WE BRING YOU THE LATEST RESEARCH NEWS AND HIGHLIGHTS FROM THE SCHOOL OF CHEMICAL ENGINEERING AT UNSW AUSTRALIA

As a research-intensive school with strong links to industry and a hub of international networks and collaborations, our focus is to promote the outcomes of advanced technologies and progressive research within the School.

This issue delves into the history of membrane technology, captures the insight of Australia’s most prominent female chemical engineer and explores important research into food allergies.

FEATURE ARTICLES INCLUDE
• Prof Vicki Chen – new Head of School
• Membrane technology – school research impacting industry
• Prof Rose Amal, scientist, mentor and inspirational woman in engineering
• Vital research into food allergies
• In the Spotlight: Scientia Prof Neil R. Foster
• Let there be light: photoinduced living/controlled polymerisation
• FRAN 2014 – the Third Forum of the French Researchers in Australia Network
• Q&A with UNSW Alumni Mick Farrell and Dr Jennifer Moss
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Prof Vicki Chen - new Head of School

Professor Vicki Chen picked up the reins as the new Head of School at the beginning of August, taking over from Scientia Professor Rose Amal. After completing a Bachelor of Science in Chemical Engineering at the Massachusetts Institute of Technology and a PhD in Chemical Engineering from the University of Minnesota, Professor Chen joined the UNESCO Centre for Membrane Science and Technology (CMST). Her research interests encompass water treatment and CO$_2$ capture technologies from both the material and process development aspects. She became the director of CMST in 2006, serving in this role until November this year. Professor Chen has a wide portfolio of projects funded by the Australian Research Council, National Centre of Excellence in Desalination, Cooperative Research Centres, and industry. She is an editorial board member of the Journal Membrane Science and a founding board member of the Membrane Society of Australasia (MSA).

Professor Chen said that one of her roles over the next few years is to oversee the outcomes of millions of dollars of recent investment by UNSW in terms of new staff and infrastructure for the School of Chemical Engineering. Highlighted in this issue are new staff such as Sean Smith and Cyrille Boyer as well as achievements of longstanding researchers in the School. She says energy, health, and water are worldwide issues that the School is already contributing leading research to in terms of water recycling, nanomedicine, energy storage and the next generation catalytic materials. The new focus on agriculture and food worldwide is also reflected in the School’s research.

“Our School has an unusual breadth of research from fundamental material chemistry and food science to translational research in process control and modelling. This provides an uniquely rich and vibrant research environment for students and industry.”

READ MORE ABOUT PROF CHEN HERE 📚

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UNESCO Centre for Membrane Science & Technology welcomes new director

Professor Greg Leslie has been appointed as the new director of the Centre from the 1 November, 2014. Professor Leslie is the fifth director and succeeds founding director Professor Chris Fell, co-directors Hans Coster and Tony Fane (1992-2005) and Professor Vicki Chen (2006-2014).

His research team uses advanced experimental and computational fluid dynamics (CFD) modelling techniques to improve the performance of membrane processes to recycle water and nutrients from municipal and industrial waste. Recent projects have targeted the performance of polymeric and ceramic membranes in desalination, water recycling, biofuels and meat abattoir applications.

Professor Leslie was the co-recipient of the Australian Museum Eureka Prize for Water Innovation in 2010 and holds major grants including:

- Australia-India Strategic Research Fund (AISRF) (2012-2015) Development of innovative spent wash treatment systems and resource recovery options for distillery applications.

Professor Leslie’s research interest surrounds water and resource recovery.

“Our School will play an integral role in the area of advanced food processing in the coming years. Last year we received more than $2 million AUD in funding from the Australian Research Council to establish a centre that will investigate innovative ways to improve the processing, quality, safety and nutrition of Australian food products”.

Professor Leslie looks forward to increasing interactions with alumni, international collaborators and industry in the coming year.

“We hope to inspire another generation of UNSW Chemical engineering students and researchers to have an impact on the needs of citizens around the globe.”

READ MORE ABOUT PROFESSOR LESLIE 📚

MORE INFORMATION ABOUT THE UNESCO CENTRE 📚

che.unsw.edu.au
UNSW membrane research impacting industry

What began at UNSW as an undergraduate chemical engineering assignment in the mid 1970s has led to globally adopted clean water technology. A student, searching for an economical solution to treat his father’s factory effluent, prompted a team of UNSW researchers to begin investigating membrane technologies more rigorously.

A breakthrough came in 1977 when UNSW Chemical Engineer Professor Chris Fell, in collaboration with visiting scientist Dr Michel Lefebvre, developed and patented a new type of membrane made of hollow nylon fibres. They recognised that these unusual membranes could be used at low pressures to successfully remove macromolecules and pathogens from water, overcoming the cost limitations of the existing, post-war high-pressure membrane filters.

“At the time, this was a transformational technology because nobody was thinking about low pressure treatment,” says Professor Fell.

Low-pressure microfiltration facilitated affordable water treatment and it eventually became the preferred method for treating potable and process water. The commercialisation of this technology led to a $600 million US dollar company, which now forms an integral part of the water portfolio of engineering giant Siemens International, under the name Memcor.

“There is an entire global industry in hollow fibre membranes for water treatment built on the trail that was blazed by Memcor building on Professor Chris Fell’s research,” says Dr Andrew Groth, the Global R&D Director with Siemens Water Technologies.

The pioneering research of Professor Fell and his colleagues led to the formation of the UNESCO Centre for Membrane Science and Technology at UNSW, which continues to operate today and produces internationally respected research.

The Centre conducts a broad range of fundamental and applied research and has a strong international profile and reputation. It is the largest academic membrane research group in Australia and one of the largest globally.

A key element of the success of the Centre is a focus that recognises the importance of combining the experimental and theoretical analytical tools to fundamentally study membranes. This rigorous approach leads to the successful development of high performance membranes for industrial purposes. Today, 22 years after the centre received UNESCO accreditation, this blended approach is applied to the development of membrane and separation processes in five key portfolio areas including food processing, biomass separation, water treatment, gas separation and carbon-capture and storage. Each portfolio area is led by a full time academic responsible for a research team consisting of postdoctoral researchers, postgraduate and undergraduate students.

The UNESCO Centre’s facilities includes membrane fabrication, surface characterisation, advanced water and gas characterisation, bench and pilot scale membrane and separation systems (including ion-exchange and dissolved air flotation advanced fluid), and material modelling software and a range of membrane autopsy techniques. These facilities are widely used by industry in Australia and internationally.

For more information on membrane research at UNSW Chemical Engineering contact the director of the UNESCO Centre Professor Greg Leslie (g.leslie@unsw.edu.au)

READ MORE ABOUT THE CENTRE HERE

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Membrane research from UNSW Chemical Engineering has been successfully translated from bench to business with an entire global industry based on hollow fibre research developed at the School

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UNSW CHEM ENG IS AT THE FOREFRONT OF RESEARCH IN GLOBAL ISSUES INCLUDING ENERGY, WATER, FOOD AND HEALTH
VITAL research into food allergies

Dr Alice Lee is passionate about improving the quality and safety of our food. With up to 2% of adults and 8% of children worldwide suffering food allergies (alone in China 45 million people suffer from food allergies), and the resulting restricted food and social choices, it is a passion that is well directed. Further, estimates indicate that the worldwide economic impact of food allergies is in excess of $7 billion AUD.

Dr Lee’s personal research aims to advance our understanding of how chemical and biological agents may affect our health, with special interests in chemical contaminants, toxins and food allergens.

“My adventure into food bioactive research also allows me to explore the relationships between phytochemical active principles, and chemical and biological hazards”.

The Voluntary Incidental Trace Allergen Labelling (VITAL) initiative is an Australian Food Industry initiative built on a risk-based methodology. A recent research breakthrough from the team has great potential in reducing a common protein allergy.

Underpinning VITAL are a number of research projects, including allergen purification and characterisation, developing new detection methodologies, process intervention, and studying the of effects of food processing on food allergenicity. Recently, her research team successfully demonstrated and optimised combined HHP-thermal processing that could significantly improve whey protein hydrolysis. This effect may potentially reduce sensitisation potential of this common allergen.

Dr Lee is working on a range of food allergens including those significant to Australia such as southern hemisphere fish species and macadamia nuts. She is also developing a new nanoparticle based rapid test platform, which could be easily adopted by the food industry to manage safety of their products.

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On her latest adventure, Dr Lee co-chaired the session Food Allergen Management - Towards Broader Convergence Amongst APEC Economies and presented her research at the China International Food Safety and Quality Conference and Expo in Shanghai.

In her presentation, Dr Lee reported on the centre’s progress in food allergen research and the VITAL initiative. The Voluntary Incidental Trace Allergen Labelling (VITAL) initiative is an Australian Food Industry initiative built on a risk-based methodology. The initiative aims to provide appropriate precautionary allergen labelling, avoiding the widespread use of indiscriminate precautionary warnings (for example, may contain nuts).

“The ubiquitous use of ‘may contain nuts’ has led to uncertainty and the reduced impact of these warnings”, Dr Lee said.

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READ MORE ABOUT DR ALICE LEE’S RESEARCH AND THE ATFM.

FAST FACTS LEARNING

500 Undergraduate students

200 Postgraduate students

65 Years teaching experience

4 Study paths available to undergraduates. In 2014 most of our students took the BE (Hons) Chemical Engineering degree

BACHELOR ENGINEERING, CHEMICAL ENGINEERING
BACHELOR SCIENCE, FOOD SCIENCE & TECHNOLOGY
BACHELOR SCIENCE, FOOD SCIENCE & NUTRITION
BACHELOR ENGINEERING, INDUSTRIAL CHEMISTRY

A UNIQUE STRENGTH OF UNSW CHEM ENG IS THE COMBINATION OF CHEMICAL ENGINEERING AND FOOD SCIENCE AND TECHNOLOGY
Scientia Professor Rose Amal is an outstanding chemical engineer and world leader in research on particle and catalyst technologies. She leads the Particle and Catalysis group at the School of Chemical Engineering and her achievements have been recognised with a UNSW Scientia Professorship and an ARC Laureate Fellowship. She has been listed as one of the Top 100 most influential engineers in Australia for three consecutive years (2012-2014).

A recognised pioneer and leading authority in the fields of fine particle technology, photocatalysis and functional nanomaterials, she also actively seeks to bridge the gap from pure to applied research to market. However, despite her illustrious career as a researcher and engineer, one of Prof Amal’s enduring legacies is her promotion of women in science and engineering. Prof Amal believes that many women have the skills to be leaders in science and engineering, they just need the encouragement and guidance on how to get there.

As the youngest woman in Australia to be promoted to full Professor of Chemical Engineering, she has continued to work as a mentor to young women in engineering. Her work has been honoured with the Judy Raper Award for Leadership - a UNSW Women in Engineering Award.

She has successfully supervised over 30 PhD Students, 5 Masters Students and more than 100 honours students in fields relating to environmental and energy technologies, including eight University Medallists and over 20 Australian and International Postgraduate Award recipients. More than 60 percent of these have been women.

Prof Amal’s current research focuses on designing nanomaterials for solar and chemical energy conversion applications (including photocatalysis for water and air purification, water splitting, development of indoor self-cleaning materials, low temperature catalytic reactions) and engineering systems for solar induced processes using the sun’s energy as a clean fuel source.

Professor Amal is a Fellow of Australian Academy of Technological Sciences and Engineering (ATSE) and Fellow of Australian Academy of Science (AAS).

READ MORE ABOUT PROFESSOR AMAL AND THE PARTICLE AND CATALYSIS GROUP
WATCH HER AUSTRALIAN ACADEMY OF SCIENCE ADDRESS AT THE SHINE DOME

Prof Rose Amal with Mr Christopher Pyne MP, Australian Minister for Education

UNSW CHEM ENG PROVIDES A VERY PROGRESSIVE ENVIRONMENT FOR STAFF AND STUDENTS
THE SCHOOL IS AT THE FOREFRONT OF SOCIAL EQUITY IN RESEARCH

* The Australian Academy of Technological Sciences and Engineering
In profile: Prof Sean Smith

Prof Sean Smith believes nanotech will have the largest impact on energy and medicine in the future. The next generation of batteries, supercapacitors and fuel cells will be critical to the ongoing development of our economy and to the sustainability of our energy demands. Nanoscience will drive advances in this area by enhancing the properties of the materials that go into these devices. Medical research at the nanoscale is going to be an area of keen interest, both because of its potential benefits for society and because it involves collaborative research among physical and material scientists, biologists and clinicians.

The School of Chemical Engineering at UNSW is thrilled to have Professor Sean Smith on board, who joined the team in April earlier this year.

Sean brings a wealth of international research expertise to the School. His specific research involves theoretical and computational studies of chemical kinetics, reaction dynamics, catalysis, as well as structure, self-assembly and transport phenomena within nanomaterials, proteins, and hybrid nano-bio systems.

Sean received his PhD in theoretical chemistry at the University of Canterbury, New Zealand, in 1989. Following an Alexander von Humboldt Fellowship at the University of Göttingen and postdoctoral research at the University of California, Berkeley, he accepted a faculty position at The University of Queensland, Australia in 1993.

He became Professor and Director of the Centre for Computational Molecular Science at UQ in 2002 and in 2006 his laboratory moved to the Australian Institute for Bioengineering and Nanotechnology at UQ. He worked with colleagues in the ARC Centre of Excellence for Functional Nanomaterials 2002-2011 as Program Leader (Computational Nanoscience) and Deputy Director (Internationalisation).

From 2011-2014, he was the Director of the US Department of Energy funded Center for Nanophase Materials Sciences (CNMS) at Oak Ridge National Laboratory, one of five major DOE nanoscience research and user facilities in the US.

Sean has published over 230 refereed journal papers. In 1998 he was elected Fellow of the RACI. In 2006 he was recipient of a Bessel Research Award of the Alexander von Humboldt Foundation in Germany and in 2012 he was elected Fellow of the American Association for the Advancement of Science (AAAS).

Nanoscale medical research will have a large impact in the future and it is a growing research area at UNSW, with collaboration between physical and material scientists, biologists and clinicians.

Snapshots taken during one of Sean’s molecular dynamics simulation of G1 PAMAM dendrimers (each with 8+ charge) complexing with 21 base pair duplex small interfering RNA at charge ratio 2/1 a) 0 ns; b) 2ns; c) 4ns. The last figure shows the system with explicit water solvent molecules – these are omitted for clarity in the snapshots.
IN THE SPOTLIGHT: SCIENTIA PROF. NEIL R. FOSTER

Scientia Professor Neil Foster has been elected to the European Academy of Sciences and Arts. Among the 1,500 members are 29 Nobel Prize winners as well as Pope Benedict XVI. Professor Foster is one of only three Australians to be currently accorded this most prestigious recognition and has been invited to attend the festive Plenary Session where new members are inaugurated on Saturday, 7 March 2015 in Salzburg.

Neil has been directly associated with the UNSW School of Chemical Engineering, either as a student or a Faculty member for almost 38 years. He enrolled in Industrial Chemistry as a CSR Cadet in 1970, completing in 1975.

In 1976 he commenced his PhD as Mark Wainwright’s first PhD student. A year as a postdoctoral fellow at McMaster University in Ontario followed, the experience gained earning him a Research Scientist position at the then CSIRO Division of Process Technology in Ryde, NSW, where he was the Project Leader for the Coal Liquefaction Reaction Engineering programme.

In 1986 Neil answered the call from Prof Chris Fell and Prof Mark Wainwright to return to UNSW, and he established the Supercritical Fluids Research Programme. His initial work involved fundamental studies of supercritical fluid properties, extraction of natural products and multiphase reaction engineering. As time passed the focus of his work became more directed towards re-engineering of pharmaceuticals to increase bioavailability and to facilitate less invasive modes of delivery compared to parenteral injections.

The scope of Neil’s interests then expanded to harnessing the properties of supercritical fluids and Gas Expanded Liquids, whilst embracing the principles of Process Intensification and Sustainability, to develop innovative green process technologies.

Neil has published around 300 scientific papers, with 150 in peer reviewed scientific journals. He has raised in excess of $13 million AUD of research funds, almost half of which has come from industry, thus reflecting the commercial relevance of his innovative technological developments.

UNSW has recognised Neil’s achievements over a sustained period of time with promotion to Full Professor in 1995, the award of a Doctor of Science in 2008, and appointment as a Scientia Professor in 2009.

External recognition of his contributions to chemical engineering has included Honorary Professorial appointments at Beijing University of Chemical Technology, Xiamen University and Virginia Commonwealth University. He was awarded a prestigious Qian Ren (1000 Talents) Professorship by the People’s Republic of China in 2010, an honour bestowed upon only four non-National Chinese at the time. Neil has also received numerous awards from the learned bodies – Brodie Medal, RACI R K Murphy Medal, ExxonMobil Prize, RACI Applied Research Award. Neil is a Fellow of both the RACI and Engineers Australia. Recently, in October 2014 he was elected as a Fellow of the Australian Academy for Technological Sciences and Engineering and the Royal Society of New South Wales.

In 2013, Neil convened the Asia-Pacific Society for Process Intensification and Sustainability, which held its first International Symposium in Changzhou in May 2014. The second meeting will be held in Sydney in September 2015, with Professor Bob Langer as the Distinguished Presenter.

In addition to his academic pursuits Neil has also been very active in the commercialisation of technology. In 2000 he co-founded Eiffel Technologies, an ASX listed company established solely for the commercialisation of innovations from the UNSW SCF group. He was the Technical Director of Eiffel Technologies from 2000 to 2006. In 2008 he established Bioparticle Technologies P/L, a UNSW spin-off company. He has been the Founding Director and Chief Scientific Officer since incorporation.

LET THERE BE LIGHT: PHOTOINDUCED LIVING/CONTROLLED POLYMERISATION

In a breakthrough study, A/Prof Cyrille Boyer, Dr Jiangtuo Xu and PhD candidate Sivaprakash Shannugam and colleagues have developed a polymerisation process that is activated at room temperature using sunlight or low energy visible light. This process converts and stores visible light energy for electrochemical reactions to form polymeric materials. This process resembles natural photosynthesis and drastically reduces the amount of energy required in polymer production.

Synthetic polymers (or more commonly named plastic materials) are ubiquitous in our daily life. They make up cloth, food packaging, coatings, adhesives, building materials, automotive parts; this list goes on. Several billion tons of polymers are consumed every year worldwide.

In conventional processes, polymer synthesis occurs over several hours at high temperatures, typically above 70°C. This consumes a huge amount of energy and resources. Achieving polymerisation at room temperature under natural light conditions utilises an abundant and renewable resource.

A/Prof Boyer and his team were able to control and manipulate the polymerisation rate, molecular structures and molecular weights by varying light intensity and temporal control of light “ON” and “OFF”. The key of this process is the use of photoredox catalyst capable to activate living radical polymerisation when the light is on. In the absence of light, the polymerisation stops immediately. This technique offers the ability to tailor 3D surface and materials.

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UNSW Chemical Engineering alumnus Michael ‘Mick’ Farrell is the current Chief Executive Officer of ResMed.

ResMed is a global leader in sleep technology, with over 25 years experience in the research and development of products for the diagnosis, treatment and management of sleep.

Before joining ResMed in 2000, Mr. Farrell honed his management and consulting skills at several high profile biotech and chemical companies including Arthur D. Little, Genzyme Corporation, The Dow Chemical Company, and BHP Billiton.

Following his Bachelor of Engineering in Chemical Engineering (with first-class honours) from UNSW Australia, he went on to complete a Master of Science in Chemical Engineering from the Massachusetts Institute of Technology (MIT), and an M.B.A. from the MIT Sloan School of Management.

Read more about Mick Farrell’s journey from engineering undergraduate to CEO, and some of the exciting innovations he is currently involved with in our Q&A.

Where did it all start? What interested you about science and engineering and how did this evolve and develop over time?

My interest in science started when I was in high school in Sydney – I found the elegant logic of mathematics and physics combined with the creative and destructive power of chemistry an exciting area for my future study. When I looked at Australian universities, I found the co-operative education program (UNSW Co-op Program), which had just started at UNSW in the late 1980s, to be very exciting.

The chance to apply science at four companies while studying engineering was the key element for my choice of Chemical Engineering at UNSW in 1990. To this day, as global CEO of a public company, listed on the Australian Securities Exchange ASX and the New York Stock Exchange (NYSE), I still use the skills that I gained while studying at UNSW.

What are some of the most notable achievements throughout your career?

While it is nice to be involved in some leadership roles on the Board of Directors of the Medical Device Manufacturers’ Alliance (MDMA) in Washington, DC and the California Healthcare Institute (CHI) in Sacramento, CA, I am more proud of the not-for-profit boards that I serve on as a volunteer. This includes the New Children’s Museum in downtown San Diego where we provide creative and artistic education to children from public schools who have cut arts education out of their curriculum due to budget constraints.

How do you see the impact of research on industry?

Research and development are the turbo-chargers of the ResMed machine. Our ability to partner with institutions like UNSW, as well as Harvard, Stanford, Cleveland Clinic, Johns Hopkins, Imperial College London, University of Edinburgh, the University of Essen in Germany, and many more, and translate basic science and clinical research into applied research and ultimately real products and services for our customers, differentiates us from our competitors.

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UNSW Chemical Engineering graduate and Res-Med CEO Mick Farrell

“As global CEO of a public company, listed on the Australian Securities Exchange ASX and the New York Stock Exchange (NYSE), I still use the skills that I gained while studying at UNSW.”
What are you currently excited about? Are there any recent innovations or new technology that you are working on?

Andy Grove, co-founder of Intel, once stated, “Only the paranoid survive”. He was meaning survival in the hyper-competitive computer chip industry; I think that applies in medical device innovation as well. I prefer the Jim Collins (author of Good to Great and Great by Choice) description of a competency that he calls “Productive Paranoia”. That means looking at all technology that could and should impact your industry.

One of the innovations we introduced to the market this year is a non-contact sensor that uses Doppler-effect radar techniques to monitor movement of the chest wall to calculate respiratory rate and heart rate with no sensors touching the body. This technology is a game-changer and right now our first product is a sleep wellness device called S+ (www.mysplus.com).

We have licensed the technology to Nintendo to help drive consumer awareness of sleep health – and this is just the beginning. Watch this space!

What would your advice be for young engineers or scientists who are at the start of their career?

My advice to engineers and scientists just starting their careers would be simple – pursue your passions, seize every opportunity to stretch yourself, and you will never look back.

My pursuit of my passion for post-graduate education in biomedical engineering and business, and seizing an opportunity (applying for a ‘Leaders for Global Operations’ scholarship at MIT) was an inflection point in my career trajectory. It took me from a steelworks in Wollongong on a path that stretched my brain to its extremes, and led me to work with Genzyme, a groundbreaking biotechnology company, and ultimately to ResMed, the world’s leading respiratory medicine company. We will change 20 million lives by 2020, literally helping people breathe, and I love it!

READ MORE ABOUT RES MED AND THE S+
School alumnus Dr Jennifer Moss innovating Australia’s favourite food brand

Dr Jennifer Moss completed a PhD in Chemical Engineering UNSW in 1993. She has gone on to head the R&D of some of the world’s most innovative companies including Procter & Gamble and Unilver. She is currently the Vice President R&D International of the Campbell Arnott’s Asia Pacific.

In our Q&A, Jennifer offers some sound advice on how to combine a career in technology and research with business.

Where did it all start? What interested you about this discipline and why did you decide to study Industrial Chemistry and then go on to pursue a PhD in Chemical Engineering (Polymer Science)?

At school I always loved the application of science to the real world. In particular it fascinated me that behind even the most ordinary consumer product, there was a great deal of science.

How do you see the impact of research on industry activities?

Base research is fundamental to all industrial activities. The only way to produce differentiated products or processes is to ensure you are competitive by having a network of connectivity to fundamental research groups.

What are you currently excited about, for e.g. any recent innovations or new products that you are working on?

In my current role my team are working on many new and exciting food innovations. Whether it is nutritional research to support benefits in beverage (V8), healthy snacking (Vita-Weat), or innovating new processes for production or packaging all around the world. However holding accountability for the Arnott’s Tim Tam brand innovation always amazes me, and Tim Tam’s recent move into moulded Chocolate with the launch of Tim Tam Chocolicious has been one of my most exciting innovations.

What would your advice be for young engineers/researchers who are at the start of their career?

Always follow your passion, if you do what you really enjoy, you will always be more successful and your career will evolve. Also, as a technical person, be very aware that it is not just your technical expertise that will help you grow. You must always balance strong technical skills with strong leadership behaviours (confidence, presence and resilience) to ensure your insights, views and ideas are heard.

“...you must always balance strong technical skills with strong leadership behaviours (confidence, presence and resilience) to ensure your insights, views and ideas are heard.”

Let there be light: Photoinduced Living/Controlled Polymerisation cont.

More recently (published in Chemical Science), this process has been extended to utilise a non-toxic, fully biodegradable and renewable photo-redox catalysts obtained from biomass, such as chlorophyll a.

The team also demonstrated that this polymerisation technique can be employed at ambient conditions, which is not commonly applicable in current living radical polymerisation processes.


READ MORE ABOUT CYRILLE BOYER AND HIS RESEARCH

UNSW CHEM ENG HAS GRADUATED SOME OF AUSTRALIA’S MOST SUCCESSFUL AND INFLUENTIAL ENGINEERS. FOUR OF OUR GRADUATES HAVE BEEN LISTED IN THE TOP 100 INFLUENTIAL ENGINEERS IN AUSTRALIA. THIS IS THE HIGHEST NUMBER FOR ANY CHEM ENG SCHOOL IN AUSTRALIA.
In the lead up to FRAN 2014, researchers from the School of Chemical Engineering organised a site visit for the representatives from the French government travelling with the President to see the School’s research laboratories.

The largest ever forum of French researchers in Australia took place in November at UNSW Australia in Sydney.

Jointly hosted by the Embassy of France, UNSW and the Australian Academy of Science, the French Researchers in Australia Network brought together more than 140 French scientists working in Australian research agencies from every capital city to discuss climate science and strategies to increase collaboration and innovation with industry.

His Excellency Mr Christophe Lecourtier, Ambassador of France to Australia, Mr Aleksandr Voninski, Executive Director UNSW International and Mr Xavier Sticker, French Ambassador for the Environment, officially opened the forum.

The formal opening was followed by presentations from the Department of Industry, the Delegation of the European Union and UBIFRANCE.

Two representatives from the French government provided a special address to the delegates: Ms Marie-Hélène Aubert, Adviser to the President of France for the Environment and Climate, and Mr Nicolas Bériot, Secretary General to the National Observatory of the effects of climate change, French Ministry of Ecology, Sustainable Development and Energy.

More than 15 scientific presentations over the course of the forum showcased the diversity of research being undertaken in Australia covering the themes of atmospheric climate change, oceans and the changing climate, and the impacts of climate variability.

Associate Professor Cyrille Boyer and Associate Professor Francois Aguey-Zinsou from the UNSW School of Chemical Engineering each gave presentations at the forum within the ‘research focus’ session on the second day. Cyrille presented on “Engineering nanomaterials for bioapplications” and Francois’ topic was on “Hydrogen energy: French-Australian advancements and an electric bicycle prototype”.

Our researchers meet French President Francois Hollande

The forum coincided with the arrival in Sydney of French President Francois Hollande, who became the first French leader to visit Australia when he attended the G-20 conference held in Brisbane from 15-16 November. Researchers from the School, A/Prof Cyrille Boyer and A/Prof Francois Aguey-Zinsou, were invited to a private diner with President Francois Hollande at the Aria Restaurant to discuss innovation in the context of building up stronger links between Australia and France.
The wrap - Energy Future Conference

Energy Future aims at identifying energy needs specific to Australia and to generate new research and business opportunities to boost Australia’s competitiveness in the energy sector. The conference organisers and collaborators foresee the conference to continue to be held annually at different Australia universities.

The inaugural Energy Future Conference attracted over 250 local and international participants from China, India, Italy, Japan, Korea, Malaysia, Indonesia and Sweden. With representation across academic and non-academic areas including people from UNSW, other Australian universities, government organisations and private sector companies.

This 1st edition of Energy Future with specific themes on “Natural Resources and Energy”, covered international advances from research to industry alongside an impressive exhibition showcasing advanced energy technologies from renewables to gas processing and coal mining.

Energy Future 2014 was sponsored by NSW Trade & Investment, UNSW Engineering, UNSW School of Chemical Engineering and UNSW NewSouth Innovations and was held at Colombo House, UNSW Kensington campus in early November 2014.

The conference was officially opened by Professor Graham Davies, Dean of the UNSW Faculty of Engineering, which was followed by an opening address by the Hon. Minister, Anthony Roberts MP (NSW Minister for Resources and Energy).

There was a continuous flurry of activity over the 3-day conference which included a guided facilities tour of the Tyree Energy Technology Building, 10 plenary and keynote presentations, which covered topics such as nuclear energy and technology, bioenergy, intelligent grids, photovoltaics, photocatalysis and carbon catalysis. In addition, there were 21 invited talks, 61 oral presentations, 53 research posters presented, two workshops, and two panel discussions about the ‘electricity market’ and ‘coal seam gas’.

The conference welcomed eight exhibitors including Scitek total vacuum solutions, MEP instruments, Newlede Tech Solutions, the National Measurement Institute, Elsevier, Particle & Surface Sciences Pty Ltd, Sunswift and John Morris Scientific.

UNSW Chemical Engineering PhD candidate, Lei Wang received the award for the best research poster presented during a networking event on the first night of the conference. Lei Wang is developing new methods to enable the reversible storage of hydrogen with lithium, which has the potential to safely power fuel cell vehicles. He received an iPad for the award.

The UNSW Innovation Award was also announced during the conference and was presented to Professor Behdad Moghtaderi from the University of Newcastle. Professor Moghtaderi’s received a $2000 cash prize for his energy innovation, the GRANEX™ Heat Engine: A low cost green energy solution technology.

MORE INFORMATION ABOUT THE UNSW INNOVATION AWARD HERE.

Photo caption clockwise from top: The future energy program, delegates enjoying dinner and networking opportunities, UNSW A/Prof. Kondo-Francois Aguey-Zinsou with Prof. Behdad Moghtaderi – The University of Newcastle received The UNSW Energy Future Collaborative Innovation Award from NSi’s CEO Dr Kevin Cullen and A/Prof Francois Aguey-Zinsou.

UNSW CHEM ENG IS ONE OF THE MOST AWARDED ENGINEERING SCHOOLS IN AUSTRALIA

# (QS 2014)
^ 2014 National Taiwan University Rankings
* The Australian Academy of Technological Sciences and Engineering
2015 marks a new year for the School of Chemical Engineering leaving its original home to a new state-of-the-art engineering oriented research building. The construction started late 2013 and will be completed by Sept 2015.

The $145 million AUD building will be nine levels high and contain 23,500m$^2$ of floor space to initially cater to 300 students and staff. Also included will be a basement specifically designed to house highly sensitive research equipment, integrated office and laboratory areas, a glass façade with reinforced concrete masonry blades for solar shading, and a modular laboratory design.

The design clearly expressed the importance of research and learning spaces by placing laboratories and research within the core of the building, serviced by a central spine of reticulated services.

The School of Chemical Engineering is expected to utilise the top three floors of the building to host its research hubs in energy, environmental technology, soft matter and advanced food and health technologies. The ground floor will also provide a new capability for entrepreneurship the ‘Crouch Centre For Innovation’. The Crouch Innovation Centre will be a world leading environment for students, staff and the community where innovative products and new companies will be developed and showcased.

**VIEW THE PROJECT LIVE**
Click here to watch the project’s progress.

**CONTACT**
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