Imperial Bioengineer

March 2016

INNOVATION IN UK MEDTECH

This month the Department hosted the inaugural UK MedEnterprise Training Network. The event attracted students, academics, clinicians, industry, policy makers and investors from across the UK.

Why? The UK has all of the ingredients for a robust and world-leading medical technology development hub, but relatively few large-scale successes so far. Such success requires a startup ecosystem that includes IP experts, regulatory resources, knowledge of reimbursement protocols, and an entrepreneurial culture, as well as a wide spectrum of investors. Universities can marry this ecosystem to technological breakthroughs, and thereby train and launch the next generation of medtech entrepreneurs.

What courses are out there?
There are a growing number of courses which seek to bring together training in entrepreneurship and innovation with bioengineering and medical technology.

Some courses including Oxford, Newcastle and Bristol have taken inspiration from the Stanford Biodesign programme.

- Oxford Biodesign launched in 2015, led by Maarten De Vos the focus of the Oxford programme is digital health.
- Newcastle University has a 12-week programme created by Lucille Valentine on Medical Technology Innovation.
- University of Bristol's, Lars Sundstom spoke of the innovation ecosystem in Bristol, which includes the Elizabeth Blackwell Institute for Health Research, the Research for Health challenge and Healthcare Innovation Programme (HIP).

Partnership with SETsquared was mentioned as a key enterprise collaboration between the universities of Bath, Bristol, Exeter, Southampton and Surrey.

A variety of different approaches are taken by institutions, taking into account their strengths and local landscape.

- University of Strathclyde has the Strathclyde Entrepreneurial Network (SEN) and specific medtech provision through the Centre for Doctoral Training in Medical Devices and Health Technologies and Institute of Medical Devices which are led by Professor Patricia Connolly.
- Imperial College London, the Medical Device Design and Entrepreneurship MRes programme (est. 2013 by Jimmy Moore) has already raised £1.5 million in seed funding and over £2 million pending applications.
- The Institute for Life Sciences (IfLS) at University of Southampton plays an important role for interdisciplinary life sciences research.
- The Insigneo Institute for in silico Medicine is a collaborative initiative between the University of Sheffield and Sheffield Teaching Hospitals NHS Foundation Trust set-up in 2012 led by Marco Viceconti

The final session was organised by MedCity and SEHTA about 'how to access the NHS' with insight from Innovation leads in the Academic Health Science Network and Technical Advisors in NICE. The workshop centered around the role of universities in the development of the UK medtech entrepreneurship ecosystem. Topics covered highlighted the need for collaboration across the sector from student training to full-scale medtech businesses. We already have many of the key ingredients in the UK but to realise the potential we need to bring these ingredients together to create a robust and world-leading medical technology development hub.

WELCOME TO THE DEPARTMENT

Welcome to new starters

- Dr Firat Guder

Lecturer

- Dr Mary Ann Go

Research Associate working with Simon Schultz

- Dr Luke Heaton

Research Associate working with Reiko Tanaka

- Dr Fani Tsitouroudi

Research Associate working with Anthony Bull

- Dr Christina Warboys

BHF Research Fellow

This month sadly five colleagues are leaving, we wish them all the best in their new roles:

- **Amy Birch**
- **Angelo Karunaratne**
- **Nawal Kinany**
- **Catherine Ainsworth**
- **Carlo Bagnato**

****LONG SERVICE RECOGNITION****
Liam Madden (30 years)
Angela Glyes (25 years)

GRANT SUCCESS

EPSRC grant awarded to **Dr Claire Higgins** (PI) and **Dr Spyros Masouros** (Co-I) from Bioengineering, and Dr Marc Masen (Co-I) from Mechanical Engineering to research *re-engineering skin as a means to alleviate pressure ulcers.* (£616,000)

BBSRC grant awarded to **Dr Claudia Clopath** with Dr Jack Mellor, University of Bristol, for *Plasticity of inhibitory synaptic transmission in the hippocampus* (£561,771)

BHF Project Grant awarded to **Prof Peter Weinberg** with Dr David Leake and Prof Ketan Patel, University of Reading) on *Inhibition of the lysosomal oxidation of low density lipoprotein and its effect on atherosclerosis* (£182,779)

BHF Project Grant awarded to **Prof Peter Weinberg** for *Effect of multidirectional flow on endothelial cell alignment and transport of LDL-sized particles* (£228,486)

BHF Intermediate Basic Science Fellowship awarded to **Dr Chrstina Warboys** for *Is β-catenin a master regulator of mechanical signalling in the endothelium?* (£427,760)

FIRST YEAR STUDENT START-UP SUCCESS

A team of Slovak students at Imperial College London placed first with their project in a national competition CISCO Switch-up Challenge.

Awareness of great potential hidden in the "Internet of Everything" and various ideas of its use brought eight teams from various British universities to the UK CISCO headquarters, where they competed in the final of the Switch-Up Challenge in February 2016.

First year students **Miroslav Gasparek** (Bioengineering), Martin Ferianc (Electronic and Information Engineering) and Daniel Zvara (Computing) achieved first place for their innovation, wellsCap. Over the next few months they will travel to Cisco's Global headquarters in California, where they will introduce their project to the top management of Cisco Systems. The wells team was later joined by Filip Stollar (Imperial College London, Computing) and Alzbeta Dlha (University College London, IT Business & Management).

Preservation of the proper daily water intake is very important for everyone. Optimal fluid intake is beneficial for health and also enables us to achieve high physical and mental performance. However, many people are either not aware of the importance of hydration or just do not know what is the appropriate amount of water for their level of physical activity. wellsCap is a bottle cap that converts ordinary PET bottle into smart device that measures your water intake in real-time. wellsCap measures your daily water intake and subsequently synchronizes with application (or server), which determines the ideal daily water intake based on sex, height, weight, age, and overall level of physical activity. Planned app update also records information about your health condition and other data, such as temperature and chemical composition of the liquid. User can therefore track his liquid intake in real time on the screen of the smartphone and get notifications which remind them that they should drink again. Data can also be exported and further analyzed for diagnostic purposes.

OUT AND ABOUT

Dr Chiu Fan Lee gave invited talks at the University of Oregon (Physics Department), McGill University (Physics Department), Princeton University (Chemical and Biological Engineering Department), and Queen Mary University of London (Maths Department).

Satpal Sangha and **Dr Jenna Stevens-Smith** spoke at Dormer Wells Junior School, Southall on 14 March about bioengineering and what it is like to be an engineer.

Dr Jenna Stevens-Smith and PhD student **John Wilson** spoke at Tiffin Girls School in Kingston on 15 March about bioengineering and fluid mechanics of the lymphatic system.

Dr Andrei Kozlov and **Dr Jenna Stevens-Smith** visited Bishop Gilpin Primary School on 18 March to support the science focus group present their project on an animal that can hear on a planet with no atmosphere to all of Year 5 and Year 6.

Antonis Pouliopoulos presented a poster and oral talk at the 16th International Symposium on Therapeutic Ultrasound (ISTU 2016), in Tel Aviv, Israel his oral talk was entitled "*Rapid short-pulse (RaSP) sequences improve cavitation dynamics for ultrasound therapy*".

Congratulations to **Dr Tom Ellis** who has been promoted to Reader, the promotion will formerly take effect from the end of the summer.

STAFF & STUDENT SUCCESS

Professor Richard Kitney has been elected to the Fellowship of the Royal Society of Edinburgh.

Prof Molly Stevens has won the prestigious Clemson Award for Basic Research for 2016 from the Society of Biomaterials! This award recognises the Stevens Group for having contributed to the basic knowledge and understanding of the interaction of materials with tissue. The Clemson Award is considered one of the premier awards from the International Society for Biomaterials and will be presented at the 2016 World Biomaterials Congress in Montreal.

Dana Al Sulaiman from Dr Sylvain Ladame's group won the bronze medal in the engineering category at SET for Britain in the Houses of Parliament on 7 March.

Dr Stefaan Verbruggen presented his research *"A Window on the Womb: How Strong is a Baby's Kick?"* at SET for Britain in Parliament on 7 March

Dana Al Sulaiman and **Dr Stefaan Verbruggen** were featured in the *Imperial College Podcast*, where they were interviewed by Colin Smith about their research and experience at SET for Britain.

Bioengineering success at the *Institute for Global Health Innovation Student Challenges Competition* **Harriet Gliddon**, a PhD student under the supervision of **Prof Molly Stevens**, won the video competition with her video called *Putting TB to the test* that summarises her approach of creating nanomaterial-based biosensors capable of detecting biomarkers of tuberculosis and first place at the Dragons Den-style event (£5,000) While **Antonis Chronopoulos** and **Tyler Lieberthal** from Dr Armando del Rio Hernandes's group won the audience choice award at the Global Health Innovation Award for their project ExoSonic, which they will also be exhibiting at the Imperial Festival. Fellow bioengineers **Hana Janebdar** and **Paolo Cadinu** were also finalists with their point-of-care blood group testing device called Instatype.

Research Associate **Dr Maedeh Borhani** MIMechE has received her Chartered Engineer status.

Antonis Pouliopoulos (Choi lab) won the "Best Student Poster Presentation Award" at the 16th International Symposium on Therapeutic Ultrasound (ISTU 2016), in Tel Aviv, Israel, for his poster was entitled "*The Superharmonic Microbubble Doppler Effect in Ultrasound Therapy: An Observation Useful for Monitoring Velocities*"

Dr Angela Kedgley has been awarded Fellowship of the Higher Education Academy (FHEA) by following the College's STAR framework.

Prof Richard Kitney and **Prof Paul Freemont** have both been made Visiting Professors at NUS in Singapore.

Dr Andrea Serio, PDRA in Prof Molly Stevens' lab, is this month's featured researcher on the new website of the *Imperial Stem Cell and Regenerative Medicine Network*, which is co-led by Profs Sara Rankin, Sian Harding and Molly Stevens. Dr Paola Campagnolo, also a postdoc within the Stevens Group, organises regular events for this Network, which hosts world-leading researcher lectures at Imperial College.

Spring Cleaning

****NOTICE FROM DEPARTMENT RESOURCES OFFICER, EDIT TOTH****

Waste electrical waste and electronic equipment (WEEE):

- Please bring any broken or unwanted IT and electronic equipment (including cables, keyboards, mice, monitors, PCs etc.) to my office (RSM 3.18).

Boxes, cardboards:

- Please throw away any unused boxes and cardboards. (Especially from the top of the cupboards in the shared offices!)
- Please flatten the boxes and place them at the nearest recycling point. Fillings (plastic and polystyrene) must go into the black bins.

Food storage boxes:

- Please remove abandoned food storage boxes/mugs from the kitchens. Anything left behind will be disposed after Easter.

MEET FIRAT GÜDER THE NEW LECTURER

Dr Firat Güder is the newest addition to the academic staff in the Department of Bioengineering. Dr Güder's research is on the development of sensors, actuators and integrated systems. He has a background in Computer Engineering and through his academic career has developed an interest in material science which led him to pursue a PhD and postdoctoral positions in this area. His research involved the investigation of nanostructural transformations by atomic layer deposition, unconventional methods for photolithography/patterning, synthesis of nanomaterials and design and fabrication of sensors and actuators. In 2014, Firat joined the laboratory of George Whitesides at Harvard, as a German Research Foundation research fellow and developed paper sensors and actuators, methods for density-based analysis of plant seeds and new classes of soft-composite materials. Firat is an innovator, having set up a start-up at Harvard before moving to London and is motivated to solve real-life problems. We look forward to seeing the solutions he develops through his research at Imperial.

If you're interested in working with Dr Firat Güder he has an opening for a 3-year PhD studentship in *Sensors: the research and development of new classes of materials and sensor platforms based on commonly available low-cost materials*.

UPCOMING EVENTS

Departmental Seminars

Thursdays12.00-13.00

21 April 2016 12:00-13:00 RSM2.28
Professor Brent Doiron from the Department of Mathematics, University of Pittsburgh

28 April 2016 12:00-13:00 RSM2.28
Professor Liam Grover, from the School of Chemical Engineering, University of Birmingham

Imperial Events

7-8 May 2016
Imperial Festival and Alumni Reunion Weekend
Imperial College London, South Kensington campus

15 June 2016 17:30-18:30
2016 Bioengineering Annual Lecture
Professor James Collins, MIT
Imperial College London, South Kensington campus
http://www.imperial.ac.uk/bioengineering/about/bioengineering_lecture/

Conferences

4-7 July 2016
Eurohaptics 2016
Professor Etienne Burdet, Dr Ildar Farkhatdinov and Dr Franck Gonzalez are co-organising. Website: www.eurohaptics2016.org
Imperial College London, South Kensington campus

5-6 September 2016
MEIbioeng16 (abstract deadline 6 May)
Institute of Biomedical Engineering, University of Oxford
Website: http://meibioeng.org/

7-9 September 2016
Young Researchers' Futures Meeting 2016
Medical Imaging and Interventions: engineering a better look at cancer
Imperial College London, South Kensington campus
Website: http://www.yrfm.uk/

12-14 September 2016
Medical Physics and Engineering Conference 2016 (MPEC)
Science for patient benefit
Manchester
Website: www.ipem.ac.uk/ConferencesEvents/MPEC.aspx

5-8 October 2016
2016 BMES Annual Meeting
Innovation at the Interface (abstract deadline 26 April)
Minneapolis Convention Center/ Minneapolis, Minnesota, USA
Website: bmes.org/annualmeeting

PUBLICATION SPOTLIGHT

Be sure to check out the Department's recent publications:

Mark Johnsona, Jay McLarend, Darryl Overby *Unconventional aqueous humor outflow: A review*, Experimental Eye Research (2016), doi:10.1016/j.exer.2016.01.017

Iñaki Sainz de Murieta, Matthieu Bultelle, Richard Kitney *Toward the First Data Acquisition Standard in Synthetic Biology* ACS Synth. Biol. (2016) doi: 10.1021/acssynbio.5b00222

CONTACT

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