The second semester of the 2014/15 academic year is now well underway and final year students are working hard on their projects. Exciting projects include several based round our entry to the IMechE Unmanned Aircraft Systems Challenge (UAS Challenge) http://www.imeche.org/knowledge/industries/aerospace/auasc and the Formula Student Electric, http://teambathracingelectric.com.

We are pleased to welcome Dave Chapman who has joined our Department as an Electronics Teaching Support Technician. Also joining us in April from the University of Southampton is Peter Wilson, who will be our new Professor in Electronics and Systems Engineering. Peter will be leading initiatives in electronic design in the Department and will be contributing to the new fourth year Advanced Microelectronic System Design unit. Also new in 2015/16 will be a full Satellite Based Navigation Systems unit, drawing upon our research expertise in this area.

This newsletter contains a selection of the many varied activities undertaken by our staff and students. Happy reading and have a good semester.

Excellent results in Research Assessment Exercise 2014

The Research Assessment Exercise 2014 measured the quality of academic research across all of the UK’s universities. The results were released in December 2014. The Department of Electronic & Electrical Engineering had an excellent result, with 91% of our work being rated as either “world-leading” or “internationally excellent” in quality. The Department included in its submission to the RAE examples of our research work that had a high impact on industry and on government policy. These included work on space weather; work on Long Run Incremental Cost (LRIC) pricing for electricity distribution systems; and work on radio-frequency interference detection to protect GPS-reliant infrastructure from deliberate and accidental jamming.

Professor Nicholas Mitchell, Chair of the Department’s Research Committee described the result as “confirming the international standing, breadth and vitality of our research in a wide range of important engineering disciplines”.

New joint education programme with Sichuan University

The Department of Electronic & Electrical Engineering is proud to announce the launch of a new joint education programme with a leading Electrical Engineering School at Sichuan University, China. The first cohort of students will be welcomed to Bath in September 2015. Professor Gary Hawley, Dean of the Faculty of Engineering & Design, and Dr Adrian Evans, Head of Department for Electronic & Electrical Engineering, recently visited Sichuan University to sign the bilateral agreement that will bring greater collaboration between the two Universities and strengthen ties with China. After three years of study in China, students from the School of Electrical Engineering and Information (SEEI) at Sichuan University will join the final two years of our MEng programmes within the Department.

This agreement will also provide opportunities for cooperation in scientific research, and staff and student exchanges with Sichuan University, one of China’s top ten universities and a leading institution in the South West of the country.

Adrian Evans commented: "In addition to giving students from Sichuan the opportunity to study at Bath, this important strategic partnership will further develop the established research links between Bath and Sichuan in smart grids and underpin new collaborations in other research areas of electronic and electrical engineering."
Researchers embark on expedition to solve the 'small island problem'

Researchers from the Department of Electronic & Electrical Engineering started their new year with an expedition to the island of South Georgia to carry out research into improving weather forecasting. The team's progress is detailed on their blog at http://sgwex.wordpress.com/

Whilst the rest of us prepared to celebrate on New Year's Eve, the research team, PhD students Andrew Moss and Corwin Wright, were taking off from RAF Brize Norton to fly to the Falkland Islands. Once there, they transferred on to a ship for the four-day, 1000 miles journey to the remote and inhospitable South Georgia.

The South Georgia Wave Experiment (SG-WEX) saw the team carrying out observational and modelling experiments on atmospheric waves in the troposphere, stratosphere and mesosphere in the island area. The researchers set up unique equipment to gather data about the nature and variability of these waves over the coming year.

The mountainous island is a British overseas territory in the southern Atlantic Ocean situated in the southerly latitudinal region known as the 'furious fifties' for its severely turbulent wind conditions. The size and conditions of the island cause real problems for numerical weather prediction/climate models, which cannot accurately model waves from islands too small in comparison to the resolution of the models. This is widely known as the 'small island problem'.

The results will give us a better understanding of the fundamental physics of atmospheric waves, innovate new satellite analysis techniques and help to solve the 'small island problem'.

Students enjoy Dyson workshop and lecture

Last semester the Department welcomed two guests from internationally renowned vacuum company Dyson and their non-profit arm, the James Dyson Foundation.

First-year students studying the Professional Engineering Practice unit enjoyed a lecture in the morning, jointly delivered by Nick Schneider, from Dyson's Engineering and Design Department and Robyn Skelton from Communications. The lecture provided fascinating insights into the history, values and production of the company.

In the afternoon, a team icebreaking event helped students to get to know colleagues in their tutorial groups. This was followed by the chance to participate in a workshop involving a free thinking design exercise using Dyson parts to help improve some aspect of society, for example children, the elderly, entertainment or transport.

The students worked in teams to produce a 3D model of their idea from Dyson parts, which led to such innovative designs as a programmable musical organ for children and an evacuated tube delivery network for organ transplants.

Dr Simon Le Blond, Lecturer in the Department, said: "The workshop was a great success and all the students thoroughly enjoyed it. Robyn and Nick commented on the high creativity and quality of the ideas produced."

Dyson was founded in 1978 and now employs over 1,000 engineers worldwide. The James Dyson Foundation is a charitable organisation that supports students and teachers via bursaries, education programmes and teaching materials. It is dedicated to encouraging young people to think differently, make mistakes, invent and realise their engineering potential.

www.bath.ac.uk/elec-eng
Recent Integrated Mechanical & Electrical Engineering graduate, Tom Brown, was a finalist in the National Instruments Student Design Contest 2014.

Tom's project, a cyclocopter rotor for testing lift and power capabilities, was among three designs that were shortlisted for the final.

Tom said: "I was extremely happy to make it through to the final of the competition, it's the best wrap up of university I could hope for. I think the project really shows the breadth of technical knowledge you can get through the IMEE program; without either mechanical or electrical knowledge I would not have been able to bring the project as far as I did.

"This project also shows how exciting it is to be an engineer right now. There are some extremely cool and interesting concepts floating about. I would encourage anyone choosing their final-year project to pick an idea incorporating a novel, or new, idea. For me, the time spent working on this project, alongside Dr du Bois, has been the best time at university."

Dr Jon Du Bois, a lecturer in the Department of Mechanical Engineering commented: "Tom's covered a lot of ground with this project, he's taken a novel aircraft configuration and built a fully-operational rotor from scratch, developing and validating the design principles along the way. He's had to be truly multidisciplinary in his approach, working simultaneously with embedded electronics, kinematic design and fluid dynamics.

"His work is a great example of the complex, integrated engineering projects that our IMEE students can take in their stride and it's rewarding to see his achievements recognised in this competition."

To be eligible to enter the National Instruments Student Design Content students must demonstrate that they are engineering a better world using National Instruments’ LabVIEW system design software.

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Dr Chenghong Gu awarded EPSRC Postdoctoral Fellowship

Well done to Research Associate, Dr Chenghong Gu, who has been awarded an EPSRC Postdoctoral Fellowship to develop a statistical model for combined gas and electricity systems that will ultimately contribute to lower carbon emissions and low costs for customers.

The proposed model will help encourage increased use of renewables and public infrastructure by developing highly efficient network sampling methodologies, and multi-vector probabilistic energy flow and optimisation tools, which will transform the modelling and analysis of highly integrated systems.

Dr Philip Shields wins grant to create hub for nano-engineering

Congratulations as well to Dr Philip Shields, who is the lead on a project that has secured a £2.65 million grant from EPSRC to develop advanced manufacturing techniques for nano-engineered semiconductors, particularly the III-nitrides. The Universities of Bristol, Sheffield and Strathclyde and industrial partners are collaborators on the project.

The III-nitrides underpin the emerging global solid state lighting and power electronics industries. Creating three-dimensional structures at the nanoscale provides a route to improving the quality of these materials and in turn the performance of these devices. Ultimately this will increase the energy efficiency in these and other emerging applications, such as water purification, where ultra-violet LEDs are used to prevent viruses reproducing.

"This grant will enable us to develop the nanostructuring processes on a manufacturing scale along with reproducible device designs and measurement techniques to unlock the potential of these properties in a range of materials and innovative nano-devices," commented Dr Shields.
The Department of Electronic & Electrical Engineering was proud to see Professor Yonghua Song, long-term academic associate, and Lu Ma, postgraduate student, receive their degrees at the University’s Winter graduation ceremony in December. Lu Ma joined the Department as part of the first cohort of NCPU students six years ago and chose to complete her postgraduate studies with us. Throughout her time here, Lu Ma has demonstrated an unerring enthusiasm for finding practical engineering solutions with far-reaching benefits to wider society. She was awarded two Schlumberger Foundation Faculty for the Future Fellowships and an Outstanding PhD Student Overseas scholarship from the Chinese Scholarship Council.

Professor Yonghua Song was awarded an Honorary Degree in recognition of his contribution to international research collaboration between universities in China and the UK. Professor Song began his academic career in 1989 at Tsinghua University, China, as a Postdoctoral Research Fellow. He joined the University of Bath in 1992 and rapidly became a major force behind the development of artificial intelligence in electrical power engineering. In 1997, he joined Brunel University as a Research Professor of Power Systems, making him the youngest engineering professor in the UK at the time. Throughout his extensive career, Professor Song has maintained very close research links with the University of Bath. He is a pioneer in engaging the Chinese government with universities from across the world, which has significantly benefitted both countries’ capacity in teaching and research to tackle global challenges in food, energy, health, environment and climate change.

In November, the Department co-sponsored four of our undergraduate students to attend the sixth Annual WES (Women's Engineering Society) Student Conference. Leen Jabban, Cherie Tie, Serife Ustuner and Dian Wang, joined twelve other students from the Faculty of Engineering & Design at the conference, which was held at the University of Aston.

The aim of the conference was to bring together over 150 students and engineers to celebrate a shared passion in engineering and technology, and to open students’ eyes to career possibilities. Along with some inspirational talks and practical workshop sessions on topics such as ‘Communication with Impact’, the students had the opportunity to practice their networking skills and one even made contact with a company with whom she hopes to spend her placement year.

Leen Jabban commented, “I think those two days were extremely beneficial and enjoyable and I would suggest that all female students should try attending one of the conferences during their study.”

The University of Bath’s Student Women’s Engineering Society (WESBath) has been formed to support and empower current students within the Faculty of Engineering & Design, as well as to help encourage more young women to choose engineering at university and as a career. Find out more at: [http://www.bath.ac.uk/engineering/women/society/index.html](http://www.bath.ac.uk/engineering/women/society/index.html)

**Celebrating excellence at the Winter Graduations**

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**Question time with Dr Biagio Forte**

How long have you worked in the Department?
I joined in 2012 as a Prize Fellow, but I had been a Visiting Fellow the summer before.

What do you like best about living in Bath?
It’s a nice city — not too big, not too small and rich in cultural heritage.

What is your favourite food?
Tortellini, that’s the food I cook on special occasions!

Do you have any hobbies?
I like swimming and walking. I play the accordion and like dancing the Argentinian Tango.

What is your favourite quote?
"For a successful technology, reality must take precedence over public relations, for nature cannot be fooled." (Richard P. Feynman).

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