

The **MARUM** - Center for Marine Environmental Sciences - at the **UNIVERSITY OF BREMEN** is offering – pending approval of external funding - two

**PhD positions (f/m/d)**

**German federal salary scale 13 TV-L (75 %)**

in the field of physical oceanography, **starting at July 1, 2024**, limited for the **duration of 48 months**, until 30.06.2028 at the longest (according to § 2 WissZeitVG).

The position is funded under the DFG Collaborative Research Centre TRR 181 “Energy Transfers in Atmosphere and Ocean”, projects

- 1) W4: Gravity Wave Parameterisation for the Ocean
- 2) W5: Internal Wave Energy Dissipation and Wavenumber Spectra

**Description**

Energetic inconsistencies in present climate models feature errors of the same magnitude as the energy imbalance of Earth's climate system due to anthropogenic greenhouse gas emissions. This leads to biases that limit the models ability to predict climate relevant physical processes. The collaborative research centre TRR 181 “Energy Transfers in Atmosphere and Ocean” aims to address these shortcomings by deepening the physical understanding of energy transfers between the main dynamical regimes, i.e., geostrophic motions, gravity waves, and turbulence.

**Topic (1): Internal gravity wave spectral variability in the world ocean.** The importance of wave-induced mixing in the ocean requires a better knowledge of the spatial and temporal variability of the internal wave spectrum. Recently available observational data have reached a scale and distribution that allows global analysis of spectral properties in the interior and abyssal ocean, and new machine learning capabilities for global mapping can be explored. In this project, you will combine regional and global data sets with the results of simplified and complex version of an energetically consistent parameterization for the diapycnal diffusivity induced by breaking internal gravity waves.

**Topic (2): Energy transfer into the interior ocean by extreme events.** The fraction of energy input by wind transferred into the deep ocean is dominated by extreme events like storms, where direct in situ observations are difficult to carry out. Autonomous platforms like gliders are useful tools to observe the generation of internal gravity waves under harsh conditions, using adaptive sampling techniques and path planning without direct human interventions. In this project, you will be using glider-based and complementary observations from previous and new measurement campaigns to study the impact of storms on the energy input in form of internal waves in the interior ocean, and the associated mixing. You will use the data to develop and validate a parametric source model using machine learning techniques.

We are searching for researchers with a keen interest in observational physical oceanography and its application in theory and modelling. The positions will be located in

the Physical Oceanography group at the University of Bremen. We offer you the opportunity to work in cutting-edge marine research in an interdisciplinary international team in the vibrant city of Bremen in northern Germany, also within the TRR network. As a doctoral researcher, you will be part of the TRR Research Training Group ENERGY, spread across Germany's leading oceanographic research sites.

## Requirements

- Completed scientific university studies (Master's degree/university diploma) in physical oceanography, meteorology, physics, or closely related fields
- Demonstrated skills in scientific computer programming (e.g. Matlab or similar)
- Solid background in physical oceanography, esp. internal gravity waves
- Experience in working with deep-sea instrumentation and heterogeneous data sets are advantageous
- Excellent written and verbal communication skills
- Applicants should be proficient in English, and enjoy working in an international and interdisciplinary team

## General hints

MARUM ([www.marum.de](http://www.marum.de)) has developed into an internationally recognised centre for marine research with a focus on the geosciences, anchored at the University of Bremen.

Open to unconventional approaches in research and teaching, the University of Bremen has retained its character as a place of short distances for people and ideas since its founding in 1971. With a broad range of subjects, we combine exceptional performance and innovative potential. As an ambitious research university, we stand for research-based learning approaches and a pronounced interdisciplinary orientation. We actively pursue international scientific cooperation in a spirit of global partnership.

Today, around 23,000 people learn, teach, research and work on our international campus. In research and teaching, administration and operations, we are firmly committed to the goals of sustainability, climate justice and climate neutrality. Our Bremen spirit is expressed in the courage to dare new things, in supportive cooperation, in respect and appreciation for each other. With our study and research profile and as part of the European YUFE network, we assume social responsibility in the region, in Europe and in the world.

The university is family-friendly, diverse and sees itself as an international university. We therefore welcome all applicants regardless of gender, nationality, ethnic and social origin, religion/belief, disability, age, sexual orientation and identity.

As the University of Bremen intends to increase the proportion of female employees in science, women are particularly encouraged to apply.

Disabled applicants will be given priority if their professional and personal qualifications are essentially the same.

For more information on the positions, please contact Dr. Christian Mertens ([cmertens@uni-bremen.de](mailto:cmertens@uni-bremen.de)) for Topic (1), or Dr. Maren Walter ([maren.walter@uni-bremen.de](mailto:maren.walter@uni-bremen.de)) for Topic (2).

Applicants should submit following documents: CV, copies of diplomas, letter of motivation and names of at least two references with reference to **job advertisement number A172-24** by **13.05.2024** to

Barbara Kozák  
FB1, Physical Oceanography  
University of Bremen  
NW1, Room S 0430  
Otto-Hahn-Allee 1  
28359 Bremen  
Germany

or as a single PDF file by e-mail to [bewerbung-a17224@marum.de](mailto:bewerbung-a17224@marum.de).

We kindly ask you to send us only copies (no portfolios) of your application documents, as we cannot return them. They will be destroyed after the selection process has been completed.

Any application costs cannot be reimbursed.