



INDUSTRIAL BIOCOMPATIBILITY

By Samson Anene

Bioengineering is the application of engineering knowledge to the fields of medicine and biology. As Imperial College London states, it draws upon electrical, mechanical and materials engineering. It is a field that is relatively new, as it was unknown before World War II. This war torn era allowed the field to emerge as it provided opportunities where medical advancements were a necessity but often needed engineering applications to proceed. In the world today there are endless examples of bioengineering, be it smart devices that can monitor things our heart rate/sleep patterns to other branches of bioengineering such as agricultural, bionics, environmental and genetic.

Bioengineering brings academia and industry together as it is often a combination of the two that yields new and innovative products. The growth of both bioengineering industry and research in the UK has come at an exciting time, where innovations in healthcare are rising to the top of the agenda for many big companies e.g. Google, McLaren, GSK alongside an explosion of start-up and spin-out activity in the sector. The breath of bioengineering means research and commercialisation advancements are arising in many areas including pharmaceuticals, materials, big data, surgical tools, imaging, monitoring and diagnostics.

One aspect of bioengineering that particularly interests me is the idea of the connected health home that could alleviate some of the burden on the NHS, a company called [Plextek](#) has explore this idea in a recent report and suggest that in the future our homes could be connected by using an interactive system to contact a specialist from home. Another area that is of interest to me is wound repair, through interdisciplinary research bringing together materials engineers, biologists, mechanical engineers, clinicians and bioengineers there is a lot of opportunity to innovate. I was particularly impressed with the research being undertaken in Dr Ben Almquist's lab where they are working at the nanoscale.

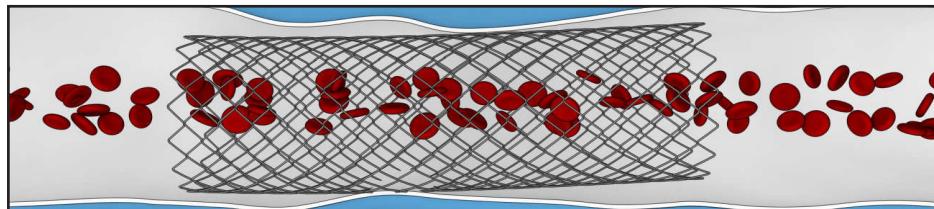
ABOUT THE AUTHOR

Samson Anene has just completed a degree in bioengineering at the University of Sheffield with a final year project in tissue engineering a polyurethane bone scaffold. Samson worked with Dr Stevens-Smith in the Department in August 2016, and is going on to do a MSc in Medical Biotechnology and Business Management at University of Warwick in October 2016.

I am optimistic that the growth in bioengineering over the last 20 years is only going to accelerate with the growing global burden of the ageing population to consider. In the recent [Foresight report on Future of an ageing population](#) Rt. Hon. Oliver Letwin MP states "The UK has a choice. Will the growing number of people in later life be predominantly empowered, skilled, healthy and able to contribute fully to society? Or will we be increasingly unhealthy, disempowered and dependent?" On this matter bioengineering will undoubtedly play a major role.

Building good relationships with industry is key to the dissemination and translation of our research to the public and the Institute of Biomedical Engineering and Department of Bioengineering has developed an industry club, coordinated by Robert Ferguson. Termly MedTech Links events provide an opportunity to find out more about bioengineering at Imperial, bringing together leaders in bioengineering, medicine and industry. The next event is biocompatible materials and will feature talks from many renowned experts in their field including Professor Molly Stevens and Renishaw. Events are free to attend but must be booked in advance.

NEXT MEDTECH LINKS EVENT WILL BE ON CARDIOVASCULAR INNOVATIONS IN DECEMBER 2016.
Please contact Robert Ferguson for further information.



Imperial Bioengineer

August 2016

WELCOME TO THE DEPARTMENT

Welcome to new starters

- **Dr Rylie Green**
Senior Lecturer
- **Nicolas Kyllis**
iGEM Project Officer
- **Dr Biswa Sengupta**
Visiting Researcher with Dr Jennifer Tweedy

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

- **Rebecca Rolfe**
- **Carlos Bricio**
- **Cristoforo Silvestri**
- **Tomaso Muzzu**
- **Jed McDonald**
- **Eleni Bazigou**
- **Kok Yean Choi**
- **Stefania Garasto**
- **Peter Sowinski**

PUBLICATION SPOTLIGHT

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

Jose Rivera-Rubio, Kai Arulkumaran, Hemang Rishi, Anil A. Bharath [An assistive haptic interface for appearance-based indoor navigation](#) Computer Vision and Image Understanding 2016, 149, pp 126-145 doi: [10.1016/j.cviu.2016.02.014](https://doi.org/10.1016/j.cviu.2016.02.014)

Muge Sarper, Ernesto Cortes, Tyler J. Lieberthal & Armando del Río Hernández [ATRA modulates mechanical activation of TGF-β by pancreatic stellate cells](#) Scientific Reports 2016, 6, 27639 doi:[10.1038/srep27639](https://doi.org/10.1038/srep27639)

Gavin A.D. Metcalf, Akifumi Shibakawa, Hinesh Patel, Ailsa Sita-Lumsden, Andrea Zivi, Nona Rama, Charlotte Bevan, and Sylvain Ladame [Amplification-Free Detection of Circulating microRNA Biomarkers from Body Fluids Based on Fluorogenic Oligonucleotide-Templated Reaction between Engineered Peptide Nucleic Acid Probes: Application to Prostate Cancer Diagnosis](#) Anal. Chem. 2016, 88 (16), pp 8091-8098 doi: [10.1021/acs.analchem.6b01594](https://doi.org/10.1021/acs.analchem.6b01594)

Antonis N. Pouliopoulos and James J. Choi [Superharmonic microbubble Doppler effect in ultrasound therapy](#) Phys. Med. Biol. 2016, 61 (16) pp 6154–71 doi: [10.1088/0031-9155/61/16/6154](https://doi.org/10.1088/0031-9155/61/16/6154)

Alexander J. Patton, Laura A. Poole-Warren, Rylie A. Green [Mechanisms for Imparting Conductivity to Nonconductive Polymeric Biomaterials](#) Macromol Biosci 2016, 16 (8), pp 1103–11 doi: [10.1002/mabi.201600057](https://doi.org/10.1002/mabi.201600057)

VivaTechnology Paris 2016: The biggest European start-up conference

by Miroslav Gasperek

Sometimes, opportunities come suddenly and require us to take immediate action. Receiving an e-mail from CISCO University Relations Team with the offer of the free ticket to the biggest European start-up conference in Paris just six days before event represents exactly that kind of opportunity - and I knew I couldn't miss it.

Therefore, my colleague Martin Ferianc, first year student in EEE, with whom I am running wells - start-up project focusing on creation of smart bottle cap and smartphone app enabling user to track his water intake and individually determine his ideal water intake - completely changed our agendas and left to Paris. Looking back, I must say that it was definitely worth it.

VivaTechnology Paris welcomed more than 500 start-ups in various stages of funding. All of them were bringing great business ideas that could have a positive impact on the World. From a bioengineer's perspective, it was good to see many of them focused on health technology and biotechnology. The conference did not only have start-ups seeking investment, but was also attended by some of the big players of the tech and pharmaceutical sectors including Facebook, Google, Novartis. Facebook staff spoke about the secrets of the successful Facebook advertising campaign. Google brought a Google Car to the Europe for the first time and presented its Project Jacquard, which transforms everyday objects like clothes into interactive surfaces. The project was introduced by its project lead, Dr Ivan Poupyrev, who is one of the leaders within Google Advanced Technology and Projects division. The opportunity to talk to him, pass on my CV and tell him about my ideas of using Project Jacquard in biomedical applications was an unforgettable experience.

However, the highlight of the conference were talks by the most important people in today's industry. I talked with Co-Founder and VP of LinkedIn about the use of physiological data - not exactly a day-to-day experience! But the absolute highlight was the talk by Eric Schmidt, Executive Chairman of Alphabet, the parent of Google and the world's most valuable public company. His message was clear- Biotechnology, bioengineering and big data analysis are the biggest and most exciting upcoming topics, and as a bioengineer, I was very happy to hear this.

I have seen much more interesting things and powerful people, ranging from Founder and CEO of Google Deep Mind to the Israeli Minister of Economics. To conclude, this conference was an unforgettable experience and it gave me a lot both in terms of personal and professional development.

OUT AND ABOUT

Liam Madden, Paschal Egan, Niraj Kanabar and Dr Jenna Stevens-Smith who ran the Sutton Trust Summer School for the second year this year with Y12 students developing their programming and electronics skills to build a digital stethoscope.

Dr Jenna Stevens-Smith delivered two STEM lectures to the new STEM potential intake on 15 and 22 August.

Liam Madden recently hosted a number of Insight days for prospective undergraduates in the Department.

STAFF & STUDENT SUCCESS

2016 CVET Most Cited Article Award, jointly awarded by the Biomedical Engineering Society and Springer Nature for **Professor Jimmy Moore** and co-authors for the most cited article from papers published in Cardiovascular Engineering Technologies (CVET) in the last five years, between March 2010 and March 2016. The article is *Biodegradable Stents: Biomechanics Modeling Challenges and Opportunities*, 2010;1(1):52-55, doi: 10.1007/s13239-010-0005-7.

Alejandro Granados awarded an EPSRC Doctoral Prize Fellowship.

ALUMNI SUCCESS



Riham Satti (MEng 2011) one of Forbes top three female founders <http://www.forbes.com/sites/philiipsalter/2016/08/02/three-female-founders-taking-the-uk-by-storm/#489c29bd201b>

Hildur Einarsdottir (MSc 2006) now Director of Global Product Management, Prosthetics at Össur in Iceland featured in Economist film <http://films.economist.com/future-works/body-builders/>

Benjamin Miller (MEng 2012) has been awarded a prestigious Fulbright Scholarship. Ben is one of 46 British grantees that make up the 2016-17 Fulbright Cohort and will be going to MIT to do his PhD in Bioengineering http://www3.imperial.ac.uk/newsandeventsppgrp/imperialcollege/newssummary/news_11-8-2016-16-7-23

UPCOMING EVENTS

Departmental Seminars

Thursdays 12.00-13.00

23 Aug 2016 12:00 - 13:00 RSM3.01D

Fluidics for Life Dr Alar Ainla, from the Department of Chemistry and Chemical Biology at Harvard University.

23 Sept 2016 12:00 - 13:00 RSM3.03

Robots helping to care for older people Professor Bruce MacDonald, University of Auckland, New Zealand

Imperial Events

17 September 2016

UG Open Day

Imperial College London

Website: <http://www.imperial.ac.uk/study/ug/visit/open-days/>

22-25 September 2016

New Scientist Live

Excel London, Royal Victoria Dock, London

Website: <https://live.newscientist.com/>

Conferences

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: <http://www.ipem.ac.uk/ConferencesEvents/MPEC.aspx>

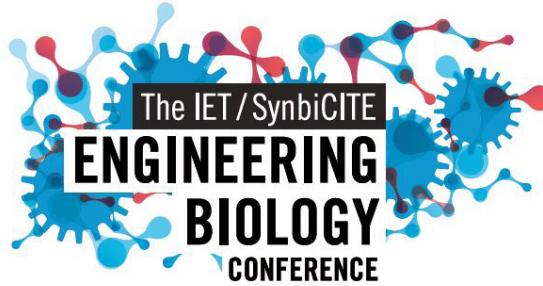
5-8 October 2016

2016 BMES Annual Meeting

Innovation at the Interface (abstract deadline 26 April)

Minneapolis Convention Center/ Minneapolis, Minnesota, USA

Website: bmes.org/annualmeeting



13-15 December 2016

IET/SynbiCITE Engineering Biology Conference

IET, Savoy Place, London

The programme includes major international speakers in the field, including keynote addresses from Professor Jay Keasling from UC Berkeley, and Professor Chris Voigt from MIT.

Students, researchers and academics are encouraged to submit abstracts and/or register to attend.

Website: <http://conferences.theiet.org/synthetic-conference/about/index.cfm>



ENTER IMAGES NOW!

We are looking to acquire high-quality images that relate to biomedical science and contemporary healthcare. We are interested in all artistic media and imaging techniques, from hand-drawn illustrations to clinical photography, super-resolution microscopy and functional MRI scans.

Every image accepted into our collections by 11 September 2016 will be considered for the Wellcome Image Awards 2017. The winning images will go on display in science centres and public galleries around the world. Enter for your chance to win prize money: £5,000 for the overall winner, £2,500 for the Julie Dorrington Award winner, and £500 for each of the other winning images.

CONTACT

Send news for the next issue to:

Dr Jenna Stevens-Smith

Outreach & Public Engagement Manager