

A PhD position in marine optical modelling

A PhD fellowship is available at the Modelling for Aquatic Systems research group ([MAST](#)) from the University of Liège (ULiège), Belgium for developing and implementing an optical module in an existing tri-dimensional coupled physical –biogeochemical model that is used for environmental forecasting in the Black Sea in the frame of the marine Copernicus program ([CMEMS](#)). The physical model is the Nucleus for European Modelling of the Ocean ([NEMO](#)) while the biogeochemical model is the Biogeochemical Model for Hypoxic and Benthic Influenced areas ([BAMHBI](#)).

Research activities

The candidate will have to:

- (1) develop the optical part by implementing a radiative transfer module (RTM) describing the in-water irradiance in different spectral bands coupled to the Inherent Optical Properties provided by the biogeochemical model (the absorption and scattering properties of optically active components);
- (2) fine-tune an existing data assimilation system (based on Kalman filtering) in order to assimilate radiometric quantities;
- (3) assess the impact on model predictions (physics and biogeochemistry) of using a better representation of the in-water irradiance field and of simulating radiometric properties.

The model will be tested in the Black Sea, the largest oxygen deficient environment, in which a large gradient in optical sea water properties prevails: deep sea can be considered as a Case 1 water type while the shelf is considered as Case 2 water type. In addition to gather Case 1 and Case 2 waters, the Black Sea is particularly challenging in terms of bio-optical model development because it is characterized by unique attenuation coefficients significantly different from the global ocean and other regional seas due its particular high content in Coloured Dissolved Organic Materials (CDOMs). Biogeochemical Argo floats are deployed in the Black Sea since 2011 offering biogeochemical and optical data for model testing. In addition, new satellite products (e.g. ocean colour) delivered by a recently starting ESA project on Earth Observations for Science and Innovation in the Black Sea ([EO4SIBS](#)) will be used.

In addition to the scientific project described here above, the successful candidate will have to:

- be involved in the supervision of master thesis (related to this PhD topic) in the frame of the master programs in ocean science organized by the Liège University including Erasmus mundus programs (details [here](#) and [here](#)). This would allow to help him/her in progressing in his/her PhD (~max. 2 master theses during the whole PhD).
- Travel to other research groups, to project and scientific meetings (e.g. AGU, EGU, IMBER).
- To follow the Doctoral Formation mandatory for obtaining a PhD at the Liège University. This involves to acquire thematic, transversal and scientific competences with for instance, to take courses in a domain linked to the PhD topic, to give presentations, to write publications, participate to summer schools, (see more details [here](#)).

Requirements for application

- Applicants for doctoral position must have completed a master degree (with minimum cum laude) in a field closely related to physics, engineering or equivalent.
- A capacity and interest to work in different fields of marine science including physics, biogeochemistry, ecological processes, data assimilation techniques.
- Talent for computational scientific work is necessary.
- Very good written and verbal English communication skills are required.
- Good communication skills for communicating results to different audience including general public in relation to dissemination activities to which the MAST group contributes.

Our offer

- A 3-year full time contract starting in January 2020 with eventually one additional year if fundings permit.
- An attractive salary of master level (indicative net salary: ~2000 euros subject to adjustment in relation to the diploma of the candidate).
- The successful candidate will benefit from a dynamic working environment benefiting from the research projects of the group in different fields of ocean physical and biogeochemical modelling connecting modelled predictions with observations and end-users requirements. He/she will be integrated in the Freshwater and Oceanic sScience Unit of research ([FOCUS](#)) from the ULiège Science Faculty that gathers 80 persons working in ocean and fresh water science. The group contributes to the organisation of the annual [international Liege colloquium on ocean dynamics](#).
- A stimulating international environment in relation to the research projects of the group (e.g. Marine Copernicus international program, ESA program).
- Enjoyable living and working conditions. The University of Liège offers a comprehensive and innovative training program, which enables early-career scientists to carry out their research in the best possible conditions, in compliance with the European Charter for Researchers.

How to Apply: The candidate should send by e-mail his/her curriculum vitae, full transcripts of Bachelor and Master studies (including notes), a covering letter of motivation, together with two references (name and email address), to [Marilaure Grégoire](mailto:Marilaure.Gregoire@ulg.ac.be) (email: mgregoire@ulg.ac.be) with copy to oceanphys@ulg.ac.be. Applications will be considered until the position is filled. Short-listed candidates will be invited for an oral (skype) interview. The positions will remain open until filled; but the selection will start from November 15th, 2019. Starting date is expected in January 2020.