

DES News

Department of Engineering Science

October 2011 | Alumni and Friends quarterly newsletter | Number 12

Dear Alumni and Friends

In the October newsletter we give you an update on Andrew Pullan, with special thanks to all of you who have made donations to the Pullan family trust. The amount of support given to Andrew this way is a brilliant testimony of the Engineering Science family spirit.

You will also see that our students have been very active with social activities, besides their academic commitments. As usual we give you an update on what some of our current students and past graduates are up to, including featured alumni and students. You will also see that some of our staff have won significant awards.

Watch this space, in the next edition you will read about the Part IV project dinner and more staff awards.

Professor Matthias Ehrgott, Head of Department
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Update on Andrew Pullan

Rosalind Archer, Trustee, Pullan Family Trust

The trust fund appeal has raised over \$70,000 so far with donations from at least 150 individuals. Andrew's treatment began on August 1st and is progressing very well. I can see real change when I visit him. Last time I visited Andrew happened to be having an early lunch. I was heartened to see him enjoy a large meal. The knowledge that he does not need to worry about the financial implications of his treatment is a great relief to Andrew and his family and really does allow him to focus on the process of returning to full health. Andrew is very grateful for the support he is receiving from alumni and supporters of the Department in NZ and around the world.

From Andrew's blog (excerpt, August 12th)

"Thanks for the great emails

I have been receiving wonderful emails from students, colleagues, relatives, and from long lost friends from my high school. With all my visitors and my rest periods I have not been able to reply to them all, and those that I have managed to reply to were not as long as I would have liked. But please fabulous writers do know that I value these emails. And what is it that I value so much about these emails? They talk about life - what they are doing, how their work is going, what their new Bach decorations look like, and what they have been doing since my old high schooldays. They talk about the life I will be coming back to. There may be an encouraging line or two in the email (which is very nice) but it is the fact that in the email I am treated like a normal person, colleague, relative or old friend.

... I am a person on the mend, and will update, as best I can via the blog, how the mending is going. In direct conversation I want to hear about the life that is going on whilst I am recuperating and the life that I am coming back to.

Thank you again to all my readers."

<http://andrewsrecovery.blogspot.com/>

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Faculty Bakeoff for Pullan

A group comprised mainly of Class of 2010 BME graduates devised and organised the first ever (Faculty of Engineering Bakeoff. The purpose of the bakeoff was to raise funds for the Pullan Family Trust, which it did with great success - \$975 was raised.

This bakeoff represents another development in the bakeoff tradition started in 2009 by Tessa Paris (BME Class of 2010, profile inside) and Angela Buckland (EngSci, Class of 2010).

Continued on the last page



Featured Undergraduate

Samantha Oldfield, Part II Biomedical Engineering

As a child my favourite toy was a doctors set that had a stethoscope and bandages and everything you could possibly need to treat your friends for kooties. From a young age I was convinced I was either going to be a doctor or a vet when I grew up.

However as I went through high school I didn't count on loving maths, physics and design just as much as biology and treating sick people. Suddenly I had a dilemma which was solved when I found the perfect degree for me, Biomedical Engineering. It combines everything that I love into a degree that is both challenging and rewarding.

I am currently in my second year and have had the chance to do a wide variety of papers from both engineering and biology. One of these was BIOSCI 107, a stage one paper that gives an overview of biological science. One of our labs involved making a 4 week old embryo out of clay to cement our knowledge of embryonic development. This model inspired my entry in the Department Bake-off as it gave me a chance to bring biology into engineering much like the degree I am studying towards.



Part IV's decorate the department

The fourth years decided that we as a department, needed to get involved in the Rugby World Cup celebrations considering it was taking over our city.

The first event was "Decorate Your Floor!" Each floor was assigned a pool of teams and a budget of \$45. Mission: to decorate the floor in team colours. The only two requirements were that all teams within the pool allocated to the floor be represented, and that the decorations be removeable.

Judging took place on September 16th by HoD Matthias Ehrgott. Not surprisingly, level 3 triumphed. [More photos](#) are on the DES website - the posters put on level 3 staff doors (example right) are particularly well worth a look.



Two Part IV's singing in the RWC

Around 480 singers were chosen from the 1000 that auditioned for the Rugby World Cup choirs, and two of them are Part IV BME students Chloe Irwin Whitney and Sarah Milsom. Sarah is singing at the South Africa vs Namibia game on the 22nd of September, and Chloe is singing in the England vs Scotland game (1st of Oct), Quarter Final #4 (9th of Oct), Semifinal #1 (15th of Oct) and the Bronze final (21st of Oct). Each choir has 30 people, and sings the two relevant anthems on the field before the game.

Part IV project

by Hanieh Sanei (Part IV Engsci Rep)

As the Part IV project deadline advanced, questions were raised among staff and supervisors as to how this years Part IVs had things under control with not much panic occurring. There was a simple one word, one letter answer to that question: V!

The artistic feature of the project room on level 3 is the V wall admired by many passers-by on Symonds St as well as the project room inmates.

As a side note, Part IV project students were granted 24-hour access to 70 Symonds St to enable them to dedicate their lives to their projects. Predictions that the size of the wall would grow exponentially as the deadline drew closer were fulfilled.



Rowing update

Rowing was left out of the Tertiary Challenge this year so Waikato hosted the Waikato Uni River Dash. Auckland Uni won and DES students played their part. Chris Rolls was a member of the winning Men's Champ 4-, Champ 4x-, and Champ 8+, and coached the Womens Novice 4+. Chris also coached fellow EngScis John Park, Denis Helm and Jason Udan in the Novice 4+ and Novice 8+. Ellyce Stehlin (ABI) was in the Women's Champ 4- winning team. Ellyce and Chris were also part of the 'Best dressed in costume race', Smurf theme team.

The New Zealand University Transtasman series also went well, Chris' lightweight four won their races and New Zealand won overall.

Ellyce and Chris have been selected into the Women's and Men's Open 4- for the Inter Provincial competition to be held on the 8th and 9th of October.



Spring Graduation 2011

Announcing DES' most recent graduates, as of September 22nd

Master of Engineering in Engineering Science

Eduard Bulog
Patrick Kenny

Diploma in Geothermal Energy Technology

Tashin Basaran

Postgraduate Diploma in Operations Research

Zhengliang Liu PGDOR

Bachelor of Engineering (Honours) in Biomedical Engineering

Gabriel Loh 1st class honours
Rhys Williams 1st class honours
Luqman Bachtiar 2nd class honours, second division
Prachi Redey 2nd class honours, second division

Bachelor of Engineering (Honours) in Engineering Science

Veselina Pencheva 2nd class honours, second division

Bachelor of Engineering (Honours) in Engineering Science/ Bachelor of Science (Conjoint)

Simon Bull 2nd class honours, first division

Bachelor of Engineering in Engineering Science

Kerin Brockbank
Gemma Mathieson
Timothy Harton

BME Class of 2010 - what they are doing this year Note, postgraduate degrees are at The University of Auckland unless otherwise specified

Anuprita Arora	Completing BE/BCom Conjoint
Luqman Bachtiar	ME in Engineering Science
Ana Basabas	MEngSt in Medical Devices
Ming Cen	Planning on doing an ME in Bioengineering
Jenny (Chun-Mi) Chen	Bachelor of Medicine and Bachelor of Surgery (MBBS) Australian National University
Kevin Cheong	ME in Engineering Science
Linda Feng	MSc in Chemistry
Mark Hanna	Junior Software Developer, Propellerhead
Emily Hargrave-Thomas	PhD in Chemical and Materials Engineering
Jeelean Lim	ME in Bioengineering
Gabriel Loh	ME in Bioengineering
Sudarshan Naidoo	Completing BE
Aswin Narayanan	Computer Modeller, Light Metals Research Centre
Tessa Paris	Product Development Engineer, Fisher & Paykel Healthcare
John Park	ME in Bioengineering
Rebecca Pullon	Christian Worker, Student Life, University of Waikato
Prachi Redey	Research Assistant, Institute of Biomedical Technology, AUT
Chris Rolls	Completing BE
Gary Tao	Considering further study
Rhys Williams	PhD in Bioengineering

Ram Parameshwar studying MBA in Pittsburgh

Ram Parameshwar (BME, Class of 2008) is studying for an MBA at the Joseph M. Katz Graduate School of Business in Pittsburgh, USA, which ranks 11th in the world among public institutions. The MBA is a 2 year programme, and Ram is concentrating on strategy with marketing and operations. Ram is there on a part scholarship from the Katz Graduate School.



Featured Alumni

Tessa Paris, Class of 2010

When I was deciding what to do at university I looked at doing Medicine or Engineering. Both fields appealed to me but neither fitted quite right, then I saw a poster for Biomedical Engineering on the wall of my school's careers room and after a little investigation I was completely sold!

I loved my time in the Department of Engineering Science and especially being part of our close group of Engsci's and Biomed's. I really enjoyed the instrumentation side of Biomedical engineering and I was lucky enough to be able to do my Part IV project with the Auckland Bioengineering Institute's Biomimetics group. My project "Roboshrimp" involved modelling and building prototype designs using a dielectric elastomer "artificial muscle" material. The practical and electrical nature of my project helped me get my job at Fisher and Paykel Healthcare.

I am now a Product Development Engineer in an electronics team that works on developing Fisher and Paykel's base product - the humidifier. I have been learning lots about electronics, my team are really great with teaching me and they also respect the different skill set that I bring to the team. So far my job includes designing and carrying out electrical tests, making prototypes and developing designs. It's nice to have joined the growing group of Department of Engineering Science graduates at Fisher and Paykel. I am really enjoying the working lifestyle, especially having a little more money and time to spend on my other interests such as travelling, food and baking!



Featured Postgraduate

Peng Du, Class of 2007

I was interested in applying engineering techniques beyond the traditional sense, and this led me to choose Biomedical Engineering as my specialisation.

Armed with the advantages of a multidisciplinary approach, I became involved in projects where we designed blood cell counters, simulated physiological processes and experimented with living tissues.

I decided to pursue a PhD degree, and my project involves measuring and modelling gastrointestinal electrical activity. I had to design custom-built electrodes, setup recording systems, and construct a virtual model based on our experimental data. I am working alongside surgeons at Auckland Hospital and the University of Mississippi Medical Centre to conduct measurements during operations, as well as designing innovative devices to aid the diagnostic procedure of digestive related medical conditions.

The University of Auckland and the Department of Engineering Science supported me with a PhD scholarship and other funds which has allowed me to continue my PhD study and attend multiple international conferences to present my work.

Below: Peng's entry in the BME/Engsci Bakeoff earlier this year



Research Update - Gastrointestinal Research Group

Gastrointestinal disorders affect more than 25% of the global population. The cost to society is well over \$30 billion annually. Yet despite the high prevalence and high cost of these diseases, diagnostic and treatment procedures are still inadequate today. This is mainly due to the complexity of the gastrointestinal system - digestive disorders are often caused by multiple factors and manifest in a variety of symptoms. Diagnosis requires more than a straightforward 'cause-and-effect' observation.

In cases like this, mathematical modelling can prove very useful. This is the focus of the gastrointestinal research group based at the Auckland Bioengineering Institute. The group creates computer models of the gastrointestinal tract, with the aim of providing virtual methods to investigate how the digestive system works. Because these models incorporate physiologically accurate details, they can potentially be used to test new treatment methods, validate diagnostic techniques and provide supplementary evidence to support the more traditional animal and human studies.

Another research focus of the group is high-resolution recording of electrical activity in the stomach and intestine. These electrical signals control how the organs contract to grind food up into tiny particles, and transport food and waste through the digestive tract. Good quality measurements of these signals, taken from diseased systems, have successfully highlighted sources of abnormal functioning. The group is working on developing a similar, less invasive technique that will allow safer, cheaper and more effective diagnosis of gastrointestinal disorders.

The research group is led by Professor Andrew Pullan and has grant funding from the NZ Health Research Council, the Riddet Institute and the National Institutes of Health. The group is currently made up of Prof. Andrew J Pullan, Dr Leo K Cheng, Dr Juliana Kim, Simon Bull, Peng Du, Dr Greg O'Grady, Tim Angeli, Niranchan Paskaranandavadivel, Rachel Lees-Green, Jeelean Lim and Jerry Gao.

Peng Du, Three Minute Thesis Competition finalist

Also known as 'Thesis Idol', the Three Minute Thesis Competition is run in universities worldwide, and is an opportunity to describe a student's research to a general audience - in under 180 seconds. It is the ultimate elevator pitch for a Master or PhD level research project. Only a single static PowerPoint slide with no transitional effects is allowed, and entrants are judged on communication style, comprehension and engagement.

The challenge of presenting both the physiology and engineering aspects of a biomedical engineering project adequately to a general audience is profound; however, this is the second year that a Bioengineering postgraduate student has done it. Evan Blumgart (BME Class of 2009) gave a talk on his cardiac project in the inaugural competition last year, and this year Peng Du (BME Class of 2007) claimed the runner-up place with his talk on the effects of a specific type of cell loss in gut health and disease. Peng's talk focused on one of the most important discoveries made in his project, the electrophysiological consequence of the interstitial cells of Cajal degradation in the gut, which is linked to digestive related symptoms in late-stage diabetes. The discovery was possible because Peng employed a combined approach of medical imaging and mathematical modelling, in which the network models of the interstitial cells of Cajal were used to simulate the electrophysiology of these cells at different levels of cell degradation. This project is part of an on-going collaboration effort between the Department of Engineering Science, Auckland Bioengineering Institute, and Mayo Clinic (Rochester, Minnesota, USA).

Biomimetics Lab in The Economist

Back in the April edition, we reported that the Biomimetics Lab had featured in the **New Scientist** with their all-rubber motor. They have now appeared in **The Economist** (Technology Quarterly: Q3 2011), in an article on the possibilities of artificial muscles in motors.

The Biomimetics Lab is led by DES/ABI staff member Iain Anderson (BE Class of '80, ME Class of '83, PhD Class of 96), and its members include Tom McKay (Class of 2004), Tony Tse (Class of 2009) and Scott Walbran (Class of 2006).

Archer wins inaugural Society of Petroleum Engineers award

Associate Professor Rosalind Archer was chosen as the first person to be awarded the Society of Petroleum Engineering's new SPE Regional Distinguished Achievement Award for Petroleum Engineering Faculty. The award recognizes "superiority in classroom teaching, excellence in research, significant contributions to the petroleum engineering profession and/or special effectiveness in advising and guiding students".

The award was to have been presented this month at the 2011 Asia Pacific Oil & Gas Conference and Exhibition in Jakarta, however Rosalind was unable to attend due to teaching commitments. The presentation was instead made by the Dean of Engineering, appropriately at a student event promoting female participation in petroleum engineering.

Hosted by the **Women in Engineering Network**, the event was aimed at first year engineering students. Rosalind spoke to the students about her work as an academic and a consultant to the petroleum industry, and was one of three speakers. The other two were Jessica Green (Process Engineer at Origin Energy Resources NZ), and Reneke van Soest (Staff Petroleum Engineer at Origin Energy Resources NZ).



Left to right: Michael Davies, Dean of Engineering, Rosalind Archer, Richard Crowe, President SPE NZ

Ehrgott honoured by MCDM

At the 21st International Conference on Multiple Criteria Decision Making (MCDM), held 12-17 June in Jyväskylä, Finland, Matthias Ehrgott was awarded the Edgeworth-Pareto Award of the International Society on Multiple Criteria Decision Making.

This award was established at the 10th International Conference in 1992 and is awarded at most every two years at the International Conferences on MCDM. The citation for the award reads:

As the highest distinction that the International Society on Multiple Criteria Decision Making bestows upon a researcher who, over his/her career, has established a record of creativity to the extent that the field of MCDM would not exist in its current form without the far-reaching contributions from this distinguished scholar.



The photo (right) shows Matthias receiving the award from Prof Pekka Krhonen, chairman of the award committee, and Prof Jyrki Wallenius, programme chair of the conference.

(continued) Students raise \$975 for Pullan in Bakeoff

The bakeoff attracted over 30 entries, and was open to all Engineering students, and the theme was "Your specialisation (or a 1st year class if you're in 1st year)". There was a small entry fee for contestants, and supporters could pay a more substantial (but still bargain) fee to sample the entries after the judging was complete.

There were 3 criteria: taste, appearance and suitability to the theme, and prizes for each department, as well as overall prizes for the best bakers in the Faculty. The judges included staff from every department to keep it fair, and the overall prize was taken out by Alex Toumar (Biomedical Engineering, entry pictured on front page). The inventiveness and effort that went into the entries was truly impressive.

The organisers were Jeelean Lim, Ana Basabas, Anuprita Arora, Emily Hargrave-Thomas, Prachi Redey, Michelle Deacon, Ming Cen (all BME Class of 2010) and Catherine Roberts (EngSci Class of 2010).

All entries can be seen at www.des.auckland.ac.nz/uoa/2011-foe-bakeoff.

News in brief...

Shobha to spend year in Maths

Our Department Manager Shobha Herle is to be seconded to the Department of Mathematics next year while their Department Manager is on leave.

Juliet Newson goes to Contact

Juliet has started a new job working with Contact Energy, partly based at Wairakei and partly working with Mike O'Sullivan here in Auckland.

Taberner wins Marsden grant

The grant will financially assist in constructing a cardiac myometer. The innovative miniaturised testing device will allow force, contraction, heat production, oxygen consumption and intracellular calcium ion concentration to be measured in heart tissue all at the same time. **FOR MORE**

Second Cater baby born

John Cater (Senior Lecturer) and wife Melissa's second daughter was born at 12:10 on September 28th.

Upcoming events

DES Research Seminar Series

Information available at www.des.auckland.ac.nz/uoa/research-seminar-series

Backissues

Available at <http://www.des.auckland.ac.nz/uoa/des-news>

We welcome your feedback

Let us what you think of this newsletter: desnewsletter@auckland.ac.nz

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