

At the research group Wind Energy Systems, ForWind – Center for Wind Energy Research, Institute of Physics of the Carl von Ossietzky – University of Oldenburg, there is a vacant PhD position starting at the next possible date

Research Assistant (Salary according to TV-L E13, 100%)

The research focus will be on

Aero-servo-elastic interaction of turbulent wind fields with a model wind turbine

To improve the economic viability of very large wind turbines with slender blades in the future, an improved understanding of the aero-servo-elastic interaction of the turbine with turbulent wind fields is necessary. Turbulent structures of various size and characteristics are causing different load variations on the blades and result in fatigue and extreme loads of the whole structure of the turbine.

In the WindLab of the University of Oldenburg a wind tunnel with dimensions of 3 x 3 x 30 m³ and an active grid was commissioned in 2017. This worldwide unique active grid can impress specific turbulent structures on the flow. Furthermore a highly instrumented model wind turbine with 1.8 m rotor diameter was put into operation. The now possible experiments in the wind tunnel can be used to gain a deeper understanding of the interaction of turbulent wind fields and wind turbines and to develop and test wind turbine control algorithms for load alleviation. By this numerical simulations and tests on real wind turbines are complemented.

Job Description

The main goal of the PhD project is the investigation of the aero-servo-elastic interaction of turbulent wind fields with wind turbines, based on wind tunnel experiments with the 1.8 m diameter model wind turbine. To this aim, a new set of aero-elastically scaled rotor blades has to be designed for the model turbine. Wind tunnel experiments will be performed together with the wind tunnel team of the University of Oldenburg. Project partners, will perform Particle Image Velocimetry (PIV) measurements and blade deformation measurements using digital image correlation (DIC) methods. Based on these data by optical measurements, the forces at the blades shall be estimated and compared with blade sensors (e.g. strain gauges).

Among others, the job will comprise:

- Structural redesign of a rotor blade towards a more realistic blade bending. The blades will be built by an external company.
- Preparation of wind tunnel experiments with various inflow conditions for modelling and analysis of aeroelastic effects and control performance.
- Further development and maintenance of the model wind turbine hardware and software.
- Evaluation of experimental results and comparison with analytical and numerical models.
- Support of the teaching and other general activities of the research group.

The research and experiments will be conducted in close cooperation with the “Turbulence, Wind Energy and Stochastic” group at University of Oldenburg and the photogrammetry group at Jade Hochschule Oldenburg. In addition, the continuation of the cooperation with the Fraunhofer IWES institute and the DLR is planned for.

Furthermore, the candidate will be given opportunities to actively improve personal, scientific

and teaching skills.

Candidate Profile

Prerequisites are

- a qualifying university degree (diploma or master) in engineering or natural science preferred in mechanical engineering, aerospace technology or wind energy.
- profound knowledge of at least two of the following three fields: fluid dynamics, structural dynamics and control engineering
- basic knowledge in wind turbine dynamic are desired
- Experience with experimental techniques, Matlab/Simulink and LabVIEW programming tools, real-time control systems, and standard laboratory tools is considered a plus
- Further requirements are the aptitude and willingness for pursuing a PhD with emphasis on experimental research, as well as fluently spoken and written English. Good German language skills are desired as well.

The employment is limited until the end of project on 31st May 2021 with an intention for further prolongation up to a total of four years to facilitate a PhD.

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. Handicapped applicants will be given preference in case of equal qualification. Full-time positions can be also turned into part-time ones.

Contact

Please send your preferably electronic application referenced **#46 EAW** and appending all the usual documents

- motivation letter
- curriculum vitae
- graduation results
- job references
- proof of knowledge in the fields of fluid dynamics, structural dynamics or control engineering

in one single pdf file as well as further pdf files

- of the final thesis (if available) and
- relevant research papers (if available)

to the Carl von Ossietzky University of Oldenburg, Institute of Physics, Research Group Wind Energy Systems, Prof. Dr. M. Kühn, Kùpkersweg 70, 26129 Oldenburg, Phone +49 441 798 5061, Email wesys.bewerbungen@forwind.de, www.forwind.de until **2 May,2018**.

Applications may be formulated in German or English language.