Welcome to Edition 2!

There have been a number of great developments within the School since our last newsletter – so much so that we have too many stories to fit into the two pages of this newsletter this time around! The stories we do cover, however, show off the unique multidisciplinary breadth of the School. We would still encourage input from you as our Industrial Liaison supporters – corporate summaries and logos, any news of relevance to other industrial members, students, staff … ideas for student projects … just send the material over! We’ve also had a number of approaches from potential new members of the Committee and will be meeting those in the next couple of weeks.

Bob Stone & Carolyn Toney

A Year at CERN (by MEng Student Kevin Sperin)

I am currently undertaking a 12-month technical student placement at the European Organisation for Nuclear Research in Switzerland. I first heard about placement opportunities at CERN at a recruitment presentation organised by the College of Engineering and Physical Sciences last summer. Although physics is the very purpose of CERN, there are also many opportunities for engineers and computer scientists. After the presentation I decided to apply and within a month I was informed that I had been successful. So I put my third year on hold and prepared to join CERN. The work environment here is unusual in that it feels more like working for a university than a business organisation. The Large Hadron Collider itself surpassed all expectations. The first time I went down there I was so impressed with everything from the civil engineering of the actual tunnel to the electrical systems, monitoring systems, cryogenics and of course the superconducting magnets themselves. After my first month I have settled in and have begun work in earnest. I have spent some time in the LHC tunnel taking measurements and analysing the data. I am currently running simulations to match the data and understand why it behaves the way it does. My French is improving and I look forward to what the next 11 months will bring.

Student Develops Ultra Low-Cost Robot Arm

Chris Bibb, a BAE Systems-sponsored PhD student within EECE, has successfully used a 3D printing system to build a fully functioning robot arm with tactile feedback. All 5 fingers of the hand move independently, controlled by servos embedded within the forearm, and the cost of the arm and controllers amounts to around €120. Already expressions of interest relating to the potential for developing low-cost prosthetics have been received from the Royal Centre for Defence Medicine.

New Developments in Microwave Power Distribution

The Emerging Device Technology (EDT) Group has recently developed a new microwave coupler for microwave power distribution. The coupler has been developed through funding from the European Space Agency and Astrium. New algorithms, based on previous EDT research on coupled resonator components, have been developed to enable fast and accurate design of smaller, lighter and more complex circuits – an essential component for space electronics.

Lego League Update

We mentioned the staging of the international FIRST LEGO® League UK Competition on 07 January at the School in the first ILC newsletter. The event was a great success and academic staff, researchers, even future Armed Forces personnel from Taurus Squadron studying at Birmingham as part of the Defence Technical Undergraduate Scheme (DTUS) took part as supporters and judges. This year’s competition was called Nature's Fury and six teams of up to 10 schoolchildren were tasked to consider how we could, using Lego Robots, protect ourselves from natural disasters and rebuild communities struck by such disasters. The teams were assessed on research and presentation skills, robot design and “mission” performance, together with their team working styles in general. Bora-eaton (a scout group from Shrewsbury) was the overall winning team and they will now proceed to the national finals in Loughborough. The winner of the national final will represent the UK at the World Festival in St Louis, USA. We will be maintaining contact with the schools who took part in this competition as part of our outreach plans and aim to visit them in the coming months to give EECE-based presentations. We will also be applying for internal funding to purchase Lego Robots that can be donated to schools who cannot currently afford to take part in the competition for 2014, as the event highlighted the benefits and importance of encouraging children to participate. With this in mind, industry funding for Lego Robots would also be very welcome and we also need volunteer judges from industry for next year’s Lego League tournament, so if you would like to know more or get involved, PLEASE … do get in touch!
Industry Support

Alumnus Phil Blay writes: “Since graduating from EECE in 1980, my career has provided occasional opportunities to work together with, and provide support for the School. I am a member of the Industrial Liaison Committee, and my company has been involved in sponsoring an undergraduate project. However, the latest chance to provide support was in June 2013, when I was one of 13 alumni who took part in the filming for the “Pathways to Careers in EECE” project. I felt really strongly that this project was very worthwhile in hopefully persuading secondary school students that gaining a degree in Electronic, Electrical and Computer Engineering is a route to many varied and interesting careers. I have a career background in engine management system calibration and therefore understand the importance of encouraging our younger generations to become interested in engineering from an early age, to gain the skills and experience required to succeed in a highly rewarding and often specialised field”.

Modular Motor Drives for Electric Vehicles

In collaboration with Samsung’s Advanced Institute of Technology, Dr Pietro Tricoli is undertaking fundamental research in the field of integrated modular multilevel converters for battery electric vehicles. This research responds to the need for more resilient traction converters for battery electric vehicles in terms of modularity, fault-tolerance and cell balancing. The new converter, completely designed and built at the School, is made up of elementary half-bridge modules connected as a double star to improve the lifetime of cells and the converter’s availability, reducing the stopping times of vehicle due to failures and the maintenance costs. The balancing control of the cells is integrated with the three-phase PWM control of the AC traction motor and runs on a FPGA real-time controller, avoiding completely the Battery Management System. The converter enables a range of different modes (DC source to AC load with back-up batteries, batteries to AC load, AC source to DC load with back-up batteries and AC source to batteries) that can be useful for several power conversion applications, such as electric traction, UPS, industrial drives.

Capturing Jewellery-Making Skills in the Field

Building on technologies developed in an EU-funded project called CogWatch, the School has hosted a visitor from Turkey’s Uludag University to explore ways in which craft skills can be captured in the field. Sensors on tool handles record data from jewellery students (from Birmingham’s School of Jewellery) and these data are then processed to determine characteristics of skilled performance. The project will now help to develop an EU Horizon 2020 proposal.

New Cryogenic Energy Storage Centre

Prof Xiao-Ping Zhang and Dr Jonathan Radcliffe from the School are part of the management team for a new University cryogenic energy storage centre now being established. With £6m funding from EPSRC and £5m industry contribution the centre will put the University at the forefront of R&D for this technology. Professor Zhang will be focusing on the integration and optimisation of energy storage in the electricity grid, using new real-time power simulation equipment in the smart grid lab in EECE. Dr Radcliffe has a joint position with the Business School, and will be studying policy and regulation of energy storage, to enable its commercial deployment. Industrial partners include Highview Power Storage, the Dearman Engine Company, Air Products, Arup and the Energy Technologies Institute.

EECE Recreates the Lost HM Submarine A7

On 16 January 1914, just a few months before the beginning of World War I, HMS A7, one of the first submarines designed in Britain for the Royal Navy, was lost with all hands whilst taking part in simulated torpedo attacks to the west of Plymouth. The reason for the A7’s demise has eluded maritime and naval historians for a century. It is still not understood what problems the vessel experienced and even more baffling is the fact that she was finally discovered on the seabed at an unusual bow-up angle of around 30° with her stern embedded in over 20ft of soft clay. The School’s Human Interface Technologies Team has been invited by ProMare, a marine research and exploration charity established in 2001, to help recreate the A7 and her wreck site as a Virtual Reality diving scenario with educational content.

Staff Research Profile

Clive Roberts is our Professor of Railway Systems and has recently taken on the Directorship of the Birmingham Centre for Railway Research and Education, one of the largest research centres in the College of Engineering and Physical Sciences with some 70 members and a turnover of over £3m/annum. He works extensively with the railway industry in Britain and overseas leading a broad portfolio of research aimed at improving the performance of railway systems. Clive’s group has had a long relationship with industry in the UK, which includes a Strategic Partnership in the area of data integration with Network Rail. Internationally, Clive is a Visiting Professor at Beijing Jiaotong University in China, Nanyang Technical University in Singapore and UTM in Malaysia. In 2013 the Anhui-Birmingham International Research Institute in Rail Transportation was established and he took on the role of Director. Clive’s main research interests are rail traffic management, condition monitoring and energy simulation and system integration.

REMEmBR! If you’d like to follow up any of the articles in this or previous newsletters, or get involved with our activities and those of our students, then we’d be delighted to hear from you. We’d also like to feature short statements of interests and capabilities from our industrial partners or any news you think may interest our staff and students. PLEASE CONTACT US!!

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