

Save lives with nuclear medicine

> Smashing scientist stereotypes

Meet 6 inspiring conservationists

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RADIOCHEMIST

CAREERSWITHSTEM.COM

## STUDY THE SCIENCE THAT WILL DEFINE TOMORROW

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#### The world needs scientists now more than ever.

ECU's School of Science offers a range of practical degrees that can lead to distinctly different careers in fields such as biological science, bioinformatics, environmental science and management, data science and more. If you're interested in Science, but not sure what direction to go in, our Bachelor of Science degree gives you the flexibility to explore subjects, while developing a solid grounding in science and mathematics.

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We offer a range of undergraduate and postgraduate disciplines such as:

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- Marine & Freshwater Science
- Mathematics
- Physics
- Sustainability

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## SCIENCE SAVES LIVES More than ever, science is improving health and making the world a better place t's been a big two years. COVID-19 turned our and logistics of nuclear medicine delivery, or world upside down, but with everything from research on early development of new innovations in virus testing to amazing new radioisotopes and radiopharmaceuticals. vaccine technology, living through the pandemic Continuous improvement and new projects also has also shown us the power of science to uncover offer the opportunity to apply new technology and solutions and ultimately save lives. design thinking to improve safety, reliability and ANSTO is Australia's nuclear science and sustainability. You can find out more about STEM

technology organisation. It's home to cutting-edge nuclear science research in areas from advanced materials to environmental science. We are also in the business of using science to save lives.

Meet some of the science heroes of the last two years in this magazine, including beamline scientist Dr Santosh Panjikar (P13), who is part of a team that has helped researchers use ANSTO's nuclear science facilities remotely to help us understand COVID-19. But it's not just about stepping up in a pandemic – ANSTO also manufactures and distributes lifesaving nuclear medicine to healthcare providers around Australia everyday.

The STEM career opportunities in nuclear medicine at ANSTO and the broader health industry are incredibly diverse. You could work in production and quality control, the supply chain

careers in nuclear medicine on pages 10-11.

ANSTO's STEM workforce has joined us from a range of industries, including pharmaceutical, aviation, engineering, manufacturing, logistics, finance and communications, as well as graduates and apprentices.

My own early study path was in geology and I have since pivoted from a 24-year career in the mining industry to my current leadership role at ANSTO. I've found the change exhilarating.

The range of disciplines and diversity of experience and backgrounds at ANSTO enables us to find solutions and be innovative.

#### Pamela Naidoo-Ameglio

Group Executive, Nuclear Operations and Nuclear Medicine, ANSTO

THE STEM CAREER OPPORTUNITIES IN NUCLEAR MEDICINE AT ANSTO AND THE BROADER HEALTH INDUSTRY ARE INCREDIBLY DIVERSE



## What's inside?

P6 What does a scientist look like? We're smashing the stereotypes. You might be surprised!

**P26** Career pathways Next steps and pathways to help you nail your science and space career.





ADVENTUR

## WHY SCIENCE?

Science is critical for a prosperous, safe and sustainable future. Scientists are at the forefront of helping us understand, prevent and adapt to climate change; they've helped us navigate the COVID-19 pandemic and brought us life-saving vaccines; they've revealed the wonders of the cosmos to us.

Scientists aren't just in the business of solving global challenges, they're helping to build our economy through creative innovations, collaborations and industry partnerships. And the skills you'll learn in a science degree or career will equip you for next-gen careers, no matter the path you choose.

Careers with STEM aims to inspire and inform you about the science careers of the future, and showcase real, diverse faces of science in Australia.

FLIP THE MAGAZINE OVER **FOR SPACE CAREERS!** 



STEM + X =

Combine science (STEM) with your passion (+ X) to discover your dream career.

Science + ...

P8 The Human Body

From physiotherapy to nuclear medicine, meet science heroes working in different fields with one thing in common: our bodies.

P16 Conservation

If there was ever a time to save the planet, it's now – and if there was ever a discipline to do it, it's science. Find out how you can build the best kinda eco-career...

**P22** Critical Minerals

Discover how not just engineers but scientists too will be at the forefront of powering the renewable energy revolution. Mind blown!

**P24** Creativity

Think arts and science can't go together? Flip to this section and start planning your dream job.

SO MUCH MORE TO STEM!

Careers with STEM is so much more than a magazine!

- Explore the jobs of the future with our FREE Job Kits
- Discover your STEM personality with online quizzes
- Subscribe to our yt channel for career videos and webinars
- Connect, share and reach out on Insta or TikTok!























# (YOU) us

# CAN BE THE NEXT WAVE OF SCIENTIFIC BRILLIANCE

Imagine working with Silvester the seal, who's helping us understand the feeding habits of large marine predators.

Study with us and turn your passion for understanding the natural world into practical solutions for critical global issues.

## What does a scientist look like?

Leave your lab coats at the door because we're smashing science stereotypes!

lose your eyes and picture a scientist. If you see an eccentric, white-haired man doing risky experiments in a lab, it's time to replace that image (which has probably been formed by Hollywood movies or outdated textbooks).

Stereotypes are harmful, especially in STEM.

If people can't 'see' themselves in science, they're less likely to pursue it. And that's exactly what's happening – while STEM jobs are growing by the year, enrolments in STEM degrees are declining,

especially for women and minorities. The latest STEM Equity Monitor stats show STEM enrolments for women are just 36%.

To combat this, we love shining the spotlight on Australia's diverse scientists. And as well as showing you that not just one type of person can be a scientist, we want you to know that science degrees and skills can be used in many different ways.

Scientists don't just work in labs. You'll find them in health clinics, schools and businesses, and out in the field, too. Think: oceans, forests and deserts.

Here are four scientists flexing their skills in unexpected ways... and places! – Louise Meers





Proud Kamilaroi man Bradley switched from studying geology to environmental science at uni, followed by a Masters researching Aboriginal people's knowledge of and relationship with groundwater. He's worked in research, government and academia, specialising in the Indigenous values of water and the environment: bit.ly/moggridge



grocery products: bit.ly/bonny-rawson

## DR JAMES O'HANLON FREELANCE ARTIST AND SCIENTIST

James has combined his creativity with science skills to create a one-of-a-kind career, including everything from podcasting to illustrating science-themed kids' books: bit.ly/james-ohanlon





# I AM READY TO SUPPORT TO MOTIVATE TO FIND MY CAREER

## Leaving school and thinking about next steps?

The Your Career website has everything you need to support your next steps in training, education and employment.

The tools on Your Career offer personalised information and advice by matching your skills, interests and goals to careers that may suit you.

You can explore over 1200 occupations listed from A-to-Z, see how much you might earn, learn what a real day on the jobs looks like, understand what kind of job prospects exist in a particular field - and what skills you need to get you there.

Find up to date, accurate careers information and advice about where the opportunities are now and where they'll be in the future at yourcareer.gov.au.

You can also access the School Leavers Information Service:

- calling 1800 CAREER (1800 227 337), or
- texting 'SLIS2022'
   to 0429 009 435





Certificate III in Health Services Assistance, Swinburne University of Technology Bachelor of Health Science, Flinders University

SCIENCE+HUMAN BODY JOBS Biomedical scientist: \$41K-\$104K Microbiologist: \$46K-\$74K Epidemiologist: \$69K-\$144K Health and safety manager: \$68K-\$171K\* \*Source: salaries according to payscale.com

research aid for limb or organ replacement after illness? Material science is the gig you'll want to try.

Whatever part of the human body interests you, there's a science to support it and a STEM career path to match. – Angela Crompton

INTERESTED IN THE HUMAN BODY BUT DON'T WANT TO BE A "REGULAR" DOC HERE ARE FIVE EXAMPLES OF EMERGING STEM FIELDS YOU CAN CONSIDER INSTEAD...

## 1. 3D-PRINTED IMPLANTS

Implants of the 3D kind have become game changers for the human bod. And they need scientists to design 'em! A 3D-printed sternum and rib implant developed in a collab between CSIRO and Anatomics (an Australian medical device manufacturer), and inserted by docs in Spain, helped save a cancer patient's life. Literally.

### 2. PRECISION NUTRITION

Combining machine learning with the study of genetics and biochemistry, researchers identify diet and lifestyle interventions that aim to help treat disease, promote health, and enhance performance in elite athletes. It's predicted that by 2027, personalised nutrition could be worth more

than US\$15 billion! Which is excellent news on the career front!

#### 3. GUT MICROBIOME

This 'organ' consists of more than 1000 species of bacteria and other microbes, which is a whole lotta research in your belly. The study around the health of the gut microbiome in conditions such as Alzheimer's, Parkinson's and depression is really taking off, so employment in understanding how the gut affects overall health is high.

## 4. CLIMATE-SENSITIVE

In November 2021, a Canadian woman became the first person to receive an official diagnosis as suffering from 'climate change', demonstrating how humans are vulnerable to the impacts of extreme events, including air quality, changes in the spread of infectious diseases, threats to food and water quality and quantity, and effects on our mental health. So get on board to help find solutions!

### 5. THERANOSTICS

Theranostics is – you guessed it – medicine that's both a treatment (therapeutics) and diagnostic. This emerging field in nuclear medicine highlights radioactive particles that are used to both view and treat cancer cells. (Turn over the page for more nuclear medicine career inspo!)

**HEALTH INVENTOR** 

DR ALISON TODD HAS BUILT AND A DISTINGUISHED STEM CAREER AND **GLOBAL HEALTH SCIENCE BIZ BASED ON PASSION AND CURIOSITY** 

As the Chief Scientific Officer and co-founder of SpeeDx, a molecular diagnostics company, Alison spends her days inventing. She has 85 patented inventions so far, with 57 more awaiting approval!

Her company SpeeDx is focused on improving healthcare around the world, from developing diagnostic tools for infectious diseases or cancer to helping doctors select the right therapy for individual patients and developing fast COVID-19 tests.

Alison started uni studying vet science. She soon shifted to a Bachelor of Science with Honours in Physiology, but it was DNA and molecular biology that she found her sweet spot during third year.

Alison's PhD supervisor asked her to look at various mutations in DNA in people with leukaemia. His suggested method would have taken three days and used radioactivity, but Alison was keen to get the results quicker and more simply.

Her dream was to take a blood sample, unlock the secrets in the DNA and use that information to monitor the disease. And that's what she did.

In 2020, Alison and SpeeDx co-founder Dr Elisa Mokany were awarded the Australian Academy of Technology and Engineering's Clunies Ross Award for Innovation. Her advice to students looking to score their own science goals: "Follow your passion, be patient and persistent. And above all do what you love. You spend so much time working, it makes no sense not to." - Louise Denver

FOLLOW YOUR PASSION. BE PATIENT AND PERSISTENT

CO-FOUNDER AND CHIEF SCIENTIFIC OFFICER. SPEEDX

## MOLECULAR MEDICINE

Want to save lives and work at the cutting edge of chemistry and physics? Meet four STEM experts with the lowdown on nuclear medicine

EVER BEEN TO THE HOSPITAL FOR A NUCLEAR MEDICINE SCAN OR THERAPY? MANY OF THE MATERIALS WE NEED TO DO THESE CRITICAL TESTS ARE MADE RIGHT HERE IN AUSTRALIA.

NSTO – Australia's Nuclear Science and Technology Organisation – is home to the Open Pool Australian Lightwater nuclear reactor, aka OPAL, which is a state-of-the-art multipurpose reactor producing 75 to 80 per cent of the radioactive isotopes used in 700,000 lifesaving patient procedures in Australia every year.

"Nuclear medicine is a critical part of modern health systems and is delivered in hospitals and medical centres to diagnose and treat a vast array of illnesses, including cancer and heart, lung, muscular, neurological and skeletal conditions," explains Dr Geoff Currie, a nuclear medicine professor at Charles Sturt University in Wagga Wagga.

Geoff says demand for nuclear medicine is growing and the job opportunities are diverse: "A career in nuclear medicine could take the shape of a physician, medical physicist, radiopharmacist or, the largest professional group, a nuclear medicine technologist or scientist."

medicine technologist of octavities

Here are four people working in exciting roles in nuclear medicine... – Gemma Chilton

Nigel was always interested in "how things work". As a senior radiochemist in the Biosciences team at ANSTO, he now gets to see things working up close every day. "I lead a team of radiochemists making radioactive molecules to detect and treat human disease, primarily cancer," he explains.

Nigel says nuclear medicine is an exciting space to be in, with lots of opportunity. "Over the last five years we have seen explosive growth in the nuclear medicine field," he says. "This growth requires people as much as it does facilities, equipment and funding, so there are growing gaps in the workforce."



## NUCLEAR NAME DROP

There are so many jobs in the nuclear medicine arena! Find one that suits you...

#### IF YOU'RE INTO GUIDING PEOPLE...

- Asset Manager
- Capability and Training Leader
- ✓ Compliance and Quality Manager
- Development Manager (Scientists)
- General Manager
- Microbiology Manager

#### IF YOU'RE A PLANNER/ THINKER/CREATOR...

- Process Engineer
- Process Specialist
- Product Specialist
- Research Scientist
- Systems Engineer

I AIIRFN TROMPP



WHITEHO NUCLEAR MEDICAL TECHNOLOGIST. I-MED RADIOLOGY NETWORK, TASMANIA

essica first found out about nuclear medicine as a career option when she was in year 12 and has been fascinated ever since.

She's now landed a job with Tasmania's I-MED Radiation Network as a nuclear medicine technologist, running diagnostic scans on patients. Jessica believes that "nuclear medicine is the way of the future".

NUCLEAR MEDICINE TECHNOLOGIST.

QUEENSLAND X-RAY

In high school, Stephanie loved sport and science, and although she didn't consider herself to be very academic, nuclear medicine got her attention. "It's a good balance between science (working in a lab) and patient interaction," says Stephanie. "This allows me to use my brain every day while being able to look after and care for people."



- Quality Assurance Manager
- Quality Control Manager
- Regulatory Affairs Manager
- Senior Technical and product Specialist
- Validation Manager





Meet Aussies who have played key roles in fighting the COVID-19 pandemic



DR MOHAMED FAREH

SENIOR RESEARCH FELLOW, PETER MACCALLUM CANCER CENTRE

PANDEMIC ROLE: Mohamed and a team of scientists discovered how to stop the SARS-CoV-2 virus from replicating in infected human cells. This is a huge step towards finding a treatment for COVID-19.

PANDEMIC ROLE: These three teens from Melbourne are behind CovidBaseAU, a website that breaks down Australian and global data on infections, hospitalisations, deaths and vaccinations.

LOOKING AHEAD: "We intend to keep it running and do our part in informing the community with insightful COVID-19 data."

+ DARCY, WEBSITE CREATORS.

COVIDBASEAU

to COVID

## PROFESSOR RAINA MACINTYRE HEAD OF THE BIOSECURITY PROGRAM, KIRBY INSTITUTE

TerryWhite Chemmart

PANDEMIC ROLE: Raina runs a research program that includes epidemiology, vaccinology, mathematical modelling and infectious diseases. She's also involved in COVID-19 research studies that help inform national and international policy in disease control.



## DR WARISH AHMED, SENIOR RESEARCH SCIENTIST, CSIRO

PANDEMIC ROLE: Warish leads a team analysing wastewater samples, looking for the presence of SARS-CoV-2 (the virus that causes COVID-19) in sewage to help detect the virus ahead of an outbreak.

WHAT HE LOVES ABOUT HIS JOB: "I love

problem-solving through cutting-edge research and science."

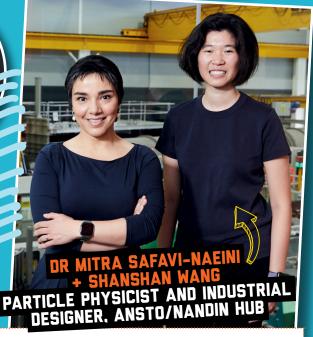


PROFESSOR TONY CUNNINGHAM
+ DR EUNOK LEE, VIROLOGIST AND
POSTDOCTORAL RESEARCH
SCIENTIST, THE WESTMEAD INSTITUTE
OF MEDICAL RESEARCH

PANDEMIC ROLE: Tony and Eunok are combining virology knowledge and computer science skills to come up with a T-cell COVID-19 booster shot.

TONY'S ADVICE FOR FUTURE VIROLOGISTS:

"Virology is of vital importance, underpinning the development of crucial vaccines and antiviral agents."



**PANDEMIC ROLE:** Mitra, ShanShan and other STEM pros from ANSTO teamed up for NASA's Space Apps COVID-19 challenge to work out how to purify air in enclosed public spaces. Read more about their winning solution: bit.ly/ansto-covid – Louise Meers

BEAMLINE SCIENTIST

r Santosh Panjikar has always been interested in **D**understanding the world around him. He studied maths and physics at college but soon realised biology was also useful. Through biology, he developed an interest in bioinformatics and started studying macromolecular crystallography – a method for working out the atomic three-dimensional structures of large biological molecules.

"I needed to use my mathematical background to understand biology," he says. "Now here I am doing what I love and working at ANSTO's Australian Synchrotron."

As a beamline scientist, Santosh works with research groups to help design and conduct synchrotron experiments, providing them with necessary tools and training, and remaining on call for assistance should they need it.

Santosh's science skills have been put to good use throughout the COVID-19 pandemic, too. In one project he worked with researchers who identified drug-like compounds

IF YOU'RE INTERESTED IN SCIENCE, EXPLORE IT IN HIGH SCHOOL"

that could block a key COVID-19 protein. Known as PLpro, this protein allows the virus to hijack and then multiply within human cells, as well as disable antiviral defences.

"Researchers sent frozen crystals of COVID-19 proteins to the Synchrotron and used the instruments remotely," he explains. "I have assisted by setting up beamlines for remote access and advising them on X-ray data collection on frozen protein crystals as well as helping with data analysis."

His top tip for those who want to work in science or researching infectious diseases? Explore! "If you're interested in science, try it in high school," he says. "Take part in STEM-based extracurricular programs, such as the Australian Science Olympiads, as well as science-based competitions like Science Talent Search."

Santosh also encourages future scientists to look for work experience opportunities at a research facility or at a school of biomedical or biological science at a university.

"This exposure will give you some insight into what scientists actually do," he says, "and it will also allow you to find the field of science that interests you the most." -Louise Meers















## Closing the gap

Christian de Cos is using health science to score goals for Indigenous communities

old university student. A proud Arrernte man, the third-year physiotherapy student comes from a family where "impact" should be the family motto. His father is an essential worker, his mother works for Indigenous Business Australia and his grandmother is an award-winning artist of Arrernte, Chinese

hristian isn't your typical 20-year-

and Anglo-Celtic heritage. Combining his heritage with a passion for making a difference is in his DNA.

Christian wants to help educate the world using the health-related skills he's learning both at uni and from the connections he's building within Indigenous communities. "I knew I wanted to do a health degree. I got offered medicine but [rather than spending eight years at uni] decided I want to get out into the community as quickly as possible to help others," Christian says.

#### **INSPIRED BY INJURY**

Physiotherapists have been an inspiration to Christian from an early age – and he's seen first-hand (literally!) how life-changing their work can be. During football trials in year 10, he broke his wrist for the third time. "The attitude that the physio has is great. Hearing the physio say, 'Your fingers are ok; you can play PlayStation this weekend,' is huge to a young person. It lifts your mood so much and I wanted to be able to do that for others."

As part of his four-year degree, Christian has to complete five work placements in a variety of

specialities. Following the footsteps of his mentor Adam Doyle, who is the first Indigenous physiotherapist to graduate from the University of Canberra, Christian's aim is to get placement in an area with a high Indigenous population. To help build his network, Christian

has joined Indigenous Allied Health – a member-based organisation that connects students with learning opportunities to better understand the complexity of, and access to, health, education and wellbeing of First Nations people.

Christian was also lucky enough to be involved in the video production of the university's Yarning About project, interviewing First Nations staff and students to talk all things culture. Its aim is to help the wider university cohort have a better understanding of Indigenous ways. "Before you close the gap in remote communities, you need to close the gap in urban communities," Christian says. – Angela Crompton

HEARING THE PHYSIO SAY,
'YOUR FINGERS ARE OK, YOU CAN
PLAY PLAYSTATION,' IS HUGE"



@christian.decos

## THE ROAD TO HEALTH

Jennifer Myers dreams of becoming an occupational therapist, even if it means taking an unconventional path to get there

ennifer first heard of STEM in year 8, but says she dismissed it as something "only for high achievers". Thankfully, she didn't let those early misconceptions stop her. Now she's on a study path towards her dream job of becoming an occupational therapist (OT) – a health profession that helps people with physical or cognitive impairments to gain independence.

Jennifer undertook a school-based traineeship in Allied Health Assistance in years 11 and 12. This included one day per week working at a hospital, gaining hands-on skills in the health sectors of medical imaging, dietetics, speech pathology, occupational therapy and physiotherapy.



MY TRANSITION
FROM SCHOOL INTO
MY DREAM COURSE AT
UNIVERSITY HAS BEEN AN
UNCONVENTIONAL ONE"

### **Leaving your comfort zone**

Jennifer says choosing a Vocational Education and Training (VET) course has given her valuable industry experience and helped to clarify her career aspirations. In 2020 Jennifer won the School-based Trainee of the Year award and went on to become a Training Awards mentor. Jennifer says in addition to her studies, this experience has been an important part of her development.

"Going from a student working around the different departments at the hospital to an allied health assistant, advocating, judging and mentoring for the VET pathway for the Australian Training Awards has pushed me out of my comfort zone and into a new role of leadership and responsibility," she says.

#### Taking the leap

After finishing school with a VET qualification already under her belt, Jennifer was accepted into her second university preference – a Bachelor of Exercise and Sport Science at the Australian Catholic University. With the first year completed, Jennifer has now transferred into a Bachelor of Occupational Therapy.

"My transition from school into my dream course at university has been an unconventional one," Jennifer says – but she's still found value and opportunity every step of the way.

"I've found this 'bridging' course to be incredibly valuable as an introduction to university, providing the foundational knowledge to human biology, technology and scientific research." Stepping out of her comfort zone has spilled into her everyday life now, too: "A few weeks ago I went skydiving... and, crazily enough, I loved it!" – Gemma Chilton

CERT III, ALLIED HEALTH ASSISTANCE,
REDCLIFFE HOSPITAL









BACHELOR OF SPORT AND EXERCISE SCIENCE (TRANSFERRING TO BACHELOR OF OCCUPATIONAL THERAPY). AUSTRALIAN CATHOLIC UNIVERSITY



Do you love plants and animals? Enjoy spending time outdoors? A conservation science pathway could be in your sights...

 $\ensuremath{\mathrm{s}}$  the human population grows, the world is experiencing a massive loss of biodiversity. In Australia, invasive weeds, feral predators such as cats and foxes, climate change and land clearing have led to more than 1800 native plants and animals being threatened with extinction. Luckily, there are passionate people like conservation scientists who are working behind the scenes to help protect plants, animals and the environment for generations to come.

Conservation career paths are as diverse as the species and ecosystems that we share this planet with. As a conservation scientist, you could specialise in anything from endangered species ecology to marine conservation, feral animal control and land restoration.

The words 'conservation science' might make you think khaki-clad rangers in remote locations – hello, field ecologists! – but

START YOUR CAREER HERE

## SCIENCE+ CONSERVATION STUDY

Bachelor of Environmental Science, The University of Queensland

Bachelor of Natural Environment and Wilderness, University of Tasmania

Diploma of Conservation and Land Management,

## SCIENCE+ CONSERVATION JOBS

Ecologist: \$56K-\$83K

Environmental consultant: \$51K-\$92K

Geographic information systems (GIS) Analyst: \$53K-\$95K\*

\*Source: salaries according to payscale.com

there are other roles that will see you splitting your time between the desk and the field, or even a classroom! You'll need a passion for flora and fauna and an undergraduate degree in environmental science. Otherwise, you can kickstart your career with a TAFE course in conservation and land management.

Once you're ready for the workforce, search the wanted ads of local councils, state and federal governments, not-for-profits and natural resource management companies. If you want to stick with the study and expand your conservation knowledge, consider an honours year or a postgraduate degree to hone your speciality. – Amelia Caddy

Australia has suffered huge declines in biodiversity, with more than 1800 native plants and animals facing extinction!



SCIENCE

## Green engineering

Dan Lim uses his science background to reduce the environmental impact of big infrastructure projects

ig companies have big environmental responsibilities, so they employ environmental scientists to ensure their eco-credentials are maintained – scientists like Dan, a senior environmental scientist at multinational engineering and infrastructure firm AECOM.

Growing up, Dan says he always wanted to be a scientist – biology and geography were his favourite subjects at school – and he went on to study a Bachelor of Applied Science (Honours) followed by a Master of Science at the University of Otago in New Zealand.

## **Wind farms and flower hunting**

As an environmental scientist, Dan's job is to help reduce the ecological impact of projects AECOM is involved with. Like RN he's working on a proposal for Australia's first offshore wind farm, which will be built off the coast of Gippsland. Dan's team is providing ecological advice during the planning and development phase of the mega renewable energy project, 'Star of the South'.

"A typical day could include fieldwork – sometimes interstate or internationally – report writing, problem-solving and using computer programs like ArcGIS for mapping and spatial analysis," Dan explains.

Still a nature lover, one of Dan's favourite ways to spend a day in the "office" is looking

DAN LIM
SENIOR ENVIRONMENTA
SCIENTIST

at flowers on bushwalks! Yep. Correct. Dan occasionally has to undertake targeted surveys of native orchids on potential development sites – in other words, searching through the bush for specific threatened orchids.

One of the biggest career hurdles Dan says he faced was breaking into a very competitive industry. His advice is to get involved in industry events and find career mentors while you're still at uni. "It's never too early to get involved," he says. – Gemma Chilton

#### **FUN FACT**

Dan was once a child actor and has lived in five different countries — New Zealand, Australia, Sweden, Japan and Singapore!





Deakin University graduate James Hattam started his career as an ecologist, but later found his calling connecting people with conservation as CEO of the Tasmanian Land Conservancy



s a student, James wasn't really 'the academic type'... until he started studying biology and outdoor education. Those interests led him to enrol in a Bachelor of Environmental Science at Deakin University, specialising in conservation ecology and plant biology.

During his early career, James tried everything from being a ranger to helping farmers control weeds and realised that conservation is just as much about engaging with people as it is about the environment.

"Ecology is the interaction of living things and my view is that humans are a part of that," he explains. "I might know all there is to know about a threatened plant or animal, but if I can't use that knowledge to inspire somebody to help protect it, then it's just interesting information."

James found the perfect opportunity to put this philosophy into practice at a not-for-profit organisation called the Tasmanian Land Conservancy, which buys and manages ecologically important landscapes. Having first joined the organisation as an ecologist, he was quickly promoted to head of the organisation's fundraising and engagement team. Then, a few years later, he became CEO.

While he's not a practising scientist anymore, James still uses his scientific training every day to communicate what he's doing and how he's doing it.

Recently, he and his team at the Tasmanian Land Conservancy raised over \$2 million to buy a property on Tasmania's east coast that's home to 40 rare and threatened species. The campaign was such a hit, they're now looking to extend the area of land protected. "In a world where there's so much destruction and loss, it is a privilege to be doing something so powerfully positive." – Amelia Caddy

BACHELOR OF ENVIRONMENTAL SCIENCE (HONOURS), DEAKIN UNIVERSITY



TRACK RANGER. PARKS VICTORIA



ECOLOGIST, TASMANIAN

DIRECTOR OF PHILANTHROPY, TASMANIAN LAND CONSERVANCY



CEO, TASMANIAN



ELISE MCCARTHY RANGER, NATIONAL PARKS AND WILDLIFE SERVICE

The ranger

As a ranger with the National Parks and Wildlife Service (NPWS), Elise's to-do list includes patrols, managing bush regeneration contracts, working with volunteers, undertaking hazard reduction burns, maintaining infrastructure and liaising with the Metropolitan Local Aboriginal Land Council on the care of cultural sites. However, it isn't all fresh air and bush walks — there's a fair bit of admin and office work to tackle each week, too. "I love the diversity of it!" When it came to picking a study path, Elise faced an overwhelming amount of choice. "There were so many courses available," she says.

A friend encouraged her to enrol in a Bachelor of Biodiversity and Conservation at Macquarie University, which proved a perfect fit. "I actually made a lot of great like-minded friends," she says.

MASTER OF CONSERVATION BIOLOGY.
MACQUARIE UNIVERSITY

RANGER. NPWS

THERE WERE SO MANY COURSES AVAILABLE!"

sustainable, or in cities, building

environmentally friendly urban spaces.

Meet two women who translated

different conservation career paths

their love of the environment into

different degrees at Macquarie

University in Sydney and took

BACHELOR OF BIODIVERSITY AND CONSERVATION.
MACQUARIE UNIVERSITY

The arts/science grad

## ANIKA FECHNER SCIENTIST

Science has always been Anika's thing, but the Macquarie University grad has always been frustrated with the stereotyped way it's portrayed as lab-based and academic.

"It's always been a goal to make science fun, relatable and accessible, and inspire people to better understand global environmental issues and sustainability initiatives!"

Anika did a Bachelor of Environment/Bachelor of Arts at Macquarie, peppered with public relations and social media units. This was all part of her master plan — to learn the skills to communicate environmental science. These days she applies these skills in her first paid grad gig at SAGE Environmental Services. She spends her 9-5 assisting an Environmental Protection Agency auditor with contaminated land projects, ensuring businesses comply with environmental laws.

"I would like to combine my love for environmental science with my passion for empowering women and First Nations knowledge – the sky is the limit!"

BACHELOR OF ENVIRONMENT / BACHELOR OF ARTS, MACQUARIE UNIVERSITY

COMMUNICATIONS INTERN, MACQUARIE
UNI SUSTAINABILITY OFFICE

GRADUATE ENVIRONMENTAL SCIENTIST.
— SAGE ENVIRONMENTAL SERVICES



## Mining for the future

Oz has huge underground reserves of important minerals for green tech, so if you've got a passion for science and care about Mother Earth, there could be a career in it for you!

ustralia is rich in sun, sea and good vibes

– that's why it's one of the best countries
in the world to live. Below the surface
though, it's also rich in the minerals that green
technologies need to function and fight climate
change. Want to engineer an electric car? You'll
need lithium. Australia produces 56% of the
world's supply. Want to build a wind turbine?
You'll need rare earths. Australia digs up 17,000
tonnes per year. So with the hidden potential
of Australia's buried treasures, it's no surprise
that the industry has added another 40,000
jobs in the past five years.

Geoscientists have always been in demand at mining companies, where they find minerals and figure out the best ways to dig them up.

Matthew Teh works at Geoscience Australia—the federal geological survey—as the executive officer for the organisation's chief scientist.

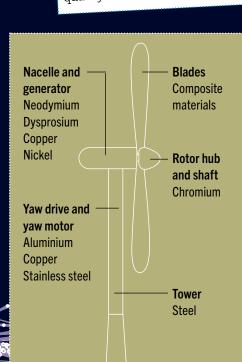
"Geoscience Australia's Graduate Program is an excellent opportunity for young people looking to embark on a career in critical minerals geoscience," he says.

Hydrologists are also mixing science with critical minerals. Their job? To maintain water quality across a mine site. Metallurgists design

processes to separate valuable metals and reduce minerals to metals and alloys, and environmental scientists minimise the effects of mining on the environment.

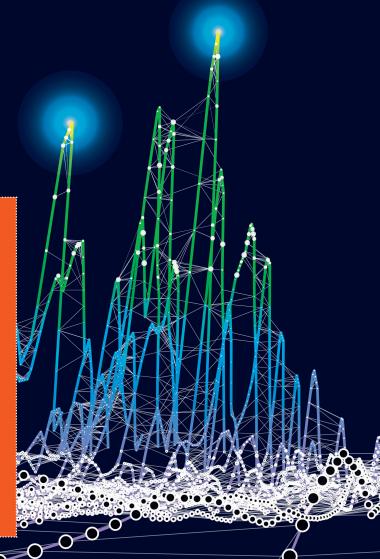
Cutting-edge tech is creating new roles in the critical minerals industry too, like virtual reality (VR) content developers, who build virtual mine sites for employee training. New employees at New Hope Group's Bengalla site spend hours in immersive simulators before driving 500-tonne dump trucks for real.

Artificial intelligence (AI) more your thing? Robotics, computer science and Big Data all have a big role in making mineral exploration and extraction safer. There's a lot to get excited about in the mineral world! – Ben Skuse



#### MINERAL-MADE MACHINES IN ACTION...

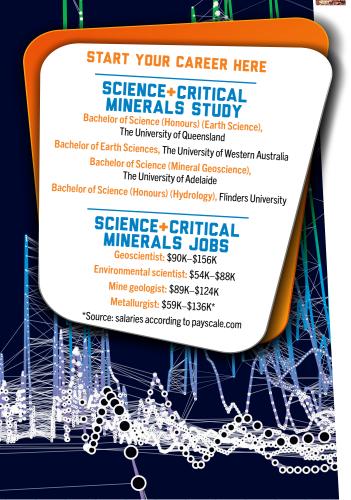
WITHOUT THE
CHEMICALS FROM
THE EARTH, WE
WOULDN'T HAVE
WIND TURBINES
CHURNING OUT
THAT GOOD,
NATURAL ENERGY!











n inspiring Earth science teacher at high school sparked a lifelong passion for geology in Louise.

A desire to understand our Earth propelled her through a geology degree and geochemistry PhD. It took her on internships to a copper exploration site in Queensland and a lab in Japan

where she grew tiny rocks. And it continues to drive her now, as a research scientist at Australia's national science agency, CSIRO, in Perth. "I had always hoped that I could work for CSIRO eventually," Louise beams.

ROCK STAR

LOUISE SCHONEVELD SHOOTS ROCKS WITH LASERS TO FIND NEW RESERVES OF CRITICAL

YES. YOU READ THAT RIGHT!

Louise shoots rocks with lasers using a piece of equipment called a laser ablation inductively coupled plasma mass spectrometer: "We make little particles and then we can count the elements in each of the minerals in the rocks." Traces of particular elements hint at whether the rocks come from near mineral deposits. Like nickel. It's an important mineral used in solar cells, wind turbines, electric vehicles and energy storage. And rocks can show us where to find it.

Most of Louise's time is spent in the lab analysing rock samples, but she does get to go out in the field from time to time. "Recently, we flew out to Kalgoorlie and took our four-wheel drive to one of the mine sites," she says. "We collected some samples for the mine geologists, brought them back and now my task is to analyse the samples in the lab."

Her advice to anyone interested in a career combining science and critical minerals? "Follow what you're interested in and reach out to people with those careers," Louise says. "See if you can visit some sites or do work experience." - Ben Skuse



RESEARCH SCIENT

@L Schoneveld

I HAD ALWAYS HOPED THAT I COULD WORK FOR CSIRO EVENTUALLY"

## Full STEAM ahead



## DRAWN TO SCIENCE

MARIANA OKSDATH MANSILLA IS EQUAL PARTS CREATIVE AND SCIENTIFIC, COMBINING BOTH HER STRENGTHS TO CREATE A ONE-OF-A-KIND JOB

ariana has always loved to draw. Growing up with artists as parents, sketching came naturally to the Argentinian-born creative, who was always encouraged through extracurricular classes and projects. But her other passion – which she speaks just as fondly of came a little more out of left field: "At school I became seriously fascinated

with science and the human body!"

SCIENTIFIC DESIGNER AND ILLUSTRATOR

Assuming - like most people do - that she had to choose between her love of art and science, Mariana (then based in South America) enrolled in a chemistry degree which led to a PhD in neuroscience at the National University of Córdoba, Argentina.

A move to Australia later, Mariana suddenly found herself with a cutting-edge research associate gig at the Centre for Cancer Biology - a world-class institute backed by the University of South Australia and SA Pathology – where she was championing a novel technique to grow human mini-brains.

And nope, according to Mariana the whole brain-growing bit wasn't even the

coolest part. "It was actually doing the scientific illustrations!" she says.



Awesome neuroscience gig aside, Mariana's creativity was calling. And, like any academic, she did what came naturally – enrol in another degree. "In 2020 I started a Master in Digital Art online, which was life-changing!" she says. "I learnt all about art, illustrations and the digital

IT'S MY JOB TO TRANSFORM COMPLEX SCIENCE INTO ACCURATE AND APPEALING IMAGES'

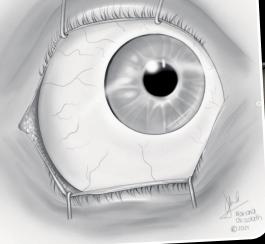
software that can help your imagination come to life."

Now, as a qualified scientist and illustrator, Mariana has combined her credentials to forge a career in both! Working for herself, she creates the sketches that sit in some of the country's top scientific journals and medical manuals. "It's my job to transform complex science into accurate and appealing images," she says. Recently she prepped a glaucoma surgical manual for eye surgery, designing 12 medical illustrations explaining the complex steps involved.

#### **Colourful career**

With the ultimate goal of creating her own Adelaide-based science communication agency, Mariana's now on the hunt for an awesome team that shares her passion for art and science.

And her advice for grads who feel torn between their creativity and STEM? "Know both disciplines! You have to find your way to learn science and art around your possibilities. It's fascinating to be a part of an emerging area!" — Cassie Steel





Inspired to pursue a career in science or the space sector?

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DANIKA SMITH WATER ENGINEER

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SIMONE BARAKAT AGRITECH PRODUCT MANAGER



Want the chance to ask the role models in the pages of this magazine your career questions in real life? We'll be hosting a live webinar with some of the featured STEM professionals on 23 February 2022.

Use this QR code to register to attend!

Miss out on the live event? Don't worry you'll find the full recording of this and all our previous (and future!) webinars at bit.ly/CwSTEMOnDemand



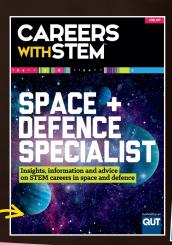
#### Scroll our science career-opedia

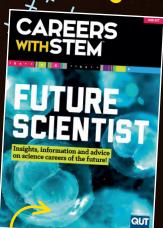
Not sure what kinds of science jobs are out there? From agricultural scientist to volcanologist, we've written down every science gig we can think of. Check it out here:

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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.

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