PhD thesis proposal in microbiology and biochemistry
Discovery of novel defluorinases for bioremediation

We are looking for an inquisitive, creative and motivated young scientist for this PhD project in microbiology, at the interface with chemical and environmental sciences. Work will be conducted under the supervision of Prof. Stéphane Vuilleumier, leader of the team "Adaptations and interactions of microorganisms in the environnement" (AIME) at GMGM (UMR 7156 CNRS) at University of Strasbourg. The PhD project will be funded by the French National Research Agency ANR, through support awarded in 2021 to the project MICROFLUOR led by Stéphane Vuilleumier.

Fluorinated compounds, and in particular fluorinated alkanes and fluorinated pharmaceuticals, represent major risks for human health and ecosystem functioning. Degradation of these "forever chemicals" in the environment is a long-standing challenge due to the strength of the carbon-fluorine bond, one of the most stable covalent bonds known. The project will aim to discover; also applying microfluidics approaches developed by project partner Prof. M. Ryckelynck (IBMC, UPR 9002 CNRS, Strasbourg), novel microbial defluorinase enzymes for applications in bioremediation.

The PhD project will involve ambitious multidisciplinary and collaborative research, with the application and optimisation of different experimental approaches in microbiology, molecular biology, genomics and metagenomics, and high-throughput sequence analysis. It will rely on the complementary expertises of the two partner laboratories, and will also involve the preparation of reports, seminar and conference presentations, and scientific publications.

Experimental work to be performed will include:

- the search for defluorinating activities by microfluidic screening of strains described in the literature, enrichment cultures from contaminated sites, and gene banks constructed from ADN samples of interest;
- the characterisation of obtained dehalogenases, and their experimental evolution in the laboratory to obtain novel protein catalysts active with defluorinating activity on selected fluorinated compounds.

Eligible applicants will have:

- a Master degree in microbiology, biochemistry, molecular biology or equivalent (delivered before September 2022, or obtained in 2021);
- practical experience of several experimental techniques in molecular biosciences;
- good command of oral and written communication, in French and/or in English;

An interest in environmental issues, working knowledge of bioinformatic tools and of biostatistics, knowledge in pollutant transformation processes, and/or international experience will represent additional assets.

Work context and complementary information

The team AIME (GMGM, UMR 7156 CNRS, https://aime.unistra.fr) aims to understand the molecular basis of bacterial metabolism of selected pollutants, in particular organohalogens, and to characterise microbial communities at contaminated sites by applying functional genomics approaches.

Research at University of Strasbourg covers all areas of science, and encourages interdisciplinary and international collaborations. Located at the heart of Europe in a trinational region of dynamic economic activity, Strasbourg is a pioneer city in terms of environmental awareness in France, and a very pleasant place to live in.

Please contact Prof. S. Vuilleumier by email (vuilleumier@unistra.fr) for any questions and further information.

Application and contact address: Prof. Stéphane Vuilleumier (vuilleumier@unistra.fr).

To apply, please send letter of motivation, CV, copies of certificates, and the names and contact information of potential referees as a single pdf file.

Applications will be processed as received, starting from March 2022. Final closing date for applications is April 30, 2022. Preferred starting period will be October 2022.