

## **Curriculum Vitae: Markus Anton Mueller**

- 1. NAME** Markus Anton Mueller
- 2. COLLEGE** Science & Engineering
- 3. SCHOOL** School of Engineering & Electronics
- 4. DATE OF APPOINTMENT** 1<sup>st</sup> January 2004
- 5. CURRENT POST** Lecturer
- 6. DATE OF BIRTH** 23<sup>rd</sup> December 1966

### **7/8. UNIVERSITY EDUCATION & DEGREES AWARDED**

- Feb 1997 - Sept 1997 *Open University*  
Part-time course entitled "Renewable Energy".
- 1989-1991 *Department of Engineering, University of Cambridge*  
Ph.D. Awarded in 1991: Improved Calculation Methods for Particular Aspects of Induction Motor Performance.
- Department of Electrical & Electronic Engineering, Imperial College of Science, Technology & Medicine, London*
- 1985-1988 B.Sc.(Eng.) 2.1 Honours
- 1988-1989 First year Ph.D. in Electrical Machines Group

### **9. CAREER : APPOINTMENTS HELD**

- Oct 1997 to Dec 2003 *School of Engineering, University of Durham*  
Lecturer in Electrical Power
- Jan 1996 –Oct 97 *Switched Reluctance Drives Ltd.*  
Senior Development Engineer involved with finite element modelling of switched reluctance (SR) motors and SR drive design.
- 1992 – 1995 *Department of Engineering, University of Cambridge*  
July - Dec 1995 *& Brook Hansen Motors Ltd., St. Thomas' Road, Huddersfield*  
At the University I was employed as a Research Associate to develop an induction motor design program for induction motor development at Brook Hansen Motors Ltd. I spent six months working full time in the company commissioning the program.

### **10. MAJOR RESEARCH INTERESTS**

With Dr. Ewen Macpherson , I am establishing an Electrical Machines and Power Electronics Research Group within the IES. Electrical machines test facilities are being developed with help from the School and more recently with a PoC award from Scottish Enterprise. By 2010 I expect the group to have built up an international reputation, which will be achieved by recruiting 8-10 PhD students and 4-5 RAs over the 5 year period. At present there are 3 PhD students, but by October this will have increased to 5, and there will also be 1RA employed. My particular areas of interests lie in the following areas:

#### **10.1 Low Speed Generator Design for Wind, Wave and Marine Current Energy Converters**

My main area of interest is in the design and development of electrical generators for renewable energy applications. In particular I have focused on low speed rotating machines for direct drive and low speed linear machines for direct drive wave and tidal energy converters.

- A Proof of Concept grant was awarded by Scottish Enterprise in March 2005 for a new topology of PM machine that can be used in both rotary and linear machines. The aim of the project is to demonstrate the technology by building prototype machines and then investigate the potential for commercial exploitation.
- As well as the electrical design I am also very interested in the mechanical and structural design of low speed high torque electrical machines. The integration of the electrical and mechanical aspects into generator design is an important issue to ensure the correct choice of machine topology for the optimum design. An EPSRC responsive mode grant application on optimizing the structure of low speed machines is in preparation and will include other colleagues in the School.

### **10.2 Mechanical Integration of Linear Machines into Wave Energy Converters.**

The successful implementation of linear machines in wave energy converters requires more research into the mechanical integration of these machines into actual wave devices. I am exploring projects with members of the Wave Energy Group at Edinburgh to develop hybrid magnetic and hydrostatic bearings for linear machines. The intention is to submit an EPSRC grant into responsive mode.

### **10.3 Electrical Machine Design**

As part of the development for novel machine topologies for renewable energy applications new machine design procedures and models have to be developed in parallel with prototype development. These new design methods employ the accuracy of finite element analysis, but are fast enough so that they can be used within an industrial design office. Prototype development and experimental work is an important part of my research to demonstrate the technology and verify design procedures for use by industry.

### **10.4 Superconducting Machines**

My present research is an extension of the work I developed and built up at Durham, but I am exploring the use of high temperature superconductors in low speed generators. This technology would provide a step-change in the powers that could be achieved at low speeds. It is a new area of research for me, but a very exciting one with many potential applications for superconducting machines. In order to develop this area of research I am establishing links with the University of Cambridge and Areva T&D with the aim of submitting an EPSRC project into responsive mode.

### **10.5 International Collaboration**

Within the UK my research on direct drive systems for wave and tidal devices is leading the way and has led to collaboration with colleagues at TU Delft, Uppsala University in Sweden and the University of Cassino in Italy. As a result of collaboration over the last few years I have been invited into 3 European Framework 6 Projects, of which one will be funded and another has been recommended for re-submission at the earliest opportunity.

- **TU Delft:** Whilst at Durham University I co-hosted Dr. Henk Polinder from Delft, with Newcastle University, which led to a joint journal publication.
- **University of Cassino:** In March 2004 I was invited by Dr. Fabrizio Marignetti at the University of Cassino to present four research seminars on my work. As a result of that visit I have been accepted as an external PhD supervisor on the Doctoral Program in Energy Systems at the Seconda Università di Napoli (SUN).
- **Oregon State University (OSU):** In May 2005 I visited OSU to explore collaboration in the area of wave energy research. Wave Energy is in the very early stages of development in the US, but OSU is leading the way in this field. There are a number of overlapping areas, from which both OSU and Edinburgh could benefit from collaboration. These will be formalized over the coming months.

### **10.6 UK Energy Research Centre – Coordinator of the Marine Energy Research Network.**

In January 2005 I was appointed coordinator of the UKERC Marine Energy Research Network. My main responsibility is to work with the academic and industrial marine renewables community to develop a research road map, which will prioritise the long term research needs to underpin the marine renewables industry. The outcomes of the network will be used by government in future energy spending reviews.

## 11. PRINCIPAL RESEARCH GRANTS

**TOTAL INCOME GENERATION AS PRINCIPAL INVESTIGATOR SINCE 1997 : £1,295,683**

### 11.1 CURRENT GRANTS

<b>Funding Body</b>	<b>Title</b>	<b>From</b>	<b>To</b>	<b>£</b>
EPSRC CASE *(a) New Malone Co.	<i>Heat Engines Using Supercritical Fluids for use in Combined Heat &amp; Power Systems</i>	Jan. 2005	Dec. 2008	<b>64,000</b>
EPSRC CASE *(b) Edinburgh Designs	<i>Fluid Mechanical Design of a Vertical Axis Tidal Current Turbine</i>	Jan. 2005	Dec. 2008	<b>64,000</b>
NERC	<i>UKERC Marine Research Network</i>	Jan 2005	Dec 2009	<b>179,000</b>
Scottish Enterprise PoC Award	<i>Lightweight Direct Drive Electrical Generator for Wind, Wave and Tidal Energy Converters (PI)</i>	TBC	TBC	<b>199,833</b>
EU Framework 6 (IP)	<i>Integrated Wind Turbine Design (PI)</i>	TBC	TBC	<b>73,000</b>

\*For these two CASE awards, I identified the funding source and wrote the applications for each with the company and the students. However, since the topics are outside my main area of interest the students are being supervised by colleagues within the IES: (a) Ronan Costello supervised by John Chick and (b) Gareth Gretton supervised by Tom Bruce. I have therefore shown academic leadership in attracting funding for other colleagues within the Institute.

### 11.2 GRANTS IN PREPARATION

<b>Funding Body</b>	<b>Title</b>	<b>To be Submitted</b>
EPSRC	<i>Investigating Scale Effects in the design of Marine Energy Converters</i>	Aug 2005
EPSRC	<i>Magneto-hydrostatic bearings for direct drive marine energy converters</i>	Sept 2005
Leverhulme Trust	<i>Improved Income Generation in Rural Areas Through Access to Electrical Energy via Wind Power</i>	Oct. 2005
EPSRC	<i>Structural optimization of High Torque Low Speed Electrical Machines</i>	Nov 2005
Carbon Trust/EPSRC	<i>Advanced Control of Wave Energy Devices using Direct Drive Power Take-Off.</i>	Dec. 2005

### 11.3 COMPLETED GRANTS

The following grants were awarded whilst a lecturer at the University of Durham.

#### Principal Investigator

<b>Funding Body</b>	<b>Title</b>	<b>From</b>	<b>To</b>	<b>£</b>
New and Renewable Energy Centre (NaREC)	<i>Development of a Reciprocating Test Rig for Wave and Tidal Power</i>	May. 2003	Nov. 2004	<b>223,000</b>
EPSRC GR/N38299*	<i>Tunable Electrical Power Take Off for Wave Energy Converters</i>	Mar. 2001	Mar. 2004	<b>209,000</b>
One North East	<i>Wind Energy Test Facilities</i>	Mar. 2002	Mar. 2003	<b>225,000</b>

EPSRC GR/M05805	<i>Evaluation of SR Machines for Wind Energy Converters</i>	Mar. 1997	Mar. 2000	<b>48,850</b>
FKI Engineering	<i>Induction Motor Modelling.</i>	Sept. 1998	Sept. 1999	<b>10,000</b>

**\*IGR FOR EPSRC GR/N38299 JUDGED TO BE “TENDING TO OUTSTANDING”.**

#### Co-investigator

Funding Body	Title	From	To	£
Newage AVK SEG,	<i>Permanent Magnet Axial Flux Machines</i>	Oct. 2002	Oct. 2003	<b>20,000</b>
EPSRC /DTI LINK GR/M86842*	<i>Engine/Generator Sets for Hybrid Electric Vehicles</i>	Mar. 2000	Mar. 2002	<b>125,000</b>
Newage International	<i>Novel Permanent Magnet Generators</i>	Jan. 1999	Jan. 2001	<b>200,000</b>

**\*IGR FOR EPSRC GR/M86842 JUDGED TO BE “TENDING TO OUTSTANDING”.**

## 12. RESEARCH SUPERVISION.

### 12.1 PRINCIPAL SUPERVISOR

#### Research Associates

- a) Jamie Taylor – 50% funded by UKERC Marine Research Network grant to assist in wave and tidal energy research.
- b) A research fellow is being recruited for the Scottish Enterprise PoC Award.

#### PhD Supervision

- a) Alasdair McDonald, “*Lightweight Low Speed Electrical Generators for Wind, Wave and Marine Current Energy Converters*”, Sept. 2004 – Sept. 2007.
- b) Paul Stott, “*Power Conversion and Control of Low Power Renewable Energy Systems*”, May 2005 – May 2008.
  - Neil Hodgins, an undergraduate in the School of Engineering and Electronics, has applied to do a PhD under my supervision.
  - The EU Framework 6 grant covers a PhD studentship – recruitment will begin once the contract has been signed.
  - Hence by December 2005 I will be Principal Supervisor for 4 PhD students.

### 12.2 SECOND SUPERVISOR

- a) Jonathan Shek, “*Phase and Amplitude Control of Wave Energy Converters using Linear Electrical Generators*”, Sept. 2004 – Sept. 2007
- b) Ronan Costello, “*Heat Engines Using Supercritical Fluids for use in Combined Heat & Power Systems*”, Jan 2005 – Dec 2007.

### 12.3 PhDs COMPLETED

- a) N.J. Baker, “*Linear Generators for Direct Drive Marine Renewable Energy Applications*”, Oct. 99- Oct 2003. PhD awarded in July 2003. **Principal Supervisor.**

### 12.4 OTHER SUPERVISION

At Durham I was involved in the supervision of two other students, but had to hand over supervision to other Durham staff when I came to Edinburgh.

- a) Richard Martin, “*Permanent Magnet Axial Flux Machines for Direct Drive Wind Energy Converters*”, Oct. 2002 – Dec. 2003. **Principal Supervisor.**
- b) Martin Cain, “*Linear Actuators for Solar Powered Pumps*”, MPhil, Oct 02 to Dec. 2003. **Second Supervisor.**

In addition I was jointly responsible for two research technicians at the University of Durham.

## **13. TEACHING EXPERIENCE**

### **13.1 PERSONAL STATEMENT ON TEACHING**

#### **Teaching Objectives:**

1. To stimulate interest and disseminate advances in renewable energy and electrical engineering.
2. To explore teaching methods which enhance the learning environment for the students..
3. To give students the confidence to apply the fundamental principles of electrical engineering to real life engineering problems.

My teaching experience is outlined below according to Institution, with most experience having been gained at Durham, where I was employed between October 1997 and December 2003.

### **13.2 SCHOOL TEACHING RESPONSIBILITIES**

#### **School of Engineering & Electronics, University of Edinburgh**

##### **Teaching**

###### **Level 1**

Engineering 1, tutorial supervision for electrical component in Semester 1  
Electrical Engineering 1, 12 lectures, 6 tutorials, 100 students; 4 Tutorial sheets and 4 marked assignments set during lecturing period.

###### **Level 3**

Power Systems, 8 lectures, 4 tutorials, 4 Examples Classes, 70 students  
POWERWAY LAB, 10 students, 6 hours per week for half of Semester 2.

###### **Level 4 &5**

MEng Dissertation Group in Semester 2  
Internal and External MEng project supervision (electrical and mechanical)  
Internal BEng Project supervision (electrical and mechanical)

### **13.3 OTHER TEACHING**

#### **School of Engineering, University of Durham**

##### **Teaching**

A list of my teaching commitments and responsibilities at Durham since 1997 is given below.

###### **Level 1**

Electromagnetism, 20 hours; 120 students; problems set once a week and marked twice a term; 4 example classes; Chief Examiner 1998-2003.  
Group design project (4-5 students), contact time 20 hours  
Tutorial classes in groups of 5 every other week

###### **Level 2**

Group design project (4-5 students), contact time 30 hours/group  
Tutorial classes in groups of 5 every other week

###### **Level 3**

Energy & the Environment, 20 hours; 50 students; 5 problem sheets, Chief Examiner 1999-2003.  
Electrical Drives, 10 hours; 50 students; 3 problem sheets, Chief Examiner 1999-2003  
Group design project (4-5 students), contact time 30 hours/group

###### **Level 4**

Electrical Drives & Power Electronics, 19 hours; 6 students; 6 problem sheets, Chief Examiner 1999-2003  
Individual project, contact time 50hours/student

Laboratory demonstration at levels 1-3, 3 hours/week

Specific teaching and contact hours in the academic years 2001/02 and 2002/03 are listed below and should be considered as normal:

**Lecturing and Tutorials:**

Level 1 Electromagnetism; contact hours = 80

Level 2 Tutorials, contact hours = 20

Level 3 Energy & Environment and Electrical Drives; contact hours = 64

Level 4 Electrical Drives & Power Electronics, contact hours = 40

Laboratory demonstration and marking in 2001/02 & 2001/03, contact hours = 120

**Project supervision:**

Level 1 Design Project, 5 groups, 2001/02 & 2002/03, contact time = 40 hours

Level 2 Design Project, 1 group, 2001/02, contact time = 30 hours

Level 4 Individual Project, 5 projects supervised in 2001/02 & 2002/03, plus an overseas student in 2002/03, total contact time = 550 hours

**University of Cassino, Italy**

I gave four two hour seminars on Electrical Machines for Renewable Energy Systems to undergraduate and postgraduate students at the University of Cassino in March 2004. The seminars formed part of an undergraduate Master's course on the design of electrical machines.

**13.4 PUBLICATIONS RELATED TO TEACHING**

*Open-Ended Laboratory Projects*, Bumby J.R., Bialek J.W., Mueller M.A., & Spooner E, Proceedings of the Universities Power Engineering Conference, Belfast, Sept. 2000, 5 pages (CDROM)

**13.5 TEACHING COURSES ATTENDED**

In 1997/98 I attended courses for the Durham Certificate in Higher Education, presented by Phil Race.

The following seminars were attended :

Tips on Assessment

Learning – a natural human process

Refreshing your lecturing

Changing assessment to improve learning

Making the most of tutorials

Teaching : creating a thirst for learning

Introducing student self-assessment and peer-assessment

Since then I have attended an Assertive Training Course, and ITS courses on the use of Durham University Online (DUO) for use in my lecture courses. I also attend conferences and research seminars regularly and if relevant I use some information in lecture courses.

**13.5 CURRICULUM & SYLLABUS DEVELOPMENT**

I have written and developed my own lecture courses rather than use previous course notes. The content in each course is presented in a logical manner, and examples or case studies are used where possible to illustrate the principles taught. I use examples from my own research to illustrate the use of fundamental principles in lecture courses at all levels. Laboratory scripts have also been modified to encourage the students to answer and ask more questions, rather than follow a recipe.

**University of Edinburgh:**

1. Level 1 Electrical Engineering 1: As Course Organiser and a Lecturer on the course I coordinated discussions on the syllabus of EE1, so that it complemented the electrical component of Engineering 1. Much of the curriculum and syllabus development on the EE1 course is part of my duties as Course Organiser.

**University of Durham:**

1. Level 3 Energy & Environment: the syllabus was changed to highlight the emergence of renewable energy technologies as an alternative to conventional fossil fuel based energy sources. In addition the course was extended to include issues of electrical integration into the power network. The aim of the course was not just to provide the fundamentals of energy technologies, but also to provide up-to-date statistical data on UK and Global Energy use and to provide information on the political and economic developments in the energy field. Hence the course was updated annually to reflect these changes.

Overall the course was a success and has been used as the basis for a new MEng stream on Renewable Energy Systems to be introduced on October 2004 at Durham.

2. Level 4 Electrical Drives and Power Electronics: this course originally focussed on advanced electrical drives building on the Level 3 course. I modified the syllabus to include the design of power electronic converters, which are integral to all electrical drive systems. The theory discussed in the 1<sup>st</sup> and 2<sup>nd</sup> year were used in the Electrical Drives courses in the 3<sup>rd</sup> & 4<sup>th</sup> year, which puts the use of these fundamental principles into context.

### **13.6 COURSE IMPROVEMENTS & FEEDBACK**

#### **University of Edinburgh**

In my first full year of lecturing at Edinburgh I have taught on two courses: Electrical Engineering 1 and Electrical Power Systems (3<sup>rd</sup> year). For EE1 the student feedback was good, scoring 3.7 (1 is poor and 5 excellent) for the delivery and content of the lectures. The 3<sup>rd</sup> year course, of which I was 1 of 3 lecturers consistently scored 4 out of 5. I was observed by a colleague during a 1<sup>st</sup> year lecture, and he was very happy with my performance, in particular my ability to engage with the students and maintain their interest. The main area for improvement is in the speed of delivery, which will be addressed over the summer.

#### **University of Durham**

Improvements in lecturing technique have been made based on comments from students in course questionnaires and from colleagues, who have sat in lectures as part of the Durham's *buddying* system. Teaching is done using case studies, examples and practical demonstrations in lectures. Interaction is achieved by asking questions in lectures and asking students to go through examples. In addition DUO is used to provide additional information to supplement lectures, providing directed reading and access to resources from the web. In the 3H Energy & Environment course the students are referred to government and institution reports to make them aware of current developments. Undergraduate feedback is obtained via departmental and my own questionnaires. Since teaching at Durham I have exceeded a score of 3/5, with some courses regularly gaining a score of 4/5 – Energy & Environment and Electrical Drives and Power Electronics.

### **14. MEMBERSHIP OF SOCIETIES/PROFESSIONAL QUALIFICATIONS**

- Member of the Institute of Electrical Engineers (MIEE)
- Chartered Engineer (C.Eng.)
- Member of the Institute of Electrical & Electronic Engineers (MIEEE)
- Associate of the City and Guilds Institute (ACGI)
- Member of the British Wind Energy Association.

### **15 MEMBERSHIP OF COMMITTEES RELEVANT TO RESEARCH**

#### **15.1 INTERNATIONAL**

- Member of the Technical Steering Committee for the IEE Power Electronics, Machines & Drives Conference, 2005-2006 .
- Member of the International Steering Committee for the Linear Drives in Industrial Applications Conference, 2003.
- Elected as an external PhD supervisor and examiner to the Doctoral program in Energy Systems at the Seconda Universita di Napoli (SUN), Italy, 2005 – 2010.
- Invited to review research proposals for the Swedish Research Council, 2005.

#### **15.2 NATIONAL**

- Member of EPSRC Peer Review College, 2003-2005.
- Technical Advisor for the IEE Energy Conversion & Applications Professional Network, 2001-present. As part of my duties I have organized 2 seminars
  - a. Axial Airgap Machines, Austin Court, Birmingham, May 2001, **Chairman**.
  - b. Electrical Aspects of Offshore Renewables (2 days), NaREC, Blyth, Feb. 2004, **Co-chair** with Prof. E. Spooner and Dr. Ian Burdon.

- Member of the Universities Power Engineering Conference Organising Committee, 2001-2002
- Member of IEE Professional Committee on Electrical Machines & Drives, 1998-2001.

### **15.3 REFEREEING ACTIVITY**

- Referee for IEE Journal on Electrical Power Applications.
- Referee for IEEE Transactions on Magnetics.
- Referee for American Society of Applied Physics.
- Referee for EPSRC Research Grant Proposals and IGRs.
- Referee for IEE Premium Awards – 1999 & 2005
- Referee for the Swedish Research Council – 2005.

## **17/18. INVITED PAPERS AT SYMPOSIA & INVITED LECTURES**

### **17/18.1 INTERNATIONAL**

- *Direct Drive Wave Energy Systems – a Review of Research at the University of Edinburgh*, presented at Oregon State University, USA, May 2005
- *Design of Electrical Generation Systems for Renewable Energy Converters*, a series of 4 seminars presented at the University of Cassino, Italy, March 2004.

### **17/18.2 NATIONAL**

- *Permanent Magnet Generators in Renewable Energy Applications*, To be presented at a UK Magnetics Society Seminar in September 2005.
- *Low Speed Direct Drive Electrical Generators for Marine Renewable Energy Converters*, presented at Heriot Watt University, Edinburgh, March 2005.
- *Modelling the Vernier Reluctance Permanent Magnet Machine*, UK Magnetics Society, De Montfort University, Leicester, 25<sup>th</sup> September, 2002.
- *Direct Drive Wave Energy Converters*, Manchester Machines Research Group Seminars, UMIST, November 2000
- *Linear Machines for Wave Energy Converters*, Wave Energy Seminar: IEE Seminar, April 2000
- *Current Trends in the use of finite elements (fe) in electromechanical design and analysis – IEE Seminar*, January 2000

## **19. PhD EXAMINER APPOINTMENTS**

### **19.1 EXTERNAL**

- PhD Examiner at University of Newcastle,
- MPhil Examiner at University of Cambridge, 1999
- External PhD supervisor and examiner at Seconda Universita di Napoli, Italy, 2005 to 2010

### **19.2 INTERNAL**

- PhD Examiner at University of Durham, 2002
- PhD Examiner at University of Edinburgh, 2004

## **20. GENERAL CONTRIBUTION**

### **School of Engineering & Electronics, University of Edinburgh.**

#### **Departmental Responsibilities**

1. EE1 Course Organiser (2004 - ). I am responsible for the running of the Electrical Engineering part of the first year course. Particular responsibilities include: coordinating lecture courses in the module; assigning the students to tutorial and lab groups; appointing academic staff to tutorial groups; liaising with lab coordinators and lecturers; writing the programme for the year booklet and updating the Web page; liaising with College to book lecture slots and rooms; distribution and analysis of questionnaires; checking and collating the exam paper; checking and collating examination results; presenting results to the Board of Examiners; sitting on the staff-student liaison committee and taking appropriate action based on comments from students; monitoring student progress and taking action where necessary according to University Regulations; curriculum development of the Electrical Engineering Course in first year; sitting on the Board of Studies.

## **School of Engineering, University of Durham**

### **Departmental Responsibilities**

1. Second year tutor (2001-2003): I was responsible for coordinating the modules in the Level 2 course, which included timetabling, coursework deadlines, production of the year booklet, sitting on the staff-student liaison committee, distribution and analysis of questionnaires, academic and some pastoral support to the students, assigning academic warnings and Level 2 BEng Course Organiser.
2. Director of the HEFCE Summer School for School of Engineering (2000-2003): I was responsible for developing engineering projects for 6<sup>th</sup> form students to undertake in the dept. as part of a University wide summer school. On average 20 students attended the Engineering part of the Summer School. Examples of the design and build projects used include, a model solar-powered car, a hovercraft, a bund-wall and a roof structure. The Summer School attracted regional television and media coverage. This activity formed part of Durham's strategy in widening participation.
3. Director of the Durham Science Festival for the School of Engineering (2000-2003): I was responsible for the coordination of the depts. Contribution to the Durham Science Festival, which included providing design & build projects to over 1000 12-14 year old students over a period of 4 days. My main task was to manage the procurement of materials for the projects, the recruitment of undergraduate students to assist in the Science Festival and to manage the day-to-day running of the Engineering part of the festival itself. The Science Festival was also part of Durham's strategy of widening participation.

### **Committee Membership at Durham (1997-2003)**

Teaching & Learning Committee, Research Committee, Board of Examiners, Board of Studies.  
Engineering Students Advisory Committee, Working group to investigate the use of questionnaires and a working group on teaching.

**PUBLICATIONS**  
**Dr. Markus Mueller**

**REFEREED JOURNAL PAPERS PUBLISHED OR ACCEPTED**

1. *The Calculation of Rotor End-ring Impedance*. Williamson S. & **Mueller M.A.** Proceedings of the Institute of Electrical Engineers, Part B, 1992, pp51-60.
2. *Effect of High Frequency Flux Ripple on Iron Loss in Induction Machines*. Baholo B., Atallah K., Mellor P.H., Howe D., **Mueller M.A.**, Flack T.J., Williamson S., Journal of Magnetism & Materials 1996, vol 158, pp 444-446.
3. *Electrical Generators for Direct Drive Wave Energy Converters*, **Mueller M.A.**, IEE Proceedings, Part C : Generation, Transmission & Distribution, Volume 149, Number 4, July 2002, pp446-456
4. *Modelling the Vernier Hybrid Machine*, **Mueller M.A.** & Baker N.J., IEE Proceedings on Electric Power Applications, Vol. 150, No. 6, pp647-654, November 2003, ISSN 1350-2352
5. *Electromagnetic Design of Axial Flux Permanent Magnet Machines*, J.R. Bumby, R. Martin, **M.A. Mueller**, E. Spooner, N.L. Brown & B..J Chalmers, IEE Proceedings on Electric Power Applications, Vol. 151, No. 2, pp151-160, March 2004, ISSN 1350-2352
6. *Polynomial Modelling of Electromechanical Devices - An Efficient Alternative to Look-Up Tables* M. N. Hamlaoui, **M. A. Mueller**, J. R. Bumby, E. Spooner, IEE Proceedings on Electric Power Applications, Vol. 151, No. 6, pp758-768, November 2004, ISSN 1350-2352
7. *Direct Drive Wave Energy Converters*, **M.A Mueller**, & N.J Baker , IMech.E Journal of Power and Energy, Vol. 219, No. A3, pp 223-234, May 2005.
8. *Linear Generators for Direct Drive Wave Energy Conversion*, H Polinder, B. Mecrow, A. Jack, P. Dickinson, & **M.A. Mueller**, IEEE. Trans. On Energy Conversion, Vol. 20, No. 2, pp 260-267, June 2005.
9. *Power Conditioning of the Output from a Linear Vernier Hybrid Permanent Magnet Machine for use in Direct Drive Marine Energy Systems* P.R.M. Brooking and **M.A. Mueller**, accepted for publication in IEE Proceedings Part C, 2005.

**JOURNAL PAPERS SUBMITTED**

10. *Structural Analysis of Low Speed Axial Flux Permanent Magnet Machines*, **M.A Mueller**, A.S McDonald & D.E. Macpherson, submitted to the IEE Proceedings, Part B Electrical Power Applications, June 2005
11. *Design and Performance of a 20kW, 100rpm, Low Speed Switched Reluctance Generator for a Direct Drive Wind Energy Converter*, **M.A. Mueller**, submitted to IEEE Transactions on Energy Conversion, June 2005
12. *Electrical Power Conversion in Direct Drive Wave Energy Converters*, **M.A.Mueller**, N.J. Baker, & P.R.M. Brooking, submitted to Journal of Renewable Energy, June 2005.

**JOURNAL PAPERS IN PREPARATION**

13. *Analysis of Low Speed Permanent Magnet Air-cored Tubular Linear Generator*, N.J. Baker & **M.A. Mueller**, to be submitted to the IEE Proceedings, Part B, Electrical Power Applications.

14. *Control of a Heaving Buoy Point Absorber using a Linear Electrical Generator in a Direct Drive Power Take off Systems*, J Xiang, **MA Mueller**, to be submitted to the IEE Proceedings, Part B, Electrical Power Applications.
15. *Lumped Parameter Models for the Design of Variable Reluctance Permanent Magnet Machines*, **Mueller M.A.**, to be submitted to IEE Proceedings, Part B, Electrical Power Applications.

## CONFERENCE PAPERS PUBLISHED

### INTERNATIONAL - FULL PAPER REFEREED.

16. *Transient Unbalanced Magnetic Pull in Pole-Change Induction Motors*. Williamson S., **Mueller M.A.**, Eastham J.F. and Lim L.H. Proceedings of the International Conference on Electrical Machines & Drives. Institute of Electrical Engineers, London, Sept. 1989, pp 261-265.
17. *Induction Motor End-winding Leakage Reactance Calculation Using the Biot Savart Method, Taking Rotor Currents into Account*. Williamson S. & **Mueller M.A.**, International Conference on Electrical Machines, Boston, USA, Aug. 1990, pp480-485.
18. *Effect of Bar-to-slot Clearance on Skin Effect in Cage Rotors*. Williamson S & **Mueller M.A.**, Proceedings of the International Conference on Electrical Machines, Paris, 1994, pp306-310.
19. *Calculation of iron losses from time-stepped finite-element models of cage induction machines*. **Mueller M.A.**, Williamson S., Flack T.J., Atallah K., Baholo B., Howe D., and Mellor P.H.. Proceedings of the 7th IEE Electrical Machines & Drives Conference, Durham, 1995, pp88-92.
20. *Calculation of High-Frequency Losses in Closed Slot Induction Motor Rotors*. McClay C.I., Williamson S. & **Mueller M.A.** Proceedings of the International Conference on Electrical Machines, Portugal, Sept. 1996, pp411-416.
21. *Switched Reluctance Machines with Rotor Skew*. **Mueller M.A.**, Proceedings of the International Conference on Electrical Machines, Istanbul, Turkey, 1998, pp1680-1685.
22. *Design of Low Speed Switched Reluctance Machines for Wind Energy Converters* , **Mueller M.A.**, Proceedings of the 9<sup>th</sup> IEE Electrical Machines & Drives Conference, Canterbury, UK, Sept. 1999, pp60-64.
23. *Magnetic field and inductance of helical armature windings*, **Mueller M.A.** & Bumby J.R., Proceedings of the International Conference on Electrical Machines, Espoo, Finland, August 2000, pp627-631.
24. *Spreadsheet design of electrical machines using pre-computed numerical models*, Spooner E & **Mueller M.A.** , Proceedings of the International Conference on Electrical Machines, Espoo, Finland, August 2000, pp1800-1804.
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