

CAREERS WITH STEMTM SCIENCE

DOUBLE
ISSUE
FLIP FOR
DIGITAL
RETAIL

Personality
quiz: Discover
your dream job
p12

Uni not for you?
Find new career
pathways
p14

ACCELERATOR
SCIENTIST

15
amazing
women in
nuclear
science
p10

CAREERSWITHSTEM.COM

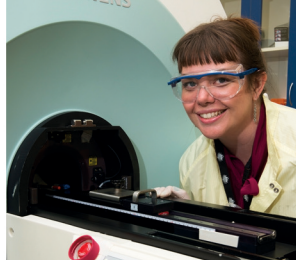
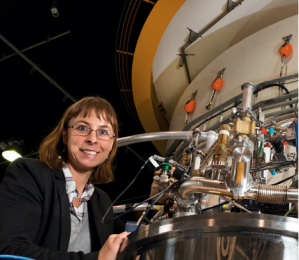
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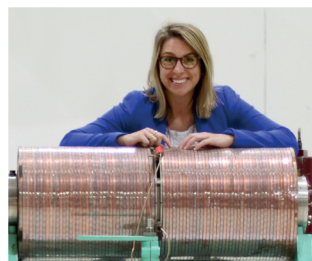
SOLVING CRIME + GLOBAL WARMING + FOOD & FARMING + RESOURCES



BE INSPIRED.



BECOME INSPIRING.



SHAPING OUR FUTURE

Build a bright future for yourself – and the world – with a science career

As part of a global community we are faced with considerable challenges, and the role of our scientists and engineers is key to delivering the solutions that will shape our future.

There are predictions that the next 10 years will deliver significant advancements in technology that will change what it's like to be human; we will need our scientists and engineers to steer us thoughtfully in the right direction.

Science will continue to contribute to substantial improvements in health and prosperity and better ways to preserve our precious environment for all the people on our planet.

It is a truly amazing time to be considering a career in STEM.

Until you see and experience science at work firsthand, it is difficult to grasp its tremendous capacity (and indeed, responsibility) to improve our world.

Take a moment to read about some of ANSTO's talented professionals, women who have used science and engineering as a springboard in their careers: an engineer now working in business development; an environmental scientist who analyses pollutants in the atmosphere; and an instrument scientist who uses nanotechnology for biomedical and agricultural applications.

Explore the profiles of young researchers who are working passionately to use STEM to solve problems across diverse disciplines and sectors.

Keep in mind that within science, technology, engineering and mathematics, there are a wide range of sub-disciplines to stimulate your interest. And new sub-disciplines are emerging all the time. There are career possibilities on the horizon that we can only imagine – perhaps you'll invent them.

As in any scientific endeavour, it is about seeing the possibilities, and asking the questions. A career in STEM can take you anywhere.

Think about the areas that intrigue you, excite you or mystify you – then, dive in and make every day count, your future (and perhaps that of our planet) is in your hands.

Penny Dobson, Deputy Chair, ANSTO Board

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IT IS A TRULY AMAZING TIME TO BE CONSIDERING A CAREER IN STEM

WHAT IS CAREERS WITH STEM?

The *Careers with STEM* magazines help students discover the careers of the future. Each year, we deliver four magazines across each of the STEM disciplines (Science, Technology, Engineering and Maths), plus special editions such as Cybersecurity and Economics. While 75% of future jobs will require STEM skills, just 16% of high-school graduates are enrolling in STEM degrees in Australia. Many of the careers that emerge will combine STEM skills with other areas. We call it **STEM + X**. Like Computer Science + Education = tech learning and Maths + Design = smarter buildings. To find your **STEM + X** and more, visit CareerswithSTEM.com

What's inside?

P6 Infographic: Where are all the jobs in STEM?

P8 Keeping science inclusive

P10 Up and atom! Meet 15 women in nuclear science

P12 Quiz: Which science should I study?

P14 Don't forget VET! Non-uni STEM pathways

P30 Study directory

P18



STEM + X = 😊

Looking for ways to combine science (STEM) with your passion (X)? Start here!

Science + ...

P16 Solving crime

P18 Global Warming

P22 Food & Farming

P26 Resources



P8



P22



THERE ARE ALREADY AMAZING WOMEN ACROSS ALL STEM INDUSTRIES WHO ARE JUST WAITING TO SUPPORT YOU AS YOU START YOUR CAREER IN STEM." SHAKILA FERNANDO, ANSTO GRADUATE

GET EVEN MORE CAREERS WITH STEM ONLINE! CAREERSWITHSTEM.COM

Find quizzes, news, STEM profiles and heaps more. Plus, you can sign up to receive Careers with STEM emails every week!

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youtube.com/c/careerswithstem





The world needs protecting.

 QUT Science

the university
for the real world 

Where are the jobs in STEM?

STEM graduates work across the economy in a wide variety of industries and occupations

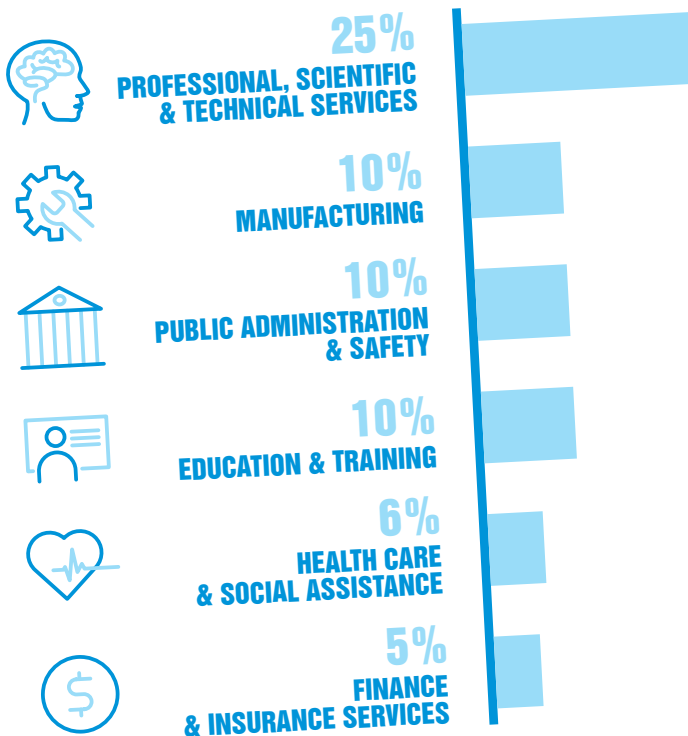
TOP FIVE STEM JOBS

OCCUPATION	JOBS	GROWTH
SOFTWARE PROGRAMMERS	121,300	21%
GENERAL PRACTITIONER & RMO	60,400	12%
CIVIL ENGINEERS	53,300	13.5%
ENVIRONMENTAL SCIENTISTS	25,300	11.3%
MEDICAL LABORATORY SCIENTISTS	24,200	6.3%

55% work as professionals
18% as managers

INDUSTRY SECTORS

TWO THIRDS OF STEM UNIVERSITY GRADUATES HAVE JOBS IN THESE INDUSTRIES



THERE ARE ABOUT **13 MILLION** PEOPLE IN THE AUSTRALIAN WORKFORCE



APPROXIMATELY **2.3 MILLION** ARE STEM EMPLOYEES



WORKING IN **108** DESIGNATED STEM OCCUPATIONS



32% ARE UNIVERSITY EDUCATED



68% HAVE VOCATIONAL EDUCATION + TRAINING (VET) QUALIFICATIONS



ONLY **30,000** ARE EMPLOYED AS LABORATORY RESEARCH SCIENTISTS



THE LAST 5 YEARS HAS SEEN **16.5% GROWTH** IN STEM EMPLOYMENT



GROWTH IN STEM EMPLOYMENT IS **160% HIGHER** THAN NON-STEM EMPLOYMENT



77% OF ALL STEM GRADUATES ARE EMPLOYED IN THE PRIVATE SECTOR



12% OF STEM GRADUATES ARE BUSINESS OWNERS



JOBS IN AGRICULTURE

GrainCorp
Employees: 6,500 employees
Annual Revenue: \$2.2 billion
Popular Degrees: B.Eng | B.Sc
Location: WA, QLD, NSW, VIC

JOBS IN HYDROGEN

2,800 new jobs in hydrogen export by 2030
National Hydrogen Strategy election promise \$100 million
Solar plants producing clean hydrogen for export

JOBS IN MARINE SCIENCE

The Australian Institute of Marine Science (AIMS)
Annual Budget: \$47 million
Staff: 244
53 Research Scientists
58 Research Support
12 Postdoctoral Fellows

JOBS IN DEFENCE

Defence Science & Technology (DST)
Budget: \$408 million
Employees: 2,300
Jobs throughout Australia
Predominantly scientists, engineers, IT specialists & technicians.

JOBS IN NUCLEAR SCIENCE

Australian Nuclear Science & Technology Organisation (ANSTO)
Annual Budget: \$355 million
Total staff: 1,261 - Predominantly scientists, engineers & nuclear experts. 3,800 researchers used ANSTO facilities in 2018

JOBS IN SPACE

New Jobs: 30,000 by 2030
Australian Space Agency: \$47.7 million
Space Infrastructure Fund: \$19.5 million
Space Discovery Centre: \$6 million

JOBS IN SNOW

Australian Antarctic Division
Annual Budget: \$252.9 million (2018-19)
Total staff: 200
70 Research scientists
60 Other research staff

JOBS IN RESEARCH

Commonwealth Scientific & Industrial Research Organisation (CSIRO)
Annual Budget: \$1,292 million
Total staff: 5,190
1,533 Research scientists
2,115 Research staff



For sources and more info head to
bit.ly/STEMjobsinfographic



Keeping science inclusive

Science has amazing stories to tell; it explains everything from the anatomy of our bodies to the chaos of the universe. Like history, it's not perfect, and can skip over communities, genders and individuals. Not many science textbooks mention that health pioneer Florence Nightingale was in love with a woman, or that Sally Ride, the first American woman in space and director of the California Space Institute, shared her life and work passions with her life partner Tam O'Shaughnessy.

In everything we do as humans, diversity of perspective is vital to help facilitate understanding – research has shown that diverse teams are more likely to make scientific breakthroughs – and there's a lot that we need to do to ensure equity of queer and sexual minority representation in science. For example Science Advances reported in 2018 that sexual minorities are less likely to persist in STEM fields after graduating – although mentorship and support from faculties can make a difference. – Heather Catchpole

BEE COOL



FROM AS EARLY AS HE CAN REMEMBER, FAELAN MOURMOURAKIS KNEW HE WANTED TO WORK WITH ANIMALS

Now a zoology researcher, Faelan says it feels unreal to be doing what he dreamed about as a kid. "I was about 12 when I first learned the word 'zoologist', and I thought 'yes, I want to be doing that,'" he says. Faelan studies how honeybees think and behave by conducting experiments where the bees have to make decisions based on different signals. As a result, he's found that honeybees are capable of really complex mental tasks. "I feel lucky to be part of a much bigger, important puzzle that is science," he says. "Even if your research is only a speck in the massive amounts of research being produced – it's still a very cool feeling."

Despite Faelan's passion for science, as a transgender scientist his path has not always been smooth – he experienced homophobia and transphobia during his undergraduate degree. "There were parts where I considered whether I should just drop out and leave," he says. But having a support group of other LGBTQ scientists made all the difference, and that's what encourages him to be an advocate for diversity in STEM today. "I know when I saw there were other LGBTQ scientists in my field it helped me feel a lot less lonely. If I can do that for younger people, especially trans scientists, then that's great." – Joanna Khan



VOLUNTEER AT ANIMAL SHELTERS AND ON ZOOLOGY RESEARCH PROJECTS

BACHELOR OF SCIENCE (ZOOLOGY), WESTERN SYDNEY UNIVERSITY

MASTERS OF SCIENCE (ZOOLOGY), MACQUARIE UNIVERSITY

Increase visibility

Here's our top 5 list to smash heteronormative STEM stereotypes!

1. 500 Queer Scientists visibility campaign 500queerscientists.com
2. @STEMforEquality scholarships bit.ly/STEMequityUS
3. Follow @LGBTSTEM on Twitter
4. Be inspired by the amazing iGEM team working with bacteria at University of Sydney, including team leader and science student Fahad Ali, founder of Muslims for Marriage Equality bit.ly/iGEM_FB
5. Queer Careers: STEM Out! is an event from Engineers Australia and Out for Australia bit.ly/QSTEMout

WORKING TOGETHER

JO LACKENBY WANTS TO SET THE STORY STRAIGHT ABOUT NUCLEAR SCIENCE



Myths and misconceptions abound when it comes to nuclear science – but engineer Jo Lackenby wants to change that. Jo is the regulatory and licensing officer at ANSTO's (Australian Nuclear Science and Technology Organisation) OPAL nuclear reactor, where she makes sure everyone is following the rules. Nuclear science is the study of the particles within an atom, and how they can be used in other areas of STEM. "We produce about 85% of Australia's nuclear medicine, which is used for diagnosing illnesses and for treatment," Jo explains. Nuclear medicine techniques are used in about a third of medical procedures, such as radiation in cancer treatment.

Jo says she has been interested in nuclear science since high school "maybe because it's slightly mysterious and unknown". And she wants to spark that curiosity in others. "My interest is in communicating nuclear science to encourage a diverse workforce, who can then also go out and communicate. Studies show diversity in any organisation leads to better outcomes, and I think anybody who wants to be in STEM should have access to it, irrespective of their background or identity." – Joanna Khan

BACHELOR OF ENGINEERING
(ENVIRONMENTAL ENGINEERING MAJOR)
(HONOURS), UNIVERSITY OF WOLLONGONG

OPAL REGULATORY AND
LICENSING OFFICER, ANSTO

PHD IN GEOTECHNICAL
ENGINEERING, UNIVERSITY
OF WOLLONGONG

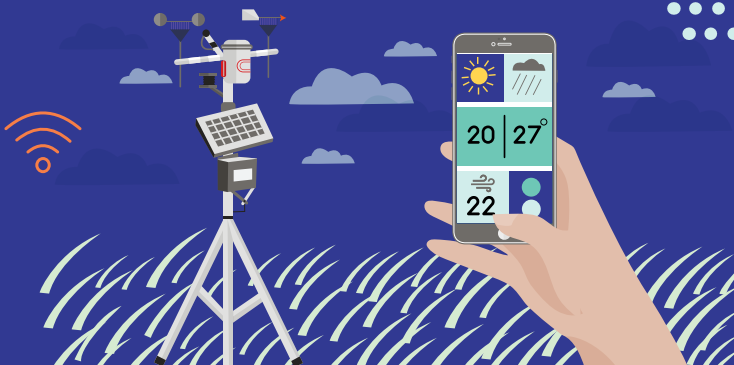
PRESIDENT OF WOMEN
IN NUCLEAR AUSTRALIA

CONSULTANT ENGINEER,
GEO-ENVIRONMENTAL
ENGINEERING

2019 SUPERSTAR
OF STEM, STA

THE GiST

Girls in STEM Toolkit



Science impacts almost everything we do, and scientists are working on the front line, solving real-world problems.

Read about everyday science professionals whose work forms an important part of our daily lives on The Girls in STEM Toolkit (The GiST).

From interesting articles, to events, activities and meet-ups, to a career quiz and examples of women doing great things in STEM, The GiST has something for those passionate about science, or just beginning to think about it.

Visit thegist.edu.au or check us out on Instagram, Facebook and Twitter.

Meet the A-Team

These 15 women are all working – and smashing stereotypes – at ANSTO

ANNA PARADOWSKA SENIOR RESEARCH SCIENTIST AND INDUSTRY ENGAGEMENT OFFICER

Job highlight: “Working with people who are not only bright but also driven and keen to make an impact through science and engineering. Being in a stimulating environment and helping our clients to find a solution to their problems.”

SUZANNE HOLLINS. HEAD OF RESEARCH

On diversity: “If we’re going to solve many of the world’s big science challenges, we need to bring together different perspectives to foster innovation. Better gender balance in STEM will ultimately lead to better solutions.”

ATUN ZAWADZKI RADIOCHEMIST

Words of wisdom: “There is so much to discover and to learn in science. Don’t miss out! You will be rewarded with an exciting career.”

HELEN MAYNARD-CASELY SENIOR INSTRUMENT SCIENTIST

On diversity: “Science is about trying to solve problems. If you just try and solve with one type of person, then you are probably not going to get the best solutions. We need all types of people and approaches.”

MADHURA MANOHAR ACCELERATOR SCIENTIST

Job low-down: “I use a particle accelerator to assess samples for research areas such as air pollution, energy storage, zoology and many other disciplines impacting health, the environment and innovation.”

MARIANNE MORTON CHIEF INFORMATION AND DIGITAL OFFICER

Job low-down: “I have a team of highly specialised people who ensure the infrastructure, applications and computing needs of ANSTO are met and maintained for the needs of the organisation today as well as continually planning for the needs of the organisation into the future.”

SHAKILA FERNANDO GRADUATE (CHEMIST + INNOVATION DEVELOPMENT)

Job highlight: “The fulfillment I feel when I know the work that I do has the potential to change lives and change the way we treat some cancers across the globe.”

KATIE SIZELAND RESEARCH PROGRAM MANAGER, HUMAN HEALTH

Job low-down: “I use light one million times brighter than the Sun travelling at close to the speed of light to look at the structure of collagen and explore medical materials such as collagen scaffolds for tissue engineering and regeneration.”

PENNY DOBSON
DEPUTY CHAIR AND
NON-EXECUTIVE DIRECTOR.
ANSTO BOARD

Words of wisdom: "Just do it! There are no magic answers for young women or men – you have to do the study and want to do it. You can make almost any career happen if you want it enough and are prepared to work enough."

KRISTEN PATCHETT
LEAD, STRATEGIC INTEGRATION

Job highlight: "I am surrounded by amazing people, whether it be a scientist looking at potential life-saving drug developments, to operators of Australia's only nuclear reactor or the CEO who is committed smashing STEM diversity stats through the roof."

PATRICIA GADD
INSTRUMENT SCIENTIST

Job low-down: "My day to day job involves looking at samples which can be tubes of mud, wood samples, prawns or even echidna quills. I look at these things to work out what they are made of using a cool instrument called an Itrax core scanner."

HAYAT CHAMTIE
SENIOR PROJECT ENGINEER

Job highlight: "I love being challenged with a good problem to solve. The various projects that I'm involved with in my job keep me stimulated and allow me to learn something new every day."

CASSANDRA CASEY
GENERAL MANAGER COMMUNICATIONS
AND COMMUNITY ENGAGEMENT

Words of wisdom: "The women I work with at ANSTO are smart, passionate and focused on making a contribution towards a more sustainable world. Look for a role where you can add the greatest value, and then lean in and make every day count."

ZHAOMING ZHANG
PRINCIPAL RESEARCH
SCIENTIST

Words of wisdom: "Pursue a career that you are interested in. There is absolutely no reason why women cannot have a fulfilling and successful career in STEM."

VANESSA PETERSON
SENIOR PRINCIPAL RESEARCH
AND NEUTRON SCATTERING
INSTRUMENT SCIENTIST

Job low-down: "I perform research, often in the form of experimental measurements, to understand the arrangement and motion of atoms that make up things. This understanding helps direct ways to improve the function of things, and make them perform better or do something new and useful. One of the things I study is lithium-ion batteries, with the aim of understanding how we can make them hold more charge and last longer."

Gender Equity
at ANSTO

ANSTO is one of Australia's biggest public research organisations. It has an award-winning plan in place over the next four years to increase gender equity, with a goal of 50:50 overall representation by 2030, and minimum 40% females and 40% males in leadership roles this year.

WHICH SCIENCE SHOULD I STUDY?

Love science but not sure which area to focus on?
Take our quiz to help choose your path

Choosing a science specialisation can be super difficult. We've simplified your choice with our science career quiz. Tell us a bit about yourself, and our career personality test will give you a starting point for your future career. But remember, where you start might not be where you end up and that's totally cool!

Q1

YOUR DREAM JOB IS...?

- A.** Working with people to improve health and medicine
- B.** Travelling and working in natural environments
- C.** Improving technology (e.g. super-fast jet planes)
- D.** In the open air (who needs an office!)

Q2

PICK A JOB YOU DON'T WANT

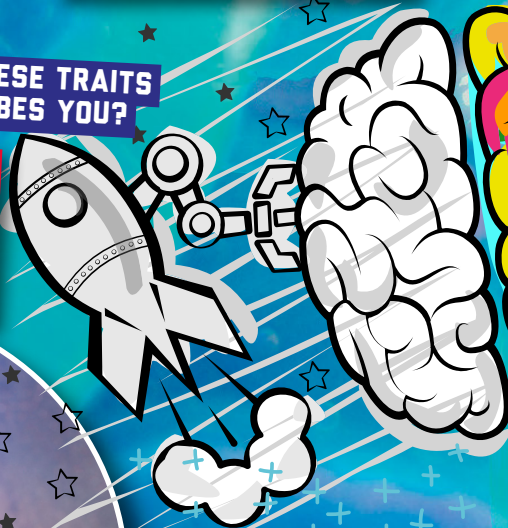
- A.** Working with patients. Medicine is cool but I'd prefer to stick with research
- B.** Working alone in a lab, I want to be out in the world!
- C.** Working on small-scale commercial projects, I want to look at big picture issues
- D.** Working alone. Boring



Q3

WHICH OF THESE TRAITS BEST DESCRIBES YOU?

- A.** Dynamic and creatively minded
- B.** Caring and empathetic
- C.** Logical and no-nonsense
- D.** Curious and fun-loving



Q4

MATHS - YAY OR NAY?

- A.** I'm good at it, but I'm not a massive fan
- B.** I love maths!
- C.** I can get by ok in maths but I don't particularly enjoy it
- D.** I never want to see a textbook again



Q5

YOUR FAVE AT-HOME SCIENCE ACTIVITY?

- A.** Mentos in a bottle of Coke. Kaboom!
- B.** Logging birds or insects into my citizen science app
- C.** Backyard star and planet gazing through my telescope
- D.** Collecting beautiful crystals (and smashing them open)

MOST ELABORATE DOPING PLOY



Q6

DOCO YOU'RE MOST LIKELY TO BINGE-WATCH...

- A.** Icarus
- B.** Life
- C.** Cosmos: A Spacetime Odyssey
- D.** Planet Earth



Q7

ULTIMATE LIFE GOAL?

- A. Create a new type of food
- B. Cure cancer
- C. Travel to Mars
- D. Combat climate change

RESULTS

Mostly As

Chemistry

They say Chemistry is the link between all the sciences because it has such valuable transferable skills. You'll learn about the nature of substances, how they behave, how they change or react to create new substances; whether that's cosmetics, medicines, or nanoparticles!

Mostly Bs

Biology

Consider biology if you're interested in all things living; from human bodies to bacteria! You could be working with animals as a zoologist, with the natural environment as an environmental scientist, or as an engineer improving medical technologies.

Mostly Cs

Physics

Before you jump to conclusions, this does not mean you're destined to be a physicist. Whether you're aspiring to be the next Einstein or not, studying physics gives you the toolkit to understanding and solving problems in a way that is useful to a whole range of careers.

Mostly Ds

Earth & Environmental Science

Whether you want to understand the history of life on Earth, create sustainable new resources, or understand past and future climate change, there's a bunch of great careers in geology, climate science and forestry to name a few. The best part? Your open air office.



Check out our list of every single science career we can think of here: bit.ly/sciencecareerslist

We're unlearning the reef to predict its future

By utilising core drilling technology and innovative 3D mapping approaches, our researchers are examining the history and effects of climate change on the Great Barrier Reef.

Find out how we're unlearning the world's greatest challenges.
sydney.edu.au/our-research



THE UNIVERSITY OF
SYDNEY

Leadership for good starts here

Don't forget VET!

Uni not for you? Consider these alternative pathways to STEM

University isn't for everyone. Fortunately, there are heaps of opportunities to study STEM that don't involve a degree. We're talking about vocational education and training – otherwise known as VET.

VET qualifications are designed in consultation with industry and courses tend to be more hands-on than university degrees, so you get a lot of practice learning the skills required before entering the workforce.

Fast-track your career

While bachelor degrees are three to four years long, VET qualifications can take as little as six months to two years, depending on the course you do. That means you can be qualified and work-ready faster, or if you're not sure what you want to do, you can try it out over a shorter period. Plus, with VET you can build on your qualifications as you go. And, in some cases, earn recognition of prior learning if you do decide on uni... #winning!

What STEM areas can you study within VET?

Engineering is by far the most popular choice. You won't become a qualified engineer – for that you need a degree

– but you might find yourself working as an engineering technician or a CAD drafter.

If you like maths you can help start your career as a bookkeeper, accountant or auditor. Science boffins can study laboratory technology and if tech is your thing, there are IT courses in everything from networking and software development to game design and digital media.

Whatever your career plans, a VET qualification could be a valuable building block in getting you where you want to go. It's good to know your options, so while you're exploring courses don't forget VET! – *Chloe Walker*

5 STEM pathways in VET

1. Health

Study: Certificate III in Pathology Collection

Job: Pathology assistants work for medical labs performing a range of tasks including extracting, collecting and labelling patient samples.

Pay: \$41K–\$57K

2. Tech

Study: Advanced Diploma of Cyber Security

Job: Cybersecurity professionals protect digital systems, networks and programs from attacks.

Pay: \$59K–\$104K

3. Science

Study: Diploma of Laboratory Technology

Job: Lab assistants help with operating and maintaining lab tools and equipment, data recording, preparing experiments and more.

Pay: \$39K–\$57K

4. Engineering

Study: Diploma of Electronics and Communications Engineering

Job: This course could land you a job as an engineering technician, and could also go towards an engineering degree if you want to further your study and qualifications.

Pay: \$47K–\$105k

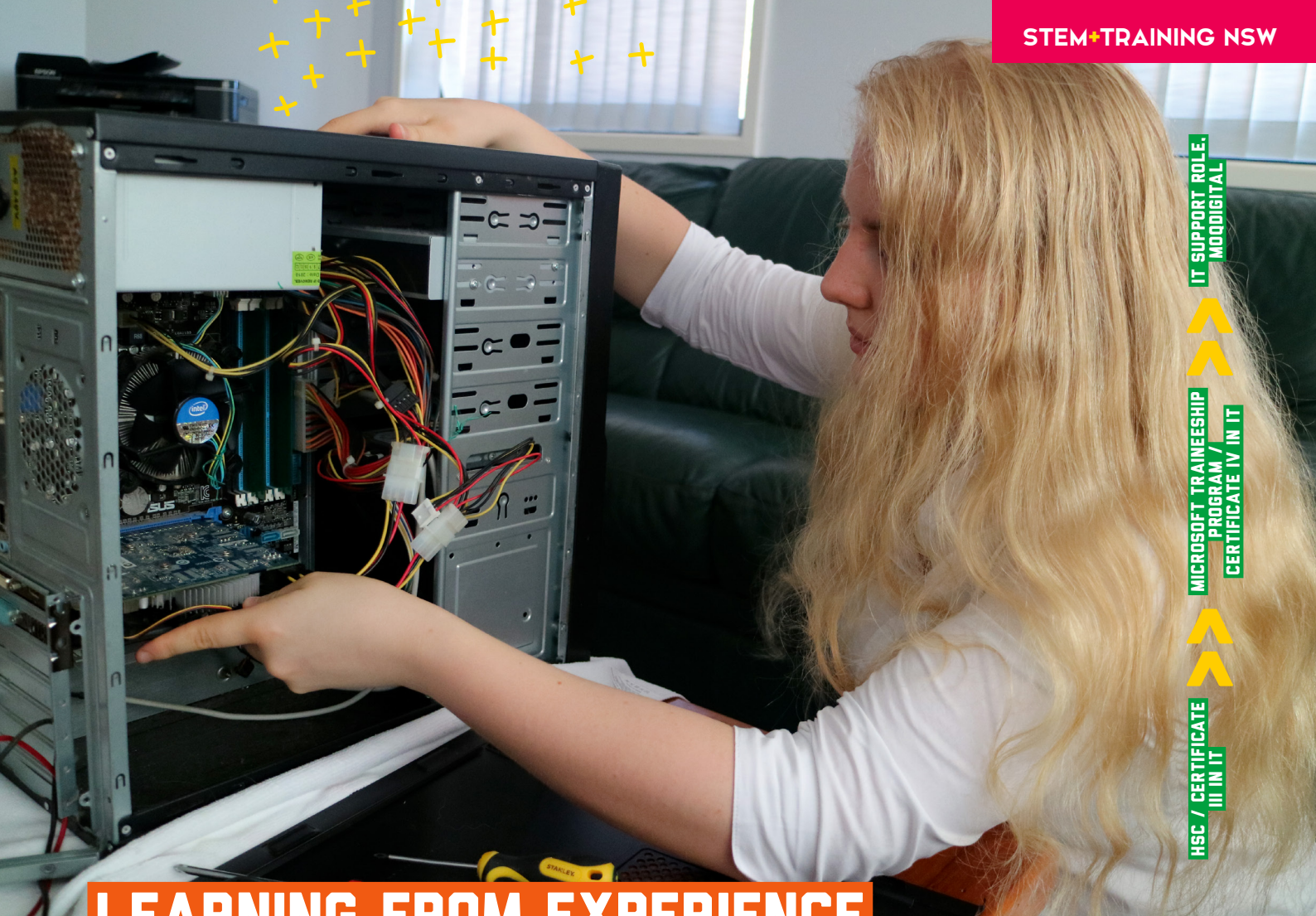
5. Finance

Study: Certificate IV in Financial Services

Job: Work as an accounts officer or bookkeeper, or use this as a stepping stone to other jobs or qualifications in the financial services sector.

Pay: \$26K–\$56K*



IT SUPPORT ROLE.
MOQDIGITALMICROSOFT TRAINEESHIP
PROGRAM /
CERTIFICATE IV IN ITHSC / CERTIFICATE
III IN IT

LEARNING FROM EXPERIENCE

NOT EVERY STEM CAREER NEEDS TO START WITH A DEGREE – **ELIZA GREENWOOD** GOT HER FIRST QUALIFICATION WHILE SHE WAS STILL IN HIGH SCHOOL

Eliza Greenwood grew up tinkering with computers, but it wasn't until late in high school that she realised she could turn her hobby into a career.

Growing up, Eliza's dad – who also works in IT – taught her how to use operating systems like Linux and Windows, and as a teenager, she would build Minecraft servers with her friends. Then, in Year 11, Eliza completed a Certificate III in IT as part of her HSC. The work experience she completed as part of the Certificate opened her eyes to career possibilities she hadn't ever thought about before.

"That's when it clicked and I thought, I want a career in this," she says. During work experience at a local IT company, Eliza did a range of tasks such as installing operating systems, troubleshooting and general maintenance. "It was basic IT stuff, but it was interesting."

ON-THE-JOB TRAINING

Towards the end of the HSC Eliza started thinking about studying the Certificate IV in IT to build on what she had already learned. Then she found out about the Microsoft Traineeship Program, which pairs aspiring IT professionals with Microsoft partner businesses for on-the-job training while earning a Certificate IV. "I didn't think I'd actually get it, but you never know if you don't try," says Eliza.

The program is highly competitive, with 4000 applicants competing for just over 80 traineeships at 40 companies. Eliza went through a series of interviews before

ending with an in-person interview with her host employer, MOQdigital. She made the cut and started working with MOQ's Managed Services team on the support desk in February last year while spending one day a week studying at TAFE.

As an outgoing person, the thing Eliza loves most about her job is the customer contact. "Not only do you get to solve problems, but you also get to build a relationship with the customers," she says. "It's not just about fixing their computers."

In between taking helpdesk calls, Eliza has also completed 12 extra certifications through Microsoft and CISCO – another perk of the job. Once her traineeship is complete she is thinking about going back to full-time study to complete a Diploma or Advanced Diploma and specialising in networking.

One thing is for sure – taking a chance has paid off. "I'm glad I took the opportunity. There's a lot of learning in work experience." – *Chloe Walker*



ELIZA GREENWOOD
IT SUPPORT ROLE.
MOQDIGITAL

NOT ONLY DO YOU GET TO SOLVE PROBLEMS. BUT YOU ALSO GET TO BUILD A RELATIONSHIP WITH THE CUSTOMERS."

To get there: bit.ly/VETNSW

Crime stoppers

Discover what a career in forensic science is really all about

Television shows like *CSI* and *Bones* feature super-scientists who can do it all, but Dr Kari Pitts says they are hard to find in the real world. Kari's knowledge in glass, gunshot residue, paints, arson accelerants, soils and minerals makes her one of the most experienced forensic scientists in the WA ChemCentre physical evidence lab – but she still falls short of that Hollywood stereotype.

Kari says some popular shows were relatively accurate in terms of techniques, but took artistic license with timeframes and what results reveal about the crime. "I used to joke they could take a sample of paint and tell that the person was left-handed," she says.

Forensic science in the real world

Kari works in a government chemical laboratory, but forensic scientists are employed in industries including toxicology, digital forensics, drug detection, food and pharmaceuticals, and accident investigation.

At school, Kari excelled in chemistry, but didn't want to be locked into repetitive work. This led her to a degree in analytical and forensic chemistry at Curtin University in Western Australia.

"I liked the theory and the chemistry, but also using the theory to help the community and the justice system," she says.

Kari joined ChemCentre 13 years ago, after a Masters and PhD in forensic science. Several years later, she took the opportunity to expand her skills to soil and mineral evidence – this involved internal mentoring and a Master of Philosophy in Applied Geology.

Match your electives

Biology • Chemistry
Physics • Forensic Science •
Mathematical Methods
• Computer Science



Dr Kari Pitts, loves solving crimes IRL, not on the TV

As a Senior Chemist and Mineralogist, Kari's job still delivers the variety she loves. "Most of the time, it's taking the evidence, analysing it using a large number of scientific instruments, and then reporting those results and interpreting them," she says.

She is sometimes called on to explain her results and their meaning to the jury or judge in criminal trials. Kari and her fellow chemists also get out of the lab a couple of times a year for training with the police bomb squad or arson branch. And, as a senior analyst, Kari travels to international conferences and meetings as well.

Kari recommends that aspiring forensic scientists learn the base science first – whether that be chemistry, biology, physics or computer science. "Forensics is the icing on the top – it's not the stuff you're going to be doing day-to-day," she says.

– Nadine Cranenburgh

START YOUR CAREER HERE

SCIENCE+SOLVING CRIME STUDY

Curtin University, Bachelor of Science:
bit.ly/BachSciCurtin

Deakin University, Bachelor of Forensic Science:
bit.ly/ForensicSciDeakin

University of Technology Sydney, Bachelor of Forensic Science:
bit.ly/ForensicUTS

SCIENCE+SOLVING CRIME JOBS

Chemist: \$50K–\$85K

Toxicologist: \$39K–\$102K

Forensic engineer: \$63K–\$80K

Information security analyst: \$59K–\$133K

*Salaries according to [payscale.com](https://www.payscale.com)

SENIOR CHEMIST AND MINERALOGIST, FORENSIC SCIENCE LABORATORY, CHEMCENTRE

MPHIL (APPLIED GEOLOGY), CURTIN UNIVERSITY

MSC AND PHD (FORENSIC SCIENCE), UWA

BACHELOR OF SCIENCE (HONS) FORENSIC AND ANALYTICAL CHEMISTRY, CURTIN UNIVERSITY

SOLVING MYSTERIES

PEOPLE IN CRIME SHOWS CAN JUST LOOK AT A BODY AND TELL THE TIME OF DEATH. BUT IN REAL LIFE IT'S NOT SO EASY...

Samara Garrett-Rickman
is doing a PhD in forensic biology

Samara Garrett-Rickman, a PhD candidate at the University of Technology Sydney (UTS) studies how human bodies decompose – a field called forensic taphonomy – so she gets there's more to it. "Temperature, weather, animal and insect interference are just some of the factors," says Samara.

In order to investigate, human donor bodies are placed outside in the natural environment within the grounds of the research centre and allowed to break down to skeletonisation. Samara studies how DNA changes over time, improving methods for telling the time of death.

There are currently 2500 thousand missing persons in Australia – along with 500 unidentified human remains – so breakthroughs in forensic taphonomy could go a long way to help match remains with missing persons and give families closure. It's important work.

Samara initially started studying medicine but was drawn to the puzzle-solving nature of forensics. She transferred to a Bachelor of Forensic Biology (Honours) at UTS before starting her PhD.

"Forensics is cool. When I found out you can develop fingerprints off paper that has been in a swimming pool and still get identification information, my mind was blown," Samara says. – Chereese Sonkkila

To get there: bit.ly/UTSScience

BACHELOR OF HEALTH SCIENCE,
THE UNIVERSITY OF AUCKLAND



BACHELOR OF SCIENCE
(FLEXIBLE MAJOR), UTS



BACHELOR OF FORENSIC
BIOLOGY IN BIOMEDICAL
SCIENCE (HONOURS), UTS



PHD IN FORENSIC
TAPHONOMY, UTS

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Working for change

An increasing number of young people are taking to the streets to protest for climate action. Why not fight global warming as a career, too?

Climate change is undoubtedly the biggest issue of our time, and it's one that many young people are passionate about solving. Climate change refers to the rising temperatures resulting from increasing greenhouse gas emissions largely caused by burning fossil fuels such as coal and oil for energy. Essentially, the world is getting hotter and weather patterns are becoming more extreme as a result.

The problem is big, but so are the opportunities to make a difference. STEM careers are among the fastest-growing in Australia, which means there are plenty of ways to help everyone from big government departments to small organisations reduce their carbon footprint and increase their sustainability.

This might involve becoming a data scientist and advising banks on investing in clean energy, or working as an agricultural scientist, actively working to create more sustainable farming methods that use less water and increase nutrients in soil.

Ancient climate, modern solutions

To see what climate change may do in the future, Dr Amy Prendergast looks to the past for answers. As a palaeoclimate scientist, who works at the University of Melbourne, Amy looks at what the Earth's climate was like thousands (even millions) of years ago.

"Climate fluctuation can occur over millennium or tens of thousands of years, so you need to understand

DR AMY PRENDERGAST PALAEOCLIMATE SCIENTIST

how our climate change compares to what happened in the past," she says.

Amy studied a breadth of subjects at school, including history, which she says gave her the most flexibility to study science at university and find her passion.

"It's a good idea to keep your high school studies quite broad. When I went into uni, I didn't realise I was going to become a scientist and I wouldn't have been able to do that unless I kept my study options open," she says. – Alana Schetzer

START YOUR CAREER HERE

SCIENCE+GLOBAL WARMING STUDY

University of Sydney: Bachelor of Science / Bachelor of Advanced Studies (Agriculture)
bit.ly/USydAgriculture

University of Melbourne: Bachelor of Science (Environmental Science) bit.ly/UniMelbEnviroSci

The University of Newcastle: Bachelor of Coastal and Marine Science: bit.ly/UONMarineSci

Queensland University of Technology: Bachelor of Science (Environmental Science) bit.ly/QUTEnviroSci

SCIENCE+GLOBAL WARMING JOBS

Agronomist: \$38K-\$83K
Environmental scientist: \$39K-\$77K
Marine Biologist: \$33K-\$97K
Meteorologist: \$34K-\$101K

Match your electives

- > Mathematics
- > Environmental Science or Earth Science
- > Agricultural Practices/Science
- > Plant Production Systems

MCKENZIE FELLOW,
UNIVERSITY OF MELBOURNE

PHD, UNIVERSITY
OF CAMBRIDGE

BACHELOR OF SCIENCE (HONOURS),
UNIVERSITY OF MELBOURNE

BACHELOR OF ARTS,
UNIVERSITY OF MELBOURNE



5

STEM CAREERS TO FIGHT GLOBAL WARMING

WANT TO SAVE THE WORLD? CHECK OUT OUR TOP 5 PLANET-SAVING CAREERS

#1

READ THE WEATHER

Jobs: Meteorologist or climate scientist

We can't fight climate change without understanding how climate and weather systems work, so meteorology or climate science would be a fab career choice for a climate change activist. Australia's Bureau of Meteorology is one of the country's top STEM employers, and offers a Graduate Meteorologist Program, for peeps with an undergraduate or postgraduate degree majoring in physics or maths.



#2

FEED THE WORLD

Job: Agricultural scientist, agritech entrepreneur, geneticist

Agriculture is one of the world's biggest greenhouse gas emitters, but with a growing global population – and many people going hungry – the need to come up with innovative solutions to improve sustainability and efficiency in farming is super urgent. The world of farming offers STEM career opportunities in everything from genetics to plant biology and cutting-edge agritech.



#3

LOOK INTO THE PAST

Job: Palaeoclimatologist, palaeo-environmental scientist

Climate change is impacting us now, but looking into the distant past could be a solution. Palaeoclimatologists like Amy Prendergast look at climate over time to help predict the effects of climate change in the future.



#4

INVENT THE SOLUTION!

Job: Tech entrepreneur

It's the entrepreneur era: as tech evolves at breakneck pace, opportunities to innovate and disrupt with cool new ideas are everywhere. Solving climate change will require smart ideas from smart, passionate people. Keen on taking the entrepreneurial route? Stick with computer science, follow your passion and find mentors!



#5

GREEN POWER GURU

Job: Renewable energy engineer

The development and use of alternative energy sources to fossil fuels will be so important to combat dangerous climate change and decoupling economic growth from carbon emissions. Unis like the Australian National University and UNSW Sydney offer engineering degrees majoring in renewable energy or specifically photovoltaics and solar energy. – Gemma Chilton

Algae has the answers

QUT PhD candidate **Mardi McNeil** studies a type of algae that can reveal insights into the past, present and future of the reef

When Mardi McNeil decided to embark on a career change, she was sure about one thing: “I wanted a job that was interesting and fun, and I didn’t want to be stuck behind a desk all day!”

A passionate scuba diver, Mardi’s dream job involved lots of fieldwork out at sea, so studying a Bachelor of Applied Science with a major in environmental science was the perfect fit. Afterwards she “wasn’t ready to finish studying”, so she enrolled in an Honours year, followed by a PhD.

Mardi’s research is on a particular type of green macroalgae, Halimeda. She’s part of a team at Queensland University of Technology (QUT) carrying out the first ever assessment of how Halimeda affects the marine ecosystem in the Great Barrier Reef. There’s been heaps of research into how coral reefs affect the flow of carbon and nutrients like nitrogen in the ocean, but Mardi says, “that’s only part of the story”. There’s still a lot that can be learnt from algae.

WHAT THE WATER TELLS US

Mardi says that to model the modern reef environment, we need to understand how carbon and nutrients are stored and released and how algae contributes to this complex cycle.

The algae not only illuminates the present and future, but also the ‘geological past’. So, what does algae and living organisms, have to do with geology? “On the outside,



SCIENCE HELPS YOU UNDERSTAND HOW THE WORLD WORKS AND TEACHES CRITICAL THINKING

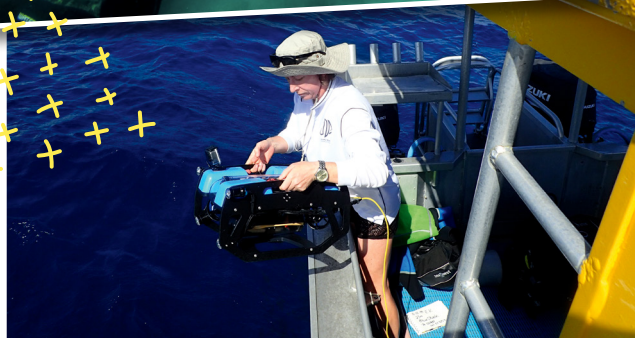
Halimeda is fleshy and green, but it has a hard skeleton made of limestone (a mineral), and this skeleton is preserved in the fossil record,” Mardi explains. That means researchers can access info about the past – like ocean temperatures and pH levels.

UNDER THE SEA

One of the biggest challenges of studying Halimeda is that it’s typically found at depths of 30 metres – and unfortunately scuba diving for samples is too risky! This means that Mardi and the team use a range of devices to collect samples, from autonomous underwater vehicles (think swimming drones) to remotely operated vehicles.

Mardi has spent the last eight years at QUT and says it’s a great place to study. She also fully admits to being biased towards science. “I think everyone should study it because science helps you understand how the world works and teaches critical thinking,” she says. – Larissa Fedunik

Mardi’s office is pretty spectacular



BUSINESS OWNER IN WHOLESALE TRADE



BACHELOR OF APPLIED SCIENCE (ENVIRONMENTAL SCIENCE / GEOSCIENCE), QUT



SUMMER RESEARCH INTERSHIP (MARINE SCIENCE), QUT + UNIVERSITY OF SYDNEY

BACHELOR OF SCIENCE (HONOURS), QUT



PHD (MARINE GEOSCIENCE), QUT

To get there: bit.ly/QUTBachSciFaculty

HEALING OUR REEFS

**PROFESSOR BILL LEGGAT IS ON A MISSION TO UNDERSTAND
- AND REVERSE - DAMAGE TO CORAL REEFS**

Bill Leggat spent many happy childhood trips visiting Coffs Harbour on the NSW mid-north coast, snorkelling and marvelling at the marine animals. "It made me fall in love with our oceans, which was what inspired me to study marine biology," says Bill, who's now an Associate Professor at the University of Newcastle.

During his uni studies, Bill decided to gain extra skills to really stand out in his huge cohort, so he began to explore biochemistry and molecular biology. This meant examining how marine systems work, from the tiniest cells to the whole ecosystem. "It's about linking those systems," says Bill. He studied giant clams and coral during his Honours year and PhD and now he's leading research into the impacts of global warming on reefs.

Recently, Bill and a team of Aussie researchers found that marine heatwaves pose a much greater threat to corals than previously thought. As well as coral bleaching, the heatwaves cause bioerosion of coral skeletons, which results in mass coral mortality. "It's a huge challenge to see the ecosystems that I love become more and more degraded," he says.

Bill's major goal for his team's research is to heal our reefs. "We want to help make decisions to allow corals to overcome anthropogenic [human-caused] stresses and see how we can restore impacted sites." – Larissa Fedunik

**BACHELOR OF SCIENCE (HONOURS)
(MARINE BIOLOGY),
JAMES COOK UNIVERSITY**



**PHD (MARINE BIOLOGY),
JAMES COOK UNIVERSITY**



**POSTDOCTORAL FELLOW,
UNIVERSITY OF QUEENSLAND**

**LECTURER, JAMES COOK
UNIVERSITY**



**ASSOCIATE PROFESSOR,
JAMES COOK UNIVERSITY**



**ASSOCIATE PROFESSOR,
ENVIRONMENTAL AND LIFE SCIENCES,
UNIVERSITY OF NEWCASTLE**



To get there: bit.ly/UONundergrad

BACHELOR OF COASTAL AND MARINE SCIENCE



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

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[NEWCASTLE.EDU.AU/UNDERGRADUATE](https://newcastle.edu.au/undergraduate)





Careers with bite

Science + food and farming on the career menu? The industry is hungry for STEM grads

People have always needed to eat, but with ever-evolving consumer behaviour, new tech developments and modern challenges like food security to face, the food and farming industry has been anything but static. Here, we look at the impact of AgTech and modern production practices on traditional careers in health, nutrition, production, farming and research.

Old Macdonald had a smart farm

Forget the tractor-driving flannel-wearing stereotype – next-gen farmers are harvesting data and rocking wearable tech! Thanks to satellite geo-positioning systems creating opportunities for farmers to engage in quality control off-site, agricultural gigs are no longer only land-bound and involve a host of new – and exciting – tech developments.

What's new? Monitoring animals with fitness trackers, using apps like CSIRO's soilmapp to store and share data, automated milking – and feeding – and using genomic tools to evaluate the genetic code of crops! With Aussie growers producing almost 93 percent of Australia's daily domestic food supply, anything that increases productivity is key.

What skills are needed? Solid smarts in app and software development, Artificial Intelligence (AI), data science and engineering!

**soil
mapp**

Company watch!

Natural Evolution Foods

This Aussie company is the first in the world to commercially produce flour from green bananas using cutting-edge tech. Packed with natural-resistant starch, the gluten and sugar-free flour can improve gut health and lower cholesterol. The company sources the bananas from local, regional suppliers who can gain income from excess product. Win, win!

Match your electives

- > Biology
- > Food Science & Technology
- > Agricultural Practices/Science
- > Plant Production Systems

START YOUR CAREER HERE

CS+FOOD+FARMING STUDY

Bachelor of Food Science and Human Nutrition,
University of Newcastle
bit.ly/FoodSciUoN

Bachelor of Science and Bachelor of Advanced
Studies (Agriculture), University of Sydney
bit.ly/USydAgriculture

Bachelor of Applied Science (Agriculture and Business),
University of Tasmania
bit.ly/AgSciUTAS

CS+FOOD+FARMING JOBS

Agronomist:
\$49K–\$84K

Dietitian or Nutritionist:
\$43K–\$78K

Farm Manager:
\$45K–A\$86K

Food technologist:
\$49K–\$93K*

*Source: salaries according to payscale.com

Food security = job security

One of the biggest challenges facing the global food and farming industry is food security – maintaining adequate access to food and water when up against climate change, changing world markets, population growth and finite resources. And with Australia positioned to play an increasing role in driving industry innovation, it's estimated we'll need 2000 agriculture grads each year to meet demand.

What's new? Innovation in weed and drought suppression, pollinator decline and sustainable development, along with practical adaptation strategies – like GM crops and lab-grown meat – to ensure the viability of resources in threatened communities.

What skills are needed? Engineers with backgrounds in health and agriculture have become increasingly sought after in developing nations and disaster-relief teams.



Food science 2.0

Healthy eating used to mean stocking up on fresh fruit and veg but thanks to innovation in food processing, supermarkets are now packed with packaged products boasting equally powerful health benefits. Food scientists are maximising nutritional intake, upping a products shelf life and meeting increasing demand for better-for-you foods. And with Australia ranked sixth in the global food security index for excellence in food knowledge, global consumers are eating it up.

What's new? Servicing customer-led dietary requirements with clean, green and ground-breaking food innovation! Companies like The Mighty Society are blowing up the plant-based dairy market with their ground-breaking 'mylk' product made from split peas.

What skills are needed? Strong science smarts – think: microbiology, biochemistry and chemistry – along with an advanced understanding of maths and nutrition.

KARTHIK GOPI
PHD RESEARCHER.
ANSTO



BACHELOR ENVIRONMENTAL MANAGEMENT, UNSW

HUMANS OF FOOD TECH

MEET THE FACES BEHIND STEM'S FOOD AND FARMING CAREERS

“In the past few years there have been growing concerns over food security, and now the source and origin of food is important too. Consumers are interested in where their food is coming from, whether it has been produced in a safe environment and prepared sustainably. Several industries are investing in technologies to help prove the origins of their produce.”

“I’m currently doing a PhD on seafood traceability, looking at determining both the source and origin of seafood distributed around Australia. With the help of industry partners, I visit different sites around NSW collecting samples, before preparing them for analysis – cleaning, drying and grinding them – in a lab. Analyses gives us lots of data to play with and then it’s up to us to decipher what it all means!”

BACHELOR SEAFOOD TRACEABILITY (HONS), ANSTO (WITH UNSW AND MACQUARIE UNIVERSITY)

PHD IN SEAFOOD TRACEABILITY, ANSTO (WITH UNSW, MACQUARIE UNIVERSITY, THE NATIONAL MEASUREMENT INSTITUTE AND INDUSTRY PARTNERS)



JENNIE BRAND-MILLER
PROFESSOR OF HUMAN NUTRITION,
UNIVERSITY OF SYDNEY

"I do lots of different types of studies under the umbrella of nutrition! We [The Charles Perkins Centre] do acute studies where we feed people different foods and determine their blood glucose, insulin and hormone responses. Along with intervention studies where we randomise volunteers to one of two diets – like, GI versus conventional.

"Recently we completed a three-year study in over 2,300 people who had prediabetes to see which diet was the most effective at preventing type 2 diabetes. The results were amazing, but I can't tell you about them... yet!"

**BACHELOR OF SCIENCE (HONS)
IN FOOD SCIENCE AND TECHNOLOGY, UNSW**

PHD, UNSW

**PROFESSOR OF HUMAN NUTRITION,
UNIVERSITY OF SYDNEY AND
CHARLES PERKINS CENTRE**



MAX CORRAL
MOLECULAR BIOLOGIST, CSIRO

"My research looks at novel and greener technologies to tackle agricultural issues regarding pests – like insects – and diseases – such as fungi that attack crops! I mostly work in the lab, but do a little bit of bioinformatics for data analysis. At the moment I'm growing fungi in plates and treating them with specific molecules to see if it decreases growth.

"Eventually I'd love to contribute to a technology that farmers could use that would be both safe to the environment and beneficial to organisms." – Cassie Steel

**BACHELOR OF BIOLOGY AND BIOCHEMISTRY,
UNIVERSITY OF ORLEANS**

**MASTERS IN PLANT
BIOCHEMISTRY, UNIVERSITY
OF OTAGO**

**PHD IN MOLECULAR BIOLOGY
AND BIOCHEMISTRY, UNIVERSITY
OF WESTERN AUSTRALIA**

HOW TO COOK UP A JOB IN FOOD SCIENCE

SERVES 1

STUDY INGREDIENTS:

CHEMISTRY
BIOLOGY
BIOCHEMISTRY
NUTRITION SCIENCE
MATHS
ENGINEERING

**AND THE METHOD? AS A START,
LOOK INTO COURSES LIKE THESE:**

**1. BACHELOR OF SCIENCE
BACHELOR OF ADVANCED STUDIES
(AGRICULTURE),
THE UNIVERSITY OF SYDNEY**

**2. BACHELOR OF FOOD
TECHNOLOGY (HONOURS),
THE UNIVERSITY OF QUEENSLAND**

**3. BACHELOR OF AGRICULTURE,
UNIVERSITY OF NEW ENGLAND**

**4. VET COURSES – ANIMAL TECH,
DAIRY PRODUCTION,
HORTICULTURE,
IRRIGATION, SEAFOOD
PROCESSING, VITICULTURE
AND SO MANY MORE!**

FOOD (CAREERS) PYRAMID

A list of job titles to search for a healthy, balanced food and farming career.

FOOD SECURITY

FOODTECH

AGTECH

Biosecurity officer
Sustainable food analyst
Food processing engineer
Food scientist
Food engineer

Food technologist
Food microbiologist
Food product developer
Food engineer • Packaging technologist
Sensory scientist • Nutritionist

Biomaterials production manager
Energy farmer
Geoengineer • Insect farmer
Water resource scientist • Soil scientist
Data scientist • Agricultural engineer
Crop scientist • Genetisist
Agronomist

Defending the good guys

Katie Tooley is researching how good bacteria in the gut can improve cognition for our defence force

Did you know there's a war going on right now, inside your gut? Well kind of – armies of bacteria are fighting it out, trying to colonise your intestines. It's called your gut microbiome, and it's the subject of a lot of emerging health science – including for our own army (the human one).

Katie Tooley is one of the scientists at the forefront of this relatively young field of research. She's studying how the gut microbiome is linked to and can influence cognitive processes such as memory. She works for Defence Science and Technology (DST), which is part of Australia's Department of Defence and is Australia's second largest government-funded science organisation.

Katie says she always knew she wanted to work in something health-related, but wasn't sure what path to take. Coming out of high school, she says she "had a very narrow idea of what working in a lab looked like".

"I'm quite a people-person and the idea of being stuck in a lab with test tubes and cell cultures didn't appeal to me."

LOVING LAB LIFE

During her Health Science degree at the University of Adelaide, Katie realised there was a lot more to research. She took up a couple of projects working in hospitals and loved it. "I quickly realised you can do a lot by working in research and in a lab," she says.

I LOVE LOOKING FOR GAPS IN THE SCIENCE AND DESIGNING PROJECTS AROUND THAT"



KATIE TOOLEY
HUMAN SCIENCES ANALYST, DST

"I loved reading the literature and looking for gaps in the science and designing projects around that."

Katie followed up her degree with Honours and a PhD in physiology, then took on several research jobs before landing her current gig at DST 10 years ago. She says while most health science research is around treating illnesses, working in Defence has offered a unique opportunity to focus on preventative health and improving the health of 'well' people.

Her research has shown some early positive signs of using probiotics to enhance cognition – a big plus for soldiers on the battlefield – but she warns that doesn't mean taking a probiotic will help you do better in your next exam. In fact, she says some off-the-shelf probiotics could even do harm.

Thankfully, research like Katie's is adding to the pool of knowledge that could not only benefit our defence force, but eventually be used in mainstream health – just like the many other defence innovations, like GPS and drones, that have found civilian applications. – Gemma Chilton

To get there: bit.ly/DSTCareers

HUMAN SCIENCES
ANALYST, DST

RESEARCH FELLOW
SCHOOL OF HEALTH SCIENCES,
UNIVERSITY OF SOUTH AUSTRALIA

RESEARCH OFFICER
WOMEN'S AND CHILDREN'S
HEALTH RESEARCH INSTITUTE

PHD, PHYSIOLOGY,
UNIVERSITY OF ADELAIDE

BACHELOR OF HEALTH SCIENCE
(HONS), UNIVERSITY OF ADELAIDE

Acing our (natural) assets

Images of open-cut mines or trucks laden with sand may not make you think of science and technology but Australia operates some of the safest, most efficient and environmentally focused mines in the world

The resources sector is a big industry in Australia and a major employer of people with science skills. Australian companies mine resources like coal and aluminium as well as many of the world's 'new and critical' resources — those that are both economically important, difficult to find and important for future technology. Some, like rare earth elements and lithium, are part of everyday items like phones and cars while others can make existing products better. For example, plane turbines made with newer materials are more powerful and fuel efficient, which is better for the environment and our climate. Scientists in the resources sector have been spectacular innovators for decades, creating many world-first technologies that have improved productivity and generated a lot of money. Think:

- Wearable technology that detects driver fatigue (biggest cause of accidents)
- Autonomous vehicles (Rio Tinto currently has 70 autonomous trucks, trains and drills operating in the Pilbara region of Western Australia)
- Bacteria to extract minerals and fix contaminated sites
- Earth-observation satellites to detect underground resources
- 3D metal printing of custom-shaped drilling parts reducing time and cost
- Digital and X-ray technology to analyse ores during processing

START YOUR CAREER HERE

SCIENCE+RESOURCES STUDY

Curtin University – Bachelor of Science (Extractive Metallurgy) bit.ly/CUBSciExtMet

Griffith University – Environmental Science bit.ly/GUQLDEnvSci

Murdoch University – Bachelor of Science (Mineral Science) bit.ly/MUBSciMin

SCIENCE+RESOURCES JOBS

Geologist: \$40K–\$119K

Environmental scientist: \$51K–\$95K

Chemist: \$36K–\$82K

*Source: salaries according to payscale.com

BACHELOR OF METALLURGICAL
ENGINEERING. CURTIN UNIVERSITY

GRADUATE METALLURGIST.
NEWMONT GOLDCORP



Want to know where a science
career could take you? Find out
bit.ly/CWSScienceCareers

Resources rising

As the resources sector evolves with new technology — such as employing robots instead of humans in dangerous areas — new jobs will emerge. Artificial Intelligence (AI), IT security, satellite, sensor, software and data science skills are already in demand.

Jenny Do, graduate metallurgist with Newmont Goldcorp, recommends students consider the resources industry because it is creating vast wealth and thousands of jobs for Australia. “It’s an essential industry for the future, without mining there’s no technology,” she says.

“Australia’s mining industry is one of the most forward-thinking and environmentally robust. As developing countries expand and upgrade their infrastructure, they will require huge amounts of mined minerals,” Jenny continues.

To unlock the potential from Australia’s resources, science graduates from all sorts of fields will be required. They will be working with mining and exploration companies, consultancy firms, government agencies and other businesses (like IT, laboratory testing or research and development).

“Science really opens the doors for career opportunities and there is more demand for graduates in the resource sector right now,” Jenny says.

“I use and see science every day; from chemistry, physics, geology and metallurgy to environmental and psychology,” she says.

Opportunity calls

Dr Suzanne Burling, a senior hydrometallurgist with ANSTO (Australian Nuclear Science and Technology Organisation) found that mining offered her an interesting change to academic research in organometallic chemistry (the study of compounds and reactions involving metal-carbon bonds).

“Mining was a work opportunity that came along as a result of my transferable chemistry skills,” she says. “BHP saw my potential and gave me on-the-job training in metallurgy which ultimately led to my career change and becoming a hydrometallurgist.”

Suzanne now manages a team at ANSTO conducting applied research using computers and laboratory tests to advise clients on how best to process mined rocks to extract the valuable metals inside, like lithium, a major component of batteries.

“The mining and resources industry has such a breadth of careers, from operations on site through to high-end technology development, there’s a place for anyone with an interest in STEM,” says Suzanne. — Claire Harris



JENNY DO
GRADUATE METALLURGIST.
NEWMONT GOLDCORP



DR SUZANNE BURLING
SENIOR HYDROMETALLURGIST, ANSTO

THE MINING AND
RESOURCES INDUSTRY HAS
SUCH A BREADTH OF CAREERS”

SAME, SAME BUT DIFF?

GET THE LOWDOWN ON WHAT EACH
INDUSTRY ACTUALLY COVERS...

RESOURCES: refers to mining, oil and gas development, mining services and the people and communities around them including those working in trades and professions with businesses, governments and research organisations.

MINING: speaks to the companies and operations focused on exploration and extraction of resources including metals, oils and precious stones.

SENIOR
HYDROMETALLURGIST.
ANSTO

SENIOR CHEMIST.
BHP

POSTDOCTORAL
RESEARCHER, UK

PHD ORGANOMETALLIC
CHEMISTRY, UNIVERSITY
OF SYDNEY

BACHELOR OF SCIENCE,
UNIVERSITY OF SYDNEY

GOLD HUNT

Searching for copper and gold takes more than just luck... geochemistry and creativity are needed too!

EXPLORATION GEOLOGIST.
SANDFIRE RESOURCES

FIELD ASSISTANT.
SANDFIRE RESOURCES

BACHELOR OF SCIENCE
(GEOLOGY/EARTH SCIENCE)
(HONOURS). THE UNIVERSITY
OF WESTERN AUSTRALIA

BACHELOR OF SCIENCE
(APPLIED GEOLOGY).
CURTIN UNIVERSITY

ELISSA EDWARD
EXPLORATION GEOLOGIST

Elissa Edward is an exploration geologist with Sandfire Resources in Western Australia. She drills for rocks in the field (sometimes she camps out) and experiments with data in the office to understand where there might be resources underground. And Elissa reckons creativity adds a lot of value to her job hunting for copper and gold.

"Although there are fundamental scientific processes to follow, there is so much variety in the way we reach our end goal, which I find exciting!" she says. "I'm currently combing through drill hole data to target oddities that might indicate hidden minerals. I love that I can create my own projects and follow my creativity."

Elissa works nine days on, five days off and on her days off she will usually be outdoors: bushwalking, snorkelling, bike riding. She also catches up with friends and takes time to "veg out" on the couch, and she loves to travel.

What did it take to get here?

At school, science and chemistry were Elissa's favourite subjects. "I loved chemistry because it has structure and certainty. Learning about the way chemistry constructs and controls the world around us, in more aspects than I ever knew, was amazing."

Elissa was such a fan, she gained a reputation in her family for talking about chemistry in everyday life, for example, how carbon chains behave in soap.

**THERE IS SO MUCH VARIETY
IN THE WAY WE REACH OUR END
GOAL, WHICH I FIND EXCITING!"**

"Then in Year 10, I met the wonderful Suzy Urbaniak (now at CoRE Learning Foundation), and my geology journey began," she says.

For students thinking about a resources career, Elissa says there are "a ridiculous amount" of opportunities awaiting them.

"We always need enthusiastic people, and someone with passion and willingness to learn and listen will always be at the top of the wanted list!" she says. – Claire Harris

2020 NSW Training Awards Be Recognised

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- School Based Apprentice/Trainee of the Year
- Aboriginal & Torres Strait Islander Student of the Year
- Vocational Student of the Year
- VET in Schools Student of the Year
- VET Trainer/Teacher of the Year
- Industry Collaboration Award
- Small Training Provider of the Year
- Large Training Provider of the Year
- Medium Employer of the Year
- Large Employer of the Year

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If you are from another state or territory visit the Australian Training Awards for a list of eligible award categories at www.australiantrainingawards.gov.au



NSW Ambassadors:
Jemasin Joyce, 2019 National Runner-Up and NSW Aboriginal & Torres Strait
Islander Student of the Year and Samuel Heffernan, 2019 NSW Trainee of the Year

WHAT DOES YOUR SCIENCE CAREER LOOK LIKE?

MATCH YOUR PASSION WITH SCIENCE AND FIND THE RIGHT STUDY PATH FOR YOUR DREAM CAREER

SCIENCE+GLOBAL WARMING

PAGE 18

Charles Sturt University
 >> Environmental Science

Flinders University
 >> Science (Environmental Science)

QUT
 >> Science (Environmental Science)

RMIT
 >> Environmental Science

University of Adelaide
 >> Science (Energy Geoscience)

University of Newcastle
 >> Coastal and Marine Science
 >> Environmental Science and Management (Marine Science)

UNSW
 >> Science (Physics)/ Engineering (Renewable Energy Engineering)

University of Sydney
 >> Science (Environmental Studies)

University of Wollongong
 >> Science (Environment)

UTS
 >> Science (Honours) (Environmental Science)

Western Sydney University
 >> Science (Environmental Science)

SCIENCE+SOLVING CRIME

PAGE 16

CQ University
 >> Accident Forensics

Deakin University
 >> Forensic Science

Flinders University
 >> Science (Forensic and Analytical Science)

Griffith University
 >> Forensic Science

QUT
 >> Science (Chemistry)

Swinburne University of Technology
 >> Health Science (Psychology and Forensic Science)

University of Canberra
 >> Applied Science (Forensic Studies)

UTS
 >> Forensic Science
 >> Medical Science

Western Sydney University
 >> Science (Forensic Science)

SCIENCE+FOOD+FARMING

PAGE 22

CQ University Australia
 >> Agriculture

Charles Sturt University
 >> Conservation Biology

>> Plant Science

Edith Cowan University
 >> Sustainability

La Trobe University
 >> Agricultural Science

Macquarie University
 >> Environment

Monash University
 >> Science Advanced – Global Challenges (Hons)

Murdoch University
 >> Science (Crop and Pasture Science)

QUT
 >> Science (Biological Sciences)

University of South Australia
 >> Sustainable Environments (Hons)

University of Sydney
 >> Science & Advanced Studies (Agriculture)
 >> Science (Plant Production)
 >> Science (Soil Science and Hydrology)

University of Melbourne
 >> Environmental Science

University of Newcastle
 >> Science (Plant Biology)

UNSW
 >> Environmental Management

University of Tasmania
 >> Natural Environment and Wilderness Studies
 >> Applied Science (Environmental Science)

UTS
 >> Biotechnology
 >> Environmental Biology

Western Sydney University
 >> Sustainable Agriculture and Food Security



Did you know only 32% of Australia's STEM workforce went to uni? See page 14 for alternative STEM career paths

Wondering where your degree could take you?
Check out our STEM career map on page 7

SCIENCE+RESOURCES

PAGE 26

ANU

>> Science (Resource and Environmental Management)

Curtin University

>> Science (Mining)

Deakin University

>> Environmental Science (Environmental Management and Sustainability)

Edith Cowan University

>> Sustainability

Federation University

>> Science (Mineral Processing)

Macquarie

>> Science (Environmental Management)

Murdoch University

>> Science (Mineral Science)

QUT

>> Science (Earth Science)

University of Adelaide

>> Science (Mineral Geoscience)

University of Newcastle

>> Science (Sustainable Resource Management)

University of New England

>> Sustainability

University of Sydney

>> Science (Geology and Geophysics)

University of Southern Queensland

>> Science (Environment and Sustainability)

University of the Sunshine Coast

>> Environmental Management

UTS

>> Science (Analytics)

University of Western Australia

>> Science (Natural Resource Management)

UNSW Sydney

>> Environmental Management

WA School of Mines

>> Exploration Geophysics

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