

NEWSLETTER



Welcome to the Autumn Edition

Issue 11

Nov 2014

Message from CPSE Director, Professor Nilay Shah



Professor Nilay Shah

Welcome to the Autumn edition. I hope that you all had a great summer. I would like to congratulate Eva Sørensen for winning the highly prestigious Inspiration Award for Women and also for her promotion to Professor. Congratulations also to Cleo Kontoravdi for the birth of her daughter. I would like to thank Krishnan for doing an excellent job organising the CPSE Seminar Series. Ruth Misener and Panos Parpas will be taking over from Krishnan and have planned some interesting seminars which I look forward to attending. The seminar video recordings will be available to Consortium Members through the website. The QS World University rankings were published and Imperial came second and University College London fifth in the world. This is a great beginning to the new academic year. I would like to take the opportunity to welcome our new PhD students and Research Associates. I would also like to welcome back existing staff and students.

This year, we mark the Centre's 25th anniversary. It is a privilege to be the Director and share the celebration with the founding father Professor Roger Sargent. The vision he had in 1989 still continues and the Centre remains a Centre of Excellence. Stratos Pistikopoulos will be giving the 21st Professor Roger Sargent Lecture and I hope to see many of you at the Lecture and the Annual Industrial Consortium Meeting on the 4th and 5th December.

This Newsletter includes an article on 'Engineering at the Cellular Scale: Understanding and Manipulating Information Processing Networks' by PhD student Aiman Alam Nazki. These technical articles have become popular and Consortium Members are encouraged to suggest topics that interest them.

Eva Sørensen Wins Inspirational Award



Eva Sørensen at the Award, Cadogan Hall, 2 Oct 2014

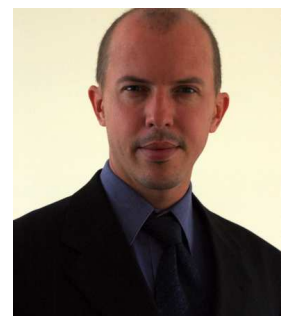
Eva Sørensen won the highly prestigious Inspiration Award for Women which supports Breakthrough Breast Cancer. Eva featured on a list of luminaries which included JK Rowling, Judi Dench and Maya Angelou. You can read more on the Award and Eva's Promotion on page 2.

Dates for your diary!!
CPSE's 25th Anniversary Celebration
4th - 5th December 2014...on page 5.

Sustainable Gas Institute Launched



Nigel Brandon,
Director



Adam Hawkes
Deputy Director

CPSE Academics Professor Nigel Brandon as Director, with Dr Adam Hawkes as Deputy Director, will head the recently launched Sustainable Gas Institute. The Institute is a collaboration between the UK and Brazil, and the first of its kind anywhere in the world. Researchers will focus on technologies that could underpin a role for natural gas in the global energy landscape. Continues on page 2.

Imperial and UCL in the top 5 in QS World Ranking

QS World University rankings was recently released. Imperial is ranked second in the world of Universities joint with Cambridge University. University College London came fifth place, joint with Oxford University. In further rankings, the Shanghai Jiao Tong Academic Ranking of World Universities ranked Imperial's Faculty of Engineering first in Europe and sixth in the world (<http://www.shanghairanking.com/>). You can read more from the QS site: <http://www.topuniversities.com/>

Inspirational Award



Eva and daughter Kristin

From page 1. Eva Sørensen was nominated for the Inspirational Teacher Award alongside Maya Angelou, and she ended up winning an Inspiration Award! Eva was recognised for her outstanding contributions to education both at UCL and further afield. Eva took her

daughter Kristin to the ceremony. Following in Mum's footsteps, Kristin also won BLD Foundation TCTL Bright Star for 2014 Award. <http://www.inspirationawards.co.uk/about/index.html>

More News on Eva!!

Eva has been Promoted to Professor. Congratulations Eva for the deserved Award and Promotion!



Professor Geoffrey Maitland took part in a panel debate called the 'the Future of Shale Gas in the UK.' Professor Maitland is quoted "calling for all stakeholders to engage in a balanced and factual debate, which considers all the issues - short- and long-term." You can read the article in

Click Green: <http://www.clickgreen.org.uk/>

Roochi Solanki (supervisor Amparo Galindo) successfully defended her PhD thesis. Congratulations Roochi!

2014 AIChE CAST Winners



Dr Benoit Chachuat



Dr Ruth Misener

CPSE academics won two of the AIChE CAST Awards. Dr Benoit Chachuat received the CAST Outstanding Young Researcher Award. The award is given to individual under the age of 40 for outstanding contributions to chemical engineering computing and systems technology literature. Benoit is the first to have won this award outside of the US. Dr Ruth Misener won the David Smith, Jr. Graduation Publication Award. The award is given to "an individual for outstanding published work in chemical engineering computing and systems technology." The publication consists of work done while pursuing graduate studies. Ruth received the award for her manuscript: R. Misener, C. A. Floudas, GloMIQO: Global Mixed-Integer Quadratic Optimizer, Journal of Global Optimization, volume 57, pp.3-30, 2013. <http://link.springer.com/article/10.1007/s10898-014-0249-0>

Cleo Kontoravdi and husband George welcomed their baby daughter on 23rd September. Congratulations Mum and Dad!

CPSE Students Win the Majority of PhD Symposium Prize Again!



David Garcia Munzer receiving his prize

CPSE students dominated the Department of Chemical Engineering PhD Symposium once again and won most of the prizes! The Academic and Industrial Panel, voted David Garcia Munzer second prize (supervisor Prof Sakis Mantalaris) and Mario Villanueva third prize (supervisor Benoit Chachuat) for Oral Presentations.

The Students Voted Mario Villanueva first prize and David Garcia Munzer second prize.

For poster prize, the Students voted Maria Fuentes Gari (supervisor Sakis Mantalaris) and Jai Rajyaguru (supervisor Benoit Chachuat). Well done CPSE Students!!



Mario Villanueva

Sustainable Gas Institute

From page 1. The Sustainable Gas Institute will operate on a hub and spoke model, with the hub at Imperial College and spokes at centres of excellence that are currently being established in Brazil and eventually in other locations around the world. According to Professor Brandon: "The translation of our research into partners in industry, other universities and into government is a vital role that we will play."

Dr Sergei Kucherenko was an instructor at the Eighth Summer School on Sensitivity Analysis of Model Output (SAMO 2014), Italy: <https://ec.europa.eu/jrc/en/event/training-course/samo-2014>

PhD Student Profile - Aiman Alam-Nazki



Aiman Alam-Nazki

At the end of my final undergraduate year in chemical engineering at the University of Iowa, USA, I was confident about my decision to go to graduate school. I already had two years of experimental experience working in various biochemical engineering laboratories both in academic and industrial settings (in addition to the prescribed coursework) and graduate school felt like the natural next step. I was also interested in delving deeper into the core chemical engineering subjects (especially dynamic behavior and process control) by way of graduate courses and eager to work on a problem, or maybe if I got lucky, a set of problems in biological systems/control engineering which would combine all my different interests.

And I did get lucky when I joined my supervisor, Dr. Krishnan, initially as a Masters student (in Chemical Engineering specializing in P.S.E.) and later continued as a PhD student. In my Masters and PhD thesis, I have worked on a number of problems, which involved understanding different aspects of signal transduction in cellular networks. I have used both mathematical modeling as well as systems engineering approaches to study how molecular networks control specific cellular processes. Developing theoretical and systems frameworks to understand different aspects of the complexity and organization of signal transduction in cells has also been a key aspect of my thesis work.

Initially, for my MSc thesis, I worked on understanding the mechanism underlying a biological process called chemorepulsion¹ (cell movement away from a chemical cue), an intriguing problem with many important applications in cancer cell migration and nerve injury and regeneration (to name a few). In my PhD thesis, I started by working on systems design based approaches to

elucidate aspects of functioning of networks controlling cell migration². A large part of my thesis work has revolved around understanding spatial effects and spatial control of signal transduction^{3,4,5} - a topic that is of considerable emerging interest in the community. I have been working on multiple aspects of this area, combining understanding basic aspects of spatial effects in signaling (relevant in multiple contexts) and elucidating spatial signaling in concrete systems. Each different part of my thesis has used different tools and approaches, and this has been enriched my PhD experience.

After I joined Dr. Krishnan as a Masters student and began working on my project I was thoroughly enticed by the prospect of working on a topic in a field that was a haven for interdisciplinary research. Standing right at the interface of so many disciplines including engineering, physics, chemistry, mathematics/computing and biology was a huge motivating force for me to pursue further research as a PhD student in this area- I found the problems interesting and the approaches we employed to elucidate different aspects of biological complexity were natural to my training as a chemical engineer. I am now nearing the end of my PhD and I am looking forward to becoming an independent researcher and branching out on my own.

Aiman's technical article on 'Engineering at the Cellular Scale: Understanding and Manipulating Information Processing Networks' is on a separate attachment with this newsletter.

References

- Alam-Nazki, A., Krishnan, J., 2010. *J. Theor. Biol.* 266, 140-153
 Krishnan, J., Alam-Nazki, A., 2011. *J. Theor. Biol.* 273, 80-99
 Alam-Nazki, A., Krishnan, J., 2012. *BMC Syst. Biol.* 6:83 [BMC Systems Biology Highly Accessed article]
 Alam-Nazki, A., Krishnan, J., 2013. *Biophys. J.* 105:1720-1731
 Alam-Nazki, A., Krishnan, J., 2014a. *Biophys. J.* (under revision)
 Alam-Nazki, A., Krishnan, J., 2014b. (in preparation)

Visit to Tsinghua University



Stratos Pistikopoulos and Pei Liu

Professor Stratos Pistikopoulos was invited to give a lecture at Tsinghua University. During the visit, he met his former PhD student Pei Liu, Associate Professor and other faculty staff.

Grants Awarded to CPSE's Newest Academic



Dr Niall Mac Dowell has won £1.6m grants in his first year as Lecturer. His two latest awards include a grant from EPSRC for £996,574 for a project 'Multi-scale Energy Systems Modelling Encompassing Renewable, Intermittent, Stored Energy and Carbon Capture and Storage (MESMERISE-CCS)'. The second grant is from UKCCSRC for £289,026 on 'Process-performance indexed design of task-specific ionic liquids for post-combustion CO₂ capture.'

New Process Automation Programme



A new part-time postgraduate programme in Process Automation has been launched by Professor Nina Thornhill and Dr Daryl Williams. To enhance the programme and provide a bespoke teaching experience, Professor Thornhill commissioned a Process Automation Rig. The rig was built by the workshop staff in the Department and ABB provided the control system

software and programming. The rig makes it possible to offer a wide variety of process automation and process control experiences for students, especially for working with a variety of control structures and control algorithms and the IEC 61131 real-time programming languages: <http://www3.imperial.ac.uk/chemicalengineering/teaching/postgraduate/processautomation>

Research Associate Dr Giorgos Kopanos (supervisor Prof Stratos Pistikopoulos) was offered a Lectureship position at Cranfield University. All the best Giorgos!

Research Associate Dr Eirini Velliou (supervisor Prof Stratos Pistikopoulos) is starting a new job as a Lecturer at Surrey University. Congratulations Eirini!

CPSE Seminar Series



Dr Krishnan

Dr Krishnan is stepping down after six years of organising the CPSE Seminar Series. Since 2008, we have enjoyed wonderful seminars that Krishnan carefully picked. Dr Ruth Misener and Dr Panos Parpas will be taking over from Krishnan. Ruth and Panos have lined up distinguished national and international academics for the next series which you can find on page 5. The seminar video recordings will also be available to Industrial Consortium Members through the website in the 'Members Only' section.

Prof Pistikopoulos Awarded Doctor Honoris



University Polytechnic of Bucharest awarded Professor Stratos Pistikopoulos, the academic title of Doctor Honoris Causa. <http://www.upb.ro/en/>

From Duathlon to Eating Cakes



Sara Budinis and Cristina Romano

Cristina Romano and Sara Budinis hosted Macmillan Coffee Morning on Friday 26 September. They baked delicious cakes and managed to get other bakers involved! It was a great success and they raised a total of £988.60 from both donations and the 100s & 1000s sweepstake. <http://coffee.macmillan.org.uk/>



Edo Boek, Anna Kubic and Isaac Sugden

On 14 September, Edo Boek, Nikola Peric, Ruth Misener, Isaac Sugden and eleven members of the Dept of Chem Eng completed the 2014 London Duathlon in Richmond Park. It was a gruelling 10km run, 44km cycle, 5km run! They raised £2,500 for the Alzheimer's Society and thanked those who generously sponsored them. There is still opportunity to donate towards this worthy cause: <http://www.justgiving.com/Imperial-2014>.



Nikola Peric



Ruth Misener

CPSE's 25th Anniversary Celebration

4th - 5th December 2014

CPSE's **25th Anniversary** celebrations will take place during the **Annual Consortium Meeting, 4th and 5th December 2014**. Part of the event includes the **Twenty First Professor Roger Sargent Lecture** which will be delivered by **Professor Stratos Pistikopoulos FREng**. The Lecture titled **"Multi-Parametric Programming & Control 25 years later: what is next?"** will take place on **4th December 2014 at 17:30**, Lecture Theatre 1 (room 250), Department of Chemical Engineering.

The programme is available on CPSE website:
<http://www3.imperial.ac.uk/centreforprocesssystemsengineering/newsandevents>



Optimisation Conference 15-17 June 2015

The 17th British-French-German Conference on Optimization is the 17th of the series of French-German meetings which started in Oberwolfach, Germany in 1980. Since 1998, the conference has been organized under the participation of a third European country. This time it is jointly organized with Britain, and takes place at Imperial College London. The conference will consist of invited plenary talks, parallel invited and contributed sessions.

The conference will address all aspects of optimization and its applications, including:

- optimization theory and algorithm design
- robust and stochastic optimization
- variational inequalities and convex analysis
- control theory
- applications in image processing, finance, energy, operations management and engineering

The conference is organised Department of Computing, Imperial College London, and Centre for Process Systems Engineering, Imperial College London, and Imperial College Business School.

For more information, please visit the conference website: <http://optimisation.doc.ic.ac.uk/bfg2015/>

CPSE Seminar Series 2015

6 February 2015, 3pm

Professor Alexander Mitsos, RWTH Aachen
Expertise: Energy systems; Bilevel optimisation; Global optimisation; Process Systems Engineering
<http://www.avt.rwth-aachen.de/AVT/index.php?id=68&L=1&showUid=688>

11 February 2015, 11am

Professor Philippe Toint, Université de Namur
Expertise: Algorithm development for nonlinear optimisation spanning: convergence theory, numerical considerations, and software development
<http://perso.fundp.ac.be/~phpoint/toint.html>

13 March 2015, 3pm

Professor Ana Barbosa-Povoa, University of Lisbon
Expertise: Operations management; Supply Chain Management and Optimisation; Process Systems Engineering
<https://fenix.tecnico.ulisboa.pt/homepage/ist13662>

15 April 2015, 3pm

Professor Leo Liberti, École Polytechnique Paris
Expertise: Mixed Integer Nonlinear Optimisation, Global optimisation, Combinatorial Optimisation, Distance Geometry
<http://www.lix.polytechnique.fr/~liberti/>

13 May 2015, 11am

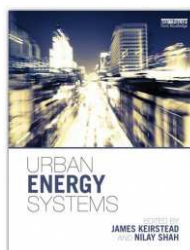
Dr. Robert Bixby, Gurobi
Expertise: Linear and Mixed Integer Optimisation; Optimisation Solver Software
<http://www.linkedin.com/pub/robert-bixby/58/757/564>

September 2015, TBC

Professor Kim Chuan Toh, National University of Singapore
Expertise: Algorithms, Applications, and Theory for Matrix Optimisation; Large-scale Semidefinite Optimisation
http://www.nus.edu.sg/uawards/2003/winners/toh_kim.html

All seminars will be held in: CPSE Seminar Room, Roderic Hill C615, Department of Chemical Engineering, South Kensington Campus, London, England SW7 2AZ, UK

For our Events, please check:
www3.imperial.ac.uk/centreforprocesssystemsengineering/newsandevents



The CPSE Newsletter aims to keep members of the Industrial Consortium, Staff and Students updated on Centre activities. If you have any comments, or would like to add to the next issue, please email: Miss Senait Selassie: s.selassie@imperial.ac.uk.