



## PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

### Open PhD position at FUB for CSC scholarship candidates 2018

*Please note: the PhD position is only offered to Chinese PhD candidates for application in the framework of the FUB-CSC PhD Program.*

<b><u>Department/Institute:</u></b>	Department of Veterinary Medicine / Institute of Animal Hygiene and Environmental Health (FUB) and Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) / Department of Engineering for Livestock Management
<b><u>Subject area:</u></b>	Livestock - Environment
<b><u>Name of Supervisor:</u></b>	Prof. Dr. Thomas Amon
<b><u>Number of open PhD positions:</u></b>	1
<b><u>Type of the PhD Study:</u></b>	Full-time
<b><u>Project title:</u></b>	Wind tunnel study of air exchange rates for naturally ventilated animal housings

#### **PhD Project description:**

The air exchange rate (AER) of naturally ventilated barns (NVB) is a crucial characteristic for the evaluation of animal welfare and environmental impact. Its accurate determination represents an unsolved problem. Commonly used methods to quantify AERs in NVBs are (i) indirect measurements via tracer gas methods and (ii) computational fluid dynamics. The quality of both methods strongly depends on a sound validation. Up to now, a golden standard method or a dataset for benchmarking and validating applied methods or models does not exist.

The project focuses on generating such datasets and providing them to the international scientific community in the form of an open source database. This can be used to validate and benchmark models and methods for simulating or measuring AERs in NVBs.

To generate the datasets, extensive wind tunnel measurements in our large atmospheric boundary layer wind tunnel (ABL-WT) will be carried out. Working steps that need to be done are as follows:

A barn scale model (representative for cattle, poultry or pig husbandry) will be investigated by the PhD candidate in the ABL-WT under different inflow angles. Velocities at all openings of the barn and at several sampling lines inside and around the barn will be measured in highest possible resolution. Based on these measurements, an overall AER and the spatial distribution of flow patterns for each inflow angle will be derived and put into the database. In parallel, the PhD candidate should run simulations on our computer cluster and compare the simulation results to the wind tunnel results.

The results of this project are expected to close a gap of knowledge in modeling and measuring AERs by providing desperately needed data for validation.

#### **Language requirements:**

IELTS 6.5 or TOEFL 95 ibt.

#### **Academic requirements:**

The project is a true interdisciplinary endeavor, as it requires studies in several different areas like physics of flows, animal and environmental health, agricultural applications and computer science. Thus, requirements are a strong interest in fluid dynamics, both measuring in the wind tunnel and modeling on the computer and animal and agricultural sciences. The candidate should have curiosity beyond the tip of the nose, flexibility and capability to work in different lab environments, willingness to work with or around farm animals and methods of numerical simulations.

Successful candidates have an MSc in Engineering (Mechanical, Electrical, Aerospace, Mechatronics or similar), Physics, Meteorology or something similar related to measurements and analysis of flow phenomena. Experience in the wind tunnel is of advantage.

**Information of the professor or research group leader:**

We offer involvement in an interdisciplinary team in an attractive working environment, application-oriented basic research and development with high practical relevance and very good conditions for your professional development.

The Dahlem Research School (DRS) from the FU-Berlin offers several education programs like the Biomedical sciences qualification program to assure and improve the quality of graduate education and support the academic career of the candidate.

[http://www.fu-](http://www.fu-berlin.de/en/sites/promovieren/drs/drs_programs/natural_and_life/biomedical_sciences/index.html)

[berlin.de/en/sites/promovieren/drs/drs\\_programs/natural\\_and\\_life/biomedical\\_sciences/index.html](http://www.fu-berlin.de/en/sites/promovieren/drs/drs_programs/natural_and_life/biomedical_sciences/index.html)

<http://www.vetmed.fu-berlin.de/en/einrichtungen/institute/we10/index.html>

<https://www.atb-potsdam.de/en/institute/departments/engineering-for-livestock-management.html>

<https://www.atb-potsdam.de/en/research-programs/precision-farming-and-precision-livestock-production/anwendungsfelder/livestock-farming/stallklima-emission.html>

<https://www.atb-potsdam.de/en/institute/about-us/team/portrait/portrait/thomas-amon.html>

**Please note:** In a first step, the complete application must be submitted to the Beijing Office for evaluation by January 4<sup>th</sup>, 2018. Please do not contact the professor before. He/She will get in contact with you after having received the complete application via the Beijing Office in January.