

# Bioengineering Newsletter

Spring 2014

## The evolving state of bioengineering

by Jenna Stevens-Smith

### THE LEADING DEPARTMENT OF BIOENGINEERING IN THE UK

Bioengineering is often recognized as the fastest growing discipline of bioengineering. It is also a very diverse discipline, covering biomechanics and biomaterials through to e-health, Neurotechnology and synthetic biology. Given this breadth it is not surprising that not all institutions or researchers have followed the same path in bioengineering. This breadth of definition was illustrated to me on my trip to the US last month, where I visited 11 institutions on the east and west coasts of the US, you can read more about this trip in the [blog](#). The Department is also evolving with research groups moving into newly created labs more information from Ken Keating on **Page 9** about what is going on, what has already been completed and further works planned. One of the key things that came out from my trip to the US was the importance that is being put on innovation and translation in the US. Innovation particularly is something that Government have encouraged and acknowledged the impact that innovation in science and engineering

can have on economic growth. The innovation of our students and staff never fails to impress me, and yet again this week a second year undergraduate and PhD student from the Department were pitching at the Wearable Technology Show after being shortlisted for the Start-up award.

Another key quality of bioengineers is their ability to communicate to a wide range of audiences, be it an electrical engineer, clinician, member of the public or a member of Parliament. Dr Claire Donoghue a Research Assistant in Professor Anthony Bull's group was recognized at the recent SET for Britain event at the House of Commons, Westminster for her ability to communicate her research to MPs. Claire was awarded the silver prize in the Engineering category, SET for Britain is a highly competitive competition, so winning this award is a tremendous achievement.

### IN THIS ISSUE

#### Medical Engineering Centres Annual Meeting and Bioengineering14

Imperial College London, South Kensington, London SW7 2AZ



#### UK's largest bioengineering meeting

On 10-11<sup>th</sup> September, Imperial will be hosting the UK's largest ever gathering of bioengineers, medical engineers and med tech industry as the Medical Engineering Centres and Bioengineering Society join forces for their annual meeting.

## At the top of their game

2014 has begun where 2013 left off. Our students, researchers and academic staff have continued to be recognised for their excellent research, innovation and ability to communicate their work.

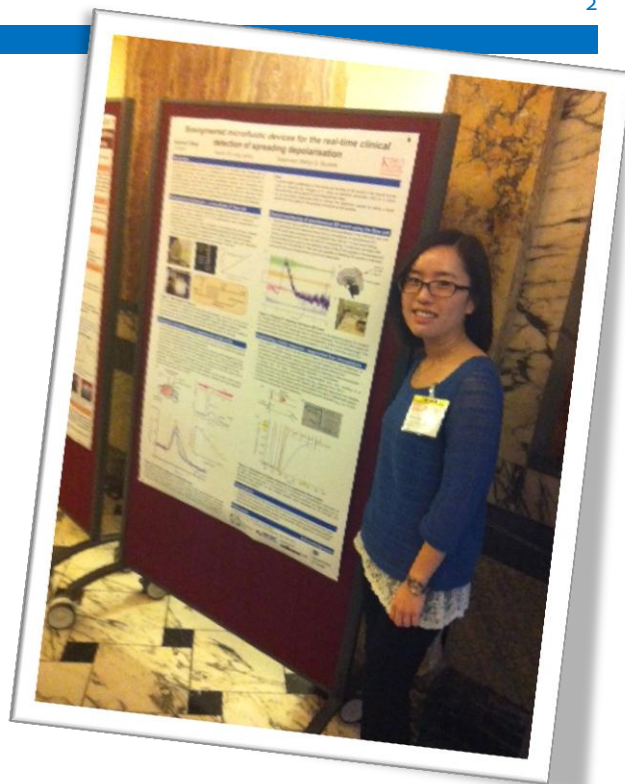
Dr Joseph M. Sherwood, Research Associate in the Department of Bioengineering won the "MediMaton Prize for Best Medical Engineering Recent PhD Thesis".

Chi Leng Leong PhD student in Professor Martyn Boutelle group in the Department of Bioengineering won the "MediMaton Prize for Best PhD Poster Presentation".

Professor Martyn Boutelle will be on [BBC1's Bang goes the Theory](#) on Monday 24th March talking about Big Data and his research on traumatic brain injury.

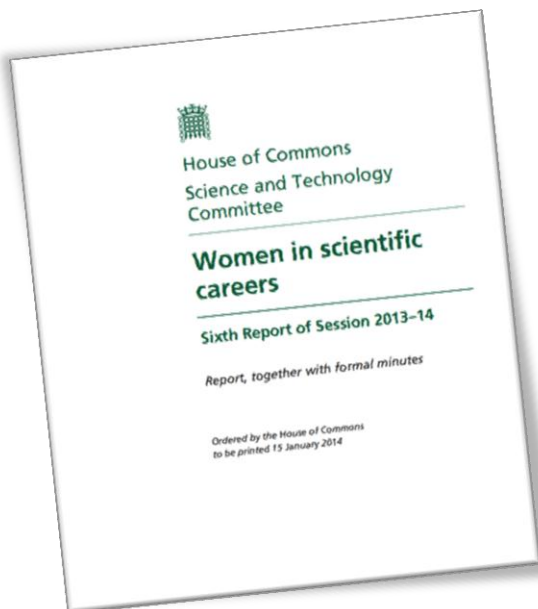
Second year undergraduate Alireza Tahmasebzadeh's Choose Blocks, "modular smart watch" has been shortlisted for start-up award at the Wearable Technology Show.

Claire Donoghue, Research Assistant in Professor Anthony Bull's group won the silver prize in the engineering session at SET for Britain competition in Parliament on 17th March 2014. SET for Britain is a poster competition where early career scientists and engineers explain their research to MPs. Claire's poster was about her work on "Teaching Machines To Diagnose Knee Osteoarthritis From MRI".



## Report on Women in STEM Careers

By Jenna Stevens-Smith



The Government plays a major role in the amount of funding available for science and engineering research through the research councils. But through the Government departments such as the Department of Business Innovation and Skills and select committees such as the House of Commons Science and Technology Select Committee other areas of STEM (science technology engineering and maths) can be explored. A couple of recent reports may be of particular interest.

On the 15<sup>th</sup> January the [House of Commons Science and Technology Select Committee published their report](#) on Women in Scientific Careers. The report was the result

of a number of consultations and evidence sessions with expert witnesses. There were 35 recommendations in this report, with a number of expected themes emerging. In particular the importance of role models, the short term contracts issue for early career researchers and the value of Athena Swan accreditation. However, the report looks more at the landscape and identifies the issues, but there is need for action and change.

On that note I would recommend you go to the [Science Grrl website on Monday when they will be launching their report](#), I guarantee it is a must read.



## WOMEN IN STEM



## London Geekettes launched

Thursday 13<sup>th</sup> March marked the official launch of London Geekettes. A grass roots network for women in Tech which began in Berlin two years ago. More in on page 5.



## Science Grrl

Science Grrl is a grass root network for women and girls working in or interested in science, technology engineering and maths. They have a UK wide network with local chapters in a number of locations, including London. They have a report coming out at the end of March 2014, which I would highly recommend reading.

<http://sciencegrrl.co.uk/>

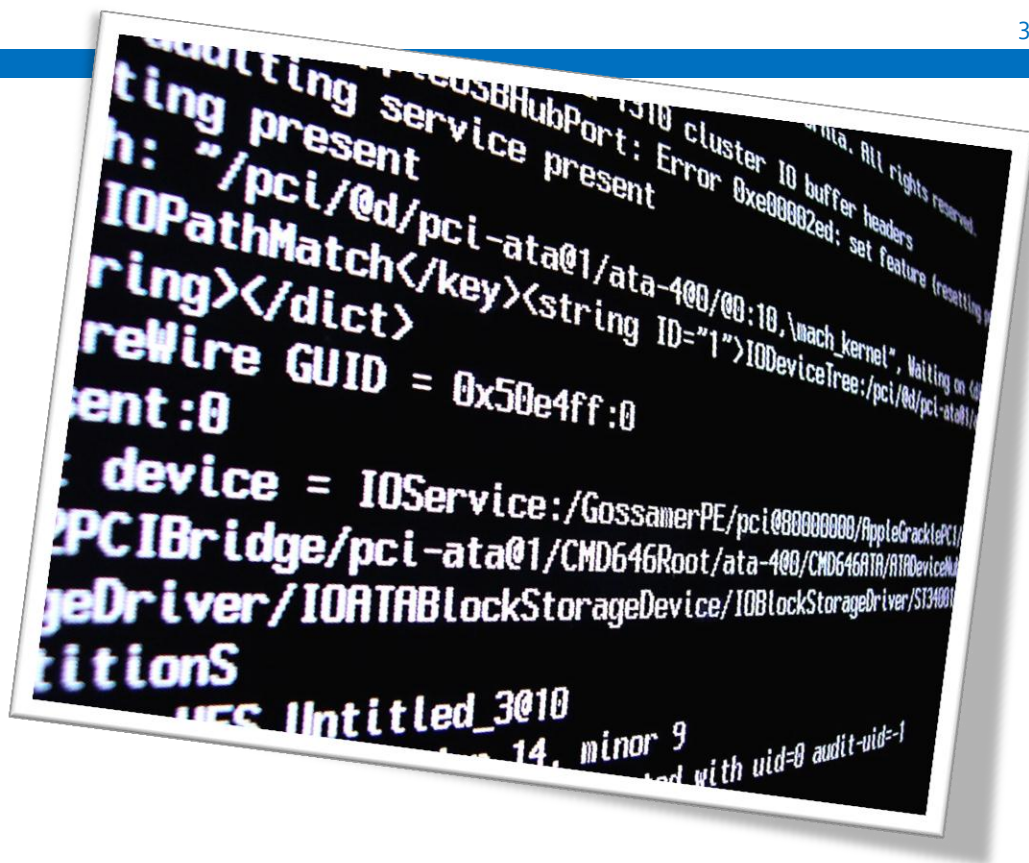
## FAST FACTS

60%

Nearly 60% of people think computer coding is an important skill for today's job market.

50%

Nearly 50% of people would like to learn computer coding.



## Why code?

by Susan Mulcahy

For me, code makes logical sense out of an illogical world. Code may seem like a foreign language but we use coding concepts in our daily lives all the time: <if else> statements, <for> loops, yes all the time.

Think about it. If we come into the lobby of RSM and need to get to the 3rd floor café via the stairs, we are subliminally carrying out a <for> loop in that we will walk up a flight of stairs 3 times. Or we could use a <while> loop stating that as long as the floor we are on is less than the 3rd floor, keep walking up. Get it?

Most of us also use code thinking every morning. When we wake up, we look outside and <if> it's raining, we take an umbrella. Granted, the reverse isn't always true in London these days, meaning even if it's sunny we should probably still bring our umbrella! But that's what attracts me to code. Once all scenarios are considered and the function is written, it will execute time and time again. Functions can be programmed considering as many conditional statements and scenarios as needed and even if the instructions are lengthy, it will execute the commands every single time.

If it doesn't work, it's because I haven't programmed it correctly or haven't accounted for all the possible scenarios. One must not underestimate the satisfaction of writing a piece of code that implements functionality as desired. It may take time and effort to fine tune and work out all the bugs, but more often than not, you'll save time analysing your data in the long run using coding concepts.

And then it's quite simple: <if> finished, <end>

## WANT TO CODE?

2014 is the year of code, if you want to find out more about coding, the year of code there are an expanding number of ways to get involved.

YEAR OF CODE: [HTTP://YEAROFCODE.ORG/](http://yearofcode.org/)

GEEKETTES: [HTTP://WWW.GEEKETTES.IO/](http://www.geekettes.io/)

STEMETTES: [HTTP://STEMETTES.ORG/](http://stemettes.org/)

HACKATHONS: [HTTP://WWW.THE-HACKFEST.COM/](http://www.the-hackfest.com/)

# Back to school

by Haroon Chughtai  
Second Year undergraduate

After the end of last term I found myself in a classroom back at my old school. However, now I was standing at the front of a group of sixth formers (mostly prospective medics), who were bemused as to why there was an engineer before them.

I had been invited by the school's Medical Society to talk about what my course actually entails and why as STEM students they should consider it. This proved to be a great opportunity to address the fact that few students have even heard of bioengineering let alone considered it as a degree. In fact when I was looking at my options a few years ago I only happened upon bioengineering

during an open day at Imperial.

My talk was short and informal, covering what fields bioengineering contained (some familiar to them but many not), how it's growing, its career prospects and why Imperial is a great place to study it. Most of my time was spent answering questions that the students had. These were principally concerned with what sort of impacts bioengineering has/will have and the role of technology in medicine (as well as the standard question of how much money they could make).

I left the school feeling that even if I hadn't managed to convince any of the students to apply for bioengineering, I did at least ensure

that they were aware of the increasing impact it is having. I strongly encourage anyone who has the opportunity to give a similar talk to do so.

## WANT TO GO BACK TO YOUR SCHOOL?

If you are interested in following in Haroon's footsteps and going back to your school to inspire the next generation of bioengineers the Department can provide you with brochures and a powerpoint presentation.

Alternatively if you are interested in going to a local school the Department can also help arrange this.

DR JENNA STEVENS-SMITH  
[j.stevens-smith@imperial.ac.uk](mailto:j.stevens-smith@imperial.ac.uk)

# Voice of the Future

by Jenna Stevens-Smith

On Wednesday 19<sup>th</sup> March I attended the Voice of the Future event at the House of Commons, Westminster. The event is a special opportunity for young scientists and engineers to ask MPs questions about a range of topics from science, engineering, and research to diversity, funding and education.

The event, now in its third year, has provided an insight into the workings of parliament, scientific advice and select committees. It is often a young scientist or engineer's first venture and engagement in science policy.

This year the witnesses called to give evidence to the panel of young scientists and engineers were as follows.

The chair of the Select Committee Andrew Miller MP encouraged all scientists and engineers to engage with their constituency MPs, to ensure that they know about their research and their constituent's views of scientific policy issues. You can do this through [Parliament website](#), by writing a letter, email or arranging to meet with your MP.

## Session One

Sir Mark Walport,  
Government Chief Scientific Adviser

## Session Two

House of Commons Science & Technology Select Committee Andrew Miller MP, Jim Dowd MP, David Heath MP, Stephen Metcalfe MP, Pamela Nash MP, Sarah Newton MP and David Tredinnick MP.

## Session Three

Liam Byrne MP Shadow Minister for Business, Innovation and Skills

## Session Four

Rt Hon David Willetts MP  
Minister for Universities and Science

An impressive line-up, especially given that an hour after the conclusion of Voice of the Future all of these MPs were sat in the chamber to listen to the Rt Hon George Osborne MP deliver the 2014 Budget. The whole event was streamed live on BBC Democracy Live and [a recording of the live coverage can be watched here](#).





# Geekettes launched

By Claire Donoghue

On 13th March, the London Geekettes launched with a party in the facebook offices. The Geekettes is designed to support and inspire women in the technology sector; developers, designers, engineers, leaders and students. A more balanced workforce doesn't only benefit individuals but society as a whole, since contributions from female perspectives can add diverse creative technological solutions which are more appropriate for a mixed group of tech consumers. The Geekettes were founded in Berlin by Jess Erickson and due to their success are now global in many cities including London.

Amongst those launching the event were four ladies who have studied at Imperial College. Jess (Geekettes founder), Marily Nika (from Department of Computing) and I kicked off the event. Andreea Babiuc followed by introducing herself; with a background of MSc in Computing from Imperial College, she is now working at Double Negative writing

special effects software for movies including Godzilla, The Hunger Games, Skyfall and Harry Potter. Catherine Ainsworth, a PhD student in Bioengineering at Imperial College concluded our Geekette community introductions.

Catherine gave an inspirational talk about her experiences solving problems in synthetic biology using coding skills. Her passion was contagious and she explained that computing was accessible, that you don't need a background in computer science to be able to benefit from computing! Catherine explained that a great thing about her experience with coding is that software errors can be identified with a little determination, which is unlike experimental errors in biology which are hard to locate.

Before my PhD, I worked as a software engineer, in a team of 50 engineers there were 2 women. Many all-male teams sat nearby in the same enormous

open plan office. Some women find this environment intimidating and it can certainly feel lonely in some ways. This anecdote rang true with many women at the launch event. The Geekettes launch party flipped these ratios; it enabled women to meet other women with similar careers. A few men attended to show their support for the cause. This is a very important part of the Geekette's goal, we wish to increase the involvement of women in tech through support and inspiration but we also want to include men in this vision.

The response we had was outstanding, the vibe and excitement is fantastic. Unfortunately we ran out of event tickets very quickly. So we are planning to make our next event, a hackathon, even bigger. Often hackathons are male dominated coding events with lots of beer and pizza. Whilst the core of the event will be the same, the Geekettes plan to place a feminine twist on the old formula!

Please get in touch if you would like to be involved or help out. And if you don't currently write software, you can still learn!



# Imperial engineer impresses politicians at House of Commons research showcase

by Deborah Evanson

The screenshot shows the Imperial College London website. The main banner features a night view of the Houses of Parliament with light trails from a long-exposure photograph. Below the banner, there are sections for 'STUDY AT IMPERIAL', 'LIFE AT IMPERIAL', and 'GIVE TO IMPERIAL'. A central 'power house' section highlights the 'Imperial engineer awarded silver medal at House of Commons research showcase'. To the right, there are 'NEWS' and 'EVENTS' sections. The 'EVENTS' section lists two upcoming lectures: 'Bright, flexible, stretchable: Electronics of the future' by Professor Thomas Anthopoulos on 26 March 2014, and 'A stroke of bad luck' by Dame Nancy Rothwell on 27 March 2014. The 'INTERACT' section promotes the Imperial Twitter account and a research community.

Speaking of her success, Dr Claire Donoghue said:

*"I am thrilled to have been chosen to receive this award, particularly when the calibre of other entrants was so high, and I really enjoyed getting a chance to discuss my research with MPs. The event highlighted some of the exciting research taking place across UK universities and it was great to be a part of this"*

## EVENTS



## Robotics of humans, robotics for humans

What can robots learn from the way that humans interact and can this help rehabilitate injured people? The Department's Professor of Human Robotics, Professor Etienne Burdet will deliver his inaugural lecture on **2<sup>nd</sup> Apr 2014 at 17:30 - 18:30** in **G16 Lecture Theatre, Sir Alexander Fleming Building**

[For more information or to register click here.](#) The Twitter hashtag for the event will be **#machineman**.



## Science, surgery, sports and rehabilitation in 2014

Seminar about current work and future directions in this interdisciplinary research area, for surgeons, engineers, physiotherapists and scientists. Held at Imperial on **30 Apr 2014 at 14:30 - 18:00** at the **Royal School of Mines**.

[For more information or to register click here.](#)

Imperial researcher Dr Claire Donoghue was awarded a silver medal at the national SET for Britain competition held at Parliament this week.

The event, hosted annually by the House of Commons, aims to promote Britain's early-career researchers and give them the chance to discuss their work with Members of Parliament.



*Dr Claire Donoghue receives her award*  
Over 200 researchers, including twelve from Imperial, exhibited their work at the competition, with prizes

being awarded on the basis of outstanding research coupled with the ability to effectively communicate their work to those without a scientific background.

Exhibitors were shortlisted from hundreds of applicants, and were entered into five categories: Engineering; Biological and Biomedical Sciences; Chemistry; Physics; and Mathematics.

I am thrilled to have been chosen to receive this award, particularly when the calibre of other entrants was so high, and I really enjoyed getting a chance to discuss my research with MPs

Dr Donoghue, a postdoctoral researcher in the Department of Bioengineering, was awarded the silver medal in the Engineering category for her work in designing software that can interpret MRI scans without human assistance and predict osteoarthritis - potentially allowing for earlier treatment of the disease.



## EVENTS



## Bagrit Lecture

The [annual lecture supported by the Bagrit Trust](#) will be delivered this year by Professor George Whitesides on **Thursday 5<sup>th</sup> June 2014 at 17:30**. As a taster why not check out his [TEDtalks](#).



## Medical Device Design Showcase

The inaugural showcase from the MRes Medical Device Design and Entrepreneurship students who will be pitching their business plans to an audience of potential investors and researchers followed by networking  
**6<sup>th</sup> June 2014, 18.00-20.00, 58 Princes Gardens**



## How to build a bionic man?

Dr Dominic Southgate will be joining forces with Professor Mark Miodownik at Cheltenham Science Festival on **6<sup>th</sup> June 2014 at 14.30** to discuss how science and engineering is beginning to catch up with science fiction in the race to replace body parts with man-made alternatives.

<http://www.cheltenhamfestivals.com/science/>

## PUBLIC ENGAGEMENT EVENTS



## EPC- Public Engagement Award

Outreach Manager Dr Jenna Stevens-Smith will be presenting at the [Engineering Professors Council Congress in Glasgow](#) on April 8<sup>th</sup> and 9<sup>th</sup> to win an award to run a public engagement project on rehabilitation engineering with Professor Etienne Burdet.



## Imperial Festival

Imperial springs to life at this free public event with hands-on science demonstrations, music, comedy, dance and art for all ages. Join the celebration and discover something different at this [annual Festival](#). The Festival will be open to the public at the following times: 16.00 - 22.00 on Friday 9 May 12.00 - 18.00 on Saturday 10 May



## Open Day

This year's [undergraduate Science and Engineering Open Days](#) will take place on Thursday 26 and Friday 27 June 2014. The Department are looking for volunteers to be involved with the Department aspect of the open day, if you are interested there is more information on page 9.

## SEMINARS



## Protein nanomechanics: Implications in physiology and health

Professor Raul Perez-Jimenez Ikerbasque Foundation for Science, CIC nanoGUNE, Donostia-San Sebastian, Spain  
**13:00 - 14:00 on 27 Mar 2014 in RSM 2.28**



## What is cancer? How can we control it?

Professor Paul Davies, Arizona State University, talks about his work at the interface of cancer and physical sciences.  
**18:00 - 19:00 on 31 Mar 2014 in RSM2.28**



## An Example of an Impactful Study on a Biological Material: The Articular Cartilage Paradigm

Professor Van C. Mow, dept. Biomedical Engineering, Columbia University.  
**13:00 - 14:00 on 06 May 2014 in RSM 2.28**

## Alumni



Running alongside the Imperial Festival, the Alumni Reunion is a special programme of events and activities designed to allow you to experience the best of Imperial today, as well as meet old friends and make new ones. More than 800 alumni and guests from 29 different countries attended last year.

The reunion package includes:

- Exclusive preview of the Festival Research Zone
- Special tours and lectures - including new tunnel tours for 2014
- A free reunion gift
- Decade networking sessions
- Lunch and cream tea options

For more information about the reunion and to book your place, [click here](#).



Alumni and current students are encouraged to get involved with the City & Guilds College Association they run a number of events and support past and current students.

<http://cgca.org.uk/>

## Outreach

Bioengineering ambassadors needed for outreach events in May, June and July. Details below...



### Imperial Festival

9-10<sup>th</sup> May 2014

South Kensington

The Department has a number of volunteering opportunities for UGs/Masters and PhD students. Currently the activities planned for the Department include: Rio Tinto Sports innovation Challenge, Fly through-Krapp Lab, Centre for Blast Injury Studies, biomechanics of dance and Robotics Zone. We also have Parkour biomechanics busking and will have a number of sessions on the Talkaoke table. Full training will be provided in advance of this event for students and staff interested in being involved. Email [Jenna](#) to express interest and availability.



### Undergraduate Open Days

26-27<sup>th</sup> June 2014

South Kensington

The Department will be running department sessions, tours and drop-in sessions on both days in addition to the stand in the Queens Tower rooms. Full training will be provided in advance of this event for students and staff interested in being involved. Email [Jenna](#) to express interest and availability.



### Headstart

2-3<sup>rd</sup> July 2014

South Kensington

The Department run a 3 hour workshop for 16-17 year olds as part of the Headstart programme run by EDT. We are looking for volunteers to help run these sessions. There is also the opportunity to develop an activity as part of the session. Email [Jenna](#) to express interest and availability.



### STEM World Summer School

The Department will be involved with the 'Which engineering?' themed week of the summer school run from 14-18 July. The residential summer school, are run by Exscitec and is open to students aged 11-17 year olds. There are opportunities for students to develop their own activities for these sessions, or to help out in preexisting sessions. Email [Jenna](#) to express interest and availability.



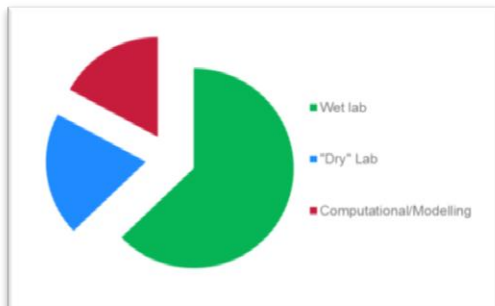
The Summer School programme runs throughout the summer and is organised by exscitec. They pay their mentors, if you're interested in finding out more email [Richard](#).



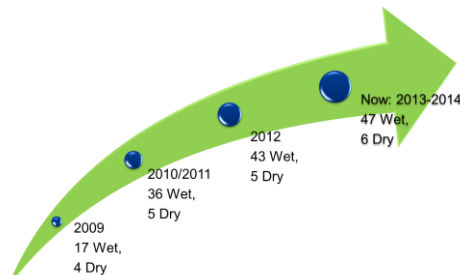
# Lab developments

It would be hard to have missed all the work and changes that have been going on in the Department of Bioengineering labs over the last few months. Lab Manager Ken Keating and Operations Manager Graeme Rae have been busy finding new space and converting old to cater for our expanding Department. There are

modelling. The demands for space have grown with the growth of the Department from 17 wet labs and 4 dry in 2009 to 47 wet labs and 6 dry in 2014.

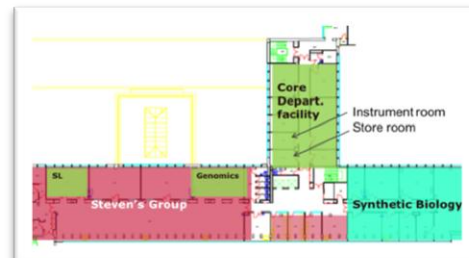


31 research groups and 4 research fellows in the Department, all with differing lab requirements, majority are wet labs 22 academics use wet labs, 7 use Dry labs / Electronics and behavioural and 6 computational /

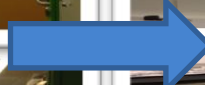
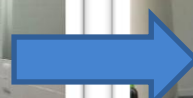
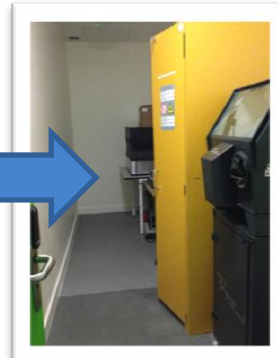
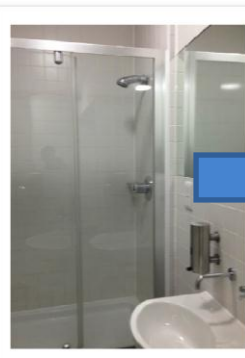


There were a number of urgent space issues where solutions had to be found. Firstly was high energy impact lab for the ANUBIS found in the basement of the Bessemer loading bay. Which once converted will not only have space for higher impact testing but also create a new mezzanine floor for a further electronics laboratory.

The second challenge was to find space for some new equipment. The Bessemer level 6 area is full as illustrated by the diagram below.



Creative solutions have to be found and what was the 6<sup>th</sup> floor shower was converted into a dedicated 3D printing room. The store room and instrument room were converted into a new genomics lab, and what was the Boutelle lab is in the process of being converted into two further core cell culture facilities.



# UK's largest bioengineering meeting

September 2014 will be a landmark month for bioengineering in the UK.

For the first time the Medical Engineering Centres Annual Meeting is joining forces with the Bioengineering Society's Annual meeting Bioengineering 14.

The meeting which will be the UK's largest ever gathering of Biomedical Engineers, Bioengineers and Medical Engineers, with participants from leading academic Centres and the MedTech industry. The programme will cover the breadth of bioengineering from biomechanics to synthetic biology with a number of sessions focused on technologies and application areas. The meeting will also enable delegates to attend industry focused sessions on Intellectual Property to sessions targeted at early career researchers on careers in bioengineering.

The meeting will be held in London at Imperial College London.

The call for abstract submission will be opening soon but if you want to express your interest early please [email the MECbioeng team](#).

Medical Engineering Centres  
Annual Meeting and  
Bioengineering14

Imperial College London, South Kensington, London SW7 2AZ



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## Bioengineering Newsletter

**Department of Bioengineering**

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