PhD position paleolimnology and microbial ecology
Application to submit to the Graduate School SISEO, University Savoie Mont Blanc

Lab: UMR CARRTEL – Alpine Centre for Research on Lake Ecosystems and Food Webs
Domaine Universitaire
73376 Le Bourget-du-Lac, France

Title: Application of microbial diversity based approaches in paleolimnology to characterize the historical evolution of local pressures on lake ecosystems

Supervisor: Isabelle DOMAIZON, INRAE, CARRTEL
Co-supervisors: David ETIENNE, University Savoie Mont Blanc, CARRTEL
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Subject: Long-term understanding of past environmental conditions and past biological communities is a key challenge to predict how future environmental changes will affect ecosystem properties and biological diversity. Lake sediments are particularly relevant archives because of their ability to record both local and global environmental conditions, and to reconstruct temporal evolutions over the last millennia. In lake ecosystems, understanding the impact of anthropogenic stresses on microbial communities is a major challenge for current and future scientific research. Changes in microorganism diversity are likely to affect associated functions and will theoretically impact the resilience of these environments. As a consequence, lake ecosystems might be affected and less prone to resist to current and future environmental changes. Although multiple paleolimnological studies have already been developed on several lake ecosystems around the world, the analysis of subfossil DNA preserved in lake sediments is currently identified as one of the most promising developments in paleoecology, expanding the range of biological data that can be extracted from lacustrine sediments. While the use of genomic approaches has been successfully developed and applied for reconstructing long-term dynamics of microbial eukaryotes, few similar application has yet been applied on microorganisms (micro-eukaryotes, bacteria and archaea), although they may represent valuable indicators of global and local environmental changes affecting the lake ecosystem. This thesis aims to develop an integrative and holistic approach to understand the in natura complexity of microbial communities in the three domains of life within lake ecosystems. In this project, the strategy is to simultaneous study archaea, bacteria and micro-eukaryotes, considering both the present and active microbial fractions, to understand microbiomes and their dynamics on large time and space scales. This will integrate questions relevant of microbial ecology and paleogenomic centered both on the aquatic and terrestrial communities archived in the sedimentary compartment.

Keywords: Bacteria • Archaea • Eukaryotes • SedDNA • Past and actual communities

Candidate profile: we seek a highly motivated and creative student with good background in microbial ecology or in molecular biology and theoretical ecology, with excellent university records. The candidate should demonstrate curiosity toward paleolimnology, statistical modelling and should be interested in undertaking multidisciplinary studies.
https://www.siseo.univ-smb.fr/wp-content/uploads/2021/04/PDF_2021_CARRTEL_Domaizon.pdf

Application: candidates can send an email with a CV, a motivation letter, 2 supporting letters and statements of previous grades and university scores to the contacts below.

Deadline for submission: 26.05.2021. A first round of interviews will take place between May 27 and June 1 with the supervisors. Selected candidate will be invited for the final interview at University Savoie Mont Blanc (June 14 and 15), during which the grant awarding decision will take place.

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