

Postdoctoral Research Associate for Satellite Ocean Colour Algorithm Development in the Eastern Mediterranean



The Hellenic Centre for Marine Research

The Hellenic Centre for Marine Research (HCMR, www.hcmr.gr/en/) is a governmental research organisation operating under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry of Development and Investments. It is comprised of three institutes: the Institute of Marine Biology, Biotechnology and Aquaculture (IMBBC); the Institute of Marine Biological Resources and Inland Waters (IMBRIW); and the Institute of Oceanography (IO) who will be responsible for this postdoctoral research.

The Institute of Oceanography

The Institute of Oceanography (IO, <https://io.hcmr.gr>) was established in 1985, evolving from the former Institute of Oceanography and Fisheries Research (IOFR, 1975-1985). Today it is considered as one of the main providers of oceanographic research in the Eastern Mediterranean, and it is the most comprehensive research institute for the marine environment in Greece, acting in several cases as the official consultant to the Greek government on marine and maritime issues. In the last 30 years, it has played a leading role in the progress of oceanographic research of the Eastern Mediterranean, with high geomorphological and biochemical complexity. By designing and implementing numerous oceanographic research projects, even in the deepest part of the Mediterranean Sea (depth >5000m), providing fixed observational/monitoring networks and establishing enhanced modelling and forecasting services, the institute has been at the forefront of research and collaboration at both a European and national scale. In its research agenda, the IO was also present in the Western Mediterranean, as well as significantly involved in Black Sea research, and since 2010 it has expanded its research activities by conducting several cruises in the Red Sea, while it has occasionally participated as a research partner in the Atlantic and Pacific Oceans. At an international level, it is recognized as one of Europe's major marine research institutes in the region of the Eastern Mediterranean, an important tool to promote, expand, and enhance the European Research Area. It has undertaken a variety of EU projects with great success, both as a coordinator and/or major partner, thus building its reputation as a competent and reliable institution.

The Marine Optics and Satellite Oceanography Group

More than a decade ago the IO formed a multidisciplinary marine optics and satellite oceanography group of scientists focusing amongst other things on the study of ocean colour and its remote sensing applications, aiming to work towards a more accurate determination of chlorophyll- α , particulate organic carbon, and particulate matter concentrations from space for the Eastern Mediterranean. In relation to satellite ocean colour validation and system vicarious calibration (OC-SVC) the group has been working towards Fiducial Reference Measurements (FRM) over the last 4-5 years with results used both for the optical characterization of the Aegean and the wider Eastern Mediterranean as well as satellite ocean colour validation. The FRM and OC-SVC related initiatives have been in the form of: SI-traceable calibration and work on an uncertainty budget for HCMR radiometric measurements; application of FRM4SOC and IOCCG field measurement and processing protocols; coordination of the bid to make Crete the new Copernicus OC-SVC site; partnership in the deployment of the high quality radiometric profiling floats ProVal (LOV, 2019) and HyperNAV (NASA, 2022) around Crete in support of OC-SVC and high accuracy ocean colour validation; a number of dedicated marine optics research cruises including a recent joint HCMR-JRC cruise circumnavigating Crete (May 2022); and funding

from the Greek state, which includes this postdoctoral appointment, to create more extensive HCMR FRM facilities, including a complete optics calibration laboratory, further optics sensor calibration and characterization work with JRC and Tartu Observatory, and further AOP and IOP measurements in the Eastern Mediterranean in support of more accurate regional chlorophyll- α and primary productivity estimates.

Postdoc objectives and principal activities

Ocean colour is an essential climate variable (ECV) that has revolutionised biological oceanography. It is used as a central element in assessing the health and productivity of marine ecosystems and the role of oceans in the global carbon cycle. However, there are still substantial systematic and unresolved errors in the estimation of its key parameters, i.e. water leaving radiance and chlorophyll- a (Chl- a), making such an application of ocean colour particularly challenging in the oligotrophic waters of the E. Mediterranean. Thus, this postdoc will be part of a project working towards resolving this problem by studying the optical properties of seawater in the oligotrophic Cretan and NW Levantine Seas, improving their SI-traceability and uncertainty evaluation and thereby deriving an appropriately accurate regional Chl- a retrieval algorithm. This will improve the quality and spatio-temporal resolution of ocean data products for the E. Mediterranean as a whole. Such an achievement will strongly support national and international marine monitoring projects and substantially improve marine ecosystem monitoring programs, management applications and services for the region.

Principal activities:

- In situ marine optical data processing
- Satellite ocean colour data processing
- Radiative transfer modeling (forward and inverse)
- Satellite ocean colour products retrieval algorithm development (empirical and physically based)

Knowledge and Skills

Required skills:

- Radiative transfer, optics or physical modeling
- Processing of satellite and in situ data
- Python and Shell programming
- Presentation of research results at international conferences
- Preparation of scientific articles & peer reviewed international journal publication track record
- Fluent in English (Greek language skills are also beneficial)

Advantageous skills:

- SI traceability and uncertainty evaluation
- Satellite ocean colour retrieval algorithms
- Experience with marine optics (apparent and inherent), bio-optics and phytoplankton
- Radiometry calibration and characterisation
- Interdisciplinary and open mindset
- Strong networking skills and ability for teamwork
- Autonomy to suggest and implement solutions

Special conditions:

A PhD is required in oceanography, remote sensing, optics, physics or a related field.
The appointment is for 32 months. Salary is 24,000 Euros p.a. gross.

Application deadline: **15 August 2022**

Intended start date of employment: **01 October 2022**

To apply, or for any further questions, please send your cover letter and curriculum vitae to Dr. Andrew Clive Banks (andyb[at]hcmr.gr)