UNIVERSITY OF BIRMINGHAM

College of Engineering and Physical Sciences

Newsletter

Birmingham Fellows p.6

BBC Stargazing p.13

Image courtesy of the BBC.

February–March 2013

The Green Commission

Richard A Williams, Head of College

In recent weeks, I have been participating in 'The Green Commission', a Group established by the Birmingham City Council to set an ambitious agenda for the City's development. The Group consists of leaders from the major organisations along with The Department for Business and Innovation Skills and The Department of Energy and Climate Change. The city is actually already nationally leading in the Energy Savers initiative and methods through which it has raised finance for major city housing initiatives. Looking ahead, the University and especially the College, has a strong opportunity to engage through, for example, the work of Professor Rogers in Liveable Cities, our forthcoming new commission in Future Cities and the development of our new Centre in Energy Storage Systems. The issue of creating sustainable and resilient city touches on many skills in the College ranging from cyber security, novel sensors, data handing and interpretation, buildings, energy and transport. This is an area where the city and University can develop new things together that provide opportunities for students, staff, research and international collaboration.

New communications

In the coming months, a variety of new communications activities will get underway relating to different aspects of life in the College both internally and externally. In particular, relating to our programmes, alumni, research initiatives and achievements, inaugural and other special lectures. Web and wider use of other media are to be explored. A Communications Group has been established in the College by Robbie Roberts. Professor David Evans (School of Physics and Astronomy) is an active member of the group advising on external communication.

BUAFTA winner

It was excellent to see Ian Tidmarsh winning a BUAFTA at the dinner and ceremony last month for his work in supporting our working environment. In addition to the BUAFTAS, I am pleased to announce the first of a series of Head of College Awards to recognise personal endeavours in the area of 'Best Practice in Safety or College Wellbeing'.

College Assembly

All members of the College are invited to the College Assembly on 19 March. The Vice Chancellor plans to join us for the meeting (more details below).

College Assembly

Tuesday 19 March, 1–2pm, G31 School of Mechanical Engineering

College Assembly is a great opportunity to learn more about exciting initiatives, network with colleagues and hear directly from Senior Management about future plans.

Confirmed speakers for the event:

1. **Vice Chancellor Professor David Eastwood**: What does success look like?
2. **Professor Paul Bowen**: Developing our relationship with Rolls Royce: Establishing a High Temperature Research
3. **Professor Richard A Williams**: Recent highlights and future initiatives Centre in Coventry

I would encourage everyone in the College to attend and look forward to seeing you all there.

Professor Richard A Williams

Head of College

Staff and awards

New staff

Chemical Engineering
- Mr Neeraj Jumbu, Research Fellow
- Dr Geraldine Oliveux, Research Fellow
- Miss Gurpreet Birdi, Research Fellow
- Mr Iain Kings, Research Fellow
- Miss Tania Selas Castineiras, KTP Research Associate
- Dr Yadira Gonzalez Espinosa, Research Fellow

Chemistry
- Miss Laura Broad, Teaching Fellow

Civil Engineering
- Ms Julianna Moats, Teaching Fellow

Computer Science
- Dr Benjamin Cowan, Research Fellow (transfer)
- Mr Daniel Gooch, Research Fellow
- Dr Flavio Garcia, Birmingham Fellow
- Mr Mohammad Tayarani, Research Fellow
- Mr Robert Durrant, Research Fellow
- Mrs Samantha Gardiner-Hardy, Academic Administration Officer

EECE
- Mr Phil Weber, Research Fellow

Mathematics
- Mr Nikolaos Pattakos, Research Fellow

Mechanical Engineering
- Dr A S Ramadhas, Marie Curie Research Fellow
- Dr Daniel Espino, Lecturer (transfer)
- Mr Darius Zielinski, Research Associate in Laser Processing/Machining
- Mr He Ma, Research Fellow
- Dr Richard Hood, Lecturer (transfer)
- Dr Rustam Stolkin, Senior Birmingham Research Fellow (transfer)

Physics and Astronomy
- Miss Anna Kowalczyk, Research Fellow
- Dr Jensen Li, Senior Lecturer
- Dr Jinlong Yin, Research Fellow
- Miss Ludovica Aperio Bella, Research Fellow
- Mr Paul May, Research Fellow
- Mr Ramon Gonzalez Mendez, Marie Curie Early Stage Research Associate
- Miss Raquel Fernandez Del Rio, Marie Curie Early Stage Research Associate
- Dr Simone Bifani, Research Fellow
- Mr Tony Price, Research Fellow

Award, grants, and appointments

Dr F Spyropoulos, School of Chemical Engineering, won £320,000 from the Technology Strategy Board for the project, *Efficient Novel Drying Processes of Foods*.

Prof J A Preece, School of Chemistry, won £16,884 from the British Council for the project, *Single Molecule Study of Weak Biological Interaction between Protein and DNA*.

Rev C J Baker, School of Civil Engineering, won £55,771 from the Commission of the European Communities for the project, *FP7_COLLAB_LivingRail*.

Dr R Stolkin, School of Computer Science, won £130,940 from the Defence Science And Technology Laboratory for the project, *Research PhD - Flexible Robotic Control via Co Operation between an Operator and an Artificial Intelligent Based Control System*.

Prof X Zhang, School of EECE, won £270,556 from the Engineering & Physical Science Research Council for the project, *(Imperial College lead) Enhanced Renewable Integration through Flexible Transmission Options (ERIFT)*.

Dr S L Soo, School of Mechanical Engineering, won £249,657 from the Technology Strategy Board for the project, *Sustainable and Resource Efficient Cutting of Titanium (SuRECuT) Lead Airbus Ops*.

Dr A Walton, School of Metallurgy and Materials, won £473,156 from the Commission of the European Communities for the project, *FP7_COLLAB_REMANENCE: Rare Earth Magnet Recovery for Environmental and Resource Protection*.

Prof W J Chaplin, School of Physics and Astronomy, won £155,078 from the Commission of the European Communities for the project, *FP7_COLLAB_SoSoSA*.

Professor William Chaplin's Inaugural Lecture

College Communications

Professor Bill Chaplin, School of Physics and Astronomy, delivered an absorbing and entertaining Inaugural Lecture on Thursday 28 February, titled *Sounding stars and sizing up Exoplanets: Searches for other Solar Systems*. The lecture used sounds and images to give a remarkable insight into stars, their natural resonances ("music of the stars"), and using data on stars to better understand new planets discovered orbiting them, as well as giving details of the methods and apparatus used to make such discoveries (some of which can be found on the roof of the Physics building).

Professor Adam Tickell, Pro-Vice-Chancellor, delivered Bill's introduction. He said; "For us it's a moment of great pride and great honour to have staff of such calibre working for us... He is clearly a major scientist with a major international reach."

Bill has had a long association with the University: He read Physics with Astrophysics in the late 1980s, winning the prize for finishing as the top astrophysicist student, and would later complete his PhD here, under the joint supervision of Professor George Isaak and Dr David Bedford. After a year spent at the European Space Agency, he returned to take up his lectureship.

Using data obtained from the Birmingham group's 'Birmingham Solar-Oscillations Network', or BiSON, Bill researched focused on the study of the Sun. In more recent years his attention has turned to the field of asteroseismology (the study of oscillations of stars), after which he initiated an international research consortium called 'asteroFLAG', and took on major leadership roles as part of the NASA Kepler Mission.

This work has led over the past two years to the publication of five papers in Nature and Science, and his research achievements were recently acknowledged by the award of the 2012 Royal Astronomical Society's Harold Jeffery's Lectureship Prize.

Professor Andy Schofield, Head of School of Physics and Astronomy, gave the Vote of Thanks. He said, "Not only have you made the subject come to life, but you've also given us a vision of what it is to be a hero, not just as a researcher, but as a teacher as well...You've taken us to other worlds with words, images, and above all with sounds, and that's been a fascinating insight into the creativity of science."

Inaugural Lecture: Present and Future of Internal Combustion Engines

Professor Hongming Xu, School of Mechanical Engineering

Thursday 19 March, 5:15pm, G33 lecture theatre, School of Mechanical Engineering

Professor Hongming Xu will deliver his Inaugural Lecture, titled *Present and Future of Internal Combustion Engines*. If you wish to attend, please email epsinternalcomms@contacts.bham.ac.uk, or call ext 51073.

Synopsis

Today, internal combustion (IC) engines are the most widely used power unit in our daily lives, at least for land-based transportation. Most people start to learn the simplest principle of four-stroke engines in secondary school, yet some scientists believe that 'we will probably never completely understand the combustion of engines, even after all fossil fuels have run out'—the point is that there is still much more to study and learn. So, do we know when fossil fuels will run out—'in 30 years'? What is the secret behind the success of the IC engine? Will we have better alternatives for which a great number of people have been striving toward for many decades? Will it be possible to replace or even 'forget about' IC engines in the future? What are we doing now and what will we be doing in future research to develop more efficient and clean engines? How much potential is still available for us to explore in terms of efficiency and how many ways are there for us to burn liquid and gaseous fuels (they do not have to be fossil based) in future engines? How eco-friendly can they be? Nowadays, when we buy a new car, the first choice to make is perhaps between diesel and gasoline, but why do we have to design gasoline and diesel engines separately? What could the future engine be like? The IC engine may have been an integral part of our lives since the 19th century, but that does not mean that we fully understand everything about it and have used its full potential. This lecture will try to answer these questions, and look to see how the IC engine may shape our lives in the future.

EPS research vision and review

Martin Freer, Director of Research

One of the challenges we all face from time to time is *seeing the bigger picture* or *the wood from the trees*. Part of that is knowing and understanding what we have achieved and translating that into a sense of purpose; having a vision for the future direction of travel.

From where I sit in Physics and Astronomy, there are many great contributions that the School has made since its foundation. Some of these are celebrated through the excellent blue plaque scheme. One captures the contribution of Randall and Boot to the development of radar: Pre-1940, 100 metre high radio masts were used to produce directional beams of radio waves. The development of the cavity magnetron by Randall and Boot (the latter was a local boy who attended King Edward's School), resulted in a device producing centimetre wavelength radar capable of sensing objects of significantly smaller size than previously possible, but crucially a device which was highly portable and could be flown on anti-submarine aircraft.

After the war serendipity intervened when it was noticed by Spencer, at Raytheon Manufacturing company in the US, that a chocolate bar in his pocket had melted following a close encounter with the magnetron. The story goes that he experimented by exposing a bag of maize and the microwave oven and popcorn were born. Arguably both have had a significant influence on Western culture.

The translation of fundamental science to application in a way that obviates the need for serendipity is a challenge increasingly levelled at University research. There are some tremendous examples across campus that are currently being captured as part of the impact cases which form a key component of the Research Excellence Framework (REF)—a topic for later.

The College is currently engaged in a process to capture the excellent research that we have done in the more recent past as part of a broader plan to highlight "ten ways in which our research has changed the world". This will become one strand of publicity campaign to increase the profile of the Colleges research; a second element involves promoting the research we are doing now. Three themes have emerged:

Science Frontiers: Fundamental breakthroughs in our understanding of the way nature works

Advanced Manufacturing: Driving industry forward; delivering the edge in the global competition through innovation

Resilience, Energy and Sustainability: Tackling the challenges of future generations now.

The promotion of these themes lies in the hands of the College marketing and communications team, headed by Robbie Roberts. Integral to this reshaping of how we promote our research is ensuring the capacity to deliver. A key strand is our research within Energy. In recent weeks there has begun a concerted effort to reinvigorate our research capacity and ambition—led by David Boardman (again a topic for later).

Finally, an experiment of my own. This is fuelled mainly out of a frustration in my inability to find time to do any of my own research, but also a desire to understand the scale of readership of the newsletter. The experiment: The first person sending me an email stating that they have read this piece will receive a bottle of wine, or the equivalent.

Birmingham Fellows

The College is proud to have a host of Birmingham Fellows this academic year, a number of whom have kindly agreed to share some insights concerning the research they are currently undertaking. To kick this new feature off, Dr Evgueni Goudzovski, School of Physics and Astronomy, tells us about how his work in particle physics is generating extraordinary results, shedding light on some rather dark matter. Read on the next page to find out more.

You can download application forms for the new research awards here:
https://intranet.birmingham.ac.uk/eps/research-knowledge-transfer/awards/Research-awards.aspx

Particle physics at the precision frontier

Evgueni Goudzovski, Birmingham Fellow, School of Physics and Astronomy

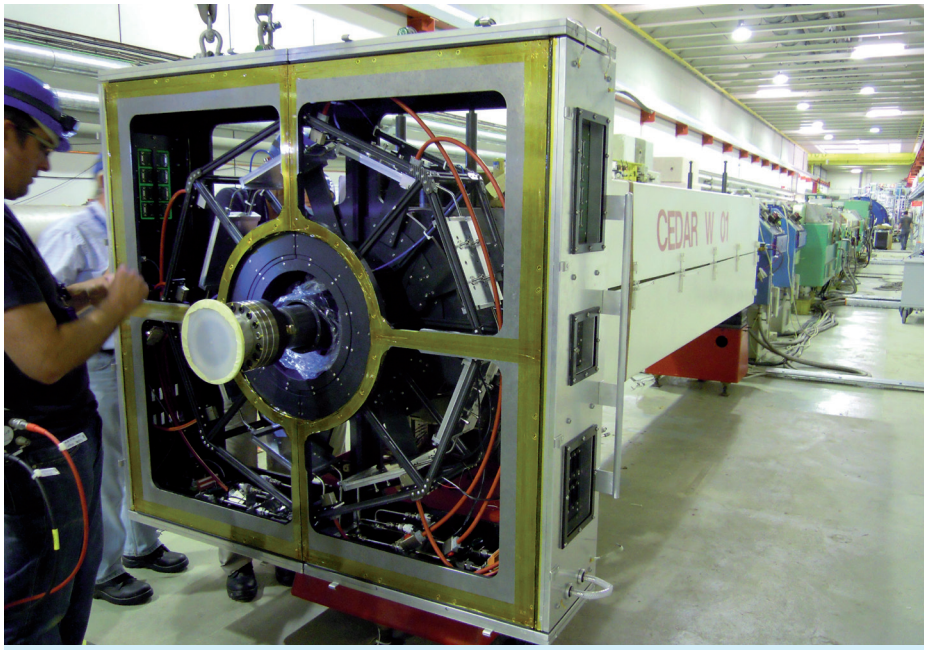
The recent discovery of the Higgs boson candidate, which made international headlines and was named the breakthrough of the year 2012 by *Science* magazine, is yet another spectacular success of the Standard Model (SM) of particle physics describing subatomic constituents of matter and their mutual interactions. Despite being able to describe a vast majority of subatomic processes, the SM has major limitations. In particular, astrophysical data indicate that the Universe is dominated by dark matter of yet unknown nature, while the visible matter known to science constitutes, astonishingly, accounts for as little as 5% of the total mass-energy. The SM cannot explain the observed matter-antimatter asymmetry of the Universe either. This defines the main challenge of particle physics: the search for new types of elementary particles and forces beyond the SM description collectively termed 'new physics'.

Laboratory searches for new physics proceed by two methods. The 'energy frontier' methodology is based on measurements of particle interactions in collisions of highest possible energy, aiming to be above the threshold for production of new heavy elementary particles. This approach is the *raison d'être* for the experiments at the Large Hadron Collider at the European Laboratory for Particle Physics (CERN), and has led to the Higgs candidate discovery mentioned above. A complementary 'precision frontier' approach, which has been tremendously successful historically, is to look carefully at very rare lower-energy subatomic processes that can be accurately predicted by the SM. New physics at high energy scale can manifest itself in dynamical effects at lower energy via quantum loop corrections to the basic processes. Therefore the differences from expectations in such processes would prove the existence, and give information on the form of, new physics.

The NA62 experiment at CERN aiming to collect data in 2014–16 is among the largest modern precision frontier particle physics experiments in the world. It will focus on the studies of the decays of a particular type of unstable particle, the charged kaon. Kaons, one of the lightest quark bound states, have been a copious source of information on fundamental interactions since their discovery in 1947. The Nobel discovery of CP violation, the phenomenon generating the matter-antimatter asymmetry of the Universe, was made in the kaon sector. Owing to a uniquely intense kaon beam provided by the CERN accelerator complex and a range of state-of-the-art detectors, the NA62 experiment will bring kaon physics to a new level of precision. The unprecedented sensitivity opens a range of new opportunities to probe the nature of new physics at the high energy scales.

The primary interest of the Birmingham group within the NA62 experiment lies in testing an accidental symmetry of the SM, the Lepton Flavour (LF) conservation. The recent discovery of neutrino oscillations has led to a conclusion that the LF symmetry is approximate rather than exact. It also implies that the neutrinos have non-zero masses, which (in addition to constituting a non-SM phenomenon by itself) opens the questions about the fundamental properties of the neutrino and the origin of its mass scale.

I lead a working group of the NA62 experiment dedicated to precision searches for processes violating LF symmetry of the SM and dark matter particle candidates such as the heavy neutrinos. My goal is placing the most stringent constraints on the nature of new physics, or indeed finding an evidence for processes or particles beyond the SM description. Birmingham is an ideal place to undertake this challenge, thanks to the strong position within the NA62 experiment, strong links to the worldwide community and the state-of-the-art laboratory facilities allowing the development of experimental equipment. The award of Birmingham fellowship provided me with independence, enabled me to develop my own research agenda and focus on extending my research group and student supervision.



Installation of a UK-built piece of equipment in the NA62 experimental hall at CERN (September 2012)

Your EPS community

Kathryn Chedgzoy, Alumni Relations Manager

Are you LinkedIn? Introducing your new EPS Community on LinkedIn

What's the most valuable outcome of an individual's college years? Beyond the knowledge gained at University, the alumni network is one of the most important benefits a graduate can receive. In the years since College, classmates have become experienced professionals, industry experts, potential clients and trusted colleagues.

An active LinkedIn network can provide the platform for natural connections to be made, but all good groups must start from somewhere and so we are pleased to announce the launch of the EPS Community group on LinkedIn, a network for alumni, students, staff and associates from the nine Schools that constitute the College. In addition, a sub-group for each School has been created to make the most of the relationships that already exist between alumni, students and their alma mater.

But we need your help to grow this community. Please join the group and engage in discussions, as well as encourage your students to join also. Join today at: www.tinyurl.com/epslinkedin

Also...

If you are in touch with any of your alumni, here are some activities coming up that you could invite them to get involved in. Full details can be found online: http://www.birmingham.ac.uk/alumni/events/events-calendar.aspx

Arts & Science Festival, 18–24 March

A free programme of talks, exhibitions, performances, and screenings, showcasing culture, research and collaboration for staff, students, alumni and friends.

Fab 'n' Fresh, 20 April

A chance for alumni from 2001 onwards to relive their student years courtesy of the Guild of Students and the Alumni Relations Office.

Birmingham Heroes Lecture: Music of the Stars, 16 May

Professor Bill Chaplin will discuss the leading role that Birmingham is playing in the study of other stellar systems in our galaxy.

Annual Alumni Reunion, 8 June

For alumni who graduated in 1988, 1978, 1973, 1968, 1963 or before. A great opportunity for each School to connect with their alumni.

Web 2.0 is live and clicking

The latest *alumni news*, hot of the press, has announced a new research investigation into the impact of the social media revolution:

"With the advent of Web 2.0 technologies such as tweets, blogs and other social media, we can now interact globally at any time of the day or night. A new research project at Birmingham is seeking to discover how this impacts our creativity and community involvement."

For more information, you can read the article on page 9 of *alumni news*: http://www.birmingham.ac.uk/Documents/alumni/UBNewsletter2013.pdf

Alumni Impact Fund update

Thank you to all who submitted application to the Alumni Impact Fund. There were 12 high-quality proposals from the College this year and the final funding decisions will be made at the panel on the 11 March and communicated to all following that.

For information on past successful projects, please see: http://www.birmingham.ac.uk/alumni/giving/circlesofinfluence/projects-supported.aspx

Community....Capital...Collaboration

Building a life-long mutually beneficial relationship with alumni and students to support and further the College and the University

Kathryn Chedgzoy
Alumni Relations Manager
College of Engineering and Physical Sciences

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ext 49037 (Tues–Thurs), Mon and Fri email only

Circles of influence
Funded through charitable giving from alumni, supporters, and friends

Business Engagement : Enterprise activity highlights
Research and Innovation Services

31/01/2013 Re-energised Cytox aims to grab Alzheimer's biomarker market with £3.5m investment

University of Birmingham Spinout Company, Cytox Limited, developer of a unique blood biomarker, ADpredict™, using a proprietary cell cycle approach for Alzheimer's disease (AD), recently announced a £3.5m injection from new and existing backers reassured by a new, experienced management team with a proven track record.

ADpredict™, a blood-based test in development for identifying AD in early symptomatic patients, was developed by Cytox's Science Director, Dr Zsuzsanna Nagy, Lead of the Neurodegeneration and Repair team based at the University of Birmingham.

22/01/2013 DTRA awards $3.3m contract to Psioxus Therapeutics to develop biodefence vaccine adjuvants

PsiOxus Therapeutics, Ltd, a development stage biotechnology company, announced on 16 January the award of a $3.3m contract from the US Defense Threat Reduction Agency (DTRA) to develop biodefence vaccine adjuvants using the company's proprietary PolyMAP technology to help improve the safety and efficacy of two vaccines candidates: the recombinant Protective Antigen (rPA) for Anthrax and the Venezuelan Equine Encephalopathy Virus (VEEV). PolyMAP is an immunotherapeutic platform that combines polymers with synthetic adjuvants to significantly enhance the effectiveness of vaccines.

PsiOxus Therapeutics was formed in 2010 through the combination of Myotec Therapeutics Ltd and University of Birmingham Spinout Hybrid Biosystems Ltd.

17/01/2013 Scientists devise unique stroke assessment tool

Scientists at the University have devised a unique screening instrument that provides a 'one-stop' brain function profile of patients who have suffered stroke or other neurological damage.

The Birmingham Cognitive Screen (BCoS) can offer a visual snapshot of the cognitive abilities and deficits of an individual which can then be used to guide clinical decision making.

The first test of its kind, BCoS has been designed by a team of brain experts and co-ordinated by Research Fellow Dr Wai-Ling Bickerton (also a chartered psychologist and occupational therapist) here at the University in collaboration with Professors Glyn Humphreys and Jane Riddoch at Oxford University and Dana Samson at Louvain University.

14/12/2012 Medical spinout company wins award

Serascience Limited, a specialist cancer diagnostic company, has been awarded best start-up at the 2012 Medilink West Midlands Healthcare Business Awards (6 December). The awards celebrate the very best and most promising new healthcare businesses in the region. Serascience is one of a portfolio of companies held by Bioscience Ventures Ltd, a Joint Venture between Birmingham and commercial partner Abingdon health Ltd.

26/11/2012 Smart Antenna Team recognised for pioneering compact antenna design

A team from the School of EECE recently celebrated a win at the finals of the national Discovering Start-Ups competition (21 November).

Calling themselves Smart Antenna Technology, or SAT, and pitching to a panel of some 20 judges, the team were praised for their leap forward in compact antenna design. Behind this aspiring new start-up opportunity are SAT team founders, Professor Peter Hall, Dr. Peter Gardner, and Dr Zhen Hua Sampson Hu. Together they have developed a unique compact antenna which has a very low production cost and assumes the role of all existing and anticipated antennas required for current and next generation mobile devices.

Commercialisation funding opportunities

Enterprising Birmingham Fund

The University has created a new source of funding focused on activities connected to the proof of commercial viability of an innovative idea and is providing small quantities of investment capital. There will also be a new fellowship programme for academics working on the commercial development of an innovation where there is a clear need to spend more time on the project in order to drive it forward.

Please contact Catherine Mansell at c.mansell@bham.ac.uk for further details

Business Engagement : Enterprise activity highlights

Research and Innovation Services

Enterprising Birmingham Innovation Competition

12 Noon
Tuesday 26 March 2013

Birmingham Business School
University of Birmingham
University House
Edgbaston Park Road
Birmingham
B15 2TY

Further information and registration via EventBrite at: http://enterprisingbirmingham.eventbrite.co.uk

The Enterprising Birmingham Innovation Competition is aimed specifically at research staff and academics who have research based ideas for creating new enterprise. The competition is intended to help to nurture and develop innovative ideas and reward enterprising researchers.

The Final Showcase being held in the Business School on 26 March, promises to be an exciting demonstration of some of the University's brightest commercial projects and entrepreneurial spirit as the finalists battle for a share of the £24,000 prize money in front of a panel of expert 'Dragons'.

The competition is divided into two categories under which applicants can submit plans:

- Innovative ideas for product / technical process based enterprise
- Innovative ideas for service / business process based enterprise.

We do hope that you will join us to celebrate the creativity of our researchers which will show you some of the innovative commercial projects in progress at the University of Birmingham as well as giving you a chance to network with university academics and specially invited guests from the world of business and commerce as well as the public sector.

We would like to take this opportunity to personally invite you to attend. An agenda and further information regarding the competition is attached.

Thank you to our sponsors: Deloitte, Marks and Clerk, MTC, Sandvik and Withers and Rogers.

Please contact Sofia Handsrod for further information. s.hansrod@bham.ac.uk.

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W: www.birmingham.ac.uk/partners

Workshop: An introduction to EU funding landscape (all disciplines)

18 March, 1–2.30pm
Venue: To be confirmed on registration.

Scope: Horizon 2020 will replace the current EU FP7 funding programme coming to an end this year. Xavier Rodde will provide an introduction to what opportunities this will bring for colleagues in all disciplines. The session will conclude with a Q&A session.

Contact: Click here to register for a place.

Research & Knowledge Transfer

Paul Marshall, Head of Research & Knowledge Transfer

As Head of Research & Knowledge Transfer (R&KT), I lead a team of six people with responsibility for supporting R&KT activities for the College. This broadly falls under three main areas of activity; local management of the institutional R & KT activities, research bid support and finally, and long-term business development.

The institutional R&KT activities 'flow down' from the University Research Committee via Research & Innovation Services (RIS), the Business Engagement (BE) Directorate and Planning, and it includes things like:

- Local administration of large "block grants" and support for strategic bids led from RIS, an example of the former is the EPSRC Impact Acceleration Account, where £1.8m is to be used for secondments, commercialisation and engagement with business; our team is co-ordinating the internal competition for the fund. An example of strategic bid support is the recently awarded HEFCE/Rolls-Royce High Temperature Research Centre; the bid was managed by RIS but with significant input from our team.
- Facilitating College involvement in pan-University visits of funding bodies, government and other delegations; in the last few months we have hosted visits from STFC, EPSRC, UKTI and several international delegations.
- Managing the College roll-out of research information systems, most notably the PURE publications and research system. We developed and delivered a College software roll-out plan, trained academics and administrators in the Schools to use the system, and provided e-mail and telephone support to users. Lauren Evans has led this activity, is the PURE College Super User and is a member of our team.

The team provides support to the College Director of R&KT, Martin Freer, most notably in secretariat duties in organising the College R&KT Committee and general liaison with School Directors of Research.

Research bid support

A major part of our activity is School-based research bid support, beginning with identifying funding opportunities, highlighting them to relevant individuals or groups, and then providing support in preparing the bid. This is done through our cluster managers: John Woodward (Chemistry, Chemical Engineering and Metallurgy and Materials), Padma Reddy (Computer Science, Mathematics and EECE) and David Boardman (Mechanical Engineering, Civil Engineering and Physics & Astronomy). The research bid support is intended to complement the School's own processes (peer review, amongst others) and focuses on the non-technical aspects related to liaising with Contracts and Finance, checking the University Asset Register, drafting pathways to impact statements and letters of support and checking compliance with guidelines before submission. The cluster managers concentrate their resource as directed by HoS and DoR but will endeavour to respond to individual requests for support.

To give a few examples: John Woodward has recently supported a successful bid to the EPSRC 'Core Capability for Chemistry' fund. John worked with PI Nigel Simpkins and his Co-Investigators to create the proposal, with particular focus on preparing the Pathways to Impact statement. The total value of the project was £1.4m (£900k of which came from EPSRC) and this success will represent a major capital investment to the School of Chemistry. John is continuing to provide post-award support to the procurement process for this project whilst also supporting a number of other research and Fellowship bids to different funders. A second recent success has been the £1m bid awarded to Peter Tino (Computer Science) by the EPSRC for research related to Personalised Medicine. The opportunity was identified and support came from Padma and colleagues in preparing the impact statements, letters of support and completion of the joint electronic submission.

The team is supporting 10–20 bids of various sizes, at a variety of stages of development, at any one time.

Although a majority of our activity is pre-award, there are odd occasions where post-award support is important. A current example of this is the EPSRC MidPlus project, a £3m collaborative project in high performance computing; the project has some specific business engagement deliverables and the expertise does not exist within the project team, so these aspects of the project are being delivered by Greg Howard in our team.

Forging links with business

The R&KT Office are also taking a leading role in supporting longer term business and research development with both a national and international reach. One example is David Boardman's support to the development of energy and energy-related activities across the University, including our multi-institutional partnerships of the Midlands Energy Consortium and the more recent Centre for Low Carbon Futures. David and Bing Liu, who is the Asia Business Development Manager in RIS, are developing long-term collaborative research and development projects with academics and industry in Guangzhou, China, in manufacturing, railways and energy. Working across EPS and LES and the University of Nottingham, we are supporting oil and gas research developments in Brazil and strategic project opportunities with BG group.

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Games-based simulation in post-op recovery and rehabilitation

School of EECE

Professor Bob Stone, School of EECE, has been working with Intensive Care consultants Prof Julian Bion (also Dean of the UK Faculty of Intensive Care Medicine) and Dr Tom Clutton-Brock, (Head of the Department of Anaesthesia & Intensive Care), and, together with Dr Charlotte Small (ST5 Anaesthetics, studying for her MD and supervised by Julian and Bob), they are researching the potential for using games-based simulation in post-operative recovery and rehabilitation support. One of Bob's Team's Virtual Restorative Environment systems has recently made its debut within the Intensive Care Unit, with a successful initial exposure to some of the patients and clinical staff, enabling his team to prepare for a more in-depth period of evaluation. Bob's team (including PhD and MPhil students Cheng Qian and Vishant Shingari) has also received a small grant from the Royal Centre for Defence Medicine to take their early research into amputee pain management. In addition, the team has just got the go-ahead to begin initial research on how real-time simulation can be used to help wean ICU patients off respirators earlier than is currently the case, thus enabling a faster transition to a normal ward environment. These projects play to the multidisciplinary strengths of the School, as there is the need to design minimally intrusive techniques of electronically capturing the patient's breathing patterns and exercise outputs and linking those signals dynamically to a real-time weaning "game". An innovative concept for the "weaning game" has already been designed and is being worked on by an EECE MSc student, along with Bob's team. More recently, the team has successfully demonstrated a real-time interface, using the Microsoft Kinect, to record amputee stump movements and to use these to control a virtual pedalo in a 3D beach environment, with the aim of helping to minimise muscle atrophy prior to the fitment of prosthetic devices. These developments will be reported later this month as part of Bob's Conference Opening Keynote at the prestigious Laval Virtual event in France (http://www.laval-virtual.org/2013/?p=301&l=en).

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Aligning our capabilities and academic-led ambition with industrial research opportunities is also an important aspect of our work and we have worked closely with DARO, RIS and the BE Directorate engaging with senior management in companies including Shell, BP and Siemens in addition to those we know well such as Jaguar Land Rover, BAE Systems and partners in the Manufacturing Technology Centre. Influence and impact outside the University does not lie solely in research and as a consequence we have actively supported the major Birmingham Policy Commissions such as the recent Nuclear Commission, led by Martin Freer in Physics and chaired by Lord Hunt, and the soon to be launched Future Cities Commission, led by Chris Rogers in Civil Engineering and chaired by Lord Shipley.

Contact details for the R&KT team and a database of current research funding opportunities can be found on the intranet: https://intranet.birmingham.ac.uk/eps/research-knowledge-transfer/index.aspx

New realities enhance historical and medical studies

School of EECE

Staff and students from the School of EECE conducted another investigation of field-based Augmented Reality (AR) last month when they attempted to recreate the experience of a World War II Spitfire preparing for taxiing within the remains of a dispersal pen at the long-abandoned RAF airfield of Harrowbeer near Yelverton. EECE PhD student Yuqing Gao is currently researching novel ways to improve location tracking and virtual object registration techniques to support effective mobile AR technologies, as, despite impressive marketing claims, current commercial products fall far short of an acceptable markerless-based experience when taken out of the laboratory and into the field. As well as witnessing the real-world problems of AR first-hand, aided and abetted by another School PhD student, Jamie White (seen in the image holding an AR marker in the freezing northerly Dartmoor wind!), Gao's first trip to the British countryside demonstrated the future challenges her research faces having selected as her AR project focus the ruins of Longstone Manor, originally built in 1500 and abandoned in 1895, just before the area was flooded to produce Burrator reservoir.

Since the summer of 2012, the Human Interface Technologies (HIT) Team's Digital Healthcare and Heritage activities have been gathering significant pace. One hitherto unexplored link which came to light after the Virtual Wembury and HMS Amethyst projects of last summer, relates to how we can exploit digital reconstructions of real-world locations, not only to provide hospitalised patients with rich interactive experiences, but also to encourage individuals and groups from all walks of life to venture out and to experience the benefits the real natural world has to offer. Specifically, the Team is now engaging with a number of conservation, healthcare and heritage groups to investigate how we can achieve this by endowing the real world with rich, discoverable, virtual cultural and historical artefacts, made accessible using appropriately-fielded VR and AR technologies. The Team also believes that such digital environments, when presented to individuals and groups using appropriate interactive formats at appropriate venues (real-world or online), can also encourage cross-generation and cross-community engagement and, thus, help to uncover information, assets and narratives that would have otherwise been lost to future beneficiaries.

As well as generating excellent journal publication and conference presentation opportunities, two websites detailing some of the team's activities in South Devon are now live (www.virtual-burrator.net and www.virtual-wembury.net). Meetings have been held with the Dartmoor National Park Authority and South West Lakes to discuss future projects and grant applications, including an exciting multi-beam echo sounder (MBES) survey of part of Burrator Reservoir to generate data suitable for an interactive 3D reconstruction of the once inhabited areas of the valley region, prior to its flooding in 1898.

BBC Stargazing Live 2013

Chiara M. F. Mingarelli, Doctoral Researcher, School of Physics and Astronomy

The Birmingham BBC Stargazing Live 2013 events were held at the University last month, in an effort to provide a large and centralised venue for all of the outreach activities happening in the Midlands. Two thousand tickets were distributed and the BBC estimated that about half as many people would attend, so when the doors opened at 5pm on January 9th we weren't quite sure what to expect. What we saw was an enormous queue to enter the Stargazing venue in our humble physics building. That day about 800 people visited the University to learn how to use their telescopes, make rockets, and learn about space—which just happens to be our specialty.

I should introduce myself: I am a 3rd year PhD student in the Gravitational Wave (GW) group and I simply love doing outreach activities (you may remember reading about my Very Early Career Woman Physicist of the Year award in the November issue). For the BBC Stargazing Live Series, which last year saw some 3.8 million people tuning in to watch physicist Brian Cox and comedian Dara O'Briain look to the stars, Richard Pearson and Sean Elvidge helped to transform Physics West into a host of activities for children of all ages. There was a telescope building station, a planetarium, public lectures and places to build a Mars Lander and launch small rockets. In Chancellor's Court, the Birmingham Astronomical Society arranged for 12 telescopes to be set up for the public to observe the night sky. They additionally ran a telescope surgery, answering any questions amateurs had about their equipment. Together with the GW group, I helped to organise a series of stations which guided our guests through the world of GWs. The younger science amateurs were very taken with our lycra universe, which we used to demonstrate Einstein's theory of gravity. Our youngest participants delighted in ejecting material from the universe, much to their parents' and volunteers' chagrin. The older audiences were fascinated by the applications of General Relativity in our everyday lives through GPS location, and the keener ones stayed around to hear explanations of the twin paradox and how the wobble of stars is used to look for giant planets in other solar systems.

As the Gravitational Wave group has many Laser Interferometer Gravitational Wave Observatory (LIGO) members, we also set up a working Michelson interferometer (a device used to split, bounce and recombine light waves) to show the audience how we look for GWs on the Earth. Furthermore, we had a scaled-down model of the suspension system used to hold the very delicate and very heavy mirrors in the LIGO detectors.

Our group managed to garner some media attention on both the local news and the BBC Stargazing Live 2013 show on BBC2. Organisers were interviewed on BBC Midlands Today and BBC WM radio. I managed to claim about five seconds of fame (in Season 3 Episode 3, around the three minute mark) when Dara O'Briain and Brian Cox went through photos from the local Stargazing Live events on the previous night. Andy Schofield, Head of the School of Physics and Astronomy, commented; "Stargazing live at Birmingham was a fantastic event which was a model of how our students and staff can put on high quality activities to satisfy the growing thirst for the public to get involved in physics and astronomy."

In the end, organisers estimate that it took about four months to organise the entire event. Richard Pearson explained that the most challenging part of the organisation was finding enough volunteers to staff the event, but maintains that it was "one of the best events we [AstroSoc] have ever had." We are all looking forward to Stargazing Live 2014!

The GW group has many more free games available on www.gwoptics.org. More information on Chiara's outreach activities and research is available on her website www.chiaramingarelli.com. Chiara was a runner up for the 2012 Shell and IoP Very Early Career Woman Physicist of the Year 2012.

Future event

Join the GW group at the Arts and Science Festival 18 March 2013 in Physics West from 4–9pm for more fun hands-on activities to discover more about black holes, bending space-time and the search for gravitational waves.

Bits and bobs

Royal Society: Brian Mercer awards for innovation

The Royal Society invites applications for the Brian Mercer awards for innovation. This scheme supports scientists who wish to develop an already proven concept or prototype into a near-market product ready for commercial exploitation.

The aim is to promote innovation and fill the funding gap between scientific research and the exploitation of an idea through venture capital investment. Subject areas covered include the built environment, clean technology, energy, nanoscience and nanotechnology.

Applicants must hold a PhD or be of equivalent standing in their profession, and hold a substantive post at a UK university.

Awards are worth up to £250,000 each for a maximum of two years and must be held at a UK university or not-for-profit research organisation.

Deadline: 25 March 13

http://royalsociety.org/grants/schemes/brian-mercer-innovation/

Project value: up to £250k.

Enterprising Birmingham Innovation Competition—Final Showcase

Tuesday 26 March 2013, 12–6pm (lunch provided), Birmingham Business School

The Enterprising Birmingham Showcase promises to be an exciting demonstration of some of the University's brightest commercial projects and entrepreneurial spirit as the finalists battle for a share of the £20,000 prize money in front of a panel of expert 'Dragons'

Sign up to register at: http://enterprisingbirmingham.eventbrite.co.uk

Jaguar Land Rover Research Tea

On Friday 22 March 2013, R&KT will be hosting a Research Tea around the College's collaborative Research & Development work with Jaguar Land Rover. There will be a representative from each U of B research group working with JLR, and each will give a short talk about their research work, followed by the opportunity for informal group discussion. Colleagues from the Development and Business Engagement directorate will also be in attendance. The relationship with Jaguar Land Rover is a strategically important one for the University, and the current JLR research portfolio exceeds £1m. Areas of current collaborative R & D include fuels/internal combustion engines, radio frequency (radar) sensors, vehicle dynamics, aluminium casting and environment and health. R&KT would like to extend the invitation to anyone within the College who might like to attend. Coffee, tea and cakes will be served. Please confirm your attendance to Lauren Evans (l.h.evans@bham.ac.uk), to ensure sufficient catering. The tea will be held on Friday 22 March 2013, 3–4pm, in room B22 of the Civil & Mechanical Engineering Building (Y3 on the map).

Arts and Science Festival

Running Monday 18–Sunday 24 March, and led by the University's Cultural Engagement team, the festival celebrates the wealth of ideas, research and celebration across campus. The programme is rich and diverse and with over 70 events, there's something for everyone—from Ancient Egyptian communication to Intelligent Robotics; Big Band performance to Classical Recitals; Urban vegetable growing to Dirty New Media. Alongside University initiated events, we have also collaborated with regional partners including Flatpack Festival, Vivid Projects, Birmingham Opera Company, Kino 10, and Writing West Midlands.

Click here for more info.