June 2013

Volume 7 Issue 6

THE LEADING DEPARTMENT OF BIOENGINEERING IN THE UK

We are bioengineering

by Jenna Stevens-Smith

My first day in the Department on Monday 10 June epitomized what I have come to believe the department stands for. There is both an appreciation of where we and the field of bioengineering have come from, and an enthusiasm and ambition for where the field and the Department are going. Such a dynamic environment breeds the creativity and ambition which will drive this department forward under the leadership of Professor Anthony Bull.

Over the next few months I will be meeting with academics from all research areas covered in the Department to gain a better understanding of your work and how we can promote it to the public. The public is a diverse bunch, but many of you will probably think of the image of the children above when you think of outreach or public engagement. My aim over the next year is to illustrate the array of ways you can do outreach from school workshops to social media, science festivals to parliamentary events.

In this newsletter I am pleased to see an emphasis on building links with industry and supporting innovation including the work undertaken by Robert Ferguson the Department's Industrial Liaison Manager, the successful Innovation and Knowledge Centre bid from the synthetic biology team and Professor James E Moore Jr's new MRes course on Medical Device Design and Entrepreneurship.

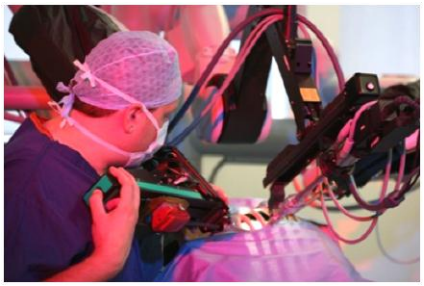
The bonus of working in a growing field is that there are exciting opportunities such as Aldo Faisal's upcoming appearance on BBC2's Dara O Briain's Science Club and the TED talks on technology. There is a real interest from the public to learn more about bioengineering and we are the perfect conduit for this.

Members of our Department continue to succeed with invitations to speak at conferences for academics and research students all over the world and awards recognizing the quality of our teaching and support staff.

It is an exciting place to be and I for one am very proud to be part of it.

Inspired by the opportunity of TED technology talks and the upcoming TEDx Albertopolis in September here is a little inspiration in the form of my favourite TED talk by Simon Sinek about how great leaders inspire action.

IN THIS ISSUE



A taste of industry

Students a plenty took up the opportunity to visit industry in June at trips to Blatchford Endolite, GlaxoSmithKline, and Siemens Magnet Technology. The trips were organized by Robert Ferguson, the Department's Industrial Liaison Manager.

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BBC Science Club

After a successful first series Dara O Briain's Science Club is back for a second series in July and the Department's very own Aldo Faisal will be featured on one of the episodes. There is also the opportunity to watch the show be recorded, more information inside.

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Centre for Blast Injury Studies News

by Major Martin Dansey

Condolences

This month CBIS activities have been overshadowed by the sad news of the loss of John Dennis. John was a good friend to the CBIS project steering us through our initial infrastructure development phase and all at the Centre are extremely sad at his passing. From all of us here we wish his wife and family the very best in this difficult time.

Visits

Within the Centre we have hosted several visits during the period including General David Jolliffe, a TRBL Trustee, and General Craig and Brigadier Garnett, members of the committee on Noise induced Hearing Loss. We also hosted General Sir Timothy Granville Chapman GBE KCB ADV Gen and are pleased to confirm his acceptance as a further member of our Advisory Board. General Sir Tim brings a vast amount of experience to the board and CBIS are honoured to have him join the team.

Undergraduate Research Opportunities Programme (UROP)

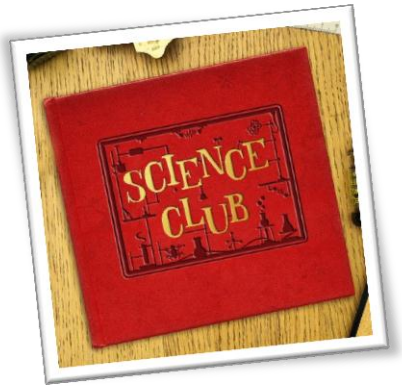
We also wish to welcome the first of our UROP students working with us for the next 10 weeks. Dr Mazdak Ghajiri is supervising Alistair Walker, Aliyah Rajabalee, Po Chan and Richard Pangonis in a project related to brain injury, helmet design and testing. Dr Angelo Karunaratne continues his work in bone fracture leading Nida Mahmud and Ke Qiu in fracture mechanisms across loading rates and the strain rate dependence of articular cartilage and subcondral bone of the tibia respectively, whilst Dr Spyros Masouros has Daniel Zaharie working on a fast running finite element model of the human body with Alexander Haley conducting an experimental study quantifying injury thresholds in rib fractures.

Congratulations

Congratulations go to Mr Nic Newell for submitting his PhD thesis in double quick time, unfortunately Nic cannot rest on his laurels as his viva is imminent. We wish him well for this next important step. We also like to pass our congratulations and best wishes to Miss Chiara Bo on her upcoming marriage to Vinny. We hope the weather holds and you have a fantastic and truly enjoyable day.

Symposium on Human Injury Assessment in vehicle explosions

Our attention is now drawn to the upcoming NATO HFM Symposium on Human Injury Assessment in vehicle explosions sponsored by CBIS and headed by Dr Masouros over the 24-26th June. The Symposium consists of two days of presentations followed by a closed conference in order to recommend the way forward for NATO in regard to vehicle explosion injuries. CBIS are proud to represent the UK in this Symposium through Dr Masouros.



We are Science Club

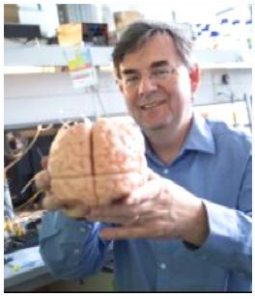
by Jenna Stevens-Smith

Calling all science lovers! The BBC are looking for fun and engaged people to be part of their studio audience for the recording of BBC 2's Dara O Briain's Science Club. Hosted by the wonderful Dara O Briain, the series is filmed 'as live' and will cover a range of cutting-edge science topics. This series we will meet the scientists who are using mosquitos to vaccinate people against malaria, preventing earthquakes using social networks, and reading dreams with MRI chambers. Dara will be joined in the studio by a host of leading scientists, including our very own Aldo Faisal and there will be some amazing science demos in the studio, ranging from remote-control cockroaches to cooking hot dogs with lightning to the spray-on clothing of the future.

Each show will be recorded from the studio in Dalston, East London, and will take place between 5.45 and 8.30pm. If interested, please email Euan McDonald with your name, the date(s) you'd like to attend, and the number of tickets you require.

Having seen the last series being filmed, I would highly recommend it.

IN THE NEWS



The doctor will sense you now

For those of you who missed Professor Martyn Boutelle's fascinating inaugural lecture 'The doctor will sense you now', the talk is now available on the Imperial College London website.

3D helical stent in the news

The unique three-dimensional helical geometry of Colin Caro's BioMimics 3D stent (Veryan Medical) caught the attention of Vascular News this month following data presented during the Trials and Innovations for Peripheral Interventions Session at EuroPCR (21–24 May 2013, Paris, France) which demonstrated safety and promising clinical performance at 12 months in the treatment of patients with peripheral arterial disease undergoing femoropopliteal artery intervention. View the article in full on the Vascular News website.

£11 billion

Value synthetic biology market is predicted to grow to by 2016

NEWS ITEMS FOR THE NEXT ISSUE?

If you have some news for the newsletter please contact Jenna Stevens-Smith j.stevens-smith@imperial.ac.uk

Professor Richard I Kitney, Professor of Biomedical Systems Engineering and co-Director of Centre for Synthetic Biology and Innovation (CSynBI) and Professor Paul Freemont, Chair in Protein Crystallography and co-Director of CSynBI

Innovation and Knowledge Centre success for synthetic biology

by Richard I Kitney

Innovation and Knowledge Centre (IKC) in synthetic biology has funding success in National Research Councils' call.

In a recent speech Rt Hon George Osbourne MP, Chancellor of the Exchequer stated that "the value of the global synthetic biology market is predicted to grow to £11 billion by 2016". In a policy statement in 2012, Rt Hon Vince Cable MP, Secretary of State for Business, Innovation and Skills stated that the "Government has identified synthetic biology as one of the three technologies important to growth over the next 20 years".

One reason for this statement is that the demand for oil will increase rapidly over the next few decades and there is therefore a need to replace oil-based produces with equivalents derived from bio-based feedstocks using synthetic biology.

The aim of the proposed IKC is to perform the important function of academic and business integration by creating an effective Industrial Translation Engine. The objective is for the IKC to create an effective mechanism to *bridge the gap between university-based research and industrial processes to create products* and jobs, through industry, for the benefit of the UK economy.

The UK has a strong academic science and engineering base. The UK's industrial and commercial base in synthetic biology is embryonic, with some activity in large companies and some SMEs and start-ups in the field. Our plan for the IKC is designed to support existing companies to grow the UK sector in line with the international economic predictions for synthetic biology. The IKC will be based at Imperial West.

What is an Innovation and Knowledge Centre?

Innovation and Knowledge Centres (IKCs) are centres of excellence with five years' funding to accelerate and promote business exploitation of an emerging research and technology field.

Their key feature is a shared space and entrepreneurial environment, in which researchers, potential customers and skilled professionals from both academia and business can work side by side to scope applications, business models and routes to market.

Industry tour- Student perspective

by Daniel Bollag, 2nd Year UG

On Wednesday 12th June an exciting trip, organised by Robert Ferguson, took place for a group of 20 students to visit the new factory of Blatchford Endolite. Blatchford is both a leading supplier of lower limb prosthetic products and manufactures its own range of such products

We were greeted and escorted into the visitor's room by Professor Saeed Zahedi, the Technical Director and we were soon to become big fans of him. Saeed gave us a very insightful and fascinating presentation into the history of the company, prosthetic devices and what developments have been made and are anticipated in the future, hopefully by us Bioengineers. Among their biggest innovations is the Elan foot- a microprocessor controlled foot.

But the best part was yet to come; we were introduced to graduate engineers who gave us an hour tour around the entire site. We were taken to the R&D floor where teams of engineers are designing new products and their R&D labs (which are similar to our workshops, just with a splash more equipment). They had an entire room dedicated to very expensive machinery which are doing 24/7 fatigue and stress testing of their new products.Along the tour we also saw some of their sophisticated manufacturing machines and the final assembly of the prosthetic products. It was very intriguing to see how everything comes together under one roof, from concept design leading to prototypes and ultimately bespoke products to suit each patient.

After the tour, over refreshments we had a chance to network/talk to the Saeed and the graduate engineers and to hear personally how they ended up working in the biomedical device industry and tips on how to do so. Ultimately, I came out feeling that in just one afternoon we were given a real insight of what working in industry is, especially in a place many of us would love to work.

endolite
get busy living

Importance of industry

Building links with industry is a key objective for the Department of Bioengineering. To progress this link the Department have employed Robert Ferguson to seek out the bioengineering companies that exist and build links and relationships with them which will benefit the department and enhance the student experience of the course.

The trip to Blatchford Endolite was the first industrial trip of its kind for the Department and you can see from Daniel's report above that it was a huge success.

There were two further trips organised for June including a trip to GlaxoSmithKline in Ware to their drug delivery device design and manufacturing team and to Siemens Magnet Technology in Oxford, where they manufacture superconducting magnets for MRI scanners. All trips were well attended and enjoyed by the students .

If you have contacts with industry or would like to more information please contact Robert directly.

FOR MORE INFORMATION

Robert Ferguson

INDUSTRIAL LIAISON MANAGER
robert.ferguson@imperial.ac.uk

NEW MRes Medical Device Design and Entrepreneurship

The Department are very excited for the new MRes to start in October. The course is headed up by Professor James E Moore Jr, Bagrit and Royal Academy of Engineering Chair in Medical Device Design who joined the Department in January.

Further information on the course can be found here.

History became legend; legend became myth - The sequel

by Liam Madden

At the midpoint of the summer term and in blistering heat about 30 Bioengineers met to play a game of football in the stadium of dreams otherwise known as Hyde Park. The good turn-out meant that a 10-aside game with rolling subs could be played and thereby avoided the need for a defibrillator (for us oldies).

On arrival in the park klaxons, chanting, cheering and booing by a big crowd could be heard. Then reality dawned it wasn't a crowd of football spectators but a political protest outside a nearby embassy.

The student team was captained by Michele Tonutti and the staff team was captained by Spyros Masouros making his debut for the staff. The latter were augmented by some fourth years to half the median age of the staff team.

On a playing surface that resembled the Apollo-11 Moon landing site both sides played without the benefit of holonomic wheels. Following a holy huddle in the middle of the pitch to discuss tactics, the students adopted an attacking 4-3-3 formation. Following a hastily convened staff meeting, the staff adopted a chaos theory inspired X-Y formation where X, Y only have the mutually exclusive values of 0 or 9 i.e. the staff were drawn to the ball like an event horizon, leaving a black hole for the defence or attack.

The first half saw the students play rings around the staff team. Concentric rings in fact, based on the golden ratio which deserved more reward but the students were thwarted by pseudo-random generated decisions by the referee i.e. me! My knowledge of the rules of the football fossilised when Bobby Moore lifted the World Cup and as for my eyesight - I need some tissue engineering fast.

The students organised themselves into a FIFO taking turns to ping shots on the staff goal but unfortunately a memory leak in their dynamic data structure resulted in run-time crashes in the staff penalty area.

The summation of periodic wave after wave of attack from the students suggested an inevitable outcome, a goal on the rising transition of a Mexican wave by the onlookers. Yet, somehow the staff held-out until the caesium atom based kitchen timer rang out to announce that the first half of twenty-five minutes had expired.

The second-half started like the first, however, the infinitely wide pitch, infinitesimally small goals and three terms of sedentary lifestyle began to take its toll. Truth be known, the staff hatched a low and cunning plan to win this match immediately after losing to the students last year.

Precision engineering had been used to select a date so that it was immediately after the third and fourth years had finished their exams and just before the first and second years would start their exams. The former would be exhausted and the latter would be distracted.

Another devious staff tactic (lower than a snakes belt-buckle) was the constant reminder at every available opportunity that "we know where your grades are stored!"

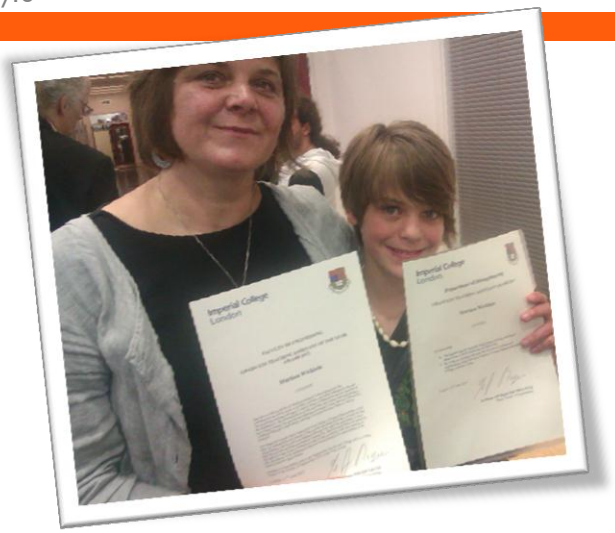
As the second half neared conclusion, bartering about exam marks and scoring own-goals began to take place. In what seemed like 25 minutes but was really 1500 seconds, the kitchen timer rang out again announcing that the second half had expired (as had the players).

Therefore 30 minutes of extra-time was needed using the golden goal rule. Goals continued to be rarer than a quark. In the very last minute of extra-time a goal was awarded to staff when a daisy-cutter of a shot skimmed between and under the feet of at least two students and may have crossed their line. Even Hawkeye with several cameras and real-time digital image processing would have had difficulty at giving the goal. However, sun-stroke, the thought of having to devise penalty shoot-out rubrics and the delay at getting to the food and booze in the L3 common room may have induced a hallucination that the staff scored the golden goal and level the series 1-1.

A very convivial afternoon was concluded by handshakes and photographs taken by Martina Wicklein.

In 99 other parallel universes the students will play and win this match, but incredibly in our universe the staff won 1-0.

The students are the real winners as always they are a credit to themselves, their families and this department.



Martina and her daughter Anna with the departmental and Faculty citations

Awards R us

by Liam Madden

According to the Japanese proverb, *when the character of a man is not clear to you, then look at his friends*. Adapting the proverb, I would suggest that *when the character of a department is not clear to you, then look at the members of the department*.

It is with great pleasure that I can inform you that since the last newsletter many members of this department have gained well deserved awards at Faculty and College level.

You will remember that in the last newsletter we informed you that Martina Wicklein was chosen by staff and students to be the departmental 2013 GTA of the year. She will receive a trophy and cheque at the departmental awards evening on the penultimate day of term.

The Faculty of Engineering had a Teaching Awards ceremony recently. This included the selection of the Faculty GTA of the year from all nine departmental GTA of the year award winners. In the presence of the Deputy Rector Prof Stephen Richardson, the Faculty Principle Prof Jeff Magee, the Head of the Department of Bioengineering Prof Anthony Bull and many college dignitaries it was announced that Martina was selected to be the 2013 Faculty GTA of the year. The announcement that Martina was the *best of the best* was received with hoops of delight by the many Bioengineers who were in attendance.

Congratulations also go to the students that have just been awarded Faculty UROP bursaries. The recipients are Brian Chu (MEng 2), Marcus Leung (MEng 2) and Dan Tudor Zaharie (MEng 3). They are in addition to many students that have received College UROP bursaries.

Each year the College funds six students to attend the one week long British Science Festival. Selection is competitive therefore congratulations go to Haroon Chughtai (MEng 1) for gaining one of the six awards and sustaining the departments tradition of winning of this award c.f. Ella Bentin's (MEng 3) account of the 2012 festival. We look forward to reading all about 2013 Festival in a future newsletter

If the college had a strapline then it must be *the pursuit of excellence in everything*. Teaching and Research excellence is well established in our department. The college acknowledges and encourages excellence in a broader range of activities with the annual Rector's awards. The department was very well represented in the awards list this year.

- Professor Kim Parker has been awarded the *President and Rector's Award for Excellence in Research Supervision 2013*.
- Britta Ross has been awarded the *President and Rector's Award for Excellence in Supporting the Student Experience 2013*.
- Martin Holloway has been awarded the *President and Rector's Award for Excellence in Pastoral Care 2013* and the *President and Rector's Medal for Outstanding Contribution to Excellence in Pastoral Care* one of only two nominations to receive this award in 2013.
- James Field has been awarded the *President and Rector's Award for Excellence in Pastoral Care 2013* and the *President and Rector's Medal for Outstanding Contribution to Excellence in Pastoral Care* the second of the two nominations to receive this award in 2013.

All these awards are very well deserved but a special word of commendation must go to Martin Holloway who has been an award winner in three out of the four Rector's award categories in the recent past. This makes Martin unique within the college, which is something we already knew. Walk past his office anytime and you might see him demonstrating a standing wave with a piece of string attached to his radiator, writing bespoke software for tutorial administration, advising students about options and pathways, harvesting evidence for a mitigation case or bashing away on his drum kit in preparation for a gig. A true renaissance man!

In the Head of Department's message in the last newsletter Prof Anthony Bull posed the question "*How do we maintain our excellence, become more effective as individuals and as a Department, and extend our departmental culture of collegiality and support?*". The bar has been set very high but knowing that the next intake of fresher's includes applicants who have turned down offers at MIT and Berkeley to join our department suggests that the future members will sustain our very high standards.

The last few weeks have shown that the Faculty and College believe that *the pursuit of excellence in everything* is well established in our department.

TED Talks technology, science and art

by Jenna Stevens-Smith

BBC are looking into making a new lectures series with TED for BBC Four, and are currently searching for experts in the Technology field who are working on exciting and innovative ideas.

TED is a global set of conferences owned by the private non-profit Sapling Foundation, under the slogan "ideas worth spreading". Their conferences cover all variety of topics from the world of Technology, Entertainment and Design. If anyone's not aware of their conferences, their official website and a playlist of some of the best TED Talks can be found here.

They are looking for people who could give exciting, informative and entertaining talks on cutting edge or ground-breaking research into new technology that will genuinely surprise our audience. It could be in any field; engineering, medicine or natural sciences, or it could even be a talk about an interesting new research technique. The talks will typically last up to 18 minutes and can involve demonstrations and visual aids (including videos or powerpoint presentations).

The TV programme will work like a series of TED conferences, made up of a number of talks. Speakers address a wide range of topics within the research and practice of science and culture, often through storytelling. The speakers are given a maximum of 18 minutes to present their ideas in the most innovative and engaging ways they can.

Do you think that your research involving technology might make for an interesting talk? If so then contact Colin Smith.

TEDxAlbertopolis

You may have also seen that on the 23rd of September 2013, the first ever TEDxAlbertopolis will be held in the Royal Albert Hall. Featuring a series of inspiring and engaging talks across a wide range of issues, this half-day event will be an unparalleled celebration of the artistic and scientific cultures which flourish in the South Kensington community.

TEDx events are run under license from TED, a nonprofit formed to disseminate "ideas worth spreading" through a series of prestigious annual conferences and an extraordinary database of recorded talks.

TEDx events are all about celebrating the achievements of a community - and there can be few communities as exciting...

Speakers confirmed so far for TEDxAlbertopolis include David Braben, John Halpern, Aleks Krotoski, Max Marclay, Roland Lamb, Hannah Redler, Nicholas McCarthy the first one-handed pianist and Professor Dame Sally Davies is the Chief Medical Officer for England, guiding the Government on all medical issues, particularly Public Health.

For more information about the event including the speakers check out the TEDxAlbertopolis website.

FOR MORE INFORMATION

Colin Smith

SENIOR RESEARCH MEDIA OFFICER
FACULTY OF ENGINEERING

Tel: +44 (0)20 7594 6712
cd.smith@imperial.ac.uk

OUT AND ABOUT

Abu Dhabi adventure for Susan

In July, Susan Mulcahy, a PhD student in Professor Boutelle's group, will give a seminar on her research, at Khalifa University in Abu Dhabi. This invitation follows a visit from a group from Khalifa came to Imperial for a shadowing program two summers ago.

Scholarship success for Catherine

On Saturday 22nd June Katharine Fraser a Marie Curie International Incoming Fellow presented a talk at the Gordon Research Seminar on Assisted Circulation with the title "Flow weighted residence time suggests mechanical blood trauma in centrifugal VADs may be comparable to that in axial VADs" and was awarded a scholarship to attend and present the same work as a poster at the subsequent Gordon Research Conference on Assisted Circulation.

International human robotics

Dr Etienne Burdet has had a busy month with presentation on "The adaptive nature of human-human motor interaction" at the EU-COST workshop on "The future concept and reality of Social Robotics: Challenges, Perception and Applications - Role of Social Robotics in current and future society". Bruxelles, 11-13 June 2013. A talk at a colloquium on Computational Neurorehabilitation at Chateau de la Breteche, France 30 June - 3 July then a graduate lecture on "Human Robotics" at TU Berlin on 4 July. Before he goes to Osaka for a workshop he has organized on Robot-Assisted and BMI-Based Neurorehabilitation at the IEEE Engineering in Medicine and Biology Annual Meeting in Osaka (with Mitsuo Kawato, ATR International, Japan).

Charitable achievements

by Dr Zahra Mohri

On Sunday 16th June Professor Peter Weinberg and some of his team (PhD students Ethan Rowland and Yean Chooi and myself), Reva Vase , and PhD student Robert Weinert-Aplin did the London to Brighton Cycle Ride in support of the British Heart Foundation. We have raised **£741.50** so far and the website is still open for a few more months, so if you would like to sponsor the team you can do through their website BHF Fundraising.

Congratulations!

There was a real buzz in the Department on 27 June with visitors for the open day, industry representatives, media, Paralympic athletes and students presenting posters and talks. Congratulations to all the prize winners.

Funding success

Congratulations to Dr Zahra Mohri and Professor Peter Weinberg on their new **BHF Project Grant** titled *"Test of a new "comfort zone" theory relating mechanical stresses to atherosclerosis"*. The grant is for a three project and will begin on 1st July.

PhD success

Congratulations to Ioannis Alexiou on passing his viva "with minor corrections" in May. Ioannis' thesis was entitled "Complex Filters and Higher-Order Spatial Information for Image Categorization". Ioannis is now dividing his time between a company and the Department.

Congratulations to Petros Pandis who has also passed his viva.

Department of Bioengineering
Imperial College London
SW7 2AZ
+44(0)20 7594 5179