

# Application BASTRI

## Fiches Equipes

### ODYSSEY (SR0916ER)

Océan Dynamique Observations Analyse  
FLUMINANCE (SR0339TR) □ ODYSSEY

**Statut:** Décision signée

**Responsable :** Etienne Memin

**Mots-clés de "A - Thèmes de recherche en Sciences du numérique - 2023" :** A3.1. Données , A3.1.1. Modélisation, représentation , A3.2.3. Inférence , A3.4. Apprentissage et statistiques , A3.4.5. Méthodes bayésiennes , A3.4.6. Réseaux de neurones , A3.4.7. Méthodes à noyaux , A3.4.8. Apprentissage profond , A6.1.1. Modélisation continue (EDP, EDO) , A6.1.2. Modélisation stochastique , A6.1.4. Modélisation multiéchelle , A6.2. Calcul scientifique, analyse numérique et optimisation , A6.2.1. Analyse numérique des EDP et des EDO , A6.2.3. Méthodes probabilistes , A6.2.4. Méthodes statistiques , A6.3. Interaction entre calcul et données , A6.3.1. Problèmes inverses , A6.3.2. Assimilation de données , A6.3.3. Traitement de données , A6.3.4. Réduction de modèles , A6.3.5. Quantification des incertitudes , A6.4.1. Contrôle déterministe , A6.4.2. Contrôle stochastique , A6.5.2. Mécanique des fluides , A6.5.3. Transport , A6.5.4. Ondes , A9.3. Analyse de signaux (vision, parole, etc.)

**Mots-clés de "B - Autres sciences et domaines d'application - 2023" :** B3.2. Climat, météorologie , B3.3.2. Eau : mer et océan, lac et rivière , B3.3.3. Littoral , B3.3.4. Air, atmosphère

**Domaine :** Santé, biologie et planète numériques

**Thème :** Sciences de la planète, de l'environnement et de l'énergie

**Période :** 01/03/2022 -> 28/02/2026

**Dates d'évaluation :**

**Etablissement(s) de rattachement :** UBO, IMT ATLANTIQUE, IFREMER, CNRS, U. RENNES

**Laboratoire(s) partenaire(s) :** IRMAR, LAB-STICC, LOPS (254)

**CRI :** Centre Inria de l'Université de Rennes

**Localisation :** Centre Inria de l'Université de Rennes

**Code structure Inria :** 031134-0

**Numéro RNSR :** 202224252V

**N° de structure Inria:** SR0916ER

### Présentation

The name Odyssey is a short-cut that stands for "Ocean Dynamic Observation analysis", and aims to bridge model-driven and observation-driven paradigms to develop, learn and analyse novel stochastic representations of ocean dynamics. The keyword "Analysis" has to be understood in terms of physical understanding, mathematical analysis and data analysis. The team involves 5 institutions, namely Ifremer, Inria, Institut Mine Telecom (IMT), University of Brest (UBO) and University of Rennes I (UR1). It is located both in Brest and Rennes

Covering more than 70% of earth's surface, the oceans play key roles on the Earth climate regulation as well as for human societies. Yet, from wave breaking events to the movement of weather systems, the predictive capabilities of models notoriously quickly diminish with increasing lead times, even with the assistance of the world's largest supercomputers. Despite ever-increasing developments to simulate and observe the coupled ocean-atmosphere system, our ability to understand, reconstruct and forecast the ocean dynamics remains fairly limited for numerous applications.

Our motivations are to help break this apparent logjam, and more specifically to bridge model driven and observation-driven paradigms to develop and learn novel stochastic representations of the coupled ocean-atmosphere dynamics. Methodological developments will be primarily implemented and demonstrated through three main objectives: (i) the analysis of mesoscale/submesoscale processes and internal waves, (ii) the monitoring of extremes ocean-atmosphere events and routes to rapid intensifications; (iii) the derivation of forefront deep-learning stochastic data assimilation techniques.

### Contact

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### En savoir plus

- Site de l'équipe
- Site sur [inria.fr](http://inria.fr)
- Site du responsable
- Derniers Rapports d'Activité : 2022 , 2023

### Documents sur la structure

- Intranet
- Privés

### Décisions

- 15348 (18/02/2022) : création
- 16258 (03/07/2023) : modification

### Localisation

- **Adresse postale :** Centre Inria de l'Université de Rennes 263, avenue du Général Leclerc Campus universitaire de Beaulieu 35042 Rennes Cedex France
- **Coordonnées GPS :** 48.116, - 1.64

To address these challenges, we gather a unique transdisciplinary expertise in Numerical Methods, Applied Statistics, Data Science, Satellite and Physical Oceanography.

## Axes de recherche

The research objectives of our group distribute in several challenges, exploring multimodal observations, air-sea exchanges and upper ocean dynamics, bottom boundary turbulent processes, stochastic flow representations, data assimilation and machine learning procedures. All these challenges take place or rely on principles and/or tools of three methodological contexts

- **Multi-modal observations for air-sea exchanges and upper ocean dynamics**
- **Stochastic calculus / uncertainty quantification / ocean dynamics**
- **Data-driven and learning-based representations of geophysical dynamics**

Those contexts constitute the main set of methodological setups of our group. They distribute in several topical research challenges related to different issues on ocean dynamics involving observations, numerical models, learning or their coupling. We list them below.

## Topical challenges

- **Challenge C1: Observation and characterization of mesoscale and submesoscale processes**
- **Challenge C2: Observing and forecasting extremes / Cyclones / Waves**
- **Challenge C3: Multiscale Ensemble Data Assimilation and forecasting methods**
- **Challenge C4: Parameterization of subgrid scale processes in ocean models**

## Relations industrielles et internationales

Odyssey is a joint research team with IFREMER