

School of Engineering

engineering the future



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Industrial Doctoral Centre for Offshore Renewable Energy

The School of Engineering is leading the new Industrial Doctoral Centre for Offshore Renewable Energy (IDCORE), which will train 50 Engineering Doctoral (EngD) students over the next 9 years. IDCORE is a partnership between the Universities of Edinburgh, Strathclyde and Exeter together with the Scottish Association for Marine Science and HR-Wallingford, and is funded by the Energies Technology Institute (ETI) and the RCUK Energy Programme. IDCORE aims to attract the very best students into a vibrant learning environment and, in partnership with industry, train them to deliver world-class research outcomes that will accelerate the deployment of offshore wind, wave and tidal-current technologies. This will help the UK to meet its 2020 & 2050 targets for renewable energy generating capacity by expanding and sustaining a community of high-quality post-doctoral engineers for the UK offshore renewable energy industry.

During his visit in August 2011 to launch IDCORE, the Rt Hon Dr Vince Cable MP, said: "Engineering skills are vital for the growth of a more sustainable economy and are in high demand from employers. This scheme will see industry working with universities to provide students with the training and commercial experience businesses want. Scotland has real strengths in renewable energy – wind, wave and tidal power, building on a strong tradition of hydro. These students will have the chance to work with some of the leading energy companies based here and tackle one of our biggest challenges – developing technology for a greener future."



Professor Sir Timothy O'Shea (Principal of the University of Edinburgh), Professor David Ingram (IDCORE Director), Mr Chris Stuart Director of Corporate Development at the ETI, Rt Hon Dr Vince Cable MP

Force Edinburgh Racing at the Formula Student Competition 2011



Force Edinburgh Racing (FER) was formed in April 2010 by a group of 3rd year engineering students who began working on the design of a single seat, open cockpit, racing car. The goal is to take part in the annual Institution of Mechanical Engineers' Formula Student competition, where university students from around the world are challenged to design and build their own racing cars and compete against each other at the Silverstone Race Circuit. As the team grew in size, and the designs progressed, FER managed to attract corporate sponsors like Shell, Exxon Mobil, Mardix, and Dassault Systemes. For 2011, FER decided to enter the 'Class 2' group in which the team competed on the strength of their designs. With the

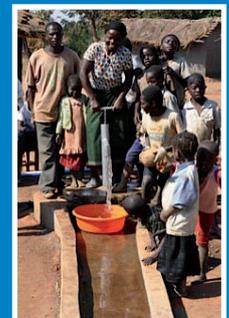
backing of the companies, FER put on an excellent first-time performance, coming in 6th overall and winning the Cost Analysis category. The team for the 2012 competition started with an incredible growth. FER now has over 40 active students across every year from 1st to 5th, mostly Mechanical Engineers but with a large Electrical Engineering team working on the electrical systems. FER is also now working with academics to offer FER related projects in Mechanical Engineering courses in all years from 2nd to 5th.

Safe drinking water technology for Africa from Edinburgh

An environmental engineering team from the University of Edinburgh have developed innovative technologies to address the water problem in Malawi.

Mikael Ullero, Christopher McKeand and Blanca Antizar-Ladislao, in partnership with the charity Water Works (founded by Edinburgh graduate Simon Cohen) have designed the Abakus pump. This is a simple, efficient and sustainable water pump that can be built and maintained by rural communities using locally available and inexpensive materials (i.e. a bicycle wheel/tyre, plastic pipe, rope, and wood).

The problem being addressed is the disrepair of over a third of the rural water pumps in sub-Saharan Africa. With the seed funding from University of Edinburgh Development Trust and Waterloo Foundation, the team and the villagers worked together to build the pumps in 18 rural villages of Malawi. Several months after the training course, the communities were not only able to maintain the Abakus pump, but could build additional pumps without any further assistance.



Edinburgh University Research wins Silver at Business Plan Award

Ahmed El-Rayis, co-founder of **SOFANT Technologies** has won second place in a national competition to recognise the best and brightest research entrepreneurs in Scotland. He received his award, a prize fund worth nearly £12,000, from Professor Steve Chapman, Principal of Heriot-Watt University at an awards dinner held in September.

SOFANT Technologies has designed and patented a new smart antenna technology which will increase signal strength and reduce transmitted power by up to 90%, leading to increased battery life for smart phones and portable devices. SOFANT aims to become a world-leader in supplying green and eco-friendly wireless solutions.

Awards

A number of awards during 2011 have recognised the contributions and impact of our research. These include Stephen Salter who has won the Scottish Government's inaugural Saltire medal in recognition of his role in the development of marine energy.

New Fellow Congratulation to Professor Ian Bryden on his recent election as Fellow of the Royal Society of Edinburgh. Professor Bryden is the Head of the Institute for Energy Systems.

The Royal Society of Edinburgh Launches new Young Academy of Scotland Congratulations to Professor Gareth Harrison who is one of a small number of engineers among the 68 young academics, entrepreneurs and professionals chosen as the first members of the new RSE Young Academy of Scotland.



Our students have had another very successful year winning prizes in various categories including: **Chemical Engineering students runners up in BP's Ultimate Field Trip Competition 2011**

Three third year chemical engineering students, Gareth Herron, Rory Griffin and Sam Walpole, made it to the final of this year's BP's Ultimate Field Trip challenge, a yearly team competition open to UK undergraduate students.

Best Student Paper at the IEEE PowerTech 2011 Conference Adam Collin, a postgraduate student in the School of Engineering, has won the best student paper at the IEEE PowerTech 2011 Conference.

Wave Tank

Earlier this year members of the Institute for Energy Systems (IES) were successful in securing a £6 million grant from the Engineering and Physical Sciences Research Council (EPSRC) towards the construction of the world's most sophisticated test facility for model wave and tidal current energy devices. The All Waters Current and Wave Test Facility is presently being constructed at The King's Buildings.

The facility consists of a 30m diameter circular tank which is equipped with wave making flaps around its perimeter and a bank of flow generators under the working floor. This will allow effective simulation of waves and currents representative of conditions anywhere on the European continental shelf, at scales as large as 1/10th. This new facility has been primarily designed to support the rapidly expanding wave and tidal current energy industry but interest has already been expressed by representatives of the oil and gas industry for the testing of their new generation of subsea facilities and by the underwater vehicle industry. The Facility is due to open in July 2013, in time to support the testing of a new generation of wave and tidal energy arrays, which will be necessary to meet the Scottish and UK governments' ambitious energy plans for 2020 and beyond.

Professor Harald Haas invited to talk at TED Global 2011

Our 5 billion mobile phones transmit 600 petabytes of data every month. That is 6 with 17 zeros. The looming crisis is that we are running out of radio frequency spectrum. Prof Haas showed at the very prestigious TED talks that to solve the problem we have developed technology to exploit the 10,000 larger, free and safe visible light spectrum. We use ordinary off-the-shelf LED light bulbs to transmit data wirelessly. Our technology enables data rates twice as fast as WiFi.

Another Record Breaking Year for Research Income

In 2010/2011 the School was awarded £21.32M of new research grants and contracts which represented a 23.6% increase over our previous best year (2006/7). Major awards received were for the Wave Tank (EPSRC) and IDCORE (EPSRC and ETI).

Improved biorefineries using genetically engineered machines

On a crisp, sunny New England afternoon the University of Edinburgh's iGEM team presented their summer's efforts in designing, building and testing a genetically engineered machine to an audience of the world's elite Universities. From July to September the undergrad team of two engineers, one cognitive scientist, one designer, and three biologists worked on plant-digesting enzymes which can turn cellulose into sugar needed to manufacture biofuels. On the first weekend in September the team travelled to Amsterdam to compete in the European Championship, scooping the Best Model prize for their computational simulations of how enzyme combinations can achieve better efficiency. The team was one of 20 chosen from a field of 50 to proceed to the World Finals. MIT in Boston welcomed 66 teams from across the globe to compete for the coveted trophy! Edinburgh's team faced extremely tough competition but performed fabulously to win the prize for Best Human Practises project for their consideration of how genetically engineered organisms can be integrated into a modern chemical manufacturing production facility. Despite the long hours and steep learning curve team have thoroughly enjoyed their experience in real research in the world's most revolutionary technology; Synthetic Biology.



Alumni News

Former Student is Young Engineer of the Year

Mairead Kelly, a former student of the School of Engineering, has been named Young Engineer of the Year by **bee** (British Engineering Excellence Awards).

The Judges wanted to see a demonstration of the knowledge which the young engineer has had to apply; the contribution made to a project; the degree of innovation applied and the nominee's personal qualities, including their motivation, dedication and ability to act as an ambassador for their discipline.



From the Head of School

"Our graduates' success is always a source of great satisfaction. It's especially heartening to see our alumni succeeding at this high level in areas of work that we would regard as our specialities (in Mairead's case, analogue design).

Mairead was one of our most able students and she has gone on to show that her abilities are not simply academic. Well done, your old School is bursting with pride!"