



## **2-year postdoc: coupling Ocean colour satellite remote sensing and Shellfish modelling**

We are seeking a postdoctoral researcher with experience in ocean colour remote sensing (OC RS) to join the European H2020 funded project TAPAS (Tools for Assessment and Planning of Aquaculture Sustainability). The TAPAS project (<http://tapas-h2020.eu/>), led by the University of Stirling (UoS), will create cost-efficient management tools and practices for the European aquaculture sector to investigate the limits to fish and shellfish farming activities in location, social interactions, potential environmental impacts and any future risks. With concerns around sustainability of food security continuing to rise, a team of European aquaculture experts have begun a four-year study worth almost €7 million to establish new strategies and models for sustainable growth in the industry. The TAPAS project will specifically address coastal and offshore aquaculture segments, operating from regional ecosystem scale to pan-European scale. Existing approaches to combine OC RS with shellfish and ecosystem modelling will be developed and implemented in the TAPAS toolbox for the environmental sustainability of aquaculture.

The main objectives of the postdoc will be to process a large database of OC RS data. Satellite data will be coupled with shellfish models with to analyse the potential of off-shore shellfish farming over a wide range of spatial scales, from a single mudflat ecosystem case study to the whole European western coastal ocean.

A large dataset of satellite SST, Chl and SPM data will be provided by project partners from the Plymouth Marine Laboratory (PML). The RS data include CCI products<sup>1</sup> from the merged SeaWiFS/MODIS/MERIS/VIIRS time series (1998–2015), the whole MERIS archive (2002 – 2012), as well as on-going Sentinel3-OLCI and Sentinel2-MSI data series. Existing Dynamic Energy Budget (DEB) models for oyster (Pouvreau et al., 2006) and mussel (Flye Sainte Marie et al., 2009) will be coupled with sea surface temperature (SST), chlorophyll-*a* (Chl) and suspended particulate matter (SPM) concentration to simulate shellfish's growth and reproduction (Thomas et al., 2011, 2016). Modelled spatial maps of shellfish growth potential will then be used to investigate the sustainability of offshore shellfish farming at both near field and far field levels.

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<sup>1</sup>[http://www.esa-oceancolour-cci.org/?q=webfm\\_send/531](http://www.esa-oceancolour-cci.org/?q=webfm_send/531)

At near field level (defined as farm level to water-body scale), the postdoc will work on a case study site located in southern Brittany along the French Atlantic coast (namely Bourgneuf Bay) for which in situ oyster growth data are available to validate the model outputs in both intertidal and offshore environments. Bio-optical field data are also available for this turbid case2 coastal site (Gernez et al., 2014, 2015), and the postdoc will also have to validate and improve the Chl and SPM inversion algorithms.

Results will then be up-scaled at far field level, corresponding here to pan-European scale from Portugal to UK and Norway. In addition to RS satellite data, simulation outputs from the European Regional Seas Ecosystem Model (ERSEM, Ciavatta et al., 2016) will be provided by PML, and the postdoctoral researcher will also couple ERSEM environmental data with the oyster- and mussel-DEB models to study shellfish physiological responses and growth potential at pan-European scale. Regional climatologies will be derived from long-term RS and ERSEM data (1998 – present), from which multi-indicator time-series trajectories will be analysed in the framework of aquaculture environmental sustainability. Knowledge from the past will be used to envision the future, and large-scale physical-biological model projections (0.1° scale) will be coupled with shellfish models to identify which segments may support new or enhanced aquaculture activities, or will be beyond their optimal window by 2050.

The candidate should have a solid background and a good publications record in at least one of the following fields: marine optics, ocean colour remote sensing, numerical ecology, shellfish ecophysiology, and coastal oceanography. Large datasets from RS and ERSEM will be coupled with shellfish models, and the candidate should show a keen interest and demonstrate efficiency in the processing, analysis and interpretation of large-scale environmental and biological time-series data. Experience in the processing and interpretation of satellite data is required. Working experience in inter-disciplinary teams is required.

The postdoc will work at the University of Nantes (France) under the direction of Dr. Pierre Gernez (<http://www.univ-nantes.fr/gernez-p>) and Prof. Laurent Barillé (<http://www.univ-nantes.fr/barille-l>) in collaborations with other participants of the TAPAS project including researcher from the UoS, DHI, and PML. Informal enquiries may be made to Pierre Gernez ([pierre.gernez@univ-nantes.fr](mailto:pierre.gernez@univ-nantes.fr)) and Laurent Barillé ([laurent.barille@univ-nantes.fr](mailto:laurent.barille@univ-nantes.fr)). The deadline for the receipt of applications is the 28 February 2017. The position will start in spring 2017. The basic salary (2250 Euros net per month) could be negotiated depending on the professional experience. The salary will include full health insurance and social benefits.

## **Complementary information**

*TAPAS press release:*

<http://www.marine.ie/Home/site-area/news-events/press-releases/%E2%82%AC7-million-project-support-sustainable-growth-aquaculture>

### *Bibliographical references*

- Ciavatta et al., 2016
- Filgueira et al. 2015
- Gernez et al., 2014, 2015
- Flye Sainte Marie et al., 2009
- McKindsey et al. 2006
- Pouvreau et al., 2006
- Thomas et al., 2011
- Thomas et al., 2016