

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 as soon as possible

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

The research focus will be on

**Experimental Approach to Modelling and Control of Wind Farms**

Recently, the topic of wind farm control received a strong attention from both the scientific community and industry. In wind farm control, typically concepts of distributed control are employed to achieve control objectives with respect to mechanical and electrical loads, energy yield and grid code requirements on the individual turbine as well as system level. The complex aerodynamic interaction within a wind farm by wakes is not adequately taken into account in current industrial controllers.

Novel wind farm controllers capable of influencing and utilizing wake interaction could lead to improved operation, such as maximization of energy yield, reduction of turbine loads, or better tracking of a power reference set by a transmission system operator. However, to design such a controller, further improvements in modelling as well as in measurement and estimation concepts are needed. In order to tackle this shortcoming, ForWind – Oldenburg is utilizing its state of the art research infrastructures such as the new large turbulent wind tunnel, lidar windscanners and a dedicated high performance computing cluster. Novel and far reaching research activities are offered by a close link of lab and full-scale experiments with high fidelity simulations and the interdisciplinary cooperation of physicists, engineers and meteorologists.

**Job Description**

The main goals of the PhD project are to develop suitable experimental procedures for designing and validating data driven approaches in model identification and wind farm control. An experimental setup consisting of fully controllable scaled wind turbine models in a wind tunnel will be developed, with aim of enabling all relevant control/actuator capabilities of full scale wind farms in a wind tunnel. Starting from a standard wind farm control approach, methodologies for system identification will be developed, that can be performed without obstructing wind farm operation. Different levels of model and control complexity will be analysed in order to find the best solutions in respect to wind farm performance and required hardware for implementation of the developed control algorithms.

Among others, the job will comprise:

- Extension of the existing experimental setup
- Development and implementation of wind turbine control algorithms
- Designing and performing wind tunnel experiments
- Development of wind turbine and wind farm mathematical models
- Development of wind farm control algorithms
- Comparison of numerical and experimental results
- Support of the teaching and other general activities of the research group

Furthermore, the candidate will be given opportunities to actively improve personal, scientific and teaching skills.

## **Candidate Profile**

Prerequisite is a qualifying university degree (diploma or master) in engineering, physics or an equivalent course of studies with extensive knowledge in control engineering. Basic expertise in wind turbine dynamics, fluid and structural dynamics is desired. Hands-on experience with Matlab/Simulink and LabVIEW programming tools, real-time control systems, electrical and mechanical 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.

In the beginning, the employment is limited to three years. Afterwards, an extension to a total of 4 years with the opportunity of pursuing a PhD is aimed at.

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 #FW41 and appending all the usual documents (motivation letter, curriculum vitae, graduation results, job references) in one single pdf file as well as another pdf of the final thesis of your studies or 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, Kükersweg 70, 26129 Oldenburg, Germany, Phone +49 441 798 5061, Email [wesys.bewerbungen@forwind.de](mailto:wesys.bewerbungen@forwind.de), [www.forwind.de](http://www.forwind.de) until October 10<sup>th</sup>, 2017.