UNIVERSITY OF BIRMINGHAM
COLLEGE OF ENGINEERING & PHYSICAL SCIENCE
SCHOOL OF CIVIL ENGINEERING

School Newsletter Summer 2012

Yesterday I had the pleasure of watching another cohort of graduates celebrate their achievements along with a very large contingent of proud family and friends. Such events are often emotional and always enjoyable for those involved. Graduation typically heralds the end of the academic year and I am often asked what I and my colleagues will be doing over the long summer - the implication being that I will spend the next 8 weeks or so sunning myself on some far flung beach. Alas, this is not the case but around this time of year things normally do slow down somewhat. However, as described elsewhere in the newsletter this has been an incredibly busy and successful year for the School and as such there has been little time to catch ones breath:

- The School has seen significant staff changes. We have strengthened our academic base with the permanent appointments of Prof Lambis Bantiopoulos, Prof Miles Tight, Dr Samir Dirar, Dr Pedro Martinez-Vazquez, Dr Bill Ling (resulting in a dynamic new structures team) and Dr Dexter Hunt, who adds critical mass to our resilience research; Mr Dean Moody, Mr Neil Nelson and Ms Becky Green have joined the academic support staff; Mr Mark Carter and Mr Seb Ballard have revitalized our public health and geotechnical support respectively. I am pleased to say that all of these new additions have made a positive impact on School and always appear to be smiling (at least when I am around....). The final addition to the staff that I can announce is the appointment of Prof John Nolan of Nolan Associates and current IStructE President. John will be joining us on the 1st October to take up the position of Royal Academy of Engineering Visiting Professor in Innovation. Those of you have met John will know of his passion and enthusiasm for the industry.
- We have launched an Alumni mentoring scheme which has proved to be more popular than I dared to hope, thank you to those that have agreed to participate.
- Our research income has increased by more than 200% compared to this time last year.
- We launched a new MSc degree programme in Civil Engineering.
- Our degree programmes have been reaccredited by the Institution of Structural Engineering, Institute of Civil Engineering, Institute of Highways Engineers and the Chartered Institution of Highways & Transportation.

I will be visiting two institutions in Hong Kong over the summer in order to explore closer relations which will enhance our students' experience, while Dr Jimmy Yang takes a well earned sabbatical in Shanghai. This year has been incredibly challenging but also highly enjoyable. I believe that the School is well placed to move forward and I look forward to the next newsletter where I will outline how we have built on our success. I hope you enjoy the small insight that this newsletter gives into the life of the School. I am now off to try and find that elusive beach…

Dr Mark Sterling
Head of School

In this issue:

UNIVERSITY OF BIRMINGHAM

TEACHING & LEARNING

Civil Engineering Mentoring Scheme

L-R – Dr Mark Sterling, Petros Isidorou (URS Scott Wilson), Edmund Salt (Aecom), Jon Wiseman (Aecom) and Dan Bishop (Atkins)

A pioneering mentoring scheme has been set up in the School of Civil Engineering to help improve students' employability. The Scheme is the first of its kind for the University in targeting a specific School.

An e-mail request was sent out to the School's alumni community asking for volunteers to take part in the scheme. There were no specific guidelines as to the type of people wanted, just someone who felt that a student would benefit from his or her experience, knowledge and advice as they prepare for their working life.

As this is a pilot, it was decided to start with a small cohort of students and grow the scheme organically with an initial target of finding mentors for 10 students. This equates to approximately 10% of all the mentoring available at the University at present.

The alumni who have generously volunteered to be part of the process are of a very high calibre in terms of their roles and experience; ranging from more traditional Civil Engineering employers such as Atkins and AECOM, through to financial institution JP Morgan Chase & Co. there are even two internationally based alumni taking part - a project director from Melbourne Airport and Head of Asia Pacific Operations for RBS.

The School are delighted with the response from the alumni and with the level of interest from The students. Dr Mark Sterling, Head of School said “The enthusiasm and support offered by the mentors is fat beyond that which I had hoped for. The School is grateful to those who have given their valuable time to support the next generation of engineers"

It is hoped that the students will develop strong relationships with their alumni mentors sharing knowledge, skills and information. In particular the mentors have been asked to help their mentees focus on their time beyond University and advise them to seek out work placements and experience over the coming summer vacation to help them get graduate jobs when they leave.

If you would like to take part in this scheme, please contact Vickie Pargetter, College of Engineering and Physical Sciences Alumni Relations Manager on 0121 414 9227 or e-mail v.a.pargetter@bham.ac.uk.

Birmingham Assessment for Learning Initiative (BALI)

The School of Civil Engineering is taking a central role in a new educational initiative which is developing across the University of Birmingham campus. The background to this initiative is that the 'modularisation' of all university courses over the past decade has, over time, resulted in some unintended challenges for students (and staff) at programme level. The focus on individual modules can lead to a perception of 'scattered courses', each with their own assessments, and thus student's 'pigeonholing' their learning, and feedback on performance, to narrow areas of work.

The HEA (Higher Education Authority) Change Programme offered the University of Birmingham the opportunity to undertake a review of selected degree programmes, including Civil Engineering, using a proven education approach (TESTA), with support from experienced colleagues and peers from other institutions. This initiative aligns with the University strategic aim to 'provide our students with a distinctive, high quality experience through curriculum innovation and enhancement of the student experience'.

The review aims to collect quantitative and qualitative information about the Civil Engineering programme as a whole and the perceptions of students who have recently completed the course. Three methods for data collection are underway which collate published course information, student feedback from surveys and interviews with both students and staff. This intensive review is intended to provide a wealth of coherent, triangulated, data to the normal annual review process and the collated results will be provided to the Civil Engineering programme team who oversee changes for next academic year. These changes will assist staff and students to strengthen the links between sections of the course and see how new technologies, material and educational enhancements can be implemented more rapidly, coherently and sustainably.

Dr Andrew Quinn presenting some of the lessons learnt to date

As well as informing changes to the way Civil Engineering is taught at Birmingham this initiative will introduce new skills to key individuals from all the schools in the College of EPS, across the University, and the central education support unit, through a process of 'shadowing', so that a sustainable approach to assessment and feedback across programmes can be embedded across the institution through undertaking such reviews. Birmingham's lead in this has already been recognised and colleagues from the faculty of Engineering at the University of Nottingham will be joining us to learn from our initiative.

Further information can be found on the HEA website:
(http://www.heacademy.ac.uk/resources/detail/change/TESTA%28AF%29_CP_11-12)

A video of a presentation to the 'Assessment in the Digital Age conference' at the University of Nottingham is available at:
(http://www.nottingham.ac.uk/teaching/event/ada-conference.aspx)

The BALI project in Civil Engineering is led by Dr Andrew Quinn with Corony Edwards from CLAD (Centre for Learning and Development) and Dr Jonathan Green from the College of Life and Environmental Sciences.

Constructionarium 2012

Civil Engineering Students Returning to Constructionarium

Following the School of Civil Engineering's first successful visit to Constructionarium in 2011, a group of undergraduate students are once again travelling to Constructionarium in 2012 to attempt to construct a structure in just five days.

Constructionarium was created to provide Civil Engineering students with practical construction experiences by undertaking the construction of various structures in less than a week. The students undertake all phases of construction from the design stage: they programme the schedule of works, produce a bill of quantities and cost the project as well as prepare the all important risk assessments and methods of work.

When on site the students undertake the practical construction processes from setting out to steel fixing fabrication of formwork to the pouring of concrete. All of these activities are supported by a contracting company, ensuring that the students learn/implement best practices throughout.

In 2011 two bridges were constructed (one of which is pictured) and in 2012, in association with Interserve and EoN, the undergraduate students from Civil Engineering are attempting to construct a floating oil platform. This challenging project requires the creation of a concrete caisson, the erection of a steel platform and surveying on a boat! This venture has been made possible with the kind donation of funding from EoN.

Student–Led Employability Skills Audit

There is increasing importance being placed on the effective integration of graduate skills within degree programmes.

The school has obtained funding from the National HESTEM programme (http://www.hestem.ac.uk/), for which Birmingham is the host institution of the Midlands and East Anglia regional spoke (with Prof Kamel Hawwash of our school being seconded as the spoke Director).

The Project entitled, "Measuring the extent to which employability skills are embedded within existing degree programmes through a student-led employability audit" (http://www.hestem-sw.org.uk/project?id=20), aims to examine our undergraduate experience in order to review the employability skills. The skills reviewed are: Communication, Numeracy, Team working, Problem solving, Project management, Research skills, Self-management, Commercial awareness, Creative thinking, Positive attitude to work, IT skills and Career management skills. We have students involved from each of the year groups.

These students met to review the current module descriptions from their experience of the actual delivery of the modules. By performing a student-led audit, the modules were viewed from a user point of view. Throughout the audit, students provide structured feedback on the perceived employability skills attained within their existing degree programmes, and identified opportunities for the school to improve employability provision within the programmes and practice amongst members of the teaching staff.

These results will be disseminated to the teaching staff and will also feed into the module and programme review with the aim to improve the embedding of employability skills in the Civil Engineering programme. Due to the time limitation of the project and the proximity of the examination, significant employer's involvement was not possible this time around, however it is planned that similar activities will be introduced in the future. It is hoped that activity following the same or similar concept will continue and will involve employers and the industrial advisory board so that the review process and skills audit will be performed regularly in the future.

Prof A Chan, Philippa Jefferis and Mark Hipwell, showcase the project at the HE STEM Midlands & East Anglia Spoke, showcase event in July 2012

RESEARCH

Birmingham Centre for Railway Research and Education

Prof Chris Baker, Dr Mark Sterling, Dr Andrew Quinn and Dr Hassan Hemida, have been awarded a grant worth £550k by the Engineering and Physical Sciences Research Council (EPSRC) for a project entitled "The measurement of train aerodynamic phenomena in operational conditions". This takes as its hypothesis that the current methods for predicting the various aerodynamic phenomena on trains and railway infrastructure are likely to be very conservative. Thus the aim of the current project is to investigate and measure a range of aerodynamic phenomena observed in real train operation, both relative to the train and relative to a fixed point at the trackside, and to compare how such effects match model scale measurements and various types of CFD calculation, and thus to test the validity, or otherwise, of the above hypothesis.

This will be achieved through the instrumentation of the Network Rail High Speed Measuring Train to measure aerodynamic effects, as the train carries out its normal duty cycle around the UK rail network. Also trackside instrumentation will be installed at a suitable site that will allow off-train phenomena to be measured. Calibration wind tunnel, CFD and moving model tests using the University of Birmingham TRAIN rig at Derby will be carried out in the conventional way for comparison with data measured at full scale. The work will investigate how the train based measurements of cross wind forces, pressure transients etc compare with those predicted by conventional methodologies, and how the track side measurements compare with conventional test results. The investigators will synthesise the results and make recommendations for future aerodynamic test methods.

Further information on the work and research activities of the Birmingham Centre for Railway Research and Education can be found at:
http://www.birmingham.ac.uk/research/activity/railway/index.aspx

Or contact Professor Chris Baker, Director of the Centre on 0121 414 5067 or c.j.baker@bham.ac.uk

I am delighted to report that, from a research perspective, this has been a particularly good year for the School.

We are particularly pleased to have attracted some very strong researchers as part of the successful recruitment strategy; each of whom strengthens our existing portfolio of wide ranging research, under the over-arching themes of Resilience and Transport. Professor Lambis Baniotopoulos is now leading our successful Birmingham Centre for Resilience Research and Education whilst Professor Miles Tight has joined us to develop further our work into transport energy and the environment. In addition, Dr Tung-Chi Ling has added to our award-winning capabilities in structural engineering research. However, the news isn't just about the new staff. Our existing staff have found significant success in securing research funding in recent months. Chris Rogers and his team were recently awarded a prestigious programme grant from The Engineering and Physical Science Research Council (EPSRC). Programme grants are flexible grants made available to world-leading research teams aiming to address major research challenges. Working with colleagues from Lancaster University, University College London and the University of Southampton, the School is leading this £6m, five-year multidisciplinary research team looking at low carbon engineering solutions for cities of the future. Elsewhere in this newsletter, you can read of our successes in wind engineering, railway engineering, water engineering and resource efficiency, all of which provide evidence of the high quality of the School's wide-ranging research agenda, and of its value to, and impact upon, society today and in the future. For further information on any of the School's research activities, please contact me via the email address below.

Dr John Bridgeman
School of Civil Engineering Director of Research. (j.bridgeman@bham.ac.uk)

TRACE ELEMENT BOOST TO UK ENERGY TARGETS

Farryad Ishaq

Dr Cynthia Carliell-Marquet, a Senior Lecturer and water researcher in the School has been working with Severn Trent Water to better understand their anaerobic digesters and bioenergy output. Successful research carried out by Farryad Ishaq, a Research Fellow in the School, as part of an Engineering and Physical Sciences Research Council (EPSRC) CASE studentship, led by Dr Carliell-Marquet resulted in an EPSRC KTS (Knowledge Transfer Secondment) to transfer the full impact of the research to the water industry.

Anaerobic digesters play an essential role in wastewater treatment. They transform the sludge produced in other parts of the treatments process into methane (a highly useful end product) that can be used to generate electricity (bioenergy) or upgraded and injected directly into the gas grid (biomethane). The UK government sees anaerobic digestion (AD) as important in their renewable energy policy, with 1,000 new digesters proposed by 2020, capable of generating 10-20 TWh of heat and power. Accordingly, the focus for AD has shifted from waste treatment to bioenergy production.

The rate at which methane, and hence energy, is produce from the AD system has been found to be limited by trace nutrient availability. An anaerobic digester is a living system with a requirement for macronutrients as well as micronutrients, with deficiencies in any leading to poor digester health and sub-optimum performance. The research team identified that some of Severn Trent's digestion sites performing below their energy target were deficient in key trace nutrients. Supplementation of very small amounts of these trace elements to the digestion sites was found t lead to great gains in performance. Over just 50 days, the sites electricity production rose from 23% below target to 28% above target: the highest electricity output ever recorded from that site.

Farryad's secondment has bought about new insight into the challenges faced in full scale digester operation; this has helped to drive further research within anaerobic digestion that is specific to the needs of the water industry. Farryad is currently helping the organisation to implement changes to maximise energy recovery from their anaerobic digestion sites and thus helping them to deliver the UK government's energy vision.

For further information and enquiries concerning AD, please contact Dr Carliell-Marquet on 0121 414 5140 or by e-mail c.m.carliell@bham.ac.uk

UNDERSTANDING THE EFFECTS OF EXTREME WINDS

It is now an accepted fact that the disruption and economic losses arising as a result of extreme storms are increasing at a significant rate. There is also tentative evidence to suggest that these storms are increasing in frequency and magnitude due, primarily to climate change effects although it is acknowledged that such evidence is far from conclusive. Any increases in magnitude and frequency of extreme storms are likely to result in serious damage to the urban infrastructure, the world economy and society as a whole.

In European terms, it has been suggested that by 2080, there will be an increase in wind-related insured losses from extreme European storms by at least 25-30bn Euro. However, it is perhaps worth noting that these estimates do not take into account society's increasing exposure to extreme storms, due to growing populations, wealthier populations and increasing assets at risk.

Over the last few years there has been renewed interest in the effects of extreme wind events, since in a number of cases these events are the most important with respect to wind loading (i.e. the design of buildings/infrastructure). One particular set of extreme wind events which has received little attention in the past are those associated with thunderstorm downbursts. During a downburst a column of air moves vertically downwards and impinges on the ground. This causes the resultant air to be displaced radially outwards from the point of impingement, with a ring vortex travelling away from the stagnation point.

The effect of this is to alter the local velocity field significantly. In other words, the velocity field which was assumed when the building was designed may no longer occur, and a new, very different field may exist. The effect that this new wind field has on typical structures has yet to be addressed.

In order to examine the effect of extreme winds and their implications for engineering structures, the EPSRC has awarded Dr Mark Sterling and Dr Ian Taylor (Strathclyde University) a three year responsive mode ca. £800k.

A picture of the a ring vortex impinging on the ground.

Postgraduate Programmes in Civil Engineering

Engineering Council accredited degree

Programme	Contact	Email
MSc Construction Management	Dr Min An	m.an@bham.ac.uk
MSc Civil Engineering	Dr Pedro Martinez- Vazquez	p.vazquez@bham.ac.uk
MSc Civil Engineering & Management	Dr Pedro Martinez- Vazquez	p.vazquez@bham.ac.uk
MSc Geotechnical Engineering	Dr Ian Jefferson	i.jefferson@bham.ac.uk
MSc Geotechnical Engineering & Management	Dr Ian Jefferson	i.jefferson@bham.ac.uk
MSc Railway Systems Engineering & Integration	Prof Felix Schmid	f.schmid@bham.ac.uk
MSc Road Engineering & Management	Dr Michael Burrow	m.p.n.burrow@bham.ac.uk
MSc Water Resources Management & Technology	Dr Xiaonan Tang	x.tang@bham.ac.uk
MRes Engineering Sustainability & Resilience	Dr Tung-Chai Ling	t.ling.1@bham.ac.uk
MRes Railway Systems Integration	Prof Chris Baker	c.j.baker@bham.ac.uk
MPhil/ PhD Programmes	Prof Miles Tight	m.r.tight@bham.ac.uk

For general enquiries:
Postgraduate Admissions Tutor
Dr Gurmel Ghataora (g.s.ghataora@bham.ac.uk)

Future – proofing, resilience, infrastructure and the underground space

Across the world many urban centres are faced with an ageing and deteriorating infrastructure base whose performance relies on logistically complex operational, maintenance, repair and replacement procedures. Breakdown, either via catastrophic events such as earthquakes or chronic (long term) events can very rapidly paralyse all socio-economic workings of any urban centre. A key component of any urban infrastructure base is the urban underground space. Whilst it serves all aspects of a well-functioning urban environment, its contribution is often overlooked, being out of sight and often out of mind.

In addition, the underground space in our urban centres, in particular the near sub-surface zone, is often overcrowded with utility and other physical infrastructure, whose position and condition is typically not fully known or understood (see photos below). Moreover, in urban environments the underground zone is a hazardous place; ground conditions in the near sub-surface are often anthropogenic in nature and as a result highly variable both physically and chemically.

Crowded and haphazard use of near surface underground space in urban environments

An added complexity at the city scale is that there are many distinct end-uses for underground space. However, little attention has been paid to the fact that these various components are intimately related and thus directly / indirectly connected both physically and functionally to all urban infrastructures (above and below ground). Therefore, when planning (re)developments a more holistic, integrated and symbiotic approach than is currently adopted is needed. At city scale this should include type, density, location, user patterns, and resource requirements, for example. Critical to its long-term success is how all of these components will cope in the future and whether they are sustainable, resilient (i.e. to vulnerabilities), flexible (i.e. easily maintainable) and multi-functional whatever the future may hold.

Thus the key underlining question is; “how sustainable and resilient are the underground solutions being provided today?” This clearly depends on how the future develops. Traditionally this has been dealt with using linear future prediction drawn from past experience, extrapolated to the future. However, this approach is looking increasingly vulnerable in a rapidly changing urban environment. An alternative approach is to use scenarios-based futures to help us consider and effectively examine different extremes, 40 or more years into the future. This allows complex urban interchanges to be considered, where scale, temporal and spatial effects often conflict or compound each other in dynamic and sometimes counterintuitive ways.

Work funded under the EU Marie Curie fellowship scheme - Sustainable Infrastructure for Resilient Urban Environments (SIRUE) is currently underway to firstly understand how underground space and its physical infrastructure influence, interact with and impact on sustainability, vulnerability and resilience of urban areas, both now and in the future. This work will develop the new Urban Futures tool allowing users (e.g. planners, surveyors and engineers) to undertake meaningful futures analysis of the underground space in our urban environments, thereby allowing the various complex interchanges to be considered and tested for resilience. Ultimately this will allow more effective, efficient yet resilient use of underground space in urban environments to be achieved.

Study takes novel 'back-casting' approach to transform cities for healthier lives

Researchers at four of the country's leading universities are embarking on a low carbon engineering project that could transform the way cities are built, as well as the way we live in them, by taking a novel 'back-casting' approach to their study.

Led by Professor Chris Rogers' team at the University of Birmingham, the study will create visions of an alternative urban future with drastically reduced CO2 emissions then develop realistic and radical engineering solutions to achieve them in a socially acceptable way. Research will closely link people's social aspirations and wellbeing with the engineering of cities.

Professor Chris Rogers of the University of Birmingham's School of Engineering said: "Engineering of our cities has traditionally been a 'top-down exercise, mainly because it's so very difficult to create a 'bottom-up' approach: solutions are created and society must either learn to work and live with them or choose to resist them.

"Our research is novel in that we start by imagining the future that we want for our cities, for example what does an 80 per cent carbon reduced Birmingham look like? We then work backwards to find out what combinations of engineering solutions, behavioural changes and technological developments are needed to make these alternative futures possible, while at the same time ensuring that the planet can still provide us with the resources we need. The ambition of our research programme is necessary to deal with the global challenges that we face."

Professor Rogers' research experience encompasses the Mapping the Underworld project to create a prototype multi-sensor device to detect and map the pipes that lie beneath our cities' streets without the need for excavation. Such technical advances will make utility service provision and streetworks more sustainable.

As the world undergoes the largest wave of urban growth in history, research that can provide visions of an alternative economically viable future for low carbon, sustainable development is crucial.

In 2008, for the first time in history, more than half the world's population was living in towns and cities. The UK was the first country in the world in which this happened. At the time of the 2001 census almost 80 per cent of the UK population lived in cities, today this figure has risen to 90 per cent.

The UK government is committed to meeting its 2050 climate change target to reduce greenhouse gas emissions by 80 per cent from 1990 levels.

By using focus groups, case studies, a city analysis methodology and other approaches in pioneering futures research, the researchers will create a roadmap that aims to drive future engineering thinking for decades to come. Its goal is to influence policy and be used by urban designers in the UK with the potential to be applied anywhere in the world.

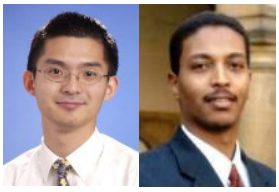
The study has been made possible by a £6 million programme grant from the Engineering and Physical Sciences Research Council (EPSRC). Programme grants are flexible grants made available to world-leading research teams aiming to address major research challenges.

Lancaster University, University College London and the University of Southampton are part of the five-year multidisciplinary research team.

Commercial partners include power and gas company E-ON, global engineering consultancy Halcrow, international engineering and construction company Costain, and the UK's rail operator Network Rail.

For further information please contact the Project Manager, Joanne Leach, 0121 414 3544, j.leach@bham.ac.uk

IStructE Research Award



Dr Jian (Jimmy) Yang and Dr Samir Dirar, have won an Institution of Structural Engineers (IStructE) Research Award for their project "Structural aspects of novel rail track concrete systems containing recycled waste materials". A rail track system incorporating prestressed concrete sleepers laid on stone ballast is widely used throughout the UK rail network. There are, however, limitations associated with the use of both sleepers and ballast.

First, the steel tendons in sleepers are susceptible to corrosion especially in coastal areas. Second, ballast requires periodic maintenance and, in the case of high speed trains, causes damage to rail and wheels. The aim of this project is to engineer corrosion-free sleepers and ballast-less track systems that require low maintenance. Central to this work is the use of waste and recycled materials to increase sustainability credentials and reduce construction costs.

This prestigious Award, funded by the IStructE's Research Fund, supports the development of innovative new research areas in structural engineering. A grant of £5000 was awarded to the project on basis of technical quality, impact to industry, benefit to IStructE members, value for money, and benefit to society.

Pressure Waves Generated by Trains

As part of my Industrial Placement module for my undergraduate degree in Civil Engineering with Industrial Experience, I am working for 10 weeks in the University of Birmingham's Centre of Railway Research and Education. As part of this placement I will be looking at the risk of pressure waves generated by trains entering a tunnel at high speed. Testing was carried out on July 1st, and history was made when a train entered and travelled through Ampthill tunnel, on the Midland Mainline, for the first time at 125mph. It was a successful day of testing, and I am now carrying out data analysis on the data collected. This will be used by Network Rail in their assessment of the risks involved in increasing the speed on the track between Derby and London.

The speedometer as the train entered the tunnel

The test train at the Derby depot

I have also had a chance to visit the Bombardier/Network Rail depot in Derby to help install the test equipment used. It was a great experience to see parts of a train you would never get to see as a passenger and have a chance to sit in the driver's seat, while the train was not on the tracks, obviously. First class is also very comfortable on East Midlands trains.

In the next couple of weeks, I will be donning my orange high visibility gear again as a team of engineers spend a week measuring the speed and air velocities associated with high speed trains on the Great Western line. This is another Network Rail project the University will be working on and is part of a risk study into the effect of trains passing workers who could be working at height alongside a live track.

It is with thanks to Dr Andrew Quinn and Professor Chris Baker that I have been able to get an insight into research carried out by the university. I just hope, however, that this work does not lead me to becoming a train spotter. I can already identify a range of trains and it is only week 4 of the placement!

Philippa Jefferis

OUTREACH & EXTERNAL CONTACTS

OUTREACH ACTIVITIES

The School of Civil Engineering pursued a number of outreach activities in addition to those organised by the student recruitment and outreach team. Professor Chris Baker has visited two mixed 11-18 comprehensive schools in Lichfield; King Edward VI (http://www.keslichfield.org.uk/) and Netherstowe (http://www.netherstowe.com/).

He gave talks to mixed year 12 and 13 groups about civil engineering in general. His talks were very well attended and generated a lot of questions about both the studies and professional development in Civil Engineering.

Dr John Bridgeman visited the Warwick School (http://www.warwickschool.org/), an independent day and boarding school for boys aged 7-18.

He gave a lunchtime presentation on Civil Engineering Degrees and Careers to a group of year 13 students who were very enthusiastic and raised a lot of questions about the Civil Engineering profession and the studies offered by the University of Birmingham.

RESPECT 'Meet the Companies' Day 2011

2011-12's recruitment for the School of Civil Engineering's *RESPECT* sponsorship/placement scheme started with a lot of noise and bustle in the Shell Lounge on 23rd November. The majority of the School's first and second year undergraduates came to meet a dozen big-name civil engineering companies, find out about the opportunities open to them for summer work placements and subsequent sponsorship through their studies.

Regular recruiters, Laing O'Rourke, Balfour Beatty Civil Engineering, Interserve Construction, Geoffrey Osborne Ltd, Mouchel, Bam Nuttall, Northmidland Construction and Grontmij were joined by Arup, Colas Rail, Keller Ground Engineering and Balfour Beatty Utilities Services. All are looking for talented young engineers to continue the success of their businesses – of which Birmingham has plenty.

The next stage for the students is to complete an application form, brush off their CVs and send them in to the School's Industrial Liaison Manager, Jenny Illingsworth. From there, the companies will decide which of their applicants to see on Interview Day in February 2012.

To take part in RESPECT and receive applications, it doesn't matter if your company wasn't there for Meet the Companies; you can still recruit students. Please contact Jenny Illingsworth on j.s.illingsworth@bham.ac.uk if you'd like to find out more and recruit enthusiastic, able students.

Budding Civil Engineers Design High Rise Buildings

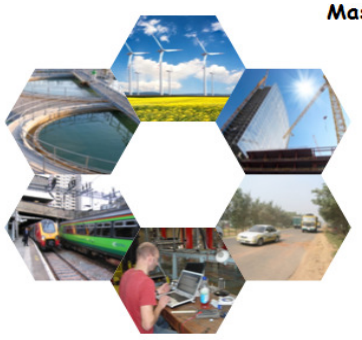
As part of the School of Civil Engineering's outreach and impact activities, a group of year 9 pupils (~14 years old) from Kings Norton High School (KNHS) visited the University. Their remit was to design a 1:200 scale model of the Hyatt hotel which was capable of supporting a 10N load at the top of the building and resisting a horizontal wind load of ~2N. The pupils were divided into small groups, given 14 sheets of A4 paper, some sellotape and after two hours produced some very credible designs.

Two of the four buildings exceeded the design criteria with one group producing a remarkably efficient design. Mark Sterling stated "*I was pleasantly surprised by not only the ingenuity of the designs but also the way in which each pupil was fully engaged with the process…..they are a credit to their School*". Dr Gerrard (Head of the faculty of Maths and Science, KNHS) was also supportive of the event stating "*It is not often that learners of this age get to interact with leading experts in the field of Wind Engineering. It is clear that they have not only thoroughly enjoyed themselves but have learnt a great deal. The learners were very much looking forward to this day and I am sure they will continue to talk about it for a long time*".

UNIVERSITY OF BIRMINGHAM

School of Civil Engineering

William E Lardner Award
for
Master of Research (MRes) programmes



The School is pleased to announce that in conjunction with Mr Lardner, it is able to offer the highly prestigious Mr William E Lardner award for the 2012/13 session.

One award, which is tenable for a period of one year, is available to a high performing student.

Further details are available at
Contact: Dr Bill Ling (t.ling.1@bham.ac.uk).

NEW SCHOOL STAFF

Welcome to:

Professor Miles Tight

Miles Tight is Professor of Transport, Energy and Environment. He was previously a senior lecturer in transport planning at the Institute for Transport Studies at the University of Leeds. He has been actively researching safety, equity and sustainability of travel for over 20 years with a particular emphasis recently on sustainability of transport.

He is currently leading a large multi-centre project funded by the UK Engineering and Physical Sciences Research Council (EPSRC). This is a 5 year project (2011-2015) called STEP-CHANGE (Sustainable Transport Evidence and modelling Paradigms: Cohort Household Analysis to support New Goals in Engineering design) (http://www.changing-mobilities.org.uk/). This project aims to do three things: firstly to develop an evidence base which considers examples of large-scale transport changes and tries to understand the reasons behind these (this will be done principally by the development of a qualitative in-depth cohort study of transport behaviour over a number of years; secondly, through development of new planning paradigms which encompass to a larger degree than is currently the case the potential for step-changes in travel patterns and; thirdly the development of new transport modeling frameworks and tools which support the development of step-changes towards a sustainable transport future.

He has recently completed another large EPSRC funded project on 'Visions for the Role of Walking and Cycling in 2030' (www.visions2030.org.uk) – essentially a future look to try to understand the role that these modes could play in creating a more sustainable transport system and a more inclusive society and how they might lead to improvements in individual health and quality of life. He has also recently completed a range of projects which have looked at sustainable transportation more generally, including work funded through EPSRC on 'Understanding Walking and Cycling' (http://www.lec.lancs.ac.uk/research/society_and_environment/walking_and_cycling.php), the Tyndall Centre for Climate Change Research on 'Behavioural Response and Lifestyle Change in Moving to Low Carbon Futures' and work funded through the Swedish MISTRA programme in the 'IMPACT' project (Implementation Paths for Action towards Sustainable Mobility).

He contributed to the European Union funded COST358 project on 'Pedestrian Quality Needs' (http://www.walkeurope.org/final_report/default.asp). He has successfully supervised 13 PhD projects on a variety of issues related to transport and sustainability and is currently continuing to supervise as an external three further PhD projects in this area at Leeds.

Professor Tight can be contacted on 0121 414 5071 or by email at m.r.tight@bham.ac.uk

Professor Charalambos Baniotopoulos

Professor Dr-Ing Charalambos (Lambis) C. Baniotopoulos joined the School on the 1st April from Aristotle University of Thessaloniki. Lambis was appointed to the School's newly created chair in Sustainable Energy Systems and his research interests are in the areas of wind energy structures, sustainable design, structural robustness and fire engineering. He has recently been awarded an EU project on high strength long span structures focusing on the use of micropiles as foundations for the new generation of wind energy structures.

His academic and professional experience will prove invaluable for his role as director of the School's resilience and sustainability research and inspirational to our undergraduate and postgraduate students. Lambis' has held a number of prestigious fellowships at Technical University of Aachen and at the Leibniz University of Hannover.

Professor Baniotopoulos can be contacted on
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Dr Samir Dirar

Dr Dirar graduated from the University of Khartoum in 2002 with a First Class BSc (Hons) degree in Civil Engineering. He then worked as Graduate Engineer for a consultancy firm before moving to the UK in 2003 to read for an MPhil in Engineering followed by a PhD in Engineering at the University of Cambridge. Following completion of his doctorate degree, he joined the Civil and Computational Engineering Centre at Swansea University where he worked as Post-doctoral Research Assistant.

His reasons for coming to Birmingham include the outstanding reputation of the School of Civil Engineering in both research and teaching, and the prospect to complement and contribute to the research work being undertaken at the School. Moreover, he is fascinated by the city of Birmingham which offers a huge range of attractions and a truly fabulous experience.

Dr Dirar has a particular interest in the area of strengthening and repair of existing structures. His research addresses the use of advanced durable materials as internal reinforcement and/or external strengthening systems for existing civil engineering structures. He has also been involved over the last 8 years in studies providing detailed analysis of the nonlinear behaviour of complex reinforced concrete structural elements. His future research agenda include net zero energy buildings and ductile concrete.

Dr Dirar can be contacted on 0121 414 3675or by email at s.m.o.h.dirar@bham.ac.uk

Dr Dexter Hunt

Dr Dexter Hunt was appointed to the position of University of Birmingham Research Fellow in the School of Civil Engineering in May 2012. Dexter has over 9 years research experience related to the schools research theme of resilience and sustainability. As a research Fellow he has looked at the sustainable regeneration of the Eastside of Birmingham and explored the future resilience of Infrastructure solutions. He is currently Co-Investigator Researcher on the £6.2 million 'liveable cities' platform grant - a 5 year multi-disciplinary project (started May 2012) that includes researchers from Southampton, Lancaster and University College London. Dexter's research interests relate to the provision and interaction of sustainable urban infrastructure systems constructed above and below ground.

Dr Hunt can be contacted on 0121 414 3544 or by e-mail at d.hunt@bham.ac.uk

Dr Tung-Chai Ling (Bill)

Dr (Bill) Tung-Chai Ling joined us as a Lecturer in Materials and Structural Engineering from The Hong Kong Polytechnic University in March 2012 and currently he is our programme convener for the MRes in Engineering Resilience and Sustainability. His main areas of research include structural materials engineering, cement and concrete composites and recycling and management of solid wastes materials.

Dr Ling can be contacted on 0121 414 5146 or by email at t.ling.1@bham.ac.uk

Dr Pedro Martinez-Vazquez

Dr Martinez-Vazquez is currently our Design Tutor, teaching structural analysis and design at undergraduate and postgraduate level. He joined the School of Civil Engineering in 2012 following a Lectureship at the University of Liverpool and a Research Fellowship at The University of Birmingham which he undertook between 2008 and 2011.

Dr Martinez-Vazquez has over eight years of experience in structural design and consultancy. He has participated in the design of a large variety of steel and concrete structures and has been involved in a number of research projects.

His research interests are varied but fall into distinct areas covering applied fluid dynamics and structural dynamics. He has extensive experience in dealing with random vibrations, artificial intelligence, image recognition techniques, and experimental methods. He has developed novel and complex computational algorithms in order to reproduce the characteristics of the undisturbed wind, including vortex shedding and its effects over structures. Dr Martinez-Vazquez joined Birmingham as he was attracted by the School's vision and strategy for teaching and research and for the high quality its academic practice.

Dr Martinez-Vazquez can be contacted on 0121 414 5059 or by email at p.vazquez@bham.ac.uk

Mr Neil Nelson

Neil is the School's Admissions and Teaching Administrator, and Line Manager for the Undergraduate Teaching Staff in the building.

Neil graduated from the University of Birmingham in 2009 with an MA in English Literature, and has worked in administrative and technical posts for Birmingham City Council, Heartlands NHS Foundation Trust and Birmingham Children's Hospital. Neil is relatively local, he grew up in Solihull and studied for his undergraduate degree at the then UCE (now BCU) in Perry Barr.

Mr Sebastian Ballard

I moved recently to Civil Engineering from Metallurgy & Materials. My role is Geotechnics technician where I run the lab, repairing, machining and constructing test rigs for research. I started my career as an apprentice for Babcock Construction becoming a specialist welder in oil and nuclear grade work. I moved to other areas of heavy and light engineering then working for British Telecom as an IT and broadband specialist before joining the University where I have been for two and a half years.

Mr Mark Carter

I am the new Public Health Engineering Technician and School Health & Safety Coordinator. I have a violent temper that can easily be set off by people not following safety procedures, thankfully, that has not happened (yet)!

In the past I have done various unsavoury jobs before moving out to Rome, Italy to work for European Molecular Biology Laboratory. Finally I could not take the sun, sand, sea and Italian food any longer and came back to the UK. Here I worked for Imperial college at the Magdi Yacoub institute for a time before remembering that beer is a lot better and cheaper in Brum.

Mr Dean Moody

I graduated from Coventry University with a degree in History and Politics which I really enjoyed doing. After graduating I worked for HM Revenue & Customs and then I worked in China for 3 years. I was teaching English to wide range of students from school children to adults in both private schools and universities.

I work in the School of Civil Engineering handling the postgraduate admission for most of the MSc programmes. The role involves dealing with all enquiries from applicant at all stages of the process, processing the applications and generally ensuring the all the applicants experience a smooth application process.

Miss Becky Green

I recently started work in Civil Engineering as the Teaching Support Administrator in the Undergraduate Office. Since taking on the role some of the tasks I have been undertaking have been; dealing with queries from the undergraduate students, organising the School celebration for graduating students and establishing MOMD options for the continuing students. My previous role was as a Research Secretary in the Cardiovascular Disease department in Primary Care here at the University.

I studied History with American Studies at Worcester University and graduated in 2005. I still hold an interest in History, particularly the older social history of the Nineteenth Century. After leaving University I went on to work at Solihull College in the Project Office which was in charge of co-ordinating the recent re-development that they undertook.

NEWS & EVENTS

Trains, Mountains, Gravity and Adhesion

Professor Felix Schmid – Inaugural Lecture

On 28 February 2012, over 150 guests from the railway industry and colleagues from several universities attended Felix Schmid's inaugural lecture with the title 'Can railways cheat adhesion and triumph over gravity?' This was not a lecture heavy on maths and engineering but could still be described as science based.

Left to Right: Prof R Wiliams, Head of College (EPS), Prof F Schmid, Prof J Heath, Pro-Vice Chancellor

Born in Switzerland, Felix became involved in railway research and education at the University of Sheffield in 1994, from where he moved to The University of Birmingham in 2005, joining the Birmingham Centre for Rail Research and Education (BCRRE).

Figure 1 Pilatus Railway in Switzerland (Picture Schmid)

At Sheffield, he had established the MSc in Railway Systems Engineering. When the programme moved to Birmingham, the title was lengthened to include 'and Integration', reflecting the systems approach adopted at Birmingham. Over 400 postgraduates from around the world have completed the programme over the past 17 years and more than 100 students are currently registered on the programme, some for a significant number of years. Felix's research interests include railway capacity, human factors and the management of organisations in safety-critical industries. The inaugural lecture marked his transition to a full professorship and served as an excellent opportunity to meet up with old friends from the railway family.

Felix received a warm introduction from Pro-Vice Chancellor Professor John Heath, who provided a potted history of his path to the present role. This was followed by an hour-long lecture that allowed Felix to offer theoretical and practical insights into the role of adhesion in the operation of railways and the impact of gravity on their performance. Felix illustrated both conventional and less conventional systems conceived and employed over the last 200 years for overcoming easy and challenging gradients in railways. With his sense of humour, imagination, storytelling ability, cultural knowledge and anecdotes, Felix kept the audience engaged and entertained even though he was covering a complex and somewhat 'niche' topic.

Figure 2 Panama Canal Tug Locomotive on Rack Section (Picture Wiki Commons)

The designers and builders of early railways feared gravity and were not convinced at all that adhesion between iron wheels and iron rails would allow the transmission of forces that were sufficient to propel a train. Ingenious solutions included John Blenkinsop's patented toothed wheels and Brunel's atmospheric railway, the latter given short shrift once the Great Western Railway's Daniel Gooch managed to convince Brunel that Mr. Stephenson built better locomotives than the eminent civil engineer himself. Felix waxed lyrically about his favourite adhesion operated Lisbon tramways and the steepest rack railway in the world, the Pilatus railway. Built by Colonel Eduard Locher, this railway manages to climb a very tough 48% gradient (see Figure 1). Felix also included the unfeasibly steep Suez Canal tug railway in his talk, admitting that he only learnt about this while preparing the inaugural lecture (see Figure 2).

Professor Richard Williams, Head of the College of Engineering and Physical Sciences brought the occasion to a fitting end by warmly thanking Felix and admitting to be a member of the Trevithick society himself. He suggested that the audience would never forget the locomotive axle arrangement 'B0zz-B0zz' that defines today's most powerful rack locomotive.

CLARK LECTURE 2012

John Nolan

John Nolan delivers Clark Lecture

The 2012 Clark Lecture invited John Nolan, President of the Institution of Structural Engineers and Chairman and Founder of Nolan Associates, to deliver a talk, entitled, *The Consulting Structural Engineer, Cost Versus Value.* Over 100 attended the lecture, which was hosted by the School of Civil Engineering, and was held Tuesday 15 June.

John is a keen advocate of the role industry can play in tertiary education. He said "*I am very excited about the direction that the School is heading, in particular its willingness to involve industry and take advantage of modern technology and methods. It was based on my Presidential Address to the Institution of Structural Engineers in response to concerns by my members that pressure on fees was having a disproportionally negative effect on the value that they could create for society. Current European Union public sector procurement legislation is a major factor in generating enormously wasteful and costly bid prequalification procedures which mitigate towards cheapest cost not best value procurement.*"

Professor Williams, Head of College of Engineering and Physical Sciences, attended the lecture. He said "*John talked about the core values of engineers and the needs for professional diligence and competence in structural engineering. In a fascinating and powerful message and demonstrated the value that consulting structural engineers can add to the economy and also the need for reform, in some of areas, of current industrial practices and nationally-imposed policies.*"

Emeritus Prof L Clark

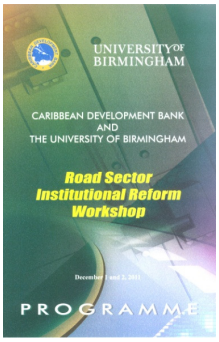
Dr Mark Sterling, Head of Civil Engineering, added "*John's presentation was not only passionate and inspirational but in places highly amusing. The buzz afterwards was palpable and celebrations extended into the night – a testament to the interest generated.*" The Clark Lecture is in honour of Emeritus Professor Leslie Clark, who joined Birmingham in 1978 as a lecturer, and retired in 2009 as Head of School, and Pro-Vice Chancellor of Estates and Infrastructure, picking up a wealth of awards and publishing a volume of papers along the way. The lecture is a highlight of the academic year. Responding to the invitation to deliver the talk, John said *"I have been a great admirer of Les and his work for many years and I considered it to be a great honour to be asked to give an address in the name of one of our great Past Presidents. As part of my role in the Institution I have had to give a number of talks during the course of this year but it gave me enormous pleasure to be able to give a keynote address in my home city."* John's connection to the City goes back a long way, and continues to expand; *"I went to school {here}, and have lived and worked in Edgbaston nearly all my life. I am a member of the School of Civil Engineering Industrial Advisory Board and from October a Royal Academy of Engineering visiting professor in innovation."* Nolan Associates is one of the largest Structural and Civil Engineers consultancies in the Midlands. A chartered member of the Institution of Structural Engineers and the Institution of Civil Engineers, John has more than 40 years experience in construction, which includes working as a labourer, contractor's engineer, consulting engineer, developer and client.

If you would like to be kept informed about future Clark Lectures and other events in the School of Civil Engineering, please contact Ms Gaby Howell with your contact information. Gaby can be contacted on g.j.howell@bham.ac.uk or 0121 414 5137.

ROAD SECTOR INSTITUTIONAL REFORMS

Workshop for the Caribbean Development Bank

The highways group of the School of Civil Engineering has a world-wide reputation in the area of road management and engineering and strong links with international organisations like the Department for International Development, the World Bank and the International Road Federation. Most recently, Drs Harry Evdorides and Michael Burrow were invited by the Caribbean Development Bank to deliver a workshop on road sector reforms and management at the Bank's premises in Barbados on 1st and 2nd December 2011. The workshop was a follow-up activity of the international Senior Road Executives Programme (SREP - www.sreprogramme.org) organised every year by Drs Burrow and Evdorides.



The workshop, tailored to the needs of the Caribbean region, discussed the principles and management systems for road institutional development through commercialisation of the management processes, involvement of customers in decision making about roads and sustainable financing mechanisms. 33 senior officials of road organisations from both the public and the private sector from thirteen Caribbean countries attended the workshop including permanent secretaries, chief engineers and planners, and directors of public works departments. The workshop led to a declaration by the delegates to disseminate further and implement the concepts they learned to improve the efficiency and effectiveness of the road sector in member countries of the Caribbean Development Bank.

UN World Water Day

Water resources technology and management students from the School of Civil Engineering together with the Birmingham Engineers Without Borders (EWB) society held an awareness raising event at Mermaid Square on 22 March. The theme of this year's UN World Water Day was water and food security, in particular raising awareness of the water required for the production of common food and drink items, with the slogan 'the world is thirsty because we are hungry'.

EWB Warwick kindly loaned a 'bottle cap water pump', a rudimentary piece of equipment used in many developing countries and curious students were invited to see how much water they could pump. With the good weather, lots of water, a few buckets and a handful of volunteers, £145.50 was raised for WaterAid and many were shocked at just how much water went into just one beef steak!

Engineers Without Borders UK

Engineers Without Borders UK is an international development organisation that removes barriers to development through engineering. Our programmes provide opportunities for young people in the UK to learn about engineering's role in poverty reduction. Part of this includes a vital network of branches at universities across the UK, where volunteers run events and activities for their members and communities.

The Birmingham branch has had a year of big events, hosting the National Conference with over 130 attendees. We have run some very successful fundraising events, that also helped to raise awareness such as 'Lunch Below the Line' where soup that cost just 33p (a third of the daily budget for someone in poverty) was sold helping to show what it really means to live below the poverty line. Our rope washer pump was put into use on World Water day, helping to raise £145 for Water Aid and demonstrating just how much effort it can take to get access to water.

The year ended on a high with the 4th year of Pear Jam, a charity band night that helped to raise over £170 for Practical Action. Next year looks to build on this success by getting more people involved and showing how we can make a difference.

University Community Day 10th June 2012

The Community Day was a great success with well over 7,000 visitors and 150 events organised by staff.

At this year's community day, Dr Pedro Martinez-Vazquez, and Civil Engineering students Sally Barnett, Andrew Mc Loughlin, Berbard Brincat, and Rianus Gonteb successfully demonstrate how easy it is to construct the new Olympic stadium....

....However, some budding engineers were overawed by the challenge!

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