

CAREERS WITH STEM™ JOB KIT



CHEMICAL ENGINEER

Design, optimise and sustainably manage the processes that turn raw materials into valuable products

SUPPORTED BY



UNSW
SYDNEY

UNSW Engineering

School of Chemical Engineering



UNSW
SYDNEY

**PROFESSOR
CORDELIA SELOMULYA
HEAD OF SCHOOL
UNSW CHEMICAL ENGINEERING**

**FIND OUT MORE
HERE OR SCAN**



TURN COMPLEXITY INTO CLARITY

From food to pharma, industries everywhere need chemical engineers

Now more than ever, chemical engineering is a powerful and rewarding career. Industries everywhere are pushing for sustainability. We need access to clean water, nutritious food, clean energy, biodegradable packaging and sustainable pharmaceutical products.

Chemical engineers are right at the heart of creating solutions for these real and urgent global challenges. We design processes that can be adapted to use less energy, reduce waste and optimise outputs.

I chose chemical engineering because I wanted something where I could solve real-world problems in areas where I can have a big impact.

Today, as well as lecturing at UNSW, I research processes used to create value-added food products, aiming to reduce waste and energy use.

Systems thinking for complex problems

As a chemical engineer, you'll be taught to see process and treatment systems as a whole. You'll be able to see how things fit together. You can solve very open-ended questions. For example: How can we treat water to a high quality but at a low cost? What are some alternative sources and processes

for more sustainable and economical green fuels for the future?

Chemical engineering isn't just about chemicals. It's about understanding and improving complex systems: how things are made, how processes work, how different parts interact with each other, and how to make entire systems more efficient and more sustainable.

At UNSW, we're very strong in clean energy, food engineering, pharmaceutical engineering, water treatment and energy storage. And our teaching labs are amazing. I've visited labs all over the world, and we have truly world-class facilities here at UNSW.

If you love solving problems and want to help shape a better world, dive into this Job Kit to learn more about becoming a chemical engineer. You'll find it's an exciting, flexible and meaningful path.

**Professor Cordelia Selomulya
Head of School
UNSW Chemical Engineering**

**AS A CHEMICAL ENGINEER, YOU'LL
HELP OUR WORLD RUN MORE SUSTAINABLY"**

**BACHELOR OF ENGINEERING
(CHEMICAL ENGINEERING). UNSW**

**PHD (CHEMICAL ENGINEERING).
UNSW**

**DIRECTOR, AUSTRALIA-CHINA JOINT RESEARCH
CENTRE IN FUTURE DAIRY MANUFACTURING**

**RESEARCH AND COMMERCIALISATION DIRECTOR,
FUTURE FOOD SYSTEMS CRC**

**HEAD OF SCHOOL,
CHEMICAL ENGINEERING, UNSW**

Check out [CareerswithSTEM.com](https://careerswithstem.com) for more insights, information, inspiration and advice about engineering careers!

Global challenges, great chemistry

Want to be where science and systems meet problem solving? Choose chemical engineering!

What is chemical engineering?

Modern chemical engineering is all about shaping a cleaner, smarter, more sustainable future. Chemical engineers will always be in demand. They design the processes that turn raw materials, like plants, oil or even waste materials, into useful products, like medicines, clean energy, food and recycled products.

WHY CHOOSE CHEM ENG?

Use chemistry, physics, maths and creativity to tackle some of the world's biggest challenges. Chemical engineering is a great choice if:

- ✓ You're curious about the world
- ✓ You enjoy science
- ✓ You want a job with real-world impact
- ✓ You're future-focused
- ✓ You're interested in decarbonisation, nanotechnology, renewable energies (like biofuel), sustainable products (like cosmetics), biodegradable plastics and environmental protection...

WHAT WILL YOU DO?

TACKLE GLOBAL CHALLENGES
like decarbonisation, a safe water supply for all, and green fuel development

MASTER SUSTAINABLE PRODUCT
process, treatment and system design

MANAGE THE ENVIRONMENTAL
financial and technical aspects of large-scale projects

Trending now

We're shifting to a more sustainable future, and chemical engineers are in demand. You can lead the way with skills in water treatment, green battery technology, cleaner manufacturing and more sustainable ways to do just about everything.

Predicted job growth:
23% over 10 years*

*Source: Jobs and Skills Australia

GOOD COMPANY

Chemical engineers know how to lead projects, solve problems and deal with complex systems. Just ask these **UNSW chemical engineering alumni**:

Vesna Olles, Director, Strategy and Clean Energy BOC

Prof Judy Raper, Former Dean and CEO of TEDI-London

Mick Farrell, CEO of Resmed

Louise Warner, CCO Ampol

Dan Mullette, Chief Science and Engineering Officer, HarvestB

Sandeep Chandra, Head of Strategy and Operations, Atlassian

Systems or products?

At UNSW you can choose to do a **Bachelor of Engineering (Honours)** in:

- **Chemical Engineering:** design and develop safe, efficient, large-scale systems

or

- **Chemical Product Engineering:** design and develop new products

Both degree options give you 60 days of industrial training, plus professional accreditation by industry associations and opportunities to be involved in exciting projects like the **ChallENG project**.

PAY DAY

Entry level chemical engineer

\$103K

AU\$115,000 / year (average salary)

A few years on the clock

\$152K

SOURCE: SEEK.COM; TALENT.COM

Simply the best

UNSW's engineering faculty consistently ranks as the best in Australia. You'll get hands-on experience, access to global research, industry placements and flexible double degree options.

GET HANDS-ON

In your final year of a **Bachelor of Engineering (Honours)** at UNSW, you'll work on a **capstone project** in a team to design a process plant. This is the real deal! You'll work from a design brief developed in consultation with industry partners. Your focus? Creating a sustainable loop where materials can be reused, waste is minimised and resources are recycled.

READ THE BRIEF > DEFINE THE PROBLEM > GENERATE AND EVALUATE CONCEPTS > PREPARE PRELIMINARY DESIGN. RISK ASSESSMENT AND COSTING > CREATE A COMPLETE PLAN > FINALISE EQUIPMENT AND LAYOUT > ASSESS ENVIRONMENTAL IMPACT AND ECONOMIC VIABILITY.

In previous years, students have designed plants to

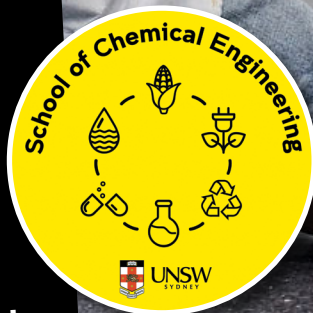
- produce sustainable aviation fuel
- recycle more water in papermills
- obtain hydrogen fuel from sustainable sources
- recover useful resources from industrial wastewater

WHERE WILL YOU WORK?

Industries everywhere need chemical engineers.

- Water treatment
- Air quality management
- Clean energy technologies
- Sustainable materials development
- Pharmaceuticals and cosmetics
- Building and construction

And more...



SCHOLARSHIPS TO WATCH

- UNSW Women in Engineering Scholarship
- UNSW Engineering Rural Scholarship
- UNSW Co-op Scholarship



FIND OUT MORE: VISIT [SCHOLARSHIPS.UNSW.EDU.AU](https://scholarships.unsw.edu.au) OR SCAN THE QR CODE

ENGINEERING+ SUSTAINABILITY= SOLVING GLOBAL CHALLENGES

MICHEL HANNOUN USES ENGINEERING AND COMPUTER SCIENCE TO BUILD SUSTAINABLE SOLUTIONS, ALL WHILE TAKING PART IN AWESOME PROJECTS

Michel Hannoun is keen on sustainability and solving complex problems. To skill up on both interests at the same time, he's studying a Bachelor of Engineering (Chemical) and Computer Science double degree at UNSW.

As part of his engineering degree, Michel is working on a UNSW project called AtomCraft, where his team aims to make the world's first fusion energy device, all created and operated by students.

He's also doing an internship at Integra Water, optimising chemical treatment for water production at major sites across Sydney.

Canola oil to jet fuel

At UNSW, Michel worked on a capstone project: one big idea students develop towards the end of their studies. In Michel's capstone, he helped design a sustainable aviation fuel production facility, converting canola oil into jet fuel using high-pressure, high-temperature reactor systems.

The result was a full-circle project, tying together technical design, environmental sustainability and economic impact, all starting with cooking oil.

Michel says the project gave him a real taste for the impact chemical engineers can have.



MICHEL HANNOUN
CHEMICAL ENGINEERING STUDENT, UNSW

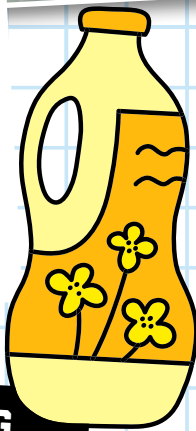
"It's rewarding to build solutions that are both technically sound and environmentally responsible."

Michel has focused his studies on optimising industrial processes, balancing energy and efficiency in systems and enhancing automation and data analysis – all while factoring in the environment.

He chose UNSW for its strong engineering program and hands-on learning approach, with world-class research facilities and meaningful projects.

Michel now plans to pursue a career in process engineering or technology integrated engineering, focusing on clean energy, water treatment or sustainable manufacturing.

"Stay curious and open to multidisciplinary learning," Michel advises. "Chemical engineering is a broad field and touches upon many aspects of design. Take on interesting projects and internships to find what you enjoy and to build confidence applying your knowledge to real-world systems."



CHEMICAL ENGINEERING IS ABOUT SOLVING CRITICAL CHALLENGES IN ENERGY, FOOD, HEALTH AND THE ENVIRONMENT"

BACHELOR OF ENGINEERING (HONOURS) (CHEMICAL) / BACHELOR OF COMPUTER SCIENCE, UNSW

INTERNSHIP, INTEGRA WATER TREATMENT SOLUTIONS

WORDS: SASKIA HORGAN-CATCHPOLE | IMAGES: SUPPLIED / SHUTTERSTOCK

SOLUTION DRIVEN

UNSW graduate **Kylie Lim** leans on her chemical engineering degree in her leadership role at engineering consultancy Beca



KYLIE LIM
ASSOCIATE PROJECT LEADER
BECA



Day in the life ...
Kylie has been working on a new drink manufacturing plant for the last four years. This is a \$400mil+ project aimed at reducing carbon emissions in drink manufacturing.

Kylie has always been big on STEM. As a high school student, the Sydney-based grad loved science, but chemical engineering was never on her radar. "I'd never even heard of engineering," she admits. "It was actually my chemistry teacher who suggested I study it." Impressed by the broadness of the field, Kylie enrolled in a Bachelor of Engineering (Chemical) at UNSW. Suddenly, she was able to dive into real-world projects, collaborating with like-minded students.

"[The degree] gave us the foundations to head into a variety of fields – nanotechnology, renewables and sustainability – but also into different markets – food and life sciences, mining, manufacturing," she says.

SUPERCHARGED CV

At uni, Kylie jumped at extracurricular opportunities. She became president of UNSW's Chemical Engineering Undergraduate Society, which set her up for a stack of leadership positions and fine-tuned her networking skills. "I learnt the importance of communicating effectively and influencing," she says. "It played a major part in why I am pushing for diversity in engineering."

Kylie is now a project manager at Beca, an engineering consultancy firm. She says a recent highlight was championing an epic new beverage manufacturing project.

"My role is to make these processes more efficient, sustainable and safe while still achieving a quality product." Kylie says chemical engineering helps her with assessing impact, understanding process changes and process safety.

I WANT TO MAKE THE WORLD A MORE SUSTAINABLE PLACE"

7:30am
Arrive on manufacturing plant construction site, make a coffee and check emails

8:00am
Manage client stakeholders on technical design reviews and 15 different contracts across the day.

5:00pm
Walk around the site with the design team to review construction progress and raise design issues.

6:00pm
Hometime



WORDS: CASSIE STEEL | IMAGES: SUPPLIED

BACHELOR OF ENGINEERING (CHEMICAL) (HONS), UNSW >>> **STUDENT CHEMICAL ENGINEER, ANSTO MINERALS** >>> **PROCESS ENGINEER, M.E ENGINEERING** >>> **ASSOCIATE PROJECT MANAGER, BECA**

Get the job!

Find your path to a career in chemical engineering

Is this career for you?

You might love a career in chemical engineering if you:

- ✓ Want to solve real-world problems
- ✓ Love seeing how chemistry, physics and maths overlap in practical ways
- ✓ Like to learn how things work and make them more efficient
- ✓ Are innovative, resilient and a great communicator

FOLLOW

Chemical Engineering Undergrad Society (CEUS)

See inside this student society at UNSW on Instagram.

Chemical Engineering Research Society (CERS)

Check out this postgraduate student society at UNSW on Instagram.

WATCH

The Martian (film)

A sci-fi film that follows Mark Watney, an astronaut stuck on Mars after being left behind in a dust storm. The main character finds ways to survive using principles of chemical engineering. Watch him create water, grow food, manage waste and produce electricity, all under extreme constraints.

Tempering chocolate (YouTube)

Chemical engineering is chocolate too. Check out this fun video on the fickle process of tempering chocolate.

YOU COULD WORK FOR:

- Nestle
- Unilever
- Sydney Water
- Jacobs
- Veolia
- Deloitte
- Master Foods
- Selleys

TO READ THIS JOB KIT ONLINE
SCAN HERE



GAMES

You can find all these games on **STEAM**

Dyson sphere program

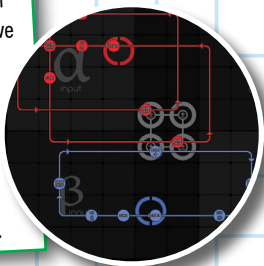
A simulation strategy game where you try to build the most efficient intergalactic factory from resources in nearby star clusters. It's based on a real theory using massive structures surrounding a star to capture the star's energy.

Fall Out 3

A post-apocalyptic role-playing game set after a nuclear war. The protagonist embarks through radioactive wasteland to search for his father and follow their dream of purifying water to save their home.

Space Chem

An indie puzzle game where you're a reactor engineer producing different chemical molecules via an assembly line.



WORDS: SAMANTHA WHEELER. IMAGES: SHUTTERSTOCK AND SUPPLIED