

18-month postdoc position in applied mathematics and climate simulations

IMT Atlantique, Brest, France

Title: Developing innovative object-oriented and integrated environmental indicators in climate simulations using AI.

Keywords: Digital Twin, Oceanography, Climate Simulations, Statistics, AI.

Conditions:

- Starts in fall 2023;
- Approximately 45 days of vacation per year;
- Net salary of around 2,500 euros.

Context: This postdoc announcement is part of the MEDIATION project, which aims to develop methods for a robust and efficient digital twin of the ocean. A total of around 15 postdocs, 3 PhDs, and 5 research engineers will be open for this 5-year project.

Supervisors: Pierre Tandeo (IMT Atlantique), Carlos Granero-Belinchon (IMT Atlantique), Romaric Verney (IFREMER), Melika Baklouti (Univ. Aix-Marseille), Samuel Somot (Météo-France).

Possible collaborations in the project: Stéphane Raynaud (SHOM), Julien Le Sommer (CNRS), Eric Blayo (INRIA), Bruno Ernande (IFREMER), Martin Huret (IFREMER).

Objectives: The goal of this postdoc is to develop tools for the evaluation and analysis of climate models. The idea is to go beyond the Eulerian point of view for model-data comparison and to aggregate the large amount of information provided by 3D climate simulations. This aggregation of climate data will be done in different ways, using object-oriented or integrated environmental indicators. From one side, the objects are local and monitor typical structures of the ecosystem, such as eddies, fronts, plumes or blooms. From the other side, environmental indicators reflect the general health and status of marine ecosystems and their services.

Methodology: Statistical and machine learning methods will be used to automatically detect objects and environmental indicators of interest in climate simulations. Those entities will be parameterized using simple mathematical shapes, and adequate metrics will be proposed to compare different climate simulations, based on different climate scenarios.

Training and skills required:

- PhD in applied mathematics (e.g., AI, machine learning, statistics) or climate sciences (including oceanography, meteorology, biology);
- Good knowledge of Python and libraries for data manipulation, statistics, and machine learning (pandas, ScikitLearn, and/or Pytorch);

- Ability to work within an interdisciplinary team and to communicate at the French and the international level.

Contacts: pierre.tandeo@imt-atlantique.fr and carlos.granero-belinchon@imt-atlantique.fr