LAB & PEOPLE

- Name of the hosting lab: Laboratoire d'Océanographie Physique et Spatiale (LOPS)
- General activities of the lab: Physical, numerical and observational oceanography
- Website: https://www.umr-lops.fr/
- Number of staff / PhD: 87/30
- Supervisor name and contact: Quentin Jamet (quentin.jamet@inria.fr), Florian Sevellec (florian.sevellec@univ-brest.fr), Jonathan Gula (jonathan.gula@univ-brest.fr)

TOPIC OF THE INTERSHIP

- Scientific context of the internship (max 20 lines)

  The ocean is *turbulent*. It is characterized by a multitude of structures of varying scales, ranging from several tens of kilometers for mesoscale eddies to a few kilometers or less for submesoscale eddies and filaments. By analogy with atmospheric circulation, these oceanic 'storms' define the 'weather' in the ocean. They play a crucial role in the energy balance of the large-scale mean circulation, modulating the energy transfers from the latter to dissipative scales (on the order of millimeters). However, the interactions between the large-scale mean circulation and these oceanic 'storms' remain poorly understood. In particular, recent numerical studies (Chen et al., 2014) have highlighted their non-locality, opening new perspectives for their analysis and parametrization in climate models. In particular, preliminary results from satellite observations suggest non-local eddy-mean flow kinetic energy transfers within the Gulf Stream can extend over much longer distances than previously thought, a dynamical aspect currently missing in oceanic sub-grid scale parametrizations.

- Keywords: Kinetic energy; Eddy-mean flow interaction; Large scale ocean dynamics.

- Bibliography: Chen, R., G. R. Flierl, and C. Wunsch, 2014: A description of local and nonlocal eddy–mean flow interaction in a global eddy-permitting state estimate. J. Phys. Oceanogr., 44 (9), 2336–2352.

- Tasks and duties entrusted to the student:

  The first objective of this internship will be to evaluate the capabilities of ocean models to reproduce non-local dynamics inferred from satellite observations, and to assess their sensitivity to model resolution. We will

use for this numerical models outputs of newly generated realistic Atlantic simulations produced with the ROMS-CROCO modeling platform (GIGATL). Depending on the progress and the interests, we will then consider extending these analyses to other regions of the ocean and/or analysing the seasonality of these interactions.

- Skills to be acquired or developed:
  Eddy-mean flow interactions; Satellite and model outputs analysis

PROFILE OF THE DESIRED STUDENT

- Minimum level of study required: First year of Master
- Field(s) of study: Oceanography, atmospheric sciences, fluid dynamics, applied mathematics.
- Scientific skills: Data analysis, geophysical fluid dynamics fundamentals
- Language skills required: Spoken and written English

THE INTERNSHIP ASSIGNMENT:

Desired duration of the internship (in months): 5 months
Desired Starting date of the internship: Feb-March
Indicative weekly schedule: *35h / week*
Remuneration: *600€/month, paid on French SEA-EU funds for a maximum of 5 months; additional Erasmus grant could be asked to your own university.*

Internship agreement: *an internship agreement will be signed.*

To SEA-EU students:
If you're interested, please and send your CV and letter of motivation to the scientist in charge, quentin.jamet@inria.fr asap and before the 28/01/2023.