



Imperial Bioengineer

July 2016

DOCTORS FROM WAR-TORN COUNTRIES LEARN NEW METHODS FOR TREATING BLAST PATIENTS

by Colin Smith, Senior Media Officer for Faculty of Engineering.

Doctors from war affected countries have been trained in the latest limb salvaging techniques as part of a free course run by Imperial.

Every year landmines kill approximately 15,000 to 20,000 people around the world and maim countless more. Developing countries that have been affected by war lack the infrastructure, trained rehabilitation professionals, financial and technical resources to adequately treat people who have suffered blast injuries.

Researchers at the Royal British Legion Centre for Blast Injury Studies (CBIS) at Imperial College London, with financial support from the charity Find a Better Way, invited a cohort of 12 trauma surgeons who live in countries that are landmine affected regions. Delegates were trained in the latest amputation and knee salvaging techniques, drawing on surgical advancements made during and after the Afghanistan (2001-2014) and Iraq (2003-2011) conflicts.

The course was led by CBIS researchers, who focus on the effects of blast injuries on the musculoskeletal system. Professor (Colonel) Jon Clasper, CBIS clinical lead, who has served in both the Iraq and Afghanistan conflicts, imparted developments in limb salvaging techniques. Mr Dafydd (Taff) Edwards, a trauma surgeon in the armed forces who is studying for a Doctorate at CBIS, shared his extensive experience of caring for injured soldiers on the front-line and in the UK.

Professor Bull, CBIS Director, who is also head of Imperial's Department of Bioengineering, said: "The trauma sustained by patients with blast injuries are usually complex and often affect the skin, nervous system, muscle and bone. We now know so much more about how to rapidly treat patients including more extensive tissue salvage, and how to make the rehabilitation process more effective. This course is our way of transferring information to surgeons working in countries that are dealing with the legacy of conflict."

Delegates came from as far afield as Sri Lanka, Indonesia and Algeria. Dr Vuthy Chhoeurn, from Cambodia, was one of the attendees. His country is one of the most contaminated regions in the world for landmine fields, mostly lying undetected in remote villages, rice fields and forests.



Low income farmers and villagers are most at risk from buried landmines, which detonate under farm machinery, near villages and on roads.

Dr Chhoeurn previously worked at a frontline hospital (1989-1997) during civil war in Cambodia, where mine injuries took approximately 30 per cent of his time. He now works at the National Children's Hospital in Phnom Penh, the capital of Cambodia, where all complicated trauma cases are sent to him. He also runs a Cambodia-wide program to treat patients with blast injuries free of charge.

Dr Chhoeurn said: "During the civil war the main blast injuries sustained to military personnel were to the lower limbs, after they stepped on buried landmines. Since then it has been farmers and children who are most vulnerable. Many children mistakenly believe they are playing with shiny scrap metal, but it can explode at any time. In these cases injuries include blindness, hand amputations, facial damage and chest and abdominal injuries. These are very complex injuries to treat."

In 2015, landmines and other old ordnance in Cambodia killed or injured 111 people, according to figures from the state-run Cambodian Mine Action Authority. Of the 111 casualties, 18 people were killed by explosions and 23 had body parts amputated.

Dr Chhoeurn added: "This course has been a really unique opportunity for me and it will put me in a better position to provide the best care ever to casualties of landmines. I am also a lecturer and I plan to share this valuable knowledge with colleagues to help train a younger generation back in Cambodia."

Examples of research areas Dr Chhoeurn and his colleagues were taught included the biophysics of blast injuries, new approaches to knee amputations, new reconstruction techniques, better methods for cleaning and treating wounds and improved methods for detecting trauma and its effects on patients.

WELCOME TO THE DEPARTMENT

Welcome to new starters

- **Mark Steadman**
Research Associate with Dr Andrei Kozlov

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

- **Jason Chang**
- **Muge Sarper**

GRANT SUCCESS

LEO Foundation Research Grant awarded to **Dr Reiko Tanaka** for her project titled *Full thickness skin models from human pluripotent stem cells for identification and testing effectiveness of personalized therapies in atopic dermatitis*. This is an international collaboration lead by Dr Dusko Ilic (King's College London), in collaboration with UCSF and University College Cork (£1.1M).

EPSRC grant awarded to **Dr Spyros Masouros**, for his project *UNIFY - Monitoring weight bearing for non-union fracture rehabilitation* (£15,196).

Rosetrees Trust grant awarded to **Dr Anil Bharath** and **Dr Jennifer Tweedy** for their project on *Atrial Fibrillation: A major clinical challenge being addressed by the Imperial College ElectroCardioMaths Group* (£41,667).

DSTL grant awarded to **Dr Spyros Masouros** for his project on the *Support to human response analysis* (£86,356).

PUBLICATION SPOTLIGHT

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

Benjamin Reeve, Elena Martinez-Klimova, Joachim de Jonghe, David J. Leak, and Tom Ellis *The Geobacillus Plasmid Set: A Modular Toolkit for Thermophile Engineering*. ACS Synth Biol June 2016
[doi:10.1021/acssynbio.5b00298](https://doi.org/10.1021/acssynbio.5b00298).

Leiming Chen, Chiu Fan Lee and John Toner *Mapping two-dimensional polar active fluids to two-dimensional soap and one-dimensional sandblasting*. Nature Communications July 2016 [doi: 10.1038/NCOMMS12215](https://doi.org/10.1038/NCOMMS12215).

Alexander William M. Haining, Magdaléna von Essen, Simon J. Attwood, Vesa P. Hytönen, and Armando del Río Hernández *All Subdomains of the Talin Rod Are Mechanically Vulnerable and May Contribute To Cellular Mechanosensing* ACS Nano, July 2016 [doi: 10.1021/acsnano.6b01658](https://doi.org/10.1021/acsnano.6b01658)

RESEARCH IMPACT

Recommendations to constrain cricket bat sizes further has been approved by Marylebone Cricket Club (MCC) the guardian of the laws of cricket. Recommendations are based on research from Professor Anthony Bull's group.

OUT AND ABOUT

Kai Arulkumaran and **Dr Anil Bharath** chaired the Deep Learning for Computer Vision workshop for the British Machine Vision Association. The event featured speakers from top UK academic institutions, as well as Google and Facebook.

Professor Moore was a game advisor at the World Ultimate Championships held in St. Albans this summer <http://wugc2016.com/game-advisors>

Dr Niamh Nowlan and **Dr Stefaan Verbruggen** gave talks at the 22nd Congress of the European Society of Biomechanics in Lyon this month.

Antonios Pouliopoulos (PhD student in Choi Lab), this has spoken about "Controlling microbubble dynamics in ultrasound therapy" at Oxford, Columbia University (New York), Harvard (Boston), and University of Cincinnati.

Dr Armando del Rio Hernandez was the conference organiser and invited speaker for Precision Medicine - Engineering Solutions for Cancer. His talk was titled "Switching off the forces that drive pancreatic cancer".

Dr Jenna Stevens-Smith gave an invited talk at the Kroto Symposium at the University of Sheffield on 14 July.

Antonios Chronopoulos (PhD student in del Rio Hernandez lab) was an invited speaker for Precision Medicine - Engineering Solutions for Cancer, where he presented "ExoSonic - an acoustic-based microfluidic technology for blood-based screening of pancreatic cancer".

Vassia Vardakastani (Kedgley group) and **Karla Sanchez Cazares** (Tweedy group) alongside **Dr Jenna Stevens-Smith** delivered the bioengineering sessions for the Engineering Summer School for Girls on 21 July.

The **Boutelle group** led by **Isabelle Samper** and the **del Rio Hernandez group** led by **Will Haining** delivered an interactive insight to bioengineering session for Year 10 students on 27 July.

Dr Paul Rinne and the gripAble team demonstrated their technology at the Science Museum Lates on 28 July.

Dr Chui Fan Lee gave an invited talk titled "A reaction-diffusion-advection model of collective motion" at the Summer School: "Interscale interactions in fluid mechanics and beyond" held at Imperial College London in July.

STAFF & STUDENT SUCCESS

Feryal Behbahani, **Guillem Singla Buxarrais**, **Aldo Faisal** were Finalist for Best Paper Award at Eurohaptics 2016 for the paper on "Haptic SLAM: an ideal observer model for Bayesian inference of object shape and hand pose from contact dynamics".

Dana Al Sulaiman and **Julia Sun** jointly won the Departmental GTA of Year award 2016.

Grigoris Grigoriadis passed his viva on 18 July for his PhD on *Heel biomechanics under blast conditions*. Greg is the first PhD student funded by CBIS within Bioengineering to have completed.

Dr Stefaan Verbruggen was a finalist in the PDC Postdoc Reps Awards this year.

Antonios Chronopoulos and **Tyler Lieberthal** won the best poster award at the Precision Medicine - Engineering Solutions for Cancer meeting.



Antonios Chronopoulos receives the best poster award at the Precision Medicine - Engineering Solutions for Cancer meeting from Professor Bob Brown



Dr Stefaan Verbruggen receives his award from Provost Professor James Stirling.

UPCOMING EVENTS

Departmental Seminars

Thursdays 12.00-13.00

07 July 2016 14:00 - 15:00 RSM2.28

Reverse Engineering Insect Flight - From Sensing to Control by **Professor Tom Daniel**, University of Washington

08 July 2016 12:00 - 13:00 RSM2.28

Building Brains in Supramolecular Materials by **Professor Samuel Stupp**, Professor of Materials Science and Engineering, Chemistry, and Medicine, Northwestern University

14 July 2016 12:00 - 13:00 RSM 2.28

Probing the Biomechanics of Protein Fibres of the Extracellular Matrix by Brillouin Spectroscopy by **Dr Francesca Palombo**, Lecturer in Biomedical Spectroscopy, Department of Physics and Astronomy, University of Exeter

19 July 2016 12:00 - 13:00 RSM 2.28

Understanding the Relationship Between Head Kinematics and Concussion Risk by **Dr Matthew Panzer**, Assistant Professor, Centre for Applied Biomechanics, University of Virginia

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: 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