Position Description

1. General Information

Name of the position	Extracting Essential Ocean Variables for benthic habitats and fishes from existing, mature protocols
Foreseen date of enrolment	1 October 2024
Position is funded by	• COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon Europe, European Union • Institut Français pour l'Exploitation de la Mer (IFREMER) • University of Tasmania (UTAS)
Research Host	Institut Français pour l'Exploitation de la Mer (IFREMER)
PhD awarding institutions	Université de Bretagne Occidentale & University of Tasmania
Locations	Primary: Lorient, Bretagne France Secondary: Hobart, Tasmania, Australia
Supervisors	Dr Dominique Pelletier (IFREMER) Dr Jacquomo Monk and Ass. Professor Neville Barrett (UTAS)
Group of discipline	Quantitative ecology, marine ecology, fisheries science, community ecology, data science, applied statistics, analysis of large multivariate data sets, advanced programming level in R

2. Research topics (only one of these projects will be funded)

Project 1: *Regionally scalable analyses of benthic habitat- and fish-related Essential Ocean Variables*

In coastal areas, both fishes and habitats are subject to multiple anthropogenic pressures and to global change. Effective management decisions need to be underpinned by data-driven assessments. This PhD will investigate and model the distribution of both fish- and habitat-related Essential Ocean Variables (EOVs) in shallow coral reef and temperate ecosystems (Australia, France and New Caledonia). It will confront the modelled distributions with maps of stressors (e.g. expected changes in temperature), pressures from human uses (e.g. fishing) and management measures (e.g. marine park zoning). This model will rely on existing comprehensive underwater image-based datasets obtained from operational protocols (e.g. BRUV, STAVIRO, AUV) from Australia, France and New Caledonia.

The modelling framework enabling the joint analysis of these data will account for the specifics of each protocol and the complementarity of the observations (taxa, scales and replication) and resulting EOV metrics. Applications to data from temperate and coral reef ecosystems will provide regionally consistent assessment of these EOVs and support a generic contribution enabling integrating several imaging protocols for increasing knowledge on biodiversity distribution. Outcomes will be disseminated toward global data and EOV repositories.

Supervisors: Dr Dominique Pelletier (IFREMER), Dr Jacquomo Monk (UTAS), Associate Professor Neville Barrett (UTAS), Dr Ben Scoulding (CSIRO)

Research Fields: Marine Ecology, Fisheries Science, Marine Conservation, Anthropogenic Pressures, Applied Statistics, Spatial Modelling, Underwater Imagery, Ecological Monitoring

Project 2: *Assessing data fitness for benthic habitat- and fish-related Essential Ocean Variables*

There is global recognition that our oceans are currently facing a multitude of human-induced threats ranging from climate change to direct and indirect impacts of fishing, oil and gas, and transportation industries, increased pollution from land, and ecosystem-altering effects of species introductions. Adding to this are the effects of the emerging deep sea mining, and offshore mariculture and energy sectors. The Global Ocean Observing System has developed Essential Ocean Variables (EOVs) to be able to deliver standardised assessments of management effectiveness against threats across habitats and jurisdictions. This PhD will investigate the fitness of existing, established imagery data collection protocols in shallow coral reef and temperate ecosystems in Australia, France and New Caledonia to derive these existing fish- and habitat-related EOVs. The project will undertake spatial and temporal analyses to highlight limitations and consistency of current EOVs derived from underwater imagery. The project will also assess the sensitivity of imagery-derived EOVs to detecting the impacts of threats and management on marine fishes and habitats.

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Research Fields: Marine Ecology, Fisheries Science, Marine Conservation, Data Science, Spatial Modelling, Underwater Imagery, Ecological Monitoring

Project 3: *Developing suitable indicator metrics of change from underwater imagery datasets*

Government agencies on marine values often suffer from a lack of spatially comprehensive, long term quantitative datasets on which to base objective assessments. Likewise, most existing datasets are local to regional in scale, and there is little opportunity to aggregate these more widely to report at greater scales, much less at national scales. The Global Ocean Observing System (GOOS) has developed Essential Ocean Variables (EOVs) to standardise metrics reporting on Ocean Health. In parallel, there is an increasing recognition for the need in establishing national, integrated monitoring programs, able to report into adaptive management frameworks. Currently, very few programs monitoring biodiversity are sufficiently mature to enable engaging in this process, particularly ones based on quantitatively comparable standard operating protocols. Stuart-Smith et al. (2017; 10.1093/biosci/biw180) made significant progress for reporting on marine values by assessing a number of biodiversity indicators in the case of diver-based Underwater Visual Censuses in shallow waters (i.e. < 15 m water depth). However, the EOVs proposed under GOOS remain largely untested on imagery datasets, while image-based protocols are able to provide an unparalleled wealth of observation on marine biodiversity. This PhD will investigate a range of new imagery-based biodiversity metrics from extensive existing underwater marine imagery datasets collected in shallow coral reef and temperate ecosystems in Australia, France and New Caledonia. Based on these large datasets, the PhD will assess the robustness and generality of the metrics, and how they may be implemented to document the EOV required for national and international reporting on biodiversity. This work is expected to contribute to development of operational EOV that will be used for periodic monitoring of coastal marine biodiversity, in the view of national and international conservation policies.

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Research Fields: Marine Ecology, Fisheries Science, Marine Conservation, Data Science, Monitoring and assessment, Underwater Imagery, Ecological Indicators

3. Employment Benefits and Conditions

The French Institute for the Exploitation of the Sea (IFREMER) offers a 36-months full-time work contract (with the option to extend up to a maximum of 42 months). The total working hours per week is 38h. The PhD will be based at Ifremer, Lorient (South Brittany).

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary EUR 27,900. Of this amount, the estimated net salary to be received by the PhD candidate is EUR 1,770 per month. However, the definite amount to be received is subject to national tax legislation and depends on the applicant's professional experience.

Benefits include
- Becoming a Marie Skłodowska-Curie fellow and be invited to join the Marie Curie Alumni Association.
- Access to all the necessary facilities and laboratories at IFREMER and UTAS.
- Tuition fees exemption at both PhD awarding institutions.
- Yearly travel allowance to cover flights and accommodation for participating in AUFRANDE events.
- 10,000 EUR allowance to cover flights and living expenses for up to 12 months in Australia.
- Same leave conditions as other IFREMER employees, including a minimum of 2.5 paid leave days per month and additional bank holidays and other leave days.
- Full health insurance, including maternity and parental leave.
- Access to social activities and help services.
- Monthly lunch allowance at Ifremer.

4. PhD enrolment

Successful candidates for this position will be enrolled by the following institutions and must comply with their specific entry requirements, in addition to AUFRANDE's conditions.

Applicants must hold a diploma in a relevant discipline conferring the degree of master at the end of a training programme establishing the aptitude for research. The training program must include a research component equivalent to 25% of a two-year Masters Coursework degree with a thesis component grade of at least Distinction grade.

Applicants must demonstrate an English language proficiency equivalent to an overall IELTS score above 7 and no band below 6.5. Note that the test needs to be completed no more than two years before enrolment. For more information about the tests accepted and scores required, visit:
https://www.utas.edu.au/research/degrees/what-is-a-research-degree

More information on Université de Bretagne Occidentale's requirements

Visit the website: https://www-iuem.univ-brest.fr/training/edsml/?lang=en (from November 2023)

More information on University of Tasmania's requirements

Visit the website: https://www.utas.edu.au/policy/procedures