

The federal state Lower Saxony supports the PhD Programme “System Integration of Renewable Energies” at the University of Oldenburg in cooperation with Jade University of Applied Sciences Wilhelmshaven, Oldenburg, Elsfleth. 15 Georg-Christoph-Lichtenberg PhD scholarships are granted in Chemistry, Informatics, Physics and Economics. The monthly allowance is 1500 EUR plus family allowance. The following three PhD scholarships are offered at the earliest date possible

**(1) SEE\_07\_MJ**

**Topic: Characterization and Prediction of the Variability of Mesoscale Wind Fields**

The share of fluctuating wind energy in the power supply system increases with future deployment of wind energy. The PhD position is located at the Center for Wind Energy Research (ForWind) and investigates atmospheric processes and conditions that lead to strong wind fluctuations in the range of one minute to one hour and to sharp wind power fluctuations of entire wind farms. Wind observations, LiDAR field measurements and eventually further observing techniques shall be analyzed and compared to available Large-Eddy Simulation (LES) of the model PALM. Besides the meteorological interpretation stochastic models shall be developed to describe heterogeneous wind fields.

Mesoscale ensemble wind forecasts of the COSMO-DE-EPS model of the German Weather Service are used in another SEE PhD project and offer the possibility to analyze the predictability of wind fluctuations. Advances in the spatio-temporal structure of mesoscale wind fields will be used in other SEE PhD projects (e.g. SEE\_09) in order to investigate the dynamics and power control of wind turbines and wind parks.

Application and contact:

Dr. Lueder von Bremen Email: [lueder.von.bremen@uni-oldenburg.de](mailto:lueder.von.bremen@uni-oldenburg.de)

ForWind – Center for Wind Energy Research

Carl von Ossietzky University of Oldenburg, Institute for Physics, Energy Meteorology Group

D-26111 Oldenburg, Germany

**(2) SEE\_11\_MJ**

**Topic: Optimization of Short-Term Solar Power Forecasts by Combination of Various Data using Statistical Learning Algorithms**

Short-term forecasts of solar power are very important for the efficient grid integration of solar power. Solar power forecasts can be based on different data sources and different methods. Numerical weather prediction models are the best choice for forecast horizons beyond 6 hours while for shorter forecast horizons cloud motion vectors based on satellite images and “online” measurements from solar systems yield valuable additional information. The forecast uncertainty of individual models can be reduced by statistical methods using measurement data. In particular, the combination of models exhibit a great potential to increase the skill of solar power forecasts.

In this PhD project current statistical learning algorithms like support-vector-methods shall be applied, developed and improved in order to combine various data sources and to optimize the solar power forecast of PV systems. The PhD position is located at the Energy Meteorology group of the Institute for Physics. The work is carried out in close cooperation with the group of Computational Intelligence at the Department of Computing Science that is also involved in the PhD Programme with several PhD positions. The joint excellence of both groups shall lead to the development of a system that is tailored to the needs of solar power forecasts.

Application and contact:

Dr. Elke Lorenz Email: [elke.lorenz@uni-oldenburg.de](mailto:elke.lorenz@uni-oldenburg.de)

Carl von Ossietzky University of Oldenburg, Institute for Physics, Energy Meteorology Group

D-26111 Oldenburg, Germany

### (3) SEE\_09\_MJ

#### **Topic: Optimized Load and Energy Yield Control of Wind Turbines with respect to real Flow Conditions in Wind Farms**

Future deployment of wind energy requires large-scale wind farms. In particular, the economics of offshore wind farming and its reliability to deliver power must be improved. The PhD project aims at modeling the interaction of the turbulent atmospheric flow in the boundary layer with the aero- and structural dynamical behavior of wind turbines. New control concepts for both wind turbines and wind farms shall be developed and tested to reduce wake-induced loads and energy losses. The turbulent inflow, wakes and the interaction between atmospheric flow and structures of wind turbines will be investigated using engineering models and flow measurements (e.g. LiDAR) combined with load measurements.

Within the PhD Programme a strong cooperation with other PhD projects at ForWind related to the non-linear dynamics of wind turbines and Energy Meteorology (e.g. SEE\_07) is envisaged to develop the interdisciplinary understanding of the dynamics and the control of wind farms.

#### Application and contact

Prof. Dr. Martin Kühn    Email: martin.kuehn@uni-oldenburg.de

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D-26111 Oldenburg, Germany

#### **Candidate Profile**

A university degree in natural sciences or engineering like physics, meteorology, mechanical or electrical engineering or a related topic is required. Profound experience in programming languages, statistics and data analysis is essential. Good knowledge in atmospheric or engineering physics, in wind or solar energy, in the usage of measurement data and in the handling of large data volumes would be an advantage. We expect very good spoken and written command of English, very good communication skills and the ability to work in a team of young scientists, but also to work independently self-organized with a high level of direct responsibility. Furthermore, we expect the strong willingness to learn the German language.

The PhD Programme offers the opportunity to work in an excellent and multidisciplinary environment with economists, computer scientists, engineers and natural scientists. Hence, we are looking for highly motivated talents that enjoy the cooperation with different disciplines and are highly interested in Renewable Energies.

The Carl von Ossietzky University of Oldenburg strives to increase the proportion of women in science, so we especially encourage female candidates 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. Candidates must not be older than 28 years at the time of appointment. Child-raising can be accounted up to two years.

Please send your complete application including a covering letter (inclusive your motivation and expertise), CV, list of references and publications, copies of relevant certificates and degrees to the contact person given above until **April 14, 2013**. It is very important to quote the relevant reference number **SEE\_07\_MJ, SEE\_09\_MJ, or SEE\_11\_MJ** as subject of your email or application letter. We encourage you to add the abstract of your last thesis and your publications.

Further information can be found at [www.forwind.de](http://www.forwind.de), [www.energiemeteorologie.de](http://www.energiemeteorologie.de) and [www.we-sys.uni-oldenburg.de](http://www.we-sys.uni-oldenburg.de). Details on the PhD Programme are given at [www.see.uni-oldenburg.de](http://www.see.uni-oldenburg.de).