



# Study of the impacts of climate change on planktons

## Type of the project

Semestre project

## Laboratory

Dudin Lab

## Professor

To be determine

## Supervisor

Omayya Dudin

## Contact person at Sailowtech

Shan Yao, Arthur Tabary

## Student

To be determine

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## Context

Sailowtech is an association and a MAKE project that aims to raise awareness of environmental issues, particularly those relating to aquatic environments. It promotes frugal and participative field science, open-source science and low-tech approach. To achieve this, Sailowtech organises scientific sailing expeditions in lakes, seas and oceans to discover field science, test the protocols and devices build by students during the semester and collect environmental data.

Plankton are defined as all organisms that drift with the currents and represent around 98% of ocean biomass. They can be animal (zooplankton) or plant (phytoplankton). They are at the base of the food chain and, through photosynthesis, phytoplankton produce more than 50% of the Earth's oxygen. It also plays a vital role in the functioning of aquatic environments and in climate regulation. Climate change and human activity, by modifying certain physico-chemical parameters of aquatic environments (in particular by warming, acidifying and adding nutrients to these environments), are disrupting all this proper functioning.

Microscopic expansion is a protocol that enables organisms to be expanded so that their internal structures can be observed under the microscope.

## Description of the project

During the "Alpine Lake" expedition organised by Sailowtech in February 2024, plankton will be sampled. The aim of these samples will be to study the distribution of plankton in the lake by analysing the 18 S gene, and also, through cultivation and laboratory experiments, to understand how the physico-chemical parameters of the water (temperature, pH, etc) influence the distribution of plankton. Various scenarios linked to climate disruption will be chosen, with the aim of gaining a better understanding of how climate disruption can impact plankton and planktonic diversity. An



analysis using expansion microscopy will also be carried out in order to obtain 3D images of plankton and to visualise their internal structure.

A comparison of the planktonic distribution with data taken in summer will be possible.

## Problematisation

The project will answer the following questions:

What is the planktonic distribution in the lake? How does it differ from summer?

What physico-chemical parameter(s) in the water have the greatest influence on the distribution of plankton?

How can climate change influence this distribution and how do plankton adapt to these changes?

## Main tasks

- Define a project schedule for the semester;
- Define the parameters to be varied and the different scenarios;
- Isolate, identify and cultivate the different organisms;
- Vary the culture conditions to better understand how they adapt;
- Genetic analysis of samples to determine the distribution of species;
- Analysis using expansion microscopy.

## Delivrables

- Summary report ;
- Oral presentation at the final project presentation session organised by Sailowtech;

## Documentation

Here are a few resources as a starting point :

- <https://www.tilt.fr/articles/le-plancton-pilier-de-locean-et-indispensable-la-vie>
- [https://link.springer.com/chapter/10.1007/978-90-481-2945-4\\_20](https://link.springer.com/chapter/10.1007/978-90-481-2945-4_20)
- <https://www.nature.com/articles/s41592-018-0219-4>

## Planned interaction with Sailowtech

By carrying out a project with Sailowtech, the student automatically becomes a member of the association. They will take part in meetings (around 3-4 during the semester) to share the progress of their project and, if necessary, to discuss any project-related needs. In addition, as a member of the association, the student may, if he or she wishes, take part in the various activities organised by the association.

## Contact

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