University of BRISTOL

LynchPin

Bristol Engineering

Spring 2011

Dynamic Designs in China and India

LynchPin Spring 2011

LynchPin is produced by the Faculty of Engineering, University of Bristol

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If you are interested in writing an article for LynchPin please contact: eng-lynchpin@bristol.ac.uk

welcome


DAVE PRATT

I realise it is four years since I wrote my first article for LynchPin and despite enormous changes in higher education, the values which we hold dear still remain constant. I have always said that the activity of the University falls in two areas: the generation of fundamental knowledge and the education of useful people. Both of these attributes are particularly apposite for an engineering faculty. My observation on how higher education is perceived by industry and Government in the intervening period has been a realisation of a migration to quality. Society has an overwhelming need for highly educated, proactive graduates, and industry recognises that not every university generates employees with the calibre that we see amongst our own students. We are indeed in a fortunate position.

It is interesting to note how industries go through cycles. Currently we are in a phase where the automotive sector has come alive after a difficult period in UK manufacturing. In the last two weeks we have been approached by the likes of Toyota Motorsport and Jaguar Land Rover, not only to work with us in fundamental research, but, more importantly from our perspective, to groom and recruit our best graduates to go and work with them and develop their careers. I think I have said before that every conversation I have with our industrial partners in whichever sector, either aerospace, civil engineering, electronics or communications amongst others, always follows the same pattern: "Yes that's fascinating research and we'd like to work with you on that but…have you got 50 or so graduates you could give us who could come and work in our industry?" I take this as the greatest plaudit for the education we provide. The active recruitment from industry, commerce and research organisations of our students means we are producing highly educated people who have marketable skills and who will progress to the very top of their career.

Yet again I have been impressed with the inventiveness of our current students. This year we launched a scheme where we allocated a sum of money entirely for our students to spend as they wish. It has struck me that while all academics have students' interests at heart, it would be interesting for us to know what really motivates students and so I have asked them to produce a prioritised list of how they would like spend a sum of £10,000. The results came back demonstrating not only the inventiveness we've come to expect, but also a gratifying understanding of social responsibility. For instance, deploying photo-voltaic cells to offset the carbon usage within the Faculty is a plan which I wouldn't have thought of immediately but clearly was a thoughtful and responsible thing to suggest. There are many others which will improve the learning environment at Bristol which we will take forward anyway because I was so impressed with the ingenuity and constructive nature of the ideas.

It is no surprise to me, given how our students have performed and how they continually impress me, that employers beat down our door to employ them. So despite changing circumstances in higher education, the fundamental remit of the Faculty to deliver first rate education and graduates continues unabated. As I say to our students, the future of the Faculty is really in your hands so go out and do great things!

Professor Nick Lieven
Dean of Engineering

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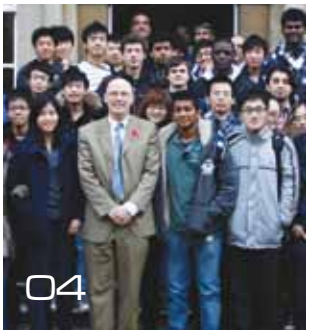
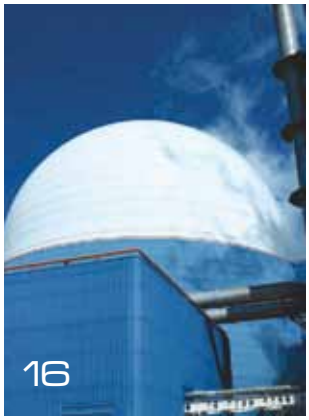


JAMIE CORBIN

TOSHIBA



UNIVERSITY SPECIAL COLLECTIONS

newsclips

ANDY STEVENS

The latest news and events from around the Faculty

Professor Nishan Canagarajah

Dr Krasimira Tsaneva-Atanasova

Professor Paul Bates, Director of the Cabot Institute

New Dean of Engineering

The new Dean of Engineering has been announced as Nishan Canagarajah, Professor of Multimedia Signal Processing, Department of Electrical & Electronic Engineering and Head of Merchant Venturers School of Engineering. Nishan will take up his new post on 1st August.

Lifetime Achievement Award

David May FRS FREng, Professor of Computer Science at the University of Bristol, as well as Chief Technical Officer and co-founder of spin-out semiconductor company XMOS, was presented with a Lifetime Achievement Award at the 2010 Elektra Electronics Industry Awards in London.

The annual awards ceremony called the Elektras are run by Electronics Weekly. The aim of the awards, which have been running for five years, is to reward the achievements of individuals and firms across the European Electronics industry.

XMOS, which started as a University of Bristol undergraduate computer-science project, is now a major semi-conductor business developing software-defined silicon devices and tools. Professor May developed the core technology that enables consumer electronics equipment manufacturers to follow fashions and differentiate products rapidly at minimal cost.

Professor May gained many years of experience in the semiconductor industry before coming to the University of Bristol in 1995. He was Head of the Department of Computer Science from 1995 to 2006. He introduced many innovations to the curriculum, especially in design and enterprise. As a result, every year, new companies are formed by graduating students.
More at www.bristol.ac.uk/news/

EPSRC grant award

Dr Krasimira Tsaneva-Atanasova, a lecturer in the Department of Engineering Mathematics, has been awarded a first grant by the UK Engineering and Physical Sciences Research Council. The first grant scheme is to enable new academics to establish an independent research team at the start of their careers.

Krasimira's research aims to develop a new technique for controlling the behaviour of neurons or other excitable cells in a functional context. The principle is to modify a component of the system in a controlled manner, and to functionally introduce it with a technique known as dynamic clamp, on the basis of a computational model.

The proposed study is highly ambitious, and will draw on the experience of leading researchers at the University of Bristol. It applies interdisciplinary approaches, such as mathematical modelling, numerical analysis and iterative cycles with wet-lab experiments to validate the models and test model predictions. Ultimately it will lead to better understanding and possibility to control the complex behaviour of excitable cells.

Director of Cabot Institute appointed

Professor Paul Bates has been appointed as the new Director of the Cabot Institute, a multidisciplinary research institute at the University of Bristol focusing on all aspects of global environmental change. Professor Bates, from the University's School of Geographical Sciences, is a hydrologist by background but has widespread research interests in risk, resilience, uncertainty, governance and decision-making in relation to natural hazards and global water issues. To date he has published over one hundred international journal papers. His current work is funded by NERC, the EU, AHRC and the Willis Research Network. He is Editor-in-Chief of the Journal of River Basin Management and a member of the Science Team in the forthcoming $600 million NASA/CNES Surface Water Ocean Topography satellite mission.

The Cabot Institute brings together some of Bristol's most outstanding research in natural hazards and risk, Bayesian statistics, uncertainty and decision-making, climate modelling, poverty, global insecurities and governance, and systems engineering.
More at www.bris.ac.uk/cabot

BCTCS 2011

Professor Nigel Smart will be giving one of the six invited talks at this years British Colloquium for Theoretical Computer Science (BCTCS). This will be the 27th BCTCS, and over time this annual event has become a focus for UK researchers in theoretical computer science. Each year the programme aims to encourage theoretical computer scientists to meet, present research findings, and discuss developments in the field. It also aims to provide an environment in which PhD students can gain experience

in presenting their work, and benefit from contact with established researchers.

BCTCS 2011 will be held at Birmingham University from 18th-21st April 2011, and is sponsored by the London Mathematical Society.

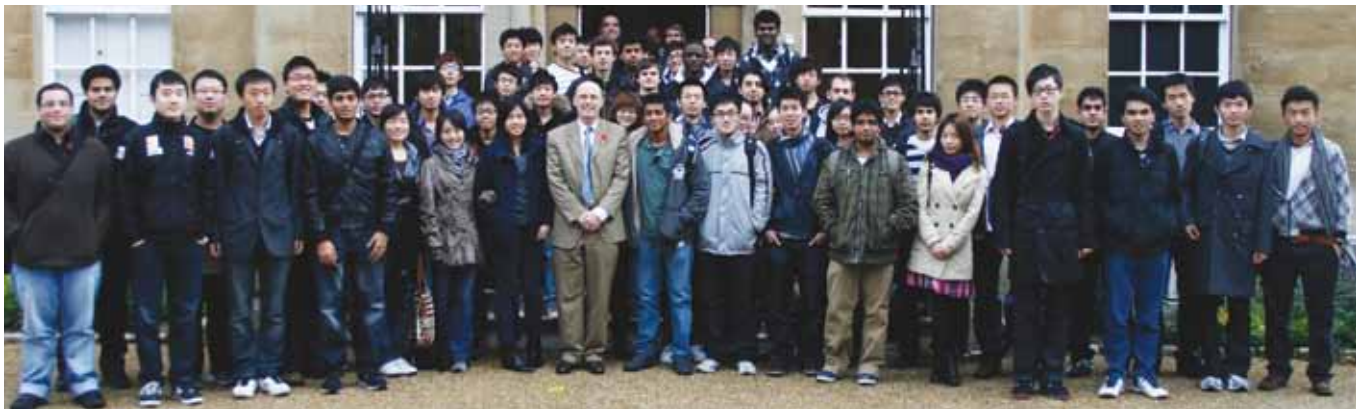
Overseas Scholarship Ceremony

An awards ceremony was held in Royal Fort House last November for new engineering undergraduate students from overseas who achieved A*AA at A level or the international equivalent. Professor Nick Lieven, Dean of Engineering, hosted the occasion and academic representatives from each department also attended.

Professor Lieven said of the event: "The criteria for these scholarships was even harder this year than last, and yet still we had many winners. This reflects the high calibre of our overseas students - congratulations to all of them."

New posts in Marketing

The Faculty welcomes Paul Ayres and Claire Eatock who will be handling our marketing and web requirements in the future. Paul takes up the post of Web and New Media Officer, and Claire that of Marketing Officer. Both are Faculty facing and will be based in Senate House. There is a short profile of Claire on page 22, and Paul will feature in the Summer LynchPin.



Green Impact
University of Bristol

Professor Nick Lieven with the Overseas Scholarship winners at the ceremony in Royal Fort House

Mr Simon McIntosh-Smith

Dr Alin Achim taking part in an Iron Man 70.3 race

The Green Impact logo

UAV Annual Conference

The 26th Bristol International UAV Systems Conference will be held over 11-12th April 2011. The first conference was held at the University back in 1979, under the joint sponsorship of the Department of Aeronautical Engineering and the Royal Aeronautical Society.

The Bristol UAV Systems Conferences have become established as the international forum for discussion of all aspects of research, development, manufacture and operation of unmanned airborne vehicle systems, both civilian and military. The conferences are sponsored by the University of Bristol and supported by Cranfield University and the Royal Aeronautical Society, together with civil and military authorities and industry.

Biodiversity Representative

Dr Alan Feest, Senior Lecturer in Continuing Education, Department of Civil Engineering, has been appointed as Biodiversity Representative to the European Commission for the European Water Association.

First Business Fellow

Research and Enterprise Development has announced that Simon McIntosh-Smith of the Department of Computer Science is to become one of the first Research and Enterprise Development Business Fellows - research scientists at Bristol who will take the lead in supporting a culture of collaboration between academics and industry. The University has been working with the London Technology Network (LTN), a group with extensive experience in helping science-based university researchers to increase their interactions with business. The new Fellowships involve intensive training and mentoring provided by LTN, who will also facilitate interactions with industry around specific projects.

Iron Man Alin

Alin Achim, of the Department of Electrical and Electronic Engineering, is taking part in one of the most gruelling races in the UK Triathlon calendar, the UK Ironman 70.3. It will take place in June at Wimbleball Lake, in the beautiful Exmoor National Park. As with any 70.3 race, Alin will need to complete a 1.9K swim, a 90K bike ride and finish with a half marathon. The bike course is particularly challenging though, as it is said to include 52 hills in 56 miles! For the extra motivation needed to see him through this challenge, Alin is seeking sponsorship and since he is into multi-sports he has opted for a multi-charity, the Rotary Club of Sherborne Castles who will distribute the money raised among charities including children's hospices, cancer charities, Air Ambulance, Help for Heroes, and Childrens Life Education.

If you would like to sponsor Alin please visit http://www.justgiving.com/Alin-Achim-70-3

Charity run

In April, Sophie Causon-Wood from the Systems Centre will be running the London Marathon as part of the Action for Children team, pledging to raise £1,500.

Sophie said: "This is the biggest challenge I've ever faced. Although I have completed half marathons before the thought of running for four hours is quite daunting. But having watched a friend complete the Marathon last year, I knew I had to take part. My charity is Action for Children as they support the UK's most vulnerable, disadvantaged and neglected children. I've seen what this charity can do and know they'll make every penny count."

If you would like to help Sophie reach her target, please visit: http://www.justgiving.com/sophie-causon-wood-london

Green Impact Awards

The Faculty is delighted to announce that the Graduate School Office, the Merchant Venturers School Office, the MVB IT team, the Queen's School Office and the Faculty Office will be taking part in this year's Green Impact Awards.

The Green Impact Awards offer a practical way of helping areas become greener, while celebrating the small steps that individuals are taking to reduce our collective environmental impacts. We are challenged to implement a number of practical actions that will help the environment. The more actions completed the more points are scored, leading to a Bronze, Bronze Plus, Silver, Gold or Platinum Award.

Recent efforts to improve our green impact have resulted in a number of changes around the Faculty: the installation of water fountains in MVB, increased signage reminding you to switch off lights before you leave an empty room, improved draught proofing of the windows in Queen's Building, and emails explaining how to set up your printer to enable double-sided printing. We would welcome any comments or suggestions you have to support this initiative. Please contact Mary Millard mary.millard@bristol.ac.uk.

More details on the scheme see http://www.bristol.ac.uk/environment/green_impact/

student news

Engineers Without Borders

'A unique combination of passion, vision and determination' was the praise used by the Alumni Committee as they awarded Peter Cooper a 2010 Convocation Award. Convocation Chairman Bill Ray accredited Peter - a second year Engineering Design student - with having created 'a generation of students with enhanced interest and vigour for their degree'.

Each year, the Alumni Committee ensure the University's greatest non-sporting award is placed in the hands of those who have contributed the most to University life out of the entire student body. Since taking the reins as President of Bristol's Engineers Without Borders Society in 2009, Peter has led the Society to a string of successes - the group now numbers an impressive 800 students, the Society's Outreach Program has gone from reaching 100 children a year to over 15,000 and in 2009 it became the first student organisation to win the University's Engagement Award. The Society's prestige grows daily: speakers travel from the capital to present new perspectives on engineering, Jaguar have emerged from industry keen to support their work, and government representatives overseas have gone so far as to propose development projects for its members.

"As honoured as I am to receive this award, a great deal of thanks goes to those who have inspired and motivated me, especially my committee" Peter commented, whose work has earned him an invitation to a Parliamentary Debate. "Traditionally there are too many boundaries: negative stereotypes about what engineers shouldn't be concerned with, including creativity, activism and human interaction. A progressive attitude is what we've always been about and it really resonates at Bristol: people genuinely care about making a difference, through the profession, to lives at home and abroad."

Nick Lieven, Peter's nominator, described his contribution as having "great benefit reaching beyond just students and academics at Bristol, to children, both at home and overseas and his subject area as a whole".

Peter will continue his leadership of the Society until the end of this academic year when he leaves for an Industrial Placement, yet to be finalised. Anyone keen to get involved with the Society should email peter.cooper@ewb-uk.org or visit www.ewb-bristol.org.

Engineers Without Borders Bristol blossoms in the Spring

Reaching 15,000 students last year, this term has seen EWB's Outreach Programme restart its crusade, with an intense period of school bookings and festivals to follow. Dropping textbooks for a day, pupils from as young as eight years old will try their hand at interactive, creative workshops designed to dispel the myths of engineering and get a feel for the world-changing power a career in the field can offer you.

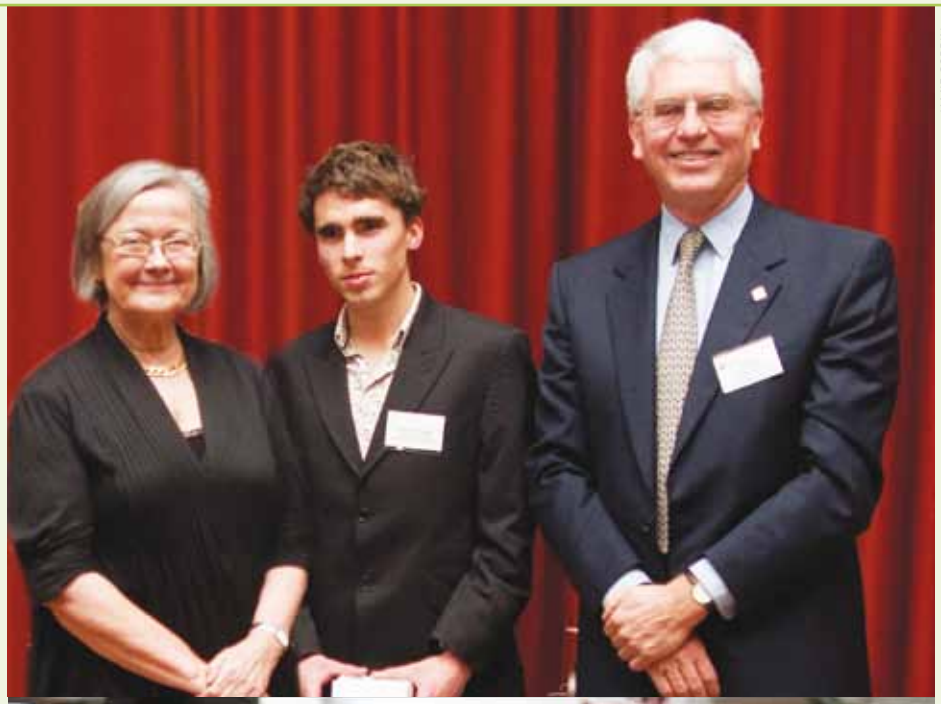
Although the team has a long way to go there's no lack of enthusiasm in the ranks; outreach training is now enhanced through a partnership with teaching experts Teach First. If you're interested in one of our many outreach workshops for any non-profit group, please contact Rachel Harding, our Outreach Officer, at rh0196@bristol.ac.uk.

Another success story is our Talks Programme. The '1.4 Billion Reasons' presentation from the Global Poverty Project who are working to alleviate poverty, was the first in a line with successful external speakers. Future orators will include Adrian Bowyer, Creator of the Rep Rap Prototyper; Vinay Gupta, Refugee Shelter Designer and a team from Red Button, Humanitarian Product Designers. If you know something that could make a difference, don't hesitate to let our Talks Officer, Chloe Tingle, find you an audience - ct9566@bristol.ac.uk.

While some fields are following tried and tested methods, others are changing with the times. Rather than relying on a myriad of websites, EWB Bristol's design team have been sweating over a new website to make EWB more communicative, efficient and slick.

Our yearly club night is also on the move. 'Sha La' this year will be held at Joe Publics, but will retain its ethos: celebrating studying Engineering broadly with a night of broad entertainment. It will be a unique fusion of comedy, acoustic, live music and niche DJs. Last but not least, there'll be a new Shadowing Scheme launching over the coming weeks. All positions - including mine - will be teamed to fresh faces at EWB keen to learn more about the roles.

Until next time,
Peter Cooper
EWB Bristol



JAMIE CORBIN

Chancellor of the University, Baroness Hale of Richmond, EWB President Peter Cooper and Convocation Chairman Bill Ray

An attentive audience listen to the talk '1.4 Billion Reasons' by the Global Poverty Project

A young mind is fascinated by the hydroelectric village at an EWB Bristol stand, part of the 2010 Discover Festival.

Portrait of a second year design project

David Dijemeni tests out his second year project design

Switch Mode Power Supplies (SMPS) provide a constant, stabilised DC voltage for a wide range of electrical and electronic equipment such as computers, televisions and so on. In the second year SMPS design laboratory, students have to design, build and test a highly efficient 45W, 15V regulated power supply that is fed from the 50Hz mains supply. The design exercise considers the use of a variety of electronic components, such as power electronic devices, transformers and filters, as well as the practical implementation of electronic control techniques in order to provide the students with an appreciation of the challenges and compromises involved with any product design.

David Dijemeni, Electrical and Electronic Engineering (MEng) writes about his involvement in the project:

"It was such a great experience. It was all engineering from start to finish. We started by designing a 3524 module and a reservoir capacitor. Deciding the size, amount of energy and output voltage of the reservoir capacitor was our first dilemma. We had to choose between efficiency and cost. A bridge rectifier was built to rectify the input voltage waveform from the 35V variac supply to the PCB. The SG3524 module was used to employ the printed circuit board which was mounted on the prototyping board together with the reservoir capacitor.

The excitement continued as we began the design and implementation of the Main transformer. It was driven by MOSFETs. This was a good design because it made the SMPS smaller, cost effective and robust but unfortunately we encountered the problem of a high rate of change of voltage and current which caused switching losses and high power dissipation losses. These losses were minimized by twisting the connecting wires, reducing the size of gate transformer and by using heat sink.

The next part of the project was to make the secondary part of the SMPS. The first part of this was to build the current transformer. This current transformer has to operate as a current limiter by establishing very little flux. Not easy! We built the secondary windings, choke filter and connected both of them to different loads. The SMPS project finished with the design and application of a closed loop integral system.

Did our SMPS work? Yes. It was really fulfilling and amazingly overwhelming to get our Switch Mode Power Supply Project to work from zero to a system level, based upon the following specifications: Input Voltage 35 Vac 50Hz ± 5%; Output Voltage 15 V dc; Power Output variable between 15W and 45W; Output Regulation 0.1% (stepping between 45W and 15W); Output regulation 1% (peak to peak ripple voltage) and an Efficiency at full load of 76%."

University Challenge success for Bristol

Congratulations to the Bristol team for their very successful campaign in the BBC's University Challenge competition this year. Although Bristol has never won the competition outright, past teams have made it through the rigorous selection process to take part in six series since the competition was revived in 1995. Reaching the quarter finals is a fantastic achievement and the speed and accuracy of the team's responses and their general good humour was a great example to all.

Ario Brunet, Mechanical Engineering (MEng) was one of the team and he writes for LynchPin about the experience.

The process to select the Bristol University Challenge team for 2010/11 began with an innocuous advertisement in Epigram during the autumn term 2009, inviting students to a trial quiz in the UBU Bar. Of the three hundred or so applicants, ten were selected to go through to the next round, and from these ten the final line up of Lucinda Critchley (Modern Languages), Georgia Malcolm (Chemistry), James Williams (Physics), who captained the team, and myself, with Claire Thomas (Modern Languages) as reserve, was chosen.

For the BBC to whittle down the teams from approximately 100 applicant universities to the 28 who would go on to compete in the challenge proper, a further two rounds of quizzes had to be endured. However, it was not only these results that determine who goes through to the televised rounds. One of the producers mentioned that a lot of deliberation goes in to ensuring that all parts of the country are fairly represented, with only five colleges from Oxford and Cambridge, and five London universities put though.

By early 2010 it was announced that the Bristol team had made it though to the televised rounds, and in April they went up to Manchester for filming. The first round, against St Andrew's University, was incredibly tight, with Bristol winning in the dying seconds by a mere five points. The fixture was so gripping that the team was immediately told that it was likely to be the first broadcast of the series. Needless to say, we were delighted by this, and a drink in the green room with Jeremy Paxman kickstarted an evening of celebration.

In May the team returned to Manchester for the second round of filming, this time up against Newnham College, Cambridge. Although their team was selected from a pool many times smaller than Bristol's, an Oxbridge college is never to be underestimated. However, Bristol romped to victory by over 100 points.

The final round of filming included a minimum of two quarter finals, with the possibility of a third, a semi final, and (whisper it) the final. Unfortunately, Queens' College, Cambridge, provided extremely stiff opposition and narrowly beat Bristol in their first quarter final. All was not lost however as, under the new system, each team gets to compete in at least two quarter finals. Win both to go through, lose both to go out, and if one match is won and one lost, a playoff happens, so Bristol still had a lifeline. If they beat their next opponents, they would receive a playoff to stay in the game. The next opponents turned out to be York University and unfortunately, despite Bristol having a commanding half-time lead, York came through with an incredibly strong second half showing to dump Bristol unceremoniously out of the competition.

■ The next series of University Challenge will be broadcast by the BBC in the summer.

BRUNSWICK.COM

Hi flying alumni

Steve Coultate graduated from Bristol University in 1980, with a degree in Mechanical Engineering. He is now Vice President and General Manager of Brunswick European Boat Group and is based in Brussels.

"Before starting at Bristol I was lucky enough to get a full sponsorship with the Ministry of Defence. This meant one year living and working away from home. I was posted to a factory in Leeds producing tanks, and spent that year with the intake of 40 craft apprentices. I learned a lot while I was there – not all to do with engineering!"

After he graduated, Steve was sent to a number of UK locations to gain some insight into research, design, product development and manufacturing. "This was really helpful because to be honest, I wasn't sure what I wanted to do. I know some people have a passion from the earliest stage, they know what they want. For me, the two years after University gave me the insight I needed."

Steve opted to return to the factory in Leeds and over the next four years gained experience as a manufacturing supervisor, then a quality engineer, and finally as a Production Scheduling Manager. "I chose probably what was then the least glamorous of routes: manufacturing. Why? Because it combines technical engineering aspects with a lot of people-related aspects: learning how to deal with people at all levels, work in teams, managing groups...to achieve great products that the whole team is proud of. It gives you an enormous buzz."

Steve joined Jaguar Cars in 1986 where he progressed to General Manager of the Halewood plant. In 2001 he was appointed as Manufacturing Director of Land Rover. "I spent 19 very stimulating years with Jaguar, Ford and Land Rover. We moved Jaguar to top of the JD Powers Quality, we converted Halewood from a Ford to a Jaguar plant, and launched some fabulous products: the XK, the XJ, the new Discovery and Range Rover Sport. I was proud to ultimately head up one of the largest manufacturing sites in the UK – and produce some world-class products."

Steve Coultate, Vice President and General Manager of Brunswick European Boat Group

In 2005 Steve took over as Managing Director for Sealine, one of the top four British manufacturers of luxury motor yachts. "I wanted full P&L responsibility: from marketing strategy through product development, manufacturing and sales. It is has been tremendous – we have just won Power Boat of the year for the new 42 foot Flybridge – Google to see it!"

Steve was appointed Vice President of the parent company's European Boat Business Unit in 2009. "As well as Sealine I now have responsibility for several other brands – including Quicksilver. It is enormous fun to run a brand: to formulate how to win market share, improve margins, challenge the others in the market place. Our new Quicksilver branding and products are doing just that."

"Bristol gave me a fantastic start - to gain confidence, be challenged, make some great friends, and grow."


ANN PETHERS

The Boeing awards ceremony held in the atrium of MVB.

Back row l to r: Professor Andy Nix, Dr Mike Barton, Andy Owen and Shane Bennison of Boeing Defence UK, Professor Nick Lieven, Professor Mark Beach, Dr Fabrizio Scarpa. Front row l to r: Ben Buxton, Bridget White, Joshua Shimmin, Sky Sartorius, James Wilcox, Samantha Huntley

The Boeing awards

From intelligent vehicles to fluid mechanics, helicopter design and ultrasound radio echoes, six students from the Faculty of Engineering have received prestigious awards from the Boeing Company for their outstanding academic performance in the field of integrated aerospace systems. Bridget White and Joshua Shimmin both received scholarships for their final year of study whilst James Wilcox, Samantha Huntley, Sky Sartorius and Ben Buxton all received awards for their final projects.

The awards are in a technology area that has been recognised as being important to UK industry. Boeing has chosen to recognise these students to encourage future generations of students to study topics that cover integrated aerospace systems.

Speaking at the award ceremony held at the University of Bristol on the 3rd February, Shane Bennison, Engineering Director for Boeing Defence UK said "these students have excelled and are worthy winners of these awards, they have demonstrated the significant prerequisites for becoming the engineering leaders of the future."

The aim of the awards is to recognise those students who have demonstrated a flair and passion for engineering and who have consistently been at the top of their class. The project work undertaken by these students has shown the necessary imagination and creativity to solve some very difficult problems and makes them worthy of such an accolade.

One of the winners James Wilcox was awarded the best MEng project in Electrical and Electronic Engineering for his project 'Fully Autonomous Scalextric Vehicle using MEMS Inertial Sensors'. Project supervisor Dr Mike Barton said: "James designed and built instrumentation to be mounted inside a Scalextric car to allow it autonomously to negotiate a track at optimum speed while transmitting telemetry data via Bluetooth - and he achieved a working demonstration on time."

Of the scholarship winners Bridget White, who is in the final year of her MEng in Aeronautical Engineering, had achieved the best academic record in the third year of her course and has been the student representative for her course last year.

The Dean of Engineering, Professor Nick Lieven commented: "our students have once again shown that they are highly capable individuals who have demonstrated a talent for engineering. Our students are without doubt amongst the best engineering graduates in the world and it is to their credit that they have been recognised for their achievements during their studies."

The awards were funded by the Boeing Company along with a contribution to support the student robot test arena and the University of Bristol Aeolus wind powered car project. The support to these students, facilities and projects are hugely important to help inspire the interest of future students and ensure that the UK remains at the forefront of advanced engineering.

Four members of the Deflection team (l to r) Samitha Soysa, Dominic Brown, Matthew Graham, Christine Spencer.

Winners of the South West ICE Teamwork Challenge

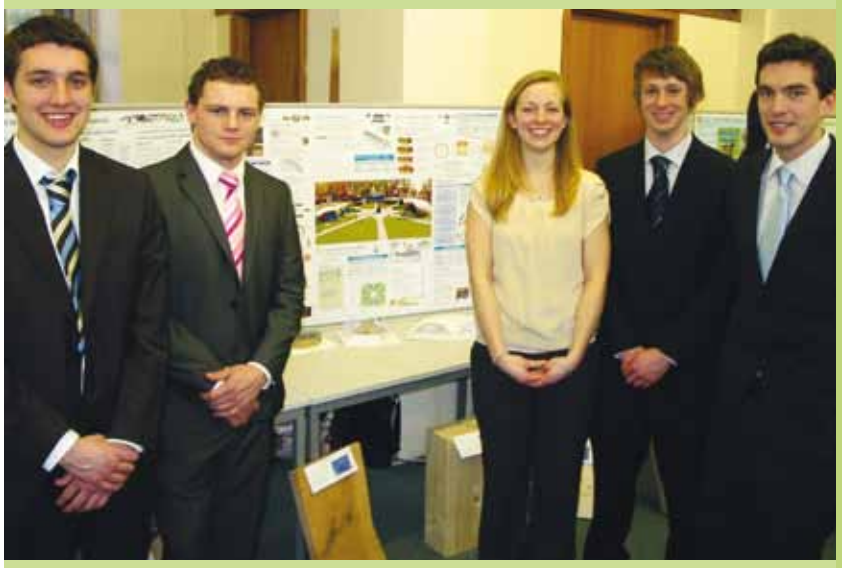
At an unholy hour on a freezing Sunday morning six Bristol students from the Civil Engineering Society 'Deflections' dragged themselves from their beds to take part in the annual Institution of Civil Engineers (ICE) Teamwork Challenge.

Samitha Soysa, Dominic Brown, Matthew Graham, Christine Spencer, Matt Oliver, and Johanna Szczyglowska formed two teams, University Challenged and Buro Bandits.

The event was held at the Mill on Brue Activity Centre in Somerset with teams of graduates and students from other universities as well as four dedicated company teams. They took part in a series of engaging activities, including "Gold Rush" - a search for gold in pitch black interlinking tunnels - obstacle courses and, of course, the inevitable bridge building exercise involving planks of wood, canoes and ropes. The hospitality of the Activity Centre was outstanding: lunch consisted of lamb hotpot and roasted vegetables with a combined total of only 27 food miles, as well as delicious afternoon snacks and a complimentary pint at the end of the day. Students joined forces with the company graduates to make teams of seven and eight. The two Deflection teams triumphed, taking the first and second places, leaving the two non student teams to swallow their pride and make their way back home to Bristol.

Deflections is a society for Civil Engineers and anyone interested in making things stand up. The Society aims to promote Civil Engineering as a course, to bring engineers together and to provide academic support for students. They organise talks, socials and trips, provide a supportive parenting scheme, collect feedback on textbooks, and help with career opportunities.

DESIGN PROJECT POSTER DISPLAY



Final year students William Oldham, Hugh McGilveray, Naomi Brass, Benjamin Cannell, George Cullinane present their poster 'A Travelling Fair to raise awareness of Sustainability' and (below) Karolis Kairelis, Laura Visockaite, Neha Patel, Sarah Quigley, Todd Dembrey present 'Gravity Foundations for Wind Turbines'

During the second term of every academic year, the final year students on the Civil Engineering MEng degree course put on a poster display of their 40-credit design projects in the Central Design Office, Queen's Building. The projects this year range in theme from the design of a 42,000 seat stadium for Bristol City Football Club to the detailing of a building to house a new national library and museum in the capital of Kazakhstan. In the latter case, the added challenge of a building façade in the form of an extruded Moebius strip is present.

Projects focused on the current hot topic of renewable energy are increasingly popular. The students mobilise themselves into groups of between three and five to work on each project. They draw inspiration from multiple sources including site visits where possible, previous though less advanced existing designs, discussions with practicing engineers from firms including Arup, Ramboll and RWE Renewables and, most importantly, their own creativity.

Redevelopment of Bristol's Colston Hall, one of this year's projects, also motivated the students to interact with acoustic engineers.

A particularly striking theme of this year's session – held on 28th February – was the extensive use of carefully crafted physical models and laptop displays to accompany the posters. The Department's industrial advisory board meeting was held on the day, enabling the visiting industrial members to view the posters and discuss the students' work with them. This interaction with the practitioners strengthens the life-like context within which the students operate at an advanced stage of their work. In the energy-focused projects, the students relish their activities which straddle the boundary between design and research. Feedback from the industrial advisors suggests that the students' approaches to solving modern problems align well with industry's needs. A representative from Fugro UK (part of the world's largest integrated supplier of geoscience, survey, and geotechnical related services) has invited one group of students working on a renewable energy project to present their ideas to his colleagues at work. The Department continues to support the students as they move into the ultimate stages of their designs and into preparation of their final reports. We wish them well through to their final exams and on into their post-University careers.

Dr Wendel Sebastian
Tutor for 4th year Design Project Unit

Dynamic Designs go Global

Following its successful launch in South Korea in the summer of 2009, 2010 saw the Dynamic Designs earthquake engineering competition go to both India and China. Both events were a great success.

feature

The competition final gets underway in Shanghai

In India the competition was held in a remote location several hours north of Delhi, as IIT Roorkee, one of the elite engineering institutions of India, played host to the final in August 2010. Drs Adam Crewe and Wendy Daniell braved extreme weather conditions to get to the venue, and various delays to the competition before the final itself. Dr Daniell writes: "India was a challenging environment to work in - the competition was nearly called off at the last minute due to the flooding between Dehli and Roorkee. Our apprehension before we left was added to by an over-eager taxi driver who took us to our venue over flood damaged, deeply pot-holed tracks to avoid traffic, not to mention the concern that riots could erupt locally that day as a result of a long-awaited high court verdict on a religious disagreement over a holy site. However, once we arrived safely at IIT Roorkee, the competition was fantastic and our hosts in the Earthquake Engineering Department were very welcoming. I was particularly impressed by the high standard of presentations from the students - very entertaining in some cases. One team had a member of such talent, as a speaker and in the research he'd done for the competition, that we were all agreed he'd make a fine catch as a PhD student."

The competition in China was accompanied by particularly huge publicity and fanfare. The British Council launched the competition at the Shanghai Expo (one of the largest exhibitions of its kind in the world) in September 2010. In the weeks immediately before the live final in Shanghai, Drs Andrew Harrison and John McWilliams (as well as Chas Pope from ARUP, a competition judge) delivered a series of lectures at universities across China that were providing finalists for the competition. Some of the audiences for these lectures were over 300 strong and these events helped to build up a great sense of anticipation in advance of the final on 30th November. All this meant that the event had a big impact in China: the website for the online competition received 16,000 visitors; the final itself - broadcast live on a major Chinese website - received over 1.5 million visitors. The British Council estimated the value of publicity to be RMB 4.75 million (nearly £0.5 million).

The final took place at Tongji University, Shanghai, one of the top universities in China, and one that shares with Bristol a specialism in earthquake engineering. The competition judges were Drs Adam Crewe and Wendy Daniell, and also Chas Pope (ARUP) and Professor Lu Xilin from Tongji University itself. After a very close competition, the event was won, fittingly, by a team from Chengdu, a city in a seismic area that suffered very badly from a major earthquake in 2008. Adam Crewe writes: "The competition in China was very different to that in India. Many of the challenges in China stemmed from the fact that the teams had very high expectations for their designs. This coupled with some interesting interpretations of the competition rules and some very creative and innovative solutions meant that I ended up having to make some very tough calls about the legality of some of the designs. The competition was fierce and

Dr Adam Crewe inspects a model, IIT Roorkee, India

with lots of teams looking over my shoulder to check I was being fair I really felt in the spotlight. Then just when I thought the pressure was off things got interesting again. At the live final (where I was the compere) I felt like a major public figure at a press conference there were so many cameras and spotlights trained on me. I later found out that hundreds of thousands of people were watching the final live online, so I'm very glad it all went smoothly. After the competition Wendy and I managed a visit up the Shanghai World Financial Center which currently holds the record for the world's highest observation deck. This gave us fantastic view of Shanghai and was a very appropriate way to round off a structural design competition in China."

Reactions to the China competition

"Dynamic Designs was a really exciting competition for us to be involved in. The feedback from teams has been excellent both about the style of the competition and interaction that they had with the tutors from Bristol! I believe it really gave students a unique taste of what is like to study in the UK and the cutting edge research that we currently have going on."

Mandy Deng, Project Manager, British Council China

"Compared with other similar structural design competitions in universities in China, Dynamic Designs had many distinct characteristics and challenges that were uniquely difficult for the students. It allowed for a multidisciplinary approach to the competition with opportunities for teams from different subjects to take part, and test their abilities in different ways. Teams needed to have not only Civil Engineering and Architecture basic skills, but also disaster reduction knowledge, sociology, English Application, CDT, and even a certain level of video-making skills."

Professor Yang Cheng, a tutor from Southwest Jiaotong University

"Taking part in Dynamic Designs was an unforgettable experience; I had a great time at this competition."

Liu Wei, a student from Jinan University

A follow up event

The winning team (Team of Legend), funded by Emirates Airlines, the British Council, and the Faculty of Engineering, have won an all expenses paid trip to Bristol in July 2011. The visit will primarily involve developing their winning design in important ways: improving the structure (with structural engineering experts at Bristol); developing a sustainable energy system for the building (working with engineers who do research on green technologies); and developing greener materials with which to build the hospital. The team will also do some sightseeing and get a taste of life as a student in the UK. Their video diaries and blogs will be available to read in China during their stay.

What is Dynamic Designs?

Dynamic Designs is an engineering competition run as a collaboration between this Faculty and Education UK (the education arm of the British Council). Teams of students (six strong, with an academic tutor to guide them) from across a country create a design for a hospital building in a seismic zone. Their design must take account of all aspects of the building, from its earthquake resistance, to its architectural design and financial viability. Academics from the University of Bristol (Drs Wendy Daniell and Adam Crewe) initially judge the competition online, narrowing down hundreds of entrants to a set of finalists. There is then a 'grand final' hosted at a university with an earthquake engineering laboratory, and judged by Adam and Wendy from Bristol and typically two others – in the case of China, a Professor of Civil Engineering at the host university and Chas Pope, a structural engineer with ARUP. The finalists have two major tasks to complete in the day: a presentation, and building and testing a small-scale replica of their building. The presentation requires two members of the team to present all aspects of their hospital design, including a visual representation of the architectural design, an explanation of the benefits to its investor and the people of the imaginary town in which the building is planned, and its ability to withstand an earthquake. The two members make their presentation within a strictly enforced time limit and then receive a (tough but fair) grilling from the expert judges. While that is happening, the rest of the team are busy building a small scale replica of their design, with strict controls on the type and amount of material used, which is then tested to destruction on the shaking table; this provides a fittingly spectacular grand finale to the event, as the heavily weighted model buildings break up under larger and larger earthquakes, throwing their weights and components in all directions. Adam Crewe is the enthusiastic ringmaster for the destruction. The combined score of the presentation and the earthquake test determines the winner, and there are also winners in various smaller categories, such as innovative design. Although the final winning team in China (Team of Legend) did not win any of the individual categories, their consistency across the two main competitions meant that they were worthy overall winners.

research

UK Centre for Doctoral Training in Communications

The Engineering and Physical Sciences Research Council (EPSRC) has introduced a new structure for postgraduate PhD training in the UK. The conventional three-year PhD programme is being complemented by an integrated four-year programme delivered through Centres for Doctoral Training (CDTs). These now provide specialist training across the EPSRC portfolio.

After a highly competitive process, EPSRC has awarded the UK CDT in Communications to the University of Bristol. It will focus on Future Communications: People, Power and Performance. While communications technology is the enabler, the new Centre recognises that it is people who are the creators, consumers and beneficiaries in terms of its broader applications. The Bristol bid was selected over nine other leading UK universities and is the result of a close collaboration between the Departments of Electrical and Electronic Engineering, Mathematics and Computer Science - all acknowledged as leaders in their fields. Communications technology not only provides personal voice and data services but it also underpins the aerospace, medical, defence and security industries. The UK is a leader in this field with the sector contributing some £129 billion last year. As a consequence, there is a growing demand for high quality communications researchers and engineers, with an immediate need to produce the next generation of innovators who can create future products and services here in the UK. The CDT has been established with financial support from EPSRC and some 25 UK companies and trade associations to address this demand. With its first intake in 2011, it will host 50 new PhD students over five cycles. As well as producing innovative solutions to key emerging research challenges, it will provide a coherent advanced training network for the communications community nationally, and entrepreneurial engineers to underpin the future of the industry.

WHY BRISTOL?

Bristol has a long-standing reputation for outstanding research in communications and in the training of excellent postgraduate students who go on to become leaders of industry. Through its Centre for Communications Research (CCR), Bristol has worked for many years on cross-disciplinary research, in particular with the Departments of Mathematics and Computer Science. The new CDT strengthens these relationships, combining CCR expertise with Bristol's world-leading capabilities in statistics and interactivity to address emerging challenges in green communications, reliable end-to-end services and safety critical systems.

TOSHIBA

TOSHIBA

Right: Smartphone prototype used to gather measurement data

THE TRAINING

The CDT will provide training in a state-of-the-art collaborative research environment with close interaction from industry. The Centre will offer a four-year enhanced PhD with a taught programme in year 1 followed by a three-year specialised research project. It will be located in dedicated space and will provide access to the best test and measurement facilities in wireless communications, signal and image processing and HCI. CDT students will become members of a close-knit cohort, working with a team of multidisciplinary academics from engineering, mathematics and computer science as well as with mentors and technical specialists from UK industry.

The Centre will address diverse challenges ranging from theoretical to applied research. The first year provides training in the broad area of Communications and the research skills necessary to undertake cutting-edge research. Students will be able to choose their PhD projects from a wide range of proposals, most of which will be collaborative with industry. The PhD programme will also include a wide range of workshops and short courses in years 2 to 4, in specialist technical subjects and business skills. Industrial partners will provide access to, and training in, the latest commercial technology.

THE LAUNCH

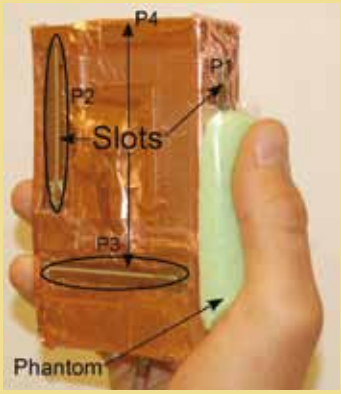
The official launch of the Centre will take place in Bristol on 30th March 2011. Industrial partners and stakeholders will be present alongside the academic community to celebrate the launch and hear about the exciting opportunities available for collaborative research and training.

CONTACT

For further information on the UK Centre for Doctoral Training in Communications please visit the website at: www.bris.ac.uk/cdt-communications.

Smartphones and the Grip of Death

The significant uptake of smartphones has highlighted the complexities of wireless communications (through problems of reduced sensitivity when some devices are held), as extensively reported by the media. Here at Bristol, specialists in the field of antennas and propagation in our Centre for Communications Research (CCR) have been investigating this problem and developing novel solutions to overcome the loss of connectivity. Building on work originally reported in the Faculty newsletter, The Brief, in June 2005 (which summarised a multi-partner industrially sponsored measurement campaign of MIMO enabled wireless devices, such as those now synonymous with the latest wireless LAN and cellular radio products), further analysis has now been conducted. Recently reported in the only peer-reviewed publication to date, the authors have rigorously characterised the radiation pattern, antenna efficiency and the ability of a smartphone to receive signals when operating hands-free, hand-held and in contact with phantom material.



The results in this IEEE publication* clearly indicate a 100 fold reduction in sensitivity of the device when held, or when the user's thumb is mimicked by phantom material – "The Grip of Death". This de-tuning of the antenna was found not to significantly alter the shape of the radiation pattern, but to modify the electrical match between the antenna and the electronic circuitry. Further tests concluded that providing a gap between the antenna surface and the phantom thumb using an insulator did not restore the matching and operational sensitivity of the phone for the antennas under evaluation.

Research addressing the automated re-tuning of the antenna elements to maintain high efficiency when holding smartphones or similar devices to enhance connection reliability with wireless networks is ongoing within the CCR.

Mark Beach, Matthew Webb and David Gibbins

*M. Webb , D Gibbins & M Beach, 'The Effects of User Grip on Smartphone Antenna Performance and Signal Quality', IEEE Antennas and Wireless Propagation Letters, Vol 9, 2010, pp10531056.

FIRA Robo World Cup 2012

Professor Bruce Drinkwater with the sonic screwdriver

Student members of BRL's Humanoid Robot World Cup Soccer Tournament (Hurosot) team from the University of Bristol and the University of the West of England

The footballer and athlete robots which make up the official logo for FIRA/ TAROS2012

The Bristol Robotics Laboratory (BRL) together with this Faculty and the University of the West of England (UWE) have won a competitive bid for the FIRA RoboWorld Cup (a major event comprising football and Olympic-style games for robots) to take place in August 2012.

The news, recently announced by the University of Bristol and UWE, has already generated significant wider interest.

The FIRA RoboWorld Cup 2012 will be combined with the FIRA RoboWorld Congress and the UK's premier robotics conference, TAROS, to form the FIRA/ TAROS 2012 event. The congress has attracted major roboticists, Professor Frank L. Lewis (University of Texas) as honorary chair, and Professor Sam S. Ge (National University of Singapore) as plenary speaker.

The competition will gather students and academics from many countries including Canada, China, Germany, Mexico, New Zealand, Singapore, Slovakia, and Taiwan. Postgraduate and undergraduate students will test their newest humanoids and mobile robots in competitive games.

The BRL has formed a team of students from the University of Bristol and UWE that will build a humanoid robot for the competition. Bryony Turtle, Claire Tobin, Bryan Thomas, Josh Kitson-Smith, and Leo Morgan from Mechanical Engineering are fired up to be working on this complex task. Their focus so far has been on the design of the robot's mechanics and control, also using CAD-tools which allow for integrated mechanical design, Matlab-simulation and control. Bryony Turtle said: "we're all really enjoying getting going on the project and are really excited to see all our hard work come together. It's great that we're hosting the FIRA competition here in Bristol, and I think it's extra motivation to make the robot perform well as it will be representing us at home. This project has had and is continuing to have involvement from many people and we really appreciate all the help we've had from the BRL, academic staff here in the Engineering Faculty, the workshop staff and many of the PhD students here." The team is particularly grateful for the financial support from the Dean and also the head of Mechanical Engineering.

Guido Herrmann, chair of the event, has been very excited since winning the bid in September 2010 in Bangalore, India, where the competition judges were convinced by the BRL's organisational team and strong reputation. Sanja Dogromadzi will be co-chair while Jonathan Rossiter and Matt Studley are the sponsorship chairs and Alan Winfield is responsible for media and publicity.

For more information see:
www.fira-taros2012.org.uk/
www.bristol.ac.uk/news/2011/7499.html

Dr Who's Sonic screwdriver

Dr Who's trusty sonic screwdriver is based on sound physics and any good ultrasonic engineer could build one. Late last year I said something along these lines to a reporter from The Telegraph. On reflection I wonder how wise this was. In the words of The Sun, who picked up the story but did not feel the need to talk to me about it, I was the "boffin from Bristol" who had invented the sonic screwdriver which will be available in all good DIY shops in the not too distant future! Well, helical acoustic and ultrasonic waves do exist and it is reasonably well known that they can be used to transfer angular momentum to objects. A few physicists have got quite excited about this phenomenon over the years as helical acoustic waves contain a singularity

at their centre. This transfer of angular momentum has been measured and was referred to by one optimistic author as an acoustic spanner. It's optimistic because, though helical sound waves are a physical reality, the torques which they can apply have only ever been measured in the 10^{-6} Nm range. So, if you live on a planet where friction is much less than here on earth the sonic screwdriver could be just what you need. However I'm struggling to come up with a reason to use a screw at all on a frictionless planet? The more interesting question is, what else can a small torque supplied via a sound wave do for you?

One of my research interests is trying to use ultrasound to manipulate small particles, such as cells, using ultrasonic radiation forces in devices called sonotweezers. For example, one long-term aim is to use these forces to assemble small pieces of biological tissue, each consisting of large numbers of individual cells. An interesting attribute of helical waves is that they have an amplitude null at their centre, surrounded by a ring of high amplitude. This is exactly what is needed to 'grip' and move a group of cells as the ultrasonic radiation force acts to move such objects from regions of high pressure towards nulls. This makes the helical beam what sci-fi enthusiasts would recognise better as a tractor beam! The secondary use of helical waves is their ability to transfer angular momentum which could, in principle at least, be used to rotate cells to specific preferred orientations prior to assembly. For these biological applications the fact that the acoustic forces and torques are small is a perfect match as it is critical the cells are kept happy as, according to our biologist colleagues, they don't like being pushed, squeezed or twisted to hard. So, whilst sonic forces are useful, if Dr Who's sonic screwdriver exists at all, it is light years away!

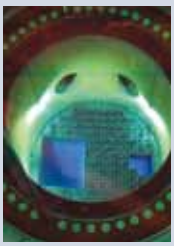
Professor Bruce Drinkwater
Department of Mechanical Engineering

Low Carbon Energy and Environmental change

David Smith reports on a new nuclear research centre between the Universities of Bristol and Oxford while Paul Harper outlines the future plans of the Cabot Institute

Bristol-Oxford Nuclear Research Centre

A new virtual research centre between the Universities of Bristol and Oxford has been created to provide an opportunity to nurture and grow nuclear research in the South West of England. This has come about because it is clear that this region will be the focus of intense activity in new nuclear build at Hinkley Point (near Minehead) and at Oldbury on the Severn Estuary in the next ten to 15 years. These new reactors are to replace our rather ageing systems and will provide the basis for substantial low carbon energy generation. In addition, the University of Oxford has for many years been closely engaged in nuclear fusion research with links to the JET Fusion reactor at Culham.



Cooling pond for active nuclear materials

Advanced nuclear research facility

To support these key low carbon power sources there is a wealth of nuclear expertise embedded in the South West of England. Companies here have for many years developed skills to support the research and design, operation and management of nuclear energy systems. Our stakeholders are keen to ensure that the Universities are able to provide underpinning research and to offer a new generation of scientists, engineers and managers. Our ambition, therefore, is to play an increasingly important role in developing and growing expertise in the many facets of nuclear research.

To reflect the diversity and depth of our new centre we have created three main themes:

- **Nuclear Futures**
Modelling nuclear futures; new power systems; economic, social and environmental impact; sustainability and resilience; national and global policy; risk assessment; safety case management; non-proliferation strategies.

- **Advanced Research**
Undertaking fundamental research in physics, materials including the nano-scale, chemistry, geo-sciences, engineering and exploring atomistic modelling, nuclear batteries, novel control and protection, smart sensors.

- **Applied Research**
Focussed on current operational needs to ensure safe nuclear systems, lifetime extension, non-destructive testing, human factors and organisational safety, instrumentation obsolescence, waste disposal, new build digital systems assurance, system resilience, decommissioning, risk and uncertainty assessment.

The development of the Centre is also integral to the activities within the Cabot Institute ensuring that research activities in energy and the environment can be brought together. For more information contact Professor David Smith, David.Smith@bristol.ac.uk

The Cabot Institute: Setting Sail for New Horizons

Following its successful launch last November, the University's new Cabot Institute now aims to establish itself as a world-leading multidisciplinary research centre dedicated to environmental change, risk and resilience.

The management structure has already been strengthened with the appointment of Professor Paul Bates, from the University's School of Geographical Sciences, as the Centre's first Director. Paul, a hydrologist by background, already works closely with the Faculty on a number of related projects. Engineering's contribution to the future direction of the Cabot Institute is reinforced by the presence of two representatives on the Institute's Internal Executive Board: Professor Alan Champneys (Head of Queen's School of Engineering) and Professor Paul Weaver (Faculty Research Director).

A significant part of Cabot's remit is to facilitate increased interaction of researchers both across the University and with external partners. This is already being achieved through a wide variety of lectures, seminars and networking events. The Institute is also keen to promote engagement with the student community and wider general public, and has recently supported a 'Climate of Change' speaker series, organised by the student led society BUST (Bristol University Sustainability Team). This has featured lectures from a range of leading environmental scientists, writers and campaigners, including influential figures from the Cabot Institute's External Advisory Board such as Tony Juniper (Sustainability Advisor) and Paul Rainger (Head of Sustainable Bristol City-Region at Forum for the Future). Engaging with policy makers is another key aim of the Cabot Institute and this is an area where academics from Civil Engineering have recently achieved particular success; Dr Alan Feest has been appointed as a Biodiversity Advisor to the European Commission and Dr Dawei Han has published a new book on Flood Risk Assessment and Management.

An Engineering led Cabot initiative with links to research, teaching and external engagement is the development of a new undergraduate research project competition, which aims to promote improved links between industry and academia in the low carbon technology sector. The competition is being sponsored by Vestas Wind Systems and is being organised in association with Low Carbon South West, the Schumacher Institute for Sustainable Systems, the University of Bath and the University of the West of England. The final will take place in the Faculty of Engineering on the evening of Wednesday 4th May and will be combined with an afternoon seminar highlighting a range of opportunities for collaborative working.

There is great potential for the Faculty of Engineering to play a key role in the future direction of the Cabot Institute. For further information on the range of current activities and opportunities for involvement, please visit the Cabot website at www.bristol.ac.uk/cabot.

teaching & learning

Patrick Townsend
Zone E team leader

Professor David Blockley

Information Technology in the New World

The University of Bristol is restructuring the delivery of IT services as part of the Support Process Review. Andrew Dixon, Migration Manager for Zone E outlines the new structures.

In the past, a number of services were provided centrally through Information Services, with faculty and departmental IT teams providing additional support. Under EF21 Faculty IT support was split across two building-based teams, and these teams will shortly be incorporated into a brand new IT organisation called IT Services.

The principle components of the restructuring are:

- All IT staff will work for IT Services.
- IT Services has been restructured centrally while maintaining local provision through six zone teams. The Zone E team based in both QB and MVB, with Patrick Townsend as team leader, services Engineering.
- Service Level Agreements, common policies, standards and operational processes will be defined.
- A central Service Desk will be put in place to handle all IT related incident calls and change requests.
- A managed desktop project will be implemented to provide a standard approach to the management of desktop computers across the University.
- There will be a defined career development structure for IT professionals with appropriate progression and movement across teams.
- AV will be serviced by the Estates Process.

We currently expect most of the Engineering IT staff to remain within the Zone E team. The streamlined organisation will afford some economies of scale and allow us more effectively to support cross departmental collaboration. Our support for students will also be more integrated.

Patrick Townsend, the new team leader, said: "I'm looking forward to leading the 12-strong team delivering IT services to the Faculty. We aim to give the Faculty the best possible IT support for its teaching, research and administration."

Further information at:
http://itreview.blogs.ilrt.org/

The Blockley Lectures at the Systems Centre

In December 2010 the Systems Centre introduced the first of the 'Blockley Lectures' to recognise the fundamental contribution of Emeritus Professor David Blockley in establishing the systems movement here in the University of Bristol.

The lectures feature high profile speakers from the UK and abroad who are using systems thinking in their own different disciplines – such as engineering, science and education. The lectures are recognition of the successful work of the Systems Centre in promoting collaborative and multidisciplinary approaches to research and teaching.

The first lecture 'A Tale of Two Systems' was given by Professor Blockley. He described his personal journey in which he came to see the large gaps between what we know, what we do and why things go wrong. He argued that the role of 'systems thinking' is to bridge those gaps and to integrate the languages of uncertainty and complexity and its expression in risk and practice. He said that risk is just as much about opportunity as it is about harm and that we need to be ready to take advantage of good unintended and unforeseen consequences too. In summary he maintained that managing risk in practice is a tale of two systems - the 'hard' embedded in the 'soft'.

In the second lecture in January 2011 Professor Dave Snowden introduced the basic principles of Complex Adaptive Systems Theory together with the pattern basis of human intelligence. He examined new approaches to risk that focus on resilience, rather than robustness. Professor Snowden looked at the shift in systems from applications to architectures, from planning towards an idealised future state to managing the evolutionary potential of the present.

Professor Mike Jackson, University of Hull, delivered the third Blockley Lecture 'Realising the Potential of Systems Thinking', on 8th March.

The fourth lecture in the series will be given by Professor Philip Bond in October 2011 in the Pugsley Lecture Theatre, Queen's Building.

The lectures are being filmed and can be viewed on the Systems Centre website: www.bristol.ac.uk/eng-systems-centre

TECHFEST 2011

Dr Ravi Vaidyanathan grabs the attention of the crowd at the ITT Bombay Techfest

The incredible queues for the Robotics exhibition

Techfest visitors watch Professor Chris Melhuish performing a human-robot interaction demonstration

To mark the launch of the new MSc in Advanced Engineering Robotics, the University of Bristol and the University of the West of England attended the IIT Bombay Techfest, one of the largest technology exhibitions in India. The Techfest took place over three days in early January 2011, and attracted tens of thousands of visitors.

The Universities showcased some of the Robotics research at the Bristol Robotics Laboratory, a joint venture between the two institutions, and also promoted the new joint Advanced Engineering Robotics MSc.

Dr Ravi Vaidyanathan, programme director of the MSc and robotics researcher at the University of Bristol, demonstrated his robotics research at the Techfest. He said: "I was staggered by the incredible size of the audience, as well as the interest and enthusiasm they displayed for our research. The reception for BRL's work was overwhelming." Ravi demonstrated an insect robot, a robotic hand to help rehabilitation after stroke, one of the world's only flying and crawling handheld robots, and gave visitors an interactive demonstration of haptic technology, whereby the user gets realistic feedback from a special joystick as they are manoeuvring a cursor in a three dimensional on-screen environment.

Sophie Turnbull, who attended the event on behalf of the University of the West of England, said: "the event was a great success and we spoke to a large number of high quality students from across India. There was large interest in the field of robotics and the Bristol Robotics Laboratory."

For more information on Robotics research at Bristol go to: http://www.brl.ac.uk/

The Modern Apprentice

Former and current Modern Apprentices from the Faculty of Engineering, l to r: Raja Singh, Paul Edwards, Emma Wood, Paige Spicer, Kerrie Walker and Siobhan Pegler

The Modern Apprentice Scheme running at the University of Bristol currently has apprentices undertaking National Vocational Qualifications (NVQs) in Business Administration, Craft and Information Technology. Each year departments and faculties have the option of taking on an apprentice in one of these work areas. Apprentices are employed for four days a week and learn as they work, attending college one day each week during term time. The college monitors their progress in the work place, acts as the assessor for their qualifications and liaises with departmental supervisors regularly. Apprentices are employed for 12 months in the first instance, as Foundation Apprentices but, if all parties agree, they may be employed for a further 12 months on an Advanced Apprenticeship. All apprentices study Key Skills such as communication, Information Technology, application of numbers, working with others, improving their learning and performance and problem solving.

Apprentices can provide extra help during busy periods and are willing to carry out a wide range of tasks that will ultimately assist them in achieving their qualifications. They do not tend to have pre-conceived ideas on how to carry out tasks and can often bring a fresh approach and renewed energy to a department.

Apprentices can become part of a succession planning strategy. Several departments have found that, at the end of the scheme, their apprentice has become integral to their team and has been offered permanent employment; others have secured positions for themselves around the University.

Since 1998, the Faculty of Engineering has employed 16 Modern Apprentices and this article pays tribute to those who began their careers here and have since taken up permanent positions. Charlotte Savage completed her apprenticeship in Business Administration in the Department of Electrical and Electronic Engineering in 2000 and is now employed as Account Administrator with the Faculty Finance team. Kerrie Walker joined the same Department as an apprentice two years later, and has remained with the Faculty ever since. She currently supports the Faculty Research team as Finance and Research Projects Administrator. Paul Edwards, now part of the Faculty Finance team, began his career as an apprentice in the Aerospace Engineering Department where he achieved his NVQs in Business Administration with additional units in Web Design. Paul's contribution to the Aerospace Departmental website demonstrates the skills he developed during his apprenticeship and the longevity of their impact within the Department.

Siobhan Pegler completed her apprenticeship in the Civil Engineering Department in 2003 and has since worked in the School of Geographical Sciences and Faculty of Social Sciences and Law. Siobhan was influenced enormously by Anne Thorpe, her Engineering line manager, and reflects that "the skill set I achieved by undertaking challenging tasks set for me have helped me secure subsequent posts across the University, enabling me to climb the career ladder quickly". Raja Singh embarked on his Foundation Apprenticeship in the Electrical and Electronic Engineering Department in 2009 and has already secured a permanent employment offer in the Faculty Finance team following the completion of his Advanced Apprenticeship in a few months time. Emma Wood completed her Foundation Apprenticeship in 2009 whilst working in the Engineering Mathematics Department, and is now based in the Faculty Office as an Advanced Apprentice. Emma has enjoyed the opportunity of working with support staff across the Faculty and in particular Kerrie Walker, her first line manager, who she described as "inspirational - as she herself started at the University as a Modern Apprentice and showed me the success that can be achieved through the scheme".

The Modern Apprenticeship scheme continues to launch the careers of school leavers today. The most recent recruit to the Faculty is Paige Spicer, who began her Foundation Apprenticeship in February supporting ACCIS in their research activities, whilst working towards the Level 2 NVQ in Business Administration.

For more information regarding the Scheme, please contact Lucy Howe (Lucy.Howe@bristol.ac.uk) or Mark Lees (Mark.A.Lees@bristol.ac.uk) in Personnel Services and Staff Development.

From the Engineering Archives

This year marks the 60th anniversary of the ceremony at which Sir Winston Spencer Churchill (1874-1965) laid the foundation stone for the new Engineering building

The photograph above was taken on the 14th December 1951 and shows Sir Winston Churchill, in his role as Chancellor of the University, laying the foundation stone for the new Engineering building which, when completed, was to become Queen's Building. On the far left stands the Chairman of Council Mr W.R. Verdon Smith and next to him is Mr R.H. Brentnall who, together with Sir George Oatley, was the architect of the project. Just behind Winston Churchill holding the ceremonial robes is Master John Jervis, the Page.

Following the stone laying ceremony, work continued apace on the two phases of the building works and on the 5th December 1958 Queen's Building was opened by Her Majesty Queen Elizabeth II.

The silver and ivory ornamental trowel and wooden mallet that Churchill is holding were produced by the Bristol Goldsmith Alliance and are stored in the University of Bristol Special Collections. They can be viewed in their 'Cabinet of Curiosities' at www.bristol.ac.uk/centenary/look/cabinet/

Winston Churchill was installed as Chancellor of the University of Bristol on 13th December 1929. He received an enthusiastic welcome on his installation, the first to be held in the Great Hall of the Wills Memorial Building. On his arrival at Bristol Temple Meads station he was greeted by students riding motorbikes, cheering crowds and the local media. Once at the University he was carried shoulder high by a group of undergraduates through a mass of supporters who threw streamers and rice. Winston Churchill remained popular with the students and held the role of Chancellor until his death in 1965, serving throughout the Second World War. For a university to have a serving Prime Minister at their head is unusual, to have a Prime Minister who led his country through a world war at the same time is extraordinary.

Special Collections holds a wealth of materials relating to Winston Churchill and the University, including correspondence, photographs, and records relating to his activities.

See www.bristol.ac.uk/is/library/collections/specialcollections/

Winston Churchill, in the ceremonial robes of Chancellor of the University, lays the foundation stone of the new Engineering building.

Image courtesy of University Special Collections

faculty people

Dr David Barton

Miss Sophie Ross-Smith

Dr Martijn Stam

Mrs Claire Eatock

LynchPin welcomes some new members of staff to the Faculty

David Barton joined the Department of Engineering Mathematics in November 2010 as a lecturer, after completing a GWR Research Fellowship in the same department.

During his PhD, David's research focus was on the area of dynamics and bifurcations of systems with time-delays, particularly focusing on numerical methods for such systems. He subsequently obtained a two-year research fellowship from the Lloyds Tercentenary Foundation to continue with the theme of systems with delay but looking more at engineering applications and, in particular, hybrid testing. David then went on to develop his research in the theme of engineering dynamics by taking a GWR Research Fellowship (jointly with the University of Bath) on the topic of modelling nonlinear energy harvesting devices.

The topic of directly combining numerical methods with physical experiments through a closed loop of actuators and sensors has appeared several times during David's past research. As such, his present research is focused on how traditional numerical methods can be made more robust to the noise and imprecision which pervade physical experiments. Related to this, he is also interested in how different modelling paradigms (for example, but not limited to, agent-based models) can be investigated using numerical tools from the nonlinear dynamics community, which traditionally work on differential equation models.

David's spare time is mostly taken up by his wife and two daughters (both under two!) but when he gets a chance he's a keen gardener and general outdoors enthusiast.

Sophie Ross-Smith joined the Faculty in September 2010, as the Administrator for the FP7 FFAST (Future Fast Aeroelastic Simulation Technologies) project co-ordinated by Drs Ann Gaitonde and Dorian Jones.

Sophie graduated from the University of Bristol with a BSc in Biology in 2008. In her final year she lived at Goldney Hall as a tutor, providing pastoral care for undergraduates. During her time at Goldney she was involved with the production of the famous Goldney Ball. Since graduating she has remained in Bristol, joining the staff at Goldney Hall, before taking up her new post in the Faculty of Engineering. Although not studying engineering herself, she comes from a family of engineers with her father, brother and sister-in-law all graduating from the Engineering Faculty at Bristol.

In her spare time Sophie enjoys dancing and, having joined the University of Bristol Le Roc society, she now competes nationally. Before studying at the University, she was heavily involved in the equestrian industry, spending her gap year working for an international dressage (ballet for horses) rider and also riding and competing on her own horse. When she has some spare time she enjoys baking, often making celebratory cakes for family and friends.

Martijn Stam joined the Department of Computer Science in February 2011 as a lecturer in cryptography. Previously, he had been a postdoc with that same department making this, after an absence of five years, a homecoming of sorts.

Martijn has been interested in cryptography from a very early age, starting with rather naive substitution ciphers using exotic alphabets and simple letter shuffling. Things became more serious when he started his MSc studies in Mathematics at the Technische Universiteit Eindhoven (Netherlands) where he specialized in cryptography and finished with a Master's project on electronic voting (conducted at BT Labs, UK).

After completing his PhD he joined the University of Bristol as a postdoc where he mainly worked on fast implementations of a certain type of cryptosystem. Eventually he received an offer he couldn't resist, and he moved to EPFL, Switzerland to be reunited with his former PhD supervisor. There he switched topics and worked on various theoretical aspects of hash functions. Following this he moved back to the UK for a postdoctoral position at Royal Holloway, University of London.

In Switzerland, Martijn was a regular at the University's ski and snowboard camps, but back in Bristol the swimming pool might prove tempting (again). Martijn is fond of good food and is fairly omniverous when it comes to movies.

Claire Eatock joined the Public Relations Office in January as Marketing Officer for the Faculty of Engineering, moving from the Campaigns and Alumni Relations Office where she had been Campaign Marketing Manager.

Travel was the centre of Claire's career and leisure time after university. She worked for a student travel company before departing the UK for two years to experience round the world travel for herself. On her return her career in marketing began back in student travel, followed by destination marketing of places as varied as the golden beaches of the Caribbean, the horse racing of Kentucky and the snowy mountains of Whistler. After a short stint managing advertising campaigns for BMW and MINI she returned to a luxury travel company to manage their customer relationship marketing.

In the midst of this Claire met and married David, an Airbus engineer based in Bristol. Following a move to the city she brought her marketing experience to the University in 2007. She sees her new role as a great opportunity to be more actively involved in the University, working closely with academics and students in the Faculty to promote engineering at Bristol. Claire feels that this is what working for a university is all about and is really enjoying this new aspect of her role.

Outside of work, when not looking after her small daughter, Claire enjoys travelling, walking, pub lunches, seeing bands and going to festivals.

ANN PETHERS

Speaking personally

Hayley Frapwell is the School Manager for Merchant Venturers School of Engineering

Interview by Emma Weeks

Where and when were you happiest?
Definitely 2002 in London immediately after the birth of my first son. I was elated for those first few weeks before the sleepless nights got the better of me.

What is your earliest memory?
When I was about three years old, living in Wiltshire, sharing a bedroom with my sister and hearing trains at the bottom of the garden going past every single morning.

What did you want to be when you were a child?
I wanted to be Frida's little sister (from Abba). I was obsessed with the group and convinced I'd been adopted and she was my big sister.

What was written on your school report?
I was always known for talking and getting easily distracted so I'm sure a lot of them said things like "doesn't pay attention", "always chatting". I was good at school but probably could have done better!

Describe yourself in four words?
Impatient, loyal, witty, realist.

If you could come back in another life, who or what would you be?
I would have to come back as a New York socialite in the 1920s. It was a very exciting era for women, the flappers had a liberated outlook on life and they defied social norms. They were characterised by their love of life, their party lifestyle and trademark fashion and hairstyles.

What single event has most changed your life?
Meeting my husband Mark. Everything changed after that. I was young, care-free and single and suddenly he appeared…

What are you most proud of?
Our two boys, Finn and Freddie, and the way they are developing their individual personalities and becoming their own people.

If you could change one thing...?
I would like to see an end to people's greed and fascination with material possessions, and a redistribution of wealth so that everyone's basic needs are met.

Classical, jazz or rock?
Definitely rock, and leaning towards the heavier variety. I have a few classical moments, particularly when I'm in the office.

Land, sea or air?
I love being by the sea, swimming in it and listening to it, but I can't travel on it! If I have to take a trip then a train is definitely the best way to go.

What would you like to see more of?
My family.

Which single item would you save if your house was on fire?
Apart from family and dog...probably photos. I don't really get attached to objects.

Which living person most inspires you?
Those individuals active in the defence of human rights and people who have devoted their lives to campaign tirelessly against apartheid, most notably Desmond Tutu and Nelson Mandela.

Favourite place in the world?
Harlech in North Wales and the Snowdonia National Park. It's where I met Mark and is the most stunning place. It has everything you could want: mountains, estuaries and beaches, there's hardly anybody there and it's perfect for walking.

Where would you rather be now?
Sitting by a pool or in a cottage somewhere with my family around me and a glass of wine.

What worries you?
Being alone when I am old.

What makes you smile?
My children playing (happily) together, friends, family, my vegetable plot full of perfectly ripe and ready to eat fruits and veggies, seeing a dragonfly hovering over the pond or darting around the garden, a summer meadow, swathes of pure white snowdrops under trees in early spring.

If money were no object I'd...
Buy a big house in the country with a few acres, surround myself with lots of animals, and try and live off the land as much as I could. That would be my dream.

How would you like to be remembered?
With fondness and for a very long time!

M.SIMMONS

Competition winners in 2010 Rupert Baker and Alex Ross of TeamUp receiving their awards from the Chairman of Motorola, Graeme Hobbs

focus on

New Enterprise Competition

The University of Bristol's New Enterprise Competition is designed to inspire new high growth business ideas and entrepreneurial talent. Launched every autumn, the competition is open to students, staff and recent graduates of the University. There is a substantial prize fund which includes a cash payment, free professional advice and managed office space to help make the businesses a commercial success.

The seven teams shortlisted to go through to the final round of this year's New Enterprise Competition have just been announced. Those teams are: SunHub, providing solar power systems to rural India; Rapunzel, a new hair-care product range; Gym2, a new strategy to encourage gym-use; Tweeter, a birdsong recognition and identification system; Puddle, a 'smart' water-meter development to encourage water-saving; CheapAFM, the production of affordable Atomic Force Microscopes; and EventBand, a new identification and proof-of-age system for festivals.

The judges were drawn from the competition's sponsors: Bristol City Council, Deloitte, EADS, IPGroup, King Sturge, Motorola, Osborne Clarke, Santander, SETsquared Business Acceleration Centre, and the Wyvern Seed Fund. The sponsors also provide the £36,000 annual prize fund. The judging was chaired by Dave Jarman of Research & Enterprise Development (RED) who said: "it's always a tough challenge for students and staff to articulate their business ideas in just four pages, but the quality of the entries was higher than ever. The judges had a tough time picking between them. But even those who weren't shortlisted will receive feedback and be helped to develop their ideas further – the University prides itself on being able to support staff and students launch their ideas." The shortlisted entries include thirteen undergraduates, one postgraduate, one post-doctoral researcher, and two staff members, drawn largely from the Engineering Faculty but also including representatives from the Faculty of Medicine & Dentistry and the Faculty of Science.

The Faculty of Engineering has always been strongly represented in the competition and this year is no different with representatives from Civil Engineering, Computer Science (five students in two shortlisted teams), Electrical & Electronic Engineering, Engineering Design, and Mechanical Engineering, all amongst the finalists. All of the three winning teams in 2010 were drawn from the Engineering Faculty: Alex Ross of TeamUp, Lee Arromba of Acceleromatix, and James Cornford of Sundio. In 2009 the Faculty provided two winners, Jennifer Griffiths with SnapFashion, and Edward Matos with Shamba Technologies. And this pattern is repeated throughout the last decade. Dave Jarman, RED's Enterprise Education Manager said: "I think the Faculty's success in the competition is down to three key elements: firstly engineers are natural problem solvers, they like to improve things! Secondly their courses involve interaction with industry and practical challenges that help students think about how engineering solutions will work in practice, and thirdly the Faculty has invested in providing entrepreneurial education to many students through the Innovation, Entrepreneurship, and Enterprise unit, and the Hi-Tech Enterprise units for Computer Science – these courses do feed a good number of high-quality entries into the competition every year."

The finalists now go through to two months of writing up full business plans with the help of RED, Basecamp, and the sponsoring organisation's mentors. The final presentations will take place on May 11th with the announcement made at the Enterprise Dinner on June 28th.