



Offre n°2023-07005

Post-Doctoral Research Visit F/M Ocean internal tide modelling in the SWOT era

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : PhD or equivalent

Fonction : Post-Doctoral Research Visit

Niveau d'expérience souhaité : Up to 3 years

A propos du centre ou de la direction fonctionnelle

The Inria Rennes - Bretagne Atlantique Centre is one of Inria's eight centres and has more than thirty research teams. The Inria Center is a major and recognized player in the field of digital sciences. It is at the heart of a rich R&D and innovation ecosystem: highly innovative PMEs, large industrial groups, competitiveness clusters, research and higher education players, laboratories of excellence, technological research institute, etc.

Contexte et atouts du poste

Odyssey (for Ocean DYNAMICs obSErvation analySis) is a recently created team involving researchers from Inria (Rennes, France), Ifremer (Brest) and IMT Atlantique (Brest).

The team expertise encompasses mathematical (stochastic) and numerical modelling of ocean flows, observational and physical oceanography, data assimilation and machine learning. Gathering this large panel of skills, the team aims at improving our understanding, reconstruction and forecasting of ocean dynamics, and more specifically to bridge model-driven and observation-driven paradigms to develop and learn novel representations of the coupled ocean-atmosphere dynamics ocean models. The postdoctoral researcher will work with Noé Lahaye (Inria, Rennes), but close collaborations with other members of the team, in particular with Aurélien Ponte (Ifremer), are expected. The postdoc will be based either at Inria (Rennes, France) or at Ifremer (Brest, France) -- as he/she pleases.

The postdoc position is funded by the French National Research Agency (ANR JCJC), as part of the **ModITO** project (Modelling the Internal Tide in the Ocean)

Funding for usual expenses (travelling, computer...) has been secured, including 1 international conference per year.

The call is open starting now and until the position is filled.

Mission confiée

The Odyssey team (Inria, Ifremer & IMT Atlantique, France) is seeking a postdoctoral researcher to work on ocean internal tide dynamics. The postdoc will work in the ModITO project (Modelling the Internal Tide in the Ocean), which aims at improving our understanding of ocean internal tides and its mapping from satellite altimeter data, in particular using wide-swath altimeter data from the SWOT mission. The main objective of the project is to develop and exploit a simplified dynamical model of internal tides dedicated to the assimilation of data from satellite altimeter and other sources of observations (e.g. surface drifters). The work is expected to have a great impact in the physical oceanography community: on the one hand, mapping the internal tide field -- and more precisely separating the internal waves from the balanced motions -- is of critical importance in the context of the SWOT mission. On the other hand, a better quantification of the internal tides and the related dynamical processes are key to better understand the ocean circulation and improve parametrizations of ocean models.

The ModITO project will consistently leverage a dynamical framework based on vertical mode decomposition of the primitive equations [e.g. Kelly et al 2016] for analysing outputs from state-of-the-art high-resolution realistic simulations, formulating theoretical expectations and developing a simplified model for the assimilation of internal tides, following recent efforts on the subject [Le Guillou et al 2022].

References:

- Kelly, S.M., Lermusiaux, P.F.J., Duda, T.F., Haley, P.J., 2016: "A Coupled-Mode Shallow-Water Model for Tidal Analysis: Internal Tide Reflection and Refraction by the Gulf Stream". *J. Phys. Oceanogr.* 46, 3661–3679. <https://doi.org/10.1175/JPO-D-16-0018.1>
- Le Guillou, F., Lahaye, N., Ubelmann, C., Metref, S., Cosme, E., Ponte, A., Le Sommer, J., Blayo, E., Vidard, A., 2021: "Joint Estimation of Balanced Motions and Internal Tides From Future Wide-Swath Altimetry". *JAMES* 13, e2021MS002613. <https://doi.org/10.1029/2021MS002613>

Principales activités

Depending of the skills and aspiration of the postdoc, his concrete implication into the project can range from theoretical developments on internal wave propagations in the ocean, to the analysis of state-of-the-art high-resolution realistic simulations, to the actual formulation and implementation of a data-assimilation model of the internal tide.

The recruited postdoc is expected to report the results through the publication of scientific articles in top-rank international journals and conferences.

Compétences

The precise workload assigned to the postdoc can be adjusted depending on his skills and affinities. Therefore, not all of the following skills are expected to be fulfilled.

Required skills (at least 2 of the following)

- Ocean dynamics, (geophysical) fluid dynamics, or physics
- Coding (python with a decent knowledge of scientific libraries)
- data assimilation

Optional skills

- Applied maths
- Internal wave dynamics
- Pangeo environment (xarray & dask), pytorch/jax
- data analysis (mostly applied to outputs from numerical simulations)
- Various numerical skills: versionning tools (git), code documentation (e.g. Sphinx, Doxygen)

Languages : English is required.

Avantages

- - Subsidized meals
 - Partial reimbursement of public transport costs
 - Possibility of teleworking (90 days per year) and flexible organization of working hours
 - partial payment of insurance costs

Rémunération

Monthly gross salary amounting to 2788 euros.

Informations générales

- **Thème/Domaine** : Optimization, machine learning and statistical methods
Scientific computing (BAP E)
- **Ville** : Rennes
- **Centre Inria** : [Centre Inria de l'Université de Rennes](#)
- **Date de prise de fonction souhaitée** :2024-02-01
- **Durée de contrat** :2 years
- **Date limite pour postuler** :2024-05-31

Contacts

- **Équipe Inria** : [ODYSSEY](#)
- **Recruteur** :
Lahaye Noe / noe.lahaye@inria.fr

A propos d'Inria

Inria est l'institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l'interface d'autres disciplines. L'institut fait appel à de nombreux talents dans plus d'une quarantaine de métiers différents. 900 personnels d'appui à la recherche et à l'innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

Autonomy and ability to interact with researchers from within and outside the team.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

Please submit online : your resume, cover letter and letters of recommendation eventually

For more information, please contact noe.lahaye@inria.fr

Sécurité défense :

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :

Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.