

## Internship Opportunity: Data Science on Ocean Physics (Waves) & Biologging (Fish) Data

- ◆ **Position:** M2 Internship (Master's level)
- ◆ **Duration:** 6 months, starting January to February 2025
- ◆ **Location:** Laboratoire d'Océanographie Physique et Spatiale (UMR-LOPS), Ifremer Brest Campus

### Context

Understanding fish migration patterns is crucial for analyzing marine ecosystems and managing sustainable fisheries. This internship seeks to integrate data science methods with biologging data from fish along with physical oceanographic data to discern and analyze migration behaviors. The biologging challenge lies in determining the fish's position by comparing tag information at specific times (such as temperature and pressure) with forecasts from ocean circulation models. Hence, biologging data inversion represents the confluence of environmental and biological research, requiring collaboration amongst professionals in ocean physics, biologging, and data science.

### Mission

Major storms produce swells that are accurately modeled and are known to influence the movement patterns of fish. Using a pre-existing storm database containing wave information, this internship's goal is to analyze biologging data together with the wave information, to find out how we observe the air-sea interaction in biologging data as fish behavior. Moreover, it aims to assess whether storm passage can be associated with biologging measurements, such as pressure changes, and utilized to enhance fish tracking inversion.

As an intern, you will:

- Work with the **Pangeo stack** (pangeo.io) to manage and analyze large-scale datasets.
- Develop workflows for parallel data processing on **cloud computing** and **high-performance computing (HPC)** infrastructures.
- Collaborate with researchers from UMR-LOPS (ocean physics), UMR-DECODE (biologging and marine ecology), and data science engineers.
- Apply advanced data analysis techniques to extract meaningful patterns linking fish migration to oceanographic processes.

### Profile

We are looking for a motivated and skilled candidate with the following qualifications:

- **Background:** Master's student in Computer Science, Data Science, Statistics, Ocean Physics, or related fields.
- **Technical Skills:**
  - Strong programming skills in **Python**.
  - Experience with data analysis and visualization libraries (e.g., Pandas, NumPy, Matplotlib).
  - Familiarity with geospatial data formats and tools (e.g., xarray, netCDF) is a plus.
  - Knowledge of cloud and HPC environments is an asset.
- **Soft Skills:**
  - Team-oriented with excellent communication skills.
  - Interest in interdisciplinary work at the interface of environmental and biological sciences.

This internship is a unique opportunity to enhance your data science expertise while contributing to cutting-edge marine research.

Related project websites:

[https://destination-earth.github.io/DestinE\\_ESA\\_GFTS/intro.html](https://destination-earth.github.io/DestinE_ESA_GFTS/intro.html)

<https://europeantrackingnetwork.org/en/dtotrack>

<https://bar.ifremer.fr/Projet-bargip>

<https://www.umr-lops.fr/Technologies/Logiciels/WAVEWATCH-III>