Welcome
to the sixth Spotlight newsletter from the School of Engineering and Design.

In this issue we celebrate both the School's outstanding successes since the last newsletter, and highlight, through the many interesting student projects, how the School is addressing the 21st Century global concerns of energy conservation and the environment.

The environmental theme begins on the inside cover, featuring the water cycle project which recently attracted immense interest on exhibition in China. Other environmental projects include the development of an electric motorcycle, an Eco car and a design project to raise children's awareness of energy issues.

Such important themes run alongside the School's other many successes: first class results in the latest Research Assessment Exercise, with General Engineering ranked 5th in the UK and the Mechanical Engineering subject area ranked 8th by Research Power; strong showings in the annual National Student Survey where design based courses featured in the top 4 in the UK for student satisfaction; success in The Guardian University Guide 2010 in which both Design and General Engineering are ranked in the top 5 in the UK; and unprecedented success at Formula Student for Brunel Racing.

I would like, on behalf of the School, to warmly welcome the many new staff that have joined us in the past year, and wish them well in their new careers.

Tom Kissack, Marketing and Recruitment Manager

Motorsport at Brunel:
Team Triumph

Brunel Racing enjoyed great success at Formula Student Silverstone 2009, exceeding all expectations to finish 6th overall in the competition! The result made Brunel the second-placed UK university in the largest Formula Student competition ever, with 87 teams from around the world competing. The entire team is immensely proud of this achievement. The final result was Brunel's best normalised Class 1 finish in the ten years the University has competed in Formula Student, having previously finished 4th out of 40 teams in 2002.

The Endurance event is the toughest test of the competition, counting for 40% of the overall points. In a heavily rain-affected session, Andrew Bonjour and Rob Still posted consistently fast lap times, enabling the team to finish fourth in the Endurance timings. With an excellent third-lowest fuel consumption of 2.124l, our combined endurance-economy score was the highest at the competition, at 355.7 points.

The final results showed an incredibly close tie between positions 4, 5 and 6, with Brunel University finishing 6th overall, 0.4 points behind fifth-placed Helsinki.
The growing demand for energy and material resources in general, is one of the most pressing issues facing the modern world. The current reliance on unsustainable resources has far-reaching environmental, political and economic consequences: if humans are to live sustainably, the Earth’s energy and environmental resources can only be used in quotas at which they are renewable.

The School has a number of undergraduate and postgraduate Master’s level engineering courses aiming to satisfy both the current and the future demand for industry expertise in this field at an international level. Such courses address industry requirements for the research and development of sustainable engineering solutions, and meet the demand for training and education of existing and future engineers in the advanced concepts and understanding of sustainability.

The programmes listed below offer focused sustainability knowledge through bespoke modules, but a broad range of other degree courses within the School also provide students with the opportunity to carry out environmentally oriented projects like the water cycle, the Tio design project, the electric motorcycle and the Eco car. These are explored in articles included in this issue.

**The following courses directly address sustainability/environmental issues:**

- Civil Engineering with Sustainability - BEng / MEng (full-time and thick sandwich)
- Electrical Engineering with Renewable Energy Systems MEng (full-time and thick sandwich)
- Building Services Engineering with Sustainable Energy MSc (full-time and distance learning)
- Sustainable Electrical Power MSc (full-time, part-time)
- Sustainable Energy: Technologies & Management MSc (full-time)
- Research – Engineering Doctorate
“Water Cycle” is a human-powered portable water device that purifies contaminated water into portable (drinking) water for the developing world. Three minutes of recycling produces one litre of drinking water, along with three litres of brine for domestic use. Water Cycle is an environmentally-friendly, instantaneous solution requiring no fuel. It is designed for ease of use enabling people to focus on disaster relief, sustainable development and education.

I was elected group leader to the Water Cycle final year MEng group project. The MEng team consisted of four members (myself, James Quinn, Michael Christodoulou and Nestoras Nestoros) and two supervisors, Dr Mark Atherton and Mr Chris Brown (academic lecturers in Mechanical Engineering).

The brief we set ourselves was firstly to investigate a project where there was a market niche, then to develop a product design specification with our potential market in mind. We chose the topic of disaster relief and our attention turned to water contamination which was proving a major problem in the developing world, for example in Africa (16.6% of the world is without clean water). Then as a group, we worked through and proposed a solution (Water Cycle) to the problem of water contamination, which we then developed as a prototype.

The Water Cycle had three clearly defined areas: the water system; the electronics with power generation; the chassis and bodywork. At the start of the project we discussed who would focus on each area and specific roles were allocated to individuals. We made contact with professionals in the water industry, spoke about our proposed product and received excellent feedback about the product design and the potential market, and also support about the products they were selling relevant to our product.

From this investigative research and collaboration we carried out a final design and analysis of the prototype we made and the water quality of its output, to validate the product. We then made a quality assessment of the water in laboratory conditions, helped by the Institute for the Environment at Brunel. They put together a sample, tested it and returned the test results which were positive in terms of quality.

The whole project experience provided the student team with a clear idea and definition of what it is to be an engineer. Essentially, an engineer has the ability to solve problems, and in the process of problem solving, he or she employs an element of design backed up by technological ability and practical application.

At MADE IN BRUNEL, the School’s Engineering and Design graduate showcase, there was massive interest from professionals with commercial experience, and investment interest in developing this idea in to a commercial proposition. As a consequence our supervisors commented that the product was a viable commercial proposition and suggested we take the idea further, especially through patenting and commercialisation.

The Water Cycle was recently on display in Beijing and has attracted immense media and commercial interest on show.

Article by Jonathan Isherwood, graduated MEng in Mechanical Engineering in 2008.
Electronic and Computer Engineering at Brunel continues to emerge as a vibrant and dynamic academic unit that is establishing itself as one of the leading subject areas in Electronic Engineering in the UK. The major highlight of the last quarter for ECE at Brunel has been the full accreditation/approval of all our BEng and MSc programmes ranging from two to five years. The Institution of Engineering and Technology, one of the most renowned professional bodies in the sector, accredited our academic provision and underlined the quality of our academic practice.

In addition to IET accreditation, ECE undergraduate and postgraduate taught provision has undergone a thorough Academic Programme Review (APR) process conducted by a set of external assessors who are eminent and well established academics in the discipline. The APR events for both our UG and PG provision received extremely positive feedback from the external assessors who praised the effectiveness of our teaching practices and educational services, which were equally commended by the students who were interviewed for that purpose.

This quarter also saw the full approval of a new MSc programme in Advanced Multimedia and 3D Technologies which will create a postgraduate presence for the existing digital media taught provision in the subject area. This course will supplement the immense success ECE has consistently maintained in its BSc digital media provision. Last summer, ECE also saw BSc Broadcast Media Design and Technology produce its first graduation cohort to further augment the volume of the annual graduation output of the digital media programmes. A recent graduate has contributed an article on page 13.

One of the major achievements of the past quarter is ECE’s continued success in the National Student Survey (NSS) for 2008/09. Not only did the subject area maintain its record of consistent progress with student satisfaction rates, but it has also achieved high participation rates; 74% for Electronic Engineering students and 76% for Design students, of which ECE digital media students are major participants. Equally importantly, Brunel Electronic Engineering (EE) students’ overall satisfaction rate obtained this year (4.1%) puts EE at Brunel in the top quartile of universities with EE undergraduate taught provision, with consistent improvements made in five of the six elements of the survey.

At the same time, the published results of the RAE2008, which placed General Engineering at Brunel in fifth position in the country in terms of research power, showed the quality and volume of the ECE research output which has contributed to over 50% of the RAE submission (UoA25) in both research man-power and profile.

The last quarter was also a remarkably active and successful period for ECE research centres in terms of conducting funded research work, submitting new bids particularly to call-4 of the EU FP7 framework programme and attracting over £1.5M worth of research grants from both the EPSRC and the European Commission. 10 EU proposals from three ECE research centres were submitted to call-4 of FP7, resulting in two projects invited to negotiations for final contractual preparations, under the leadership of ECE academics Dr. Amar Aggoun and Dr. Gary Taylor, addressing 3DTV and next generation power systems, respectively.

Moreover, Dr. Angelina Karpovich and Dr. Qiang Ni were awarded significant grants from the EPSRC to investigate “Internet of things” technologies and Quality of Service over future wireless networks, respectively. This success was complemented by the very successful reviews held for both the ongoing PSP (Policy Support Programme) DTV4all project led by Dr. Take Itagaki and the RUSHES project that concluded at the end of July 2009.

This quarter has also seen the inauguration of the CMCR (Centre for Media Communication Research) Media Lab, a modern lab facility with state-of-the-art equipment for 2D-3D visual media capture, processing and visualisation in the University’s new Michael Sterling building.

Last, but not least, the quarter has also marked the commencement of serious talks with some top French private universities, with a view to setting up durable and forward-looking partnerships, that will not only transfer high-quality students into our running taught programmes, but will also provide serious opportunities for joint research initiatives and collaborations.

Article by Professor Abdul H. Sadka, FIET, Head of Electronic and Computer Engineering.

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Article by Professor Abdul H. Sadka, FIET, Head of Electronic and Computer Engineering.
I studied Electronic & Electrical Engineering BEng (Hons) and graduated with a First Class Degree in June 2009. Having trained and worked as an electrician, I was drawn to electrical energy and I was looking to go to university in London. Brunel's reputation as a good engineering university that took a more hands-on approach made it very attractive.

The lecturers were friendly and approachable. I always felt that when asked a question, the lecturers were unfailingly helpful and would take extra time to explain or at least open your eyes to the way the solution could be found. There are a lot of opportunities available at the University which I was lucky enough to make the most of. For example with Dr Gareth Taylor, I undertook a successful undergraduate research project funded by the Nuffield Research foundation at Level 2, which was followed by the IEEE publishing a paper based on my work. With Dr Taylor's help, I was able to attend the IEEE Power and Energy Society General Meeting in Pittsburgh in July 2007 to present this paper. I did a fair amount of additional travelling including a trip to Dublin which included a visit to the Intel fabrication plant in County Kildare, and to the Intel Solutions Summit (ISS) in Rome where I represented Intel, demonstrating the company's latest server and storage solutions. Intel does not guarantee jobs for placement students after completion of the degree, however in my end of placement report my manager stated that should I apply to Intel at any time in the future, she would strongly support my application.

My course dissertation was based on small-scale embedded generation (SSEG) at the University, in particular focusing on the wind turbine we were planning to build at the University. However, because of planning permission problems, my project was instead realised using a solar panel installation at the University (see www.brunel.ac.uk/about/acad/ed/edres/systems/bips/seg). I also received the Sir William Siemens Medal during my final year which made it a lot easier when approaching Siemens about a graduate position. I am now working in the Automation & Drives Department. It was a very difficult decision to make between following a Doctorate, a PG Master's or taking this job, however I was able to get some valuable advice from a number of lecturers and professors in the School, who were more than happy to take the time to answer my questions.

I am currently a graduate management trainee at Siemens in Manchester. This graduate programme is recognised by the IET and the company is actively supporting me to achieve Chartered status with the IET. The programme lasts for 2 years, in which I have broad 6 month placements within different business sectors of the company, which will introduce me to all the various aspects of the business. At the end of this, a best fit will be found for my skills within the organisation.

Brunel offers many things. Just ask questions and the professors are very open and willing to communicate with you. The sporting facilities, accommodation and social life are very good with a wide variety for you to take advantage of. London is one of the great cities of the world and an amazing place to be a student. I must say, finally, that there is a world of opportunity at Brunel for you to come and make the best of. It's up to you!

Article by Phillip Day

="There is a world of opportunity at Brunel"

Siemens medal winner graduate profile
Gabriel Diaz, MSc Sustainable Electrical Power

My search for a course in the UK led me to the MSc in Sustainable Electrical Power at Brunel University. I was aware of the distinguished reputation that the University possesses. Furthermore, the image of Brunel as a great institution for international students, which also has its own Institute of Power Systems, considerably heightened my interest in studying there.

The modular structure of the course ideally suited my needs as I would be living off-campus. During the lectures, I could obtain all the necessary information to prepare assignments, and then in my own time conduct further research and investigate a topic. In addition, the online facilities to access the lectures at any time helped me a great deal.

I must say that, for me, the best aspect of the course was the strong links that the lecturers have developed with the electricity industry within the UK. I was fortunate enough to be selected to complete my dissertation project with National Grid UK. The project involved extensive research in partnership with the Met Office, concerning solar radiation metering and its impact on the electricity demand in the UK. The outcomes achieved were actually considered and implemented by National Grid in their forecasting methodologies.

Once I had finished the course it didn’t take me long to find a job. Having received offers from some of the top UK electricity companies, I chose to join the National Grid as my first engineering post in the country. Within my current role as a Regional Outage Planner for Southern England and Wales, I have to coordinate, prepare and refine outage plans for the assets that integrate our High Voltage transmission network. This requires a great number of detailed analyses involving thermal/voltage constraints, fault levels and stability studies, amongst other things. These help to ensure a secure and economical system configuration that complies with the UK’s security and quality of supply operational standards.

The MSc course helped me find the right direction for my career development in the UK. Therefore, I would highly encourage any applicant with an interest in sustainable electrical development and HV power systems to strongly consider coming to Brunel University. It certainly worked for me!
Industrial placement focus

Bedir Bekar is currently in his third year on industrial placement.

What drew me to the Civil Engineering course was, firstly, the sandwich placement scheme it offered, and secondly, Brunel's reputation for Engineering.

From the moment I attended the Engineering and Design open day, I have witnessed my lecturers' passion for our subject. The subject area is a wellspring of knowledge, constantly being filled by the renowned academic and practical work of the lecturers, who are all still strongly involved with the industrial world. I really enjoy knowing that I am learning from some of the best in the field. Although the emphasis on independent learning is strong, I could always go and seek personal help from my lecturers. Although I have felt challenged at times, I have never felt lost.

My first year proved an enjoyable challenge. As different as the world of university is to college, from the beginning of the course there were plenty of opportunities to "get stuck in". My favourite aspect of the first year was the high volume of practical work we took part in, particularly the five day field trip to Dorset to study coastal defences and geology, and the mid-term multidisciplinary project collaborating with Engineering and Design students from all over the School to build and enter fully functioning robotic rover units into an inter-subject area competition. The emphasis on sound practical understanding to accompany the taught theory was heightened even more in the second year, resulting in even more enjoyable practical laboratory sessions.

I am currently on a third year paid sandwich placement with the URS Corporation, one of the world's largest multidisciplinary Engineering and Environmental Services companies. I work in the London Building Structures Team in the European head office, and have been working on everything from Structural Design to Earthworks and even on the business side of the industry. I'm finding it thoroughly interesting and the placement is helping me to build a consolidated understanding of the engineering industry, that will help in my final year, and when I graduate. The placement is also enabling me to gather ideas for my dissertation.

I am sure that this industrial year will set me ahead of other graduates, and this is essential for fulfilling my goal of becoming a chartered engineer.

Academic staff profile

Professor Kai Cheng, Head of Advanced Manufacturing and Enterprise Engineering

Professor Kai Cheng received a Chair (Professorship) in Manufacturing Systems at Brunel University on 1 May 2006 and has been Head of the Advanced Manufacturing and Enterprise Engineering subject area (AMEE) since its formation on 1 August 2006. Current research interests focus on micro manufacturing, design of precision machines and instruments, and digital manufacturing and enterprise technologies. Professor Cheng is involved with teaching the following PG modules: Advanced Manufacturing Methods, Global Manufacturing Strategy and Operations, e-Manufacturing and Enterprise Engineering projects.

Professor Cheng has published over 160 papers in learned international journals and referred conferences, authored/editied five books and contributed six book chapters. He is also a fellow of the Institute of Engineering and Technology and Institution of Mechanical Engineers. Professor Cheng is the European editor of the International Journal of Advanced Manufacturing Technology, a member of the editorial board of the International Journal of Machine Tools and Manufacture, and also a member of the editorial board of another three international journals. His most recently published book is entitled Machining Dynamics: Theory, Applications and Practices (Editor: K Cheng), Springer, November 2008.

On the AMEE subject area, Professor Cheng commented: "the AMEE subject area consists of nine academics and over 30 research assistants and PhD students. AMEE is home to the following four highly successful MSc taught programmes: MSc Advanced Engineering Design, MSc Advanced Manufacturing Systems, MSc Engineering Management and MSc Packaging Technology and Management. The subject area is currently working on a number of research projects funded by the EPSRC, EU 6th/7th Framework Programs, KTP Programs, the Technology Strategy Board (TSB) High Value Manufacturing Program, and industry. It has a record of international excellence in the areas of micro manufacturing and global/sustainable manufacturing and systems.

In the 2008 RAE (Research Assessment Exercise) 50% of AMEE's staff were rated internationally excellent and 100% achieved international standard (4*-2*). With around 150 postgraduate students from all around the world and substantial research income from the EU, research councils and industry, AMEE is a major player in the field of advanced manufacturing and enterprise engineering.

In September 2008 and July 2009, respectively, AMEE successfully hosted the seventh International Conference on Manufacturing Research (ICMR2008) and the ninth International Conference and Exhibition on Laser Metrology, Machine Tools, CMM and Robotic Performance (LAMDAMAP2009)."
On choosing A-levels, I chose four very diverse subjects as I did not know what career I wanted at that time. So I took Biology, History, IT and Product Design.

When I started the Design A-level, my teachers were impressed with my design thinking and capabilities. It was obvious that Design at that level was my strongest subject. I was passionate about it and everyone saw this. A teacher gave me the MADE IN BRUNEL Show’s Design directory with all the projects. When I saw this I said “Wow! This is what I want to do!” I then did some research about Brunel and was impressed with the Design subject area’s standing.

From then onwards I had my heart set on Brunel even though I had not visited it yet. I came on two visits, one with the whole family, and then again with my mum. My mum adored the place. She felt that I would be safe on the campus, as other universities campuses sometimes had the design facilities in different locations and you had to take a bus. Brunel was ideal as everything was in walking distance. The lecture rooms, accommodation, shops and restaurants were together, and I would not have the additional stress of travelling and could concentrate on the course. So my mum liked Brunel and my dad liked the course! Having sat through the course talk he knew it was challenging and knew I would have to work. He was pleased about that, so I came to Brunel!

At Brunel I have found that the relationship with teachers and technicians is lovely in the Design subject area. You can stop and have a chat with them at any time. The Design subject area is together as a unit and you work together with staff and students alike. Paul Turnock’s lectures were inspirational and stretched me.

In my first two years at Brunel, before my placement, I had some good times on campus. There are lots of recreational activities students can do. In my second year I learned to dance salsa and now I am in my final year I am learning street dancing. Brunel’s location is fantastic. We are not paying the expensive Central London prices, but can get in to Central London easily by tube in 45 minutes. We, as Design students, also go to group exhibitions together and I am into fashion, so I go to fashion shows. I even went to a toy exhibition when we did the autonomous design project in Year 2, which gave me some good ideas.

I did a year long placement at Bentley, the luxury car maker in Crewe. I applied online through the extensive database that we have access to from Brunel’s Placement Office. After attending an assessment centre in Crewe I got the placement!

At Bentley I worked in the Concepts Department as a concept engineer and was paid £14,500 for the year’s placement. The Department came under the pre-development umbrella. As a team we were the first part of what was called the “hard point” of a vehicle – we investigated the initial architecture of the vehicle. This involved a series of investigations, initially using CAD. One example was storage investigations, for example we examined consoles, boxes, etc., to try to increase space. My work involved a lot of competitor analysis of other luxury cars. We created physical and virtual space investigations, for example where to place bottles, maps or car manuals – in fact everything to do with the car. There was a process behind these investigations, and it was not aimless as we had mandatory parameters of where things would go in the car.

I must admit that Bentley was a brilliant place to work. One of my weaknesses...
after I had completed my second year was CAD. At Bentley I did a week long course in CATIA, a CAD software, specifically designed for the automotive industry. I was fascinated with what I could create after this course. It increased my confidence in using CAD which will really help my final year at Brunel.

These investigations were only one aspect of my work there. The whole placement was quite nice because you worked in a team and touched base together. The team dealt with concepts and style feasibility across a broad area.

Every day there was something new and challenging and exciting, for example on one occasion three luxury cars were brought on site – a Lotus, Ferrari and Aston Martin. An ergonomics clinic (validation team) was carried out; the cars were set alongside each other and tested and compared for human usability.

The year also included industrial placement monthly meetings, and we carried out a self development module and a “communicate clearly” module. Both the Concepts Department and the Personnel Department required us to carry out separate development programmes. Every two weeks we created a fortnightly log, including a record of what we had achieved and suggestions as to how things could be improved.

For self-development we were required to become involved with charity work for St Luke's Hospice in Crewe. Another area we became involved in was school liaisons for the company, and on one event we had school children creating card factories for the company, and on one event we had school children creating card factories emphasising brand thinking and enterprise. I was part of the judging team! It was so nice to get involved with young students to help them if they were stuck in the creative process.

The placement has for me been a great opportunity and I learnt a vast array of skills, from technical, to communication to commercial. Personally, after the placement I actually emerged as a more self-reliant individual, as for one year I lived completely by myself without my family, so my confidence and independence increased. Practically, my skill on CAD improved.

Looking back, this year in industry was truly fantastic and I am now more critical of my own work. I understand the needs of the end user and what I am trying to achieve, so I am more self assessing. The placement in the end was all about self improvement. I learnt a lot of graphical and presentation skills. All the investigations we did I converted into visual presentations, which made it easier for the end user to understand our work.

I also created a new system with a lot of dimensional data. The system involved an EXCEL workbook. With so many different dimensions in the research and investigation processes there was, until I developed my system, no way of making comparisons of so much data, but my system automated everything. Anything put in Excel went directly to visual representation. Prior to my system, the user had to copy and paste things, which often involved errors and problems. I am proud to say that my system is now being used by Bentley.

In sum, my placement helped my personal development in technical, communications and business enterprise areas. Also, my general work ethic improved, because on the placement I got into a routine and set my deadlines to achieve each day. I had to time manage. Before my placement, unless someone told me what to do, I might have lost my way, but now I am confident to act independently and am self starting.

The placement was certainly for me a life changing experience! When the placement ended I was invited to go back on an assessment scheme after graduation with a view to being offered a job! So though not guaranteed, there is a possibility of a job with Bentley in the end. I will definitely go to the assessment centre to pursue this dream after my final year at Brunel.
In September 2008, four students from the Mechanical Engineering subject area suggested to Mr Chris Brown (Reader in Mechanical Engineering) that they design and build a high performance electric motorcycle for their MEng group project. Their inspiration was the recently announced TTXGP, a competition to race electric motorcycles at the gruelling Isle of Man TT course. The 37.73 mile course is famous for its country roads and steep inclines and, especially, the mountain section, which rises above the tree line and climbs to a height of approximately 1400ft. Chris assembled an academic team, which included Dr. Koen Matthys and Dr. Efstatios Velenis, both from Mechanical Engineering, and Dr. Roger Powell, from Electronic and Computer Engineering.

The design of this bike required huge ingenuity on the part of the students to fit all the batteries into a small space, to understand and wire up the Battery Management System (BMS), and to design the various other subsystems. There were a number of unexpected problems and as the race day approached the students worked many nights and well into the small hours of many mornings.

When the bike arrived on the Isle of Man, it had not been track or dynamometer tested. In fact it had hardly turned a wheel, so the first qualifying session was the first-ever test and the team had had only limited time to prepare the batteries properly. Nevertheless, the team made 26.4 miles before the BMS called a halt. This was a really pleasing result. It meant that everything worked perfectly: the motor, the controller, the BMS and the batteries all worked to specification. The only problem was that, as we already knew, there wasn’t enough charge in the batteries to get all the way up the mountain!
In preparation for the second qualifying event, the team made some adjustments to the controller characteristics, allowing the motor to draw more current and hopefully improve the throttle response. The modifications worked well and the bike went even faster, getting up to 75-80mph.

However, we had operated the motor outside its operational limits for too long and damaged the brushes after about 11 miles. Although the problem was not the fault of the motor, the designer, Cedric Lynch from Agni Motors, very kindly repaired our motor free of charge, which allowed us to complete a demonstration test at Jurby airfield circuit, and finally to start the race the next day with the other competitors.

Riders for teams that did not qualify by the preferred route had to wear an orange vest. There were four starters, ourselves included, in that category.

In preparation for race day we made some final adjustments to the BMS and reduced the current that the motor could draw. We knew that we wouldn’t get a race-winning time, but we hoped we might at least make it round.

On the day, the quality of the team and the rider’s skill shone through, as we achieved a great success! The bike made it over the mountain and completed the lap, and during the last mile, to preserve battery power, the rider dismounted and guided the bike on foot. Even with nearly a mile of walking-pace speed, our average lap speed was still over 40mph. If it had maintained its steady 60mph we would have finished about third. This was a tremendous achievement for the Bike’s third ever run!

There were some big names that failed to finish, including a multimillion dollar entry from the USA. Out of 22 entries there were about 13 starters and we finished 6th out of the Pro class and 9th overall. We were the only UK university to finish, which spoke immense volumes about the dedication, skill and technical set and support the whole student team received!

We were the only UK university in Pro Class, against the multimillion dollar US bikes and some very experienced inventors.

**Article by Dr. Roger Powell, Senior Lecturer - Control / Engineering Level 3 Project Coordinator**

There were effectively three stages to the event:

1. To build a working race bike in eight months (time from first announcement to race).
2. To bring the bike to the Isle of Man and get it ready for the TT race by passing race scrutineering.
3. The TT race itself.

Brunel X-team made it from build over scrutineering to the finish line on race day. The whole team must be congratulated for this astounding result!
EngD Conference – January 2010

The bi-annual EngD Conference took place on 7 January 2010. The photograph above shows Gideon Susman, EngD Research Engineer, giving his presentation at the Conference. Gideon is supervised by Dr Zahir Dehouche, Mechanical Engineering, and sponsored by Buro Happold Engineers. Despite severe adverse weather conditions, the Conference went ahead with twelve oral presentations and eight poster presentations. Over 50 participants including industrial sponsor companies and research students from both Brunel and the University of Surrey attended. Given the extreme weather circumstances, the EngD Conference proved to be a very successful day.

The EngD is a four-year programme established in 1993, combining environmentally-focused research with industrial experience, along with personal and professional development. Each research engineer (RE) is based within a sponsoring company and attends the University for taught modules. The sponsor provides a research project and jointly supervises the RE with Brunel academics. The Brunel EngD scheme is currently funded by EPSRC.

Brunel University CERN summer school (22 Aug - 4 Sept)

CERN School of Computing is a prestigious international summer school for PhD students and young researchers. It is organised every year by CERN (European Organisation for Nuclear Research), Geneva, together with an institute or university from a Member State of the organisation at the location of that institute or university.

The summer school is attended by 60 to 70 participants and consists of two weeks of lectures, seminars and practical workshops on modern topics of computing relevance to many research and engineering fields. The lecturers are international experts. The school ends with an examination which is recognised by the European education institutions. It also has a rich social and sporting programme to facilitate interaction among the participants.

Brunel University will host the 2010 summer school, funded by CERN. The School organisational representative is Dr Liliana Teoderescu.

Research in the School


The “Design Bugs Out” commode (see below) is the result of a successful collaboration between the Human-Centred Design Institute at Brunel University, PearsonLloyd (Design Consultants) and Kirton Healthcare (specialist manufacturers of medical products).

As part of a team answering the Design Council’s National Design Challenge “Design Bugs Out”, Brunel Design researchers undertook in-depth research into the usage of hospital commodes and patient chairs (see below). This research formed well-defined design specifications for the development of the new products, towards the delivery of working prototypes in April 2009, launched in the Design Council. Both the commode and the patient chair were selected as excellent design examples for the “Ergonomics - Real Design” exhibition at the Design Museum. The commode has been nominated for the Design Museum Brit Insurance Designs of the Year 2010 awards and will be highlighted in the annual Brit Insurance exhibition which will run from 17 February – 6 June 2010.

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CERN School of Computing is a prestigious international summer school for PhD students and young researchers. It is organised every year by CERN (European Organisation for Nuclear Research), Geneva, together with an institute or university from a Member State of the organisation at the location of that institute or university.

The summer school is attended by 60 to 70 participants and consists of two weeks of lectures, seminars and practical workshops on modern topics of computing relevance to many research and engineering fields. The lecturers are international experts. The school ends with an examination which is recognised by the European education institutions. It also has a rich social and sporting programme to facilitate interaction among the participants.

Brunel University will host the 2010 summer school, funded by CERN. The School organisational representative is Dr Liliana Teoderescu.

Research in the School


The “Design Bugs Out” commode (see below) is the result of a successful collaboration between the Human-Centred Design Institute at Brunel University, PearsonLloyd (Design Consultants) and Kirton Healthcare (specialist manufacturers of medical products).

As part of a team answering the Design Council’s National Design Challenge “Design Bugs Out”, Brunel Design researchers undertook in-depth research into the usage of hospital commodes and patient chairs (see below). This research formed well-defined design specifications for the development of the new products, towards the delivery of working prototypes in April 2009, launched in the Design Council. Both the commode and the patient chair were selected as excellent design examples for the “Ergonomics - Real Design” exhibition at the Design Museum. The commode has been nominated for the Design Museum Brit Insurance Designs of the Year 2010 awards and will be highlighted in the annual Brit Insurance exhibition which will run from 17 February – 6 June 2010.
When searching for the degree course I would undertake, the first thing that struck me about Broadcast Media Design and Technology at Brunel was how much of a forward-thinking course it was, and how its content was not only varied, creative and interesting, but also designed to stay up-to-date with advances in the broadcasting and media industries. The latter quality I deem essential, in order to become a successful graduate in an industry where the design and technological climates are progressing so rapidly.

Having now graduated from the course, I am working for a company called New Media Research (NMR) as a junior support engineer. NMR is a consultant reseller in the broadcast, film and tele-visual media industries and provides solutions and systems integration for production companies, animation houses, educational facilities and broadcasters. I strongly believe that my Broadcast Media Design and Technology degree gave me the upper hand in becoming employed in this company, because I was taught subjects that are essential in the modern media industries and that are often over-looked by other courses. It is vital to stay abreast of technology in order to stay up-to-date with an industry that is developing so rapidly, and the Broadcast Media course really gives you a wide and in-depth knowledge of technological subjects as well as design principles.

The Broadcast Media Design and Technology course gives you a wide skill set that can be applied to many of the different sectors of this industry. There is enough scope within the course to enter into production, animation, technology and design upon graduation. This is a vital characteristic for graduates in this area. Having such a widespread knowledge base across a variety of different subjects makes for a more employable graduate compared to a graduate with very specific skills.

The facilities available to you on this course are second to none. The equipment available in the broadcast media studio often far exceeds the equipment kept in house by some of the larger production companies that I have seen since starting my job at NMR. This prepares undergraduates with a knowledge base that far exceeds that of many other courses available.

Furthermore, the teaching staff at Brunel are not only friendly, enthusiastic and helpful but also have a vast collective wealth of knowledge amongst them that covers all areas of the subjects they teach.

The course is not only very stimulating on an intellectual level, but also fun and exciting. On the course you are allowed masses of creative freedom and the only limitation to most projects is your own imagination. Broadcast Media Design and Technology is a course which truly allows you to visualise, communicate and make real the ideas that you create yourself.

The Brunel campus is a diverse, exciting and interesting place to live and study. There is always something happening on campus to become involved with. The food halls and bars are a great place to socialise and meet new people, as well as the Academy (where I spent many a night!). The halls of accommodation are within a very short distance of all the places you visit regularly, including Uxbridge High Street, which boasts two shopping centres, a cinema, bars and restaurants. The local transport is very efficient, with Central London being only a 45 minute tube ride away.

The experience of taking a degree should be intellectually, creatively and socially stimulating. I believe that Brunel gave me all of these opportunities and is an institution I would gladly recommend to anyone.

Tom graduated in July 2009.
I have lived in Munich, Germany, since 1996 and was educated at the Munich International School. I took Art and Design Higher Level as part of the International Baccalaureate (IB) diploma.

I chose Brunel because of its reputation in the Design world, its proximity to London and Heathrow Airport, and its strong connections with industry.

The course was stimulating from an academic viewpoint, requiring production of high quality work. The environment was conducive to do work and everyone was motivated. A good thing at Brunel is that I felt like a person not a number in a big organisation; when I was studying for the IB there was a close relationship with teachers and I was happy to find this translated to my Brunel experience. The Design subject area was small enough to accommodate different viewpoints and that everyone knew each other and all the staff were very supportive and willing to accommodate different viewpoints and interests.

During my time at Brunel I undertook a number of internships. I did a six-month paid work placement in Boston, USA, at a consultancy called Proteus Design. I worked on quick turnaround, market-oriented products for various clients, in a large team of industrial designers, engineers and marketeers. The company was quite surprised at the range of skills and knowledge I brought as an Industrial Design student. I also did another paid placement in Munich, for f/p Design. During this second placement I worked on high-end products such as office chairs and furniture in a smaller team of four designers. The working environment was that of a small family and I was expected to be a part of the team and contribute to the success of the company from day one.

I chose my 'Tio' project as a result of a final year project brief with a company called Onzo, based in Central London. I won the pitch and started working on the 'Tio'. The project is a system, consisting of a wall-mounted light switch and a computer programme, that aims to increase children's awareness of energy consumption. The wall-mounted light switch monitors the amount of time lights have been on for, and gives visual and tactile feedback to the child. Increasing the younger generation’s awareness of energy consumption now will help to effect change in the future. Children play a key role in reducing energy consumption due to the fact that they will be among the key decision-makers in the next 30 years. A simple way to engage and educate them is to concentrate on lighting, which accounts for up to 15% of electricity use in the home.

The target market for 'Tio' is seven to eleven year-olds. This coincides with a period in primary education during which children begin to learn about the environment, energy and the effects that humans are having on the world. Tio aims to bridge the gap between school and home, allowing children to demonstrate their knowledge of energy conservation to their family and encourage their role as 'energy champions' of the home.

The wall-mounted light switch, which can be installed in the place of a standard light switch, controls the lighting in the child's room. 'Tio' is soft and tactile, thus encouraging user interaction. The character of 'Tio' displayed on the light switch encourages children to turn their lights off: 'Tio' is happy when the lights have only been on for a short period of time. The longer they are left on, the angrier he becomes. This acts as an emotional reminder to turn the lights off.

The 'Tio' system gives children instant and cumulative feedback on their energy saving performance. The recommended 'lights-on time' is influenced by the child's age, their daily activities and the time of day.

Typically, energy meters display energy usage in terms of monetary value or technical units, for example Euros or kWh, respectively. This, however, does not motivate or engage children. 'Tio' relates lighting usage to topics that are meaningful to them; how energy affects trees, animals and the local environment. This not only makes energy consumption more understandable to the child, but also shows the effect it can have on his or her life.

Information ('lights-on' time) is sent wirelessly from the wall switch to a computer. The computer programme allows the child to track their lighting-use performance over an extended period of time. The child takes care of a 'virtual tree' by moderating their lighting-use performance. This engages children to make a personal contribution to reducing energy consumption.

'Tio' was awarded the HSBC Award for Sustainability at the Made in Brunel show in June 2009. The judges commended the fact that the project focused on the future, by educating the younger generation, and that it made the complex subject of ‘energy’ more tangible and understandable. The project was supported by Onzo, a company that designs unique products and services that encourage real and long-term behaviour change.

I would recommend Brunel and the Design course, because it gives you a wide range of skills that can be applied to many different situations. I believe that this flexibility is something that employers are looking for now and in the future.

Tim Holley graduated with First Class Honours BSc Industrial Design in July 2009.
Teams of engineers entered vehicles in the 25th Shell Eco-marathon Europe 2009 which took place in Germany on 7 May 2009.

These vehicles aimed to travel hundreds of miles using the equivalent of a coke can full of fuel. The competing engineers comprised teams drawn from the four corners of the globe competing for the title of the world’s most fuel efficient vehicle. The competition challenges those taking part to build a vehicle which can travel the furthest on a single litre of fuel.

Brunel University entered the Shell Eco-marathon Europe for the first time in 2009. Five Brunel students from the Automotive and Motorsport MSc programme had a clear challenge at last year’s Shell Eco-marathon Europe: with a small but enthusiastic team, they planned to build the most fuel-efficient vehicle to participate in the competition. Each team member had a very specific and clearly defined area of expertise and responsibility in the development of the vehicle.

The Urban Concept vehicle that the team raced during the Shell Eco-marathon competition used a 5.6 kilowatt internal combustion engine, and ran on the newly developed Gas to Liquid (GTL) fuel which burns cleaner than standard diesel fuel, and enables greater flexibility in engine design due to its specific properties. To date, this cutting edge fuel has only been commercialised as a component in high performance or special city fuels.

The construction of this vehicle for Shell Eco-marathon was a compulsory part of the team’s academic curriculum and accounted for 45 of the 180 credits to be collected during this one year international postgraduate course in Automotive and Motorsport Engineering.

This very hands-on learning experience was rewarding in many ways. Students contributed to something important: a new generation of car designers’ attempt to protect and safeguard the future of our environment by contributing to the search for greater fuel efficiency. The students also improved their future employability due to the many skills they learnt during their participation in this event: from project management to teamwork.

Ali Hussain, team leader of the Brunel team – whose vehicle was dubbed the Brunel Masters Eco-Car (BMEC) – said: “Creating a car capable of crossing the USA on a litre of fuel has pushed each and every member of the team to the limit.”

For more information about Shell Eco-marathon Europe 2009 see www.shell.com/home/content/ecomarathon
Anirudh Narayan,  
Aerospace Engineering graduate

I graduated in MSc Aerospace Engineering at Brunel in November 2009. I was interested in aircraft and space from a young age because my mom used to read books about the universe and aircraft to me. Later when I grew older I loved building model aircraft.

I did my Bachelors degree in Mechanical Engineering from India. I got offers from a number of universities but I chose Brunel because of its location and closed, secure campus, which I needed initially to adjust to being in a new country. Brunel has got all the modern facilities I needed and the location is perfect; close to London, but also away from the busy city. I can say that most of the lecturers were very approachable and helped me a lot.

In the Advanced Aircraft Analysis (AAA) project we were asked to choose an aircraft we liked and design it using AAA software. I chose the Airbus A380. I researched everything I could about this aircraft as the more data we gathered the more accurate the results would be. By the end of this project I knew every little detail about aircraft and the process of aircraft design. My dissertation title was “Conceptual design of a business jet and finite element analysis of the wing structure”.

The design of the whole aircraft was made in AAA; in the same way, I re-made the A380, the difference being that this time it was my own design.

The model obtained from AAA and Aeropack is a shell; it has no structure or material properties. I imported the model to Abaqus where I assigned material properties to the shell and gave the wing internal structure like spars and ribs. I later did a linear elastic analysis in Abaqus with values from AAA to prove that the carbon fibre composite wing I designed would not fail during cruise conditions. I also developed a method to test different parts of the aircraft at different flight conditions using these two pieces of software, which no one has done before.

On graduation I got a job as a structural engineer in the research and development department of a large Indian company, Larsen & Toubro, based in Mumbai. I will be on training for one year in my new job. I got this job by applying online and taking an online test and two telephone interviews.

The MSc Aerospace course helped me get this job as I was easily able to answer the questions they asked about structural analysis, as I had done this for my dissertation.

To summarise, Brunel’s MSc Aerospace course is a great course, and it made me an aerospace engineer.

New courses starting September 2010

- MSc Advanced Multimedia Design and 3D Technologies

Course accreditation in 2009

The Royal Aeronautical Engineering Society (RAeS) visited on 11 March 2009 and accredited the following BEng/MEng courses:

- BEng Aviation Eng/Aviation Eng with Pilot Studies
- MEng Aviation Eng/Aviation Eng with Pilot Studies

The Institution of Mechanical Engineers (IMechE) visited on 29/30 June 2009 and accredited the following courses:

- MSc Building Services Engineering
- MSc Building Services Engineering Management
- MSc Building Services Engineering with Sustainable Energy
- MSc Sustainable Energy: Technology and Management
- MSc Automotive and Motorsport Engineering
- MSc Biomedical Engineering
- MSc Advanced Engineering Design
- MSc Aerospace Engineering

The Institution of Engineering Designers (IED) visited on 24/25 June 2009 and accredited the following courses:

- MA Design and Branding Strategy
- MA Design Strategy and Innovation
- MSc Integrated Product Design

JBM (Joint Board of Moderators, Institution of Civil Engineers) visited on 3 December 2009 to re-accredit the following programmes:

- BEng/MEng Civil Engineering with Sustainability

For information on all courses and previous Spotlight newsletter issues, see: www.brunel.ac.uk/sed

Further comments, suggestions and future submissions:

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