job location: Toulouse at Laboratoire de Genie Chimique (www.lgc.cnrs.fr) and Institut Clement Ader (www.institut-clement-ader.org);

Duration: 1 year from September 1st, 2016

The post-doc position is funded by the research federation FERMaT. Net salary including social security: ~2150 €/month.

Send a CV, references and motivation letter before **June 10, 2016** to

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