

2-year postdoctoral position on physics-informed deep emulators for ocean simulation and forecasting, OceaniX, IMT Atlantique/Lab-STICC, Brest France

Positions: 24-month position in OceaniX group at IMT Atlantique/Lab-STICC, Brest

Supervisor: Ronan Fablet, Professor IMT Atlantique, OceaniX PI, ronan.fablet@imt-atlantique.fr, <https://cia-oceanix.github.io/>

Context and objectives: This postdoc position is opened in the framework of AI chair OceaniX (<https://cia-oceanix.github.io/>) dedicated to physics-informed AI for the monitoring and surveillance of the oceans. OceaniX chair gathers an interdisciplinary group with expertise in numerical modeling, applied math deep learning, remote sensing and ocean science to leverage AI technologies and paradigms to address key challenges in ocean modeling and forecasting, observing system design and control, surveillance and monitoring of maritime activities. OceaniX chair also benefits from the strong academy-industry partnerships (eg, Ifremer, CNES, CLS, NavalGroup, Eodyn, OceanDataLab, OceanNext...).

The successful candidate shall develop cutting-edge collaborative research activities for physics-informed emulators [Crammer et al., 2020; Nonnenmacher et al., 2021] for the simulation and forecasting of ocean dynamics with a strong interest in the ability to fully exploit multimodal observation datasets. Recent advances within our group on related topics [e.g., Fablet et al., 2021; Ouala et al., 2020; Roy et al., 2021, Frezat et al., 2021] could provide a relevant basis for novel broad-impact contributions. Specific case-studies on subgrid-scale parameterization, ocean-atmosphere extreme dynamics (e.g., hurricanes, marine heatwave) as well as smart multimodal observing systems will be of key interest.

Additional Information on our ongoing research may be found at <https://cia-oceanix.github.io/>.

Requirements: Applications from candidates with a Ph.D in applied math/machine learning/data science and a strong interest in ocean and climate science as well as with a PhD in ocean and climate science and a proven background in machine and deep learning are welcome. Candidates should have a strong interest and commitment to research. Creativity with an aim towards independent research is highly emphasized.

Application: Send CV, statement of research interests and the contacts of at least two references to ronan.fablet@imt-atlantique.fr. Review of applications will begin immediately and continue until the position is filled.

Specs: the position will initially funded for a 2-year period and could be renewed upon scientific outcome and funding availability. The net annual salary will range from 30,000€ to 36,000€ depending on experience.

References:

Crammer et al. (2020) The frontier of simulation-based inference. PNAS, 117 (48) 30055-30062; <https://doi.org/10.1073/pnas.1912789117>

Nonnenmacher, et al. (2021). Deep emulators for differentiation, forecasting, and parametrization in Earth science simulators. *JAMES*, 13, e2021MS002554. <https://doi.org/10.1029/2021MS002554>

Fablet et al. (2021). Learning Variational Data Assimilation Models and Solvers. *JAMES*. doi: 10.1029/2021MS002572

S. Ouala et al. (2020) "Learning latent dynamics for partially observed chaotic systems", *Chaos* 30, 103121, <https://doi.org/10.1063/5.0019309>.

Roy et al. (2021) GAN for the simulation of central-place foraging trajectories. bioRxiv 2021.09.27.461940, <https://doi.org/10.1101/2021.09.27.461940>

Frezat et al. (2021) A priori and a posteriori learning strategies for subgrid modelling: application to QG flows. In prep.