

# CAREERS WITH STEM™ ENGINEERING

**DOUBLE ISSUE**  
FLIP FOR CAREERS IN NET ZERO

**Find friends in engineering**  
p8

**Harry's startup success**  
p18

**Bring your design ideas to life**  
p20



**HARRY LUCAS**  
**STARTUP FOUNDER**

CAREERSWITHSTEM.COM





MACQUARIE  
University



---

**YOU WILL CREATE NOVEL  
SOLUTIONS TO  
COMPLEX PROBLEMS**

*with us*

---

**(YOU)<sup>us</sup>**





In the future, lifting heavy objects, fighting bushfires and finding missing people will be helped by swarms of drones, able to coordinate with each other independent of human intervention.

Researchers from Macquarie University's Drone Lab are helping to bring these swarm clouds to life by fine-tuning the technology that enables drones to work together effectively.

A hub of groundbreaking science and engineering advances, notably in robotics, mechatronics and electronics, Macquarie is proud to have pioneered *FIRST*® Robotics in Australia. Our other clubs and societies – including MQ Orbital, our student-led space program; MQ Automotive; and MQ Speed Team – combined with our project-based approach to learning ensure you will graduate with the practical skills you need to be successful in your career.

Macquarie's engineering program – offering specialties in electrical and electronic, mechanical, mechatronic or software engineering – uniquely combines a solid foundation in theoretical knowledge with practical skills acquisition and industry experience. And because we know that creativity is the driving force underpinning engineering advances, our unique curriculum allows you to combine other areas of interest, enriching your university experience – and providing the spark that could inspire world-changing new ideas.



**FIND OUT MORE  
AND APPLY TODAY**



# What's inside?

FLIP OVER FOR  
CAREERS IN NET ZERO

**P6** Engineering with imagination  
Think engineering is all precision and equations? Think again!

**P8** A woman's place is in engineering  
In fact, everyone belongs in the 'E' in STEM!

**P10** No uni? No worries!  
7 benefits of studying engineering via VET

## WHY ENGINEERING?

Australia has around half a million qualified engineers, but needs a lot more to help the country thrive and innovate. It's engineers that are helping us build a better future, be it with sustainable design, building new businesses or responding to climate change with renewable energy.

P8

P12

P20

**STEM + X =** 😊  
Combine engineering (STEM) with your passion (+ X) to discover your dream career.

Engineering + ...

**P12** Oceans  
Engineering skills are your ticket to hitting the high seas in style!

**P16** Business  
Take your ideas to the bank or be the boss of the next big thing

**P20** Design & Construction  
Blend creativity with technical expertise to turn cool concepts into reality

**P24** Agriculture  
If you love science, the outdoors and problem-solving, this could be the path for you

# Engineer a sustainable future

Chemical engineers solve real-world challenges by taking raw materials and turning them into useful products. They can craft plant-based food alternatives, design clean mineral processing methods or develop sustainable energy resources.

## Study Chemical Engineering



THE UNIVERSITY  
of ADELAIDE



**ANNA QUILLINAN**  
CHIEF DEVELOPMENT OFFICER –  
NET ZERO ENERGY SOLUTIONS  
ENGIE AUSTRALIA + NZ



# ENGINEERS ARE INFLUENCERS TOO!

Engineers have the skills to help all of us adapt to a changing world

**C**areers in engineering are evolving quickly as society confronts one of its biggest challenges: climate change. We need more dedicated and passionate people with engineering skills to drive the change needed over the next 50 to 100 years.

That's what I love about engineering – it gives you the skills to build everything that our society needs, be it bridges, roads, mines to produce critical minerals or robots to conduct surgeries too complex to be done with human hands.

As we transition away from fossil fuels to other forms of energy, we're always asking ourselves how we can use energy differently to produce better results for society. Engineers are problem-solvers with a real ability to influence the future.

At my company ENGIE, we're building a network of electric vehicle charging stations, but the first step is to change how people think about refuelling. For example, if you drive a petrol or diesel car, you'll drive to the petrol station to fill your car's tank up. ENGIE's charging stations are located in shopping centre carparks so people can do other things while their cars charge.

There are similar problems to solve in changing how and when people use energy in their homes, like encouraging people to

**IT'S ABOUT APPLYING TECHNICAL SKILLS TO DRIVE POSITIVE CHANGE"**

use their washing machines when the sun is shining and there's excess solar power.

The growth of data, mechatronics and robotics will unlock even more engineering careers in fields like energy, health and medicine, business and agriculture.

In many of these areas, engineers will need to work with other professionals, like community engagement teams, to help influence and change people's behaviour.

Being an engineer is about so much more than working with maths, physics or chemistry. It's about teamwork, good communication and applying your technical skills to drive positive change.

**Anna Quillinan**  
Chief Development Officer – Net Zero Energy Solutions, ENGIE Australia & New Zealand

**BACHELOR OF ENGINEERING (CHEMICAL ENGINEERING) (HONOURS), RMIT**



**GRADUATE ENGINEER, PASMINGO AUSTRALIA**



**PROCESS ENGINEER, JACOBS ENGINEERING**

**LEAD PROCESS ENGINEER, PERFORMANCE + INNOVATION DIRECTOR, WORLEYPARSONS**



**CHIEF DEVELOPMENT OFFICER – NET ZERO ENERGY SOLUTIONS, ENGIE AUSTRALIA + NEW ZEALAND**

SHUTTERSTOCK



# Engineering with imagination

Think engineering is all precision and equations? Think again! Engineers use their imagination and creativity to solve problems and innovate every day

## What's creativity?

Creativity is all about coming up with new and unique ideas, seeing problems and situations in new ways and inventing solutions that might be surprising or out of the ordinary. And it's not limited to fields like art and music! Creative skills are super valuable in every career, including engineering. The good news? Creativity is a skill that can be developed over time through regular practice. Think: finding opportunities to embrace tough challenges, exposing yourself to a wide variety of new experiences and ideas, and regularly engaging with activities that require creative thinking, whether it's brainstorming solutions to random problems or taking an art class! – Gemma Chilton



## REAL-LIFE INSPO

WE ASKED TWO ENGINEERS HOW THEY USE CREATIVITY IN THEIR STEM CAREERS



**ALLEN GLO**  
SITE ENGINEER

IN CONSTRUCTION, PROBLEM-SOLVING AND DESIGN ADJUSTMENTS ARE COMMON. AND WE WILL ALWAYS HAVE TO THINK OUTSIDE THE BOX TO FIX ISSUES THAT ARISE ON SITE"

READ MORE ABOUT ALLEN'S STUDY AND CAREER PATH ON P22



**KAYLA CHAOU**  
SITE ENGINEER

FOR US IN ENGINEERING, CREATIVITY IS ABOUT HOW YOU APPROACH AND SOLVE PROBLEMS. WHILE WORKING ON SITE, THINGS CHANGE VERY QUICKLY AND OFTEN YOU NEED TO THINK ON YOUR FEET TO PROBLEM-SOLVE BASED ON YOUR EXPERIENCE AND THE RESOURCES YOU HAVE AROUND YOU"

READ MORE ABOUT KAYLA'S STUDY AND CAREER PATH ON P22

## 5 WAYS ENGINEERS USE CREATIVITY

### 1 DESIGNING WITH EMPATHY

Engineers often use creativity to think about other people's needs and make designs that are easier and more enjoyable for everyone to use.

### 2 SOLVING COMPLEX PROBLEMS

When the usual methods don't work, engineers think creatively to come up with new and unusual ways to solve challenging problems.

### 3 USING RESOURCES WISELY

Being creative with materials means doing more with less. Engineers find clever ways to use what they have, coming up with more efficient and sustainable solutions.

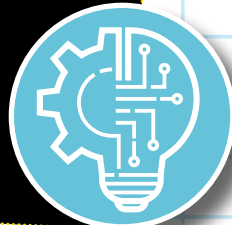


### 4 PLANNING FOR TOMORROW

Engineers use their imagination to think about what the future might hold, which helps them to get ahead of potential issues or challenges.

### 5 EMBRACING NEW TECH

Using the latest tools and software to streamline their workflow and processes is the norm for engineers, and requires plenty of creativity and thinking outside the box.



SHUTTERSTOCK





Because robots  
are only as  
capable as the  
humans that  
create them.

Creative  
thinkers  
made here.



Study Engineering and tackle exciting  
challenges in our advanced labs.  
Apply now at [ECU.EDU.AU](https://www.ecu.edu.au)



# A WOMAN'S PLACE IS IN ENGINEERING

**IN FACT, EVERYONE BELONGS IN THE 'E' IN STEM!**

**D**id you know that only 13% of qualified engineers in the Australian workforce are women? And that STEM jobs are predicted to grow by 14.2% by 2026 – almost twice as fast as non-STEM jobs? Looks like an opportunity if you ask us! It's super clear that we need more diversity AND people in engineering, so if you're a female-identifying, non-binary or gender-diverse student, there's a place for you here. – Louise Meers

## DIVERSITY FTW

According to CSIRO, diverse teams and workforces consistently have better problem-solving abilities, increased creativity and improved productivity. It should be all hands on deck to engineer solutions for a better, brighter future.

Women working in engineering agree! Materials engineer Laura Clemente says: "Diversity is important because every single person, regardless of gender orientation or cultural upbringing, matters – they have their own potential and capability to come up with new innovations that could possibly change the world."

Catherine Isaac, a medical devices engineer, adds: "Without female representation, issues that half the population face can be overlooked and ignored due to lack of awareness. Women need to be included and involved in creating the technology of the future."

### Get a role model

If you can see it, you can be it. Head to [CareerswithSTEM.com](http://CareerswithSTEM.com) to check out the CVs and career journeys of more women working in engineering.

**LAURA CLEMENTE**  
MATERIALS ENGINEER



**CATHERINE ISAAC**  
MEDICAL DEVICES ENGINEER



**ZOE EATHER**  
CIVIL AND ENVIRONMENTAL ENGINEER AND CEO



**I'M PASSIONATE ABOUT CHANGING THE NARRATIVE AROUND ENGINEERING SO THAT IT ENCOURAGES PEOPLE WHO WANT TO CHANGE THE WORLD TO GET INVOLVED IN STEM AND BRING THEIR CREATIVITY WITH THEM!"**

## GET THERE WITH A SCHOLARSHIP

### SOME GREAT ONES TO APPLY FOR ...

**Arup Women in Engineering Scholarship**, Curtin University

**Women in Engineering Scholarship**, QUT

**UNSW Women in Engineering Scholarships Program**, UNSW

**STEM Women in Engineering Scholarship**, RMIT

**Margaret Hamer Scholarship for Women in Engineering**, The University of Sydney

**Women in Engineering Scholarship**, Monash University

**The FEIT Women in Engineering and IT Scholarship**, UTS



# ALL THE INSPO

WISE WORDS FROM WOMEN IN ENGINEERING!



**KAREN WILLCOX**  
AEROSPACE ENGINEER

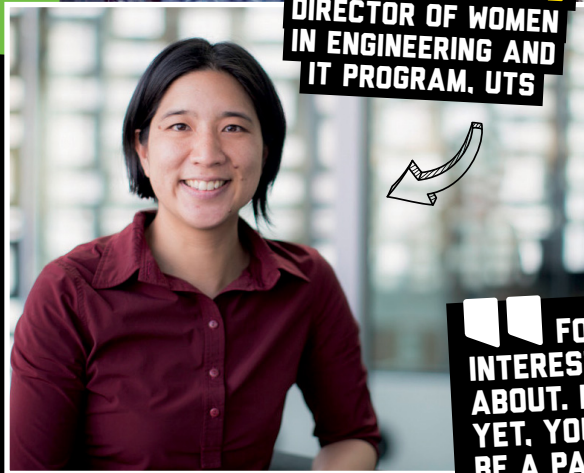
**I'VE HEARD MANY YOUNG WOMEN SAY THEY WANT A CAREER IN MEDICINE BECAUSE THEY WANT TO HELP PEOPLE. THE IMPACT MAY BE MORE INDIRECT, BUT ENGINEERS ABSOLUTELY HELP PEOPLE JUST AS MUCH AS DOCTORS"**

**YEMI PENN**  
RAIL PROJECT ENTREPRENEUR



**BE OPEN-MINDED. CREATE YOUR LANE IF YOU NEED TO. STAY CONNECTED TO 'WHY' YOU WANT TO HAVE A STEM CAREER IN THE FIRST INSTANCE AND ALWAYS GO BACK TO THIS WHEN THE GOING GETS TOUGH. BECAUSE IT WILL"**

**DR EVA CHENG**  
DIRECTOR OF WOMEN IN ENGINEERING AND IT PROGRAM, UTS



**FOLLOW WHAT YOU'RE INTERESTED IN AND CARE ABOUT. IF IT DOESN'T EXIST YET, YOU CAN CREATE IT OR BE A PART OF CREATING IT!"**

## JOIN THE CLUB

Finding like-minded peers when you're at uni can make a massive difference to your study experience. Check out these societies and clubs at some of Australia's leading universities:

**GEMS (Gender Equity in Engineering Makes Sense), QUT**

**Griffith University Women in Engineering, Griffith University**

**Newcastle University Women in Engineering, University of Newcastle**

**Sydney University Women in Engineering Society, The University of Sydney**

**Women in Engineering Curtin Division, Curtin University**

**Women in Engineering at ECU, Edith Cowan University**

**Women in Engineering and Mathematical Sciences UWA, University of Western Australia**

**Women in Engineering at Monash, Monash University**

**Women in Engineering Society, UNSW**

**Women in Science and Engineering, The University of Melbourne**

**Women in Science and Engineering, Victoria University**

## UNI PROGRAMS

Lots of unis (like Macquarie University, Monash University, QUT, RMIT, The University of Queensland, The University of Western Australia, UNSW and UTS) have awesome programs that mentor, encourage and support female-identifying, non-binary and gender-diverse students in engineering. Double check what's on offer at your favourite uni before applying.



# NO UNI? NO WORRIES!

7 benefits of studying engineering via VET



**1 IT'S HANDS-ON**  
 If you learn best by doing, **VET engineering could be the right option for you.**  
 VET is all about giving you the practical experience you need for the workplace, and you can often complete an apprenticeship as part of your studies.

**2 YOU'LL BE SUPER EMPLOYABLE**  
 According to **Jobs and Skills Australia**, **82.7%** of grads who completed a top 100 VET course were employed afterwards. The courses with the highest levels of employment after training? They were in the Engineering and Related Technologies field!

**3 YOU'LL SPEND LESS TIME STUDYING**  
 Not keen on studying a Bachelor of Engineering for four years? You could earn a VET qualification in engineering a lot faster:

- **Certificate I in Engineering – 6 months (full time)**
- **Certificate II in Engineering – 1.5 years (full time)**
- **Certificate III in Engineering – Technical – 4 to 6 months (full time)**
- **Certificate IV in Engineering Drafting – 12 months (full time)**
- **Diploma of Engineering - Technical (Mechanical) – 1 to 3 years (full time)**

**4 IT'S CHEAPER**  
 Did you know a **Bachelor of Engineering (Honours) can cost over \$30,000?**  
 VET qualifications are usually a lot cheaper, and there are fee-free and government-subsidised courses to choose from too.

**6 IT'S A GREAT ALTERNATE PATHWAY**  
 If you didn't get the ATAR for an engineering degree, you can complete a **Diploma of Engineering to gain entry into second year** of a Bachelor of Engineering at UNSW, The University of Adelaide, Monash University and more.

**7 YOU CAN COMBINE YOUR INTERESTS WITH YOUR STUDY**  
**Into construction?** Take on an Advanced Diploma of Civil and Structural Engineering. **Love design?** Study a Certificate II in Engineering (Jewellery). **Space fan?** Try an Advanced Diploma of Engineering (Aeronautical).

**5 YOU CAN START WHILE YOU'RE STILL AT SCHOOL**  
 Yep, you can take **VET courses as electives**. Scan the QR code to find 43 STEM courses you can do while at school – there are plenty of engineering options!

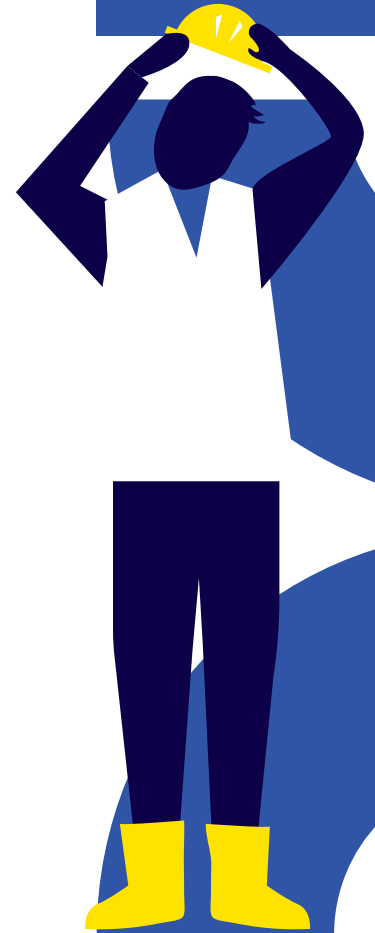




# YOUR CAREER YOUR WAY

Your career can take a variety of twists and turns, steps and stages.

**yourcareer.gov.au** can help you make informed decisions about your learning, training and career development.



## Know what you want to do when you finish school?

Got plans to do some study or training, start working, or take a gap year?

Download the **School Leavers Information Kit** for information about:

- study or training options to upskill
- financial support for further study
- how to nail a job interview
- and more!



[yourcareer.gov.au/schoolleaver](https://yourcareer.gov.au/schoolleaver)



# AWASH WITH OPPORTUNITY

Make waves with an engineering career working on or around the world's oceans

If the mysteries of the ocean fascinate you, then engineering skills are your ticket to hitting the high seas in style!

From designing sustainable solutions to address climate change to pioneering new technologies for underwater exploration, engineers are in demand on maritime projects around the world.

Imagine being part of a team that designs and constructs innovative structures like underwater turbines that harness the

power of ocean currents to generate clean energy, or coming up with solutions to minimise the impact of human activities on ocean environments. This could involve developing systems to clean up marine pollution or designing offshore structures that minimise disturbance to marine life.

Engineers also design and deploy instruments and equipment for oceanographic research, enabling scientists to study ocean currents, marine life and the effects of climate change on marine ecosystems.

Plus, with the growing demand for sustainable transportation and shipping, the world needs engineers to develop eco-friendly solutions for maritime transport. From designing more fuel-efficient ships to implementing innovative navigation and comms systems, engineers help make maritime transportation safer, cleaner and more efficient.

So dive in and discover the exciting world of engineering careers in maritime projects!  
– Charis Palmer



## Specialist pay

The average salary for a marine engineer in Australia is **\$105K\***, with an average starting salary of **\$84K**.



## THE RIGHT FIT?

Skills you'll need to float in this field:

✓ **PROBLEM-SOLVING**

✓ **CREATIVITY**

✓ **A LOVE OF BEING ON THE WATER**

✓ **BASIC PHYSICS AND MATHS**



# BOAT DESIGNER

**GROWING UP ON AN ISLAND, EVERY PASSING BOAT WAS A LESSON IN DESIGN AND ENGINEERING FOR TYLER RATCLIFF!**

**TYLER RATCLIFF**  
MARITIME ENGINEERING STUDENT

**ENGINEERING + OCEANS + STUDY**

Bachelor of **Maritime Engineering, (Specialisation) (Honours)**, Edith Cowan University

Bachelor of **Maritime Engineering, (Specialisation) (Honours)**, University of Tasmania

Bachelor of **Engineering (Honours) (Naval Architecture)**, UNSW Canberra

Bachelor of **Applied Science (Marine Engineering)**, Australian Maritime College, University of Tasmania

Certificate IV in **Engineering (Marine Craft Construction)**, Federation Academy

**ENGINEERING + OCEANS + JOBS**

**Marine engineer** \$62K-\$107K

**Marine surveyor** \$51K-\$120K

**Navy mechanical engineer submariner** \$113K

**Naval architect** \$66K-\$152K\*

\*Salaries sourced from payscale.com, Indeed.com and adfcareers.gov.au

Tyler has loved boats for as long as he can remember. Growing up on an island in Sydney's Pittwater, sailing wasn't just a hobby for him; it was a way of life.

"I've been surrounded by boats my whole life through sailing events – I even took a ferry to school. My grandpa has done over 50 Sydney to Hobart yacht races, so I definitely grew up in a sailing family," he explains.

As a child, Tyler and his dad would discuss the design features of passing boats and why they worked or didn't. "In Year 8, I remember watching the America's Cup on TV and being fascinated by the commentary about the yacht design. That's what really got me into fast yachts."

With a deep connection to the sea and an interest in maths and science, Tyler knew he'd found his calling. He chose to study maritime engineering at the Australian Maritime College, specialising in naval architecture. He's now in his fourth year and charting a path towards a promising career.

## THE SKILLS YOU DEVELOP WORKING IN THE INDUSTRY ARE SO USEFUL"

### LEARNING THE ROPES

A real highlight for Tyler has been gaining hands-on skills, both as a waterproofing apprentice in his gap year and as an intern with Incat Crowther, an Australian marine engineering company.

"The skills you develop by working in the industry are so useful," he says. "Some uni assignments are practical, including one big building project a year where we design and build working in teams, so I really value those skills."

Tyler's dream career is to help design a boat for the America's Cup.

"I like how the design changes each year and how teams manufacture solutions. As a kid, I decided I wanted to be on a winning team!" – Danielle Lucas

GAP YEAR, LABOUR WORK AND WATERPROOFING APPRENTICESHIP

INTERN, INCAT CROWTHER

BACHELOR OF MARITIME ENGINEERING (SPECIALISATION) (HONOURS), AUSTRALIAN MARITIME COLLEGE, UNIVERSITY OF TASMANIA



# Whatever floats your boat

**AWARD-WINNING APPRENTICE JOACHIM LOPEZ-VALOA FOLLOWED HIS INTERESTS TO A CAREER AT HIS PERFECT WORKPLACE**

Joachim has always enjoyed learning the science behind how things work. Now, as an apprentice marine technician, his job involves fixing and maintaining marine equipment. One of the best parts? Getting to test his work!

“The coolest thing about my job would be whenever we water test a boat that has been repaired or fitted with a new engine. Nothing beats going out on the water in a boat that you’ve just put together,” Joachim says.

Always a lover of physics and maths, Joachim enjoys solving problems and testing for faults in his work so he can learn and improve. “My favourite subject at school was physics, but also the maths involved was fun since it felt satisfying when you would get it right,” he says.

So, what does a typical day for Joachim look like? There isn't one! From disassembling engines and gearboxes and putting them back together to boat rigging and water testing, Joachim's work is diverse and never boring.

**JOACHIM LOPEZ-VALOA**  
APPRENTICE MARINE  
TECHNICIAN

**NOTHING BEATS GOING OUT ON THE WATER IN A BOAT YOU'VE JUST FIXED"**

He even adds some dance moves to his day when a good song comes on the radio!  
Joachim is currently completing a Certificate III in Marine Mechanical Technology and says it's exciting to know that with this qualification, he'll be able to get a job in most countries around the world.  
Looking back on his pathway so far, Joachim says he wouldn't change a thing. “I would follow the exact same path, which was to pursue what I actually wanted – done through trial and error until I found the perfect workplace that suited me.” – Jaina McIntyre

CERTIFICATE III IN MARINE MECHANICAL TECHNOLOGY

2023 VICTORIAN SCHOOL-BASED APPRENTICE OF THE YEAR

2023 KANGAN INSTITUTE SCHOOL-BASED APPRENTICE OF THE YEAR

2023 AUSTRALIAN TRAINING AWARDS SCHOOL-BASED APPRENTICE OR TRAINEE OF THE YEAR FINALIST

APPRENTICE MARINE TECHNICIAN, MERCURY MARINE



# WATER ROBOT

Electronics engineer Vance Takiguchi's love for robotics started early and now he's helping others find their path



**VANCE TAKIGUCHI**  
ELECTRONICS ENGINEER



Electronics engineer Vance was lucky enough to start working with robots in Year 4 when he joined the FIRST Robotics club. From there he was hooked, joining another robotics program and eventually landing a scholarship to do a Bachelor of Engineering (Honours), with a specialisation in mechatronics at Macquarie University.

Vance says that while his involvement in the robotics clubs definitely helped with his studies, it proved even more valuable when it came time for him to join the workforce.

"The main thing I got was a problem-solving mindset and skills that I now use in my work," he explains.

"While in university I also had the opportunity to coach in a video game professionally. This is something that I am very happy about because I don't think many people get that chance!" Vance says.

**FROM ROBOTICS I GOT A PROBLEM-SOLVING MINDSET THAT I NOW USE IN MY WORK"**

Vance is now an electronics engineer at CEE HydroSystems, a company that manufactures equipment for underwater surveys, where he works on self-driving boats!

"My work consists of developing anything that moves and the autopilot," he says.

Vance also still supports robotics competitions, volunteering as a mentor and helping kids to build robots and compete on the national stage against teams from around the world. – Charis Palmer

## CHECK OUT FIRST ROBOTICS



FIRST Robotics is about more than just robots – it's a community of students learning important life skills that will help them compete in the workforce of tomorrow. There are regular meetings and competitions around Australia, like the annual Duel Down Under. For the full calendar, visit [firstaustralia.org](http://firstaustralia.org)

ELECTRONICS ENGINEER, CEE HYDROSYSTEMS

ROBOTICS MENTOR, FIRST TEAM 3132

ROBOTICS INSTRUCTOR, KNOX GRAMMAR SCHOOL

BACHELOR OF ENGINEERING (MECHATRONICS, ROBOTICS AND AUTOMATION ENGINEERING), MACQUARIE UNIVERSITY



# Invent the world

Take your ideas to the bank or be the boss of the next big thing

If you're keen on engineering, you probably already know it's all about problem-solving, be it developing new tech, improving existing systems or creating something more sustainable than what's already there.

But what if you want to turn your ideas into something bigger? That's where business comes in – giving you the skills to create innovative products and bring them to market.

By combining engineering and business skills, you'll have career options in many industries. You might find yourself leading a startup, managing projects for a global corporation or inventing the next big thing!

To get there, you'll need determination, hard work and business basics. – *Charis Palmer*

## WHAT IT TAKES

To be a business leader you'll need these skills in abundance:

### ANALYTICS

So you can connect the dots between a current problem and how it might be solved in the future.

### COMMUNICATION

So you can sell your idea to potential investors.

### FINANCIAL MANAGEMENT

So you can make the money you raise go far.

### HUSTLE

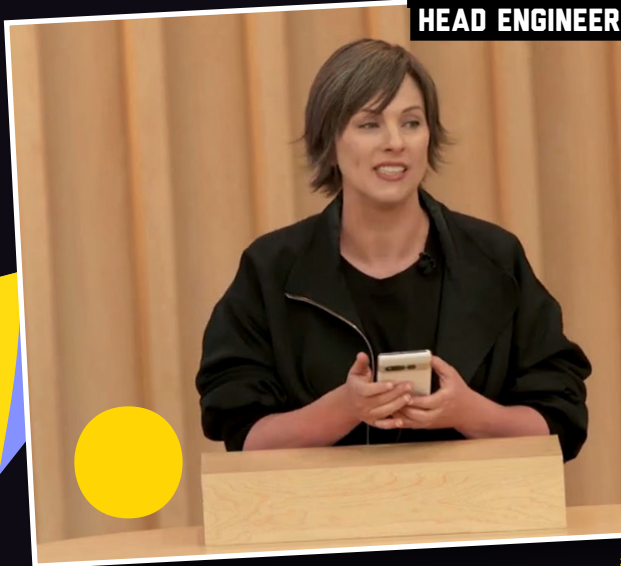
So you can handle rejection and keep going through tough times.

### TEAM BUILDING

So you can bring the best team around you and keep them loyal.



**CATHY EDWARDS**  
HEAD ENGINEER, GOOGLE



**INSPIRING BUSINESS FOUNDERS WHO STARTED OUT IN ENGINEERING**

**#1 CATHY EDWARDS**

As the head engineer at Google, and former director of engineering at Apple, Cathy is an Aussie who was encouraged to code at a young age. Before holding down two of the most powerful computer engineer gigs in the world, Cathy co-founded search engine Chomp, which Apple acquired for US\$50 million.

**#2 FLAVIA TATA NARDINI**

Aerospace engineer Flavia wanted to be an astronaut when she was a girl, but then she decided she'd rather build rockets! Flavia co-founded Fleet Space Technologies, a leading Australian space company with a mission to empower humanity's exploration of new worlds.

**#3 STEVE WOZNIAK**

You've probably heard of Apple founder Steve Jobs, but what about his co-founder Steve Wozniak? An electrical engineer by training, it was Wozniak that designed the Apple II, one of the first highly successful mass-produced microcomputers. He went on to found other companies too, including one that developed and brought the first programmable universal remote control to market.



**FLAVIA TATA NARDINI**  
CO-FOUNDER, FLEET SPACE TECHNOLOGIES



**STEVE WOZNIAK**  
CO-FOUNDER, APPLE

**ENGINEERING + BUSINESS + STUDY**

Bachelor of **Commerce** / Bachelor of **Engineering (Honours)**, Macquarie University

Bachelor of **Engineering (Honours)** / Bachelor of **Commerce**, Edith Cowan University

Bachelor of **Engineering (Honours)** / Bachelor of **Business**, QUT

Bachelor of **Engineering (Honours)** / Bachelor of **Commerce**, UNSW

**ENGINEERING + BUSINESS + JOBS**

**Entrepreneur**

**CEO**  
\$100K–\$297K

**Founder**  
\$42K–\$294K

**Head of engineering**  
\$140K–\$200K\*

\*Salaries sourced from [payscale.com](https://www.payscale.com) and [seek.com](https://www.seek.com.au)



# STAYING THE COURSE

AFTER A SETBACK WITH HIS FIRST STARTUP, **HARRY LUCAS** KEPT LEARNING AND LEVERAGED HIS PERSISTENCE INTO A NEW BUSINESS MAKING BIG CHANGE IN MANUFACTURING



**HARRY LUCAS**  
STARTUP FOUNDER

**W**e first profiled engineer and entrepreneur Harry Lucas in 2015, when he was a uni student studying mechatronics. Back then, Harry was building a company aiming to change global food production. That company didn't make it, but last year Harry's current startup, Phasio, raised \$3.8 million in venture capital funding, which in Australian startup terms is a big deal! We caught up with Harry to discuss his pathway to building a successful business. – Charis Palmer

**What happened after you had to close your first business?**

I landed an internship at the European Astronaut Center in Germany, working on lunar operations with the European Space Agency (ESA). This experience was pivotal as it showed me the vast potential of 'hard' software — software with real-world impacts on life and mission success. Craving a more formal software background, I joined JPMorgan Chase as a software engineer. Living in Geneva, I worked on incredible technologies and transitioned from being 'an engineer' to a 'software engineer'.

**What convinced you to do another startup?**

I came across this company in Zurich who told me they were founded through an accelerator program called Entrepreneur First. It pays founders for three months to get a new business

underway. I applied for the cohort in Singapore and they flew me there in January 2021! I met my cofounder Raman online while I was in COVID quarantine in Singapore. He was a 3D printing metallurgist who had published some mechanical engineering research papers that made my eyes water they were so incredible. So we paired off and started Phasio, a business that provides software tools to manufacturers to help enhance their websites and sales process.

**Engineer or founder — which comes first?**

I'd say being a generalist has been my biggest advantage over the past decade. Bridging the gap between different fields has allowed me to come up with innovative solutions and inspire others to join the journey and look toward the future.

MASTER OF SCIENCE, COMPUTER SCIENCE,  
GEORGIA INSTITUTE OF TECHNOLOGY (ONGOING)

CO-FOUNDER,  
PHASIO

SOFTWARE ENGINEER,  
JPMORGAN CHASE + CO

CO-FOUNDER,  
SEER INSIGHTS

BACHELOR OF ENGINEERING (HONOURS),  
MECHATRONICS, UNIVERSITY OF ADELAIDE





# Tunnel vision

**BREANNA CAMERON**  
UNDERGROUND MINE  
MANAGER



ECU GRADUATE **BREANNA CAMERON** DUG THROUGH HER ENGINEERING DEGREE TO LAUNCH HER OWN MINING SERVICES BUSINESS

**A**t high school, when it came to STEM, Breanna favoured maths. So much so that she enjoyed helping her mates out when they were stuck – something she still does in her next-gen mining gig.

“It’s one of my favourite parts of the job now,” Breanna says. “Helping people see things from different perspectives is what I love to do most.”

So, how did this maths lover end up as a leader in Australia’s mining industry? The answer: a degree at Edith Cowan University (ECU), loads of hands-on work experience and a talent for leadership and inspiring others.

## ABOVE GROUND

After high school, Breanna navigated heavy machinery in the iron ore, lithium, gold and nickel sectors before heading to uni. When she decided to study engineering, she had no idea just how much it would supercharge her career.

“I thought the degree [at ECU] would complement the work I was already doing but it created more than just work opportunities,” she says. “It provided access to long-term career pathways and positioned me to have wider industry impact.”

Breanna credits much of her career success to the many extra-curricular offerings at ECU that she was able to take advantage of – from a study exchange to China to work experience placements at mining and construction

companies. “I gained a skill set that I’ll use for the rest of my life,” she says.

## ENGINEERING MEANS BUSINESS

Thanks to her work experience and academic achievements, getting a job after uni was pretty straightforward for Breanna – she was the perfect candidate for mining giant BHP.

Initially, Brenna started as an underground mining engineer at BHP’s West Australian nickel mine, but she’s since fast-tracked it to manager and production superintendent.

Somewhere in there, she’s also found time to start her own business, JUDDRILL, a mining services company specialising in drill and blast plus minor plant hire.

“It was built from a desire to provide people with a workplace filled with positivity and a sense of community,” she says. “You only have one shot at life – start early and always say yes.”

– Cassie Steel

**MY ECU DEGREE PROVIDED ACCESS TO LONG-TERM CAREER PATHWAYS AND INDUSTRY IMPACT”**

BACHELOR OF ENGINEERING (CIVIL AND ENVIRONMENTAL) HONOURS, EDITH COWAN UNIVERSITY

UNDERGRADUATE MINING ENGINEER, GOLD FIELDS

SENIOR UNDERGRADUATE MINING ENGINEER, BHP

FIRST CLASS MINE MANAGER CERTIFICATION, DMIRS

ALT. UNDERGROUND MANAGER AND PRODUCTION SUPERINTENDENT, BHP

CO-FOUNDER, JUDDRILL



# BRINGING IDEAS TO LIFE

Design and construction engineering blend creativity with technical expertise to turn concepts into reality

**D**o you ever imagine turning a sketch you've drawn into something real or spend your weekends building epic structures? If so, a career in design or construction engineering might be for you.

Design engineers create detailed plans for everything from buildings and bridges to machines, systems and everyday objects. Construction engineers take those plans and bring them to life. They oversee the construction process, manage projects and ensure everything is built to specifications and on time.

But it's not all about calculations and hard hats – you get to be creative too! As a design engineer, you'll sketch out new concepts and see them evolve from an idea to a tangible structure. Construction engineers creatively solve problems and find the best ways to implement designs. Both careers can be incredibly rewarding, offering the perfect blend of creativity and technical prowess, with real opportunities to shape the world around you. – *Charis Palmer*

## SKILLS CHECKLIST

To work as a certified engineer you'll need a four-year degree in engineering, but there are also VET pathways, starting with a Diploma of Engineering.

### TECHNICAL SKILLS

Proficiency in design software like AutoCAD or Revit is essential. You also need a strong grasp of engineering principles and mathematics.

### PROBLEM-SOLVING

Both roles require you to tackle complex challenges and find effective solutions.

### ATTENTION TO DETAIL

Precision is crucial when you're designing structures or managing construction projects.

### COMMUNICATION

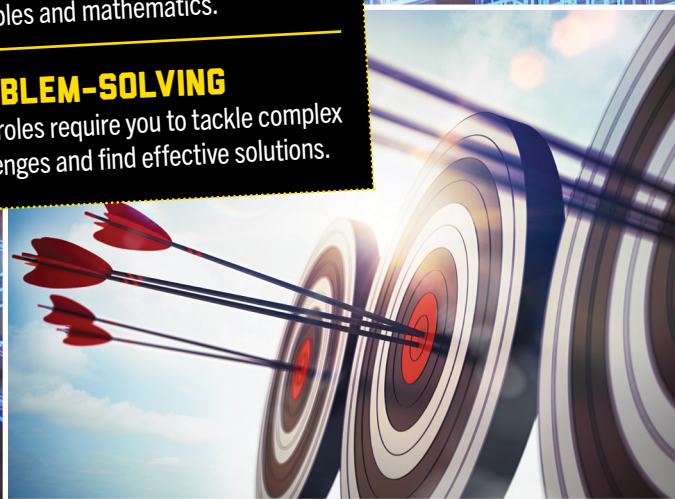
You'll work with various stakeholders, including clients, architects and contractors, so clear and effective communication is key.

### PROJECT MANAGEMENT

Managing timelines, budgets and resources efficiently is a big part of construction engineering.

### CREATIVITY

Despite the technical nature, these fields are highly creative. You'll design innovative solutions and find ways to bring unique visions to life.





# DRAWING ON STEM

**MECHATRONICS MAJOR SOPHIA SCHULZ IS PROOF THAT STEM CAREERS CAN BE CREATIVE TOO**



**SOPHIA SCHULZ**  
**MECHATRONICS ENGINEERING STUDENT**

Sophia's high school timetable was equal parts creative and STEM-based. As an International Baccalaureate student in Canada, she took physics, chemistry and advanced calculus to fulfil the prerequisites for an engineering degree in New Zealand – yet she still enjoyed units like photography, music and design.

"Even though my STEM skills didn't come as naturally [as my creative ones at university], engineering appealed to me because it was really hands-on," she says.

Sophia decided to focus on mechatronics because it covered many different niches, including mechanical, electrical and software systems.

Though she struggled at first with the rigidity of engineering, it didn't take Sophia long to realise her

creative skills were a major asset. Thinking outside the box has proved pivotal to her engineering units, bringing innovation, fresh ideas and next-level presentation skills.

"When I'm coming up with a hardware design, like a robot or a moving camera, I always start by sketching my ideas to problem-solve," she says. "That's creativity at work!" – Cassie Steel

**ENGINEERING APPEALED BECAUSE IT WAS HANDS-ON"**

**BACHELOR OF ENGINEERING (MECHATRONICS ENGINEERING) (HONOURS), UNIVERSITY OF AUCKLAND**

**INTERN. HALTER**

**INTERN. AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH**

**RESEARCH ASSISTANT, UNIVERSITY OF AUCKLAND**

## WHO'S HIRING?

**AECOM** A global firm providing design, consulting, construction and management services.

**ARUP** Another global group known for its innovative design and sustainable engineering solutions.

**LENDLEASE** A leading international property and infrastructure group.

**LAING O'ROURKE** A multinational construction company delivering complex projects.

**GHD** Provides engineering, architecture, environmental and construction services.

**HANSEN YUNCKEN** An Australian construction company specialising in commercial projects.

**ENGINEERING + DESIGN + CONSTRUCTION + STUDY**

Diploma of **Engineering**, Macquarie University

Bachelor of **Engineering (Civil Engineering) (Honours)**, Macquarie University

Bachelor of **Engineering (Civil) (Honours)**, Edith Cowan University

Bachelor of **Engineering (Civil) (Honours)**, Charles Sturt University

Bachelor of **Design / Bachelor of Engineering (Honours)**, QUT

Bachelor of **Engineering (Mechatronic Engineering) (Honours)**, Macquarie University

**ENGINEERING + DESIGN + CONSTRUCTION + JOBS**

**Civil engineer**  
\$60K–\$119K

**Project engineer, Construction**  
\$62K–\$136K

**Design engineer**  
\$59K–\$117K

**Engineering project manager**  
\$76K–\$188K\*

\*Salaries sourced from payscale.com



# BUILDING THE FUTURE

Site engineers **Kayla Chaoui** and **Allen Glo** love the real-world impact their work has

#1

## CITY SHAPER

**KAYLA CHAOU**  
SITE ENGINEER



Kayla initially had her heart set on becoming an architect but a work experience placement at an architectural firm made her realise she wanted something STEM-based.

She soon decided upon civil engineering, and found out about Inspiring STEM+, a program offered by international engineering company Laing O'Rourke that aims to combat gender imbalance in the construction industry.

"I went from knowing barely anything about the construction industry and the role of engineers to knowing that construction was where I wanted to end up," Kayla says.

Now a site engineer with Laing O'Rourke, Kayla says a highlight of her role is the variety. "Some days I'm mainly in the office doing tasks on my laptop to prepare for upcoming works or attending meetings, while other days I'm out on site monitoring a concrete pour."

She also loves that her work contributes to "city-shaping infrastructure that will outlive you and get used by so many people." – Gemma Chilton

CONSTRUCTION WAS WHERE I WANTED TO END UP

BACHELOR OF ENGINEERING (CIVIL ENGINEERING WITH ARCHITECTURE), UNSW

UNDERGRADUATE SITE ENGINEER, LAING O'ROURKE

GRADUATE SITE ENGINEER, LAING O'ROURKE

SITE ENGINEER, LAING O'ROURKE

#2

## SKILLS COLLECTOR

**ALLEN GLO**  
GRADUATE SITE ENGINEER



ALL MY EXPERIENCES HELPED ME LAND EVERY ROLE

Allen's engineering career started at an unlikely place: McDonald's. He may not have been employed as an engineer, but Allen says his eight years at the fast food giant taught him vital skills like communication, teamwork and task management.

After school, Allen enrolled in a Bachelor of Engineering (Civil and Structural) at Charles Darwin University. While studying, he successfully applied for an internship at Halikos Group, a Northern Territory-based construction company. His one-month internship turned into a casual job, and eventually evolved into a full-time role.

Towards the end of his degree, Allen applied for a graduate site engineer role being advertised at Aussie construction giant, Lendlease – and landed his dream engineering gig.

His advice for aspiring engineers? Take every opportunity. "All my experiences helped me achieve every role that I got." – Gemma Chilton

BACHELOR OF ENGINEERING (CIVIL AND STRUCTURAL), CHARLES DARWIN UNIVERSITY

CREW MEMBER / SAFETY TEAM, MCDONALD'S

INTERN, HALIKOS GROUP

UNDERGRADUATE PROJECT COORDINATOR, HALIKOS GROUP

GRADUATE SITE ENGINEER, LENDLEASE



# BRIDGE BUILDER

REAL-WORLD LEARNING AND PAID PLACEMENTS AS A CHARLES STURT ENGINEERING STUDENT HELPED **ETHAN CARTER** FAST-TRACK HIS CAREER

For Ethan, choosing to study engineering was a no-brainer. "It's an extremely rewarding career, with an ability to contribute to and positively impact your community," he says.

Ethan began constructing his engineering career before he graduated thanks to paid industry placements as part of his degree at Charles Sturt University – first at oil and gas mining resources company Monadelphous Group, and later at engineering services firm GHD.

"The ability to work while studying has enabled me to accelerate not only my career but my financial position," Ethan says. "The industry considered my pre-graduation placement as relevant postgraduate experience, which sped up my progression."

Ethan is now thriving as a bridge engineer, where his role involves designing, constructing and maintaining new and existing structures to support transport-related projects. – *Charis Palmer*

**ETHAN CARTER**  
STRUCTURAL ENGINEER



## SCHOLARSHIP

Want to study engineering at Charles Sturt? Check out the \$20,000 Transgrid Civil Engineering Scholarship to help build your career!

Learn more: [csu.edu.au/engineering/transgrid-scholarship](https://csu.edu.au/engineering/transgrid-scholarship)

BACHELOR OF TECHNOLOGY (CIVIL) / MASTER OF ENGINEERING (CIVIL), CHARLES STURT UNIVERSITY

ENGINEERING INTERN, WESTERN PROJECT SERVICES

UNDERGRADUATE PROJECT ENGINEER, MONADELPHOUS GROUP

GRADUATE ENGINEERING TECHNOLOGIST, GHD

STRUCTURAL ENGINEER – BRIDGES, GHD



Charles Sturt University

## Get ahead of the curve with Charles Sturt Engineering

Want to unearth a future in engineering? Build a career that will improve communities with the university where 100 per cent of engineering grads get jobs – and earn a starting salary 35 per cent higher than engineering grads from any other university.\*

- Get paid while you study with industry cadetships.
- Experience real-world, project-based learning.
- Connect with industry and be taught by practising engineers.
- Choose from our range of engineering courses to find your perfect fit.



Best of all, you could score a Transgrid engineering scholarship worth \$20,000 – there are 25 on offer each year.



Learn more  
→ [csu.edu.au/engineering](https://csu.edu.au/engineering)

\*Quality Indicators from Learning and Teaching



# CALM YOUR FARM...

... and combine engineering with agriculture for an earth-shaping career

If you love science, problem-solving and the outdoors, then a career in engineering and agriculture could be the path for you!

Agricultural engineers design and develop new equipment and systems to make farming more efficient, sustainable and environmentally friendly. This could involve anything from creating advanced irrigation systems to developing drones that monitor crop health from the sky.

These engineers are helping to ensure we can feed a growing global population while protecting our planet.

And it isn't just about sitting behind a desk. You'll spend time working on the land, seeing the tangible impacts of your work like healthier crops and happier livestock. Plus, you'll use the latest tech, like UAVs, sensors and automated machinery. How cool is that? – *Charis Palmer*



## SKILLS TO GATHER

### Problem-solving

Come up with innovative solutions to practical problems.

### Creativity

Design new tools and systems that improve farming practices.

### Analytics

Analyse data to optimise processes and increase efficiency.

### Communication

Work with farmers, scientists and other engineers.

### Environmental awareness

Understand sustainable practices and their environmental impact.



## WHO'S HIRING?

Australia is a leader in innovative agricultural practices, and there are many exciting companies to work for. Here are just a handful:

### JOHN DEERE

Known for advanced farming equipment and technology.

### AGRIFUTURES AUSTRALIA

Focuses on agricultural innovation and development.

### ELDERS

Provides a range of services to support agricultural businesses.

### AGCO AUSTRALIA

Supplies agricultural machinery and precision farming technology.

## ENGINEERING + AGRICULTURE STUDY

Bachelor of Engineering (Agricultural Engineering) (Honours), University of Southern Queensland

Bachelor of Engineering (Chemical) (Honours), Edith Cowan University

Bachelor of Agricultural Science, Charles Sturt University

Bachelor of Engineering (Honours), Macquarie University

## ENGINEERING + AGRICULTURE JOBS

Agricultural engineer  
\$56K–\$84K

Chemical engineer  
\$60K–\$112K

Mechanical engineer  
\$60K–\$121K

Environmental engineer  
\$60K–\$141K\*

\*Salaries sourced from [payscale.com](https://www.payscale.com)



# PROCESS ENGINEER

BY SHAKING UP THE WAY WE MAKE THINGS, AHMED NAUFAL IS HELPING TO IMPROVE ALL OUR LIVES

As a process engineer, Ahmed has found himself in some awesome places, like the massive greenhouses at Sundrop Farms that produce tomatoes for Coles. All those buildings need electricity and Ahmed was in charge of the solar thermal plant responsible for powering 20 hectares of greenhouses.

Now, Ahmed is shaping the way we make activated carbon. This essential filter is used to purify liquids and gases for drinking water and air in public venting systems, as well as to refine sugar and recover gold.

To anyone considering entering the process engineering field, Ahmed says one of the most exciting aspects of the job is working with emerging technologies.

His favourite part of having a STEM career? Working with like-minded people, as well as "learning to observe and analyse everything technically to figure out how things work." – Amy Briggs



**AHMED NAUFAL**  
PROCESS ENGINEER

## Fun fact

If you spread out one teaspoon of activated charcoal, it would contain enough matter to cover an entire football field!

## WHAT TO STUDY

Solve real-world challenges with a Bachelor of Engineering (Honours) (Chemical) from the University of Adelaide. More information at: [bit.ly/studychemeng](http://bit.ly/studychemeng)

BACHELOR OF CHEMICAL AND PROCESS ENGINEERING, UNIVERSITY OF CANTERBURY

GRADUATE CHEMICAL AND PROCESS ENGINEER, SILVERFERN FARMS, NZ

ENERGY CONSULTANT, RENEWABLE ENERGY, MALDIVES

ENGINEERING SPECIALIST, SUNDROP FARMS, PORT AUGUSTA

PROCESS ENGINEER, BYGEN

## 5 ways to kickstart your career today!

### 1 CHOOSE THE RIGHT ELECTIVES

Be sure to check whether the qualification you're interested in has any prerequisites. You might also consider helpful subjects like engineering studies, maths, design and technology, biology and chemistry.

### 2 FIND ENGINEERING ROLE MODELS

This is an awesome way to find out about different engineering roles and how to land them. Find role models at [CareerswithSTEM.com/category/engineering/](http://CareerswithSTEM.com/category/engineering/)

### 3 LEARN ABOUT SPECIFIC CAREERS

Download one of our free engineering Job Kits. These mini mags dive deep into careers like renewable energy engineer, metaverse engineer, and electrical engineer. [CareerswithSTEM.com/product-category/stem-job-kit/](http://CareerswithSTEM.com/product-category/stem-job-kit/)

### 4 CONSIDER YOUR STUDY OPTIONS

Look up engineering degrees at [gooduniversitiesguide.com.au](http://gooduniversitiesguide.com.au) or explore VET engineering options at [bit.ly/STEM-VET](http://bit.ly/STEM-VET)

### 5 QUIZ YOURSELF

Can't decide on what area of engineering you should study? Scan the QR code for a handy quiz that will help you out!



NEXT STEPS

REFRACTION MEDIA

CAREERS WITHSTEM.COM

Careers with STEM: Engineering 2024 is a publication and trademark of Refraction Media. Copyright © 2024 Refraction Media, all rights reserved. No part of this publication may be reproduced in any manner or form without written permission. If you would like to reproduce anything from this magazine, email: [info@refractionmedia.com.au](mailto:info@refractionmedia.com.au).

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging.

This issue went to press on 12 July 2024.

Printed in Australia by IVE.

Cover images: Ricardo Seah/Lauren Trompp

Co-founder, CEO & Publisher: Karen Taylor-Brown

Partnerships Manager: Rachel Jones

Managing Editor: Charis Palmer

Deputy Editor: Louise Meers

Sub Editor: Amelia Caddy

Art Director: Katherine Power

Writers: Amy Briggs, Gemma Chilton, Danielle Lucas, Jaina McIntyre, Louise Meers, Cassie Steel

SUBSCRIBE AND ORDER COPIES: [CareerswithSTEM.com/subscribe](http://CareerswithSTEM.com/subscribe)

EDITORIAL & ADVERTISING ENQUIRIES: Email: [info@refractionmedia.com.au](mailto:info@refractionmedia.com.au)

POSTAL ADDRESS: PO Box 154, Oyster Bay, NSW 2225, Australia

CareerswithSTEM.com

ISSN 2209-1076



FLIP OVER FOR CAREERS IN NET ZERO!

