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University  
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Engineering.

## **Sheffield Engineering – Siemens Wind Power Scholarships**

### **PhD full-fees scholarship for China Scholarships Council scholars from Zhejiang University**

**Project:** *Condition monitoring of wind power permanent magnet generator system*

For offshore wind power generation systems, direct-drive permanent magnet generators is preferred to employ due to their high power density and high efficiency. However, the repairing cost of a faulty offshore wind power generator is excessive (>£1million for a 5 MW generator). It is essential that effective fault detection and fault mitigation techniques are developed, e.g. to detect the temperature rises in the rotor magnets and stator windings, winding open-circuit and short-circuit faults, including partially shorted-circuited turns etc, using existing or additional sensors.

This will be complemented by condition monitoring via model based state observers to detect position/speed sensor faults and to monitor the operational conditions of machines (such as the winding flux-linkage and the winding temperature, etc). Statistical-based anomaly detection algorithms, fault pattern recognition techniques and advanced probabilistic models for diagnosing structure, performance and vibration related faults and degradation, will also be developed for real-time monitoring environments. All possible failure modes will be identified, and their impact on the machine and converter operation, as well as on the power network, will be fully analyzed.

**Supervisors:** Professor Z.Q. Zhu (Electronic and Electrical Engineering) and Dr C. M. Bingham (Electronic and Electrical Engineering)

**Scholarship:** Sheffield Engineering scholarships cover the full cost of PhD registration fees for 3 years

**Eligibility:** Sheffield Engineering scholarships are available to students who secure a CSC scholarship. Applicants must meet the University of Sheffield English Language requirements, full details of which are available at:

<http://www.shef.ac.uk/postgraduate/info/englang.html>

**Applications:** Please send a CV together with a brief covering letter to Dr Catherine Biggs, Faculty of Engineering Head of Research Studies at [c.biggs@sheffield.ac.uk](mailto:c.biggs@sheffield.ac.uk) by **17<sup>th</sup> Feb 2010**. Include the title of the project in your covering letter and any English language test results.