People

Prof. P.J. Tavner

Peter received a degree in Mechanical Sciences from Cambridge University in 1969 and Ph.D degree from Southampton University in 1978. He has held a number of senior research and technical positions in industry including Technical Director of Laurence, Scott & Electromotors Ltd, Engineering Director of Lintott plc and Brush Electrical Machines Ltd. Most recently he was Group Technical Director of FKI Energy Technology, an international business which manufactures wind turbines, electrical machines, electrical drives, dynamometers, transformers and switchgear in the UK, Holland, Italy, Germany and the Czech Republic. He is currently Head of the School of Engineering in Durham University. He is also a member of the Council of the Institution of Engineering Technology, a Director of the New & Renewable Energy Centre, Blyth, Northumberland and winner of the Institution Premium of the IET.

Dr Wenxian Yang

Wenxian received his Doctorate degree in mechanical engineering from Xi'an Jiaotong University in 1999. He completed his postdoctoral research in Northwestern Polytechnical University in 2001. Then, he worked in the City University of Hong Kong, Nottingham Trent University and Cranfield University. He joined Durham University in 2007. He has particular experience in machine condition monitoring and fault diagnosis, vibration analysis, NDT & NDE, digital signal processing and artificial intelligence.

Dr Li Ran

Li received Ph.D degree from Chongqing University in 1989. After working as a lecturer at Chongqing, he joined Aberdeen University as a research fellow. At Aberdeen (1993-1996), he was involved in research on Marine Electrical Propulsion and Offshore Electrical Systems. He then worked at the universities of Nottingham and Heriot-Watt as a research associate (1996-1999). He joined Durham University in 2003 and is currently a lecturer in the School of Engineering. Li is interested in the generation, transmission and distribution of Electrical Energy. He also likes to investigate some specialist problems in the design and operation of drives and other systems of Electrical Energy Utilization.

Mr Chris Crabtree

Chis received his first MEng degree from Durham University in New & Renewable Energy. He is currently a PhD student working on the Supergen project at Durham concentrating on the control, performance and modelling of the Condition Monitoring Test Rig.

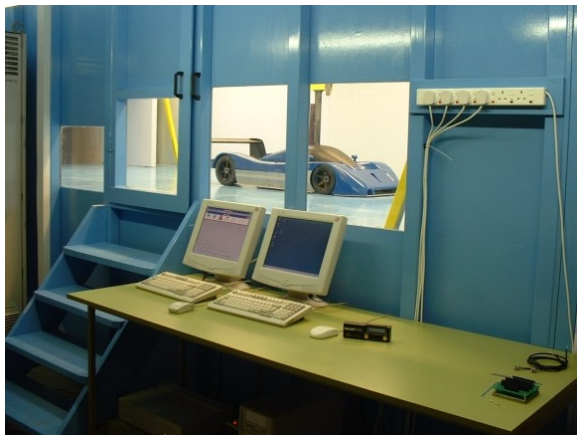
Relevant Expertise

The School of Engineering undertakes research in a number of fields. In the most recent national research assessment exercise (RAE2001) the School was awarded a Grade 5 rating. We have a strong record of successful Technology transfer through KTP (Knowledge Transfer Partnerships) projects. Those investigations not funded solely by industry are supported through EPSRC, DTI and EU grants.

The Energy Research Group is one of the research and teaching groups within the School of Engineering. It has 12 full time academic staff, 7 researchers and 14 postgraduate students working in it. Research within the group ranges from the study of artificial joints to the design and development of renewable energy generators for wind turbines. The Group also researches on a range of motive or energy generation systems; from engine, motor and generator design and analysis to the bio-tribology of artificial human joints. Since 2003, the team has won 2 DTI awards and 4 EPSRC research grants, including the prestigious Supergen Wind award. Prof. Tavner is the Principal Investigator, with Durham the financial hub for the Supergen award. Dr Taylor is work-package leader for the £2.5m EPSRC/Industry strategic alliance research project. Research programmes related to electrical machines also include electrical assistance for turbochargers with funding from Cummins Turbo Technologies (Holset) and from the EU.

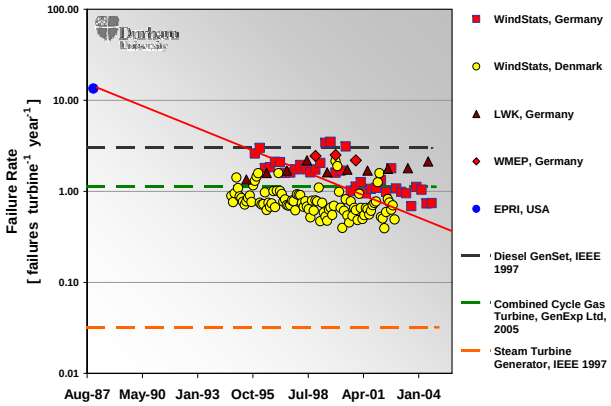
Photo Voltaic panels installed on the roof of the School of Engineering

Pre production prototype permanent magnet generator developed at Durham School of

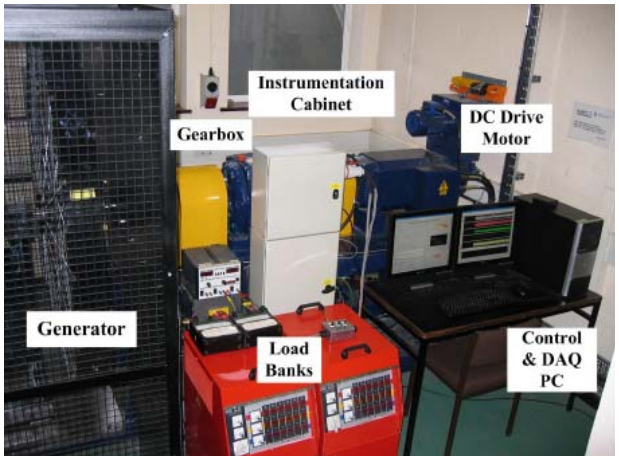


Large scale Wind Tunnel in the School of Engineering

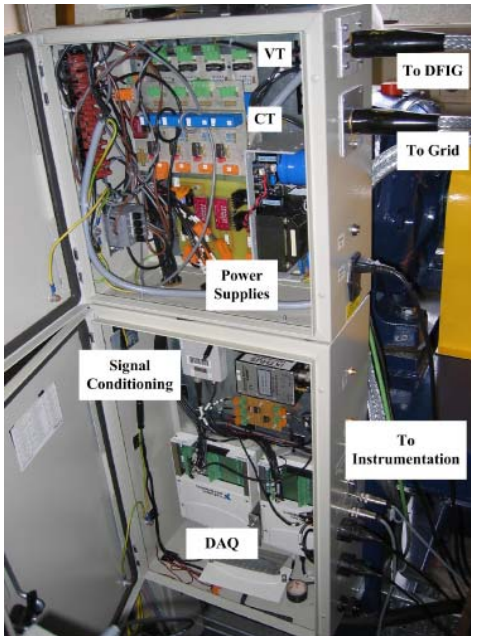
Technical role within the Supergen



Wind Turbine failure rate data extracted from European surveys



Wind Turbine Condition Monitoring Test Rig at Durham with Direct Drive Synchronous Generator fitted



Data Acquisition equipment for the Test Rig

Durham's objectives for Supergen Wind are:

- Take publicly available reliability data to identify Failure Modes in current Turbine designs. Statistical analysis of the data, to identify trends and significance, and mathematical modelling to establish Life Models for different designs of Turbines and their main Subassemblies. Conclusions will be drawn about Turbine design for reliability and the Subassemblies that require the most attention in terms of Condition Monitoring and Maintenance to achieve a high Availability.

- Develop a physical model representing the turbine drive train under the fault conditions identified above. The interaction of the faulted mechanical system with the generator and converter will be explored, experimentally and analytically, to identify components in the current spectra that can be used to discriminate between mechanical faults. The work will apply the results from mathematical and physical modelling, verifying them on an existing Wind Turbine Condition Monitoring Test Rig.
- Individual fault characterisation models developed by Durham and Manchester will be linked to form a model representing the electrical and mechanical interactions of the wind turbine drive train under fault conditions. The system modelled will be generic, allowing extrapolation to specific turbine designs. Work will be done to enable detection of faults by measurement of electrical terminal quantities, together with the minimum number of necessary external sensors, to raise the detection signal-to-noise ratio and develop a high level of intrinsic analysis but low capital cost system with easy retrofit capability, suitable for wind turbines.