Type d'offre : Laboratory offer

Post date : 04.02.25

Laboratoire de Mathématiques d'Orsay (LMO)

M2 internship offer l A topological analysis of the El Niño Southern Oscillation

Informations générales

Contract type : Stage

Contract length : 5 months max.

Contact :

Hannah Christensen / **Nina Otter**

Starting date : Tue 01/04/2025 - 12:00

Trade : Technicien

Topic : Analyse et traitement d'images

Laboratoire de Mathématiques d'Orsay (LMO) :

The **Laboratoire de Mathématiques d'Orsay** (LMO) brings together a wide range of research topics, from the most fundamental to the most applied mathematics. Researchers are divided into 5 research teams: Harmonic Analysis, Numerical Analysis and Partial Differential Equations, Arithmetic and Algebraic Geometry, Probability and Statistics, Topology, Geometry and Dynamics.

Address :

Rue Michel Magat - Bât. 307
91400 Orsay
France

Détail de l'offre (poste, mission, profil) :

Offer context

The El Niño Southern Oscillation (ENSO) is one of the most important and studied atmospheric variability phenomena, influencing global temperature variations. A better understanding of ENSO is essential to better model the climate response to ongoing anthropogenic emissions. In this project, we propose to use topological data analysis techniques to better understand existing ENSO models. The project will be supervised by Hannah Christensen, Associate Professor, Department of Physics, University of Oxford, and Nina Otter, Inria Starting Faculty, DataShape, Inria-Saclay.

Course objectives

- Use of PH-based methods to analyze bifurcation plots of ENSO models, both in the deterministic and stochastic framework ;
- Calculation and comparison of PH with respect to sub-level ensemble filtrations of ENSO time series from observational data and time series from ENSO models ;

- Participation and brief progress report at the annual DataShape seminar, May 2025, Porquerolles ;
- Writing of a research paper, to be submitted to a climate science research journal.

Skills required

- Proficiency in Python ;
- Proficiency in MATLAB preferred, but not required ;
- Strong knowledge of algebraic topology or climate modeling.

URL de l'offre :

https://www.dataia.eu/sites/default/files/Stage%20M2%20-%20ENSO_TDA_all_details.pdf

Lien vers l'offre sur le site dataia.eu :https://da-cor-dev.peppercube.org/node/1221