GEOMAR Helmholtz Centre for Ocean Research Kiel is a foundation under public law jointly financed by the Federal Republic of Germany (90%) and the State of Schleswig-Holstein (10%). It is one of the internationally leading institutions in the field of marine research.

Through our research and our commitment to the transfer of knowledge and technology, we contribute significantly to the preservation of the function and protection of the ocean for future generations.

The research unit Biological Oceanography of the research division Marine Biogeochemistry is offering a position as a

Doctoral researcher (m/f/d)
Computer and Marine Data Science in the project "AqQua - Generating an Aquatic Life Foundation Model"

starting at the earliest possible date. The employment is initially for three years.

The position offers the possibility to attain a doctoral degree in computer sciences as member of the graduate "Helmholtz School for Marine Data Science" (MarDATA). MarDATA aims to define and educate a new type of "marine data scientists" by introducing and embedding researchers from computer sciences and mathematics into ocean sciences, covering a broad range from supercomputing and modelling, (bio)informatics, robotics, to statistics and big data methodologies. Education of doctoral researchers in joint block courses, international summer schools and colloquia goes beyond a single discipline towards genuine scientific insight into and a more systematic treatment of marine data (https://www.mardata.de/).

Project Description

The essential role of aquatic life for human well-being and our climate in particular mandates precise global mapping and monitoring. While the surface of our blue planet is well-monitored via satellites, most of the water column - the so-called pelagic zone - is not. Only distributed pelagic imaging enables comprehensive, automated in-depth aquatic life observations (Kiko et al. 2023). These can target micro- to macroscopic organisms beyond resolution or depth limits of satellites, down to the sea floor. To date, millions of images of aquatic organisms and particles have been acquired around the globe in a distributed fashion, using a variety of in situ cameras and benchtop systems. Each image bears information about species diversity, ecosystem health, or carbon fluxes. For this, assignment of taxonomic species- or broader taxon group labels (classification) and extraction of functional properties (so called traits, e.g. 'bearing eggs', 'full gut', …; Orenstein et al. 2022) is required for each image. Actual acquisition rates require full automation and a consistent approach across imaging systems, which calls for a dedicated, large-scale modality-agnostic self-supervised learning (SSL) approach: a foundation model. Together with colleagues from GEOMAR, Kiel University and the Max Delbrück Centre Berlin, you will create such a foundation model for plankton image classification and trait extraction and will test whether inclusion of size-information, geospatial, environmental and other metadata improves performance.

This is a joint research project located at Marine Biogeochemistry department of GEOMAR (AG Prof. Dr. Kiko, Plankton Biogeochemistry and Dynamics), the Department of Computer Science at Kiel University (AG Prof. Dr. Kevin Köser, Marine Data Science), and the Max Delbrück Centre, Berlin (AG Prof. Dr. Kainmüller, Biomedical Image Analysis). You will be based at GEOMAR in Kiel and will be co-supervised at Kiel University, but you will also be able

to spend extended time periods at the Max Delbrück Centre, Berlin. You will work at the interface between Computer Science and Biological Oceanography, but with a focus on the Computer Science aspects.

Qualification

Required:

- Master's degree (or equivalent) in Computer Sciences or a related field by the beginning of the project, preferably with a focus on neural networks or machine learning and image recognition in general.
- be able to communicate fluently in spoken and written English
- have experience in software development, preferably in image processing applications, in Python or related programming languages

If the required degree is not completed at the time of application, the degree certificate must be handed in before the start date of the contract and the application must contain plausible evidence that the degree can be finished before that date.

Desired:

- knowledge in Marine Sciences, in particular Marine Biology
- ability to work in a collaborative, interdisciplinary team and the MarDATA school
- experience with neural networks
- experience in image processing
- ability and interest to delve into a new topic

At a workplace, directly on the Kiel Fjord with many leisure and recreational opportunities, we offer you:
- Good conditions for work-life balance: We offer, among other things, the possibility of mobile working and individual working time arrangements, vacation courses for the children of our employees, and good support in finding a place in a daycare center at the Kiel site
- Support services for professional and personal life situations
- An exciting work environment with the opportunity to provide important impetus for the development of sustainable solutions
- Exciting topics in an international environment
- Work in the field of marine and climate research, a forward-looking area with social significance
- 30 vacation days and additional time off at Christmas Eve and New Year's Eve
- Company pension plan and capital-forming benefits
- You will also have the option to participate in a research cruise (approx. 1 Month with one of the large German research vessels) to contribute to image acquisition efforts.

The position is available for a funding period of 36 months. The salary depends on qualification and could be up to the class 13 TVöD-Bund of the German tariff for public employees. This is a full-time position (39 hrs/week). The position cannot be split. Flexible working time models are generally possible. The fixed-term contract shall comply with Section 2 Paragraph 1 of The Act of Academic Fixed-Term Contract (German WissZeitVG).

GEOMAR Helmholtz Centre for Ocean Research Kiel seeks to increase the proportion of female scientists and explicitly encourages qualified female academics to apply. GEOMAR is an equal opportunity employer and encourages scientists with disabilities to apply. Qualified disabled applicants will receive preference in the application process.

Please send your application for this post **not later than October 2nd, 2024** under the following link:

Online application

As soon as the selection procedure has finished, all your application data will be removed according to data protection regulation.

For further information regarding the position and research unit please contact Prof. Dr. Rainer Kiko (rkiko@geomar.de).

However, we will answer all your questions if you send us an e-mail to bewerbung@geomar.de. In doing so, please refer to the keyword "MarData-AqQua".

For further information on GEOMAR Helmholtz Centre for Ocean Research Kiel or the Helmholtz Association, please visit www.geomar.de or www.helmholtz.de.

GEOMAR is committed to an objective and non-discriminatory personnel selection. Our job advertisements address all people. We expressly renounce the submission of application photos.

The TOTAL E-QUALITY award is presented to GEOMAR for efforts in terms of human resource management aimed at providing equal opportunity.