

*Open position:*     **Doctoral Student**  
                              **Bioscience and Biotechnology Institute of Aix Marseille**

*Subject:*             Magnetotactic bacteria and their motion in complex environments

The institute focuses on interdisciplinary research in the field of environmental biology, biofuel, and health and environmental biotechnology. In particular, the team of molecular and environmental microbiology attempts to understand how microorganisms interact with their environment and to develop new actuators and sensors. In this context, the group working on magnetotactic bacteria invites applications for a:

**Doctoral Student (3 years position)**

Magnetotactic bacteria orient in magnetic fields with the help of a dedicated organelle, the magnetosome chain, which acts as an intracellular compass needle. In this way, their swimming, powered by their flagella, is guided by the magnetic field; the bacteria can be understood as self-propelled compass needles. Magnetotactic bacteria often live in the sediments of aquatic environments and thus swim in a milieu characterized by pores and obstacles. However, their swimming behavior is mostly studied in bulk aqueous environments. In this project, we will use an experimental approach for the quantitative characterization of magnetotactic motility in complex environments and in 3D. We will investigate how directional motility is achieved in such an environment and how these bacteria balance chemical signals (oxygen) with physical determinants (magnetisms and obstacles).

The candidate will be responsible for the experimental part of the project. This includes growing different species of bacteria. She/he will develop microfluidic devices to study the bacterium responses under controlled oxygen conditions and will use a custom-design microscope to study the swimming behavior in controlled magnetic conditions. Image analysis is also typically based on custom-designed approaches. Special emphasis will be laid on interdisciplinary research so that close collaboration with scientists working in Lyon (Cécile Cottin-Bizonne) and Paris (Eric Clément) will be expected.

*Qualification:*

Candidates should have a Master degree in biophysics, biotechnology, physics, materials science, chemistry or microbiology. Proficient English is required. Good theoretical and practical skills in the lab are expected. Skills in microfluidics, optical microscopy, and programming will be highly appreciated.

*Recent papers on the subject:*

Klumpp S. et al., 2019, Physics Reports, 789: 1-54.

Lefèvre C. et al., 2014, Biophysical Journal, 107: 527-538.

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*Documents:*       please include CV, publications' list, motivation letter and at least 2 names for reference letters to your application