

# ChemEng *focus*

March 2013

Volume 6, Issue 1

## Thanks to our Corporate Supporters

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## The Department of Chemical Engineering to host “The Australia-China Workshop on Novel Carbon Capture Technologies”

The Australia-China Workshop on Chemical Sciences and Engineering Novel Carbon Capture Technology (ATSE). The presentations will engage with ongoing coal research projects, focussing on technologies such as chemical looping, drying, advanced combustion, and gasification. This workshop is sponsored by ATSE under the Australia-China Joint Coordination Group on Clean Coal Technology - Commonwealth of Australia and the BCIA. For details, please contact Associate Professor Sankar Bhattacharya or Mrs Jill Crisfield.

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## Now open—2013 Distinguished Alumni Awards

Join us in recognising the achievements of our worldwide alumni and student communities by nominating someone you know for a 2013 Distinguished Alumni Award.

Nominations must be submitted online and close 5pm (AEST), Monday, 15 April 2013.

**Visit our nomination website now.**

This year we will celebrate the 20th anniversary of the awards at a gala ceremony in September.

## Carbon sponge could soak up coal emissions

Emissions from coal power stations could be drastically reduced by a new, energy-efficient material that adsorbs large amounts of carbon dioxide, then releases it when exposed to sunlight. In a study published today in *Angewandte Chemie*, Monash University and CSIRO scientists for the first time discovered a photosensitive metal organic framework (MOF) - a class of materials known for their exceptional capacity to store gases. This has created a powerful and cost-effective new tool to capture and store, or potentially recycle, carbon dioxide.

By utilising sunlight to release the stored carbon, the new material overcomes the problems of expense and inefficiency associated with current, energy-intensive methods of carbon capture. Current technologies use liquid capture materials that are then heated in a prolonged process to release the carbon dioxide for storage.

Associate Professor Bradley Ladewig of the Monash Department of Chemical Engineering said the MOF was an exciting development in emissions reduction technology.

"For the first time, this has opened up the opportunity to design carbon capture systems that use sunlight to trigger the release of carbon dioxide," Associate Professor Ladewig said.

"This is a step-change in carbon capture technologies." A promising and novel class of materials, MOFs are clusters of metal atoms connected by organic molecules.

Due to their extremely high internal surface area - that could cover an entire football field in a single gram - they can store large volumes of gas.

PhD student Richelle Lyndon and lead author of the paper said the technology, known as dynamic photo-switching, was accomplished using light-sensitive azobenzene molecules.

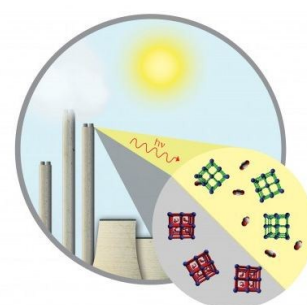
"The MOF can release the adsorbed carbon dioxide when irradiated with light found in sunlight, just like wringing out a sponge," Ms Lyndon said.

"The MOF we discovered had a particular affinity for carbon dioxide. However, the light responsive molecules could potentially be combined with other MOFs, making the capture and release technology appropriate for other gases."

The researchers, led by Professor Matthew Hill of CSIRO, will now optimise the material to increase the efficiency of carbon dioxide to levels suitable for an industrial environment.

The study was supported by the Science and Industry Endowment Fund.

Read more about carbon capture in Associate Professor Ladewig's article published in [The Conversation](#).



A new material powered by sunlight could help to drastically cut carbon emissions.

## IChemE Senior Moulton Medal 2012 award

The IChemE Senior [Moulton Medal](#) 2012 has been awarded to Tarrant Falke, Andrew Hoadley, David Brennan and Sarah Sinclair, for their paper "[The sustainability of clean coal technology - IGCC with/without CCS](#)", which was published in *Process Safety and Environmental Protection* in January 2011. The Senior Moulton Medal is awarded by IChemE annually for the most meritorious paper published in an IChemE journal during the last year. IChemE rewards papers that are forward-looking in topic areas that will be important in the future, or papers on traditional areas which give a good explanation

to non-experts. The paper was based on Tarrant Falke's 4th year CHE4170 design project, which also won the Pratt Prize, Aker Kavaerner Design Prize and the IChemE McNab medal. This is quite an achievement for an undergraduate student, with support from the Monash team. This is also David Brennan's second win of the Moulton medal - he was also awarded the medal in 1998. The medal will be presented at the IChemE AGM in the UK this May.

## Meet our new staff

### Academic-Teaching, Esther Ventura-Medina



Esther earned her Bachelor of Science and Masters of Science degrees in Chemical Engineering from Simon Bolivar University (Venezuela) and her PhD in Chemical Engineering (Minerals Processing) from UMIST, Manchester (UK). After her PhD Esther continued to work at Manchester as a Research Associate at UMIST and then went to do a Post-Graduate Certificate in Education (Secondary Mathematics)

where she gained great experience in the area of Education.

In 2005 Esther joined the School of Chemical Engineering and Analytical Science at The University of Manchester in a teaching-focused academic post as a Teaching Fellow. Her work has been focused on improving the student university experience and student support. Esther has lead funded projects in the areas of student support and innovative teaching methods such as PIPE (Pre-Induction Pack for Engineers) to support the School-University transition, Introducing Enquiry-Based Learning (EBL) to first and second

year units and has also introduced a variety of online tools to enhance and support face-to-face teaching such as e-assessments, podcasts, peer-assessments within the Virtual Learning Environment as well as Scenario-Based Learning Interactive to support EBL. Esther has also worked in curriculum development.

Esther has been involved in the delivery of units at all different levels in a programme (First year 'Chemical Engineering Design', 2nd year 'Solid-Fluid Systems', 3rd and 4th year 'Synthesis and Design' and 'Design Project' as well as 'Laboratory projects', 'Foundation Year projects') and working with classes of up to 250 students. In her time at Manchester Esther was the Director of Undergraduate Studies from 2010 until her departure in January 2013 and helped to introduce several administrative reforms in the UG operation.

Esther is very passionate about Learning and Teaching and is currently interested in curriculum development and the perspective of students, industry and educators as well as the use and impact of social media on learning. At Monash she will be involved in the delivery of 'Engineers in Society', 'Heat and Mass transfer', 'Process Design' and 'Design Project'.

### Adjunct Research Fellow, Dr Laura-lee Innes

Laura-lee works with the Environmental Protection Authority (EPA) where she is the Principle expert on Waste (Policy and Technical). She is originally from Canada where she did a PhD on the containment of industrial waste. Whilst at Monash, Laura-lee plans to develop ideas for long term strategies for waste management, and collaborating with other academics on grants and projects, including EPA projects. She will also be sharing her knowledge through guest lectures and in the long-

term through 4th year projects.

Chemical Engineering and the EPA are both partners in the new Victorian Centre for Sustainable Chemicals Manufacturing, which also involves Chemistry and other depts at Monash, as well as CSIRO. Laura-lee plans to spend one day each week at Monash (currently Thursdays) and her office is off the tea room in Building 36.

### Company participation?

- **Would your company like to offer any of the following?**
  - **Vacation Work Experience to our undergraduate students**
  - **Graduate Positions (Undergraduate and Postgraduate)**
  - **Speak to undergraduate students at a lunch time seminar about your company**
  - **Become a corporate sponsor or donate a student prize**

**Would you like to receive future issues of ChemEng Focus? If so, please email [lilyanne.price@monash.edu](mailto:lilyanne.price@monash.edu) and we will add you to our newsletter mailing list.**

**Department of Chemical Engineering**  
Monash University  
PO Box 36  
Clayton Victoria 3800  
Tel: +61 3 9905 1872  
Fax: +61 3 9905 5686

## A trip down memory lane—Class of 1978



**Left to Right**

**Front row:** Colin Nash; Terry O'Donnoghue; Huong, Pham Thi Thanh; Dan, Phuong Dung; Prof Potter; Despina Tramoundanis; Carlos Tiu

**Middle row :** Mark Lapworth; Peter Uhlherr; Young, Huong Chee; Russell Williams; Bruce Watkins; Chuong, Nguyen Kim; Chee, Ngee Onn; Damrong Khummongkol; Che Kamaruddin bin Mohamad; Alan Holder;

**Back Row:** Greg Clements; Barry Windridge; Malcolm Potter; Ramli Wan Daud; Unknown; Low, Guan Shin; Harry Lehrer; Nguyen, Quoc Dzuy

## Contributing images to MONPIX

Monash University Archives currently holds approximately 50,000 images that document the history, buildings, students and staff of the university and its predecessor institutions. These include black and white prints, colour prints, negatives, slides and digital images. Over 7,000 of these images are available on-line for research and study purposes. A Monpix search criteria " chemical engineering" <http://www.adm.monash.edu.au/records-archives/archives/monpix/search.html> shows many photos of final class years. However, some years are missing from the collection. If you have a photograph taken during your time at Monash University please consider contributing the images to MONPIX. The University

Archives is always on the lookout for more images for its database. If you have images relevant to the history of Monash University, and you would like to donate them to the Archives, please contact [Archives](#).

### University Archives

Telephone: (03) 9905 3674

Fax: (03) 9905 9966

Email: [archives@monash.edu](mailto:archives@monash.edu)



## Partnership to strengthen engagement with China

Monash has recently become a Gold Level Partner of the Australia China Alumni Association (ACAA), a not-for-profit organisation that supports alumni of Australian universities who are living in China.

The ACAA, which has offices in Beijing, Shanghai and Guangzhou, provides its members with career and development support, as well as opportunities to attend networking and social events and to participate in an annual awards program.

It also supports the development of alumni networks across China, as well as industry-specific interest clubs. The organisation can be an important touchstone for alumni, particularly for new graduates returning to China after study at Monash.

The ACAA is funded by 29 Australian partner universities as well as the Australian Government's Australian Education International.

The Office of the Vice-Chancellor and President, Alumni Relations and Employment and Career Development are the key beneficiaries of the new partnership.

Louise McCarthy, Director of Alumni Relationship, said the partnership would support the University's transition into China and promote the Suzhou graduate school to alumni and their families and friends.

"We believe the partnership with the ACAA will complement our campus in Suzhou and provide new opportunities for alumni in China to reconnect with Monash and each other," Ms McCarthy said.

"Our Employment and Career Development office also sees the relationship as a means of supporting positive employment outcomes for our graduates in China." For any enquiries regarding the partnership please email Amy Merlo, amy.merlo@monash.edu.

## Linked in to Chemical Engineering Alumni Group

We have started a LinkedIn group for all alumni from Chemical Engineering at Monash University to keep in touch with each other, and also with the department. This includes our former undergraduate students, postgraduate students, as well as academic, technical and professional staff. "[Monash Chemical Engineering Alumni](#)" on LinkedIn.com.

## SMUCE Mentoring Program

This year SMUCE, the Department of Chemical Engineering and Monash Alumni are working together to produce a Chemical Engineering Mentoring Program. This is a fantastic opportunity for students to hear from past Monash chemical engineering students about using their degree, practise networking and gain some useful life guidance. Over the course of the year, students will have a chance to learn from their mentors whether it be by meetings, skype, e-mail or phone conversations. There will also be events run both by Monash Alumni and SMUCE to further help develop students.

For more information and to register, please follow the [link](#). Should you have any further questions regarding the program, please contact [SMUCE](#)

## Australian Endeavour Award gave me networking opportunities and skills development—Kathryn Waldron

I was lucky enough to be awarded the Australian Endeavour Award, for a Research Fellowship contributing to my PhD degree, which provided for me amply during my stay in Xiamen, China. When I found out I had received the award, I saw endless possibilities. The award gave me to opportunity to work with my supervisor Professor Dong Chen and to collaborate with some of my fellow researchers at Xiamen University; whilst being immersed in the culture and lifestyle that is China. Having lived in Melbourne my whole life and never having a stamp in my passport, the idea of living alone for five months in China was a little terrifying. However I was not alone. My supervisor, Dong, ensured that I was well looked after and my fellow students were incredibly friendly and willing to help in any way they could. The students were all eager to practice their English with me and laugh in turn at my attempts at Mandarin.

China was not at all what I expected. Xiamen is an absolutely beautiful island filled with gardens, the university campus is a garden paradise filled with lovely walks around lakes, flowers everywhere, and I was delighted to see even a few gum trees! The city didn't fully wake up until close to 11 am but it never really went to sleep either; there was such an energy filling the atmosphere with people always bustling about. Every path seemed to be lined with people determined to sell you their wares; the prices usually negotiable.

My work there was two-fold: 1) investigate the spray drying of probiotics (good bacteria) in order to improve their shelf-life and delivery, and 2) help organize and run the 18th International Drying Symposium which was held in Xiamen during my time there. Both tasks were challenging, exciting and provided me with fantastic experiences. I feel I have grown as a person, more capable of facing challenges, more flexible in my wants and needs, and better equipped to bravely face whatever my future may hold. Without this amazing opportunity I would not know that I was capable of such a different life. This experience was unique to research; I know that if I was not undertaking a PhD degree, I would never have been given such a fantastic opportunity. I am truly thankful to both my supervisors Dong Chen and Cordelia Selomulya for urging me to go, and the Australian Endeavour Awards for providing me with the means to go.

China presented many opportunities to develop networks and build skills. That was just one part of why I applied for the Endeavour Award. I also applied for my own career prospects after completing my PhD degree.

To those who are thinking of applying for an Endeavour Award, take it with both hands and look at the opportunities that lie ahead. I took every opportunity and really made the most of it.

[Applications](#) for the 2014 Endeavour Awards open in April 2013.

## Australia Day Honours

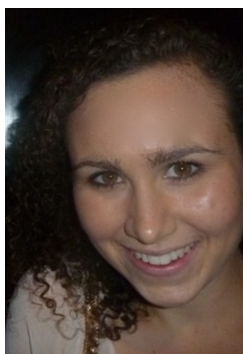
The Department congratulates alumnus Emeritus Professor Owen Potter on being amongst those recognised in the Australia Day 2013 Honours List. Emeritus Professor Potter was made a Member of the Order of Australia (AM) for his significant service to chemical engineering and to the Catholic Church. In 1963, Professor Potter joined Monash University as Foundation Professor and became Chair of the Department of Chemical Engineering in the same year until 1990.

Professor Potter invented steam fluidised bed drying of solids such as Victoria's lignite coal. Using his patented invention, calculations showed that the thermal efficiency

of a power station using lignite coal could be increased almost to the same level as is achieved by power stations using bituminous coal. Professor Potter has won a number of prestigious awards, including the Arnold Greene Medal from the Institution of Chemical Engineers UK, the ICI (UK) Award for Innovation in Drying and the Kernot Medal from the University of Melbourne. In honour of his achievements and contributions within the Department of Chemical Engineering, Monash University created the Owen Potter Award for Chemical Engineering Excellence.

## Allina Fawcett

**Bachelor of Engineering (Chemical Engineering) and Bachelor of Commerce**



"I like that engineering has practical applicability and as an engineer you can work in a range of different areas." Allina Fawcett chose Monash University for many reasons including the reputation of the Engineering Faculty and the wide range of extra-curricular activities the university has to offer. The deciding factor was that Monash offered the double degree she wanted to do, a Bachelor of

Commerce and a Bachelor of Engineering.

"Furthermore, the other opportunities Monash offer are amazing, in particular the wider range of exchange programs. It made me realize that Monash is a university with a global outlook which is so important in today's society."

Like many engineering students, Allina chose engineering because it played to her strengths. Having always excelled in maths and science, engineering seemed like the right choice. Engineering also involves problem solving, which Allina enjoys. "I like that engineering has practical applicability and as an engineer you can work in a range of different areas."

Allina chose chemical engineering as her field of study.

"I chose chemical engineering because I liked chemistry and found it challenging, but at the time I did not fully appreciate how much chemical engineering can actually offer. There are so many different areas you can work in –from petrochemicals, to mining, research, pharmaceuticals, food processing cosmetics and sustainable processing."

The highlight of Allina's course has been her exchange to Malaysia, at the Monash Sunway Campus.

"It was a once in a lifetime opportunity where I was immersed in a different culture, made new friends and studied in a different environment. It also allowed me to travel and explore not only Malaysia, but a lot of other parts of South East Asia too. I believe that travel and understanding other cultures is a fundamental part of education."

"Once I graduate, I would like to work as a process engineer in petrochemicals or mining, hopefully coming up with sustainable solutions to engineering problems. I wish to have a diverse career and work with many different processing areas and to use the commerce side of my degree too in a managerial role. Lastly, I would love to work overseas!"

## Alex Holdsworth

**Bachelor of Engineering (Chemical Engineering) and Bachelor of Commerce**



"I was attracted to engineering due to its combination of maths and science and application of these concepts to real world problems."

Alex Holdsworth knew Monash University was the right choice because they offered an engineering/commerce double degree combination, which is exactly what Alex wanted to study.

"Engineering and commerce are two areas I have always been interested in and I wanted to be able to study both."

"I was attracted to engineering due to its combination of maths and science and application of these concepts to real world problems. I have always enjoyed problem solving so this aspect of engineering has always appealed to me."

Alex is currently studying chemical engineering. Chemical engineering involves designing and optimising chemical processes for the purpose of converting raw materials into valuable products with further practical uses.

"I like the idea of working on and designing large-scale processes and the innovation associated with this."

"In addition to this I have always had a general interest in the practical application of chemistry and figured chemical engineering would be the best way for me to foster this interest."

On top of his study, Alex is a part of the Leadership in a Technological Environment program and is in his third and final year. "The LITE program has been a great opportunity to learn about many topics involved in engineering that may not be covered in regular engineering subjects such as critical thinking, innovation and entrepreneurship. I would recommend future students do a double degree with engineering. Another degree, in my case commerce, provides a great balance and definitely enhances future employment opportunities."

## Elly Thorne

### Bachelor of Engineering (Chemical Engineering) and Bachelor of Science

Elly Thorne is currently completing a double degree in Science and Engineering (Chemical).

"I was initially introduced to engineering through the Women in Engineering program I participated in at school. At that stage I wasn't totally convinced that engineering was for me. It was halfway through Year 12 that I found the course that combined both my strengths and passions."

"With the double degree, we get to choose our engineering stream upon enrolment. It was the option to enter the cosmetics and pharmaceuticals industries that made me choose Chemical Engineering."

As Elly explains, "Chemical Engineering is primarily a combination of chemistry, physics and mathematics. As Chemical Engineers, we create, design, develop and

operate processes that alter materials to make them into more valuable and practical products."

"My favourite thing about the course is that I'm constantly being challenged and asked to think outside the box. The real life applications also reassure me that what we are learning is invaluable to our future careers."



Throughout her time at Monash, Elly has been involved with the Monash Engineering Students Society (MESS) and also went to the Australian University Games with the Monash Netball Club.

After graduating, Elly hopes to work in the cosmetics industry.

"I'd like to be involved in designing and manufacturing make-up, skin care and other cosmetic products. Eventually, I'd really love to develop and produce my own range of cosmetics."

## Workshop- Sustainability Initiatives in Industry and Education

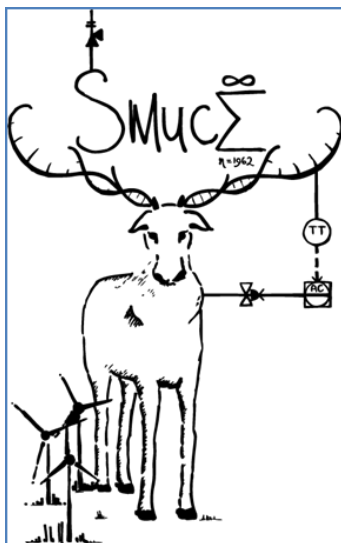
A workshop was held on Wednesday 21st November at Monash, Clayton on 'Sustainability in the Process Industries – Implications for Practice and Education'. The occasion marked the launch of a new book entitled 'Sustainable Process Engineering' written by David Brennan and published by Pan Stanford. The workshop was attended by academic staff, research staff and students, a range of visitors from CSIRO and industry and some family members.

The workshop was chaired by Andrew Hoadley from the chemical engineering department. John Lear, process development manager at Orica, and Paul Taranto, lead contact engineer at Qenos, reviewed a range of sustainability challenges in their companies at the Botany and Altona sites. The challenges included design of effluent treatment plants, minimizing emissions, meeting more stringent environmental standards, and dealing with encroachment of urban growth adjacent to their sites. David Brennan then outlined his new book entitled 'Sustainable Process Engineering - Concepts, Strategies, Evaluation, Implementation.' Department

chair, Karen Hapgood concluded the proceedings and thanked the speakers.

The key objectives of David Brennan's book are to identify opportunities to make process plants more sustainable, and to widen system boundaries to include utility supplies, interconnected plants and industries, and entire product life cycles. Emphasis is on identification and minimization of waste at source in process and utility systems. Evaluation encompasses environmental (through life cycle assessment), safety, economic and sustainability criteria. Implementation is explored through planning, design, project development and operational activities. Case examples and problems are included reflecting current industry challenges. The book is intended primarily for undergraduate chemical engineering students, but is potentially of wider interest for both students and practicing engineers and scientists. Details of the book can be found at [Pan Stanford](http://www.panstanford.com) website.

## Society of Monash University Chemical Engineers (SMUCE) President—Rhett Richardson



### Aims

The Society of Monash University Chemical Engineers (SMUCE) aims to bridge the gap between the classrooms and the world outside university. SMUCE is a student run society aiming to help and engage with the chemical engineering student community.

Through our hugely popular Industry Seminar Series we strive to expose our fellow

students to the chemical engineering world by regularly inviting industry members to visit. These visits involve a presentation to students regarding what it is like to be an engineer in industry and to learn about graduate and vacation opportunities. We also work closely with the Department of Chemical Engineering and Monash Employment and Careers Development to increase student awareness of the professional opportunities and to build upon the skills necessary to aid them in their professional undertakings.

Socially, SMUCE organises a number of events to facilitate networking opportunities between students, different year levels and academic staff. Such events include barbecues, game competition nights and our annual SMUCE Academic Dinner.

### SMUCE membership benefits include:

- Weekly Industry Seminars with FREE Pizza Lunch (confirmed companies include ExxonMobil, PwC, Orica, GSK, Lion, KPMG, Uhde Shedden, Worley Parsons, Australian Paper and DIAL)
- BBQ events and social nights throughout the semester
- Copy of the 2013 SMUCE Careers Guide
- Invitation to the 2013 Next Step and Peer Mentoring Programs
- Invites to careers nights, Pratt Prize evening and our combined events with Melbourne University and RMIT
- Discounted Annual Academic Dinner tickets
- All SMUCE members also receive a 10% discount on hot beverages from Cinque Lire Café

Membership is \$10 (or \$5 for MSA card holders) and SMUCE T-shirts are on sale for \$20 each.

In 2013 SMUCE is planning two new initiatives; an engineering mentor program and an industry seminar night, both of which would allow for an open dialogue between professional engineers and students.

### Company participation

If your company would like to connect with SMUCE and Monash Chemical Engineering students, please contact Jerard Koon, Academic Vice President.

### SMUCE

**“Linking students  
with Industry”**



#### Jerard Koon

**Academic Vice President [2013]**

**SMUCE**

**Society of Monash University Chemical Engineers**

C/O Department of Chemical Engineering,

Building 35, Room 226

Monash University, Clayton Campus 3800

## SMUCE Semester 1—Key Events Summary

EVENT NAME	WEEK	DATE AND TIME	LOCATION
SMUCE Membership Launch BBQ	1	Thursday, 07/03/13 12:00pm – 2:00pm	Kenneth Hunt Memorial Garden (behind SMUCE office)
SMUCE Industry Seminar - ExxonMobil	2	Thursday, 14/03/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Combined Lecture 1 – Pratt Prize & Design	3	Tuesday, 19/03/13 7:00pm – 8:30pm	Lecture Theatre E3, Building 32
SMUCE Industry Seminar – PwC + SMUCE OGM (elect 3 new 2 <sup>nd</sup> year reps)	3	Thursday, 21/03/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Combined Lecture 2 – Chemical Engineering Design	4	Tuesday, 26/03/13 6:30pm – 8:00pm (TBC)	Melbourne University (TBC)
SMUCE Industry Seminar - Orica	4	Thursday, 28/03/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Combined Lecture 3 – Chemical Engineering Design	5	Tuesday, 09/04/13 6:30pm – 8:00pm (TBC)	RMIT University (TBC)
SMUCE Industry Seminar - GSK	5	Thursday, 11/04/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Trivia Night	6 (TBA)	(TBA)	Sir John's Bar (TBA)
SMUCE Industry Seminar - Lion	6	Thursday, 18/04/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Industry Seminar - KPMG	8	Thursday, 02/05/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Industry Seminar – Uhde Shedden	9	Thursday, 09/05/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Industry Seminar – Worley Parsons	10	Thursday, 16/05/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Pratt Prize Night and Combined Pub Crawl	TBA	TBA	TBA
SMUCE Industry Seminar – Australian Paper	11	Thursday, 23/05/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201
SMUCE Industry Seminar – DIAL	12	Thursday, 30/05/13 12:00pm – 1:00pm	4 <sup>th</sup> Year Room Building 69, Room 201

**Committee Office:** Opposite lecture theatres E1-E3, Building 32

[smuce@monashclubs.org](mailto:smuce@monashclubs.org)

<https://www.facebook.com/SocietyOfMonashUniversityChemicalEngineers>

## The Department welcomes the following new HDR students starting their degree [January-March 2013]

### PhD:

- **Mr Jiunn Yuan Tan** [Supervisors: Dong Chen/Karen Hapgood/Meng Wai Woo]  
**Research Topic:** Hydrogen separation is essential as hydrogen plays an important role as a promising alternative clean energy source to carbon-based fuel. Zeolitic imidazolate frameworks (ZIFs) have attracted significant interest in hydrogen separation application due to its exceptional thermal and chemical stability as well as their superhydrophobic surfaces property which allows separation in the presence of steam. ZIF-7 in particular has the ideal pore size of 0.3 nm.
- **Mr Anthony De Girolamo** [Supervisors: Lian Zhang/Meng Wai Woo]  
**Research Topic:** Low-rank coal contains alkali and alkaline earth metals which are prone to cause slagging near the burners in a boiler, and fouling in both super-heater and reheater. This study aims to develop the use of a low-cost fuel additive, clay to minimise the ash fouling and slagging propensities in a low-rank coal-fired boiler.
- **Mr Jack Leong** [Supervisors: Bradley Ladewig/Matthew Hill (CSIRO)]  
**Research Topic:** This project will investigate the preparation of nanocomposite desalination membranes, in particular focusing on membranes with value added functionality such as anti-fouling properties and antibacterial properties. This will be accomplished through the design and synthesis of targeted nanocomposite materials, using conventional high performance engineering polymers such as polysulfone, and nanomaterials including silver nanoparticles (for antibacterial functionality), and porous zeolitic.
- **Mr Mahmood Al Lawati** [Supervisors: Wenlong Cheng/Wei Shen]  
**Research Topic:** Through nanomedicine, the unique properties of the nano-scale particles are being discovered and utilized to optimize the benefits. Gold nanoparticles with its properties have the potential to diagnose and treat the chronic disease of cancer. The approach of using gold nanoparticles and noble materials in general for selective targeting, molecular imaging, and selective therapy is general and flexible. It can be extended to many biological applications broader than cancer.
- **Mrs Nur Hidayah Zainan** [Supervisors: Sankar Bhattacharya/Klaus Hein]  
**Research Topic:** This research project will be concern about biogas production from *Chlamydomonas Reinhardtii* using both biochemical and thermochemical component. The significance of this study will lead to the production of biohydrogen and biomethane which is an alternative energy to fossil fuel. Furthermore, the use of microalgae as substrate will play a role in future energy systems.
- **Mr Stefan Smith** [Supervisors: Bradley Ladewig/Matthew Hill (CSIRO)]  
**Research Topic:** Project as part of the New Horizons Centre. Kiara Roberts has been contacted for additional information.
- **Mr Lim Wei Yap** [Supervisors: Wenlong Cheng/Yonggang Zhu]  
**Research Topic:** Aerogel is the lightest solid material which might be fabricated with various properties such as low thermal conductivity, high surface area and high flexibility. Copper nanowire could be fabricated into highly flexible aerogel which might be able to replace the usage of depleting Indium. Copper nanowire aerogel can be produce by freeze drying solution with copper nanowire.
- **Mr Peter Tsirikis** [Supervisors: Cordelia Selomulya/Magdalena Plebanski (Alfred Hospital)]  
**Research Topic:** Hollow granules are formed when liquid marbles, which are droplets of liquid encapsulated in hydrophobic powder are dried and the internal fluid removed. This project will explore the properties of this phenomenon with an aim to create "designer granules" which will hold implications in delivery of hydrophobic drugs with the required property specifications.

### Masters:

- **Ms Sally Sang Yue** [Supervisors: Karen Hapgood/Wei Shen]  
**Research Topic:** Hollow granules are formed when liquid marbles, which are droplets of liquid encapsulated in hydrophobic powder are dried and the internal fluid removed. This project will explore the properties of this phenomenon with an aim to create "designer granules" which will hold implications in delivery of hydrophobic drugs with the required property specifications.
- **Ms Praveena Raj** [Supervisors: Warren Batchelor/Gil Garnier]  
**Research Topic:** This research project will investigate the use of cellulose nanofibres as a foundation for membranes for green, recyclable materials for ultrafiltration. Well known and novel polyelectrolyte polymers will be used together with nanoparticle for strength development, functionalisation and porosity control. Methods will be developed to characterise the internal structure of the composite using mercury porosimetry, SEM, x-ray tomography or confocal microscopy.
- **Mr Sean Jun Liang Chew** [Supervisors: Dong Chen/Karen Hapgood/Meng Wai Woo]  
**Research Topic:** The proposed title would look into how spray dried particles can be used as micro-reactors, with each "reactor" encapsulated in a shell. This allows for transport and/or storage while the reaction is still taking place in the shell.

## Congratulations to the following HDR students completing their degree [December 2012-March 2013]

### PhD:

- **Dr Junfei Tian** [Supervisors: Wei Shen]  
**Thesis Title:** "Bioanalysis through patterning low-cost substrates"
- **Dr Tina Akbarzadeh Arbatan** [Supervisors: Wei Shen]  
**Thesis Title:** "Superhydrophobicity from biomedical to environmental applications"
- **Dr Mohammad A. Taher Al-Mayyahi** [Supervisors: Andrew Hoadley/Gade Pandu Rangaiah (National University of Singapore—NUS)]  
**Thesis Title:** "Multi-objective optimization of CO<sub>2</sub> emissions from refinery operations"
- **Dr Chiranjib Saha** [Supervisors: Sankar Bhattacharya]  
**Thesis Title:** "Chemical-looping combustion of Victorian brown coal"

### News in brief.....

- Congratulations to **Ruohui Lin** who received the "Best Poster" award, Meng Wai Woo who received the "Young Scientist" award for drying research and Xiao Dong Chen who received the "Taylor and Francis" Award for contribution to Drying Technology at the 18th International Drying Symposium held in Xiamen University.
- Congratulations to **Professor Huanting Wang** on his successful nomination to the ARC College of Experts. This is a wonderful recognition of Huanting's long term research contributions.
- Congratulations to **Professor David Boger** who received the Distinguished Engineering Alumni Award from Bucknell University. David Boger attended Bucknell University as a member of the Class of 1961, graduating with a Bachelor of Science in Chemical Engineering, and held memberships in both the engineering and chemistry honor societies. He continued his studies at the University of Illinois, and earned Master of Science and Doctor of Philosophy degrees in Chemical Engineering in 1965.
- Postgraduate student **Ms Joanne Tanner** and **A/Prof Sankar Bhattacharya** have received travel funding for gasification research in Germany under the Go8-DAAD scheme. They will also host at Monash two researchers from Germany under the scheme.
- **A/Prof Sankar Bhattacharya** has been invited to serve on the technical panel discussion on low-rank coal utilisation at the Clearwater conference in June - <http://www.coaltechnologies.com/pages/2013%20Program%20Announcement.pdf>
- **A/Prof Sankar Bhattacharya** has also been invited to present on coal gasification at a South Asian industry/government conference in Singapore on Coal upgrading and conversion. (<http://www.coalupgrade.com/speakers.php>). He will also present a day-long workshop there on coal gasification for power industry officials.
- Congratulation to **Dr Lizhong He** for his successful proposal of "Advanced biocatalysis for biomolecule production at high pressure" in the 2013-2014 Group of Eight Australia – Germany Joint Research Co-operation Scheme. The scheme supports exchanges for Go8 researchers to spend time at partner institutions in Germany and for collaborating German researchers to spend time at Go8 universities. The scheme aims to:
  - foster research collaboration of the highest quality between Australian researchers from Go8 universities and German researchers; and
  - result in research outcomes and the exchange of skills and knowledge of mutual benefit to Australia and Germany.
- Congratulations to **Akshat** and **Sonika Tanksale** as well as their extended family for the arrival of their 2nd baby girl. They called her Paravi (meaning: the one with 'par' or wings in Hindi). She was born on 13 December 2012 at 12:39am, weighing 3000g and was 49.0 cm long at birth.