INTERNSHIP TITLE	**Active Microswimmers in Complex Fluids**
MASTER-2 AND/OR PHD	Possibility to continue with a PhD
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RESEARCH PROJECT

Motility is a fundamental characteristic of life, from large animals to microorganisms such as bacteria. Such single cell organisms usually live in ecosystems full of colloids and macromolecules (mucus,…) and understanding their swimming behavior in such complex environment is of key-importance to control the spread of diseases and therefore the development of medical treatments, but also to open avenues for the design of artificial self-propelled nanomachines.

The research project of the internship deals with the study of biological microswimmers in complex fluids and aims at understanding their spatio-temporal organization in such crowded environments. Specifically, we will use different strains of flagellated bacteria, which have been genetically modified to display fluorescence, enabling therefore their tracking by optical microscopy thanks to home-made developed Matlab codes. The student will characterize the behavior and organization of these bacterial microswimmers in complex fluids with various patterns and topologies, such as liquid crystalline order, which has been shown to monitor both the direction and the intensity of their swimming speed. Beyond its fundamental interest, such a control of biological active matter motility and directional taxis through a complex environment has a great potential to develop smart therapeutics with targeted drug delivery capabilities.

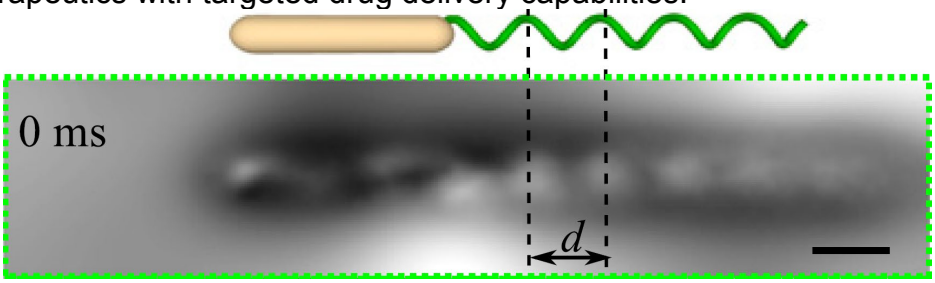

Figure: Distorsion of a liquid crystal by a swimming bacteria. Scale bar : 5µm

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