

June 2022: Issue #4

THE LEAD

UNSW SCHOOL OF CHEMICAL ENGINEERING NEWSLETTER



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UNSW
SYDNEY

Message from the Head of School

Dear members of the UNSW Chemical Engineering community,

As we gradually transition towards post-pandemic norms, I hope you enjoy reading this new issue of UNSW School of Chemical Engineering newsletter about in-person activities happening all over the campus.

In each newsletter, we aim to describe a major research theme in our school. This issue highlights researchers and their research projects in food and health. As you may have noticed, chemical engineering education and research are undergoing major transformations towards renewable energy, sustainable processes and products, health, and bioengineering. UNSW Chemical Engineering aims to stay at the forefront of chemical engineering innovations and asserts our global leadership.

In this issue, you will also read about accomplishments made by our current and former students. The school has vibrant student societies led by energetic and talented student leaders. One of the most pleasant discoveries I made after taking on academic administrative leadership roles is how much I enjoy working with our student leaders. Our academic unit is in fact much bigger than just the core academics. We accomplish so much more by working closely with our students, alumni, student societies, employers of chemical engineers and food scientists, our professional staff, and all our stakeholders.

We are interested in hearing your stories of collaborations and partnerships. Please send them to ChemEng@unsw.edu.au.

Best wishes,
Professor Guangzhao Mao



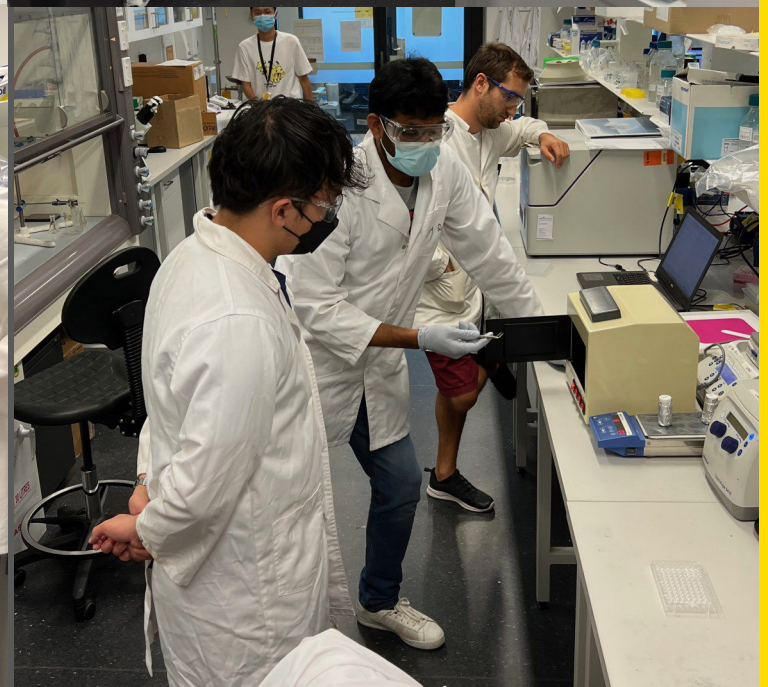
UNSW Chemical Engineering rankings:

- #53 QS World by Subject
- #55 US News Global Ranking (Chemical Engineering)



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OPEN LAB WEEK



First Open Lab Week a big success!

In week 21-25 March, the School of Chemical Engineering hosted its first 'Open Lab Week' in the Faculty of Engineering. It was full of great opportunities for attendees to learn more about the exciting research that is undertaken in the school.

Tailored to undergraduate students in the 2nd and 3rd years of their degrees, the 'open lab' event gave them the opportunity to learn more from Chemical Engineering researchers and plan ahead for possible future honours, masters or PhD research projects.

The students were able to meet with researchers in 30 min slots on campus, learning more about their research through presentations, laboratory tours and small experimental demonstrations.

Dozens of Chemical Engineering students attended, with many of them visiting multiple academics and research clusters throughout the week.

To those who missed out this time, make sure you're following our social channels as we will announce a second open lab week later in 2022!

Food and Health Group



The Food and Health research program is made up of seven researchers from the UNSW School of Chemical Engineering. It is a multidisciplinary team with complementary expertise spanning across the food supply chain, from farm gate to plate, delivering safe, nutritious and appealing food.

Food Systems and Nutrition Patterns is one of the six transformation targets in the UN Sustainable Development Goals. Our program is actively engaged in research in all aspects of the UN targets stated above.

Our world class researchers drive innovations in health, processing and sustainability to build a Sustainable Food System that has real-world impacts - science to practice. The three major areas of health, processing and engineering and sustainability cover the group's research areas.

The researchers and their teams are contributing towards achieving the UN Sustainable Development Goals (SDGs)—specifically SDGs 1 (No poverty), 2 (Zero hunger), 3 (Good health and wellbeing), 4 (Quality education), 9 (Innovation and infrastructure) and 12 (Responsible consumption and production).

Here, they talk about their research in their own words...

Our researchers

JOHANNES LE COUTRE

“Many of our global food systems are in danger of being broken. Plastic, food waste, water management, deforestation and livestock handling are just a few of the issues in this context. Our group is developing a technology suite known as Cellular Agriculture with the aim to alleviate some of these problems. Cellular Agriculture is rooted in established technologies. It combines elements of agriculture, life science, medical research, and engineering with the goal of growing edible tissues from vegetables or meat at the cellular level. Specifically, we investigate the interaction of edible muscle cells with their environment to develop mimetics similar to a piece of meat as we all know it. The challenge is immense, as we are also pushing for improved and affordable media formulations as well as innovative adaptations for specific bioreactors to grow these novel ‘materials’. Our group is collaborating with the private sector, various leading universities and also with the Australian government. The exquisite infrastructure at UNSW enables us to go all the way, from cell line development to the scaling of biomass and ultimately to professional sensory evaluation.”



CORDELIA SELOMULYA

“I am leading a research team with an internationally recognised reputation in particle and drying technology research, including for functional particle synthesis and encapsulation via spray drying. We have a unique microfluidic spray dryer that can be used to generate uniform particles with targeted properties (e.g., microparticles for encapsulation and controlled release, heat sensitive / bioactive particles, mesoporous microspheres, etc), and to design new formulations for spray-dried powders prior to scale-up. Spray drying is a common process to convert liquid feed into solid powders and is used in various industries including pharmaceutical, specialty chemicals, personal care, food and dairy. Of particular interest is to understand how the formulation and properties of the liquid feed and pre-treatment conditions can influence the final properties of spray-dried particles. In this regard, we are collaborating with local and international companies to improve their existing products and to co-create new powder-based ingredients for food and nutraceutical applications. With the increasing interest in plant-based foods, we are also investigating non-thermal methods to improve the functionality and application of plant proteins in food systems. Our research is supported by ARC and CRC grants, as well as direct funding for industry PhD projects.”



JAYASHREE ARCOT

“Food and Nutritional Science is at cross-roads with changing dietary patterns (e.g. shift from meat-eating to vegan diets) in the population. There is more need now than ever before to produce sustainable foods leading to sustainable diets that are nutritious addressing both food and nutrient security. Equally food technology/ processing is gaining momentum with the need to utilize appropriate technology to manufacture nutritious foods. I lead a team of seven PhD scholars and several master’s and honours students and research spans across both fundamental and applied areas of food and nutritional sciences, exploring the components present in food (nutrients and bioactives) and their functionality by understanding their digestion process using simulated human digestion models and bioavailability of nutrients. Our group’s research focusses on human clinical studies as well as in vitro 2D and 3D cell models to mimic human absorption processes to study bioavailability of nutrients and assessing their functionalities (e.g. anti-inflammatory properties) in collaboration with cell biologists to be able to set dietary guidelines and recommendations for nutrients. Our research contributes to public health policies particularly in the field of fortification of foods with micronutrients (vitamins and minerals) to prevent micronutrient deficiencies in the population. Our research also extends into food and nutrient security issues in low to middle income countries with studies in The Philippines, Papua New Guinea and [Indonesia](#) and the Democratic Republic of Congo- the latter through the International Humanitarian Network that has members from several countries including the World Food Program and FAO. Our projects aim to also have impacts on real world situations in the food and nutrient security space addressing the UN SDG goals (Zero hunger (No:2), Good health and well-being (No:3), Quality education (No:4)). Our research is supported by industry and other competitive grants that fund PhD projects.”



JIAN ZHAO

“Our research group focuses on two main areas: microbiology of fermented foods and beverages and bioactive food components. Our research on cocoa fermentation has challenged some of the long-held beliefs including the role of lactic acid bacteria in cocoa fermentation. Our research on coffee fermentation demonstrates the crucial role of yeasts in the flavour development of high-quality coffee. The research is leading to the development of microbial starter cultures that can improve the flavour and quality of chocolate and coffee, with a major French company showing interest in testing the yeast species we have isolated. Our research on bioactive food components includes efficient isolation and chemical identification of polyphenols and peptides from Australian native plants, marine algae (seaweed) and cereal brans, and characterisation of their health promoting properties. We are also working on molecular encapsulation methods to protect these bioactive components and control their release during digestion. These research activities are leading towards the development of functional ingredients for food and nutraceuticals that can help alleviate many of the life-style diseases prevalent in our society.”



ALICE LEE

“Of food-related health conditions, food allergy is no longer a rare condition and is recently recognised as a chronic disease of our time by the federal government. My “Food and Allergy research” program integrates food science and molecular allergology to study food immunology and allergy. We aim to alleviate food allergies through dietary intervention and immunotherapy. Our team focuses on molecular characteristics of allergens, and their relationship with food processing and allergic sensitisation, in view to develop food-based therapeutics. We also focus on engineering nanoallergen delivery systems functionalised with novel dietary adjuvants from food sources (e.g., polyphenols and prebiotics). Immunodiagnostic tests are an important component integrated into the program. We design immunogens and generate bioaffinity molecules for wide-ranging targets from small molecules (e.g., food contaminants, toxins) to macromolecules (e.g., allergens), and develop immunoassays and sensors that fit for purpose. We collaborate with allergists to conduct B-cell mechanistic study (e.g., BOPI and OPIA trials) to enable a better understanding of molecular immunology of food allergens. This collaboration is also extended to epitope-marker discovery for developing non-invasive allergy diagnostic tools in future, which is critically needed for paediatric allergy.”



FRANCISCO TRUJILLO

“Our group focuses on novel and traditional food processing technologies to improve the quality of food products by keeping foods safe but fresher, tasting better and with higher nutritional value. Traditional thermal processing is very effective to kill microorganisms, ensuring the safety of foods, but they can be detrimental for their sensorial and nutritional quality. Our research on novel processing technologies such as ultrasound, radio frequency electric fields, dielectric heating and plasma aims to find alternatives to process foods at lower temperatures to reduced thermal detrimental effects. For instance, we study the generation of a natural disinfectant from water and air, called Plasma Activated Water, by generating cold plasma on the air phase. Our team has successfully developed a non-thermal plasma technology that can be implemented in the meat processing industry to extend the shelf-life of chilled meats by reducing the microbiological load. This technology is valuable in reducing the amount of wastewater generated during the meat washing. We also investigate on the effect of radio frequency electric fields to inactivate microorganisms via electroporation at sub-pasteurization temperatures. Ultrasound is also studied to extract coffee brews of enhanced sensorial quality and to accelerate and enhance the drying of foods.”



ALISON JONES

“I am an education-focused academic and contribute to teaching into the food science, technology and nutrition programs within the school. My research focuses on both food science education and sensory science. In the Education field within the community of practice, I focus on strategies to enhance first year student experience. I also conduct research in the field of sensory science contributing to research across several areas of food science and technology that ultimately need testing for sensory attributes that consumers look for in foods. My research involves trained panel profiling of foods and ingredients, creating appropriate environments for improving the vegetable intakes of children (e.g through music therapy); descriptive profiling of minimally processed salads and determination of best before quality parameters and educating food scientists on how to ensure quality of foods and their safety adhering to the national and international regulations and guidelines while processing foods.”





Study with us at UNSW Chemical Engineering



Message from our Head of School

You will learn from dedicated educators in world class facilities. Your UNSW degree will enable you to pursue a variety of professional careers in academia, industry, government and community organisations. Our School has a long and proud history of teaching, research and service for the advancement of chemical engineering and food science to solve real-world problems both in Australia and around the globe.

Professor Guangzhao Mao

Our Programs

Bachelor of Engineering (Honours)

Chemical Product Engineering Chemical Engineering

Bachelor of Science (Honours)

Food Science and Nutrition Food Science and Technology



Join our network of world-changing alumni working across a range of key industries. A degree in Chemical Engineering provides a gateway into a wide range of careers, with graduates earning an average of over \$68,000 (Association of Professional Engineers Australia, 2019).



A wide range of scholarships are available from the University and Faculty.



Trimester system offers increased flexibility in study, offering opportunities to study abroad and gain industrial training.



Our degrees offer experience in hands-on learning, including thesis projects and lab courses.



All of our undergraduate programs are professionally accredited by industry associations.

Want to find out more? Find us at....



chemeng.FutureStudents@unsw.edu.au



UNSW School of Chemical Engineering



@UNSWChemEng



@UNSWChemEng

www.unsw.edu.au/engineering/our-schools/chemical-engineering

Our school in numbers

#1

Ranked Engineering Faculty in Australia

#1

Most employable students (AFR Future Leaders Awards 2020)

#1

University for research and impact in Australia

46%

Female undergraduate students in the School

Professor Rose Amal Reflects on 30 Years at UNSW

Professor Rose Amal is an icon at UNSW Sydney. Her 30 years with the School of Chemical Engineering have seen her named NSW Scientist of the year, a companion of the Order of Australia, an Honorary Fellow of Engineers Australia and as one of the Most Influential Engineers—not just once—but multiple times. Just last year, she was also awarded the prestigious Chemeca Medal and the James Cook Medal.

But despite all her phenomenal achievements, Rose remains a personable and humble colleague—and a highly respected mentor and champion for many early career researchers. We spoke to her to mark her 30 years at UNSW, discovering some thought-provoking insights about her journey and her anticipations for the field of Chemical Engineering.

It may come as a surprise to many that UNSW was not Rose's first choice of tertiary institution. After enjoying mathematics and science subjects at school she knew she wanted to pursue chemical engineering, but her first choice was to go to Melbourne. Entry requirements for overseas students at that time were different, with most students required to take one year matriculation (similar to Foundation Studies) before commencing their undergraduate degree. Rose decided to stop over in Sydney before heading to Melbourne to see if any universities would accept her immediately, and was lucky enough to have UNSW welcome her with open arms.

But after a year of undergraduate study, Rose was drawn to another institution.

"During a recent presentation, I made a joke about being rejected from the University of Sydney - and it's actually a true story!" says Rose.

"I was impressed by the University of Sydney's history and grand buildings, and applied to transfer there after receiving high distinction average in the first year of my degree at UNSW. But regardless of my grades, they did not accept me because I did not do High School Certificate in Australia."

Rose was disappointed at the time, but the experience taught her the importance of being flexible and making decisions on a case-by-case basis—an approach she thinks should have been taken in this instance, rather than applying a rigid, blanket rule across all applications.



Professor Rose Amal celebrates a graduation in the late 90s with Emeritus Professor Mark Wainwright and Dr Graeme Bushell



Professor Rose Amal celebrated her 50th birthday in 2015 with her research group.

It's one of many learnings Rose has taken away from her highly successful career, and one which she also applies to her important role as a supervisor to PhD students. Rose has supervised over 70 students and become a highly respected mentor, and she says if there is any advice she would give to other mentors, it's to understand that every student is unique and to tailor each approach accordingly.

"We need to treat all students as individuals," says Rose.

Before I take on PhD students, I ask about what they want to do in life, what their strengths are and what their aspirations are - and adjust my supervision style to suit their journey."

For some students this might mean getting them involved in other projects to broaden their knowledge and network, while others might benefit from opportunities where they can utilise their public speaking skills. Rose sees all her students every fortnight where she discusses with them about their research and challenges they face, and she sees this is as one of the most important and rewarding parts of her schedule.

But Rose's busy schedule has not been without its obstacles. When asked about the biggest challenge she has faced during her career at UNSW, it was without a doubt the juggle of balancing work and family life - especially when she had young children who were often unwell. The mother of two, who are now young adults, always blocked out space in the evening for family time and caught up on work in weekends. She also identified fairly early in her career that the early mornings were a highly productive time of day, and for many years dedicated 4am-7am to intensive working time where she would complete her most demanding tasks. It could have been this unusual schedule that triggered the rumour that Rose does not need to sleep much - something that continues to be shared among UNSW circles.

Another difficult aspect of Rose's career was when she was faced with deciding whether to continue to pursue research, or transition to the administrative side by accepting a leadership role within the school. She grappled with this for a while, but it was receiving a Laureate Fellowship in 2014 that was her signal to continue her research journey.

"Most of the time, if I have a difficult decision to make, I think about how significant the need is and whether I truly feel that my contribution will make a real difference," says Rose.

"If I have a difficult decision to make, I think about how significant the need is and whether I truly feel that my contribution will make a real difference"



Professor Rose Amal pictured at the UNSW walkway during her graduation in 1988.

chemical engineering played a role in things like minimising carbon emissions and waste, more would be interested in careers in this field.”

As one of relatively few women at the top level in chemical engineering, Rose has been lucky enough not to experience any discrimination during her career. While she is often the only female on committees she does feel heard and accepted, and believes this is due to making her contribution clear and entering into circumstances with the overarching belief that most people are good natured with equally good values.

While Rose has a long list of accolades under her belt, she maintains that the most rewarding part of her career has been her supervision role.

“I love to work with early career researchers and see how they learn and grow,” says Rose.

“There is nothing more rewarding than watching a once-timid student become confident in their abilities and contributions and want to scream their achievements from the rooftops.

“Many of my students are now well-respected academics or doing well in industry, and I am always heartened to read and hear about all their achievements and see them sharing the lessons with others that I once shared with them.”

The UNSW School of Chemical Engineering congratulates Professor Rose Amal on her 30 year anniversary.

“While I would have had some exciting opportunities on the administrative side, I ultimately realised that I could make the biggest impact in research, and resolved to dedicate more time to setting up initiatives like training centres and an innovation hub.”

Rose is now the Director of the ARC Training Centre for the Global Hydrogen Economy, an important focus for chemical engineering and related industries that she would not have anticipated at the beginning of her career.

“When I began my studies in chemical engineering, I researched the types of careers I could pursue and they were heavily dominated by roles in the chemical industry as well as oil and gas,” says Rose.

“Nowadays, we are not looking at oil and gas, but energy transitions in which chemical engineering plays a critical role. Instead of utilising fossil fuels, we need renewable energy and comprehensive knowledge on chemicals like hydrogen to be able to harness its properties as a chemical fuel.”

Rose thinks that the younger generation’s perception of chemical engineering may still be overshadowed by oil and gas, and is interested in how these perceptions could be changed.

“Younger generations now are very environmentally conscious, and I believe that if more people knew that

“I believe that if more people knew that chemical engineering played a role in things like minimising carbon emissions and waste, more would be interested in careers in this field.”

Advancing the Journey to Net Zero

UNSW to host new Decarbonisation Innovation Hub

UNSW led NUW Alliance is the host to NSW Decarbonisation Innovation Hub! Within the hub, School of Chemical Engineering Scientia Professor Rose Amal is leading the Powerfuels including hydrogen network and is supported by network coordinator Dr. Rahman Daiyan. The network includes 5 universities and 65 industry partners from the state and will play a critical role in translating emerging Power-to-X technology for providing decarbonisation solutions for the state.

UNSW & Newcastle University to host ATRaCE Program

UNSW and University of Newcastle led consortia has been successful in their bid to host the Australian Trailblazer for Recycling and Clean Energy (ATRaCE). Within the program, School of Chemical Engineering Scientia Professor Rose Amal will be co-leading the sustainable fuels and chemicals manufacturing stream with Professor Behdad Moghtaderi from University of Newcastle, which aims to accelerate the translation of disruptive technologies to decarbonise NSW and Australia.

HySupply hosts German Delegation

On 26 May, The HySupply Australia consortium, lead by UNSW, hosted a German delegation headed by Federal Minister for Education and Research, Honourable Bettina Stark-Watzinger and accompanied by German industry-academic delegates. HySupply Australia was represented by Dr. Alan Finkel, Australian Ambassador to Germany H.E. Philip Green, industry partners and School of Chemical Engineering Chief Investigators Scientia Professor Rose Amal and Dr. Rahman Daiyan.



UNSW representatives and the German delegation with a hydrogen-powered bike.

Strategy by the Sea

The entire staff from the School of Chemical Engineering met at the Clovelly Bowling Club on the 5th of May for their annual strategy workshop. This was an opportunity to reflect on the progress made by the School since its last retreat in 2020 and to identify new challenges and opportunities for the year to come.

The modernisation of the school identity and the need to better communicate how Chemical Engineers are working on some of the grand challenges of the 21st century were discussed, with new research positioning statements developed during the workshop and soon to be implemented on our website.

The continuous upgrading of our educational programs was also addressed, with some of the best ideas to be implemented in our cursus in 2023 thanks to teaching microgrants. This was an opportunity to officially recognise the recent efforts of our teaching-focused staff in developing innovative approaches in the learning of Chemical Engineering, becoming an intrinsic research topic of the School.

Reflecting on the productive day, the staff also greatly enjoyed spending time with colleagues face to face after so many months of online meetings. Not only did the location of the retreat offer an incredible ocean view, but a friendly game of lawn bowls concluded the workshop on a high note.



Design Project for Future Chemical Engineers



Best Design Project Team, "PowerLoop Consulting" (Isabella Notarpietro, Melanie Stramotas, Tina Ventoura, Claire Wilson and Danyon Farrell) with course coordinator Pierre Le Clech

Often defined as a challenging yet rewarding experience, the Design Project course (CEIC4001) was completed by the 2022 cohort in early May. This year, in teams of five, students were asked to design a series of processes able to produce clean fuels and/or chemicals, such as green hydrogen, ammonia and/or synthetic hydrocarbons using the low-cost energy and/or other resources locally available at the specific brownfield site of Bell Bay, Tasmania.

The overall objective was to evaluate the technical feasibility, financial viability and environmental impact of their selected process system and to provide recommendations on the potential future investment for its implementation. In the early stage of the project, students considered a range of potential clean chemicals to produce, and justified the most appropriate option to select for the detailed design and sizing of the plant. After assessing the expected flow capacity for the new plant, based on the site opportunities and constraints, the students estimated its capital and operating costs.

After 10 weeks, the students were interviewed by a panel of industry representatives, assessing the quality of their design. Although the interviews are generally considered a nerve-racking experience, the students were able to appreciate and reflect on their abilities to answer difficult questions by professionals, feeling significantly more job-ready.

Invitation to Industry Partners

The UNSW School of Chemical Engineering has a long tradition of engagement and collaboration with industry. Over the years, our students have not only greatly benefited from industry guest lecturers, and their participation in curriculum review, but also from a range of site visits, industrial training placements and industry-based projects spread across the teaching programs. The industry also gains from these interactions, having prime access to the best graduates on the market and to academic experts in the topics of energy, polymers, environmental technologies, food science and nutrition and more to address their research needs. We invite industry to engage with our school through one of our many pathways.



Teaching

Contact: *Stuart Prescott*
Deputy Head of School Education
s.prescott@unsw.edu.au

Educating the next generation of Chemical Engineers is the main objective of the School and we continuously strive to offer modern and industry-relevant programs. Both students and Industry partners can greatly benefit from industry participation to our curriculum and seminars, during which a range of topics and case studies can be presented. We also invite industry representatives to interview 4th year students on their capstone design project (see video)

Examples:

- Guest lecture
- Curriculum design/ review
- Inspiring alumni presentations
- Case studies
- Interview/ Assessment

Welcome to the Tooheys Brewery 360° Virtual Tour

This virtual tour has been specially prepared for the chemical engineering students at UNSW. See behind the scenes of the Tooheys brewery to observe the materials, processes and equipment that go into making beer. Here you will learn about the system design, quality control and waste management of an industrial scale beverage operation.

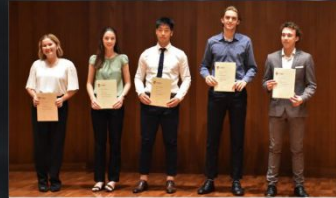
Site visit (real or virtual)

Contact: *Sarah Grundy (Lecturer)*
s.grundy@unsw.edu.au

Visits of real operating plants are a great opportunity for the students to see chemical engineering in action. We are now bringing some visits to the next level by developing virtual reality tours which can be used directly in our teaching materials. See here the insight virtual visit of the Tooheys brewery at Lidcombe guided by one of our new undergrad student.

Examples:

- Virtual Reality tour of Tooheys
- Site visit Tooheys



Scholarships/ prizes/ awards

Contact: *Emma Lovell (Lecturer)*
e.lovell@unsw.edu.au
or Co-op office (cooprog@unsw.edu.au)

UNSW, the Faculty of Engineering and the School offer a range of options to celebrate the great work done by our students through prizes and awards. One of the most prestigious accolade remains the Coop scheme during which industry can sponsor a high achiever high schooler to join the Chemical Engineering program and work with them through a number of internships distributed across the program.

Examples:

- Honours poster prize
- Co-op program



Industrial training & graduate job opportunities

Contact: *Sarah Grundy (Lecturer)*
s.grundy@unsw.edu.au
or industrial training office, ENG.IT-training@unsw.edu.au

Industrial training allows industry partners to work with current students and to identify potential future recruits. Students have the opportunity to gain exposure to a Chemical Engineering or Food workplace, culture and expectations. It plays an important part in any engineer's professional development. Scan the QR code to read our Industrial partner guide.



Industry Honours Project

Contact: *Pierre Le-Clech (Deputy Head of School Engagement)*
p.le-clech@unsw.edu.au

We have been running several 4th year honours projects with industry partners such as Arnotts, Sydney Water, Tooheys, where the students work on topics related to industry challenge and with an industry mentor.

There is no stipend required, although depending on the nature of the project, the industry partner may provide in kind in the form of materials, access to their facilities, etc. If you have a project topic / scope, feel free to contact us.



Consulting/ Commercial Activities

Contact: ChemEng@unsw.edu.au
or specific academic of interest for consultation specific to your field

Industry can greatly benefit from the range of resources, infrastructure and expertise that UNSW and the School of Chemical Engineering staff can offer. Whatever the size of your business or business problem, we can help.

Examples:

- Access to advanced analytical services
- Assistance with results interpretation and advices

To view full list of equipment in UNSW Mark Wainright Research Center (MWAC), head to



Research Projects (including industry Master and PhD)

Contact: *Cyrille Boyer (Deputy Head of School Research)* cboyer@unsw.edu.au
or *Cordelia Selomulya*, cordelia.selomulya@unsw.edu.au

We are in constant conversation with industry partners to assess and address their current challenges. By holding the quality of our research to the highest academic standards, we aim to deliver positive, real-world impact to the industry. While the Australian Research Council (ARC)'s Linkage scheme remains a conventional approach to work with the School, research partners can benefit from new industry-Master and -PhD programs.

Examples:

- Linkage with Australia Research Centre (ARC)
- Future Food Systems CRC
- Master of Industrial Research
- Industry-based PhD project
- AGSE PhD (to be launched in 2022)



Philanthropy

Contact: *UNSW Alumni and Giving*

By giving to UNSW and the School of Chemical Engineering, you are enabling cutting-edge research and creating opportunities to break cycles of disadvantage. In particular, we work with non-for-profit organisations and foundations to develop and conduct humanitarian engineering projects in various countries.

Are you the next Co-op Scholar in Chemical Engineering or Chemical Product Engineering?

What is the Co-op Program Scholarship?

The Co-op Program scholarship is a unique opportunity to combine normal study in the School of Chemical Engineering with a series of four industry training placements with sponsors. The program also features numerous workshops and training sessions to develop leadership and professional skills. Additionally scholars receive more than AU\$75,000 (tax free!) over the four years of the program to study at UNSW.

Joining the Co-op program enables scholars to form life changing connections and opens up a world of opportunities. Scholars not only gain academic and professional insight from alumni, older scholars, and the broader Co-op community, they also start forming their professional and social network from day one.

Co-op in the School of Chemical Engineering

Because Chemical Engineering offers surprisingly flexible career paths, a wide range of industry sponsors have supported the program over the years. Scholars can spend time with well-known employers like Qenos, Origin Energy, Selleys and James Hardie. Additionally, an increasing number of scholars are now embarking on placements with companies focusing on water treatment and supply (Sydney Water), food and beverage production (Arnott's, Lion), environmental services (Veolia, Suez), and energy production (Origin Energy).

Who should apply?

In addition to meeting the general entrance requirements for a Co-op scholar (visit coop.unsw.edu.au for details), successful chemical engineering applicants should have:

- A strong interest in mathematics, physics and chemistry
- A desire to apply this knowledge to solve real-world problems

The recommended knowledge for entry into the UNSW Co-op Program in Chemical Engineering is:

- Mathematics Extension 1
- Physics and Chemistry

Sponsors

Chemical Product Engineering: Era Polymers and The Arnott's Group
Chemical Engineering: Safework NSW, Rio Tinto Aluminium, Qenos Pty Ltd

Contact

For more information on the Co-op Scholarship, please contact:

Dr Emma Lovell
Co-op Coordinator
School of Chemical Engineering
Phone: 9385 5385
Email: e.lovell@unsw.edu.au
Web: www.chse.unsw.edu.au and <https://www.coop.unsw.edu.au/>



Our latest Co-op Scholars (L-R): Bonnie Ranger (INC), Jasmine Blanch (INC), Ming-Lok Sun (CHM), James Houseman (CHM), Matthew Cameron (CHM)

Reflections from Co-Op Scholars

“The most valuable part of the Co-op Program would definitely be the industry placements which have taught me 100% more than my degree! It's really accelerated my growth in confidence, public speaking, networking and made me feel comfortable in the workplace, which definitely places me in good stead during interviews for graduate roles and when I eventually start my career. On top of that, I've often learnt things on placement (e.g. VBA coding) that I previously had trouble with or didn't enjoy doing in Uni courses and I've made many good friends too at the 4 companies that I've worked for which I regularly catch-up with still. I also contact them when I need professional advice for my Uni Design Project, which is awesome (and something I'd never be able to do without the Co-op Program!)” - Denise Chan, Chemical Engineering



“Life at UNSW is fun and challenging. You are expected to complete your own work in your own time and take the initiative to ask questions. You are responsible for your own learning. While this seems daunting at first, there is a large community of students that you have access to to ask for help. There are also many events and activities happening at university everyday that will help you make memories.” - Julina Lim, Chemical Engineering



Updates from our student societies

Chemical Engineering Undergraduate Society (CEUS)

Despite the weather playing havoc with camping plans, Terms 1 and 2 have been busy for CEUS members. Defined by the return to campus, many CEUS members met other people studying their degree for the first time—such an important part of the University experience. A coastal walk and BBQ with peers from the UNSW Civil Engineering Society (CEVSOC) and the UTS Engineering Society was a fabulous way to see out the summer, and winter was welcomed with one of the biggest events on the 2022 calendar, the annual harbour cruise in partnership with the UNSW Materials Science and Engineering Student Society (MATSOC) and Food Science Association (FSA).

[Facebook](#) | [LinkedIn](#)



Food Science Association (FSA)

FSA kickstarted the year with a welcome lunch, and while their camp was cancelled once again, there were plenty of other opportunities for members to finally put faces to names. In Term 1 they held an International Women's Day Morning Tea, Professionals Australia Seminar and the first site tour post-Covid at Tooheys. An Easter Food Science workshop, organised in collaboration with the Girls in Engineering (GIE) Society, was a highly rewarding experience for all participants, providing them with an opportunity to inform and inspire high school girls on possibilities in the food technology industry.

[Instagram: @fsa.unsw](#) | [Facebook:](#) | [LinkedIn](#)



Chemical Engineering Research Society (CERS)

The UNSW Chemical Engineering Research Society (CERS) has hosted nine events since the beginning of the year, offering members multiple opportunities to learn, socialise, network and extend their skillsets. Most recently, an event on Mastering Networking Skills was held in collaboration with the ARC Training Centre for The Global Hydrogen Economy and UNSW Employability. Participants learnt how to develop their own elevator pitches and personal brands, and discovered tips and tricks to hold effective and meaningful conversations. In May, CERS also hosted a site visit to BOC South Pacific's gas production facility in Wetherill Park, Sydney, giving members the opportunity to look at the \$15 million robot cylinder automation system. The inaugural CERS networking was a sell out, with over 160 people from more than 40 organisations in attendance to build professional connections. The organising committee was heartened by the amount of funding collected from 16 sponsors as the event would not be as successful without their invaluable contributions.

[Latest newsletter](#) | [Instagram: @cersunsw](#) | [Twitter: @CersUnsw](#)





Inspiring Alumni

Dr Jennifer Moss Chief R&D Officer, pladis

On Wednesday 6 April, the School hosted a presentation by Jennifer Moss, who graduated from UNSW as an Industrial Chemist before going on to complete her PhD in polymer science with the School of Chemical Engineering.

Now Chief R&D Officer at pladis, Jennifer has 30 years of experience in consumer products across a broad range of consumer categories within Unilever, Procter and Gamble, Campbell's Soup Company and pladis.

Jennifer revealed that her PhD taught her many skills, including how approach problems and how to deal with ambiguity. In her advice for future graduates, she emphasised the importance of following your passion, getting outside your comfort zone and remaining curious.

"There is no straight path," Jennifer concluded.

"Enjoy the journey—you never know where in the world you might end up."

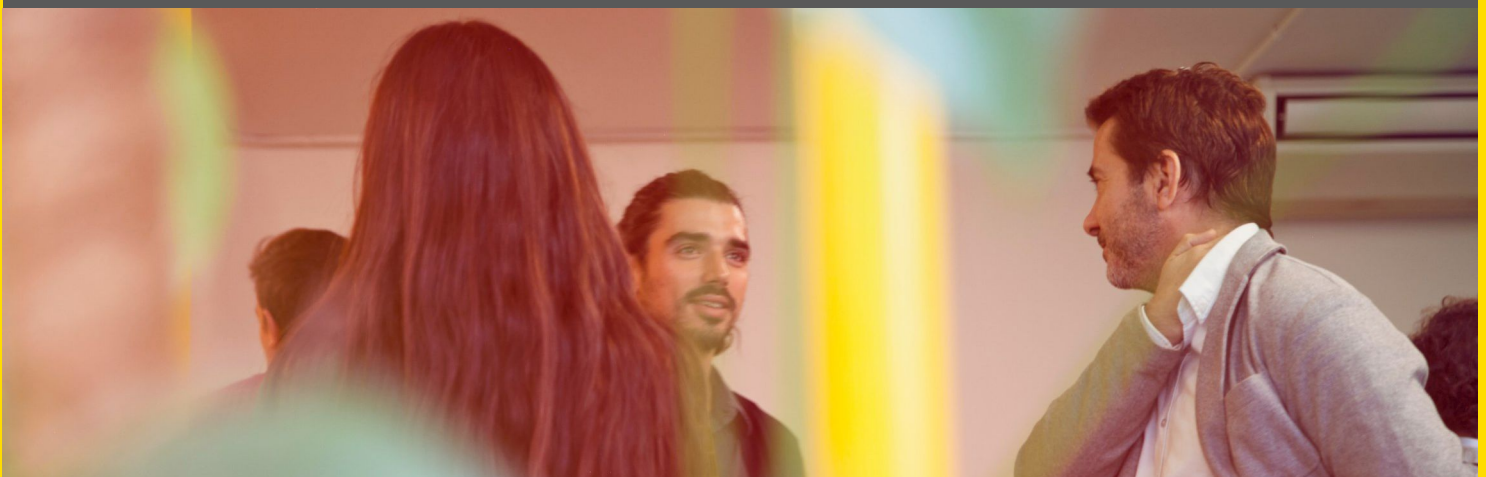
[View the presentation highlights](#)



Calling all Alumni—Save the Date!

On Thursday 20th October, the School will hold its next Alumni Evening. This an opportunities for graduates of all ages to catch up with old friends, talk to previous lecturers, visit the school's new teaching facilities and learn about new programs and research activities.

We will also take the time to celebrate recent achievements made by students, staff and alumni. So mark the date in your calendars and make sure you're following our social pages as more details will be announced soon!





PhD Students present 3-minute thesis

Ten Chemical Engineering students recently participated in the School's heat of the 3-minute thesis contest. Arslan Siddique was named the inner for his thesis on 'Thunderstorm-borne Grass Pollen: A Major Public Health Concern'. Arslan and runner-up Hyun Jin Kim will progress to the engineering faculty heats in June, and the winner from each faculty heat will qualify for the university-wide event on 31 August. We wish our Chemical Engineering students the best of luck!

Congratulations to the following people from the School of Chemical Engineering

Kourosh Kalantar-Zadeh

UNSW Engineering and Australian Research Council Laureate Fellow, Professor Kourosh Kalantar-Zadeh was named a Fellow of the American Association for the Advancement of Science, for his seminal contributions to the fields of sensors, electronics and analytical chemistry, especially for innovations with two-dimensional semiconductors, ingestible sensors and liquid metals.



Johannes le Coutre

Prof Johannes le Coutre was elected as one of the 2022 Food Standards Australia New Zealand (FSANZ) Fellows



Cordelia Selomulya and Yong Wang

Prof Cordelia Selomulya and Dr Yong Wang were recently awarded an Australian Research Council Linkage grant on engineering improved fat encapsulation for food powders, in partnership with Koninklijke Douwe Egberts B.V.





Postgraduate study at UNSW Chemical Engineering



Message from our Head of School

You will learn from dedicated educators in world class facilities. Your UNSW degree will enable you to pursue a variety of professional careers in academia, industry, government and community organisations. Our School has a long and proud history of teaching, research and service for the advancement of chemical engineering and food science to solve real-world problems both in Australia and around the globe.

Professor Guangzhao Mao

Our Programs

Master of Food Science

Master of Engineering Science

Chemical Process
Engineering

Food Process
Engineering

Key Benefits

Whether you have just completed your undergraduate studies or are a few years into your career, a Masters degree from UNSW School of Chemical Engineering, will provide you with the opportunity to advance your professional skills and deepen your knowledge and expertise. Study with us in Sydney, Australia! According to the Association of Professional Engineers Australia (2019), holding a Masters Degree delivered a wage premium of 15.4%, compared with a Bachelors degree.



Join our network of world-changing alumni working across a range of key industries.



Trimester system offers increased flexibility in study, offering opportunities to study abroad and accelerate learning.



Our degrees offer experience in hands-on learning included thesis projects and lab courses.

Want to find out more? Find us at....



chemeng.FutureStudents@unsw.edu.au

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www.unsw.edu.au/engineering/our-schools/chemical-engineering

What's hot?

Graduate Certificates

Study something bite-sized to whet your appetite for our postgraduate programs.

Our school in numbers

#1

Ranked Engineering Faculty in Australia

#1

Most employable students (AFR Future Leaders Awards 2020)

#1

University for research and impact in Australia

Executive Team



Guangzhao Mao
Head of School



Cyrille Boyer
Deputy Head of
Research



Stuart Prescott
Deputy Head of
Education



Pierre Le Clech
Deputy Head of
Engagement



John Starling
Technical
Manager



Rahul Bajoria
School Manager



Ali Jalili



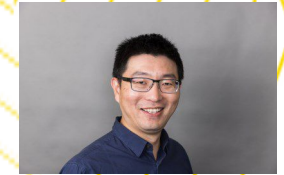
Alice Lee



Alison Jones



Cordelia Selomulya



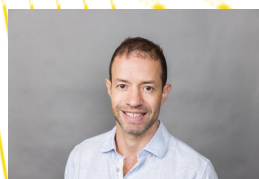
Da-Wei Wang



Dipan Kundu



Emma Lovell



Francisco Trujillo



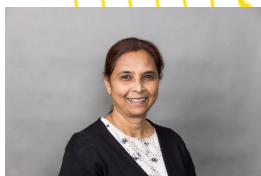
Graeme Bushell



Greg Leslie



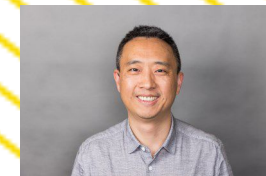
Jason Scott



Jayashree Arcott



Jian Zhao



Jiangtao Xu



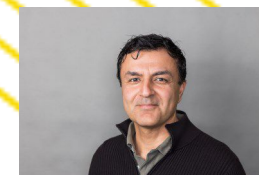
Jie Bao



Johannes Le Coutre



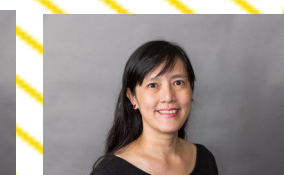
Kang Liang



**Kourosh Kalantar-
Zadeh**



Liming Dai



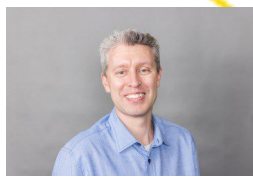
May Lim



Nicholas Bedford



Patrick Spicer



Per Zetterlund



Peter Neal



Peter Wich



Priyank Kumar



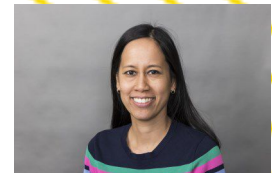
Rita Henderson



Rona Chandrawati



Rose Amal



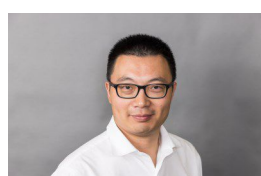
Sarah Grundy



Xunyu Lu



Yansong Sheng



Zhaojun Han



Zi Gu

Academic Team



www.unsw.edu.au

UNSW School of Chemical Engineering in numbers

Total number of academic staff: 40
Total number of technical and professional staff: 18
Total number of PhD students: ~220
Total number of postdocs: 65

Research funding: USD 236k/academic staff/year
Publications: ~10 papers/academic staff/year
Clarivate 2021 HCR: 5 academic staff



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<https://www.unsw.edu.au/engineering/our-schools/chemical-engineering>