# Imperial Bioengineer

January 2018

# 2018: Building on the success of 2017

In this first newsletter of 2018 we can look back to some great achievements in 2017 and look forward to 2018 with confidence and optimism.
Some of our many recent highlights are:

• We have started our new undergraduate degree in Molecular Bioengineering. This will create a new breed of bioengineers fit for the future demands of industry and academia. Many staff have contributed to the development of this degree, but I would like to specifically thank Dr Sylvain Ladame for his academic leadership of this and Maddi O'Brien for her fantastic organisation and administrative leadership of this new initiative.

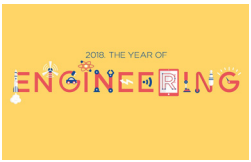
• We have recruited more stellar new academic staff. Academic staff and students are the lifeblood of a university. New academics with fresh research directions, different expertise, and the drive to start new things always make an impact on the Department's students and staff.

• We have taken on new space in the Bessemer Building to support our expansion. Although there is still much to be done to make this space fully functional and to make sure that the Bessemer and RSM parts of the Department are fully integrated, I am sure that you will agree that this is a welcome addition to the Department. Ken Keating and his team, Edit Toth and Graeme Rae have amazingly managed to make significant changes to our physical infrastructure while keeping the show on the road.

• We are really excited to have started our new intercalated BSc for medical students. This degree sees medical students spend a whole year in the Department of Bioengineering, learning how to be an engineer and how to work in engineering teams. Dr Danny O'Hare and his team have delivered something of which we can all be proud.


We believe that graduates from this programme will be future leaders in medicine.

Another point of note is the number of children born to colleagues within the Department. 2017 was a real 'bioengineering baby boom' year, and 2018 looks set to continue in that vein. Congratulations to all those with new additions and we wish all the best to those expecting in 2018.




As we look forward, we are proud to work together with the whole Faculty of Engineering on the government's "Year of Engineering". In particularly, we are leading on the annual bioengineering meeting which we started in 2008 and has grown to be an annual event at which we expect more than 500 delegates. BioMedEng18 will take place on the 6/7th September 2018, so be sure to put this in your diaries. Professor Peter Weinberg, Dr Gifty Tetteh and Kemi Aofolaju are leading on this event, so do pass them your ideas and offers of help.

I am immensely proud of the achievements of this world-leading department and am honoured to hold the baton as Head of Department for this short time in its evolution and growth. The Department is made by its people and I thank you all for making this such a wonderful place to work and study.

**Send news for the next issue to:**
**Kemi Aofolaju**
*Communications & Events Officer*

## WELCOME TO THE DEPARTMENT

The Department are delighted to welcome the following new staff and researchers:

- **Jo Adam**
  Recruitment and Personnel Administrator
- **Michael Berthaume**
  RA with Professor Anthony Bull
- **Jonathan Eden**
  RA with Professor Etienne Burdet
- **Taeho Oh**
  PhD student with Dr Claire Higgins
- **Gifty Tetteh**
  Centre Manager, Musculoskeletal Medical Engineering
- **Leandre Varennes-Phillit**
  RA with Professor Holger G Krapp

We will sadly be saying goodbye to colleagues who are leaving. We wish them the best of luck for the future:

- Dr Oliver Borkowski
- Mrs Edina Forman
- Dr Alejandro Granados
- Dr Peter Hellyer
- Dr Katerina Kandylaki
- Dr Agnes Leong
- Dr Stefaan Verbruggen

We would also like to congratulate **Dr Niamh Nowlan** and **Dr Colin Boyle** on the birth of their son Patrick and **Dr Rylie Green** and family on the birth of her son Emerson.

## OUT AND ABOUT

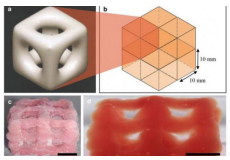
**Dr Aldo Faisal** co-hosted an "AI fact-finding" meeting with Professor Cedric Villani, Fields medallist and Member of the French Parliament and Head of President Macron's Strategic AI Initiative to discuss opportunities and repercussions of AI across research, industry and society.

**Dr Aldo Faisal** spoke at the CreAItvity - Artificial Intelligence and Creativity, Night of Ideas panel debate at Imperial College London.

**Professor Molly Stevens** gave a presentation on her research in Biomedical Materials Engineering at the Congreso Futuro 2018 conference.

# IN THE NEWS

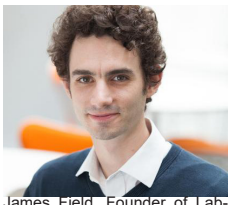
• **Professor Simon Schultz, Dr Paul Chadderon** and **Dr Luca Annecchino's** paper on robotic two photon-targeted patch clamp electrophysiology was highlighted by The Scientist Magazine as one of the Top Technical Advances in 2017 (alongside extensions of CRISPR-Cas, DNA Origami, and live cell mRNA sampling).



• A collaborative paper on cryogenic 3D printing by **Dr Antonio Forte**, Research Associate, Professor Daniele Dini and Miss Zhengchu Tan from the Department of Mechanical Engineering has taken the internet by storm. Articles on the paper have been featured on many news sites including Science Daily, Live Science and Yahoo news.

Rafael Michali and Renato Circi of CortiCare.

• Members of the Department of Bioengineering's alumni were counted among the most promising young innovators in Europe, according to Forbes. **Renato Circi** and **Rafael Michali**, both graduated from our Biomedical Engineering MEng course in 2017 and were recognised in the Forbes 30 Under 30 Science & Healthcare category for their technology and design company CortiCare. CortiCare aims to build a portable and smart device for affordable, quick and accurate hormonal testing using novel biomimetic materials developed within the department.

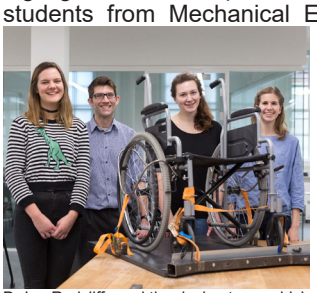


James Field, Founder of LabGenius and Synthetic Biology PhD holder.

**James Field**, Founder and CEO of LabGenius, an Imperial SynBio startup, is also featured in the Science and Healthcare category. LabGenius' mission is to harness evolution with AI to develop radically new biological products. The company uses its platform technology to develop new products in partnership with world-leading multinationals, and recently raised $3.6million in seed funding.

• **Dr Aldo Faisal**'s research funding success has been featured in the Imperial College News. Dr Faisal has been awarded £320,000 by the Duchenne Research Fund to deploy his lab's novel sensor "suit" and develop an AI for Healthcare that will enable the development of treatments for neurodegenerative disorders, such as the currently lethal Duchenne Muscular Dystrophy for currently no disease modifying treatment exists.
Dr Faisal's "suit" measures full body kinematics through everyday life in children with and without Duchenne. The clinical trials will be conducted through Great Ormond Street Hospital lasting 12 months, during which time will wear the sensor suit on a 24/7 basis. Dr Faisal will be Chief Investigator of this clinical trial, one of only a handful of UK engineers to lead technology research all the way to the bedside.

• **Dr Ian Radcliffe**'s success in leading a team of students that designed a wheelchair fencing frame for the International Wheelchair & Amputee Sports Federation (IWAS) has been highlighted in the Imperial College news. The team, made up of students from Mechanical Engineering and the Dyson School of Design Engineering created a wheelchair frame that is suitable for club fencing and practice. The frame is designed to be manufactured locally and to be a more affordable alternative to elite-level equipment. The outcome of the project, comprising instructional videos and an accompanying manual, is currently available on the IWAS website and was recently launched officially in an event hosted by Imperial College London.



Dr Ian Radcliffe and the design team which is made up of students from Mechanical Engineering and the Dyson School of Design Engineering.

# PUBLICATION SPOTLIGHT

Be sure to check out the Department's recent publications, some of which are included here:

Angela K. Garland, Darsham S. Shah, Angela E. Kedgley, *Wrist tendon moment arms: Quantification by imaging and experimental techniques,* Journal of Biomechanics (2017), doi: 10.1016/j.jbiomech.2017.12.024

C. Loynachan, M. R. Thomas, E. Gray, D. Richards, J. Kim, B. Miller, J. Brookes, S. Agarwal, V. Chudasama, R. A. McKendry, M. M. Stevens, *Platinum Nanocatalyst Amplification: Redifing the Gold Standard for Immunoassays with Ultra-Broad Dynamic Range*, ACS Nano. 2017, doi:10.1021/acsnano.7b06229

Ghetti, M., Topouzi, H., Higgins CA, *Sub-Populations of Dermal Skin Fibroblasts Secrete Distinct Extracellular Matrix: Implications for Using Skin Substitutes in the Clinic,* Br J Dermatol (2017). doi: 10.1111/bjd.16255

James E Moore Jr, Lowell T. Edgar, *Biomechanics of the Lymphatic Circulation*, Springer (2018), doi.org/10.1007/978-3-319-52423-8

Ian C. Campbell, Joseph M. Sherwood, Darryl R. Overby, Bailey G. Hannon, A. Thomas Read, Julia Raykin, C. Ross Ethier, *Quantification of Scleral Biomechanics and Collagen Fiber Alignment*, Methods in Molecular Biology (2017), doi: 10.1007/978-1-4939-7407-8_13

Schobesberger S, Jonsson P, Buzuk A, Korchev Y, Siggers J, Gorelik J, *Nanoscale, Voltage-Driven Application of Bioactive Substances onto Cells with Organized Topography,* Biophysical Journal (2017), doi: 10.1016/j.bpj.2015.11.017

Renaud Schuck, Mary Ann Go, Stef Garasto, Stepahnie Reynolds, Pier Luigi Dragotti and Simon Schultz, *Multiphoton minimal inertia scanning for fast acquisition of neural activity signals*, Journal of Neural Engineering (2017), doi: 10.1088/1741-2552/aa99e2

Matjaz Ogrinc, Ildar Farkhatdinov, Rich Walker, Etienne Burdet, *Sensory integration of apparent motion speed and vibration magnitude*, IEEE Transactions on Haptics (2017), doi: 10.1109/TOH.2017.2772232

Francesco Gianoli, Thomas Risler and Andrei S. Kozlov, *Lipid bilayer mediates ion-channel cooperativity in a model of hair-cell mechanotransduction*, PNAS (2017), doi: 10.1073/pnas.1713135114

P. Brangel, A. Sobarzo, C. Parolo, B. S. Miller, P. D. Howes, S. Gelkop, J. J. Lutwama, J. M. Dye, R. A. McKendry, L. Lobel, M. M. Stevens, *A serological point-of-care test for the detection of IgG antibodies against Ebola virus in human survivors*, ACS Nano (2017), doi: 10.1021/acsnano.7b07021

M. S. Bergholt, A. Serio, J. S. McKenzie, A. Boyd, R. F. Soares, J. Tillner, C. Chiappini, V. Wu, A. Dannhorn, Z. Takats, A. Williams, M. M. Stevens, *Correlated heterospectral lipidomics for biomolecular profiling of remyelination in multiple sclerosis,* ACS Central Science (2017), doi: 10.1021/acscentsci.7b00367

# AWARDS

Dr Ben Almquist (PI), awarded an EPSRC grant for the project *Healing Tissues via Programmable DNA Nanotechnology,* £316,304

Dr Colin Boyle and Dr Spyros Masouros (PIs), awarded a Joint Imperial College and Imperial Innovations Proof of Concept grant for the project *New paradigm in support surface design for pressure ulcer prevention,* £48,000

Dr Paul Chadderton (PI), awarded a Wellcome Trust grant for the project *The role of cerebellar circuitry in movement control and real-time motor learning,* £1,498,083

Dr Aldo Faisal (PI) awarded the Duchenne Research Fund grant for the project *Combating or treating the Duchenne Muscular Dystrophy*, £320,000

# BioMed Eng18

## BioMedEng18 Conference

***Professor Peter Weinberg***

*Conference Chair*

It gives me great pleasure to invite you to participate in the BioMedEng 18 conference, which will be held at Imperial on September 6th and 7th.

The meeting has been held annually for over 10 years under a variety of similar names and has become the UK's largest gathering for our discipline. It was held at Imperial College London in 2008 and 2014, and returns to Imperial not only for 2018 but for 2019 as well. The name change emphasises our desire to be as inclusive as possible: we hope that the meeting will be attractive to all of those who consider themselves Bioengineers, Biomedical Engineers and Medical Engineers.

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The large number of participants (over 500 in 2014) from universities, the NHS and industry demonstrates the phenomenal growth of bioengineering and related disciplines in the UK. That growth in turn reflects, and engenders, excitement about the scientific, engineering and medical breakthroughs that could arise out of our research. Please join us to present your work and share that excitement. We look forward to welcoming you in London in September!

## STAFF & STUDENT SUCCESS

Congratulations are due to:

**Dr Ben Almquist** whose project "Healing Tissues via Programmable DNA Nanotechnology" was listed as one of the 28 that will receive support from the Engineering and Physical Sciences Research Council (EPSRC) as part of the Year of Engineering - a goverment-wide campaign to celebrate UK engineering.

**Antonios Chronopoulos, Behzad Farzaneh, Yuanwei Li, Renaud Schuck, Marie Tolkiehn** and **Fatamulzehra Uslu** for passing their vivas and being awarded their PhDs.

**Professor Dario Farina** who was elected Fellow of the Institute of Electrical and Electronic Engineers.

**Professor Dario Farina** who won the Annual Brain-Computer Interface Award with the project "Online adaptive brain-computer interface with attention variations".

**Professor Dario Farina** who has been awarded an honorary doctorate by Aalbord University, Denmark.

**Dr Warren Macdonald,** Senior Teaching Fellow who has been made a Fellow of the Higher Education Academy.

**Dr Adrian Najer** on being awarded the Sir Henry Wellcome Trust Postdoctoral Fellowship, to support his project on developing nanomaterial-based approaches against malaria. This is a joint award with Professsors Molly Stevens and Jake Baume.

**Professor Molly Stevens** who was awarded the Marshall R. Urist Lecture Award by the Orthopaedic Research Society (ORS).

## UPCOMING EVENTS

### Departmental Seminars

**07 Feb, 16:00-17:00, RSM 2.28**
Dr Guy-Bart Stan, Department of Bioengineering:
*Best in-class tools for better productivity*

**14 Feb, 16:00-17:00, RSM 2.28**
Professor Dario Farina, Department of Bioengineering:
*Man-Machine interfacing by decoding spinar motor neurons*

**28 Feb, 15:30-16:30, RSM 2.28**
Professor Kyujin Cho, Seoul National University:
*Talk title to be confirmed*

**14 Mar, 16:00-17:00, RSM 2.28**
Professor Sarah Cartmell, University of Manchester:
*Talk title to be confirmed*

**28 Mar, 16:00-17:00, RSM 2.28**
Dr Danny O'Hare, Department of Bioengineering
*Talk title to be confirmed*

For more information, visit:
http://www3.imperial.ac.uk/bioengineering/events/departmentalseminars

### Departmental Events

**13 Mar, 18:00-22:00, RSM G.05**
Bioengineering Society / Alumni Networking Event
Bioengineering alumni and members of the Bioengineering Society are invited to attend back to the department to network over refreshments, cheese and wine.

**27 Apr, 12:00 - 12:00, RSM G.01**
MSKMEC Seminar
Professor Roger Enoka, University of Colorado will be the speaker. For more information, please contact Dr Gifty Tetteh.

**18 Jun, 17:30-18:30, G16, SAF Building**
2018 Annual Bioengineering Lecture
Professor Natalia Trayanova, Murray B. Sachs Professor at the Department of Biomedical Engineering, John Hopkins University presents the 2018 Department of Bioengineering annual lecture. Register for this event by email to Kemi Aofolaju.

**6-7 Sep, Imperial College London**
BioMedEng18 Conference.
The UK's largest gathering of Biomedical Engineers, Medical Engineers and Bioengineers. For more information, please contact Dr Gifty Tetteh.

### College Events

**28-29 Apr, South Kensington Campus**
Imperial College Festival


Join us at Imperial College for a weekend of exciting science, new technology, live music, talks, creative workshops and freshly cooked food. For more information, visit the Imperial Festival Website.