

PhD studentship network

WindNet: Integrated Impact Assessment of Urban Wind Turbines

In recognition of the environmental, humanitarian and economic risks posed by climate change; decisive steps are now being taken to stabilise and reduce the anthropogenic greenhouse gas emissions. These steps have included a substantial re-envisioning of how the electricity we use should be generated and supplied. Onshore wind turbines present one of the most technologically mature and economically viable renewables. Whilst the focus to date has principally been on development of this technology in more rural contexts, there is an increasing focus on development within urban settings. The PhD studentship WindNet examines this particular aspect of the technology.

A cross-cutting PhD studentship network consists of 3 PhD students, each supervised by academics from different faculties of the University. WindNet brings together expertise from 6 departments across 4 faculties, in order to provide an integrated, interdisciplinary perspective on several of the key socio-technical barriers to urban wind turbine development, i.e., aspects of cumulative landscape and visual impact (*Project 1*); noise-impact modelling and the impacts of noise on well-being (*Project 2*); and a significant improvement in the understanding of turbine type selection and siting practices on the energy yield of a turbine within urban settings (*Project 3*).

The aims and objectives of the three projects are given below, together with a brief description of the ideal student to take this forward. For further details of the individual projects, and on the PhD student network itself, please contact the named academics.

Project 1: Advances in the assessment of the cumulative landscape and visual impacts associated with wind-turbine development

Principal supervisor: Dr. Christopher R. Jones <c.r.jones@shef.ac.uk>
(Department of Psychology)

Co-supervisor: Professor Eckart Lange <e.lange@shef.ac.uk> (Department of Landscape)

Aims and Objectives of PhD research: Cumulative Effects Assessment has long been a requisite component of Environmental Impact Assessment for wind-power development. The principal aim of *Project 1* is to deepen understanding of *Cumulative Landscape and Visual Impact* (CLVI) in order to make assessment of this issue more objective and quantifiable. To achieve this aim, the student will use the latest computer-visualisation software in order to model and investigate:

1. How people respond to the various types and levels of CLVI that can occur as a result of wind-power development in both urban and more rural settings; and
2. what factors might be important in predicting subjective reactions to CLVI in such settings.

Ideal student: The student will be based the Department of Psychology and co-supervised by the Department of Landscape. The ideal student for Project 1 will have a degree in psychology, landscape architecture or a cognate subject, and have interests in issues of energy & environment and attitude assessment. While not essential, it will be desirable for the student to have good IT skills and, ideally, experience using visualisation software packages.

Project 2: Use of noise mapping to understand the well-being impact of urban wind turbines

Principal supervisor: Professor Jian Kang <j.kang@sheffield.ac.uk> (School of Architecture)

Co-supervisor: Professor Aki Tsuchiya <a.tsuchiya@sheffield.ac.uk> (School of Health and Related Research: SchARR)

Aims and Objectives of PhD research: The main aim of the PhD project is to use noise mapping to understand the well-being impact of urban wind turbines. The PhD project will address this through the following objectives.

1. To adapt existing methods of noise mapping to incorporate the impact of noise on human well-being;
2. To identify the impact of noise generated by urban wind turbines on human well-being; and
3. To understand the association of contextual factors with the noise interact in this process.

Ideal student: The student will be based at the School of Architecture and co-supervised by SchARR. The ideal student for Project 2 would have a background in a quantitative subject such as engineering or operational research, with an interest in energy and environmental issues. The student must be open to the idea of collecting primary data through face to face interviews of human subjects. A dual degree in engineering and architecture would be ideal.

Project 3: Location, design and the energy generation potential of urban wind turbines

Principal supervisor: Dr. Robert J Howell <r.howell@sheffield.ac.uk> (Department of Mechanical Engineering)

Co-supervisor: Dr. Aidan While <a.h.while@sheffield.ac.uk> (School of Town and Regional Planning)

Aims and Objectives of PhD research: This part of WindNet would seek to enhance knowledge and understanding of the energy generation impacts of urban wind turbine design and location. One of the distinctive contributions of the project will be to undertaken in-situ experimental modelling involving decision-makers (and notably urban planners). Within the overall aim the objectives would be:

1. To research the effect of wind turbine and farm location on energy yield within a variety environments.
2. To model (a fluid mechanics package) those selected environments to determine the optimal locations for a wind turbine, or wind turbine farm.
3. To investigate how decisions are made about urban wind turbines and determine how planning processes can be modified to improve the effectiveness of planning for wind turbines by incorporating information gained in points 1 and 2.

Ideal student: The student will be based in the Department of Mechanical Engineering and co-supervised by the Department of Town and Regional Planning. The ideal student for Project 3 would have a background in engineering given the technical requirements of the PhD, but with an interest in energy policy and environmental issues. The student must be open to the idea of collecting primary data through face to face interviews of human subjects.

Award details

Each scholarship will cover the cost of UK/EU tuition fees and provides an annual, tax-free maintenance stipend at the standard Research Council rate (£13,590 in 2011-12). The recipient will also receive a Research Training Support Grant of £1000 per year. International applicants will need to pay the difference between the UK/EU and Overseas tuition fees.

Eligibility

- Academic requirements – applicants should have, or expect to achieve, a first or upper second class UK honours degree or equivalent qualifications gained outside the UK in an appropriate area of study.
- Allowed study options – applicants should be registering on their first year of study with the University for 2012-13.
- Residency restrictions – awards are open to UK, EU and international applicants.

How to apply

- Applicants are advised to contact the relevant lead supervisor named above to discuss their application in the first instance.
- Complete an application for admission as a postgraduate student - <http://www.sheffield.ac.uk/postgraduate/research/apply>
- On the application form please state you are applying for this project and briefly outline your reasons for doing so.

Applicants may be asked to attend an interview.