The University of Oldenburg is seeking to fill the following position:

Research Assistant, Measuring and modelling turbulent inflow conditions and wakes of wind turbines operating at large altitudes

Paygrade
E13

Working Hours
100% (suitable for part-time)

Institution
ForWind - Center for Wind Energy Research, Institute of Physics

Location
Oldenburg (Old)

Application Deadline
01.05.2025

First day of work
as soon as possible

Limited
until 31.12.2028

Benefits at University of Oldenburg

- 30 days vacation
- Company pension scheme
- Flexible working hours
- Remote working
- Support with childcare
- Secure remuneration according to collective agreement
- Further education opportunities
- Health management
- Compatibility of career and family
- University Sports Centre

About us

Wind energy research at the Carl von Ossietzky Universität Oldenburg is internationally recognized through its integration into ForWind – Center for Wind Energy Research, a collaboration among the Universities of Oldenburg, Hannover, and Bremen, and by being part of the National Wind Energy Research Alliance.

In Oldenburg, 50 researchers from physics, meteorology, and engineering work together on fundamental and applied research questions in the state-of-the-art Research Laboratory for Turbulence and Wind Energy Systems. Our mission is to advance the understanding of wind as a complex flow system with a focus on its interaction with wind turbines, providing essential insights to meet the global demand for renewable energy. We employ a multidisciplinary approach that includes free-field measurements, HPC-based numerical simulations, and laboratory experiments.

Oldenburg is particularly renowned for its unique large wind tunnel with an active grid and leading expertise in developing laboratory-scale turbines. Combined with modern measurement methods, these facilities offer ideal conditions for addressing real-world wind energy challenges under controlled laboratory settings.

The position to be filled is part of the second phase of the Collaborative Research Center 1463, *"Integrated Design and Operation Methodology for Offshore Megastructures"*, funded by the German Research foundation (DFG). The goal of this collaborative project is to model the entire lifecycle of offshore wind turbines—construction, operation, and decommissioning—within a comprehensive digital twin framework.

Your tasks

As a Research Associate in our subproject of the CRC 1463 you will reproduce the wind conditions of the future offshore wind turbine megastructures in the laboratory and analyze the wake dynamics and turbine loads. These megastructures partly operate at altitudes above the turbulent boundary layer reaching into the higher quasi-laminar winds. Such laminar-turbulent inflow conditions are scarcely studied and challenge the assumptions underlying most wind and turbine models.

A key part of this position is to perform and analyze extensive experiments (two laboratory turbines in the large Oldenburg wind tunnel). Additionally, the flow modeling is enhanced in a stepwise manner. Initially, a flow model developed during the first funding phase is applied and compared with measurements. At present, this model accurately reproduces the small-scale structures of the fractal laminar-turbulent interface. In the next step, you will further refine the model to capture larger-scale features associated with laminar-turbulent flow patterns, such as those observed in turbine wakes.

The ultimate goal is to apply this enhanced model to generate numerical wind fields that will serve as inputs for the digital twin of a megastructure turbine, developed within CRC 1463.

Job description

This project builds upon a wind tunnel experiment fully set up and tested and an existing in-house modeling of wind fields for a digital twin turbine.

Your key responsibilities will be:

- Conduct wind tunnel experiments with laboratory turbines to measure turbulent wake flows and assess the loads of a downstream turbine.
- Utilize advanced experimental tools such as the active grids in the large Oldenburg wind tunnel to simulate realistic wind conditions and
- Perform high-resolution measurement methods, including Hot-Wire Anemometry, Laser Doppler Anemometry (LDA), and Particle Image Velocimetry (PIV).
- Extend existing in-house wind field models (based on stochastic differential equations such as Langevin or Fokker-Planck types).
- Integrate novel approaches, e.g., directed percolation, into numerical wind field generation.
- Collaborate within a research consortium to enhance digital twin capabilities for wind energy systems.
- Publish findings in peer-reviewed journals and present at conferences.
- Supervise Bachelor's and Master's theses.
- Engage in teaching activities and support grant proposal preparation.

Your profile

Your profile

Requirements for employment include:

- A qualifying university master’s degree in physics, engineering, meteorology, or a comparable field.
- Knowledge of fluid dynamics or nonlinear systems
- Experience in programming with Matlab or Python
- Proficiency in spoken and written English.
- Team spirit and strong analytical thinking skills.

Please state your expertise (if existing) with respect to:

- Turbulence and (flow) instabilities.
- Analyzing time series of (experimental) measurements.
- Developing or adapting models.
- Setting up a (laboratory) experiment and performing measurements.
- Presentation skills.

And describe in addition your specific knowledge (if existing) with respect to:

- Optical flow measurement methods, e.g. PIV.
- Methods to model stochastic processes and/or spatio-temporal dynamics.
- Develop or adapt models of turbulent fluid flows
- Dynamical systems theory
- German language skills.

In the evaluation procedure, we consider the breath of your existing expertise as well as outstanding specific skills or achievements. If you are not yet familiar with turbulence, please outline in your cover letter, how you plan to introduce yourself to the topic.

We offer

We offer globally unique laboratory infrastructure for wind energy research and a young, interdisciplinary working group of physicists, engineers, and meteorologists. By working with the wind tunnel, you will become part of a dynamic and supportive team of experimenters, while receiving close supervision from a senior researcher for data analysis.

You will be based in the **WindLab** - one of the university's most modern office and laboratory spaces - while also having the opportunity to work flexibly and remotely. The position provides an excellent opportunity for academic advancement (PhD), supported by specialized seminars, workshops, and meetings provided by:

- Collaborative Research Centre 1463 Offshore Megastructures
- ForWind and Fraunhofer IWES in Oldenburg,
- European academy of wind energy, e.g. PhD Seminar

Our group cares for a family-friendly working environment and the university offers a family service centre and children's daycare on campus.

Our standards

The University of Oldenburg is dedicated to increase the percentage of female employees in the field of science. Therefore, female candidates are strongly encouraged to apply. In accordance to § 21 Section 3 NHG, female candidates with equal qualifications will be preferentially considered. Applicants with disabilities will be given preference in case of equal qualification.

Further information

Further information is available about ForWind at www.forwind.de/en/, the research group https://uol.de/en/physics/research/tucs and the CRC 1436 https://www.sfb1463.uni-hannover.de/en/.

Contact

For questions regarding this job opportunity, please contact Prof. Kerstin Avila by email at kerstin.avila@uni-oldenburg.de.

Apply now

Please send your application via e-mail by 01.05.2025 to

application.tucs@uol.de

Please submit your application as **one PDF file** to University of Oldenburg, Faculty V, Institute of Physics, ForWind - Center for Wind Energy Research, Research Group Fundamentals of Turbulence and Complex Systems, Prof. Dr. Kerstin Avila, Küpkersweg 70, 26129 Oldenburg, Germany and include reference **# SFB-TuCS-PhD**.

The pdf file must include:

- A cover letter motivating your application.
- Four presentation slides about your master thesis or another research project of you (1. Motivation and Goal of the research project, 2. Methods used (by yourself), 3. Obtained results and their implications and 4. Your key expertise and motivation for the position)
- Curriculum vitae including your final mark of the Bachelor and Master studies
- Grade transcripts and BSc/MSc diploma
- Employment references, if available

A second PDF file containing your Master Thesis or relevant research papers (if available) is an optional attachment.

Information on the application procedure

- Information on the application portal (positions in *technology and administration* or *non-professorial academic staff*)
- Information on the appointment portal (professorships)

Data privacy

- Information for applicants on the collection and use of personal data in the application procedure