



SMUCE CAREERS GUIDE 2019

YOUR LINK WITH
INDUSTRY

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This publication was supported by the Clubs & Societies Council,
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ACKNOWLEDGEMENTS



The successful production of the 2019 SMUCE Careers Guide was not the result of a single person's efforts, but the culmination of multiple people's generous contribution of their time, effort and resources. Like any engineering project, this guide is the result of the collaboration and coordination between many people of multiple disciplinary backgrounds coming together to work on this project; therefore, I would like to acknowledge those people below.

Thank you to all contributors who generously provided their time, effort and information to create this publication. This includes all individuals, organisations, and company representatives. Thank you to everyone who took the time out of their busy schedule, from PhD students, to researchers and Monash department coordinators, your small sacrifice has helped further equip the upcoming generations of Chemical Engineers to tackle the world that lies beyond university.

Thank you especially to Monash University, Monash Industry Team Initiative, the Engineering Faculty and the Department of Chemical Engineering.

I would like to extend my thanks to all SMUCE committee members who assisted with creating this guide. Getting this guide ready for publishing on time would not have been possible without the hard work put into proofreading and contacting companies, organisations, researchers and individuals. I would not have finished this guide without all your help. Moreover, I would like to especially thank the 2019 SMUCE President, Shivank Vijayakumar for without his guidance and advice on this project, it would not have turned out as it did.

This year's Guide was designed by Rowena Baulch, with her talent and hard work towards the vision of this guide proving pivotal in the overall aesthetic and professionalism of the publication.

Finally, SMUCE would like to thank all our sponsors, namely - IChemE, Carlton & United Breweries, Wood, Ford Motor Company and the Department of Chemical Engineering at Monash University. Without your support, this publication would not have been possible.

— *Nicholas Farrugia, Industry Vice President 2019*

WELCOME

The Society of Monash University Chemical Engineers proudly presents our 2019 Careers Guide which is the tangible product of SMUCE's vision and goal to link students with industry. You will find that this guide will not only provide insight into the traditional pathway of a chemical engineering student graduating into an industry role as a process engineer; but also aims to shed light onto other possible pathways such as research and academia careers. This guide includes numerous industry profiles, research opportunities, student testimonials from some fantastic students and tips to help you get that dream job.

SMUCE:

Established in 1962, the Society of Monash University Chemical Engineers is a student led society which aims to enhance the experience of chemical engineering students through facilitating greater student-staff relationships and providing opportunities to network by being your link with industry. SMUCE believes that as a student, industry contacts are just as important as getting good grades and as such provides the means for students to network with industry leaders and company representatives.

This year we will continue our 57-year long tradition to provide connections for our students through our various initiatives including:

Weekly Industry Seminars

Each week during the semester we invite representatives from different companies or organisations to come and speak to our students. These seminars allow companies to present to students on who they are, what they do and potential career pathways into employment. Additionally, these seminars provide an avenue for students to ask questions and network with working engineers. These seminars are held on the Thursday of each week throughout the academic year from 12-1pm in the Lawson Room (22 Alliance Lane, Room 201) and are followed by a free pizza for lunch.

Site Tours

Continuing in 2018, SMUCE will run several industry visits every semester to help chemical engineering students attain more hands-on industrial experience and bridge the gap between the lecture halls and industry.

More Information

To hear more about SMUCE and our events like us on Facebook at www.facebook.com/SocietyOfMonashUniversityChemicalEngineers, connect with us on LinkedIn <https://www.linkedin.com/in/smuce>, visit our website <https://www.smuce.org> and feel free to ask us any questions via email at smuce@monashclubs.org.

Students are also welcome to speak to us in person at our office, located on the ground floor of Engineering Building 37, room G03.

TIPS ON WRITING A RESUME FOR A CHEMICAL ENGINEER GRADUATE

Your resume is the first impression that you will give to a potential employer. So make it clear, concise and relevant.

You should take the time to research the organisation and the position that you are applying for. This will enable you to link the skills and experiences from your time at Monash University as a Chemical Engineering student and any other employment, volunteer work, memberships and involvement in groups or bodies.

Try not to use the same resume for every job that you apply for - tailor it for each different position and company. Doing this will help you stand out for all the right reasons. Your resume is where you show that you have the required skills, knowledge and qualifications that are needed for the position.

The first page of your resume should reflect the most relevant information pertaining to the job. As you head towards completion of your Chemical Engineering degree, details of your education will most likely be of most interest to the potential employer unless, of course, you have any industry related experience.

List your education in reverse chronological order. If you received any outstanding marks, be sure to include these, if not, there is no need to list them as companies often request a copy of your academic transcript which will contain this information. If you did well in a particular subject and the position requires this, then make the potential employer aware of your mark.

Also be sure to list your work experience and employment history in reverse chronological order. For each position, describe your duties and any achievements, beginning each point with an action verb (e.g. formulated, identified, solved, accomplished, managed, assisted etc.) and remember to keep to the point and stress what you have achieved.

Any engineering related work experience you have could have a separate heading for example "Chemical engineering related experience". Keep in mind that most engineering work is project based, therefore you should give brief details of any projects that

you were involved in and highlight your specific contribution to its' success.

Over and above your Chemical Engineering degree and any engineering related experience, companies will look for employability skills that you have developed. These could include the following and should be addressed in a "Skills summary" section of your resume:

- Communication
- Creativity and Innovation
- Initiative and Enterprise
- Professionalism
- Planning and Organisation
- Problem Identification and Solution
- Intercultural Competence
- Teamwork
- Use of Tools and Technology

You should include evidence of how you possess and utilise some of these skills by using relevant examples. Merely listing skills with no evidence is meaningless for employers. Remember this is the section that should contain the skills that the employer has specifically identified as being important and should be different for each application.

Another heading to include in your resume if relevant is "Voluntary and community work". Employers value people who are worldly and culturally aware and willing to contribute to the greater community. If you are a member/student member of any professional associations for example Engineers Australia, mention this on your resume as it demonstrates your interest and commitment to the engineering field. You may or may not include a list of your "Interests and hobbies" - it's a personal choice. Employers are usually interested in you as a person and this section could add another dimension.

Finally you need to include a section with details of potential referees. List their name, position title, organisation and contact details. Referees should have witnessed your capabilities in a working environment. It is acceptable to write "Available upon request" if you don't have up to date details but bare in mind you will need to provide the details if employers are serious about employing you.

Always ensure you speak to your referees before listing their contact details. See some samples using the link below:

monash.edu.au/students/career-connect/apply-for-a-job/resume-samples.html

Quick tips:

- Use 10, 11 or 12 font - Arial, Calibri or Times New Roman are good choices
- Triple check your grammar and spelling
- Be consistent with formatting – use clear headings, bullet points (make sure they line up)
- Choose an easy to read layout and make sure there is plenty of 'white space' on the page
- Be concise and use relevant examples
- Write content in the third person – no 'I' or 'we'

How can we help you?

Chat with the friendly staff at Career Connect about:

- Meeting with a Careers Education Consultant
- Getting your job application checked
- Interview tips, including Interview Stream (monash.interviewstream.com/signup)
- Developing your employability and using Student Futures (student-futures.monash.edu)
- Your work rights
- Career Gateway jobs board (careergateway.monash.edu.au)
- Jobs for Students program
- Student leadership development
- Volunteering at Monash (monash.edu/volunteer)
- Career seminars and events

Please visit our website for more information monash.edu/students/career-connect/

Your cover letter could be the first thing that an employer will read about you.

A cover letter should introduce you and describe your qualifications, it should demonstrate your motivation for wanting to work for that particular company and your passion for chemical engineering and it should show that you have the relevant skills for the position. A common mistake made with cover letters is to repeat the information that is in your resume – this is not the point of a cover letter! Also rewrite your cover letter for each application as it must be tailored specifically to each job you apply for.

Paragraph one

This should include the purpose of your letter. Include your qualifications, the position title and any reference number to the position (if applicable). If you're not writing in response to an advert and canvassing for potential employment, introduce yourself and your current career circumstances as concisely as possible, including any specialised professional interests and abilities.

Paragraphs two/three/four/five

These paragraphs should demonstrate why you want to work for this employer and why they should want you. It is essential that you demonstrate within these paragraphs your ability to gather the most relevant information from a range of sources to state your claim as a suitable candidate.

Highlight the skills, expertise, qualities and employment experience you have included in your resume that you believe are most relevant to the requirements of the position. Make sure that you can demonstrate how you meet the selection criteria, and how what you have to offer relates to both the current and future needs of the employer.

TIPS ON WRITING A RESUME FOR A CHEMICAL ENGINEER GRADUATE (CONT'D)

Include other factors that point to your possession of key general skills (e.g. communication, teamwork, initiative, self-management) through your experiences in voluntary or community activities, clubs and societies etc. If you have done a chemical engineering internship or vacation work include skills from this experience as evidence.

Show that you have researched the organisation and the position. Include this when you show your enthusiasm for that particular position with that particular employer but do not copy sentences from the employer's website.

Final Paragraph

What do you want to happen next?

Confirm that you have attached your resume and any other documents requested. Finish on a positive note, thank the employer for their time and express interest in attending an interview.

Have a look at the link below for examples, and for the correct way to address the letter, the salutation and how to close the letter.

Quick tips:

- ONE PAGE ONLY – never longer (unless specified by employer)
- Tailor it to the job for which you are applying
- Use a standard business style for your letter
- Use 10, 11 or 12 font - Arial, Calibri or Times New Roman are good choices
- Clear structure – one main idea per paragraph
- Plenty of white space (standard margins and space between paragraphs)
- 100% accurate spelling and grammar
- Short, well-constructed sentences, not unnecessarily long and wordy
- A positive tone (do not include your weaknesses)
- Plain English (avoid slang, SMS language or other abbreviations, jargon or terms which are too casual)

Please visit our website for more information and sample Cover Letters monash.edu/students/career-connect/apply-for-a-job/cover-letters.html

How can we help you?

- Attend 10 minute drop-in sessions for a quick feedback on job application or career advice
- Provide you with tips on assessment centres
- Offer you half hour one-on-one career consultations
- Online resources including sample resumes and cover letters, and lots of other useful career planning tips and information regarding employment outcomes based on your degree program
- Brush up your interview skills
- Practice job interview using Monash Career Connect Interview Stream

For more information please visit

<https://monash.interviewstream.com/signup>

The Monash Employment, Careers and Development Centre is located in the Campus Centre, 21 Chancellors Walk.

NETWORKING

Why should a company hire you?

Maybe because of your grades.
Maybe because of your extra-curriculars.
Maybe because of your good looks.

Whilst all of these factors count (good looks aside, sorry Brad Pitt), often what is critical is how well you can connect with someone. The ability to connect and interact with people will assist you at all stages in your career; networking nights, the interview table or on-the-job every day with colleagues, building rapport with others is always beneficial.

Often it seems like that building rapport (part of what is often referred to as “soft skills”) is less of a science and more of an art at best, and mystical randomness at worst. Thankfully like most things, whilst some people do have a level of natural talent, building rapport is a skill and, regardless of who you are, this skill can be developed and honed. The opportunities to practice this skill are unlimited but here are some potential situations that will allow you to refine your craft.

Networking Night

These nights are literally designed for you to practice building rapport with both other students and professionals. Make sure to talk to people from both of these camps as variety is always useful. You may have heard of having an “elevator pitch” which is usually described as a two to three minute spiel of who you are, what you are studying and what you are interested in pursuing later in life.

Ideally, you don’t use one of these (think how you would feel if someone jumped in front of you and talked non-stop for three minutes), however they can be nice to have as a safety-net of sorts if you are unsure of what to say.

A great in this sort of environment is to get the other person talking. This is helpful for a number of reasons. Firstly, if you find the right topic, people enjoy talking about themselves.

This makes them feel valued and that you are interested in them. Secondly this gives you more

information to help you continue the conversation with them; you can pick up on some of their interests, maybe mentally note some places where you could take the conversation further (“You mentioned you travelled to Japan for work, what were you doing over there?”) and even use this information to help decide what you would like to mention about yourself.

Lastly, getting others’ to talk about themselves gives you time to think and also relax. When you’re not talking, make sure that you are actively listening, but feel free to take a mental step back and try to avoid churning everything over in your own mind. These nights are a great place to engage in conversation with a wide variety of people and give room to push yourself out of your comfort zone, with opportunity to go back to your peers if need be.

SMUCE Industry Seminars

SMUCE Industry Seminars give a much more “close” scenario where you can interact with industry representatives in a one-on-one manner. These situations are especially helpful if you want to connect more deeply with them and form a closer connection. The connections that you make at this event certainly has potential to be fruitful in the future, whether as having them as a mentor, helpful informant or even as a pathway to a job or career.

Volunteering Opportunities

Volunteering is a fantastic way to practice every variety of soft skill. From networking with peers and professionals alike, to leading teams or even potential for public speaking, volunteering can give you hugely beneficial experience in a swathe of different skills. Additionally, volunteering is a fantastic thing to put on your CV and depending on what it is, may contribute to your CPD requirements. Volunteering ultimately is very much a hands-on experience and can be hugely rewarding especially if it is in a field, or for a purpose, that you are passionate about.

— *Jesse Givens-Lamb*



CELEBRATING
OUR CENTENARY



ENGINEERS
AUSTRALIA

Frontier

The Young Engineer's Guide to Getting Ahead

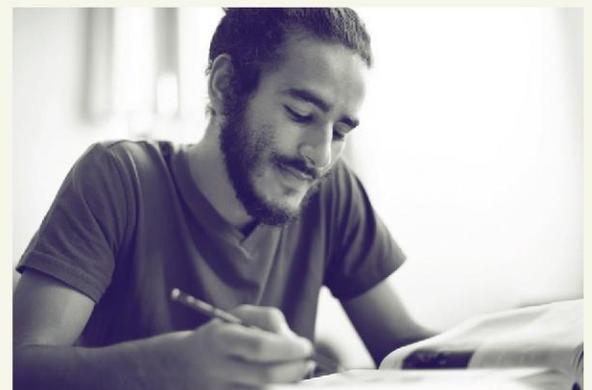


5 ways to engage with Engineers Australia

1. Become a free student member and join our members-only Frontier Community
 -  Check out the website: frontier.engineersaustralia.org.au
 -  Join the closed members-only Facebook Group: facebook.com/groups/Frontier
 -  Download the members-only Frontier App: Search FRONTIER or go to easgm.eventapp.com.au
2. Explore events happening near you to network with industry leaders and build your knowledge and professional network: frontier.engineersaustralia.org.au/events
3. Access a range of online services to assist you in your studies from university into the working world: frontier.engineersaustralia.org.au/careers-hub/
4. Check out our careers webinars series, designed to help students and grads start their careers: frontier.engineersaustralia.org.au/careerwebinars
5. Keep up to date on industry developments with our monthly magazine create (free online for student members): engineersaustralia.org.au/create

Engineers Australia
A membership for your future.

Become a student member today:
frontier.engineersaustralia.org.au/membership



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ENGINEERS
AUSTRALIA



The Young Engineer's Guide to Getting Ahead

CAREER | LIFE | INSPIRATION

  @EngAustralia

 facebook.com/groups/frontier/

Frontier is a community for student and graduate members of Engineers Australia specifically designed to support you on your career journey. You can access a range of resources and benefits created to provide tailored support, guidance and advice on all things relating to university, graduating, getting a job and finding your professional feet.



**Are you a student or graduate?
Join our community**

frontier.engineersaustralia.org.au

2019 Chemeca

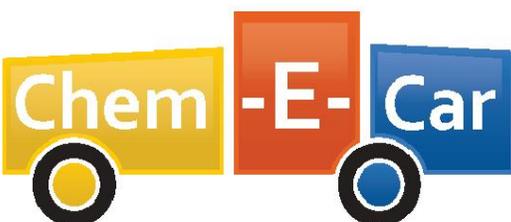
Chemical engineering megatrends and the elements
International Year of the Periodic Table

Si

Silicon

C

Carbon



Chemeca 2019 will be taking place in Sydney, Australia on 29th September – 2nd October and entries are now being accepted for the much anticipated Chem-E-Car competition that is part of the event.

Chem-E-Car is a fun, interactive and open-ended learning experience for university and senior high school students. The competition is about:

- working as a team
- testing your ability to design a working chemical reactor (your car) that must operate under real conditions
- sticking to a tight schedule with a fixed budget
- being flexible and fast thinking

Do you have what it takes?

Visit the Chemeca 2019 website to download the competition rules and guidelines then submit your team entry by 30th of August 2019 to be a part of this exciting competition.

For further information

Visit: www.chemeca2019.org



Na

Sodium

Ni

Nickel

O

Oxygen



H

Hydrogen



chemeca
CONFERENCE

29 September – 2 October 2019
Sydney, Australia

Uni helps you do the job. We help you get it.

Even more reasons to become a member of Engineers Australia.

Being a member of Engineers Australia can now directly connect you to employment opportunities to build you into an engineering leader of tomorrow.

Powered by GradAustralia, the Engineers Australia jobs board has opportunities from a wide range of amazing employers across different disciplines, no matter what graduate stage you're at.

Whether you're looking for an engineering internship, vacation placement, first job or position up to four years' post your graduation, the Engineers Australia members-only jobs board is the place to go.

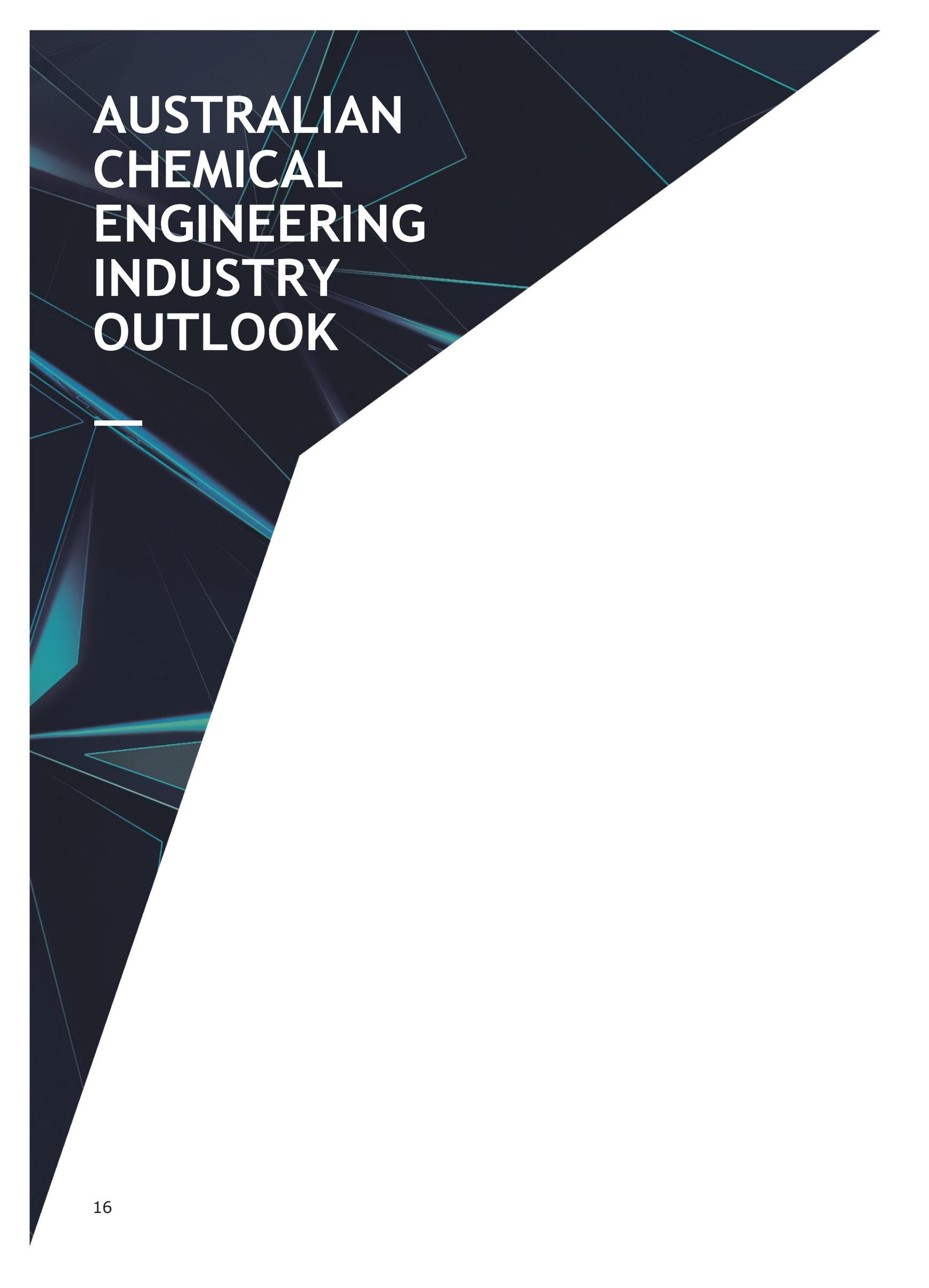
Check it out out.

Be one of the first to access our new platform head to: jobs.engineersaustralia.org.au

Got questions?

Contact us at: careers@engineersaustralia.org.au
or head to frontier.engineersaustralia.org.au





AUSTRALIAN CHEMICAL ENGINEERING INDUSTRY OUTLOOK

WHAT IS CHEMICAL ENGINEERING?

A chemical engineer uses technical knowledge to convert an unusable primary resource into a usable and beneficial secondary resource in a sustainable and cost-efficient way. A chemical engineer is a key component in the large-scale production of any commodity; being able to effectively manage, troubleshoot and operate on a massive industrial manufacturing scale.

Chemical Engineering Specialisations **Pharmaceuticals**

(See the company profile from CSL)
Working on the production of new pharmaceutical drugs and improving the efficiency of existing processes

Food and drink

(See the company profile from MARS or CUB)
Improving the longevity, packaging, convenience and taste of food products

Chemical processes

(See the company profile from Dulux, PPG or Lyonell Basell)
Involving the production of fertilisers and pesticides, specialty chemicals as well as producing everyday chemicals used in households such as glass, cosmetics and cleaning chemicals

Combustion

Involving power generation from coal or gas powerplants.

Consulting

(See the company profile from Bain & Co, EY or Jacobs)
Designing, proposing and orchestrating the production of a project with contractors in an economic way.

Environmental and Sustainability

Involving the safe and sustainable treatment of waste and as well as maintaining water quality of cities and towns.

Mining

(See the company profile from MMG or Rio Tinto)
Involving the extraction and purification of major commodities such as aluminium, iron, copper, lead and gold.

Petrochemicals

(See the company profile from Suez)
Converting oil and gas into plastics, synthetic rubber and other things.

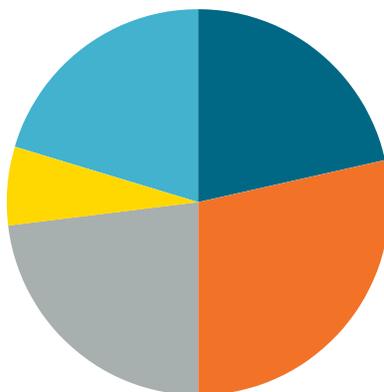
Process control

Instrumentation and control systems which make a manufacturing process run smoothly, safely and efficiently.

Petroleum

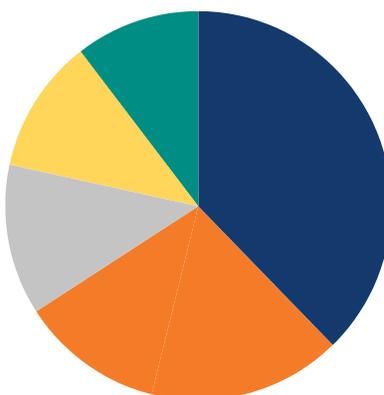
(See the company profile from Shell)
Producing oil, petrol and LPG.

EMPLOYEE STATISTICS



Australian Distribution

State	Chemical Engineers	
NSW	23	●
VIC	26.4	●
QLD	24.1	●
SA	5.1	●
WA	21	●
TAS	0	
NT	0.4	
ACT	0	



Main Employing Industries

Industry (% share)		
Manufacturing	44	●
Professional, Scientific and Technical Services	17.5	●
Mining	13	●
Electricity, Gas, Water and Waste Services	9.8	●
Other Industries	15.7	●

FAST FACTS

AVERAGE SALARY —

AU\$86,604

SALARY RANGE—

AU\$59000 TO AU\$126000P.A

BONUS —

AU\$5000 TO AU\$13000

WORKFORCE —

7400 EXPECTED TO GROW TO 8200 BY 2023

AVERAGE WORKING WEEK —

39.2 HOURS

AVERAGE AGE—

40 YEARS

GENDER RATIO—

75.6% MALE 24.4%FEMALE

INDUSTRY PROFILES

—

Honeywell

THE POWER OF **CONNECTED**

Welcome to Honeywell, a Fortune 100 company that invents and manufactures technologies to address some of the world's most critical challenges around energy, safety, security, productivity and global urbanization.

We are uniquely positioned to blend physical products with software to support connected systems that improve buildings, factories, utilities, and aircraft, and that enable a safer, more comfortable and more productive world. Our solutions enhance the quality of life of people around the globe and create new markets and even new industries

What does your company look for in an employee?

We work hard to build a team of results-oriented individuals, then empower them to make the world a better place. With the support of a global organisation and a culture of teamwork and camaraderie that is second to none, Honeywell employees can navigate their way around the world and progress from career to career within the same dynamic company. Our employees are encouraged to be visionaries and they achieve great things.

At what sites do your employees work at?

In Victoria: Abbotsford and East Bentleigh. What vacation opportunities are currently offered or will be in the near future?

Yet to be confirmed

What graduate opportunities are currently offered or will be in the near future?

Our Graduate Program

The Honeywell Graduate Program is designed from the ground up to empower people from the moment they start their careers with Honeywell. Through challenging and meaningful assignments with great learning opportunities,

together with quality training and development opportunities, the 2-year program has a rich history of fostering our future leaders.

We work hard to build a team of results-oriented individuals, then empower them to make the world a better place. With the support of a global organisation and a culture of teamwork and camaraderie that is second to none, Honeywell employees can navigate their way around the world and progress from career to career within the same dynamic company. Our employees are encouraged to be visionaries and they achieve great things.

Are there any restrictions on, or additional opportunities for international students?

No, unfortunately not. Must be Permanent Residents or Citizens

Are there any other opportunities available?

Please see information on our early careers website - [/www.earlycareersathoneywell.com.au/](http://www.earlycareersathoneywell.com.au/)

How can a student or recent graduate apply for these positions?

Via website above

How can a student find out more information about your company?

www.honeywell.com or www.earlycareersathoneywell.com.au/.



Wood is a global leader in the delivery of project, engineering and technical services to energy and industrial markets.

We operate in more than 60 countries, employing around 60,000 people, with revenues of over \$10 billion. We provide performance-driven solutions throughout the asset life cycle, from concept to decommissioning across a broad range of industrial markets, including upstream, midstream and downstream oil & gas, chemicals, environment and infrastructure, power & process, clean energy, mining, nuclear, and general industrial sectors.

Employee Attributes:

For graduates we look for: A Bachelor's degree from a recognised university maintaining a high Credit or Distinction average, excellent written and verbal communication skills, demonstrated time management and organisational skill, a strong sense of commitment, a willingness to learn, and a desire to work in a dynamic deadline driven environment and ability to work away on site and interstate.

We hire graduates who show, energy, enthusiasm and passion.

Employee Development:

We have our performance & development tool called My Success Plan. Employees agree with their managers a range of performance & development objectives that they will achieve during the year. Graduates also attend a range of face-to-face training programs that lead to a Cert IV in project Management.

Locations:

Our head office for Australia is in Collins Street Melbourne. Our work in Victoria is mainly in the Gippsland region and offshore in Bass Strait. In Australia we operate in Victoria, Western Australia & Queensland as well as in more than 60 countries world-wide.

Vacation Opportunities:

Too early to tell for 2019/2020. Our vacation programs run from early December to late February and are usually available Australia wide. For these roles we only accept applications from Australian citizens or those that have PR. Applications for vacation roles open in August of each year.

Graduate Opportunities:

Applications for graduate roles are now open closing on 31 March 2019. We have requirements for graduate Chemical Engineers Australia wide. What makes our grad program unique is that we offer graduates the ability to attain a Cert IV in Project Management

Applications and Eligibility:

We only accept applications from Australian citizens or those that have PR. Applications are made online. The next phase is a video interview, assessment centre and finally a face-to-face interview. The application process for vacation students does not include assessment centre.

Student Advice:

Attend career fairs and talk to our employees. When approaching employers at events, DO NOT ASK "so what do you guys do?" This is an employer's most irritating question. Also follow us on Facebook, LinkedIn, Twitter and YouTube.

More Information:

Via our website: www.woodplc.com.





YOU ARE OUR NEXT BIG IDEA.

Wood is a global leader in the delivery of project, engineering and technical services to energy and industrial markets. We operate in more than 60 countries, employing around 60,000 people, with revenues of over \$10 billion.

Our business is evolving at incredible pace creating awesome career opportunities for those taking the first big step on their career journey. You will have the opportunity to make a real impact with an organisation that truly cares, from industry challenges to making a difference in the communities in which we operate.

wood. make it possible

Discover more at [woodplc.com/careers](https://www.woodplc.com/careers)

LyondellBasell Australia Pty Ltd produces polypropylene at its Geelong plant, a base material used to produce a variety of products that are used to advance solutions in nearly every sector of the economy.

LyondellBasell (NYSE: LYB) is one of the largest plastics, chemicals and refining companies in the world. Driven by its employees around the globe, LyondellBasell produces materials and products that are key to advancing solutions to modern challenges like enhancing food safety through lightweight and flexible packaging, protecting the purity of water supplies through stronger and more versatile pipes, improving the safety, comfort and fuel efficiency of many of the cars and trucks on the road, and ensuring the safe and effective functionality in electronics and appliances.

LyondellBasell sells products into more than 100 countries and is the world's largest producer of polymer compounds and the largest licensor of polyolefin technologies. In 2019, LyondellBasell was named to Fortune magazine's list of the "World's Most Admired Companies."

Employee Attributes:

Engineering careers at LyondellBasell include a wide variety of opportunities. With roles that balance day-to-day tactical decision making with long-term strategic execution, engineers are an essential element of LyondellBasell's success.

Employee Development:

Our innovative employees are a global team dedicated to advancing the big ideas and providing solutions to the world's biggest challenges, such as reducing emissions by making vehicles lighter. Working together, LyondellBasell produces the plastics, chemicals and fuels that advance the positive future we know is possible.

Locations:

LyondellBasell Australia's head office is located in South Yarra, Victoria and the manufacturing site is located 70km southwest of Melbourne in Geelong. There is an onsite Market Development Laboratory at Geelong that provides technical and product development support.

Vacation Opportunities:

LyondellBasell Australia offers vacation work and scholarships that involve real hands-on experience on projects that add value to the process and our business. Also, students have the opportunity to work on process safety, process optimisation and trouble shooting.

Application and Eligibility:

The faculties of respective universities (Monash, RMIT and Melbourne University) will send out an email when the applications are open.

Student Advice:

Ask questions, be willing to try anything, show initiative.

More Information:

More information about LyondellBasell can be found at www.LyondellBasell.com.

Jacobs are a global engineering consultancy with thousands of employees worldwide. We tackle the world's most challenging issues, involving Infrastructure, Water and Sustainability.

Employee Attributes:

Jacobs want employees who are client focused, have good technical and organisational skills, and are willing and able to be innovative and resourceful. Our employees must be able to collaborate with each other and with partners and contractors to safely deliver multidisciplinary projects from small to large scale.

Employee Development:

Jacobs develop our staff through on the job learning opportunities and support for formal learning and development. At an entry level, we have a 2-year graduate development program which features a range of learning and development programs, mentoring, and an emphasis on Chartership under Engineers Australia.

Locations:

In Victoria our main office is in Melbourne CBD, with a regional office in Tatura. We also have project offices in a variety of locations including Mitcham, Richmond and Albert Park.

Vacation Opportunities:

Vacation opportunities are advertised on Jacobs' website around August. The vacation program begins in late November and runs for 12 weeks.

Graduate Opportunities:

Applications for the 2020 graduate program are now open and will close on the 31st of March. You will be required to upload a cover letter, CV, academic transcript and answer some short answer questions.

Application and Eligibility:

All applications are accepted via the Jacobs website. Candidates will be shortlisted based on their application, and interviews undertaken with shortlisted candidates.

More Information:

Candidates can find more information about Bain through our website <https://www.jacobs.com/>





Bain & Company is one of the world's leading management consulting firms. We support companies in important decisions on strategy, operations, technology, organisation, private equity and mergers and acquisitions – cross-industry and cross-border. We help the world's top leaders solve their toughest challenges. Our work fuels the growth of many industries; it creates change for some of the most influential organisations and notable brands around the world – and when those organisations are truly doing things right, they are positively impacting people's lives around the world.

Employee Attributes:

We are looking for all-rounders — independent thinkers who thrive as part of a team. We recognize that everyone is different and everyone will bring their own unique experiences and perspectives to the team. The essential skills we'll be looking for in an undergraduate candidate are: a demonstration of exceptional academic performance and strong analytical, interpersonal and leadership skills.

Employee Development:

The support you receive to help you thrive throughout your career at Bain is award winning. We have built the foundation of our supportive culture around our local offices—your home base. You will very quickly develop meaningful relationships with your peers, your managers, your mentors and your staffing manager—all of whom will have a deep interest in making you successful. Professional support starts from day one with our world-class global training where we teach you everything you need to be brilliant at what you do. From a professional development perspective, the firm provides a wide range of opportunities including: mentoring, global transfers (short & long term options available), externships and affiliation groups e.g., Women@Bain and BGLAD (Bain GLBT Association for Diversity).

Locations:

The Bain Australia practice is made up of the Sydney, Melbourne and Perth offices. These three offices are all located in central CBD locations and contain all of the modern traits you would expect to see in a fast-paced, dynamic work environment. Globally, we have 58 offices around the world, and we work seamlessly together as one firm to serve our clients wherever they need us.

Graduate Opportunities:

Bain Australia recruits graduates between February and March for Associate Consultant (AC) positions starting in January, March and July the following year. Those currently completing an undergraduate, masters (non-MBA) or PhD degree, or with up to five years of industry experience are encouraged to apply.

Other Opportunities

We also offer the True North Scholarship for Women for eligible female, penultimate-year students, giving them a chance to win a \$15,000 scholarship, a Bain mentor and an Associate Consultant job offer. In addition, we welcome applications from experienced professionals with up to five years of industry experience who are looking to make a change in their careers. Please note that the Associate Consultant Internship program is not available in Bain's Australian practice.

Application and Eligibility:

Students or recent graduates can apply for all positions via www.bain.com/careers. To apply, submit your CV, cover letter and transcript including relevant test scores such as OP, ATAR, GPA, GMAT, WAM etc.

INT	GRAD	VAC
X	✓	X

Student Advice:

When applying ensure you have a well-rounded application that demonstrates exceptional academic performance and strong analytical, interpersonal and leadership skills. To prepare for your application and case interviews we strongly advise that you read the 'Application information' and 'Interview preparation' sections of our www.bain.com/careers website.

When invited to interview, we encourage you to practice some case interviews with a friend, classmate or colleague. Rest assured that we're not looking to interrogate you in our interviews but rather cultivate an environment that promotes a series of productive and intellectually stimulating discussions. Lastly, be yourself! We encourage diversity at Bain and want to get to know the real you.

More Information:

Candidates can find more information about Bain through our website <http://www.bain.com> and keep up with our work, people and culture via our social media channels:

Facebook - @bainandcompanyAUS

Instagram - @bainandcompany

For specific recruiting enquiries, please email australia.recruiting@bain.com



INT	GRAD	VAC
X	✓	X

CSL is a global specialty biopharmaceuticals company that develops and delivers innovative biotherapies that save lives and help people with life-threatening medical conditions live full lives. CSL also manufactures, markets and distributes vaccines with particular focus on vaccines (Influenza) for the prevention and treatment of serious disease.

Employee Attributes:

Within the Engineering work stream, the Graduate Program typically targets Mechanical, Chemical and Process Engineering Graduates. In addition to technical knowledge, we also evaluate applicants based on our company values, which are; Patient Focus, Innovation, Integrity, Collaboration and Superior Performance. Graduates who have the capacity to demonstrate these values, are encouraged to apply. Strong communication skills are also vital.

Employee Development:

The Program begins with a comprehensive induction process designed to educate new graduates about the CSL businesses, their history and key business objectives. Graduates are also given the opportunity to engage with key senior leaders within the business. Throughout the Program, graduates are supported with tailored development that is regularly discussed with their managers, providing them with considered training and relevant opportunities as they build their careers.

Locations:

Engineering Roles within the Program are available within both our CSL Behring and Seqirus Businesses based at Broadmeadows and Parkville respectively.

Vacation Opportunities:

CSL does not currently offer summer work placements for students.

Graduate Opportunities:

Graduate opportunities are advertised mid-year, typically in June/July. In mid-2019 positions will once again become available for Graduates within Engineering and Science. To keep up to date on the application process, graduates can register their interest on the website.

Applications and Eligibility:

<https://www.cslbehring.com.au/careers/graduate-program>

Student Advice:

Take the time to tailor your application to our Program. CSL looks for Graduates who have invested in understanding the role and have directly addressed the criteria and requirements. When participating in the interview process be yourself; it is important we know who you are and what you would like to achieve through the Program. Critically, do your research on our businesses. We want to understand what you know about CSL, CSL Behring and Seqirus and what role you see yourself playing within our business.

More Information:

Please visit us at: <http://www.csl.com.au/home>, <https://www.cslbehring.com.au/careers/graduate-program>



INT	GRAD	VAC
✓	✓	✓

Carlton & United Breweries (CUB) is one of Australia's most iconic companies. We brew some of Australia's most beloved beers and ciders including Victoria Bitter, Carlton Draught, Great Northern, PureBlonde, Strongbow, Mercury and Bulmers. We employ nearly 1,500 people in Australia, at our five breweries and various offices across the country. As a part of AB InBev, the largest and only truly global brewer, we also brew and distribute global iconic brands such as Corona, Stella Artois and Budweiser. Carlton & United Breweries is on the hunt for the next generation of graduates who are determined to dream big and empowered to lead change. Are you up for the challenge?

Employee Attributes:

To be eligible to apply for the Global Management Trainee (GMT) Program; you will have less than two years of full-time work experience and hold (or be studying towards) a Bachelor or Masters (or equivalent) degree in any discipline. For the Supply Management Trainee (SMT) Program, you will also have less than two years of full-time work experience, with an undergraduate degree preferably in Engineering (Chemical, Mechanical, Process, Production or Electrical) or Science (Biochemistry, Micro-biology, Brewing, Food Science or Pharmacy). You must have work authorisation for Australia and be geographically mobile.

Employee Development:

As part of AB InBev, CUB employs world leading people management practices through a structured People Development program. The People Development cycle is supported by one-on-one manager monthly coaching and underpinned with formal learning experiences delivered through AB InBev University programs.

Locations:

Our corporate Head Office is based in Southbank, Melbourne and we have major sales offices located in each state and territory. Our three breweries are located in Victoria (Abbotsford Brewery), Queensland (Yatala Brewery) and Tasmania (Cascade Brewery).

Vacation Opportunities:

10-week Summer Internship Program commencing in November through to February.

Graduate Opportunities:

GMT Program: from brewery operations to sales, you'll master the fundamentals of every department in our company across a 10-month rotational program. As part of the program, you'll be inducted in our Australian operations before travelling to Shanghai, China for our APAC zone induction, and St. Louis, USA for our global induction. SMT Program: develop the technical skills to brew the beers we're famous for across a 12-month functional training program in the Supply function. Working closely with our senior leaders, you will also expand your leadership skills by managing hands-on projects centred around technical and practical challenges.

International Opportunities:

As part of the AB InBev family, our programs operate across the globe. International students can apply for these programs as long as they have full work-rights for the duration of the program.

Applications and Eligibility:

Applications are open now and close strictly on April 12th: <https://cub.com.au/careers/talent-programs/>

Student Advice:

Culture is a huge component for CUB so get to know the culture and 10 principles of our company and if it aligns with what you stand for.

More Information:

Visit our CUB website for more information: www.cub.com.au



INT	GRAD	VAC
X	✓	✓

Dulux Australia develops and manufactures a range of paints and coatings for the Australia and New Zealand markets, which are sold into home DIY and trade markets under various brand names including Dulux, British Paints and Cabot's. We are headquartered in Clayton, Melbourne, where our Innovation Centre is also located and it is within this facility that we undertake the majority of the development work on new coatings products. DuluxGroup is the parent company and employs about 4,500 people. Around 130 employees work in a R&D function, with about half of these people located in our Clayton Innovation Centre.

Employee Attributes:

We look for people who are enthusiastic about working for Dulux, are good communicators and who work well in teams. A typical graduate chemist employed at Dulux will commence working on a project in conjunction with an experienced Dulux chemist, who will help the new starter learn all of the essential skills that they require. No prior knowledge of paint and polymer science is required (although such experience can be useful for standing out during the recruitment process).

Employee Development:

All employees will have a development plan put in place by their managers which is reviewed on a regular basis. In addition DuluxGroup offers a graduate program for suitable employees who are seen as having leadership potential and new R&D graduates can enter this program following a competitive interview process.

Locations:

As outlined above our head office and key R&D facility is located in Clayton, Melbourne. We also have manufacturing sites at Merrifield (new high volume waterborne paint factory on the northern edge of Melbourne) and Dandenong South (Woodcare, Protective Coating and Powder Coating).

Vacation Opportunities:

We currently offer vacation opportunities to students currently enrolled or who have just completed the Pharmaceutical Science course, which some students take in conjunction with a Chemical Engineering degree. To a limited degree we also offer such opportunities to Monash Chemistry students.

Graduate Opportunities:

We generally employ Chemical Engineering students into R&D roles at our Clayton Innovation Centre. These roles are advertised and filled as required, rather than via an annual graduate program intake. Entry to our three year graduate program is then offered to new and recently employed graduates as outlined above.

Other Opportunities:

We generally take in two students per annum via the CHE4180 course to undertake research work in our Clayton Innovation centre.

Application and Eligibility:

Calls for the vacation opportunities are offered via the Pharmaceutical Sciences course coordinator, while the CHE4180 opportunities are offered to students who have elected to take that course. Graduate roles are advertised via our DuluxGroup careers page and via Seek.

Student Advice:

A key bit of advice is to understand in yourself why you would want to work for that organisation (as opposed to other options that might be available), because by being sure yourself will mean that you can convince an interviewer that you really want to be there.

More Information:

The website for Dulux Australia (www.dulux.com.au) and our parent company DuluxGroup (www.duluxgroup.com.au) offers a lot of information about our company and the career opportunities we offer.



INT	GRAD	VAC
	✓	✓

Do you know what it takes to build a better working world?

Share in our purpose and see the world through the lens of better.

Better defines the way we work and starts with asking questions like, what's next? You see, the biggest breakthroughs in the world happen by asking these two small but powerful words. With the world in the midst of a Transformative Age, we need to respond to rapidly changing circumstances. And that's what we're all about at EY.

Using the knowledge you've gained from your studies, you'll help all types of companies, from entrepreneurial start-ups to multinationals. We'll provide you with experiences that'll shape your career for years to come. Because when you grow, we do too. Discover the legacy EY is seeking to create at ey.com/betterworkingworld

Take control of your career

Whether your future lies in Assurance, Tax, Transactions or Advisory, we'll provide the learning, experiences and coaching you need to become a successful professional.

At EY, there is no one path for everyone. You're encouraged to create a path that reflects your individual talents and aspirations. We'll work with you to help you succeed professionally and personally. With EY you can influence the future of your career, the businesses you work with and even the world you live in.

Your exceptional EY experience begins here.

Our Career Compass Program offers you a unique learning experience that will help you make smart decisions about your professional career.

Our Vacationer Program is a great way to experience the working world during your summer (or winter) holidays. Show us what you're capable of and you may be invited to join us after graduation in a full-time position.

Our Graduate Program will put your knowledge to the test. Build your technical skills. Join us full-time as a graduate and you'll get early responsibility, support and training.

Start your career journey at ey.com/au/betterbeginsnow



Engineers Without Borders (EWB) was founded in Australia by local engineers and now has 2,000 active members and 15,000 supporters across Australia. We are the only dedicated organisation in Australia that connects STEM (science, technology, engineering and mathematics) professionals with local communities, industry, the education sector and government to address social and environmental issues. We have been engineering people out of poverty for over 14 years.

We do this by:

- Working in partnership to address a lack of access to basic human needs such as clean water, sanitation and hygiene, energy, basic infrastructure, waste systems, information communication technology and engineering education.
- Educating and training Australian students, engineers and the wider community on issues including sustainable development, appropriate technology, poverty and the power of humanitarian engineering.
- Leading a movement of like-minded people with strong values and a passion for humanitarian engineering within Australia and overseas.

Our Vision:

Everyone has access to the engineering knowledge and resources required to lead a life of opportunity, free from poverty.

Our Mission:

We connect, educate and empower people through humanitarian engineering. Humanitarian engineering uses a people centred, strength-based approach to improve community health, wellbeing and opportunity.

Our Values:

We build relationships based on mutual trust and respect and believe all relationships thrive on a two-way sharing of knowledge and culture.

Employee Attributes:

EWB takes good intentions and turns them into meaningful impact. Anyone can contribute, you don't need to be an engineer and there are plenty of ways to be involved from simply spreading the word, engaging in meaningful volunteerism or making a donation.

Employee Development:

The EWB Institute is the education, training, research and innovation section of Engineers Without Borders Australia. The EWB Institute delivers high quality educational and training outcomes for students, professionals and EWB members. It also provides technical and educational support of EWB's development programs through courses, knowledge partnerships and university programs.

The key initiatives coordinated within the EWB Institute are:

- EWB Challenge – a design program for first year engineering students.
- Dialogues on Development – intensive study tours in Cambodia, India and in Aboriginal communities.
- Asian Humanitarian Design Summit: Student program based in countries such as Cambodia and India, with a focus on community development and appropriate technology.
- School Outreach Program – a member-led, hands-on science education program delivered to school students.
- Knowledge Centres – communities of practice providing professional expertise in support of EWB's development programs.
- Research Program – a program for engineering student researchers connecting them to real-world, humanitarian engineering projects.
- Training Activities – in support of EWB's Field Volunteers, chapter leaders and membership.

INT	GRAD	VAC
✓	✓	✓

“They leave the program with an entirely changed perception of their role as engineers and as members of a global community.”

- Dr. Daniel Edgington-Mitchell, Monash University

Locations:

EWB operates local chapters in each State consisting of students, professionals and non-engineers who are passionate about humanitarian engineering and enacting change in the local community. We also have international placements in India, Cambodia, East Timor, Papua New Guinea, Sri Lanka, Nepal, Vietnam and Indonesia.

Vacation Opportunities:

EWB Australia offers unpaid internship opportunities at the National Office for students, an exciting program that will engage passionate individuals with EWB’s work. This program has the clear objective of seeking people with a social awareness and humanitarian commitment to contribute through diverse skills (engineering, education, marketing, communications, events and fundraising) to achieve EWB’s mission.

EWB Monash also offers volunteering opportunities in a dynamic environment where you will be helping make a positive impact whilst making new friends, exercising your leadership, and your communications skills.

EWB encourages students to get involved with the Monash Chapter projects in order to get a feel of the culture and projects:

- School Outreach: Teach students about challenges faced by developing communities with hands-on activities that encourage problem solving, time management and teamwork skills.
- Appropriate Technology: Technology that is environmentally, ethically, culturally, socially and economically viable; looking at the bigger picture.

Graduate Opportunities:

As EWB is a not-for-profit, we offer both national and international volunteer placements rather than graduate programs. However, you can still stay involved after university, such as by joining the Victorian Region Chapter committee.

International Opportunities:

There are no restrictions – all opportunities are available to international students.

More Information:

To find more information about how to get involved with EWB, including applying for current position openings, please visit <http://www.ewb.org.au/get-involved/> or email info@ewb.org.au and if you’re interested about joining us on campus, just speak to any EWB member and/or visit www.facebook.com/EngineersWithoutBordersMonash/ or www.ewb.org.au/monash



INT GRAD VAC



We were founded in 2009 to become the world's most respected diversified base metals company. We mine to build wealth through the development of our people; the investments we make in improving local capability; and the value we deliver to our shareholders. We operate and develop copper, zinc and other base metals projects across Australia, the Democratic Republic of the Congo, and Peru. We also have significant exploration projects and partnerships across Australia, Africa and the Americas. Headquartered in Melbourne, Australia, we are listed on the Hong Kong Stock Exchange (Hex 1208) and Australian Securities Exchange (MMG).

Employee Attributes:

At MMG, we assess candidates against the essential and inherent requirements of the role by looking at their skills, knowledge, experience, qualifications, values and behaviours.

Employee Development:

We have formal annual personal development programmes for every employee and a focus on internal promotions, mobility and secondment opportunities.

Locations:

Chemical Engineers are likely to join us in our Research and Development business functions which are located at our regional hubs in Ballarat, VIC, Wodonga, VIC and Wyong, NSW. Full relocation support is available for those looking to make the move to join us.

Vacation Opportunities:

We typically limit offers to current scholarship students.

Graduate Opportunities:

We typically advertise all Graduate positions in March the year before the intake.

Other Opportunities:

Monash MMG Scholarship(s)

Application and Eligibility:

We always advertise on our website in March.

More Information:

Please look for our YouTube, LinkedIn, Facebook, Twitter and Corporate Site.



INT	GRAD	VAC
X	✓	✓

PPG is a global manufacturer of paints, coatings, and specialty materials. We work every day to develop and deliver products that our customers have trusted for more than 130 years.

Our vision is to be the world's leading coatings company by consistently delivering high-quality, innovative and sustainable solutions that customers trust to protect and beautify their products and surroundings.

Through leadership in innovation, sustainability and colour, PPG provides added value to customers in construction, consumer products, industrial and transportation markets and aftermarkets to enhance more surfaces in more ways than does any other company

Employee Attributes:

PPG look for students who want to find meaning in their everyday work and who want to use their personal strengths to succeed and make an impact from day one.

If you work for PPG, you will be inspired to learn and grow, and will have access to the support you need to identify and achieve your boldest career aspirations. Your contributions will not only meet the challenges of our global customers, but help them propel their industries forward. As a PPG employee, you will be welcomed into a culture where everyone's ideas and contributions are valued and encouraged. Just like you, we are driven to make a difference in our world.

Employee Development:

We take pride in providing an environment for continuous learning and embracing the ideas and diversity of others. We have a range of learning and development opportunities available to employees, including mentoring & leadership programs and both internal and external courses.

Locations:

With headquarters in Pittsburgh, US, PPG operate in more than 70 countries. Across Australia and New Zealand, PPG manufacture and distribute our products from three manufacturing sites, Auckland, Villawood and Clayton.

Vacation Opportunities:

In 2019, PPG ANZ will run our paid 12 week summer internship program, at our Clayton, Villawood and Auckland sites. Internship vacancies will be in Business, Marketing, Science (Chemistry, Environment) and Engineering.

Graduate Opportunities:

Built from our internship program, PPG offer formal graduate opportunities across multiple areas & locations. Supported by a structured two-year program, graduates are given the opportunity to take ownership of their careers with challenging projects, mentors & leadership training.

Other Opportunities:

Outside of our formal programs, PPG are always on the lookout for talented individuals. Entry level roles can arise any time during the year. We encourage Students to connect with our recruiters on LinkedIn & create a profile on our careers page.

Application and Eligibility:

Applications for 2018/2019 internships will open June/July. Students will be able to apply for the internships directly through PPG Careers, accessible through our website.

More Information:

If you are interested in learning more about PPG, visit our website: <http://www.ppg.com.au/Home.aspx> or contact Tessa Nicolson at tnicolson@ppg.com for more information on our internship program.

MARS

What do M&M's®, Pedigree®, Extra®, Royal Canin®, MasterFoods®, Skittles®, Schmackos®, and Snickers® have in common? They're all made by Mars!

Mars is behind some of the best loved brands in the world across multiple segments including Mars Petcare, Mars Wrigley Confectionary, Mars Food and Mars Edge. We're a family business that's been making products for people (and the pets that people love) for more than 100 years. We're 100,000 self-proclaimed Martians—we're pet obsessed, confectionery lovers, foodies, dream chasers and community builders—working across 76 different countries.

Here in Australia, we're a family of over 2,200 associates spread across 9 locations across New South Wales, Queensland and Victoria. Our seven factories produce 44 well-loved brands. We're also proud to announce we've been recognised as the Best Places to Work in Australia by Great Place to Work!

Employee Attributes:

Our ideal candidates will be naturally collaborative and curious. You'll know how to get things done, through formal and informal channels. You will also have examples of how you demonstrate accountability and delivery of consistent results. We want candidates who have learned from their mistakes and seek continuous improvement for self-development and growth.

Employee Development:

Whether you're just starting a career or an expert in your field, a career at Mars means you'll have access to many exciting and challenging jobs across our diverse businesses. Learning is done on-the-job and we value both deep and broad experiences. It means you'll have the freedom to explore, discover and pursue the passions that get you going every morning. Because here, you'll grow beyond your current aspirations and develop the whole you

Joining our Graduate program, which is known as The Mars Leadership Experience, will kick off 3 rewarding years packed with great experiences, opportunities and learning. Our program is designed to build both your functional/technical skills, as well as providing you with stretching leadership opportunities to prepare you for an exciting career.

Key features of The Mars Leadership Experience include:

- Individualised career pathways/rotations
- Ongoing support from Senior Leaders, Line Managers, and peers
- Reviews of your development with Management Team members each year
- Individualised development plans annually
- Mars University (Mars' centre of learning) development opportunities and courses

Locations:

Chemical Engineers are likely to join us in our Research and Development business functions which are located at our regional hubs in Ballarat, VIC, Wodonga, VIC and Wyong, NSW. Full relocation support is available for those looking to make the move to join us.

Vacation Opportunities:

We don't currently have a standardised vocational program in place. Occasionally ad hoc opportunities will be available in a particular function or segment. All roles are advertised on our website www.mars.com/careers

Graduate Opportunities:

Applications to join the Mars Leadership Experience graduate program are due to open later in the year. Check out our website www.marsgraduates.com to learn more and pre-register your interest.

INT	GRAD	VAC
✗	✓	✗

Application and Eligibility:

Applications can only be accepted from applicants who are an Australian or New Zealand citizen, or have Australian permanent residency (PR) status at the time of application. All roles are advertised on www.mars.com/careers

Student Advice:

Here's some advice from our past and current graduates:

- Get ready to get out of your comfort zone. You don't get to rely on precedents, or hand holding in the Mars Graduate Program – you get the opportunity to create, so you need to have the confidence to make the calls.
- I feel the best piece of advice to anyone applying for a position with Mars is to relax and be yourself. I believe Mars look more to the person they are recruiting rather than the qualifications or past experiences. If your personal values and ethics fit then you are highly likely to find yourself launching your career with Mars.
- Just be you – whatever that may be! It will not only help you to relax throughout the application process, but should you be successful, will help you to build relationships in the business with ease and make your introduction to the program more enjoyable.

More Information:

Learn more about our Graduate Program – www.marsgraduates.com.au

Learn more about Mars, Incorporated – <http://www.mars.com>

Connect with us on Facebook – www.facebook.com/MarsCareersAustralia

Connect with us on LinkedIn – <https://www.linkedin.com/company/mars/>

Follow us on Instagram – <https://www.instagram.com/marsaustralia/>





Ford Motor Company was built on the belief that freedom of movement drives progress. It's a belief that has always fuelled our passion to create great cars and trucks. In the City of Tomorrow, there will be smart vehicles in a smart world. At Ford, we are working with great partners to bring this future to life and improve the lives of individuals and communities.

Over a hundred years ago, the automobile was the ultimate disruptor to human life. It gave people extraordinary new freedom—to travel great distances and to get around like never before. We're entering another era of disruption, another era of change in transportation. Technology is transforming life in our cities, making it possible to share resources in ways we never could before – not just information, but food, jobs, rides, rooms and much more. Ford is a global company and has been operating within Australia since 1925 and we continue our great work through design, engineering, marketing and selling of Ford vehicles within Australia.

Employee Attributes:

Innovation, problem solving, design thinking and creativity are key to a successful career at Ford! Being able to think outside the box and take risks with your ideas are key traits Ford looks for in graduates and employees. Teamwork is also critical, by being a leader but also knowing how to be a part of a high performing team will accelerate your career at Ford.

Employee Development:

Our graduate program provides graduates with a development day per month! Every month will be a different experience from learning about business writing skills, communication essentials to drive days and leadership events. We also have a Flourish at Ford program which provides all employees with a foundation of mental health and wellbeing initiatives and information to enhance our satisfaction and safety at work.

Locations:

Our sites include: Asia Pacific Product Development Centre based in Campbellfield, proving ground based in Lara, testing facilities based in Geelong and the National Sales Company based in Richmond. For our sales employees we also have sites interstate which work directly with dealerships.

Vacation Opportunities:

At the moment, Ford does not have a formal vacation program, however we will try our best to work directly with university career counsellors when an opportunity does come up.

Graduate Opportunities:

Currently our graduate program for 2020 is open for applications (which closes on 31 March 2019), we typically look for engineers with diverse majors and backgrounds, finance, marketing, sale and service. Our program offer graduates the opportunity to come together once a month for a development day and join a wide range of committees (such as charity, social and graduate advisory).

INT	GRAD	VAC
X	✓	X

Application and Eligibility:

Unfortunately, we can only offer our graduate program to those students who have their permanent residency or Australian/New Zealand citizenships. Our graduate program will typically be located on our Ford Australia careers website and Gradconnection.

Student Advice:

Follow us on social media, come and chat to us at career fairs and any general questions can be emailed through to graduat2@ford.com.

More Information:

Email: Graduat2@ford.com

Website: <https://www.ford.com.au/about-ford/careers/graduate-program/>

Facebook: <https://www.facebook.com/FordAustralia/>



Imagine your career impacting the way we live everyday life. At Rio Tinto, your innovation will produce the building blocks society relies on. Like the copper in our smart-phones. And the iron in our skyscrapers. This is challenging work that calls for natural leadership and the ability to quickly develop new skills.

Employee Attributes:

We're looking for exceptional graduates who want to learn and make an impact. Ambitious personalities with the gravitas to inspire colleagues and the curiosity and analytical mind to challenge the status quo. Graduates who are driven towards becoming the next pioneer at Rio Tinto and to be the progress.

Employee Development:

At Rio Tinto, you'll have the flexibility, choice and freedom to be yourself and direct your career. Our Graduate Excellence Path gives you the perfect start: an opportunity to immediately get to grips with real work, develop your technical expertise and start a legacy that improves life for millions globally.

In fact, as well as experience in your chosen field, you can expect:

- a comprehensive training programme that gives you the tools to excel and progress;
- a diverse and highly inclusive team culture that encourages collaboration across geographies, commodities, disciplines and markets; access to industry-leading professionals who'll nurture your talent and help to fast track your career;
- exposure to innovative projects and technology that will propel mining into the digital age;
- a wide selection of digital learning materials and world-class leadership content available to boost professional growth and development.

Locations:

We've developed some of the world's largest and best quality mines and operations, across six continents in around 35 countries. Our roles in Australia are based in regional and capital cities across the country. We offer fly-in-fly-out rosters and permanent residential placements.

Vacation Opportunities:

Our Australian vacation programme offers paid work experience for university students – typically in their penultimate year – over a 12 week period from early December to February. Roles can be based at any of our Rio Tinto locations and relocation and accommodation are provided. Applications for the programme will open mid-2019.

Graduate Opportunities:

Our 2020 Australian Graduate Programme is now open, closing on 31st March 2019. We're seeking graduates with degrees in various engineering fields, computer and data science, information systems and technology, geosciences, hydrogeology and HSE (health, safety & environment).

Other Opportunities:

Whilst our campaign advert closes on the 31st March, various opportunities may be available throughout the year. These roles will be advertised on www.riotinto.com/graduates.

INT	GRAD	VAC
✓	✓	

Application and Eligibility:

So, if you're on track to graduate in 2019 or have completed your studies in the past two years and have unrestricted working rights or be able to obtain unrestricted working rights in Australia, we encourage you to apply.

There are four stages once you have submitted your application: Online gamified assessment; online cognitive and abilities testing, online pre-recorded video interview and a face-to-face interview or to partake in an assessment centre.

More Information:

If you would like to know about more careers at Rio Tinto, you can follow us on LinkedIn, Twitter and Facebook, or contact our Graduate Recruitment team at: rtgraduaterecruitmentsupport@riotinto.com.



INT	GRAD	VAC
✓	✗	✓

Founded in 2009, The GREEN Program (TGP) is an award-winning, experiential education program focused on our world's most pressing issues in sustainable development. We know that experience is invaluable. While textbook knowledge and classroom environments are traditional, working methods for learning, it's simply not enough. There is something to be said for having the opportunity to get up close and personal with your academics, interests, and passions: it is a critical step that is missing from academics. So, cue The GREEN Program. We provide short-term, accredited programs in Iceland, Peru, Japan and Nepal. By using the world as our classroom, our model expertly balances sustainability-focused course work, exclusive industry exposure, and bucket-list adventures. We specialize in providing access to leading industry facilities, from Iceland's largest Geothermal Facility to Fukushima's Daiichi Nuclear Power Plant.

Awards & Recognition

- 2018 "Company of the Year" - The Stevie Awards
- 2018 Forbes 30 Under 30 - Education
- 2017 "Best Education Abroad Provider" - Global Youth Travel Awards
- 2015 "#1 Summer Study Abroad Program" - StudyAbroad101
- 2014 "Green Innovator of the Year" - Clean Air Council, GreenFest Philly
- Top 50 Social Impact Ventures in the World - New York Stock Exchange
- Top 10 Young Company Driving Social Change - United Nations Social Innovation Summit
- Top 3 Student-Founded Companies in the World - New York Stock Exchange
- Employee Attributes:
- The GREEN Program headquarters is in Center City, Philadelphia but our global team spans the world. We're always seeking eager and motivated candidates to join us in shaking up higher education, sustainability, and travel.

Opportunities:

We have 4 programs currently on offer from us:

- JAPAN - Disaster Mitigation & Nuclear to Renewable Transitions (9-10 days)
- PERU - Water Resource Management & Sustainable Practices (9-10 days)
- ICELAND - Renewable Energy & Sustainability (8-10 days)
- NEPAL - Microgrid Systems for Rural Development (10 days)

These 4 programs encompass exclusive industry access, bucket-list adventures, cultural immersion, entrepreneurial development, and service learning... all within 10 days!

More Information:

We are thoroughly excited to work with Monash University and SMUCE, as Chemical Engineers are some of the key implementers of sustainable practices in the workplace. Not only do our students get to experience a life-changing trip, we also place them on a path to career fulfillment in sustainability & give them a global community to call family. Chat to Eddie Attenborough, our Ambassador for Monash and a final year student in Chemical Engineering for more information and details!



REYKJAVIK
ICELAND
EDUCATION ABROAD. ACCELERATED. REINVENTED.

RENEWABLE ENERGY &
SUSTAINABILITY

ANALYTIC PHOTO COURTESY OF
WWW.THEGREENPROGRAM.COM

LEARN GLOBAL, ACT LOCAL

SHORT-TERM, EXPERIENTIAL EDUCATION
FOR OUR WORLD'S MOST PRESSING ISSUES
IN SUSTAINABLE DEVELOPMENT

The IGP logo consists of the letters 'IGP' in a bold, white, sans-serif font, centered within a solid black square.

EXPLORE THE GREEN PROGRAM

2018-2019 WINTER, SPRING, & SUMMER BREAKS

NOW ENROLLING:

» CUSCO, PERU

WATER RESOURCE
MANAGEMENT &
SUSTAINABLE PRACTICES

» REYKJAVIK, ICELAND

RENEWABLE ENERGY &
SUSTAINABILITY

» FUKUSHIMA, JAPAN

DISASTER MITIGATION &
NUCLEAR TO RENEWABLE
TRANSITIONS



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Royal Dutch Shell, known as Shell, is the result of one of the 20th century's earliest and most significant mergers. In 1907, the Royal Dutch Petroleum Company joined forces with the 'Shell' Transport and Trading Company. Interesting fact: This was a British business that had pivoted from selling antiques to importing sea shells.

During WWI, Royal Dutch Shell was the main supplier of fuel to the British armed forces. Following the war, it absorbed the Mexican Eagle Petroleum Company and launched Shell Chemicals. By the end of the 1920s, Royal Dutch Shell was the world's leading oil company, a status it has enjoyed ever since, though it has diversified into producing other forms of energy.

Shell has been operating in Australia since 1901. Initially, it just imported fuel, then expanded by establishing storage and distribution terminals, oil refineries, and service stations. Shell built Australia's first kerbside petrol pumps and for over 90-years invested in fuels that helped Australians drive kids to school, get to work and go on holiday. When it became apparent that Australia had significant energy reserves, Shell Australia moved into coal mining and oil exploration. Shell is currently the leading partner in the \$25 billion North West Shelf Venture, which was built using Shell technology, and is the largest resource development ever undertaken in this part of the world.

Shell Australia has a record of investing in large projects, including the Clyde Refinery in Western Sydney, the Geelong Refinery in regional Victoria, and WA's Chevron-operated Gorgon LNG Project, which have had a material impact on the development and growth of the Australian economy over the last century.

At present, Shell's major operations in Australia are Prelude FLNG and the QGC business.

The Prelude development is a Floating Liquefied Natural Gas (FLNG) project located 475 kilometres offshore of Broome, Western Australia in the East Browse Basin. Shell is the operator and 75% interest holder in the QGC venture which produces natural gas from wells drilled into onshore coal seams in the Surat Basin.

Shell Australia has recently begun to transition their Australian operations towards renewable energy sources. It has undertaken several acquisitions in the solar energy space and has announced plans to invest roughly \$5 billion over the next two years in green energy sources. Most recently, Shell has agreed to acquire 100% of Sonnen, a leader in smart energy storage systems and innovative energy services for households.

In 2018, Shell had revenues of US\$388.4 billion and assets worth US\$399.2 billion.

Why join Shell?

There has never been a more exciting time to work in the energy industry, or at Shell. Discover your potential with Shell with outstanding career opportunities.

You will be empowered to carve out your own career path and discover your true potential. You'll have the opportunity to work with leading professionals from around the world, sharing expertise and points of view that will hugely enrich your experience.

We encourage collaboration and believe that by surrounding you with a great diverse team, your creativity will flourish, and great ideas will be inspired.

We are committed to your continuous training and development, with excellent learning opportunities available to you at every stage of your career.



INT	GRAD	VAC
X	✓	✓

The Recruitment Process

Shell recruits graduates from a wide range of disciplines. That noted, it has a greater need for those with degrees in Wells, Mechanical Engineering, Civil Engineering: Electrical Engineering, Static Engineering, Process Engineering, Upstream Production Engineering, Offshore Engineering, Materials Engineering, Pipelines, Flow Assurance, Subsea, Utilities & Energy and Heat Transfer, and Health, Safety, Environment, and Security. Handily, you can go to the degree matcher page on the Shell Australia website to find out what kind of career path is available given your qualifications.

Depending on what area of the business they aspire to be part of, grads take part in development programs that last from two to five years. Grads are divided into those joining the technical and those joining the commercial side of the business.

Whichever side you opt for, you'll take part in a comprehensive onboarding program that will expose you to all areas of the business. Graduate hires may go on rotations and combine on-the-job learning with formal training, that might even take you bi-coastal! You'll have a direct supervisor who will provide supportive guidance, constructive feedback, and access to a mentorship program.

The process starts with a brief online application that can be expedited if connected to your LinkedIn profile. After the application is made, you will need to do an online timed cognitive test, online working

style assessment, and an online short, self-recorded video interview that Shell calls the "On-Demand Video Interview". If you make the cut, you'll then be invited to take part in an online interview. This will include doing a presentation relating to a case study, with two Shell assessors.

Finally, you will be invited to a nearby Shell office to meet with staff at all levels and learn more about what a career at Shell involves. Should you wish to get an idea of whether you'd be happy at Shell prior to graduating, you can apply for one of Shell's 12-week assessed internships.



Social contribution

Shell acknowledges that its activities have an environmental and social impact. It seeks to provide communities that have not previously had access to safe, reliable, and affordable energy, and to contribute to economic growth in the countries it operates in. It does this by offering direct employment and the opportunity for local suppliers to be included in supply chains. Shell works across many regional areas of Australia, and we want to give back to the communities that host our business. There are several ways we do this: we create local jobs, we employ local apprentices and trainees, we buy from local businesses, we add to local infrastructure and we support local communities. We call this support 'Social Investment', and we do this because we know that what's good for local communities is good for us too. Strong and diverse local economies benefit everyone. For Shell, they keep supply chains short and create a stronger labour market for local hire. For communities, they create jobs, keep rural towns vibrant and help attract new residents. Shell is committed to sustainability. It has made huge investments in low-carbon energy solutions and advanced technologies, such as those that increase energy efficiency and reduce emissions

The Vibe of the Place

This varies depending on what area of the business you're in. Shell invests a lot in developing its employees. It gives them a lot of responsibility from early on and rewards them if they rise to the challenges set. You can expect to form fantastic friendships with your colleagues and spend plenty of time socialising with them out of office hours. The culture is friendly and respectful, and perks such as 'flex days' make up for those times when you need to put in long hours.

Powering Progress Together

Shell is an innovation-driven global energy and petrochemical company operating in over 70 countries and employing approximately 93,000 people. More people want cleaner and greater access to energy. At Shell, we are unlocking new energy sources and working to get more from what we have. With others, we are finding innovative ways to meet growing energy demands and helping customers to get the most out of every drop of fuel. By building a better energy future we all have a part to play.

To build a brighter future for all, we're in search of students and graduates who can translate inspiration into ideas, and ideas into game-changing solutions.

Rewarding Career

Embark on a fulfilling and rewarding career at Shell via:

- Work that makes a difference
- Professional and individual development
- World-class training and unequalled career opportunities
- Hands on experience on international projects

Right now, Shell is working on some of the most exciting, innovative energy projects in the world. We're in search of students and graduates who are curious to explore new ideas, experiences and frontiers. For further information or to apply, visit our website at [Shell.com.au/Careers](https://www.shell.com.au/Careers)

Suez Oil & Gas Systems is part of the global Suez organisation that employs about 90,000 people across five continents. Suez' focus is the sustainable use of resources and its activities include delivering clean drinking water, treating waste water and collecting and recycling waste for millions of people world-wide. Suez Oil & Gas Systems (SOGS) has an established track record as a leading international supplier of modular process plants and complete process trains to a range of industries including the Oil & Gas and Petrochemical industries. Our clients include many major Oil & Gas companies such as Shell, BP, ConocoPhillips, McDermott, Petronas, Chevron, ONGC, Exxon Mobil, Technip and Santos. SOGS is a strongly vertically integrated company providing services in project execution from front-end process engineering, through to detailed project engineering and management, and ultimately fabrication, commissioning and maintenance of the processing plant.

The SOGS product range includes:

- Oil & Gas production facilities
- Crude Oil stabilisation & treatment
- Refining & Petrochemical applications
- Produced Water treatment systems
- Solids handling & Wellhead Desander systems
- Energy & Power generation

SOGS has designed and fabricated processing packages for some of the major oil and gas developments that have occurred in recent years. These include gas processing packages for Jemena's Northern Gas Pipeline in the Northern Territory, INPEX's Ichthys LNG project off the Western Australian coast, Santo's GLNG project in Queensland, Exmar's floating LNG unit in Columbia and Oil Search's LNG project in the highlands of Papua New Guinea.

Further afield, significant produced water packages have been supplied to Indonesia and Iraq and oil treatment packages to Tunisia and Venezuela.

Employee Attributes:

Suez employees embrace the challenges of working in a global environment, enjoy creating innovative solutions and are ready to "roll up their sleeves" to get the job done to the satisfaction of all parties.

Employee Development:

SOGS employs a wide range of engineers, including chemical, mechanical and electrical, as well as technical specialists. We offer extensive on-the-job training, development and mentoring tailored to the position and the interests and skills of the individual. Most training will tap into our extensive worldwide online resources managed by Suez and may also include internally or externally run courses. Specialisations include process design, mechanical design, detailed engineering, procurement, fabrication, commissioning and site services.

Locations:

SOGS is based in Rowville, Melbourne and also has offices in Singapore, Abu Dhabi and Houston. Our engineers regularly travel around the globe to visit clients and suppliers based in countries such as Oman, UAE, Turkmenistan, USA, Brazil, India, UK, Australia, New Zealand, China, Thailand, Indonesia and Malaysia. The offices of our parent company Suez are located around the globe with headquarters based in Paris, France.

Graduate Opportunities:

Due to an upturn in the Oil & Gas market SOGS anticipates that we will hire some graduate process and/or project engineers during 2019.

Applications and Eligibility:

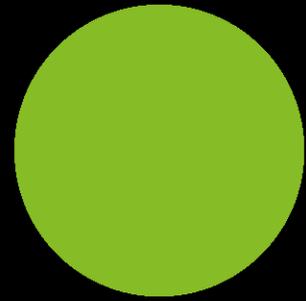
Refer to the SUEZ Water Technologies website Careers page for details of current available positions. Melbourne positions may also be advertised directly via the Monash University Chemical Engineering Department.

More Information:

Refer to <https://www.suezwatertechnologies.com/industries/upstream-oil-and-gas> for information about Suez Oil & Gas Systems and www.suez.com for information about the global Suez organisation.



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Our student programs

Graduate Program

The most innovative graduate program in Australia. A full-time, 12-month role involving purpose-led projects, networking and learning opportunities.

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A 3-8 week paid internship that gives you the chance to land a full-time role with us before you even graduate!

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RESEARCH PROFILES



A/PROF. VICTORIA HARITOS

SMR ✓ MST ✓ PhD ✓ INT ✓



Research Interests:

My interest is in bringing together biology and engineering to address current and future manufacturing needs. This means discovering and developing biologically-derived catalysts, enzymes, to use in conversion processes or improving the performance of microbial cells (yeast, bacteria) to make products like proteins and lipids with high efficiency. Also, I work with the food industry to do more with food wastes and byproducts such as extract and enhance nutritional components such as antioxidants and dietary fibres.

Current research projects in my group:

- Metabolic engineering of yeast for high productivity fatty acids
- Heterologous expression of proteins in lipid bodies of yeast
- Microbial heterogeneity and cell stress
- Enhancing nutritional components of foods especially from legumes and grape/wine
- Microbial bioelectrochemistry
- Using enzymes to modify cellulose for high value applications

Major Projects and Impacts:

Our focus is on developing biological processes for chemical production or processing renewable materials to yield valuable products.

The results of our research are publications in peer reviewed journals, patents and novel or modified processes that our industry partners can adopt.

Future Endeavours:

Deepen relationships with local and international research collaborators to increase the impact of our research and with industry, especially the Australian food industry, to help them deliver innovations that will improve their productivity.

Student Attributes:

I'm looking for enthusiastic students who like to undertake laboratory-based experimental research, keen to learn new skills and to be challenged.

Summer Research Opportunities:

I have regularly supervised summer research students and encourage you to get in contact if you're interested. Paid scholarship opportunities supported by the Faculty of Engineering are advertised during semester 1.

PhD and Masters Research Opportunities:

Both PhD and Master by research positions are available. More commonly I supervise PhD research projects as there is so much more that you can achieve in the longer timeframe. There are living allowance scholarships available through the Faculty of Engineering and through industry-supported programs, however, you must apply and meet the (very competitive) criteria to be successful.

International Students Research Opportunities:

As above. Both living allowance and tuition scholarships are available but you must meet the (very competitive) criteria to be successful in gaining these.

Applications and Additional Information:

Please contact me Victoria.haritos@monash.edu to discuss your interests in research and visit <https://research.monash.edu/en/persons/victoria-haritos> for more information.

DR JOANNE TANNER



Research Interests:

I have an industry background in process control, pilot scale process development, thermochemistry and reaction engineering. My current research sits in the general area of sustainability and biorefinery; replacing traditional fossil fuel-based fuel and chemical production processes with analogous processes using sustainable biomass as the primary feedstock. I am interested in reaction and process design and development, with a focus on sustainability. Most of my projects are applied research, and I try to involve industry partners as much as possible to make sure that my research is addressing real-world problems.

Major Projects and Impacts:

BioPRIA: I am part of the Bioresource Processing Research Institute of Australia (BioPRIA) where I am building a research group focused on Green Chemistry and Sustainable Production. BioPRIA is the offspring of the Australian Pulp and Paper Institute, and we work closely with our consortium of pulp and paper industry partners to develop advanced technologies and new products that build on their existing capabilities to transform them from traditional paper mills to the sustainable, integrated bio-refineries of the future.

PALS: I am one of the Chief Investigators in the

ARC Transformation Hub for Processing Advanced Lignocellulosics (PALS), which is run by BioPRIA. PALS aims to convert renewable and readily-available biomass material and waste streams from the Australian pulp, paper and forest industry into new, high-value products that are in high demand in existing and developing markets. PALS includes 11 PhD students, three domestic and international universities, six industry partners, and \$6.8 million in funding. Two of my PhD students are part of this Hub.

Food and Dairy GRIP: My other two current PhD students are part of the FDGRIP program. Monash GRIP programs support direct industry collaboration and includes technical and business training above and beyond the research training usually provided in a PhD program. For example, students benefit from internships and industry-run workshops on topics such as IP, commercialisation and management.

My current projects include:

- In-pack freshness sensors for fresh meat products (GRIP project, industry partner: Meat and Livestock Australia). We are developing a novel compound to detect gaseous analytes from meat and integrating this compound into current fresh meat packaging solutions. Our aim is to replace arbitrary and wasteful 'use by' dates with factual freshness information direct to the consumer.
- Sustainable packaging solutions for fresh meat products (GRIP project, industry partner: Meat and Livestock Australia). This project will invent a new cross-linked cellulose-based superabsorbent polymer using green chemistry and green engineering principles for the absorption of drip loss from packaged fresh meat. Our aim is to increase shelf-life and reduce waste by replacing the current fossil resource-derived in-pack absorbents with sustainable, biodegradable super-absorbent alternatives.

SMR	MST	PhD	INT
✓	✓	✓	✓

- Energy efficient production of nanocellulose (PALS project, pulp and paper consortium contacts). Nanocellulose is a natural, sustainable feedstock that can be used in various forms for a wide range of applications including thermoformed packaging for foods and beverages, gels for pharmaceutical and agricultural use, and membranes for separation and purification processes. The major impediment to its widespread use is the high energy, and therefore high cost, associated with its production via traditional chemical and mechanical processes. We are performing a comprehensive assessment of nanocellulose production options, including novel technologies, to significantly reduce the cost of nanocellulose production.

- Closed loop water systems in biorefineries (PALS project, industry partner: Visy). Pulp mills, which are the basis for biorefineries, are extremely high water users, and most of the water is not recovered due to high energy costs associated with treatment. Less total water could be used, but recycling it costs energy. This project will quantify the water-energy tradeoff and investigate potential technology solutions to close the water loop in modern biorefineries.

Although academic endeavours must have a focus on scientific details and fundamentals, I always aim to make sure my research is industrially applicable. Also, whether it be a new solution to a specific process problem, a new process that is not yet fully understood, or a new take on an old process, I strive to make sure that my research promotes sustainability.

Some of my potential upcoming projects may include:

- Continuous flow, autothermal, mini - and micro-reactor technologies for reaction engineering applications, including process design and scale-up
- Any and all things biorefinery. That is the production of fuels and chemicals using non-food, bio-based feedstocks. If this area is of interest to you, or you have an idea you'd like to turn into a research project, please let me know!

Student Attributes:

HD averages and high GPAs are laudable, but my philosophy is that all you need to take on the challenging pursuit of research is an open and enquiring mind, an enthusiastic approach, and a persevering attitude. The most important trait in a PhD student is dedication to the project, everything else can be learned! Therefore, I do not require any particular technical skills in my commencing PhD students. I firmly believe in learning by doing and am happy to provide this opportunity.

My projects tend to be hands-on, lab-based research, but don't let that discourage you! Bring along your enthusiasm and initiative, and we will get along just fine.

Summer Research Opportunities:

I will most likely have summer 2019-20 research positions available. These will be advertised through the Faculty summer research scholarships program.

PhD and Masters Research Opportunities:

From time to time, I will advertise new PhD and research Masters projects on my BioPRIA webpage: www.biopria.com.au/ourpeople/dr-joanne-tanner/

I also invite anyone who has an interest in sustainability and biorefinery to contact me with their ideas. The project doesn't have to come from the supervisor – everyone is an inventor at heart!

International Students Research Opportunities:

I'm happy to offer positions to international students who have a scholarship (Monash / home country).

DR. PARAMA CHAKRABORTY BANERJEE



Research Interests:

Analysis of multi-scale electrochemical processes and design of new materials for next generation energy storage, energy conversion and corrosion. Energy storage systems comes in various length-scales and are essential in most electronic systems (from wearable sensors to electric vehicles to off-grid storage of renewable energy). The challenge is to develop cost efficient environmentally friendly energy storage systems. I collaborate with various industry partners and government organisation (like CSIRO) to mitigate this challenge. My research team also has immense interest in understanding electrochemical corrosion and designing anti-corrosion coatings for of various metallic systems used in aerospace and automotive industries.

Major Current Projects and Impacts:

I am leading the Multi-Scale Electro Materials group. This is a new, dynamic and collaborative research group supported by Australian Research Council, Ionic Industries Pty Ltd and CSIRO. Energy storage technologies have attracted significant academic and industry attention. Infact, we have been funded by Ionic Industries Pty. Ltd. since our inception on various projects related to the development of different energy storage systems. Recently miniaturisation of energy storage systems have become one of the hottest research areas with growing interests in (i) further miniaturisation, (ii) tailored performance of the devices and (iii) identification of an easy, cost-effective, scalable, one-step fabrication method.

However, till date the miniaturized energy storage systems reported in the literature are fabricated by complex multistep processes. We are currently designing and fabricating energy storage systems (batteries and supercapacitors) with significantly reduced feature sizes (in micrometer length scale) using a simple one-step printing process (Prov. Patent AU2018050379).

Our team is also engaged in identifying the impact of pulsed current on Li battery performance and cycle life. This work has direct relevance in electric vehicles and off-grid energy storage systems. In this project, we collaborate with CSIRO and Reelectrify Pty Ltd to understand the effect of pulsed current on the battery electrode kinetics. We also heavily work on various anti-corrosion coatings for different metal and alloy systems used in automotive and aerospace industry (Prov. Patent 2019900664).

Some of these works are published in high impact international journals including, *Advanced Energy Materials*, *ACS Nano*, *Nature Communications*, *Journal of Materials Chemistry A*, *Corrosion Science*, *Carbon* etc. My efforts in the field of electrochemistry and materials engineering has been recognised by various awards including, an early career research award by Cooperative Research Council of Australia and the prestigious "Brian Cherry Forum award" for the best PhD thesis in Corrosion.

SMR	MST	PhD	INT
✓		✓	✓

Student Attributes:

Students with excellent academic records and healthy attitudes towards solving open-ended problems, proactive, and with excellent communication skills and time management (crucial attributes to develop as an independent researcher).

Prior qualifications could include: Honours Class 1 or a good Master degree from respectable institutions. Refereed publications in scientific journals and / or industry experience will help boost the chance of success of the application.

Summer Research Opportunities:

Yes if students are eligible / qualify through the faculty's summer research program.

PhD and Masters Research Opportunities:

PhD opportunities are usually advertised via the Department's or the University's website or at seek.com.au. Feel free to drop me an email at parama.banerjee@monash.edu or come by my office if you want to explore project opportunities. Currently we have two such scholarships (with top-ups) available in our team (which have been advertised in Monash job Website and in Seek.com.au).

To apply:

There are two round of scholarship in the middle and end of the year. Students who are interested to apply are advised to prepare their documents (CVs etc) and talk to potential supervisors around March / April or September/October.

International Students Research Opportunities:

International students require fee and living allowance scholarships, which are highly competitive. That also means that international students that can obtain these scholarships usually have very good record, and so I am happy to consider accepting them in my group. Please see <https://www.monash.edu/graduate-research/future-students/international-students> for more

Email: parama.banerjee@monash.edu

PROF. CORDELIA SELOMULYA



Research Interests:

Design and delivery of nanoparticle vaccines, and functional particle assembly via microfluidic spray drying. The unique spray dryer can be used to synthesise various types of particles, including thermal sensitive and bioactive particles, microparticles for controlled release and microencapsulation, magnetic and fluorescent composites, and mesoporous microspheres with hierarchical structures and properties superior to those observed on nanomaterials. The method is scalable and is potentially a cost effective, energy and material-efficient route to produce high quality powders with better functionality and ease of handling. Through my research, I work closely with the dairy and food industry in Australia and abroad.

Major Projects and Impacts:

I am leading the Biotechnology and Food Engineering group with an internationally recognised reputation in drying technology research, and the only facility in Australia for functional particle assembly via microfluidic spray drying. The unique spray dryer can be used to synthesise other types of particles, including thermal sensitive and bioactive particles, microparticles for controlled release and microencapsulation, magnetic and fluorescent composites, and mesoporous microspheres with hierarchical structures and properties superior to those observed on nanomaterials (Prov. Patent AU2013904021).

The method is scalable and is potentially a cost effective, energy and material-efficient route to produce high quality powders with better functionality and ease of handling. This technology is an integral part of my previous and ongoing collaborations with Dairy Innovation Australia Ltd, French National Institute for Agricultural Research (INRA), Agrocampus Ovest (France), Dairy Management Inc. (US), South Dakota State University, several Chinese universities (Soochow, Xiamen, Fudan, Nanchang) and companies (Kingdomway Group, Guangzhou Ling Nan Intel Enterprise Group Co., Ltd, 3M, P&G, etc). I am the director of the Australia-China Joint Research Centre for Future Dairy Manufacturing (<http://acjrc.eng.monash.edu/>), a joint strategic initiative funded by the Australian and Chinese governments, and industry partners in both countries, including Bega, Saputo Dairy Australia (formerly Devondale Murray Goulburn), Fonterra, Gardiner Foundation, Food Innovation Centre, COFCO, and Mengniu Dairy.

I am also the director of the Food and Dairy Graduate Research Industry Partnership (GRIP), encompassing 14 PhD projects and 10 industry partners (<https://www.monash.edu/fdgrip>). My works with the dairy industry have been highlighted in Chemical Processing, Monash Magazine, Australian Financial Review, and internationally (Science Daily, ABC International, The World of Food Ingredients, The Chemical Engineers, etc).

Our research program has been recognised recently with the 2018 Business - Higher Education Roundtable (BHERT) award for Outstanding Collaboration in R&D and the 2018 IChemE Global Awards in the Food and Drink category.

My other work at the Monash Advanced Particle Engineering Laboratory (MAPEL) is in interdisciplinary research for the design of nanoparticle vaccines and mesoporous materials (including a recent 2016 article in Nature Chemistry).

SMR	MST	PhD	INT
✓	✗	✓	✓

Examples include designing a more efficient DNA vaccine delivery system for malaria using magnetic nanoparticles (<http://www.nanowerk.com/spotlight/spotid=21315.php>), understanding the role of nanoparticle adjuvants for vaccine applications, and designing functional materials with enhanced properties (<https://www.chemistryworld.com/research/nanodots-pencil-in-way-to-boost-solar-cells/9227.article>).

I also collaborated with researchers from Materials Engineering in designing magnetic nanocomposites for electromagnetic interference shielding and developing new 1st order magnetic nanomaterials for magnetic heating (Prov. Patent AU2013905012)

Current Program:

From Australia's perspective, the functional foods industry (for better health and also ageing population) will be key, especially considering the Asian and other emerging markets. Monash University has launched a Graduate Research Industry Partnership (GRIP) with the food and dairy industry in 2017 (<https://www.monash.edu/fdgrip>) which I direct. The program will help us to train highly skilled professionals to enable significant innovations in the industry and secure Australia's economic and social prosperity in future. We also continuously working directly with industry to solve their innovation challenges.

Student Attributes:

Students with excellent academic records and healthy attitudes towards solving open-ended problems, proactive, and with excellent communication skills and time management (crucial attributes to develop as an independent researcher).

With our projects with the food and dairy industry, interest / experience in food science and technology, and a strong interest for a career in the industry will be desirable.

Prior qualifications could include: Honours Class 1 or a good Master degree from respectable institutions. Refereed publications in scientific journals and / or industry experience will help boost the chance of success of the application.

Summer Research Opportunities:

Yes if students are eligible / qualify through the faculty's summer research program.

PhD and Masters Research Opportunities:

PhD opportunities are usually advertised via the Department's or the University's website or at seek.com.au. Feel free to drop me an email at cordelia.selomulya@monash.edu or come by my office if you want to explore project opportunities.

To apply:

There are two round of scholarship in the middle and end of the year. Students who are interested to apply are advised to prepare their documents (CVs etc) and talk to potential supervisors around March/April or September/October.

International Students Research Opportunities:

International students require fee and living allowance scholarships, which are highly competitive. That also means that international students that can obtain these scholarships usually have very good record, and so I am happy to consider accepting them in my group. Please see <https://www.monash.edu/graduate-research/future-students/international-students> for more information.

PROF. RAVI JAGADEESHAN



Research Interests:

Several systems such as granular materials, colloidal suspensions, polymeric liquids, and biological matter, are classified as complex fluids because their microstructure crucially influences their material properties. These systems are inspiring several new technologies. A key challenge is to describe their flow behaviour by understanding the connections between their microscopic structure and macroscopic properties. The molecular rheology group, which I lead, uses molecular models and a continuum level description to advance the microscopic and macroscopic description of polymer solution dynamics.

The use of polymer solutions in the intermediate stages of various modern processes makes the understanding of the dynamics of polymer solutions essential for maximising the efficiency of these processes. Small amounts of polymer are known to reduce the drag experienced by bodies in turbulent flows, and significantly change the distribution of drop sizes in spraying and atomisation operations.

There are also a number of contexts involving polymer solutions, such as in the spinning of nanofibers or in ink jet printing, where in order to achieve the most optimal outcome, the concentration of polymers must not be too dilute or too concentrated, but somewhere in between. It is vitally important to unravel the fundamental physics that governs the behaviour of polymer solutions across the range

of concentrations in the presence of a flow field. In work carried out in my group, we investigate the dynamics of polymer solutions through theory, computer simulations and experimental characterization, using non-equilibrium statistical mechanics, novel computational algorithms and experimental techniques.

These studies provide an understanding of the linear and non-linear viscoelastic behaviour of polymer solutions, spanning a range of concentrations and molecular weights. The correlation of molecular simulations with rheology measurements enable a much clearer understanding of the connection between microscopic physical mechanisms and macroscopic flow properties.

In the last few decades, there has been a surge of interest in applying the methods of physical sciences to the problems of biology. The goal of research in my group is to carry out interdisciplinary research in which the techniques of experimental and theoretical rheology, and advances in single molecule techniques, are brought to bear on several physical problems that are relevant in a biological context.

Major Projects and Impacts:

Students in my group are currently working on the following projects.

The rheology of sticky polymer solutions: Associative (sticky) polymers are macromolecules with attractive groups, which are used in a wide variety of applications because the interactions between the attractive groups can be "tuned" by varying their number, strength and location on the polymer. This provides a means of exquisitely controlling the physical properties of associative polymer solutions. Successful formulation of the appropriate associative polymer system for these various applications currently rests on using polymer chemistry to engineer innovative polymers, followed by extensive experimental investigation to select the most suitable candidates.

SMR	MST	PhD	INT
✓	✗	✓	✓

The aim of this project is to understand how microscopic topology and the strength/number of intermolecular interactions control the flow behaviour of associative polymer solutions.

The expected outcome is a quantitative framework for connecting the molecular structure and energy landscape with resulting macroscopic properties, which would enable the rational design of supra-molecular systems in which the thermorheological properties can be tuned over a wide range of force/time scales with applications spanning from enhanced oil recovery to injectable hydrogels. **Computing the dynamics of chromatin folding:** Chromatin is a packaged form of DNA, which in humans has a contour length of approximately two meters. The packaging of chromatin in the cell is achieved with a large number of proteins that bend and fold DNA to induce local curvature. In order for life processes to go on, chromatin needs to be unfolded and re-folded dynamically so that it can be read, repaired and replicated repeatedly. Nearly nothing is known about how the unfolding and folding happens, and the precise sequence of events during folding and unfolding.

A proper understanding of cellular processes requires the development of a dynamic model that can predict how chromatin is locally folded and unfolded regularly, within the timescale relevant to biological processes such as transcription and gene regulation. The aim of this project is to develop a multi-scale computational model that can predict the dynamics of chromatin packaging on the scale of many genes.

In particular, simulations will be used to understand the various elements that determine the dynamics of chromatin folding, such as how the curvature created by proteins on the DNA, and interactions between proteins and DNA determine the rate of folding and the nature of local folded structures, which are fundamental to determining transcription-factor accessibility and gene regulation.

Influence of wet and dry friction on polymer dynamics:

Experimental and theoretical studies have shown that the presence of internal friction in biological molecules modulates their conformational changes in a number of different contexts. This includes slowing down the process of protein folding, influencing stretching transitions in single biomolecule force spectroscopy, and effecting the dynamics of intermolecular interactions in intrinsically disordered proteins. In all these situations, internal friction arises from configurational rearrangements of biomolecules on an underlying energy landscape.

PROFESSOR RAVI J AGADEESHAN (CONT'D)

In parallel, recent advances in modelling polymer solution rheology has revealed the crucial role played by fluctuating hydrodynamic interactions in determining the dynamics of polymers. Models that include both internal friction and hydrodynamic interactions are rare. In this project, molecular simulations are used to carefully differentiate the influence of solvent-mediated friction on conformational dynamics, from the influence of a dissipative mechanism that is independent of solvent viscosity.

Understanding the molecular origin of internal friction is key to understanding aspects of protein folding, the dynamics of intrinsically disordered proteins, and the transient response of polymer solutions subjected to a variety of flow fields.

Monitoring drug binding in cells for enhanced drug discovery: There is an impending crisis in the practice of medicine.

The treatment of routine infections may no longer be possible because of increasing prevalence of drug resistant bacteria. Drug discovery is a major focus of current research to deal with antimicrobial resistance, but an equally important challenge is to develop new analytical methodologies to screen potential drugs against cellular targets. Many targets for antimicrobial resistance drugs are high aspect ratio complex molecular assemblies of proteins, lipids, and nucleic acids, which are challenging to characterise using traditional techniques such as NMR or X-ray crystallography. Linear dichroism, however, is a powerful technique to analyse the structure of filamentous assemblies and long molecules.

Nevertheless, only a qualitative indication of drug binding can currently be deduced from linear dichroism. Using a multidisciplinary approach combining molecular simulations with single molecule fluorescence microscopy and flow oriented spectroscopy, this project aims to extract the maximum level of dynamic structural binding information from linear dichroism spectra, so it can serve as a quantitative screen of drug binding to molecular targets in bacteria.

Future Endeavours:

Each of the projects above are vast in scope, and we expect that they will be a rich source of research topics for several years to come.

Student Attributes:

I am looking for students with an aptitude for mathematics and computations, and who can demonstrate exceptional performance in quantitative subjects. A background in engineering or physics would be appropriate. I am happy to recruit students with qualification at all levels – double degree BEng and Science (Physics or Mathematics), Masters by Coursework or Masters by Research in the relevant fields.

Summer Research Opportunities:

Summer research projects are available for exceptional students.

PhD and Masters Research Opportunities:

PhD projects are available but the candidate must be competitive for securing Monash central or Faculty scholarship.

International Students Research Opportunities:

Both international and domestic students are welcome but the candidate must be competitive for securing Monash central or Faculty scholarship.

Applications and Additional Information:

To apply for a project please contact me on avi.jagadeeshan@monash.edu or come and see me in my office.

A/PROF. AKSHAT TANKSALE



Research Interests:

My research group is broadly categorised into three platforms – (1) Syngas Platform, (2) Biorefinery Platform and (3) NanoCatalyst Platform.

In (1) we are focusing on developing pathways for the conversion of biomass into syngas via reactive flash volatilisation, which is a catalytic autothermal millisecond gasifier for in situ tar reforming during gasification. This is an applied catalysis research area where aspects of catalyst performance and stability is tested. Furthermore, in (1) syngas and CO₂ are converted into fuels and chemicals via catalytic pathways.

This research spans from fundamental to applied catalysis where we are investigating the role of catalysts and solvents at molecular level on the reaction mechanism and energetics. Some of the breakthroughs in this area include first report of tar-free gasification of lignocellulose and microalgae into synthesis gas in a single millisecond reactor; first report of direct hydrogenation of CO and CO₂ into formaldehyde and its derivative (poly)oxymethylene ethers using water and methanol as solvent.

In (2) we developing pathways for the utilisation of biomass at low temperature and high pressure liquid phase catalytic reactions to produce functional molecules. This is an applied catalysis research including green and sustainable chemistry. (2) also includes research on waste valorisation via hydrothermal and microwave assisted methods. Our latest results in this field include reactive fractionation of lignocellulose into cellulose, hemicellulose and lignin; conversion of cellulose and hemicellulose into value added chemicals like 5-HMF and furfural.

In (3) we are working on synthesis of nano-, subnano- and single site- heterogeneous catalyst development and their characterisation. This research spans from fundamental to applied nature. Here we are working on developing fundamental understanding of the catalytic properties.

We have recently developed mono-dispersed Ru nanoparticles encapsulated in metal organic frameworks which are highly active for low temperature reactions.

To underpin the catalytic science and engineering, the effects of catalysts and solvents on the reaction mechanism and kinetics are investigated using state of the art X-ray techniques (XAS, RXES, wet-RIXS, SAXS, and WAXS) and small angle neutron scattering (SANS) methods.

Major Projects and Impacts:

One of the most prominent projects that we are currently working on is the conversion of CO and CO₂ into formaldehyde and its derivatives. There are many serious global challenges that can be addressed by this method since formaldehyde can be used an intermediate is about 50 industries. Conversion of CO₂ into formaldehyde may be a way to reduce the impact global warming as well since formaldehyde is a large volume chemical. Source is hydrogen for this process must be sustainable though as currently over 95% of hydrogen comes from natural gas.

SMR	MST	PhD	INT
✓	✓	✓	✓

Future Endeavours:

We would like to explore more opportunities for CO₂ conversion into other valuable chemicals and fuels, in addition to continuing the conversion of biomass derived molecules into chemicals.

Student Attributes:

I am looking for students with strong background in reaction engineering, catalysis, organic chemistry, physical chemistry or chemical physics. I am happy to recruit students with qualification at all levels – BEng, Masters by Coursework or Masters by Research. I am also interested in summer research students who have keen interest in catalysis and reaction engineering.

Summer Research Opportunities:

Both summer research and HDR projects are available.

PhD and Masters Research Opportunities:

Both PhD and Master by Research projects are available but the candidate must be competitive for securing Monash central or Faculty scholarship.

International Students Research Opportunities:

Both international and domestic students are welcome but the candidate must be competitive for securing Monash central or Faculty scholarship.

Applications and Additional Information:

To apply for a project please contact me on Akshat.Tansale@monash.edu or come and see me in my office.



THE NEXT STEP

—

ASHLEEN KAUR'S CUB EXPERIENCE



Bachelor of Chemical Engineering (Hons).

The Job Hunt:

I am currently a part of the Global Management Trainee (GMT) program at CUB and I would like to take you through my journey to CUB. It started out through the conventional method of searching for a career and an employer that resonated strongly with my values and goals in life. I clearly remember my reaction when I came across the recruitment process for the management trainee programs at CUB, it was daunting and I was sceptical about my ability to progress through each stage of the recruitment process. However, with each interview it was evident that practice was what I needed and with each stage of the interview process it became much easier and more of a natural process. I am a firm believer that the recruitment process works both ways, it's for the employers to get to know you and for you to get to know them.

Vacation work.

As an engineering student, I valued exposure to on-site training as I wanted to apply my theoretical knowledge to the practical world. I completed a couple of internships throughout my university life. My internship experiences were quite interesting as they were from very diverse industries, my first internship

was with PricewaterhouseCoopers (PwC) where I was placed within the sustainability consulting team and my second internship was with Henkel and I was in the production team. The exposure I gained from the internships was one of the main contributing factors for my application to the GMT program at CUB; whilst I enjoyed engineering, my internship with PwC allowed me to get a glimpse of how I could use my skills in a non-engineering role and it was extremely exciting as I enjoyed the challenges I faced.

Finding a cause you feel strongly about:

As a female who pursued a course which was male dominated, I felt the need to change the perception of what an engineer looked like to society. I wanted to inspire female engineering students to encourage them to work towards leadership roles in their engineering careers to bridge the gender gap in engineering. Alongside working towards inspiring female engineers, I wanted to develop my personal skills. Thus, I worked my way towards becoming the President of Female Engineers at Monash (FEM).

FEM is a student run society dedicated to supporting female engineering students by inspiring and connecting them with successful females in the engineering profession. I held multiple leadership roles with FEM throughout my university life and although it was a task to keep up with everything at university and engineering school, it was an extremely fulfilling experience. Post-graduation, I continued to pursue a role in female engineering bodies and am currently the secretary for Women In Engineering Victoria as part of Engineers Australia.

ISAAC PINCUS' PHD EXPERIENCE



Research Interests:

My work is related to polymer physics, which is essentially the study of how the macroscopic things we observe in bulk polymers or polymer solutions arise from microscopic details of the polymer molecules. Specifically, I'm using computer simulations to try and understand how large, semi-flexible polymers like DNA molecules align themselves in solution in the presence of shear flow. My day-to-day research is mostly physics, but I also do a large amount of computer programming and occasionally touch on subjects in chemistry. I have a blog about my PhD at isaacphd.wordpress.com if you're interested.

Supervisor:

Supervisor – Ravi Jagadeeshan
External co-supervisor – Alison Rodger (Maquarie University, Sydney, Chemistry department)

Impacts of Research:

My research will be useful in improving an analytical chemistry technique known as linear dichroism, which can probe the structure and interaction of large biological molecules. Many current techniques for analysing large polymer molecules are very limited, requiring perfect crystals (crystallography), substitution of isotopes (NMR) and extremely expensive equipment (electron microscopes or AFM). Linear dichroism can be used with small amounts of unaltered sample in solution, making it potentially useful for applications such as high-throughput screening of potential antibiotic drugs. However, my research is needed to improve the quantitative accuracy of the technique.

What got you into research:

I did my undergraduate studies at the University of Queensland in Brisbane, where I studied a dual degree in Chemical Engineering and Physics. I started my PhD immediately after graduating with honours in chemical engineering. I was honestly always more interested in the physics classwork, but didn't like a lot of the areas of physics research, which is mostly quantum physics and cosmology. After doing a summer and winter research project in a rheology lab at UQ, my supervisor at UQ recommended I get in touch with Ravi, whose work is theoretical and computational rather than experimental. I really enjoy working in computational physics and classical physics so doing my PhD here with Ravi has been perfect.

Advice for students considering undertaking a PhD:

The classic advice for those considering a PhD is:

- Be passionate about your project
- Get on well with your supervisor
- Both of which are excellent pieces of advice

To that I'll add another few points which I feel are more relevant to me:

- Interest in learning and finding things out is important (maybe even more important than passion for your project), particularly if you're doing research which is more theoretical or fundamental.
- PhDs can be different in different parts of the world. I'm very happy with my choice to do a PhD in Australia as the stipend is fair here and there isn't the pressure of mountains of coursework and demonstrating. What you studied in undergrad isn't necessarily what your lecturers are working on. Chemical engineering is incredibly broad, so do some searching to find an area which suits you!

Future Endeavours:

I'm still near the start of my PhD, so I haven't given a huge amount of thought to what I want to do afterwards, except that I know I want it to be technical or research-focused. I will probably apply for postdoc positions after graduating and stay in academia, but nowadays there's a very long and competitive path to becoming a lecturer or professor, which only a very small percentage of PhD students manage.

GRACE TALBOT-WALSH' PHD EXPERIENCE



I first started at Monash in 2011, enrolling in a double degree of Science and Engineering, majoring in Chemical Engineering. Although staying on at Monash and completing a PhD was never of much interest to me, in my final year I started to consider it as a valid option. I have always have a keen interest in the pharmaceutical and food manufacturing sectors, as the implicit nature of providing food and medicine to people gives these industries a high moral standing, with Australian products particularly renowned for their high quality.

The Food and Dairy Graduate Research Program (GRIP) was also in its infancy, and was offering positions for PhD students to be partnered with industry, to understand and help with current industrial problems.

In 2016 I started my PhD position in the department as a Food and Dairy GRIP student, working with Bega Foods in the field of functional products. In the last three years, my research has included looking at current manufacturing protocols, and understanding at a molecular level as to why certain product defects occur, and how processes can be manipulated to change them.

My work has also looked at adding higher value to products, through the incorporation of probiotics and vitamins, and reduction of fat and salt content without negatively impacting product characteristics.

In my first year, I won a travel scholarship to travel to South Korea, to attend the Young Women in Science camp (Daejeon, South Korean) where I had to opportunity to meet many other young female researchers from the world. I have also been fortunate enough to be able to present my own research at two international conferences in 2018, presenting at the 10th INRA Cheese and Dairy symposium (Rennes, France), and the 2nd Symposium for the Joint Research Centre in Future Dairy Manufacturing (Beijing, China).

Although I am coming to the end of my PhD journey, I am extremely grateful for all the opportunities provided to me by the department and the university as a whole, with special thanks to my supervisor, Prof. Cordelia Selomulya, and my group for their support.

CALLUM'S LYONDELLBASELL EXPERIENCE



Photo: LyondellBasell Australia's Propylene Spillter Distillation Column

Industry Experience with LyondellBasell Australia

As a recent graduate, I'm taking the opportunity to reflect and share some of the experiences and learning that I accumulated outside of the classroom. While the knowledge gained at university will be integral to your career, the skills gained in the industry provide a practical aspect to engineering that will expedite your transition after graduation.

While LyondellBasell Australia may have gone under the radar for many students pursuing work experience, I cannot recommend their program highly enough. Whilst working at their polypropylene facility in Geelong, I was allocated a variety of challenging projects and investigations of genuine value that directly influenced their process. In this position I was treated like a professional engineer, entrusted with responsibilities and expected to act accordingly.

This can be daunting at times, but the learning curve is incredibly fast. These experiences not only prepared me, but have allowed me to thrive in my role new as a graduate process engineer with Australian Paper.

For students and soon-to-be graduates entering the industry, the best advice I can offer is to persevere with problems and maintain viable contingencies. Things often do not go as planned the first-time round, but this should not deter you.

There are numerous obstacles that you can encounter when undertaking problems; necessary information can be lost or challenging to find, colleagues or contacts can be absent from work, ideas can quickly escalate in cost, circumstances can change, impacting the feasibility of your designs etc. A lot of this can be out of your control and frustrating to experience.

Persevering through these issues or taking a different approach can lead to a truly rewarding solution and demonstrate your flexibility with problem-solving. Don't forget; "You've got options".

JOHN WESTOVER



John Westover began work as a chemical process engineer in the natural gas fields of Oklahoma (Central United States) in 1981. His company responded to the skill shortage at the time by giving him more responsibility than he should have had. John used his responsibility as the surveillance engineer for several small natural gas processing facilities and wellhead facilities to get involved in as many aspects of the operations as possible. For example, he read the gas sales contracts, found some loopholes, and exploited them to increase production. He found ways to use surplus equipment to generate extra profit. He conceived projects; then he executed them. It gave him a good grounding for the rest of his engineering career.

“He read the gas sales contracts, found some loopholes, and exploited them to increase production. He found ways to use surplus equipment to generate extra profit.”

One day John walked into his foreman’s office and announced that the thermocouples on the main distillation column were not working. The foreman chuckled, gave John a voltmeter, a radio, a harness, and a second voltmeter to the control room and told him to go check for himself. After the first few readings showed John was correct, the company electrician came to watch. Satisfied that John was doing the check correctly (by the way – John was now 2/3 of the way up a 30-metre tall distillation column, outside the ladder cage, on a windy day), he let John continue to collect his data. Once completed, the group was able to determine

the thermocouple wiring was actually unshielded. Replacing the wire with shielded wire allowed profits to be increased by about \$30000 / year (1984). That was the moment John “arrived” as an engineer.

“Replacing the wire with shielded wire allowed profits to be increased by about \$30000 / year (1984). That was the moment John “arrived” as an engineer.”

He was then transferred to the Rocky Mountains (Wyoming), where he was a process/project engineer on a tertiary oilfield project. It was here that John first learned about the impact of ambient pressure, working at altitude (2200 metres above sea level) and low ambient temperatures (often dropping to -25 deg C in winter). This was also John’s first exposure to toxic gases. Here John learned the issues of remote operations, the need for proper project planning (to manage outdoor construction weather windows) and the plusses/minuses of using buildings for weatherproofing from winter. John also learned how to work with environmental and cultural (archaeological) teams while doing pipeline construction.

A corporate restructure allowed John to take a voluntary redundancy package and join an EPCM company in Anchorage, Alaska. Everything he learned in Wyoming was applicable but intensified. John worked supporting the Arctic oilfields, and on the 21st of December 1989, it was -45 °C. John says it was so cold it changed his perception of reality. It was here that John was first introduced to offshore oil operations and the unique issues with offshore operations and projects. While in Alaska, John started to take on more responsibility for training and risk assessment/management.

“John says it was so cold it changed his perception of reality.”

In 1993, John accepted a 2-year assignment in Melbourne, Australia (which became permanent). His first assignment was to investigate a small incident, and then he was involved in risk assessments for three years. During that time, he was introduced to different industries within Australia (water treatment, pulp and paper, and mining). He became a lead process engineer on numerous small projects before joining a design team for FEED on a large offshore gas processing facility. John was responsible for the cold systems and process safety compliance.

In 1998, John was involved in a restoration project after an explosion in a gas processing facility, and he eventually joined the non-operating joint venture partner as part of the asset monitoring team. In this role, John continued to gain breadth to his experience, this time working with all aspects of the asset (maintenance, integrity, security of supply, marketing, shutdown planning, product marketing planning, project approval, etc.) but from a non-operating perspective. As the non-operator, the group was responsible for understanding the needs of the asset from a high-level perspective – giving John “access to all areas”.

In 2006, John started working for himself. He started by being a contract engineer for a new gas plant start-up in Pakistan, but he also worked one day per week at one of the local Melbourne universities in the Spring semester. In late 2006 a small training company approached John, looking for a last minute replacement for the facilitator (illness).

“Since that modest beginning, John has now delivered over 180 training courses in the Middle East, SE Asia, Turkey, Australia, and New Zealand, and over 280 live one-hour webcasts which have been broadcast into all seven continents (including an Antarctic island).”

The SMUCE Chemical Engineering Careers Guide aims to provide both undergraduate and postgraduate students with useful information, hints and advice on career and research opportunities relevant to Chemical Engineering.

This Guide is not intended to be comprehensive. The information in this Guide was compiled by contacting each company/researcher and asking them to complete a short survey about their company/research and providing details of their graduate and vacation employment offerings. The information in this Guide is the compiled information from the companies/researchers and does not represent the opinion of SMUCE or Monash University.

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