Institut des Géosciences de l'Environnement

Génie Electrique, Automatique Bio-Ingénierie

Development of microfluidic systems to characterize microbial communities trapped in glacial archives

Keywords: Microsystems, Microfluidics, Cell Sorting, Metagenomics, Microbiology

In a context of global change, it is essential to improve our understanding of the functioning of the Earth system in order to better anticipate its future evolution. **Ice archives** (ice cores extracted at high and mid-latitudes) can contribute significantly to this effort by providing information on past climate, but have been underexploited for probing biotic evolution over time. To date, no comprehensive microbial record from ice cores exists, mostly due to a lack of clean and time efficient methods to measure them. By **developing the tools necessary for studying microbial communities** trapped in these archives, it will become possible to extract complementary biological information to chemical and physical measurements to **describe past environments**.

Among the themes evaluated as strategic for the CNRS, this project was selected by the *Mission for Transversal and Interdisciplinary Initiatives* to answer this new scientific and methodological question. Within the framework of the 80|PRIME call for proposals, **a three-year doctoral contract (gross salary 2135 € monthly) and financial support was granted to the project,** which sets up a new collaboration between two CNRS laboratories, the Institute of Environmental Geosciences and the Ampère laboratory.

The main objective of this thesis is to develop a microfluidic tool to separate and capture the constituents of ice samples (inorganic or cellular debris, bacteria, DNA…) for the metagenomic analysis of microbial communities trapped in the ice archives. This tool could be coupled to existing chemical measurement modules dedicated to the continuous and high-resolution analysis of ice core samples, leading to a more complete understanding of the Earth's evolutionary history.

Candidate's profile: We are looking for a highly motivated candidate with a master degree in physics, and a **background in microfluidics.** A first experience working at the physics/biology interface would be a plus. The candidate must be able to integrate into teams of different cultures, have a strong taste for experimentation, be autonomous and know how to take initiatives.

Applications must be submitted through the CNRS portal: https://bit.ly/3n5taOg

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