

## CURRICULUM VITAE: Professor Peter Tavner

**Department:** School of Engineering, Durham University

**Position:** Head of School and Professor of New & Renewable Energy

### Academic Qualifications:

- 1969 MA (Hons), Electrical Engineering, Cambridge University
- 1975 Member Institution of Electrical Engineers, Chartered Engineer, C Eng
- 1978 Ph D, Electrical Engineering, Southampton University
- 1988 Fellow, Institution of Electrical Engineers
- 2003 European Registered Engineer, Eur Ing, Italian speaker



### Experience and Employment Summary:

- 1978-1985 Principal Engineer, Central Electricity Generating Board, South Eastern Region
- 1985-1990 Technical Director, Laurence, Scott & Electromotors Ltd, Norwich
- 1990-1997 Engineering Director & General Manager, Lintott PLC, Norwich
- 1997-1999 Technical Director, Brush Electrical Machines, Ltd
- 1997-2003 Group Technical Director, FKI Energy Technology, Loughborough
- 2003-present Professor of New & Renewable Energy, Durham University.
- 2006-present Head of School of Engineering, Durham University

### Professional:

- Member of the Council of the Institution of Engineering & Technology, UK
- Director of the New & Renewable Energy Centre, Blyth, Northumberland
- Chairman of the Advisory Panel of the New & Renewable Energy Centre, Blyth, Northumberland
- Lecturer to the Royal College of Defence Studies, London, 2005, 2006, 2007.
- 41<sup>st</sup> IEE Hunter Memorial Lecturer 2004
- Founder and Core Mentor of the FKI Graduate Training Programme
- Member of the EPSRC College of Peers
- Chairman of the IEE 2004 International Power Electronics Machines and Drives Conference, Bath, UK
- Editor of a book series on electrical machines, Research Studies Press Ltd

### Publications:

- Author of “The Condition Monitoring of Rotating Electrical Machines”, Peter Peregrinus Press, 2<sup>nd</sup> Ed 2008 in print, 1<sup>st</sup> Ed 1987
- More than 100 publications in the fields of electrical machines, energy efficiency, condition monitoring, and machine applications.
- Winner of the Institution Premium of the IEE for a paper on the condition monitoring of electrical machines.

**Current Involvement in Energy Research:** Prof Tavner joined the School of Engineering at Durham University 3 years ago.

He leads the New & Renewable Energy Research Group. <http://www.dur.ac.uk/engineering/nareg/>

He has 25 years experience in research and the electrical and electronic manufacturing industry, most recently he has been Group Technical Director of FKI Energy Technology, an international business, manufacturing generators, motors, drives, dynamometers, transformers, switchgear, power system control equipment and wind turbines. Most recently he was responsible for international developments of the Group’s Italian subsidiary, Marelli Motori, working in Italy, China, Bulgaria & UK.

His current areas of research at Durham are electrical machinery, the reliability, availability and condition monitoring of onshore & offshore machinery, the development of grid compatible onshore and offshore wind systems and the development of machine and power electronics solutions for the effective extraction of energy from new or renewable sources.

He is the Principal Investigator of the £2.55M EPSRC Supergen Wind Consortium.

He is reliability expert on the Euro 8M EU FP7 RELIAWIND Consortium.

### Recent Publications:

1. Tavner, PJ, Review of condition monitoring of rotating electrical machines. Proc. IET – Electrical Power Applications, To be published, ISSN:1350-2352. [J]
2. Tavner, P J, Ran, L, Penman, J, Sedding, H, Condition Monitoring Of Rotating Electrical Machines, IET Publishing Stevenage, UK, 290 pp. [B]
3. Ng, CH, Parker M.A., Ran L., Tavner P.J., Bumby J.R., Spooner E., A Multilevel Modular Converter for a Large, Light Weight Wind Turbine Generator, IEEE Trans. on Power Electronics, Vol. 25, No. 3, May 2008, pp1062-1074 [J]

4. Tavner, P J, Spinato, F, van Bussel, CG J W, Koutoulakos, E, Reliability of different wind turbine concepts with relevance to offshore application, European Wind Energy Conference, April 2008, Brussels. [RC].
5. Yang, W X, Tavner, P J, Wilkinson, M R, Condition monitoring and fault diagnosis of a wind turbine with a synchronous generator using wavelet transforms, 4<sup>th</sup> IET Power electronics Machines & Drives Conference, York, April 2008.
6. Spinato, F, Tavner, P J, van Bussel, G J W, Reliability-growth analysis of wind turbines from fleet field data, ARTS Conference, Loughborough, April 2007.
7. Wang, X, McMahon, R A, Tavner, P J: Design of the Brushless Doubly-Fed (Induction)Machine, Proceedings of International Conference on Electrical Machines & Drives (IEMDC), IEEE, Ankara, April 2007, [RC]
8. Ng, CH, Parker M.A., Ran L., Tavner P.J., Bumby J.R., Spooner E., A Multilevel Modular Converter for a Large, Light Weight Wind Turbine Generator, accepted IEEE Trans. on Power Electronics, October 2007 [J]
9. Baker NJ, Muller MA, Ran L, Tavner PJ & MacDonald S 2007. Development of a Linear Test Rig for Electrical Power Take-off from Waves. Proceedings Institute of Marine Engineering, Science and Technology 10(A): 3-15 [J]
10. Qaqish, T, Fitch, R, Tavner, P J, Agile manufacturing in the cladding industry, IIET ICAM Conference, Durham, April 2007. [RC]
11. Wilkinson, M R, Spinato, F, Tavner, P J, Condition monitoring of generators & other subassemblies in wind turbine drive trains, IEEE SDEMPED Conference, Cracow Sept, 2007. [RC]
12. Xiang, D., Ran, L., Bumby, J.R., Tavner, P.J. and Yang, S.; Coordinated control of and HVDC Link and Doubly Fed Induction Generators in a Large Offshore Wind Farm, IEEE Transactions on Power Delivery, Vol. 21, No. 1, Jan 2006, pp 463-471 [J]
13. Tavner, P., Edwards, C., Brinkman, A. and Spinato, F.; Influence of Wind Speed on Wind Turbine Reliability, Wind Engineering Journal , Vol. 30, No. 1, 2006, 19pp. [J]
14. Tavner, P.J., Xiang, J. and Spinato, F.; Reliability Analysis for Wind Turbines, Journal of Wind Energy, Vol 10, No 1, 2007, 21pp. [J]
15. Xiang, D., Ran, L., Tavner, P.J. and Yang, S. Control of a Doubly Fed Induction Generator in a Wind Turbine during Grid Fault Ride-through, IEEE Transactions, Energy Conversion, Vol. 21, No. 2, September 2006, pp652-662 [J]
16. Polinder, H., van der Pijl, F.F.A, de Vilder, G.J. and Tavner, P.J., Comparison of Direct-Drive and Geared Generator Concepts for Wind Turbines, IEEE Transactions on Energy Conversion, Vol. 21, No. 3, September 2006, 725-733. [J]
17. Jagelia, M., Bumby, J.R. and Tavner, P.: A sliding surface technique incorporating radial basis functions for movement simulation in 2-D models of rotating machines, 6<sup>th</sup> Int. Conf. on Computation in Electromagnetics, Aachen, Germany, 4<sup>th</sup>-6<sup>th</sup> April 2006. (3 pages) [RC]
18. McMahon, R.A., Wang, X., Abdi-Jalebi, E., Tavner, P.J., Roberts, P.C. and Jagiela, M.; The BDFM as a Generator in Wind Turbines, European Power Electronics Conference, 2006, 7pp. [RC]
19. Ran, L., Tavner, P.J., Mueller, M.A., Baker, N.J. and McDonald, S.; Power Conversion and Control for a Low Speed, Permanent Magnet, Direct-Drive, Wave Energy Converter, 3<sup>rd</sup> International IEE Conference Power Electronics Machines and Drives, Dublin, April 2006, 5pp. [RC]
20. Tavner, P., Jagiela, M., Chick, T. and Abdi-Jaelbi, E.; A Brushless Doubly Fed Machine for Use in an Integrated Motor/Converter, Considering the Rotor Flux, 3<sup>rd</sup> International IEE Conference Power Electronics Machines and Drives, Dublin, April 2006, 5pp. [RC]
21. Tavner, P.J., van Bussel, G.J.W. and Spinato, F.; Machine and Converter Reliabilities in Wind Turbines, 3<sup>rd</sup> International IEE Conference Power Electronics Machines and Drives, Dublin, April 2006, 6pp. [RC]
22. Wilkinson, M., Spinato, F., Knowles, M. and Tavner, P.; Towards the Zero Maintenance Wind Turbine, 41<sup>st</sup> Universities Power Engineering Conference, Newcastle, September 2006, 5pp. [C]
23. Parker M.A., Ng C.H., Ran L. and Tavner P.J., Power Control Of Direct Drive Wind Turbine With Simplified Conversion Stage & Transformerless Grid Interface, 41<sup>st</sup> Universities Power Engineering Conference, Newcastle, September 2006, 4pp [RC]
24. Tavner, P.J., Spooner, E., Light Structures for Large Low-Speed Machines for Direct-Drive Applications, International Conference of Electrical Machines, Chania, Crete, Greece, September 2006, 6pp. [RC]
25. Tavner, P.J., McMahon, R.A., Roberts, P., Abdi-Jalebi, E., Wang, X., Jagiela, M. and Chick, T., Rotor Design and Performance for a BDFM, International Conference of Electrical Machines, Chania, Crete, Greece, September 2006, 5pp. [RC]
26. Wilkinson, M.R. and Tavner, P.J., Condition Monitoring of Wind Turbine Drive Trains, International Conference of Electrical Machines, Chania, Crete, Greece, September 2006, 5pp. [RC]
27. Tavner, P.J. and Xiang, J., Wind Turbine Reliability, How Does it Compare with other Embedded Generation Sources, IEE RTDN Conference, London, 2005. [RC]
28. Tavner, P.J., Xiang, J., Spinato, F., Improving the Reliability of Wind Turbine Generation and its Impact on Overall Distribution Network Reliability, Keynote Speaker, IEE CIRED Conference, Turin, 6-9 June 2005. [RC]
29. Jagiela, M., Lukaszyn, M., Tavner, P.J. and Bumby J.R., Formation of Circuit Equations for Inclusion in 2-D Time-Stepping Finite Element Analysis of Rotating Machines”, XXVIII Int. Conf. on Fundamentals of Electrotechnics and Circuit Theory, Ustron, Poland, 11-14<sup>th</sup> May, 2005. [RC]
30. Xiang, D., Ran, L., Bumby, J.R., Tavner, P.J. and Yang, S., Coordinated control of and HVDC Link and Doubly Fed Induction Generators in a Large Offshore Wind Farm, IEEE Transactions on Power Delivery, 2005. [J]
31. Baker, N.J., Mueller, M.A., Tavner, P.J. and Ran, L., Direct Electrical Power Take off for Wave Energy Converters: Past, Present and Future Work, IMechE Seminar: Fluid Machinery for Wave and Tidal Energy: State of the Art and New Developments, London, October 2005, (12 pages). [RC]

32. Baker, N.J., Mueller, M.A., Tavner, P.J. and Ran, L., Prototype Development of Direct-Drive Linear Electrical Machines for Machine Energy Converters, *World Renewable Energy Congress 2005*, pp271-276. [RC]
33. McMahon, R.A., Roberts, P.C., Wang, X. and Tavner, P.J., The performance of the BDFM as a Generator and Motor, *IEE Proc. Electrical Power Applications*, to be published (29 pages) ISSN:1350-2352. [J]
34. Polinder, I.H., van der Pijl, F.F.A, de Vilder, G.J. and Tavner, P., Comparison of Direct-Drive and Geared Generator Concepts for Wind Turbines, *IEEE IEMDC Conference*, USA, 2005 (8 pages). [RC]
35. Smith, S., Todd, R., Barnes, M. and Tavner, P.J., Improved Energy Conversion for Doubly-Fed Wind Generators, presented at *IEEE IAS Conference*, Hong Kong, 2005 (8 pages). [RC]
36. Tavner, P.J. and Anderson, A.F., Core Faults in Large Generators, *IEE Proc. Electrical Power Applications*, Vol 152, No 6, Nov 2005, pp 1427-1439, ISSN:1350-2352. [J]
37. Tavner, P.J., Jagiela, M, and Ingleton, C., A Larger Motor/Converter Combination for High Efficiency Drives, *EEMODS Conference*, Heidelberg, Germany, 2005 (9 pages) [RC]
38. Wilkinson, M.R. and Tavner, P.J., Condition Monitoring of Wind Turbine Drive Trains, *41<sup>st</sup> Universities Power Engineering Conference*, Cork, 2005 (5 pages). [C]
39. Parker M., Tavner P., Ran L. and Wilson A., A Low-Cost Power Tracking Controller for a Small Vertical Axis Wind Turbine, *40<sup>th</sup> International Universities Power Engineering Conference*, Cork, Ireland, 2005 (5 pages) [RC]
40. Tavner, P.J., Investigation of Electrical Machinery Failures in Modern Power Plants, IMechE Forensic Seminar, London, Feb 2005 (4 pages). [C]