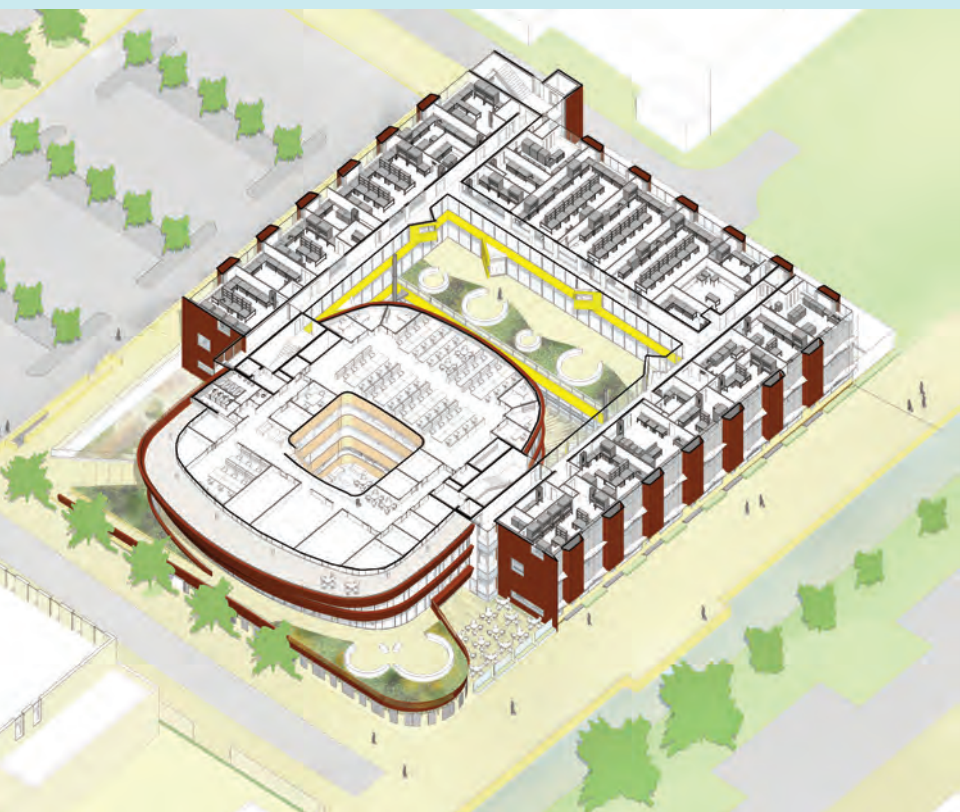


CEB *Focus*

Department of Chemical Engineering and Biotechnology



CEB New Building: A Vision Now in Sight

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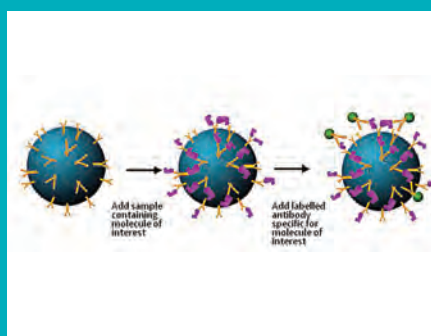
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Message from HoD Professor Nigel Slater



Welcome to the autumn edition of *CEB Focus*. Traditionally the Long Vacation, or Research Period as the University prefers to call it, is a quiet time but it has seen great activity for CEB. Following months of intense work with architects and designers, the Stage 2 designs for the new building

have been signed off and approved by the University,

and the go-ahead for construction has been given. Every member of CEB has been deeply involved in this process to ensure that the designs meet all our needs both now and in the future. Simultaneously, the Easter Term saw all the usual examining load completed on a very tight schedule, research proposals and papers written and submitted, and Professor Hall, our Director of Research continue the preparations for the forthcoming Research Excellence Framework (REF) audit of research. In addition, we continued our search for a new Professor of Sustainable Reaction Engineering and obtained approval to appoint a new Lecturer. Overall, the focus is very much on the future with new colleagues and a new home, and we look forward to welcoming our friends and alumni to see these developments in due course.

Notes from the Editorial Team

The *CEB Focus* Editorial Team wishes you a wonderful start to the new academic year!

Editorial Team is led by Elena Gonzalez, PA to HoD Professor Nigel Slater, assisted by fellow editors Jawad Rehman and new members: PhD students Jordan Ramsey, Jantine Broek and Jim Ross and undergraduate Chensong Gao. We would like to welcome these new additions to the Team and also thank former editorial members, MRRC PhD students Marijke Fagan and Nick Ramskill, for their valuable contribution to previous issues. Their commitment to the project and enthusiastic ideas have been key in further developing the newsletter look and editorial content.

We are always keen to see new faces so please email us on ceb-focus@ceb.cam.ac.uk if you are interested in joining us.

The *Cover Article* focuses on the exciting plans for our new department building in West Cambridge, which has recently been given the green light, very much facilitated by the help of corporate partners like Johnson Matthey.

Research Highlights features best paper *Metabolite Biomarker Discovery for Metabolic Diseases* by Dr Vassilis Vassiliadis and work by PhD student Viktoria Stelzhammer on Electroconvulsive therapy treatment in

major depression. The *Research Feature* presents groundbreaking research in the field of psychiatric disorders diagnosis and management by Professor Sabine Bahn and Dr Paul Guest. Also worth noting is the *Alumni Corner* featuring Dr Andrew Kilner's insights into management in Chemical Engineering. Finally, the highly popular section with a comical twist *Teatime Teaser*, still contributed by former editorial member Marijke. Do try your hand at her crossword and find your answers online.

CEB Focus would like to thank webmaster Vanessa Blake for regularly providing photos and department members, alumni and corporate partners for article contributions. Please keep sending them to ceb-focus@ceb.cam.ac.uk. To receive a regular e-copy of *CEB Focus* subscribe by sending a message to ceb-news-request@lists.cam.ac.uk with 'Subscribe' as the subject of the message.



CEB Focus is a joint-team effort led by Elena Gonzalez

CEB New Building: A Vision Now in Sight



South elevation design sketch

Plans for a new CEB Department building have now been unveiled:

A new purpose-designed building will be situated in West Cambridge, the University's new science and technology centre, and will enable cutting-edge developments through the creation of a new research-to-business hub that combines and extends CEB's expertise in research, teaching, commercial incubation and personalised medicine.

CEB currently occupies old buildings on the New Museums Site, with some Biotechnology research based at Tennis Court Road and the Magnetic Resonance Research Centre at West Cambridge. Across these locations the Department's current net useable area is 5,510 sq. m. An Area Needs Analysis and feasibility study were carried out by architects BDP, in consultation with CEB, to determine the area and type of space required. The Department relocation to the West Cambridge has also been identified as a top priority in the strategic plan of the School of Technology (Cambridge University Reporter No 6273 Wednesday 11th July 2012).

"...the way is clear to start work on the building with occupation planned for late 2015. Although little physical evidence of construction will be seen on the site for at least another year, behind the scenes the designers are completing the detailed design in close consultation with the Department" Professor Nigel Slater, Head of Department

This building will unite the entire department under one roof: currently, Chemical Engineering is based on Pembroke Street, the Institute of Biotechnology is based on Tennis Court Road, and the Magnetic Resonance Research Centre is on the West Cambridge Site. The new facility will create a sense of community and cohesion by accommodating all three groups within the same building and placing them together on the West Cambridge site between the new Materials Science and Metallurgy Building and The Institute for Manufacturing as shown on the plan below. The site is provided with roads and key services.

The building will include biology, chemistry, and engineering research laboratories which have demanding vibration, acoustic, and electromagnetic environmental needs, in addition to providing for a very extensive teaching programme.

It will enable all the activities within the research-to-exploitation process to happen in one space without internal boundaries: housing the fundamental sequence of development from research through to practical application, incubation of companies and eventual spin out.



New Building location seen from the M11

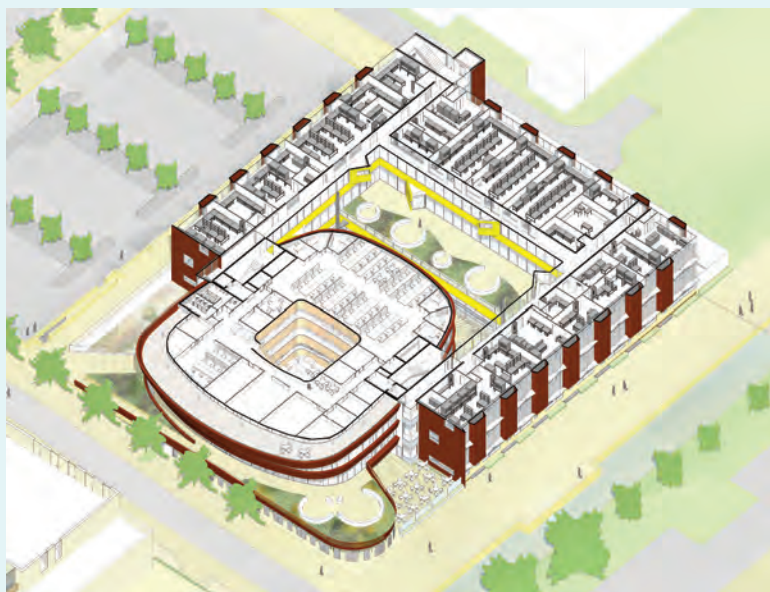
After an extensive competition amongst many leading international firms, architects BDP were appointed in summer 2011 to lead the design team. BDP are a renowned global design practice of architects, designers, engineers and urbanists. The BDP team is led by Architect Director, Keith Papa, who commented, *“It has been a great experience working with the department on the design of the new Chemical Engineering and Biotechnology building. We have had a lot of detailed conversations with many of the people who will work in the facilities and it has been an interesting challenge to put together a design which will support the innovative work of the department. The team that has been assembled to develop the design of the new building has extensive experience of the different types of research laboratories required for CEB, but it is rare to find them all in one building – it is this challenge that has inspired us to develop what we hope will be an inspiring environment in which it will be a joy to work.”*

Assuming the Planning process proceeds without major problems, the project should start on site in early summer 2013 and be completed around Easter 2015. The Department anticipates being fully operational in the new building in October 2015.

Professor Nigel Slater, Head of Department commented, *“CEB’s plans moved forward considerably during the past quarter as the University approved the construction of the department’s new home on the West Cambridge site. This now means that the way is clear to start work on the building with occupation planned for late 2015. Although little physical evidence of construction will be seen on the site for at least another year, behind the scenes the designers are completing the detailed design in close consultation with the department. The drawings that the architects have produced are truly stunning and we are excited about our relocation to an iconic new home.”*

Investing in the future

The work of CEB is critical to the University’s ability to fulfil its mission to facilitate great minds to do what they do best, by putting in place the optimum conditions for discovery to flourish and for its benefits to be realised in substantive, real-world ways, solving substantial, real-world problems. The new building will be key in helping the University maintain its international standing as a champion of innovation and enterprise, excelling in both discovery and the means to follow through, for social good. The Department’s work will continue to grow in importance as the world’s challenges grow, as will its contributions to the UK and global innovation sectors, with all the societal benefits of wealth-creation.



Cutaway axonometric of the design team co-ordinated Revit model

The University is committing £50 million towards the cost of the new building, and is seeking philanthropic partnership to fund the remaining £10 million of this £60 million project, which will serve as a global beacon for advances in chemical engineering and biotechnology. The Department is delighted to have already received substantial support for the project from one of its key corporate partners, Johnson Matthey (JM). Dr Barry Murrer, Director of JM Technology Centre sees this as a sound investment: *“not only will the teaching and research housed within the new building be a great asset for the future of the Department new building, but the graduates and scientists it produces will be a great asset for JM and the UK industry at large.”*

Advancing multi-disciplinary solutions

The entrepreneurial ethos of the merged Department will be reflected in the design of the new building, which will be laid out in as open a plan as possible. This accessible design will foster openness and collaboration within the community, enabling scientists to observe entrepreneurs engaged in commercialisation activities and *vice versa*, as well as building students' awareness of commercialisation, industry and business while developing their core skills in engineering and technology.

Promoting teaching innovations

The opportunity presented by the new building will ensure that the Department can deliver teaching methods that are as cutting-edge as its research, and can accommodate students efficiently, effectively and comfortably.

Accelerating commercial exploitation

An integral feature of phase 2 of the new building will be a technology incubator, or 'crèche,' in which very early-stage companies can benefit from a shared technical staff and equipment pool, and develop their business ideas within the nurturing environment of the academic laboratory. This critical development will ensure that CEB can fully implement its Research-to-Exploitation strategy to apply its research to real-world problems. Key to this will be harnessing the skills of the students on the Masters in Bioscience Enterprise (MBE) at all stages in the process, from concept, through to business planning, to becoming part of a spinout company. The provision of such crèche facilities will enhance the experience of all who work in the Department, whether they are PhD, postdoctoral or academic staff, and will help to create a pipeline of entrepreneurial students who are equipped, early in their career, to invigorate the UK innovation sector and become leaders in translating academic research for societal benefit.



Cutaway perspective of the work in progress Revit model showing the laboratory fit-out model combined with the structural and architectural model

The new building: facts and figures

The new building will be situated on the West Cambridge site in the heart of the University's science campus. It will comprise approx 10,353m² of space over four floors, accommodating the whole department on one site, and will provide:

- Laboratories for Magnetic Resonance Imaging and Reaction Engineering studies;
- Materials, chemistry and laser imaging laboratories;
- Biological laboratories enabling contained research with genetically modified organisms;
- Electro-chemistry clean rooms;
- Two large tiered-floor lecture theatres suitable for formal lectures and symposia;
- Meeting rooms for team project work and informal teaching;
- Office space for academics and open-plan office space for researchers;
- Amenity space to encourage effective communication between staff and students.

All in all, the proposed building will provide state of the art facilities for research and teaching in a single location with considerable efficiency benefits to be expected. The CEB new building aims

- to encourage greater interaction and interdisciplinary working;
- to provide facilities in a safe working environment which are better suited to current research;
- to provide flexible space that can be adapted, in the future, as requirements change;
- to create a building that will facilitate teaching, learning, and research in a pleasant environment;
- to create a centre for CEB with a distinctive presence at West Cambridge.

The Chairman of the University's Buildings Committee has noted that this new building 'is the most complex and most iconic that the University has yet embarked upon'. As the design for the new building nears the end of RIBA stage D and a planning application is being sent to the city council, the Department is pleased to see its vision for the new building become reality, and looks forward to having more opportunity to shape the plans before ground-breaking takes place next year.

TO BE CONTINUED...



Sketch view of the new building from South West

Note from Incoming CUCES President

Lauren Atherton, CUCES President 2012-13



Terrified President Lauren (right) wrestling in a sumo suit!

The Cambridge University Chemical Engineering Society (CUCES) lies at the heart of our department, facilitating communication between students and recruiters from a wide variety of sectors, as well as organising numerous social events throughout the year. As a committee, we aim to help the students gain as much information as possible about the various opportunities available to them in terms of internships and graduate employment, and learn new skills that will prove valuable in their chosen careers. We also hope to maintain the department's sociable and welcoming reputation and strengthen the sense of community that already exists between undergraduates, postgraduates and staff.

Firstly, I would like to congratulate Akshay and his committee on their accomplishments last year, despite facing several challenges along the way. I would also like to introduce the new committee: Tom Dalton (Treasurer), Julia Engstrom (Secretary), Isabelle Bush (Careers Rep), Chensong Gao (IT & Publicity) and Isabel Dafinone (Social Sec).

In the coming year the new committee aim to focus particular attention on: securing additional sponsorship to make CUCES events even more brilliant; ensuring more companies from the Teaching Consortium visit the department and hold careers events; attracting companies from under-represented industries; organising more social events alongside the main events of the year; and promoting better integration of Part I students with other year groups. Following the success of our first event (the BP Summer Barbecue held in Easter term), I am confident that we will continue to replicate and build on the achievements of previous committees, especially with the ongoing support of the department and the Teaching Consortium for which we are extremely grateful.

To find out more about what we have planned for Michaelmas 2012, please take a look at our recently updated website www.cuces.soc.srcf.net. We are always keen to hear your feedback and answer any questions you may have, so don't hesitate to stop us for a chat or drop us an email.

BP Summer Barbeque

Chensong Gao, CUCES IT & Publicity Officer 2012-13

The 2012 BP Summer Barbecue took place on the 21st June at the now-almost-traditional venue of Churchill College Chapel Grounds. Where to begin? Well for starters, the event was a great success! With no official complaints of food poisoning and all guests leaving the event in a jolly, animated and somewhat inebriated state, the barbecue was a testament to the spirit of May Week.

The more enthusiastic guests began milling in at around midday with an appetite only to be quenched by the vast selection of food and drink on offer. As the burgers sizzled away on the grill, all was ready apart from the salad and the gazebo, the latter of which proved to be extremely demanding. Unsurprisingly, the infamous British weather lived up to its name and as more guests arrived, the heaven pipes started leaking. Momentarily forgetting the burgers, setting up the gazebo became the prime objective. Alas, despite multiple attempts from several people, the gazebo still somehow managed to outwit the best of us, so people were forced to take cover under the trees.

Undergraduate Focus

In spite of the far from ideal weather, the mood was in no way dampened. By 2.00pm the event was boasting a turnout of over 70 people ... including surprise celebrity appearances from Dr Barrie, Dr Vassiliadis and not forgetting special guest appearances from a pair of keen freshers.

Food, drink and the presence of the Department Big Cats were not the only entertainment though. Garden games from giant snakes and ladders to football and even sumo wrestling were available. The sumo suits proved extremely popular. As people climbed into the monumental hips and sagging breasts, a spark of fierce competition was lit. The two brave warriors would wrestle each other ferociously (but safely) as the spectators cheered for the victor and ridiculed the defeated (not in a bullying way).

Then the highlight of the entire event, what everyone had been waiting for – the salad. Its entrance was marked with grandeur. All conversations stopped immediately and all eyes were fixated on the two bowls overflowing with this green ambrosia. Following an afternoon of burgers, grease and alcohol, the organic, freshly chopped salad, soaked in balsamic vinegar with a hint of olive oil tasted truly like food for the gods. Unfortunately the amount of salad outnumbered people's demand by several orders of magnitude and most of it became nourishment for the bin.

The afternoon passed quickly and people chatted lackadaisically as they recovered from the intensity and hard work of May Week. What a relaxed way to end the year...

Design Project Winners 2012



The prize winners with Matt Turnbull from BP

The winners of this year's prize for the best undergraduate design project presentation were Akshay Deshmukh, James Perry, Pawel Jajesniak, Charles Macmillan, Donna Golach, Katherine Suddaby and Lutong Guo.

The full-time Design Project lasting five weeks is undertaken by third year students following their examinations and forms a significant part of their coursework. This year the project was supported by BP.

The students were given a brief to design a process to produce 100,000 tonnes of biobutanol per annum from a wheat feedstock, by the ABE (acetone, butanol, ethanol) fermentation process. The project included all the key aspects of Chemical Engineering design – from process flowsheet development to safety and environmental considerations – and was completed in groups of six or seven students. The students prepared a report on their design which was handed in on 7th June 2012, with their 10 minute presentations on the project being delivered the following day.

The judges were Alan Stanford, the IChemE East Anglian branch secretary, Dr Alan Clegg, a committee member from the IChemE's East Anglia branch and Matt Turnbull from BP. All the groups were praised on the high standard of their designs and the judges commented on the professionalism and honesty of the presentations. Congratulations to the winning group (Group D), who were presented with a cash prize of £250 to share between them.

Congratulations also to the runners up: Group I (Dominic de'Ath, Fei Teng, Tim Beeson-Jones, Julia Engstrom, Phoebe Cheung, Marina Steketee and Daniel Marron) and Group E (Suhan Wang, David Baynard, Peter Wilcock, Jessica Fish, Chieh Lung Ng and Tom Dalton).

Postgraduate Prize Winners

At the end of May a drinks reception was held at the Department and prizes were awarded to postgraduate students.



Front row: Ipshita Mandal, Jessica Ocampos Colina, Mariana Domingos, Marco Saucedo Martinez. Middle row: Nadia Tsao, Nicholas Tan, Polly Keen. Back row: Frieder Haenisch, Oliver Bartlett, Robert Pott

First year student prizes for best presentations went to Ipshita Mandal, Jessica Ocampos Colina, Frieder Haenisch, Nicholas Tan and Nadia Tsao.

Frieder, who gave the 1st year talk about *“Identification of a Molecular Signature for Bipolar Disorder versus closely related Psychiatric Disorders”* added, *“I joined the CEB department and the group of Prof. Bahn in March 2011 as a visiting student for a 6 month-period working on a computer science project. Over the summer I received a PhD offer and the decision to take the PhD was based on my previous experience in this lab including great support, open minded discussions and advanced technical equipment. During the PhD programme I had the opportunity to get familiar with the fascinating work in other CEB-groups and to start interactions to learn about the resources used in the department.”*

The second year students gave presentations and prepared posters in February. Oliver Bartlett and Polly Keen were awarded the prizes for best posters.

Ollie, whose project is on *Multiphase Flow Validation using Magnetic Resonance Imaging (MRI)* added, *“It was a real surprise to receive the 2nd year poster prize in the face of such stiff competition, particularly considering the fascinating research presented by my peers. At this stage in my project, it was a welcome reassurance against the mounting pressure that all PhD students seem to feel. I have greatly enjoyed my time in Cambridge since I arrived in 2010, and a big part of that is due to the people in this department. My colleagues and supervisors at the MRRC are an invaluable source of advice and a constant inspiration as I progress with my research.”*

The third year Graduate Conference took place back in April and the prizes for best presentations went to Mariana Domingos, Robert Pott and Marco Saucedo Martinez.

Marco, researching into *The gasification of Fossil Fuels in the presence of Iron-based Oxygen Carriers for Chemical Looping Combustion* commented, *“being a member of this department is something that should make us all proud. It’s an incredible experience to share ideas and research opportunities with all our fellows from many different countries and backgrounds. Winning this prize is something I never expected, but it is nice to be recognized for your daily work and the many hours spent on these presentations. I thank all my fellow colleagues from the Combustion Group, my supervisors and all other members of this Department that make my life richer every day.”*

The presented research projects were:

Ipshita Mandal: *Novel Matrices for In-Process Biopharmaceutical Manufacturing*

Jessica Ocampos Colina: *Polymer-mediated Delivery System for Mammalian Cell Biopreservation*

Frieder Haenisch: *Identification of a Molecular Signature for Bipolar Disorder versus closely related Psychiatric Disorders*

Nicholas Tan: *Microstructure Analysis of Catalysts using Terahertz Spectroscopy and Imaging*

Nadia Tsao: *Microbubbles for Ultrasound Triggered Delivery*

Oliver Bartlett: *Multiphase Flow Validation using Magnetic Resonance Imaging (MRI)*

Polly Keen: *Encapsulation of Microorganisms in Colloidosomes*

Mariana Domingos: *Turbulent Plumes and Thermals with Chemical Reaction*

Robert Pott: *The Conversion of Crude Glycerol from the Biodiesel Industry into Hydrogen using Photosynthetic Bacteria*

Marco Saucedo Martinez: *The Gasification of Fossil Fuels in the Presence of Iron-based Oxygen Carriers for Chemical Looping Combustion.*

Manny's Charity Skydive



Manny in Lewes

It seems that it is now a rule that every summer I do something ridiculous for a charity. Coincidentally, this is the first summer in a while that I haven't ended up in Addenbrookes at some point. Perhaps, then, it was in the interests of efficiency that I undertook to jump 13,000 feet from a light aircraft on 21st July over Sibson, Huntingdonshire in a bid to raise money for the National Autistic Society (NAS), thereby endeavouring to combine my two routine summer pursuits.

The NAS supports over half a million people with autism in the UK, like my older brother, Matthew.

Though I haven't supported the NAS directly, I have had several years of involvement with Cambridge RAG, the student charity fundraising society that organised the skydive and that raised over £180,000 last year for various foundations. The skydive touches near to the reason I got into charity work in the first place. Matthew has severe autism and lives in permanent residential care, and several other members of my family are also on the autistic spectrum. So, after doing the Three Peaks for KidsCan and dressing as Father Christmas to one of Dr Cardoso's lectures I signed up to the "Great Cambridge Jump", an event I have previously been involved in organising like so many others during my time on the RAG committee. Suffice to say, there is a world of difference between paperwork, counting money and persuading others to sign up to do something and tipping over into a 172 mph wind in a jump suit with another person strapped to your back while clouds fly past you and fields and copses move towards you very rapidly.

"...There is a world of difference between paperwork... and tipping over into a 172mph wind in a jump suit."

My JustGiving page is at www.justgiving.com/nas-manny-jump. I have raised £318 so far and a further £55.50 in Gift Aid. I also paid the entire cost of the Skydive out of my own pocket, so every penny donated will go to the NAS. I have always known this department to be supportive of the charity work done by RAG, as exemplified by the generous donations I received for the Three Peaks Challenge and by the succession of dedicated RAG fundraisers from the students here, like Katy Hope, Ross Hubble, Annie Spencer, Vinayak Rajendran and, most recently, our very own Akshay Deshmukh. Jumping out of a plane is no casual undertaking, and while I cannot say I enjoyed it, I would certainly go so far as to recommend it. Any support would be gratefully received.

Immanuel (Manny) Kemp is a PhD student in the Department. He works on Fischer Tropsch reactions in the Combustion Group.

BUCT Summer School Continues

Dr Yunfeng Gu

July 2012 saw the third visit to CEB of students from Beijing University of Chemical Engineering (BUCT) attending a summer education programme in Cambridge. This year 39 students participated in a 12-day schedule of lectures, cultural events and social exchange activities hosted by CEB members. The course builds on the recently signed MoU, which seeks to develop stronger research links between the universities. The BUCT course has a strong focus on establishing strategic links for Chinese undergraduates interested in studying for further degrees in Cambridge and beyond. Looking ahead, we anticipate it will dovetail with the growing engagement of the department with other universities in Southeast Asia. This year saw growing contributions from other departments within the University, including the Cambridge Centre for Smart Infrastructure and Construction, which coordinated a case study in cross-disciplinary activities between electrical and chemical engineering.



BUCT visits the Department for summer school

MBE Farewell Dinner and 10th Anniversary Celebrations

The graduation of the 2011-12 MPhil in Bioscience Enterprise (MBE) programme cohort as well as the programme's 10th anniversary provided perfect reasons to plan midsummer night festivities. Over 130 students and business guests enjoyed a reception in the convivial setting of St John's College Cloisters, followed by dinner in the Hall. A total of 240 students have studied the course since its inception. It was exceptionally good to see so many of our student and staff alumni joining the celebrations. They travelled from ten countries to be with us and it was a real pleasure to catch up on their impressive careers and to meet their family and friends who accompanied them to Cambridge.

Guest of honour Ms Nicky Morgan MP spoke eloquently after dinner about the responsibilities that accompany her role as Parliamentary Secretary to the Rt Hon David Willetts, Minister of State for Universities and Science.



MBE dinner and anniversary at St. John's College

In the formal proceedings Mr Perry Evans presented the RSA Dissertation Excellence Award to Basmah Khogeer and Prof Chris Lowe the awards of MPhil with Distinction to Victor Dillard, Basmah Khogeer and Richard Secker-Johnson. Chris also thanked Prof Graham Richards of the University of Oxford at the conclusion of his three-year term of duty as External Examiner.

MBE Programme: Boston Biotech Study Tour

At the conclusion of two terms of hard study, it was a very cheerful and enthusiastic party of students and staff that made the MBE programme's annual pilgrimage to Boston in March 2012. Particular interest was stimulated by an in-depth discussion with Dr Dan Robertson of Joule Unlimited. The company is currently implementing its promising Helioculture Platform technology on a massive scale. Dr Kate Sheldon invited the group to visit Courtagen, providing a tour of the pristine Protein Diagnostics Division, which had just been granted regulatory approval to offer mitochondrial DNA testing services to patients. Finally, updates at Agamatrix were provided by two Institute of Biotechnology alumni, co-founders Dr Sridhar Iyengar and Dr Richard Williams. Agamatrix recently gained FDA approval for the only iPhone-compatible glucose measurement accessory. This product has earned the company a global marketing deal with Sanofi and can now be purchased over-the-counter.

The participating students returned to Cambridge, UK very much wiser about the ways to bring advances in science and technology to commercial fruition. We take this opportunity to acknowledge the legendary American hospitality that we received during our visit.

Hard Facts about Soft Skills for Engineers and Scientists

Dr Jamie Cleaver, Chemical Engineering PhD, 1991

So what are soft skills exactly? Well, the term conjures up different things for different people. For now let's shortlist the main ones: communication, teamwork, leadership and creative problem solving. The commercial value of soft skills has long been recognised. Back in 1936 Dale Carnegie wrote, "...even in such technical lines as engineering, about 15% of one's financial success is due to one's technical knowledge and about 85% is due to skill in human engineering, to personality and the ability to lead people." So why does soft skills development appear to be a low priority in many organisations? One challenge is complacency. A structured approach to soft skills training from the organisation will get better results than leaving it to chance. The challenge is exacerbated by the naturally introverted nature of engineers putting us well outside our comfort zone when it comes to activities such as making presentations, negotiating, and giving constructive feedback.

"Essential Skills for Research Entrepreneurs - A Course for Chemical and Biochemical Engineers"¹ delivered by Dr Jamie Cleaver addressed the role of a research entrepreneur; communication skills; effective team building; financial administration and business plan development; intellectual property. He commented, *"Interacting with researchers from Chemical Engineering in Cambridge is always exciting. I encounter high levels of motivation, depth of technical knowledge and strong capability for critical analysis."*

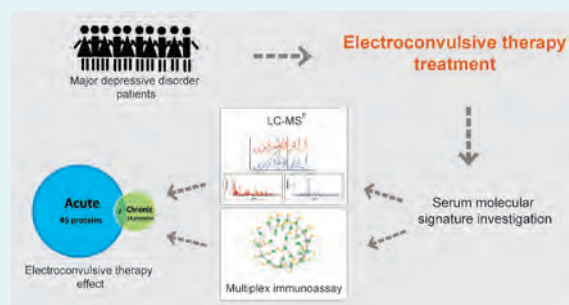
¹ The full version appeared in TCE in April 2012, P 41



CBE students on a team building exercise

Electroconvulsive therapy treatment in major depression

Viktoria Stelzhammer PhD Student, CCNR



Electroconvulsive Therapy (ECT) is a short term treatment for major depressive disorder. We used molecular profiling methods to study ECT, as well as pre-ECT treatments, with the aim of identifying novel drug targets and better understanding the mechanisms of action of ECT.

Proteomic profiling analyses, used in our lab, involve a combination of multiplex immunoassay and liquid chromatography mass spectrometry in data independent mode (LC-MSE), which comprehensively interrogate the disease state by analysing hundreds of proteins and smaller molecules in one experiment. Therefore, these molecular profiling techniques allow the elimination of variability across individual measurements, thereby allowing reliable identification of molecules which are co-regulated within and across molecular pathways.

We have identified several molecules and proteins changed after only anaesthesia and muscle relaxant pre-treatment which were previously reported in the literature as potential ECT markers. This demonstrates the importance of taking into account the potential effect of the pre-treatment on molecular profiling studies, especially effects that mask or interfere with the direction and degree of fold change. We also identified that ECT has a predominantly acute molecular effect, lasting approximately 6 hours, whereas chronic exposure to ECT (2 weeks) changed only very few molecules. These results revealed a 'trigger-nature' of ECT, which seems to reboot the patient's body, and make it once more responsive to AD treatment. Interestingly, MDD patients also seemed to have a

greater response to ECT on the molecular level, once they received additional AD treatment. However, when comparing the blood signature of patients receiving only ECT to patients receiving only AD treatment, few similarities were detected, suggesting that ECT and ADs may have different mechanisms of action. Unravelling the acute molecular effects underlying ECT treatment led to the identification of possible novel drug targets which could result in more effective antidepressant treatment approaches, for which there is a great need in psychiatry today.

Metabolite Biomarker Discovery for Metabolic Diseases

Dr Vassilis Vassiliadis

Metabolites can serve as biomarkers of metabolic diseases, and their identification is significant in the study of biochemical reaction signalling networks. The paper presents an approach to identify metabolic biomarkers through integration of biomedical data and disease-specific gene expression data. An optimization approach was used to determine flux variability intervals leading to the identification of significant metabolic reactions. The corresponding metabolites were then compared to results in the existing literature. The approach proposed in this work is general and can be applied to the discovery of potentially novel biomarkers in biomedical research.

The work is led by Professor Ching's group at Hong Kong University and Dr. Vassiliadis of the PSE group in the Department was invited to participate in the paper following recent collaborative efforts between the two research groups. Among many topics of common interest that were identified was also the case of Biochemical Reaction Networks. Professor Wai-Ki Ching was a visitor of the PSE group in our Department in July of 2012, exploring options with Dr. Vassiliadis for collaboration in applied mathematical methods and optimization. He is Associate Professor of Applied Mathematics at Hong-Kong University. CEB Academic Dr. Vassiliadis participated in the 6th IEEE International Conference on Systems Biology in China back in August when he was awarded "Best Paper".

Biomarker Blood Tests for Treatment of Psychiatric Disorders

Sabine Bahn^{1, 2} and Paul C Guest¹

¹Department of Chemical Engineering and Biotechnology, University of Cambridge, Tennis Court Road, Cambridge, UK.

²Department of Neuroscience, Erasmus Medical Centre, Rotterdam, The Netherlands.

Introduction

The search for biomarkers for psychiatric disorders such as schizophrenia has been ongoing for many years. It is hoped that such biomarkers can be used in standardized tests to improve the diagnosis and clinical management of patients. Currently, psychiatric disorders are diagnosed by clinicians and psychiatrists based on subjective interviews using DSM-IV or ICD-10 criteria, which have many shortcomings. There are now concerted efforts to identify biomarkers which are reflective of the underlying pathologies or the mechanism of currently used medications. Ultimately, the results of these efforts may lead to personalized medicine approaches for more effective treatment of patients with these devastating conditions (Figure 1).

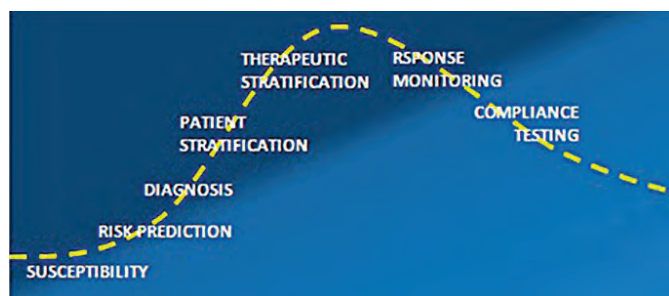


Figure 1. Anticipated stages of biomarker use for psychiatric disorders

The Food and Drug Administration (FDA) has set the guidelines based on three classes of biomarkers: 1) exploratory biomarkers, 2) probable valid biomarkers and 3) known valid biomarkers. For the exploratory biomarkers class, there must be scientific proof of concept. The probable valid biomarker class requires that biomarkers can be measured with strict performance characteristics and that the scientific findings can explain the relevance and significance of the results. The known valid biomarker class requires that all results are replicated in different laboratories and sites.

For studies of psychiatric disorders, it has been anticipated that it will be difficult to meet these

requirements. This is due to multiple problems. To name some of them: psychiatric conditions are poorly understood, there is an overlap of symptoms across different disorders and there is considerable heterogeneity in how these illnesses manifest in different individuals. However, the application of emerging multiplexed molecular profiling platforms has facilitated identification of biomarkers through the simultaneous measurement of hundreds and even thousands of molecules. This resulted in the identification of a molecular fingerprint that could be used to classify schizophrenia subjects compared to controls with an accuracy of greater than 80% (1).

The need for biomarkers in psychiatric disorders

The FDA, pharmaceutical and biotechnology companies now accept that the use of biomarker-based platforms will be of benefit in the development of improved diagnostics and surrogate biomarkers for drug discovery. In the case of psychiatric conditions, there are many anticipated benefits (Table 1). However, potential reasons for the failure to incorporate biomarkers into clinical projects include problems in design, enrolling patients at different stages of the disease process and the possibility that biomarkers may not be causal but rather a result of the disease process (2).

An example of biomarker use in psychiatric conditions can be found in schizophrenia. Most psychiatrists acknowledge that schizophrenia is an umbrella term for a mixture of conditions that present with similar symptoms and, therefore, misdiagnosis is a common problem. A number of studies have suggested that manifestation of schizophrenia symptoms can be mitigated or prevented if environmental risk-factors can be determined and avoided. Interestingly, we have shown that various markers can be identified in patients even prior to disease onset, suggesting that effects on these pathways may be involved in the disease aetiology

Earlier diagnosis and treatment decisions

Better prognoses and increased savings for healthcare services
Better classification of psychiatric disorders
Better clinical treatment decisions

Stratified medicine approaches

Prediction of responders to specific drugs
Treatment selection according to patient phenotype
Side effect prediction (weight gain, insulin resistance)

Treatment monitoring

Testing for normalization of biomarker signature after treatment
Testing for molecular signature for recurrence of symptoms
Testing for medication compliance

Development of novel therapeutic approaches

Prediction of at risk individuals and testing of prophylactic treatments
Monitoring efficacy of new treatments

Table 1. Potential benefits of incorporating biomarker platforms into research of psychiatric disorders

(3). The next step will be the determination whether or not disease conversion can be prevented or minimized in at-risk individuals. Eventually, this will lead to a decrease in delayed diagnosis and misdiagnosis. It is now accepted that single biomarkers are unlikely to be effective given the complexity of diseases such as psychiatric disorders. Therefore, a panel of biomarkers must be employed to address this complexity and increase specificity. Such biomarker panels must be rigorously validated in multiple centres and across different time points to produce reproducible and accurate tests. Biomarker panels must also be

disease-specific, at least relative to other diseases which have similar symptoms. Also, biomarker tests must be delivered in a format that is high-throughput and user friendly to allow use by clinicians, hospital staff and scientists alike. Mass spectrometry and two-dimensional gel electrophoresis platforms would be too cumbersome and necessitate too much expertise to be considered as realistic possibilities. Instead, automated platforms such as the multiplexed immunoassay system and multiple reaction monitoring are more likely candidates as clinically-friendly platforms which have already shown promise. Also, holographic sensors have already been employed for detection of biomarkers (4) and could easily be adapted as robust and user-friendly tests in clinical applications.

Development of a molecular blood test for schizophrenia

We recently developed the first multiplex immunoassay biomarker test for schizophrenia in collaboration with Rules Based Medicine and Psynova Neurotech (5). This biomarker test resulted in a sensitive and specific prediction for presence of schizophrenia in subjects compared to matched controls, with a receiver operating characteristic-area under the curve of 88%. This multiplexed assay system was launched in 2010 as a CLIA-approved test to aid diagnosis of schizophrenia (Figure 3).

The development of this test followed decision-modelling analysis carried out to construct a socio-economic case for early detection of schizophrenia and to determine the prospective market. This showed that the cost of a patient in the United Kingdom diagnosed after a first psychotic episode would be approximately £182,000 over 5 years. However, the cost

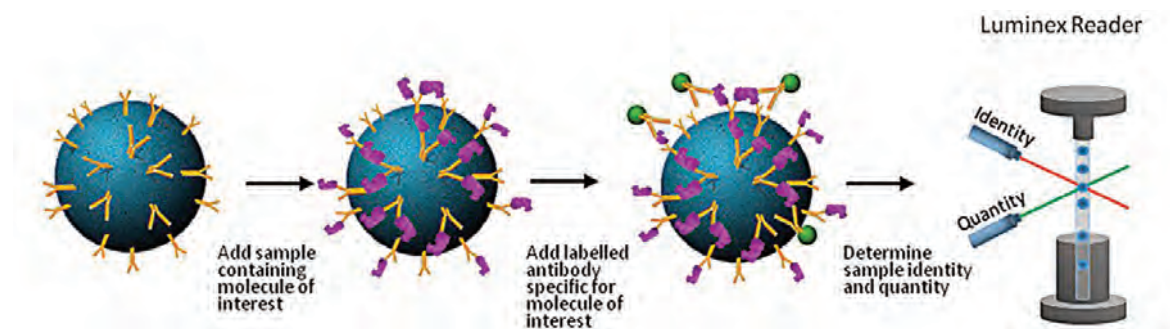


Figure 3. Multiplex immunoassay scheme. The diagram indicates the measurement of a single molecule. Multiplexing uses mixtures of two or more antibody-microsphere conjugates and labelled antibodies

for a patient diagnosed at an earlier stage would be only around £27,000. This suggests that there is a good socio-economic case for introducing better diagnostic tools for detection of schizophrenia during the early phase.

A specific and justified criticism of the current test is that it was developed to distinguish schizophrenia patients from healthy controls and not to differentiate schizophrenia from other psychiatric disorders. Therefore, the next stage towards clinical translation is to conduct a large scale clinical validation study using samples from diverse psychiatric patient populations and settings in a series of prospective studies. Eventually, the discovery and thorough validation of such biomarkers will benefit both the patient – reducing the disease burden by aiding prevention, diagnosis and treatment – and society as a whole.

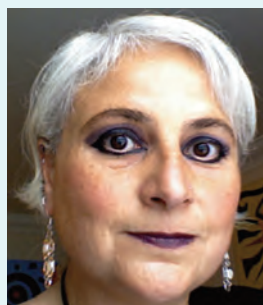
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Dear Dr Sarah...

I escaped "the bubble" a couple of years ago and am having trouble with my electrical and mechanical engineering colleagues. They are of the opinion that chemical engineers are nothing but advanced plumbers. How can I prove them wrong?

Dr Mario



Dr Sarah says...

I've found the best way to deal with an 'awkward' colleague, shall we say, is to empty a rubbish bin over their desk – they soon come around to my way of thinking. Anyway, there's nothing wrong in my book with being an advanced plumber; rather than someone who performs virtual work

analyses on pin-jointed trusses, yawn.

All this elitism is not helping the ecumenical spirit within the engineering community; and unfortunately the IChemE has also been guilty of this snobbery. I recall a 'campaign' of theirs a few years ago that wanted to reserve the title of 'engineer' solely for the high-class professionals, and not for the person who comes to service your washing machine, for example.

Now, I've studied Chemical Engineering at university, and in no way do I consider myself an engineer; however, the chap sent by Anglian Water to unblock the sewer pipe in my front garden, well, I was extremely happy to call him whatever he wanted, as long as it was through a closed window. He 'engineered' the job(s) pretty efficiently, in my opinion.

But we shouldn't scorn poo – it is big business nowadays. Heard about the money being pumped into researching a toilet that atomises your bum-produce to create electricity? What type of engineers/scientists/scatologists are working on that project, I wonder?

Still unable to convince your engineering colleagues? Well, soon you will be able to tell them to "Go make some electricity".



OK, where's the internet connection ?

Psynova: Leading our Understanding of Psychiatric Disorders



Psynova Neurotech Ltd was established in 2005 by Professor Sabine Bahn (MD, Ph.D, MRCPsych) and Professor Chris Lowe, Director of the Institute of Biotechnology, University of Cambridge) for the commercial development and exploitation of novel biomarkers for neuropsychiatric illnesses.

Professor Bahn, a psychiatrist by training, not only co-founded Psynova Neurotech Ltd, she also established the Cambridge Centre for Neuropsychiatric Research. For her, this has been a personal endeavour, having grown up in Germany with a father who had bipolar disorder.

Determined to raise the standard of research in this area and to bring mental disorders out of the shadows, Professor Bahn wants to tackle the stigmatisation of bipolar disorder and other mental conditions head on. For the past 7 years, she has been working towards the development of a biochemical test that could put an end to the waiting for a correct diagnosis and arrest these devastating diseases in the early stages.

Despite the staggering hundreds of millions of people worldwide suffering from mental illnesses these conditions receive less attention and financial support than those diseases where the basic underlying physiological pathways are understood, such as Diabetes or Cancer research. Psynova's motivation is to improve the clinical management of patients and the company is supporting the translation of its results towards a product which can be used in the clinic.

A proof of concept has now been established through Psynova's demonstration that molecules reflecting mental disorders can be identified in blood serum. In

spite of this success, Professor Bahn is cautious about the potential of this finding and is aware that to introduce a completely novel product is a long-term endeavour. It is important to convince the right people in a field which has not moved significantly forward for decades. It is also important to find trusted partners to contribute to the development of these novel concepts and products.

One aim of Psynova is to help raise awareness of clinicians, patients and the general public, in order that mental disorders can be treated more effectively. Many affected individuals do well with treatments and the public must know this in order for these patients to be integrated better in society and to reduce long-standing stigma.

Apart from several EU grants received by her lab, Professor Bahn is grateful to the Stanley Medical Research Institute for their support of her research and for the generous funding they have provided throughout the years. There is a mutual respect, honesty and trust with Professors Fuller Torrey and Robert Yolken for the development of new drugs and diagnostic tests for schizophrenia and bipolar disorder with the aim to produce new results in these disease areas which will, in turn, lead to improvements in the lives of patients.

Given her background, Professor Bahn feels a personal obligation to improve our understanding of mental disorders. At the same time, this could lead to an increased understanding of brain function, which is the last and most challenging frontier of human biology. She also highlights the importance of funneling enthusiasm within the scientists in her group in such a way that they become productive. She commented, *"The secret to this is attaining the right balance between giving guidance and encouraging professional development, with an aim to help increase positive outcomes in the clinic and thereby benefit patients with these devastating conditions. No career will lead anywhere without hard work."*

CEB Flying High in Rankings

The University of Cambridge has been ranked best for chemical engineering in the UK, and one of the best internationally. The Complete University Guide and the Guardian University Guide ranked CEB as the best chemical engineering department in the country and the University of Cambridge as best institution overall. On the international front, the QS World University Rankings for 2012 rate the University of Cambridge third in the world in amongst 200 universities for chemical engineering.

Head of Department Nigel Slater welcomed the new rankings and Cambridge's lofty position: *"We are delighted that CEB ranks again in the top three departments of chemical engineering according to the renowned QS World Rankings of university departments. We come third after MIT and Berkeley with the highest score of all for Esteem by Industry and the highest ranking of any department outside of North America."*

Cambridge chemical engineering is given an overall score of 90.7 out of 100. The only universities ahead of Cambridge - Massachusetts Institute of Technology and the University of California, Berkeley – scored 97.1 and 92.6 respectively.

QS World University Rankings measure university research quality, graduate employability, teaching commitment and international commitment, using a combination of global surveys and audited data, including citation counts.



Dr Rough wins Learning and Teaching Innovation Funds



Dr Sarah Rough, Programme Manager of the MPhil Advanced Chemical Engineering (ACE) course, has won £20k of Learning and Teaching Innovation funds from the University's Teaching and Learning Support Services. The money

was awarded in order to deliver a project entitled *"Getting the best out of a one year postgraduate taught Master's programme at Cambridge"*. The project will provide interactive and experiential support for students in both the taught and research components of the ACE course. Part of the project will be based around a number of short workshop-style training courses, led by professional skills trainer Dr Jamie Cleaver.

"Not only do we aim to develop the students' taught and research study skills so that they can learn, adapt and apply their knowledge to Chemical Engineering problems, but also to provide the opportunity for students to gain a variety of soft skills..."

Dr Rough says *"This is a real boost for the MPhil ACE course, which will allow us to expand our teaching and learning provision for the students. Not only do we aim to develop the students' taught and research study skills so that they can learn, adapt and apply their knowledge to Chemical Engineering problems, but also to provide the opportunity for students to gain a variety of soft skills which can be transferred to all aspects of any career they choose."*

Managers or Specialists?



Dr Andrew Kilner,
Chemical Engineering PhD
1959-63

"...A manager of a department required certain interpersonal skills which some people did not possess nor were they capable of acquiring"

There were shocked faces among my executive MBA students when I told them that probably no more than two thirds of them would become managers. That is certainly not what they expected, having paid a lot of money after seeing the claims in the glossy Business School brochure. After all, they already had a first degree, often in the scientific area and some professional experience; they were taking this course precisely to obtain the management fundamentals which they were missing. What is the explanation for this unexpected remark they asked me? The fundamental reasons I told them was that a manager of a department required certain interpersonal skills which some people did not possess nor were they capable of acquiring. Typical among these skills are the abilities to motivate & coach their subordinates, to handle certain difficult situations -especially those dealing with conflict, and to foster the good performance of the whole team rather than just of themselves.

The origin of this situation is that we all have an innate preference either for dealing with people or for working on tasks: very few of us are excellent in both. It is thus the first group who are more suited to be managers, whereas the second group can follow a career as 'specialists' be it in research, IT or in other specific departmental functions. Among auxiliary characteristics of these two groups are opposing perspectives (broad & general versus narrower & detailed), and the less extrovert behaviour of scientific specialists, being more at ease to work on their own.

A common error made by companies is to designate a successful but non-suitable person as manager. Take the example of a good salesman gifted in dealing with his clients but who could be ineffective in managing other salesmen. Promoting such a salesperson to sales

manager will have a doubly negative effect in that the firm acquires a bad manager and at the same time 'loses' a good salesman.

I could quote the case of two fellow lecturers who were at the opposite ends of such a spectrum. The first was a man from Scotland teaching HRM, always willing to have a chat with you or with the students even using student type colloquial expressions. However one had to be careful in asking him to do a detailed project as this was not one of his strengths. The second was an English lady having a doctorate in electrical engineering and teaching operations management. She was more reserved and less sociable but her lecture notes and other tasks were perfectly done.

However, there are of course many people who are not at either of these two extremes; they could be represented by coordinates of say 5,5 on a 10x10 graph showing emphasis on people as opposed to task as depicted in the figure below.

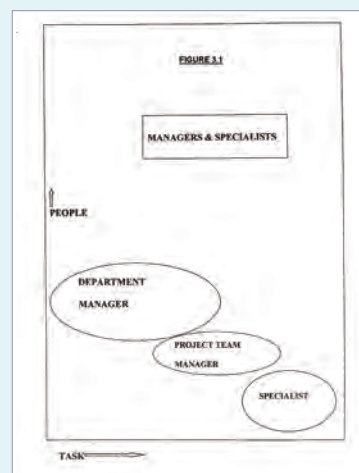


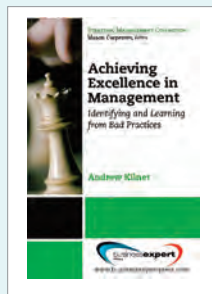
Diagram from Dr Andrew Kilner's book
"Achieving Excellence in Management"

For such people, there is the possibility of being project team leaders where, from time to time, they head a multi-disciplinary team working on a specific project. The project team leader option is therefore useful for specialists to get an experience of management, and for managers to improve their knowledge of

complex factors concerning the product or process being developed. The latter is particularly important in Anglo-Saxon companies which frequently select as managers people who do not have much product knowledge.

Thus, for example, I came across General Managers within electrical engineering firms who did not have scientific degrees-something which would never occur

in a German company who would insist on the person having an engineering or at least a physics degree.



To conclude, I should like to say a few words about careers for the two types of employees. In the more progressive firms there are parallel avenues of advancement for managers and for specialists with fairly comparable salary scales. Although the managers may be seen as being more important and possessing greater prospects

for reaching the top levels within the company, they also run greater risks of being made redundant especially during periods of change when they may get a new boss who appreciates them less than did the previous one. Moreover, as there is obviously only limited space at the top of the organisational pyramid, the less successful candidates reach a positional and salary plateau from which they are encouraged to depart from the firm after the age of 45.

Such a situation is more rare for specialists who, if they have been keeping up with progress in their subject, can maintain their post to a later age.

Hopefully this short article, based on contents within my Management Excellence book (published by Businessexpertpress.com), will be useful to Chem Eng graduates prior to and soon after entering employment. Some further charts from the book are available on the interactive web site www.rafme.homestead.com

Biography

Dr Andrew Kilner, BSc(Imperial,London),PhD (Chem. Eng. Cambridge), MBA (City, London) has had an extremely varied career thus enabling him to analyse management factors from diverse points of view.

After a spell as research engineer in the USA, he spent over 15 years as Business Planning Manager in large international companies in several countries, acted as a consultant to small UK firms and the British Foreign Office aid projects for Poland, created his own automotive research bureau in Brussels, and ultimately became Professor, Head of Department and first MBA director at the Rennes Graduate School of Business in France.

In recent years, his main field of research concerns 'management excellence' and the application of sound management principles to diverse areas of activity as described in the recent book published by Businessexpertpress. He is currently lecturing in various institutions and writing occasional articles on these topics in the Les Echos business daily.

'Life On The Edge' Book Launch

Peter Varey



Sir David Harrison and Professor Howard Chase (right) listen to author Peter Varey (left) describing his experiences writing a biography of the late Head of Chemical Engineering and Shell Professor Peter Danckwerts



"Life on the Edge" was launched at Heffer's bookshop in Cambridge back in June. The book - 'Life on the edge: Peter Danckwerts GC MBE FRS, brave, shy, brilliant' - is now available on-line and in bookshops worldwide - search under 'Books' for 'Danckwerts': www.amazon.co.uk, www.amazon.com and www.thenile.com.au

Mr Varey commented, *"I was delighted that some 40 or so turned up at the launch, most of them distinguished engineers. Even the Vice-Chancellor popped in, interested in Danckwerts and innovation. As Peter Danckwerts is such a crucial figure in the history of chemical engineering, I am hoping to encourage every engineer to read about him: the book would be an ideal Christmas present!"*

Pembroke Street Lab FAQs

- **How do I get in contact with a technician?**

Using the e-mail address
cheng-labtech@lists.cam.ac.uk

- **What equipment is available in this department?**

We have some collectively owned equipment and Electronics have equipment for loan. Some research groups have specialised equipment. Editorial constraints have prevented us from listing it here. Please refer to the website for the full list of FAQs.
<http://www.ceb.cam.ac.uk/pages/technical-teaching-and-research-support.html>

- **What help is available on this site?**

The technicians can help with most laboratory queries, including rig building and safety. See also Electronics, Computer Section or the Workshop for specialist help.
Dr Simon Butler is the Technical Officer for Rheology and Polymer Science.
Zlatko Saracevic looks after the Particle Size Analyser and other analytical equipment.
Materials Imaging and Analysis, see Dr KamramYunus.

- **Where can you find waste bottles?**

You can find them in a tray outside the stores.

- **What to do with your waste chemicals?**

Liquid: waste bottle. Do not overfill or over tighten the lid. Label with name, date and contents. Solid waste: use lidded buckets from the stores. Place in the labelled black cabinet in Unit Ops Lower. Ensure you fill in the form on the clip board near the cupboard.

- **How do I get training for gas, liquid nitrogen, CUBE?**

Contact Lab Section, using the e-mail address
Cheng-labtech@lists.cam.ac.uk.

- **How do I deal with a spillage of a chemical?**

In every lab there is a spillage kit. If the spillage is too large, get in contact with a technician. If you have used some of the spillage kits please let the technician know so we can replace it. In CUBE see the CUBE manual.

- **What to do if I need to work out of hours?**

You need to fill out the risk assessment and you must have your PI's permission. Out of hours is defined as any time outside 8.30am – 5.00pm Mon – Fri. Weekend working is not encouraged. Please see the full FAQ list on the website.

- **How do I get some chemicals/consumables?**

The stores stock a large amount of consumables including glassware, so check whether they have what you need. Any other consumable/chemicals can be ordered via the stores. You need a grant code for any consumables/chemicals which you can get from your P.I.

- **What is the difference between a fume cabinet and class II hoods?**

Fume hoods keep gases/vapours/powders away from the researchers. It is not a sterile environment. Class II cabinets are a sterile working environment if used correctly. Both the worker and the experiment are protected from contamination.

- **Note to Part IIB students:**

Before the end of the Easter term meet with your supervisor and your mentors. Technical, Electronic and Workshop involvements should be discussed as you may have to order equipment. No experimental work can be done without appropriate risk assessments. Obey the rules laid down in the lab, etc., such as wearing of lab coats and safety glasses or receiving training. If you are using CUBE, please get in contact with lab section in order to be trained. Equipment, consumables and chemicals have to be ordered on the part IIB budget. Do not use anything in the lab unless it has been discussed with your mentor. As there will be many pairs competing with you for access to staff, an early start is vital.



From left to right: Jon Cowper, Gareth Evans, Maggie Wallduck, Roz Williams and Annette Williams

Student Admin Survival Guide FAQs



CEB Administrators Chloe Aust and Amanda Taylor

1. Where do I get a letter confirming that I am a student so that I can apply for a Visa?

The University uses a secure electronic document system, called “Digitary”, which allows current registered graduate students to request and access verification letters online. Just log-in to your CamSIS self-service page, and under ‘Apply for Things’ in the bottom right corner, click on ‘Verification Letters’. On the next screen, just click ‘Request’ and a letter will be automatically generated and available electronically within 5 working days.

2. How do I let the Cambridge City Council know that I’m a student for Council Tax purposes?

The process is the same as above; just log-in to your self-service and request a verification letter.

3. Where can I find information on my 3-month report, NOTAF/CPGS report, First Year Seminar, etc?

The Department publishes the guidelines for the required postgraduate milestones on CamTools. You can find a link to CamTools on the Department’s website.

Once in CamTools, click on ‘Resources’ on the left-hand side and then select the folder ‘Postgraduate Passport’. Additional folders will drop down, and from those folders, select the folder relevant to your year group. You may then download the instruction sheets you need.

4. What do I need to do when I submit my PhD or MPhil in Chemical Engineering and Biotechnology thesis?

The Department of Chemical Engineering and Biotechnology falls under the Degree Committee of Engineering. As such, our thesis submission procedures follow those of Engineering. The guidelines may be found on Engineering’s website: www.eng.cam.ac.uk/postgraduate/current-students/dissertation-submission

5. Department Contacts for any issues that arise:

- For Student Admin-Related Queries: Amanda Taylor (NMS) at at481@cam.ac.uk or Chloe Aust (TCR) at ca328@cam.ac.uk
- For Safety-Related Queries: Your supervisor in the first instance, but additional advice may be sought from Sarada Crowe (NMS) or Debby Singh (TCR).
- For Work-Related Queries: Your supervisor or advisor in the first instance.
- For Work-Related Queries, which you are unable to discuss with your supervisor or advisor: Dr Alex Routh, Chair of Graduate Education Committee (NMS), Prof Lisa Hall (TCR), Director of Research, or Dr Patrick Barrie, Director of Teaching.
- For Non-Academic Issues: Your College Tutor.
- You may also wish to provide feedback via comments to reps on Staff-Student Consultative Committee and student rep on CEB Syndicate.

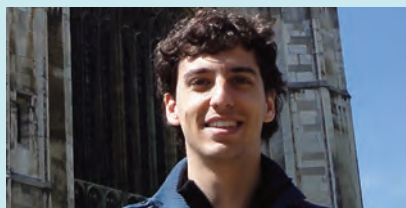
CEB Student Administrators commented, “Chloe and I really enjoy helping students during their time at Cambridge. We’re usually able to advise on accommodation options, University regulations, great places to visit for fun that cost little or no money, when and where to submit things, etc. In any case, we can usually point students in the right direction if we don’t know the answer straight away. And we’re even happier to help if students come bearing chocolate!”



Dr Alasdair Campbell

Fluids and Environment, CEB

Finally! A mere twelve years after first setting foot in the department as a fresh faced Part I student who was determined to work in industry when he graduated, a measly nine years after starting a PhD and vowing to be done in three years so I could go and get a real job, and a trifling five years after realising that I should really stop making such terrible career predictions and finally succumbed to the academic life, they've at last kicked me out to investigate the tales of this mythical world outside Cambridge that I've heard so much about. Whilst it's always hard to leave a place you've called home for so long, I'm excited to begin the next chapter of my life as a lecturer at the University of Surrey (there are universities outside Cambridge, who knew?). I want to thank Silvana and Allan for all their help and guidance over the past twelve years. Out with (sorry Allan!) those two, I would also like to thank McGregor for stealing my office, and for ensuring that I wasn't the only one sitting in the corner of the tea room looking miserable every day. And finally, thanks to all the students, past and present, who make the department such a fun and interesting place to work.



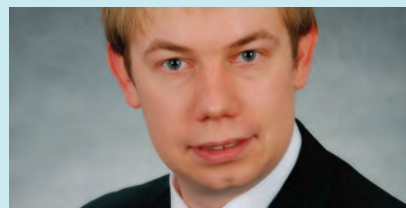
Pablo Arias Vecino

Magnetic Resonance, MRRC

I first came to Cambridge in 2009. A Spaniard that studied Chemical Engineering at the University of Oviedo and finished right when the economy turned on the red alarms in the EU...oh joy!

I was accepted into the MPhil in Advanced Chemical Engineering where I learnt to combine business related subjects and experience with core Chemical Engineering subjects. We were a class of 16 people from all over the world trying to get through a difficult year, but also a friendly bunch and we enjoyed our time together.

Subsequently, I decided to embrace the wonders of research in the Catalysis group where my supervisors Prof. Lynn Gladden and Dr. James McGregor are like second family. My current research is focused on developing advanced NMR techniques to understand catalytic behaviour and adsorption processes. I am currently applying these methods on liquid-phase reactions where it has been observed to be an important effect on the catalytic performance, depending on the type of solvent used.



Dr Markus Sander

Computational Modelling, CEB

I studied physics in the trinational Saar-Lor-Lux Course and graduated with a French/German diploma in physics. I then joined the CoMo group in 2007 for my PhD studies supervised by Prof Markus Kraft.

During my PhD I investigated a detailed particle model framework for inorganic and organic nanoparticles. The connectivity of these particles is tracked to calculate particle rounding and sintering on a local level between neighbouring particles.

The model has been applied applied to three different cases: the sintering of silica nanoparticles, the growth of soot particles in premixed flames, and the formation of nanoparticles on Titan, a moon of Saturn.

My research project has been awarded Danckwerts-Pergamon Best Thesis Prize 2011 for his work on Mathematical Modelling of Nanoparticles from the Gas-Phase.

Recently finished my PhD and I am now working for a consulting company in the financial sector. I would like to thank all the members of the CoMo group and especially Prof Kraft for the great support given at CEB.

CEB Happy Hour and Pub Nights

One and a half years since the launch of CEB social events by PhD students Kyra Sedransk and Pablo Arias, the Bio-ChEng research community and staff from across all department sites seem to have grown much closer as a result. Throughout the course of it, different research groups have taken turns to host these get-togethers once a month. Both graduate students and academic/support staff alike are welcome to come along. In fact, these have been very well attended proving quite popular, giving students from different years the chance to meet like-minded souls with similar interests in an informal setting and helping all forge new friendships as a result.

Things kick off normally on the 2nd Friday of the month from 5.00pm in the Tea room and for just a contribution of £1 a drink. This informal session helps break the ice and is normally followed by a pub/bar outing.

Ipshita Mandal a 2nd Year research student and Graduate Rep, has been leading this with Aleksander Chmielewski, also a 2nd Year research student. Ipshita

explains, “The CEB Happy Hours have been a lot of fun to organise, working with different research groups who come up with crazy and cool themes for the Happy Hours. It is great to see people from different lab groups and different sites such as IoB, MRRC and BP Institute come together!”

If you'd like your research group to host a Happy Hour, please contact Ipshita at im349@cam.ac.uk. Dates are available for 2013 but hurry as bookings are made fast!

‘Party-goers’ thoroughly enjoyed themselves last academic year and the photo below are proof of the top entertainment had by all.

The Tunnacliffe group hosted a “Happy Hour” on 27th September to kick off the new academic year with more there are a couple more to look forward to:

12th October 2012: CEB welcomes Freshers

9th November 2012: Lowe Research Group

A montage capturing some special moments from last year’s “Happy Hour”...



Oxbridge Biotech Roundtable (OBR)



OBR's mission is to engage our academic and industry communities on-campus to foster a conversation about the health care and life sciences industry. We seek to create a pan-UK network of academic innovators from across disciplines, to connect them with each other and the industry resources necessary to move ideas forward. Several CEB PhD students volunteer for OBR and support CEB events.

1. “Free IP Advice for all Entrepreneurs”

Venner Shipley comes to Cambridge on 17th October.

Book a 30minute slot now on www.camipclinic-vs.eventbrite.com

2. “Innovation in Global Health”

On 26th November with Dr. Laurence Tisi, CEO of Lumora and Dr. Vinay Nair, Head of Business Development at Acumen Fund along with others.

Location to be confirmed.

CEB Alumni Speaker Series 2012-13

The series of talks contributed by department graduates return for the 3rd year twice a term, at 4.00pm in Shell Building, Lecture Theatre 1:

Thursday 25th October 2012

Thursday 22nd November 2012

Thursday 31st January 2013

Thursday 28th February 2013

Thursday 25th April 2013

Thursday 23th May 2013

If you are an alumnus interested in contributing to the series in the future or organising a reunion for your class year – please contact Elena Gonzalez, PA to Professor Nigel Slater, HoD, on eg314@cam.ac.uk

Uxbridge English Dictionary Part 1

Professor Howard Chase

BBC Radio 4's anecdote to panel games, *I'm sorry I haven't a clue*, makes reference to the **Uxbridge English Dictionary**, which records the changing meanings of commonly used words. I offer the following entries for chemical engineering.

Reaction engineering

Catalyst - a short catalogue

Homogeneous - Oscar Wilde

Heterogeneous - also brilliant, but straight

Oscillation - making an Australian very happy

Piston - completely humiliated

Porous - some more wine please!

Pyrolytic - completely drunk and very hot

Reactor - something about a thespian

Fractionation

Bottoms product - a stool

Distillate - Sacha will sing at the end of the concert

Relative volatility - a family dispute

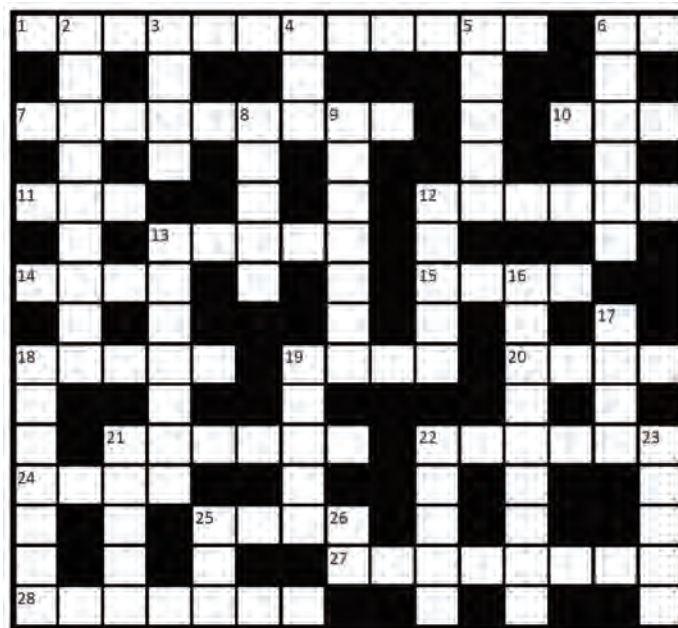
Solvent-free co-ordinates - the location of the Betty Ford clinic

Rectifying section - the complaints department

Stripping section - the dressing rooms at the Windmill Theatre

Theoretical stage - the written part of the driving test

Theoretical plate - a large flying saucer

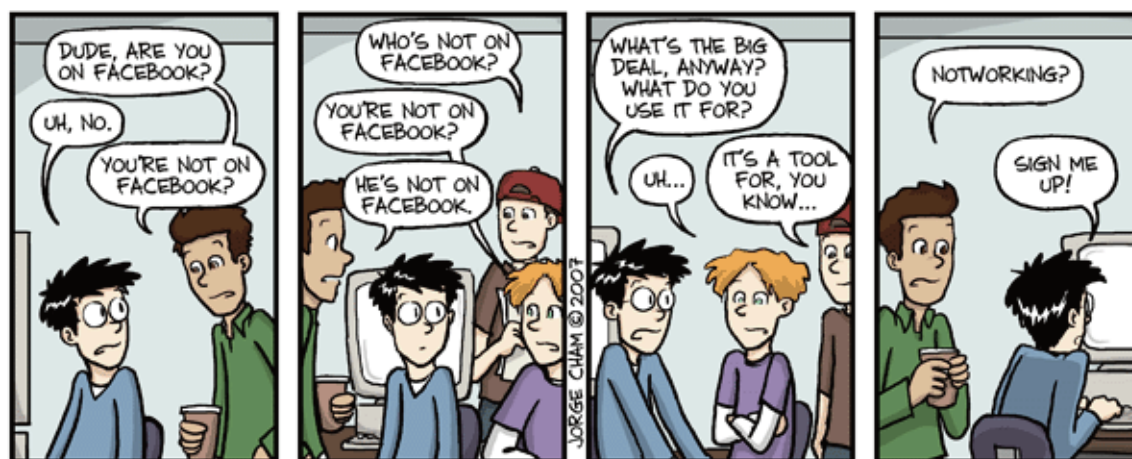


Across Clues

1. Transfer of thermal energy (4,8)
6. Rare grey-white metal (2)
7. $\pi=k \cdot x$ (6,3)
10. State of matter (3)
11. Energy carrier (3)
12. Decrease in oxidation state (6)
13. Phase of water (5)
14. Small opening (4)
15. Gelatinous substance containing medium for growth (4)
18. Changes from solid to liquid (5)
19. Ionic compound resulting in neutralization (4)
20. Variation of 16 across (4)
21. Used for containing liquids (6)
22. Type of column bed (6)
24. Rip (4)
25. Material that stores energy (4)
27. Increase the rate of reaction (8)
28. $\text{CH}_3\text{CH}_2\text{OH}$ (7)

Down Clues

2. Anode is one (9)
3. Unit of pressure (4)
4. Pre-SI unit of energy (abbr) (3)
5. Instrument to measure quantity (5)
6. Discoverer of quantum physics (6)
8. Velocity without direction (5)
9. Catalyst support (7)
12. Trace (anagram) (5)
13. Separation unit (7)
16. Sterilisation unit (9)
17. $d[A]/dt$ (4)
18. Consisting of two or more substances (7)
19. Used to determine PSD (8)
21. Reactor type (5)
22. Tray (5)
23. 1 newton = 105 ... (5)
25. Causes motion of air (3)
26. Atomic number 57 (2)



WWW.PHDCOMICS.COM

Letters to the editor

We welcome comments from our readership. Please email us your views and suggestions for future articles on ceb-focus@ceb.cam.ac.uk

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