

CAREERS WITH STEMTM TECHNOLOGY

**TECHNICAL
PROGRAM
MANAGER**

Surprising
study
pathways
p12

Quiz:
match
your skills
to your
dream job
p16

Creative
tech
careers
p24

**SECURITY
ENGINEER**

**CLOUD
TECHNOLOGIST**

CAREERSWITHSTEM.COM

SUPPORTED BY

Google



Real-world IT starts here.

Kimberly Valenny's passion for equal opportunity in the tech industry began in high school, after looking around her IT class and noticing she was the only female in the room.

After school she went on to study a QUT double degree in Information Technology and Creative Industries, majoring in Computer Science and Interaction Design. It was here she had the opportunity to further advocate for female representation in IT, becoming

president of the Women in Technology student club and hosting the regular 'Women in STEM Industry Night'.

Now a Graduate Front End Developer at Deloitte Digital, Kimberly credits her QUT 'STEM tribe' for arming her with the confidence and support to pave her own path in the historically male-dominated tech industry.



**the university
for the real world**



GRACE CHUNG
HEAD OF GOOGLE
RESEARCH AUSTRALIA

THE DIGITAL DEMAND

Want a future-focused, in-demand, rewarding job? Technology is at the centre of the roles of today and tomorrow

You may have picked up this magazine wondering if a 'tech' job is for you, but the reality is that whatever your career aspirations, technology and digital skills will be relevant, if not crucial.

In its July 2022 report *Our Future World*, Australia's national science agency, CSIRO, singled out 'Diving into Digital' as one of seven global 'megatrends' that will shape our future. They found that the COVID-19 pandemic sped up the digital transformation that was already well underway and that Australia alone will need around 6.5 million more digital workers by 2025.

Another piece of recent research predicted that one million New Zealanders and 3.7 million Australians – that's about a third of the total workforce in each country – will need training in digital skills in just the next year to keep up with the pace of change.

So the right question to ask might not be whether you will have a career with technology, but rather: what will yours look like? In the pages of this magazine, you will find role models and stories that will help you start to imagine just that.

You'll read about people working with me at Google – using their skills to drive forward the cutting edge of tech, in fields like machine learning and cloud technology. There are also people using technology skills every day on the job in diverse fields ranging from sports to health and filmmaking.

And if you need any more convincing that the digital future of our region is bright, last year, Google announced its biggest-ever investment in Australia, with the \$1 billion Digital Future Initiative. This included the creation of Google's first-ever research hub in Australia, which I will be leading, along with my colleague, Professor Peter Bartlett. Our focus at Google Research Australia will be on artificial intelligence (AI) and we will need the best tech talent to help us explore some of the key scientific and engineering questions ahead for this exciting emerging field.

Maybe you'll join our team one day or maybe your future job doesn't even exist yet! But one thing is certain: tech skills and digital literacy will be in demand for the jobs of tomorrow.

Grace Chung

Head of Google Research Australia

**WE WILL NEED THE BEST
TECH TALENT TO HELP US
EXPLORE SOME OF THE KEY
SCIENTIFIC AND ENGINEERING
QUESTIONS AHEAD"**

SENIOR RESEARCH SCIENTIST, CORPORATION
FOR NATIONAL RESEARCH INITIATIVES

HEAD OF GOOGLE
RESEARCH AUSTRALIA

PHD IN ELECTRICAL ENGINEERING/
COMPUTER SCIENCE, MIT

SOFTWARE ENGINEERING MANAGER
AND ENGINEERING SITE LEAD, GOOGLE

BACHELOR OF ENGINEERING/
SCIENCE, UNSW

SENIOR RESEARCH
FELLOW, UNSW

What's inside ...

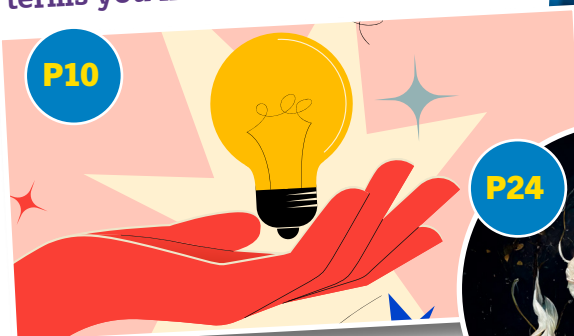
Study pathways

Wondering what (or where) to study for a career in tech? This 11-page section will get you on course!

P8 Talking tech

Ever asked, 'WTF are NFTs?' Check out our jargon buster for the tech terms you need to know

P10



P10 A to Z of tech courses

P12 Meet three people at Google with cool tech jobs – and surprising study pathways

P14 How do you get a tech job at Commonwealth Bank? The answer: so many ways!

P16 Pathfinder quiz: match your skills to your dream job

P18 STEM up your CV: discover how your part-time job could help you on your way to your dream STEM career

P24



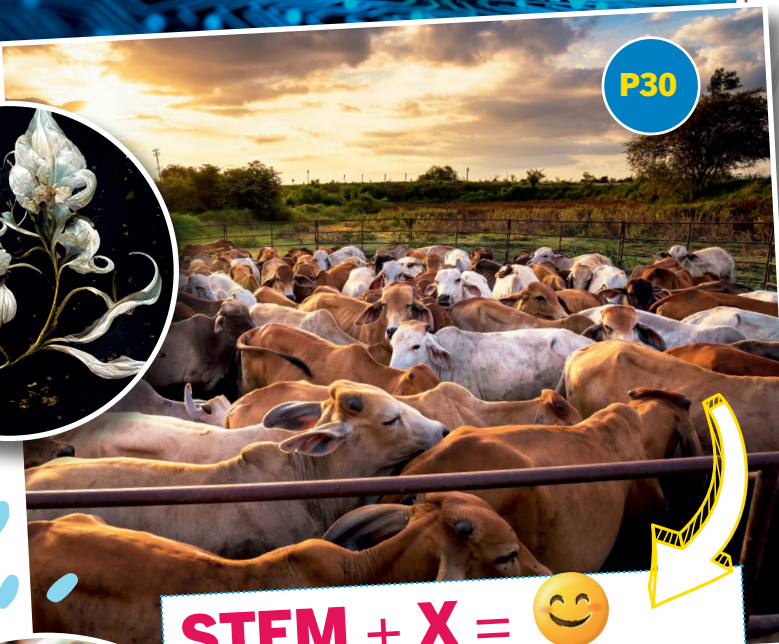
P18



P20



P30



STEM + X = 😊

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

Technology + ...

P19 What is STEM + X? And how to use it to find your dream job?

P20 Tech + Ethics

New tech is raising some big ethical questions! Combine tech knowhow with philosophy and big-picture thinking to help us answer them

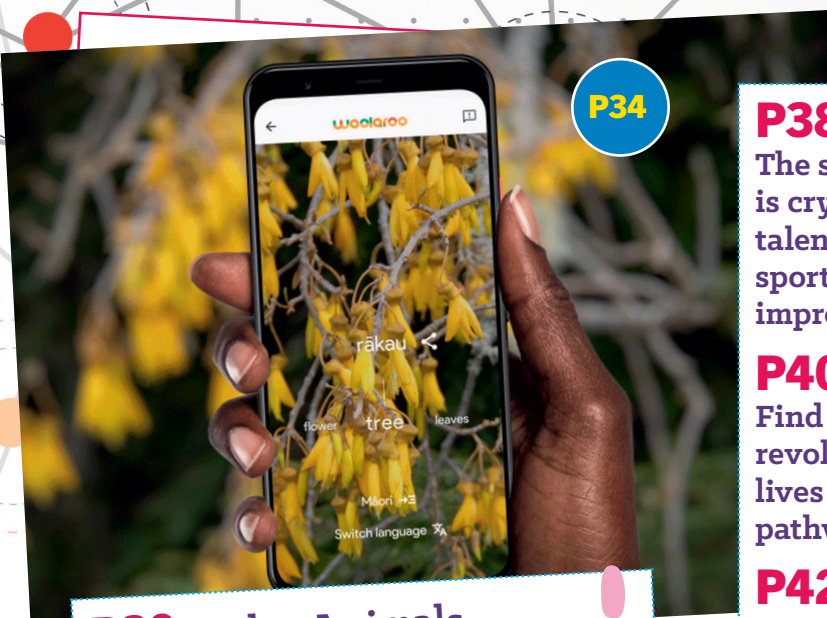
P24 Tech + Creativity

Not only are there plenty of creative careers in the tech sector, but your creativity could give you a serious edge

WHY TECHNOLOGY?

Now more than ever, technology is playing a crucial role in every aspect of our lives. It keeps us connected, working, learning... And it's in almost every industry and sector. That means the skills required to understand, use and build our digital world are increasingly relevant.

It's predicted that Australia will need 6.5 million additional workers with digital skills by 2025, according to the APAC Digital Skills Index 2020. That means it's extremely important that you equip yourself with tech skills at every stage of your educational journey, and whatever your career goals or pathway. The future is digital, and tech is for everyone!



P30 Tech + Animals

Love animals? Love tech? Get ready for a seriously cute career combining critters and computers

P34 Tech + Language & Culture

Use future tech to help us connect with, celebrate and conserve traditional languages and culture

P34

P38 Tech + Sports

The sportstech industry is crying out for tech talent to help make sports safer, more fun and improve performance

P40 Tech + Health

Find out how technology is seriously revolutionising healthcare, saving lives and opening up new career pathways in the process

P42 Tech + Crime & Justice

Fascinated about the world of crime fighting and the law? You might be surprised to discover the niche tech careers available to you!

P44 Next steps and fun stuff you can do right now as you forge your career in technology

P42



What's online ...



Podcast

Plug into our conversation with Harrison Mbugi, a security engineer at Google, in episode two of the new *Careers with STEM* podcast: *The Buzz About STEM*. Hear about his cool study path in computer science and IT, how he landed

his job at Google and his advice and tips on getting a career in tech. [CareerswithSTEM.com/podcast](https://careerswithstem.com/podcast)

Video

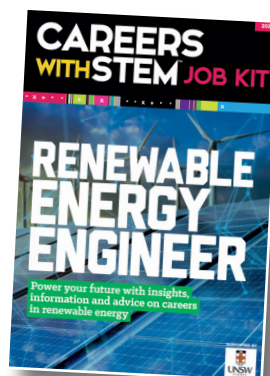
Wondering 'weather' a career in meteorology could be for you? Find out with our latest *STEM* career in 60 seconds video at [CareerswithSTEM.com/videos](https://careerswithstem.com/videos)



quantum technologies, working in space (including building and launching your own satellite!) plus rewarding Defence STEM careers in health and nutrition, engineering, apprenticeships, data science and cyber security. Find it, and all our special editions, at [CareerswithSTEM.com/magazines](https://careerswithstem.com/magazines)

Job Kit

Discover how to build a more sustainable future as a renewable energy engineer in our latest job kit. These free 8-page e-magazines give you the lowdown on specific STEM jobs. [CareerswithSTEM.com/job-kits](https://careerswithstem.com/job-kits)



Quiz

Find out how much you really know about the amazing career opportunities in the emerging field of artificial intelligence (AI) with our 'Can you guess these AI careers?' quiz. All our quizzes are at [CareerswithSTEM.com/quiz](https://careerswithstem.com/quiz)

Special edition

Careers with STEM: Defence 2022 is filled with real-world career profiles, as well as tips and advice from Defence personnel in a range of exciting fields. We explore



IN THE NEWS

We spell out a news headline from the world of tech

- **The headline:** Govt Backs Proposed 'Digital Apprenticeships' Scheme
- **Source:** [InnovationAus.com](https://innovationaus.com)
- **What?** Companies can sign up to a new deal where they employ a proportion of their workers through a 'Digital Apprenticeship' scheme: a vocational pathway into entry-level tech jobs, partly funded by the government.
- **When?** The scheme emerged from the Jobs and Skills Summit in September 2022.
- **Why?** The scheme is all about meeting the demand for tech talent, helping workers 'earn while they learn' in entry-level tech jobs, and has targets to improve representation of women, First Nations people, older Australians and veterans.

• **What we think:** This is a great move by government and business to improve equity in the tech sector, and a sign of how much demand there is for tech talent out there!



Staying on course

Wondering what – or where – to study to land your dream career in tech? Keep reading!

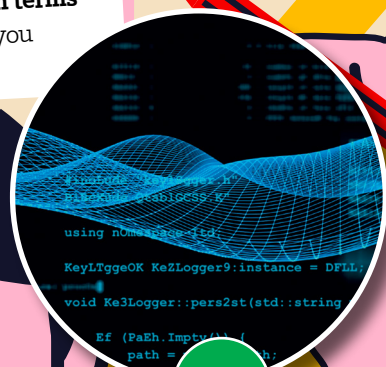


P14

There are so many different careers in the tech sector – and equally as many study pathways to get you there! The best bit? No two pathways have to look the same, and you can choose a course (literally!) that suits your strengths, passions and goals.

In our special Study Pathways section you can:

✓ **Get to grips with five tricky tech terms via our jargon buster** – because you need to know how to talk the talk.



P10

P18



✓ **Check out our A to Z of tech courses** – both vocational and at university – to give you an idea of all that's on offer!

✓ **Meet career mentors with awesome jobs** at big tech employers Google and Commonwealth Bank who all took totally diverse pathways to get there.

✓ **Take our path finder quiz** to match your skills to a dream job.

P12



✓ **Find out how on-the-job learning is totally part of the journey** – even in your casual, after-school job (and make sure it's included on your CV!)

WANT MORE?

CareerswithSTEM.com has you sorted for your study pathways information, inspiration and advice!

Head to [CareerswithSTEM.com](https://careerswithstem.com) and look under 'Study Paths' on the menu. There, you can search content matched to whatever stage of the study or career journey you're at, sorted under the following sections:

CHOOSING ELECTIVES

Before you choose what to do after school – you'll need to pick your electives in high school. This is your go-to spot with quizzes, tips and advice. Choosing electives for your uni degree? We've got you covered for that, too!

OPEN DAY

Open day season can be overwhelming! So many choices! Scroll through the Open Day section of our website for insights like how to make the most of open days, what questions to ask, new degrees to look out for, plus plenty of cool quizzes and videos.

CHANGING PREFERENCES

This is another pretty big step in any university study pathway – when you get to change your mind! We'll help you de-stress about this whole process and instead see it as an opportunity to make sure you're on the right path to your dream job.

VET

Going to university isn't the only way to kickstart a career in STEM – this section is packed with information and advice about forging your vocational STEM career path.



Australian Government

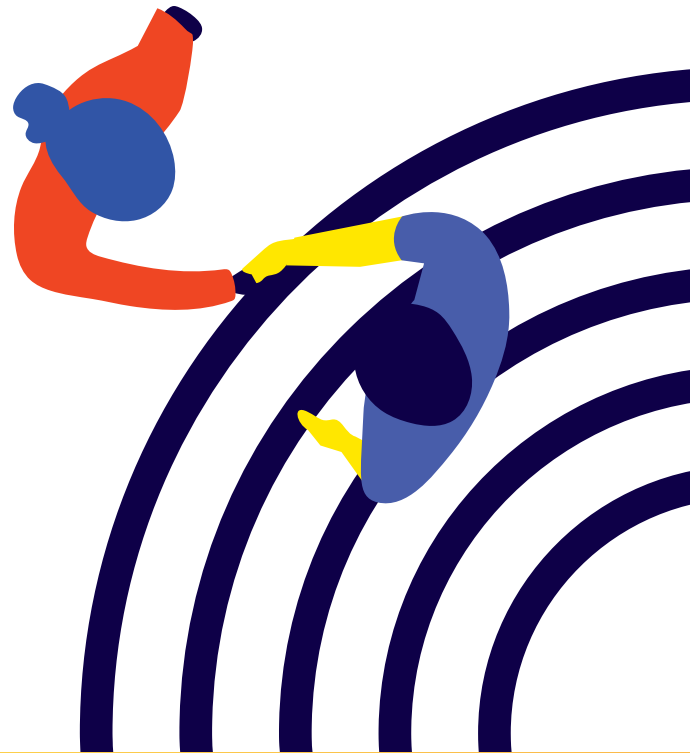


YOUR CAREER. YOUR WAY.

The National Careers Institute empowers Australians to achieve productive, rewarding and fulfilling careers and lifelong learning.

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

yourcareer.gov.au



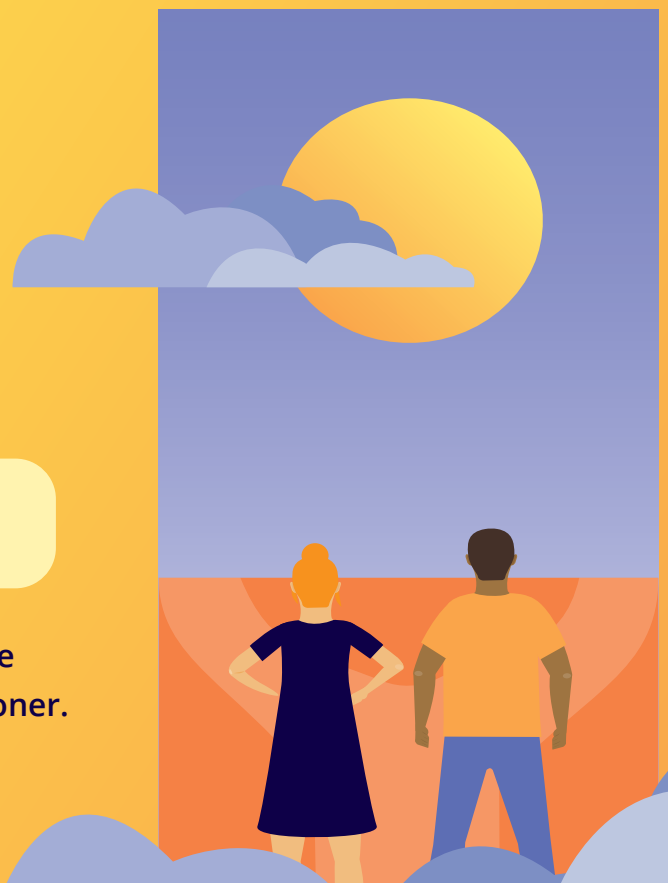
Figuring out a career can be exciting.

Are you 15 to 24 years old?
You can talk to a real person
to discuss your career options.

Text 'SLIS2022' to **0429 009 435**
Call **1800 CAREER** (1800 227 337)

Book in for a free 45-minute career guidance session with an experienced career practitioner.

yourcareer.gov.au/schoolleaver



TALKING TECH

Still trying to sort your blockchain from your NFTs?
We bust some of the jargon for you

BLOCKCHAIN

A blockchain is a digital ledger – a record of transactions or data stored on millions of computers at the same time. It delivers information fast, transparently and securely. Blockchain can store anything from currency (like Bitcoin) to medical records and can even be used for water management and transportation.

METaverse

Think of it as a network of 3D virtual worlds that you access with a virtual reality (VR) headset, which enables you to get around using voice control and eye movement. And it's not just for gaming. Everyone from social media companies to musicians and fashion brands are entering this space!

ARTIFICIAL INTELLIGENCE (AI)

AI refers to a computer or computer-controlled robot, programmed to perform tasks like visual perception, understanding natural language and decision making. Oh, and AI often boasts 'human' characteristics such as the ability to learn from past experiences, reason and self-correct.

NFT (NON-FUNGIBLE TOKEN)

An NFT digitally represents ownership of a 'non-fungible' (or unique) item. They're used to tokenise items like a piece of digital art, a song, a video, a GIF or even a tweet. An NFT can only have one owner at a time and they're stored securely on the Ethereum blockchain.

QUANTUM COMPUTING

This is all about using quantum theory (which describes the properties of materials at atomic and subatomic levels) to develop computers that can solve scientific and engineering problems too tricky for your trusty laptop or PC. We need these types of computers to run simulations and data analysis, and they'll be super-useful in areas like defence, health, AI and space – just to name a few! – Louise Meers



MONASH
University

MONASH
INFORMATION
TECHNOLOGY



• Thrive in the field of the future

Study IT at Monash



for graduate employability

30+ years

leading in real-world experience

The A-Z of tech degrees and diplomas

Looking for study pathway inspiration? This epic list of tech-related tertiary options should give you some ideas – *Cassie Steel*

A is for app development

Bachelor of Information Technology (Mobile Application Development), University of South Australia: Build up specialist skills in creating software – with a focus on mobile apps and platforms.

B is for blockchain

Diploma of Applied Blockchain, TAFE: Become fluent in one of the most in-demand tech trends.

C is for computer science

Bachelor of Computer Science, Monash University: Skill up in all things tech – operating systems, compilers and translators, and hardware.

D is for digital design

Bachelor of Design in Animation, UTS: Develop design and animation skills working on real client briefs.

E is for engineering

Bachelor of Information Technology (Data Engineering), TAFE NSW: Get the smarts you need to build systems, architecture and platforms to support Big Data solutions.

F is for FinTech

Bachelor of Commerce, UNSW: Walk away with the skills necessary to create a career in financial technology!

G is for game design

Bachelor of Game Design and Development, Macquarie University: Learn how to produce the next gen of popular video games and virtual worlds.

H is for HTML

Bachelor of Digital Media, University of South Australia: Develop the knowledge needed for a gig in documentary production, animation, visual effects, graphic design or web development.

I is for IT

Bachelor of Information Technology, Charles Darwin University: Kickstart a future in IT with problem-solving, creative thinking and communication skills.

J is for Java

Bachelor of Information Technology (Software Development), University of South Australia: Become fluent in Python, Java, Swift and SQL – highly sought-after skills in the local job market.

K is for K-12 tech ed

Bachelor of Education (Technology Secondary), Southern Cross University: You can specialise in teaching IT, digital media, engineering and more.

L is for law

Bachelor of Information Technologies/ Bachelor of Laws (Honours), QUT: Choose this combination for a career in cyber law, intellectual property, internet regulation, software development and e-commerce.

M is for machine learning

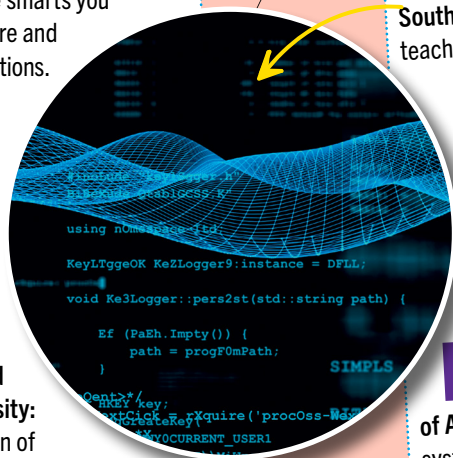
Bachelor of Computer Science, University of Adelaide: Graduate with skills in computer systems, AI and data!

N is for network engineering

Bachelor of Information Technology (Cyber and Network Security), TAFE NSW: Get prepped to work as a cyber security specialist!

O is for operations

Advanced Diploma of Computer Systems Engineering, RMIT: Score the smarts to design, install, validate, evaluate and operate systems.



P is for programming

Certificate IV in Information Technology (Programming), TAFE SA: Learn to create software and code in C#.NET, PHP/MySQL, Java and Python.

Q is for quantum

Master of Quantum Technology, The University of Queensland: Study advanced quantum physics and tech.

R is for reliability Engineering

Bachelor of Engineering (Computer Engineering), UNSW: A four-year deep dive into all things computers!

S is for software engineering

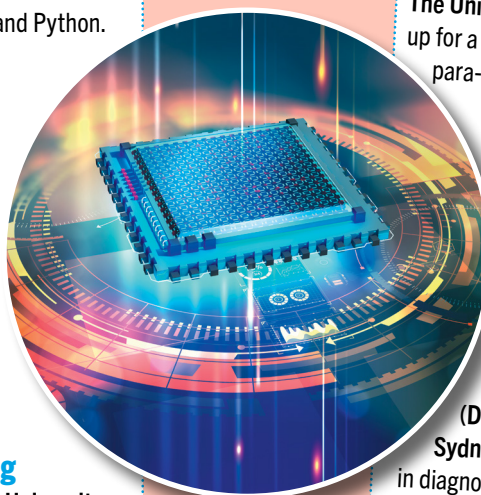
Bachelor of Software Engineering, University of Canberra: Become proficient in areas including design, coding and software specification.

T is for tech support

Bachelor of Information Technology, UTS: Designed with industry sponsors, the program develops an understanding of business and tech.

U is for UX design

Bachelor of UX and Web Design, Torrens University: Skill-up in web design to create better experiences for web and mobile platform users.



V is for veterinary technology

Bachelor of Veterinary Technology, The University of Queensland: Get set up for a career as a next-gen vet – or para-veterinary healthcare specialist.

W is for web development

Bachelor of Information Technology, Edith Cowan University: Develop skills in web development, data management, cyber security and more.

X is for X-ray technology

Bachelor of Applied Science (Diagnostic Radiography), The University of Sydney: Learn the tech and procedures involved in diagnostic health.

Y is for YouTube

Bachelor of Communication (Digital Media), Deakin University: Create podcasts, videos and more, while exploring data and analytics, virtual and augmented reality (VR and AR), AI and gamification!

Z is for ZZZZZ

Graduate Diploma in Sleep Science, The University of Western Australia: This postgrad course will get you up to speed in the latest tech used to help with sleep troubles.

LEARN IT.



WORK IT.

STUDY INFORMATION TECHNOLOGY ONLINE.

Like keeping up with the latest tech? Like solving problems?

TAFE SA offers a range of Information Technology [IT] courses that can be studied 100% online from anywhere in Australia.

Just because you're studying online, doesn't mean you have to do it alone. You'll still have the same level of support from TAFE SA lecturers and interaction with fellow students, and what's more, the flexibility of online study gives you freedom to study anywhere, anytime.

STUDY AREAS INCLUDE:

- ▶ CYBER SECURITY
- ▶ IT SUPPORT
- ▶ NETWORKING
- ▶ SOFTWARE DEVELOPMENT
- ▶ WEBSITE DEVELOPMENT

Note: to study online you will need access to a computer, tablet or smart phone with an up-to-date internet browser.

tafeSA



Government of
South Australia

TAFESA.EDU.AU/ITONLINE ▶

Choose your own path

Think you need a tech-specific degree to land a cool tech job? These three people all have successful careers at Google – but their study paths might surprise you

#1

NATALIE PIUCCO
GOOGLE CLOUD TECHNOLOGIST

BACHELOR OF BUSINESS

NATALIE PIUCCO'S ABILITY TO THINK LIKE AN ENGINEER COMBINED WITH HER BUSINESS BACKGROUND HAS ROCKETED HER CAREER INTO GOOGLE CLOUD

Natalie's thirst for collecting new skills has helped her build a stellar career, even though she didn't do a 'traditional' tech degree. Instead, she studied a Bachelor of Business for a unique combination of skills she calls her "superpower".

"We need people with a fusions of skills who can fall in love with the problem first and really unpack the human side – is this the right problem to be solving for? – then deeply understand how new technology might help to solve it," she says.

FUTURE-FOCUSED

In her current job as a cloud technologist, Natalie helps business and engineering leaders build new products or scale their business using Google Cloud technologies. She also helps businesses navigate tech and digital changes – so she has to be across a variety of tech, including artificial intelligence (AI), blockchain, data and cloud computing.

Natalie also does plenty of international travel. You might find her launching Google hardware products in Europe, running AI workshops in Japan, or at conferences in San Francisco.

As for her career aspirations? With tech changing so fast, chances are her next role doesn't exist yet, but it's likely you'll find her working with people who are applying emerging technology to complex problems that are yet to be solved, to make the world a better place.

LAUREN TROMPP

FIELD CTO + CLOUD STRATEGY.
GOOGLE APAC

GLOBAL PRACTICE LEAD.
CLOUD TRANSFORMATION. EMEA

SOLUTION ENGINEER.
GOOGLE CLOUD

ENGINEERING INTERN.
GOOGLE CLOUD

BACHELOR OF BUSINESS.
UNIVERSITY OF WOLLONGONG

BACHELOR OF FINE ARTS

ANDREW GRAY STUDIED FINE ARTS. MAJORING IN PHOTOGRAPHY – NOW HE'S DELIVERING GLOBAL SOFTWARE PROJECTS AT GOOGLE

After graduating with a photography degree, Andrew had second thoughts about turning his passion into a career. Instead he looked to other hobbies – like building and fixing computers.

Without any formal tech qualifications, he got a job providing support to Apple customers, then landed an internal IT support role at Google and – with on-the-job and self-directed learning, plus a graduate certificate in IT – Andrew's career has progressed to an awesome senior management role.

EVERY JOB IS A LEARNING OPPORTUNITY

Now leading software engineering projects across Google's ChromeOS, Andrew is proof a tech degree isn't the only path.

"Those with different education, experiences or backgrounds can be just as successful as those with the 'traditional' approach," he says. "Use every job as an opportunity to learn new skills and apply your old skills to new technical challenges."

BACHELOR OF FINE ARTS (PHOTOGRAPHY). NATIONAL ART SCHOOL

FAMILY ROOM SPECIALIST (REPAIR TECHNICIAN). APPLE

GENIUS (COMPUTER REPAIR TECHNICIAN). APPLE

INTERNAL CORPORATE IT SUPPORT. GOOGLE

CORPORATE OPERATIONS ENGINEER. GOOGLE

GRADUATE CERTIFICATE IN IT. UTS

TECHNICAL PROGRAM MANAGER. GOOGLE

SENIOR TECHNICAL PROGRAM MANAGER. GOOGLE

#2

ANDREW GRAY
SENIOR TECHNICAL PROGRAM MANAGER

BACHELOR OF SCIENCE BACHELOR OF ARTS

#3

LENA WANG
SITE RELIABILITY ENGINEER

LENA WANG COMBINED COMPUTER SCIENCE WITH ARTS. EQUIPPING HER WITH BROAD, FUTURE-FOCUSED SKILLS

Lena studied computer science as part of a Bachelor of Science, but her pathway into tech wasn't exactly typical, as she combined her degree with a Bachelor of Arts, majoring in philosophy.

"Tech has and will continue to shape our socio-political interactions, for both better and worse," she says. "I wanted to understand the innovations themselves in order to apply pressure on the industry in an informed way."

DIVERSITY, EQUITY AND INCLUSION

One way Lena has worked to apply pressure is improving representation for women and minorities. While still at uni, she was recognised for her work in this area by Google, receiving a Women Techmakers Scholarship (now known as a Generation Google Scholarship).

Before graduating, Lena undertook software engineering internships at Microsoft and Google, and is now a site reliability engineer (SRE) at Google, working behind the scenes to efficiently and automatically prevent or fix any tech outages. – Gemma Chilton

BACHELOR OF SCIENCE (PHYSICS, COMPUTER SCIENCE) / BACHELOR OF ARTS (PHILOSOPHY). THE UNIVERSITY OF SYDNEY

GENERATION GOOGLE SCHOLARSHIP. GOOGLE

SOFTWARE ENGINEER INTERN. MICROSOFT

SOFTWARE ENGINEER INTERN. GOOGLE

SITE RELIABILITY ENGINEER. GOOGLE

DESIGNING DIGITAL SPACES

Kartin Leung set out to be an architect – now she's using her design skills in the digital world and hasn't looked back

KARTIN LEUNG
DIGITAL PRODUCT DESIGNER,
COMMONWEALTH BANK

At uni, Kartin loved the idea of designing beautiful houses and wanted to become an architect.

But then after graduating with two degrees – a Bachelor of Interior Architecture and a Bachelor of Computational Design – she found herself chatting to a fellow grad who had ended up as a digital product designer, and was intrigued. “I wanted to try it out for myself,” she says.

Kartin landed a technology graduate role at Commonwealth Bank. This turned into graduate digital product designer roles first at x15ventures – Commonwealth Bank's startup accelerator – and then in the bank's Home Buying team, which looks after home loan customers.

MAKING LIFE EASIER

Kartin's role as a digital product designer is closely related to other tech roles you might have heard of: user experience (UX) and user interface (UI) design. As Kartin puts it, it's her job “to make something easy and nice for a user to use”.

Right now, she is working on a portal for home loan customers, with the aim of making the experience easier and more personalised for them.

Kartin says her field is evolving as technology evolves, with jobs becoming more niche. She predicts that next-gen product designers might specialise in virtual reality (VR) or 3D interfaces, or maybe even screenless systems, and she reckons artificial intelligence (AI) will have a big impact in her field of work.

Maybe Kartin will one day design a VR home, and her career goals will have come full circle!

NEXT-GEN PRODUCT DESIGNERS MIGHT SPECIALISE IN VR OR 3D

BACHELOR OF INTERIOR ARCHITECTURE
(HONOURS) / BACHELOR OF
COMPUTATIONAL DESIGN, UNSW

2022 TECHNOLOGY GRADUATE,
COMMONWEALTH BANK

DIGITAL PRODUCT DESIGNER,
COMMONWEALTH BANK

NEXT-GEN THINKING

Jackson Tait wasn't sure what career he wanted to pursue, only that he was all about innovation – and, for that, he's now on the perfect path

JACKSON TAIT
TECHNOLOGY GRADUATE.
COMMONWEALTH BANK

Jackson says he enrolled in a Bachelor of Technology and Innovation after high school because “it involved design thinking, was experimental and brand-new at the time”.

His first real introduction to coding wasn't until he kicked off his degree with a subject in basic coding. Thankfully, he “had a blast”.

After uni, Jackson landed a graduate position at Commonwealth Bank, where he's working on artificial intelligence (AI) used in the bank's networks. He sees AI as a super-exciting area for innovation, with “lots of emerging opportunities for data scientists and ethical considerations into how we interact with AI”.

DISABILITY NETWORKING

While Jackson is loving his work on AI, his job at has also given him opportunities to explore other areas he's passionate about. For example, he recently worked on a networking forum for Commonwealth Bank employees with disabilities.

“I have a disability myself and always wanted to chat and connect with other people with disabilities,” says Jackson, who is profoundly deaf in both ears and wears a Cochlear implant.

Jackson's career goals include one day launching a new tech startup. He might find even himself back at Commonwealth Bank – at x15ventures, among startups helping to revolutionise banking!

His tip for young people setting out on their own career journeys? “Definitely experiment, explore and research areas you're interested in.” – *Gemma Chilton*

**DEFINITELY EXPERIMENT,
EXPLORE AND RESEARCH AREAS
YOU'RE INTERESTED IN.”**

DIGITAL ACCESSIBILITY
AMBASSADOR, UTS

BACHELOR OF TECHNOLOGY
AND INNOVATION, UTS

2022 TECHNOLOGY GRADUATE,
COMMONWEALTH BANK

PATH FINDER

FOLLOW THE ARROWS TO FIND YOUR DREAM JOB IN TECHNOLOGY!

KEY



YES



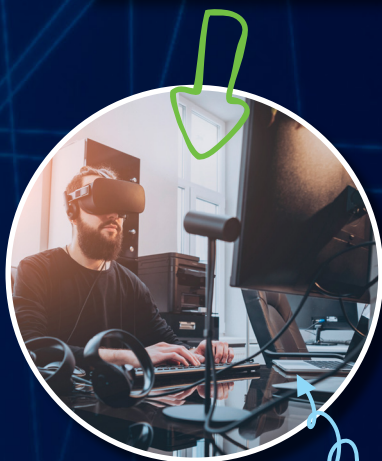
NO

START HERE...

You keep up with the latest tech and you're pretty much an expert on the subject

You already have some sweet coding skills

On the weekend, we'd find you playing video games



Game developer

These creative tech pros take a game from concept and pieces of code to a playable/interactive masterpiece.

Skills needed: Teamwork, imagination, eye for detail

What to study: Diploma of Game Development

Dream workplaces: Nintendo, Activision



Your friends would say you're definitely more logical than creative

Helping others is one of your biggest passions and you have a lot of patience

Art is your favourite school subject and you want a career where you can flex these skills on the daily



UX designer

A UX designer makes sure applications and programs are easy and enjoyable for the end user to use.

Skills needed: Research, visual design, critical thinking

What to study: Bachelor of Computational Design

Dream workplaces: Apple, Atlassian



Technology teacher

Head back to high school and equip the next gen with skills in design and technology, IT or software.

Skills needed: Communication, organisation, leadership

What to study: Bachelor of Secondary Education (majoring in STEM subjects)

Dream workplaces: Any high school

Right now, your plan is to study a Bachelor of Computer Science at university

After school, you love to binge watch true-crime docos

You're interested in working in or with artificial intelligence

You enjoy making presentations and find public speaking exciting

Statistics is one of your favourite areas of maths

You're invited to take part in a hackathon. Do you join in?

You're really good at spotting patterns and making predictions based on them

Board games and jigsaw puzzles are better than any game on your phone



Data scientist

By hunting down numbers to uncover new insights, you'll provide companies with the info needed to make smart business decisions.

Skills needed: Maths, curiosity, communication

What to study: Bachelor of Data Science

Dream workplaces: CSIRO, Facebook



Penetration tester

These cyber security experts figure out where and how a hacker might break into an organisation's computer system.

Skills needed: Problem-solving, teamwork, creative thinking

What to study: Bachelor of Cyber Security

Dream workplaces: Commonwealth Bank, Google



Software developer

Designing, coding, testing and maintaining programs and apps is all in a day's work for a software developer.

Skills needed: Attention to detail, time management, problem solving

What to study: Bachelor of Computer Science

Dream workplaces: Microsoft, Amazon

STEM up your CV

Your after-school gig can totally help you score a job down the track!

Need proof that STEM skills are used everywhere? Take a look at your casual job for starters!

Chances are that, between all the customer service, waiting tables, serving food and cleaning up, there is a range of transferable science, tech, engineering and maths smarts that you are using on the reg.

And yep, that means you can totally pop them on your CV when you're applying for work experience, internships and even future STEM roles! Here, we help you talk – and STEM – them up with the right language. – Cassie Steel

#1 HOSPITALITY



Your role: Waiting tables and serving customers
Talk it up: "Experience managing multiple projects, juggling clients and delivering outcomes to a deadline"

HIDDEN STEM SKILLS:

- Maths – tallying up orders and managing transactions
- Ratios – for example, milk to coffee or diners to tables
- Fluency with digital payment systems

#2

RETAIL



Your role: Serving customers, selling clothes and cleaning up
Talk it up: "Confidence liaising with clients, problem-solving, visual merchandising and managing e-commerce transactions"

HIDDEN STEM SKILLS:

- Fluency in e-commerce – coordination of online transactions
- Maths – confidence with addition, subtraction and percentages
- Proficiency in relevant retail-based computer software programs

#3

BABYSITTING



Your role: Minding kids
Talk it up: "Management of multiple schedules and personalities, requiring time management, attention to detail, quick thinking, flexibility, problem-solving and great people skills"

HIDDEN STEM SKILLS:

- Budgeting – quoting jobs and finalising payments
- Innovative thinking – particularly when it comes to planning of activities
- Strong leadership

#4

ODD JOBS LIKE DOG WALKING, CAR WASHING AND GARDENING



Your role: Helping out neighbours with odd jobs
Talk it up: "CEO and founder of a small, local business. Extensive experience in company growth, budget, scheduling, quoting, time management and leadership"

HIDDEN STEM SKILLS:

- Entrepreneurial smarts
- Project management and planning skills
- Initiative
- Advertising and budgeting expertise

DISCOVER YOUR DREAM JOB WITH STEM+X

Want to build a niche career path that combines STEM with your other passion? We have the secret formula!

What's STEM + X?

Careers with STEM's secret formula is all about combining STEM (science, technology, engineering and/or maths) with 'X' – aka, your other passion, hobby, interest or goal.

Think Science + Business = new space startup
Technology + Agriculture = smarter farming

Over the following pages, we've highlighted people and pathways combining technology with animals, creativity, crime & justice, language & culture, sports, ethics and health. Below are all our Xs you could combine with STEM to find your dream job!

SEARCH FOR STEM+X ROLE MODELS

Did you know you can search for STEM role models and career mentors on our website by their 'X'? Find people combining their maths skills with their passion for wildlife, or tech pros working in the creative sector, science business entrepreneurs and more – and get inspired about what your future career might look like!

Visit: careerswithstem.com/stem-x-role-models



HEALTH



LANGUAGE+
CULTURE



SPORTS

SPACE

SOCIAL
GOOD

ENVIRONMENT

DEFENCE

CYBER
SECURITY



CREATIVITY

DESIGN+
CONSTRUCTION

ECONOMICS

EDUCATION

FOOD+
AGRICULTURE

ROBOTS
AND AI

FASHION+
BEAUTY

RESOURCES+
ENERGY

QUANTUM

ANCIENT
WORLDS



ANIMALS

BUSINESS



CRIME+
JUSTICE

NOT SURE WHERE
TO START?

TAKE OUR
STEM+X QUIZ!



Let's get ethical

New technology is exciting, but there's also a risk it could cause harm. Never fear – digital ethics is here to save the day!

With great innovation comes great responsibility. Splitting the atom was an incredible breakthrough, but it also led to the atomic bomb. Technologies like artificial intelligence (AI), machine learning and robotics are developing at a rapid pace, so it's important to step back and ask questions about the consequences and how we can keep technology safe and beneficial to humanity.

Enter digital ethics, otherwise known as responsible tech – a relatively new field of research that is quickly becoming part of every major tech company.

Big retailers Bunnings and Kmart were recently in the news for their use of facial recognition software in stores. They claimed it was to help reduce theft, but they stopped using it due to concerns the system may breach privacy laws.

Digital dilemmas

How companies, governments and other organisations collect and use data about us is one ethical dilemma that needs to be solved. Others focus on how human biases can infect AI, causing it to make decisions that reinforce discrimination. For example, Amazon was using AI to scan through job applications to find the best candidates, but it found that the system gave preference to men.

Dr Simon Coghlan, senior lecturer in digital ethics at the University of Melbourne and Centre for AI and Digital Ethics (CAIDE), says that because these technologies are increasingly part of our lives, we'll soon all need a basic understanding of the ethics around technology.

"I think we'll probably all need to know a little bit about it," he says, adding that there is also a growing number of jobs in digital ethics as organisations start to realise its importance.

"Businesses are using AI and chatbots more, and collecting data about the people they do business with and making judgements about them. We'll need people who understand digital ethics, so that these businesses don't run into trouble and ruin their reputations, to help them work out when to use AI and when not to and how to use it responsibly."



DR SIMON COGHLAN
SENIOR LECTURER
IN DIGITAL ETHICS

BACHELOR OF VETERINARY MEDICINE,
UNIVERSITY OF MELBOURNE

PHD IN PHILOSOPHY,
AUSTRALIAN CATHOLIC
UNIVERSITY

MASTER OF BIOETHICS,
MONASH UNIVERSITY

LECTURER IN
PHILOSOPHY, AUSTRALIAN
CATHOLIC UNIVERSITY

VETERINARIAN,
EPSOM ROAD VET CLINIC

SENIOR LECTURER IN
DIGITAL ETHICS, UNIVERSITY
OF MELBOURNE

**TECHNOLOGY
+ ETHICS
+ STUDY**

Bachelor of **Arts (Professional)** with a major in **Ethics and Technology**, Swinburne University of Technology

Bachelor of **Laws (Honours)** with a minor in **Law, Technology and Innovation**, QUT

Bachelor of **Artificial Intelligence**, Deakin University

Bachelor of Science (**Computer Science**), University of Otago

**TECHNOLOGY
+ ETHICS
+ JOBS**

AI specialist
A\$92K (average) /
NZ\$56K (average)

Ethics officer
A\$83K-A\$145K /
NZ\$75K-NZ\$131K

Senior machine learning engineer
A\$96K-A\$152K

Digital strategist
A\$54K-A\$145K /
NZ\$155K (average)*

*Sources: payscale.com / salaryexpert.com

**WE'LL NEED PEOPLE
WHO UNDERSTAND DIGITAL
ETHICS SO THAT... BUSINESSES
DON'T RUN INTO TROUBLE AND
RUIN THEIR REPUTATIONS"**

"Will it mean nursing home residents get less care from real people or that family visit less often because they know the robots are looking after them?" Simon asks. "It raises ethical questions about how we manage aged care in the future."

Some of the job titles to look out for in digital ethics include: trust and safety officer; data or AI ethicist; and AI governance officer. But as it's such a new field, more new jobs are likely to emerge in the near future.

When it comes to what to study, Simon says it's not just about technical skills. He recommends studying things like computer programming, data science, human-computer interaction or machine learning, while combining that with humanities subjects like philosophy, politics, communication, media studies or law.

With the right combination of skills, you could be well on the way to tackling one of technology's biggest ethical questions: just because we can, does that mean we should? – *Chloe Walker*

Where you'll work

Tomorrow's technology ethicists might work at a big tech company – for example, Google's AI ethics research department employs 200 people (meet one of them on the next page!) – or you might work at a smaller consultancy firm that advises on how to use technology ethically. And experts in this space won't necessarily need loads of technical skills, with roles popping up in legal, policy, product and marketing teams.

Opportunities to become a digital ethics researcher like Simon are also growing. Simon's work delves into questions like whether or not robotic companions – such as robot pets in aged care facilities – are a good idea.

"Some people really like having the robots around, because it reminds them of their dog," he says. "But others find it insulting to be given an artificial animal."

It also raises the question of what happens as the technology develops – as the robots get better and better at communicating and performing tasks, could we get too accustomed to their help?



ALIGNING AI FOR ALL

From the ski slopes of Canada to Google's ethical AI research team, **Bec Johnson** is on the path to making our AI technologies more responsible

BECK JOHNSON
ETHICAL AI
RESEARCHER

I WANT TO
HELP BUILD MORE
RESPONSIBLE
TECHNOLOGIES
THAT REPRESENT
OUR GLOBAL
DIVERSITY"



@VoxBec

Bec has taken a winding career path from a degree in geology to managing a ski shop in Canada and researching cybernetic systems in large organisations. Now, she's an artificial intelligence (AI) researcher, PhD student and Google student researcher.

Bec has also racked up a number of degrees in both the sciences and humanities. All this experience has provided her with a unique mix of skills that she draws on when researching how to make AI technology more ethical.

"The analytical methods I honed during my geology days helped me develop rigorous empirical research capabilities. The skills I developed teaching people how to get down a mountain enrich my university teaching. The social science skills I developed in my second undergraduate degree and in my Master's by Research degree have provided me with deep inspiration in my PhD work in ethical AI," she says.

Thinking about responsible AI

Bec is a student researcher on Google's Responsible AI team, which looks at how AI is developed and used, and the best ways to build in fairness, privacy and security.

Bec does this with "large language models" – like those used in chatbots, for example. For a chatbot to respond appropriately, the data used to build the model behind it needs to be inclusive of a wide range of languages and cultural values. This is where Bec comes in.

"A lot of the models built today use data that is predominantly in English and often American in origin," she explains. "This means they're not always useful outside of English-speaking countries. It's important that those building AI models and systems use diverse datasets that are globally representative." – *Chloe Walker*

BACHELOR OF SCIENCE (GEOLOGY).
DEAKIN UNIVERSITY

MANAGER, BANFF SPRINGS SKI SHOP
+ THE SKI LOUNGE, CANADA

BACHELOR OF ARTS (COMMUNICATIONS).
UNIVERSITY OF CALGARY

MASTER'S BY RESEARCH IN COMMUNICATIONS
AND CYBERNETICS, UNIVERSITY OF SYDNEY

LECTURER,
UNIVERSITY OF SYDNEY

PHD IN AI ETHICS,
UNIVERSITY OF SYDNEY

FOUNDER, PHD STUDENTS IN AI ETHICS GLOBAL GROUP

ETHICAL AI RESEARCHER, GOOGLE


**TOM
BARRACLOUGH**
CO-FOUNDER,
BRAINBOX
 
CURTIS BARNES
CO-FOUNDER, BRAINBOX

Ethical entrepreneurs

MEET TWO UNI OF OTAGO LAW GRADS WHO LAUNCHED A NEW BUSINESS TO HELP GOVERNMENT AND INDUSTRY NAVIGATE LEGAL, ETHICAL AND POLITICAL QUESTIONS AROUND NEW TECHNOLOGY

Tom Barraclough studied law and political science at uni, because he always liked language and writing, and says he was particularly interested in “the philosophical side of things”. And while he doesn’t have any formal qualifications in technology (aside from tinkering with computers in his spare time), he was fascinated by the policy and legal implications arising from new technology.

It was while studying at the University of Otago that Tom met fellow law student Curtis Barnes, who was working on a master’s degree investigating legal and ethical questions around artificial intelligence (AI) – partly motivated by his love of the sci-fi movie *Blade Runner*!

INVESTIGATING DEEPPAKES

When Tom found out about funding available from the New Zealand Law Foundation to support research into law and emerging technology, he reached out to Curtis. The uni friends secured funding and used it to collaborate on a project investigating whether we need new laws to deal with the rise of ‘deepfakes’ (creepily convincing digital media that is actually generated by AI).

This collaboration evolved into a new business that Tom and Curtis founded, called Brainbox. Through Brainbox, they use their unique combination of skills to consult with government and business

on questions arising at the intersection of law, policy and technology.

“Finding people with expertise in either of those three areas is relatively easy, but finding people who sit in all of those worlds is very rare and very valuable,” Tom says.

But that skill combo probably won’t remain rare, he adds. In fact, Tom reckons law, policy and technology are all increasingly overlapping areas, and if you’re interested in a career in any one of them, you’ll want to get a handle on all three.

One project that Brainbox has worked on involved leading an initiative called the Action Coalition on Meaningful Transparency (ACT) – a global effort driven by tech companies, human rights and press freedom organisations, academics and investors to address concerns surrounding data use, data privacy and censorship.

Tom’s career advice? Try to find the sweet spot between what you love, what can earn you an income and what can make a difference! – Gemma Chilton

**FINDING PEOPLE WHO
SIT IN ALL OF THOSE WORLDS
IS VERY RARE”**

WORK OF ART

From designing websites to entire virtual worlds, there's so much happening in the tech sector for creatives

If your favourite subject at school is art or English, or if you're more likely to be found sketching in your spare time than coding, then the idea of a career in the tech sector might not be on your radar right now. But we're here to tell you that it actually should be!

Apps and websites don't just need to work – they need to be visually appealing and easy and enjoyable to use. Making that happen is generally the job of tech + creativity pros like user experience (UX) and user interface (UI) designers, who often come to the tech sector via a graphic design study pathway, combining their design knowhow with tech skills.

But they aren't the only tech + creative gigs on offer. How about building an entire virtual world straight from your imagination? That's the job of virtual reality (VR) and augmented reality (AR) designers, who create beautiful, realistic 3D digital interfaces, not just for video

games, but with applications in sectors like healthcare and education.

And no matter what job you have, creative people will have an edge in the tech sector, which is all about original thinking, playfulness and thinking outside the box. That's because creativity means more than being good at art; creativity means using your imagination and being an original and playful problem solver.

Ping-pong tables, scooters and video games in big tech company offices are about more than just making the workplace fun – they help workers tap into their playful, creative side, which tells you something about how important creativity is to tech employers! – *Gemma Chilton*

NO MATTER WHAT JOB YOU HAVE, CREATIVE PEOPLE WILL HAVE AN EDGE IN THE TECH SECTOR"

AI AS ARTIST



Artificial intelligence (AI) learnt how to beat humans at chess ages ago – now it's edging into the world of arts. Here are some cool examples

AI+MUSIC

Did you know AI already has its own music album? Released in 2018, *Hello World* started as a research project spearheaded by French AI expert and musician François Pachet. François is director of the Spotify Creator Technology Research Lab, where he designs next-gen AI-based tools to help musicians (tech + music career goals much?). You can listen to the album at helloworldalbum.net

AI+VISUAL ART

Salvador Dali was ahead of his time – but could the Spanish painter, born in 1904, ever have guessed an image-creating AI tool would one day be named after him? DALL-E was revealed by AI research company OpenAI in 2021. The machine learning model creates images and art from text prompts (think “baby daikon radish in a tutu walking a dog” – a real example!). DALL-E is one of many text-to-image AI systems out there – Google has one called Imagen and another was released in August by TikTok as an effect called AI Greenscreen. AI, show me a “person with mind blown by how fast tech is evolving”.



AI+WRITING

With a few prompts (a headline and some keywords) the following was generated by AI using the website copy.ai – which is just one of many such online AI-driven copy generators. TBH, we couldn't have said it better ourselves!

As you probably know, computers are good at math and logic. But can they write? In the last few years, we've seen AI programs get better at writing news articles and poetry. But is it possible for an algorithm to write a novel? The answer is: maybe!

There are plenty of algorithms that can generate text from scratch – like those used by bots on Twitter or Facebook Messenger. These programs use machine learning techniques that allow them to learn from examples of human language so that, over time, their output sounds more natural. These programs aren't great yet; they still have trouble with certain tasks like making sense of pronouns in sentences or using proper punctuation. And these shortcomings make it harder for machines to do things like write original prose or poetry without relying heavily on pre-existing material (for example, turning existing text into new sentences).

TECHNOLOGY + CREATIVITY + STUDY

Bachelor of **Creative Technologies**,
Auckland University
of Technology

Bachelor of
**Design (Digital
Technologies)**,
Deakin University

Bachelor of **Games
and Interactive
Environments**, QUT

Certificate IV
in **Information
Technology (Front-
End Web Design)**,
Australian Institute
of ICT

TECHNOLOGY + CREATIVITY + JOBS

3D animator
A\$40K-A\$83K /
NZ\$48K-NZ\$94K

UX designer
A\$54K-A\$111K /
NZ\$49K-NZ\$114K

Web designer
A\$43K-A\$93K /
NZ\$42K-NZ\$123K*

*Source: salaries according to
payscale.com

DYNAMIC DUO

MEET TWO QUT GRADS WHO BOTH LANDED AWESOME CREATIVE TECH JOBS IN GAMING

A uni networking event landed QUT grads Rachel Hempenstall and Oliver Van Dyk roles at Gameloft, a computer game publisher with 18 studios worldwide, including in Brisbane.

"Our job as QA [quality assurance] testers is to try and break the game," Rachel explains.

Rachel and Oliver met while studying a Bachelor of Games and Interactive Environments at QUT. In the third year of their degree, they worked together on a cool project creating a virtual reality (VR) training simulation for helicopter marshalling at aerospace company Airbus.

Oliver says his QUT degree study was the perfect background to create the training simulation. "Companies are coming to game engines to really immerse people in the experience."

It was when Rachel and Oliver were attending a Women in Tech networking event at QUT that they first connected with Gameloft Brisbane. They were invited to tour the Gameloft studio and show off their VR project. That was in October – by December, three out of the four project team members were offered jobs!

Oliver says such events are an important part of study at QUT. "There's always a chance to meet new people or a future employer."

I'M VERY MUCH ENJOYING PLAYING GAMES FOR A LIVING AND KNOW THAT I'LL BE ABLE TO PROGRESS TO WHERE I WANT TO GO"

Levelling up

Both Rachel and Oliver plan to climb the job ladder at Gameloft, from QA testing to their dream careers. With a passion for coding, Oliver's goal is to work in game-play programming: "Everything from dragging and dropping items to fighting the monster."

Rachel has a fine arts background and is interested in animation and 3D modelling. She's creating a portfolio of objects such as buildings, plants and people. Then she adds textures to make them look realistic. "I'm very much enjoying playing games for a living and know that I'll be able to progress to where I want to go," Rachel says.

COMPANIES ARE COMING TO GAME ENGINES TO REALLY IMMERSE PEOPLE"

#1



RACHEL HEMPENSTALL
QA TESTER

QA TESTER, GAMELOFT
BACHELOR OF GAMES AND INTERACTIVE ENVIRONMENTS, QUT
3D GENERALIST AND UI ARTIST, AIRBUS HELICOPTERS

#2

OLIVER VAN DYK
QA TESTER



TEACHING ASSISTANT, CODE CAMP

UNITY DEVELOPER AND SYSTEMS PROGRAMMER, AIRBUS HELICOPTERS

BACHELOR OF GAMES AND INTERACTIVE ENVIRONMENTS, QUT

QA TESTER, GAMELOFT

Skill time

Chris Williamson's VET study path won him a gold medal and landed him a cool tech job



CHRIS WILLIAMSON
ASSOCIATE SYSTEM ENGINEER

"I was never someone who was destined for university," says Chris – but that hasn't stopped him from learning a huge range of skills.

While Chris was studying a Diploma of Graphic Design at TAFE in Perth, his teachers encouraged him to compete in a WorldSkills competition. This was his chance to prove his burgeoning skills on a national stage in front of potential employers – and he won a gold medal!

Through his qualifications and graphic design work, Chris learnt about the principles of good design and also the psychological aspects of digital user interfaces and user experience. He then backed up these skills with a Certificate in Computer Systems Technology, through which he was able to better understand backend systems and develop his skills in technical troubleshooting. While working with Kinetic IT – his current employer – he has had multiple roles, including service desk technician and major incident management.

More recently, Chris has fallen in love with automation, as he says it means he can

MY EXPERIENCE IN MULTIPLE INDUSTRIES HAS ENDED UP BEING MY GOLDEN TICKET"

eliminate boring, repetitive tasks and focus on the fun things. Having learned PowerShell and JavaScript, his next role will be working on a platform designed to automate business tasks.

Chris says he's excited by the opportunity to use all the skills he's learnt to creatively and efficiently solve client needs.

"My experience in multiple industries has ended up being my golden ticket," he says. "These skill sets are a perfect combination for my next role: understanding how the platform works, the ability to build automation and understanding how to make the user interface easy for the intended audience."

As a VET Ambassador through the Australian VET Alumni, Chris is passionate about promoting VET STEM opportunities to help set other young people on their own successful study and career paths.

"Back when I was 16, I had no idea that WorldSkills would lead to a world of opportunities for me," he says. – Cassie Hart



WorldSkills Australia competitions can open up opportunities such as mentorship, travel and scholarships. You can learn more about them at worldskills.org.au

CERTIFICATE IV IN PRINTING AND GRAPHIC ARTS. TAFE

DIPLOMA OF GRAPHIC DESIGN. TAFE

GRAPHIC DESIGNER (FREELANCE). AUSTRALIAN ESPORTS

CERTIFICATE IV IN COMPUTER SYSTEMS TECHNOLOGY

SERVICE DESK TECHNICIAN. KINETIC IT

INCIDENT MANAGER. KINETIC IT

ASSOCIATE SYSTEM ENGINEER. KINETIC IT

VR STORYTELLER

Alejandro Davila started his career making TV and movies, then he decided to explore how to tell stories using newer tech



ALEJANDRO DAVILA
FOUNDER, CONICAL

For Alejandro, a film studies diploma at South Seas Film School in Auckland led to a career in art director and animation roles in New Zealand's film and TV industry for the next decade.

His big goal was to direct his own movie but, to achieve that, he decided to take a different path: making a movie using virtual reality (VR) technology.

"One thing I've learnt in my journey is not to get stuck on the medium," he says. "My goal was to be a film director, to tell stories, and what I found out was that I could tell stories with VR."

VR pioneer

The thing was, no-one in New Zealand had ever made a VR movie. So, in 2016, Alejandro enrolled in a Master of Creative Technology at Auckland University of Technology (AUT). His thesis question? "How can I tell stories using VR?"

As a pioneer in the space, Alejandro received support from the NZ government and film industry, and even travelled to the US to meet other VR researchers. By the end of his master's, he had produced the country's first VR movie, *The Green Fairy*, a short children's film about a fairy that lights up traffic lights.

The movie was a success and got lots of attention in the New Zealand press for being so innovative. Alejandro has since turned *The Green Fairy* into a children's book that uses augmented reality (AR) tech and a TV series.

His achievement also caught the attention of the corporate world: he was soon contacted by tech and appliances

chain Noel Leeming about using his VR skills to create more immersive training material. This led to the creation of Alejandro's company, CONICAL.

CONICAL provided VR and AR services to businesses, but that's now on pause. Alejandro was recently contacted by Epic Games to turn *The Green Fairy* into a video game – an exciting project that has enabled CONICAL to grow as a business and is taking all of Alejandro's attention right now.

Whether it's creating books, games or movies, Alejandro stresses that "technology is secondary to creativity". Instead, tech provides the tools to explore innovative ways to tell stories. – Gemma Chilton

**I FOUND OUT... I COULD
TELL STORIES WITH VR**



FILM + TELEVISION
STUDIES, SOUTH SEAS
FILM SCHOOL

ART DIRECTOR,
NZ TELEVISION

ANIMATOR,
NZ TELEVISION/
COMMERCIALS

MASTER OF CREATIVE
TECHNOLOGY, AUCKLAND
UNIVERSITY OF TECHNOLOGY

FOUNDER,
CONICAL

CANVA CREATIVE

FOR SOFTWARE ENGINEER **ABBEY VAN DE VORST**.
SCORING A ROLE AT CANVA HAS BEEN THE PERFECT
WAY TO KICKSTART HER CAREER

“I’ve always liked making things,” says Abbey, “and I loved computer science in high school, so when I found that engineering wasn’t for me in the first semester of uni, I made the switch.”

After completing her computer science degree at the University of Queensland, Abbey applied for every job she could find, including one at graphic design giant Canva. “I never expected to get an interview, let alone a job offer!”

The fast-paced environment appealed to her and Canva’s ethical values aligned with her own, so accepting a role as a backend software engineer was an easy decision.

“I wanted to do something I was passionate about, where the day-to-day work excited and challenged me,” Abbey says.

She thinks the best thing about working at Canva is learning new things and working with talented engineers, plus she loves combining technology and creativity.

“I’m constantly having to think outside the box to solve problems,” she says, “and that takes a lot of creativity.”

**I’M CONSTANTLY HAVING
TO THINK OUTSIDE THE BOX”**

WORDS: DANIELLE LUCAS

BACKEND SOFTWARE
ENGINEER, CANVA

BACHELOR OF COMPUTER SCIENCE,
UNIVERSITY OF QUEENSLAND

**ABBEY
VAN DE VORST**
CANVA

TECHNOLOGY • CREATIVITY: THE UNIVERSITY OF QUEENSLAND



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Gain a **Bachelor
and Master’s**
in four years
with a
**UQ vertical
dual degree**

Save time and double your opportunities with a vertical dual degree in computer science.

UQ’s vertical dual degrees enable students to gain a Bachelor and Master’s degree in four years – instead of five.

With a Commonwealth Supported Place throughout the program, students will study the Bachelor of Computer Science before commencing in a Master’s program in Data Science or Cyber Security.

Make yourself more employable and ready to launch into an exciting career with skills that are in high demand from some of the world’s biggest technology corporations.

study.uq.edu.au

TOTALLY WILD

Love animals? Next-gen vets and zoologists are seriously teched up

If you're keen on animals, chances are you've considered a career as a vet, zoologist, marine biologist or maybe even a wildlife researcher. It's an awesome way to combine your favourite STEM subjects with a genuine passion. And your colleagues? Cutest workmates ever!

But things have changed since the days of rocking up at a veterinary clinic and whipping out a stethoscope. Thanks to fresh tech, vets are fitting animals with wearable devices and manufacturing custom-designed prosthetics with 3D-printing techniques. Marine biologists are using remotely operated vehicles (ROVs) to explore the ocean floor. And it's safe to say that there's way more gear involved in wildlife tracking than a pen, paper and a pair of binoculars.

VET TECH

Animal scientists use so much cool tech on the daily! Here are just some examples

WILDLIFE ZOOLOGY + SOFTWARE ENGINEERING = DRONE TRACKING

Sophisticated signal-processing techniques are being used by researchers in Africa to detect heart and breathing rates of hard-to-reach animals – think zebras, antelopes, waterbucks and giraffes.

ANIMAL RESEARCH + PROGRAMMING = WEARABLE ANIMAL TECH

Used to capture stats like body temp, heart rate and pH levels, wearable tech is a very real and super-useful form of treatment for vets in 2022.

VETERINARY SCIENCE + BIOMEDICAL ENGINEERING = CUTTING-EDGE SURGERY

When it comes to surgical procedures on animals, the tech is sci-fi – with microchip fracture detection, laser eye surgery and 360-degree oral pill cameras all considered pretty routine.



Cyber safari

With cattle farmers tracking herds via satellite, it's safe to say the skill sets for animal jobs are changing – fast. Then there are marine biologists who double as data scientists, relying on cloud-based software systems as much as scuba gear.

Vanessa Pirota is one of them. Her PhD research on new conservation tech sent her on a hunt for whale snot (to track health), while ditching old-school collection methods.

“Marine scientists have traditionally used poles with collection devices at the end [to collect specimens], but this means close approaches to whales,” she says. “I’ve been investigating the use of emerging tech, like drones, which are a great non-invasive option.”

CAREER GEAR

TECHNOLOGY
+ ANIMALS
+ STUDY

Bachelor of
**Veterinary
Technology**, The
University
of Adelaide

Bachelor of
**Agribusiness /
Wildlife Science**
(dual degree),
The University of
Queensland

Bachelor of **Science
(Ecology and
Biodiversity)**,
Victoria University of
Wellington

Certificate III
in **Agriculture**,
TAFE WA

TECHNOLOGY
+ ANIMALS
+ JOBS

**Agricultural
engineer**
A\$46K-A\$173K /
NZ\$76K-NZ\$134K





Marine biologist
A\$44K-A\$122K /
NZ\$64K-NZ\$87K

Veterinarian
A\$57K-A\$106K /
NZ\$61K-NZ\$116K

Wildlife biologist
A\$44K-A\$72K /
NZ\$44K-NZ\$67K*

*Source: salaries according
to payscale.com /
salaryexpert.com

Test your knowledge! Match the jobs below to the tech they now rely on (answers at the bottom of the page)

THE CAREER	THE GEAR
 Marine biologist	A. Space satellites, GPS tech, self-driving vehicles
 Vet	B. Tree batteries, micro cameras, drones
 Ecologist	C. Sonar maps, submersible collectors, satellites
 Cattle farmer	D. 3D printers, oral pill cameras, CT scans

Creature career

When it comes to kickstarting a pathway into a tech + animals role, there are a couple of roads you can take. If you're keen on creating the tech that a vet or wildlife conservationist might use, studying a straight-up degree or diploma in software engineering, computer science or IT could be the go. Later, you can look for employers compatible with your passion for animals – zoos, unis, vet practices, research labs and agriculture companies all rely on STEM grads to employ and facilitate the latest tech developments.

But if the animal side is more your jam? Degrees and diplomas in wildlife conservation, veterinary science, animal science or even vet nursing still allow you to become fluent in the latest industry-specific tech.

Then there are pathways that combine both – like a Bachelor of Veterinary Technology, where you'd flex both your tech and animal knowledge smarts. – *Cassie Steel*

I'VE BEEN
INVESTIGATING THE USE
OF EMERGING TECH"

ANSWERS: 1. C; 2. D; 3. B; 4. A

Biologist bot

Forget what you thought you knew about animal biologists – these days, they're all fluent in tech

Dr Ludovic Dutoit is a conservationist and animal biologist based in New Zealand. Animals have always been his thing – but, as a kid growing up in Switzerland, he always pictured himself more as a vet or dog trainer.

"I liked animals but wasn't really sure what jobs involved working with them," he says. "Luckily, I had a really great high school biology teacher who inspired me to study biology at uni."

A couple of degrees later – plus a PhD in evolutionary genetics – Ludovic made the move to New Zealand. It was here that he first married his animal and tech smarts, scoring a gig as a bioinformatics specialist at the University of Otago, where he researches genetics and lectures on all things animals.

SCI-FI SCIENCE

Although traditionally 'science' based, in 2022 Ludovic's role demands fluency in the latest gene sequencing technologies. So much so that addressing questions like "How and why are females and males so different?" or "Where did this species come from?" demands a little less lab time and a lot more (computer) screen time.

I DO A LOT OF PROGRAMMING TO HANDLE BIG GENETIC DATASETS"

DR LUDOVIC DUTOIT
ANIMAL BIOLOGIST

"As a researcher, I use technology to reveal the stories evolution has left in the genes of animals," he explains. "I do a lot of programming to handle big genetic datasets and create a lot of pretty-looking [digital] graphs."

It's tech that he's stoked is slowly becoming more accessible, too.

TECH GENES

Right now, Ludovic is navigating epic datasets to determine what makes geckos male or female.

And his advice for students keen to team their STEM smarts with animals?

"Stay curious and try to find the answers to the questions you have. And reach out to scientists with jobs you like!" – Cassie Steel

LECTURER IN
EVOLUTIONARY BIOLOGY,
UNIVERSITY OF OTAGO

BIOINFORMATICS SPECIALIST,
UNIVERSITY OF OTAGO

PHD (EVOLUTIONARY GENETICS),
UPPSALA UNIVERSITY

MASTER OF SCIENCE (BEHAVIOUR,
EVOLUTION AND CONSERVATION),
UNIVERSITY OF LAUSANNE

BACHELOR OF SCIENCE (BIOLOGY),
UNIVERSITY OF LAUSANNE, SWITZERLAND

THE OYSTER WHISPERER

DESPITE GROWING UP MILES FROM THE COAST, **BRITTANY WILLIAMS** DEVELOPED A LOVE FOR THE OCEAN – AND NOW SHE'S HELPING SAVE BABY OYSTERS



BRITTANY WILLIAMS
MARINE BIOLOGIST



Brittany went to school in Canberra – about 150km from the coast – but she loved the ocean and biology was her favourite subject, so she signed up for a science degree majoring in marine biology.

After graduating, she started looking into different universities for the next step in her study path. During this process Brittany met Professor Sean Connell from The University of Adelaide, was impressed by his work and “decided to jump in the deep end”.

Reef music

It was at the end of her Honours degree in Adelaide that Brittany made the fascinating discovery that baby oysters would swim towards the “music” of the reef.

“These results showed me that using underwater sound could be an effective, affordable way to help our global ecosystems recover,” she explains. “By playing ‘ocean music’ at restoration reefs, using underwater speakers, I’ve been helping baby oysters find these reefs.”

Oysters are important to our oceans, filtering water, reducing erosion, storing carbon and providing habitat and food to other marine life. Brittany is now completing a PhD at The University of Adelaide to further her work in this area. – Cassie Hart

BACHELOR OF SCIENCE
(MARINE BIOLOGY). AUSTRALIAN
NATIONAL UNIVERSITY

ADVANCED OPEN WATER
DIVER CERTIFICATE.
PADI

BACHELOR OF SCIENCE
(HONOURS) (MARINE BIOLOGY).
THE UNIVERSITY OF ADELAIDE

PHD (MARINE BIOLOGY).
THE UNIVERSITY
OF ADELAIDE

IN

2022

GEN

UI

Free event
Wednesday 2
November, 2022

TY

2022



THE UNIVERSITY
of ADELAIDE

make
history.

South Australia's largest
design and technology expo.

INGENUITY

set.adelaide.edu.au/ingenuity/

oz MINERALS
event supporter

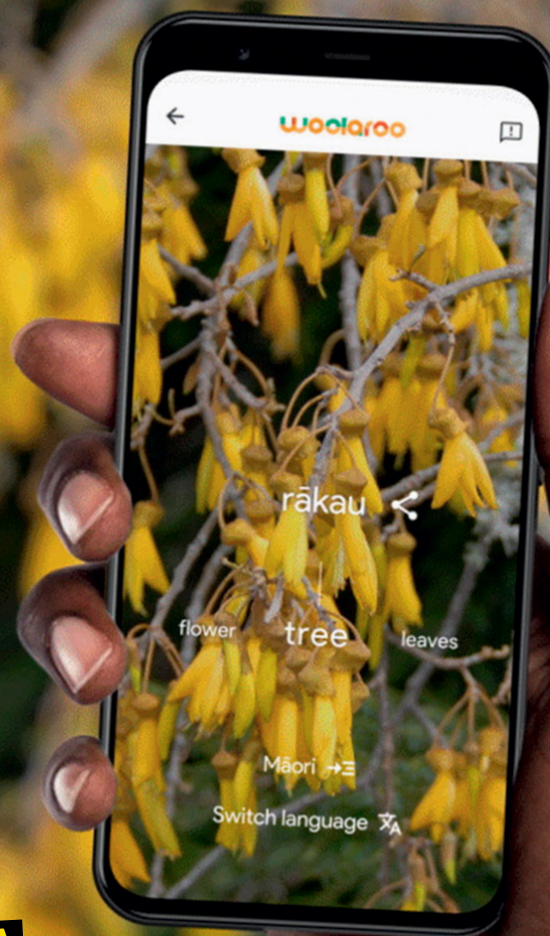
CONNECT TO CULTURE

Forget dusty old tomes in dark libraries – culture and heritage jobs are super high-tech

Australia is home to more than 250 Indigenous languages and around 800 dialects. Unfortunately, many of these are at risk of being lost as Elders are often the only fluent speakers. Only 120 languages are still used and 100 of them are considered endangered.

Language is an incredibly important part of culture. Indigenous people consider languages to be living things that connect them to Country, culture and ancestors. The race is on to create accurate records of Indigenous languages and for younger people to learn them so they can become custodians for future generations.

To highlight the need to preserve languages worldwide, Google created an app that teaches users the words for the objects around them in 17 endangered tongues. Users snap a photo and, using machine learning, the app identifies objects in the image and provides translations.



IDENTIFYING SACRED SITES WITH DRONES

Technology is also helping Indigenous people preserve other aspects of their culture. Gullara McInnes became a drone fanatic after attending a three-day camp held by geospatial education provider, She Maps. A member of the Wallara clan of the Koko-Muluridji people of Far North Queensland, Gullara was inspired to use drones to map important traditional sites.

Elders need to be able to properly identify these sites, but many of the areas are physically inaccessible due to heavy vegetation. "That's when I decided to use two drones – one to provide a bird's-eye view and the other to get under the tree canopy, all using modern drone technology," Gullara explains.

She also used drones to map where non-native plants were threatening the sites, so they could be safely burned back. Her savvy drone skills earned her the Caring for Country Award during NAIDOC Week in 2020.

GULLARA McINNES DRONE FANATIC



The app is called Woolaroo, a word from Yugambah – a language of South East Queensland – that means 'picture' or 'shadow'. Word lists and audio recordings were provided by the team at Yugambah Museum, who have been collecting local language for nearly 30 years.

TEACHING AI IN JINGULU

Indigenous language and culture apps are being developed all over Australia and New Zealand, and some schools are even experimenting with robots to help kids learn. But researchers at UNSW have found that one First Nations language could be useful in helping humans and artificial intelligence (AI) systems communicate with each other.

They found that the simple verbs used in Jingulu, a language spoken by the Jingili people

DR REBECCA PHILLIPS IS A UNIVERSITY OF AUCKLAND ARCHAEOLOGIST WORKING WITH COMPUTER SCIENTISTS TO BETTER DOCUMENT AND STUDY STONE ARTEFACTS



RECONSTRUCTING THE PAST WITH DATA AND AI

At the University of Auckland, archaeology researchers are using digital imaging, machine learning and AI to analyse stone fragments and determine whether they were once part of tools used by Māori ancestors. The system can also create a digital reconstruction of the original object to show what it might have looked like.

The project will help process and catalogue a huge number of artefacts and make them accessible to researchers worldwide. It's just one way technology can help bring the past to life!

I DECIDED TO USE TWO DRONES... TO ENABLE OUR LOCAL ELDERS TO IDENTIFY THE DIFFERENT SITES"

of the Northern Territory, translate well into AI commands. From there, they were able to develop a Jingly-inspired programming language called JSwarm.

HIGH-TECH SKILLS TO PRESERVE THE PAST

If the idea of working in culture and heritage intrigues you, the good news is there are loads of jobs in the sector that use tech skills.

Drones and laser scanners (LIDAR) have made it much easier to make digital maps of important sites such as Indigenous landmarks and heritage buildings. These services are often provided by consultancy firms that specialise in geospatial information systems (GIS). They not only need people to operate the drones, but also engineers and data analysts to design the systems and interpret the results.

Archaeologists use STEM skills, too, from creating 3D models of artefacts using computer-aided design (CAD) to interactive replicas of sites that can be explored in virtual reality (VR).

Libraries and museums are also high-tech workplaces. Data science and machine learning are transforming the way researchers delve into huge databases of text and images to make new discoveries about the past.

By studying an arts major like archaeology, digital humanities, Indigenous studies or cultural management, and combining it with skills in coding, drone tech, machine learning, AI, software development or data science, you could have a future in preserving the past!

– Chloe Walker

START YOUR CAREER HERE

TECHNOLOGY + LANGUAGE + CULTURE + STUDY

Certificate IV in **Aboriginal Cultural Heritage Management**, La Trobe University

Bachelor of **Arts (Digital Humanities)**, ANU

Bachelor of **Arts (Māori Development)**, Auckland University of Technology

Bachelor of **Digital Media**, University of South Australia

Master of **Heritage Conservation**, University of Auckland

TECHNOLOGY + LANGUAGE + CULTURE + JOBS

Archaeologist
A\$53K-A\$145K /
NZ\$46K-NZ \$73K

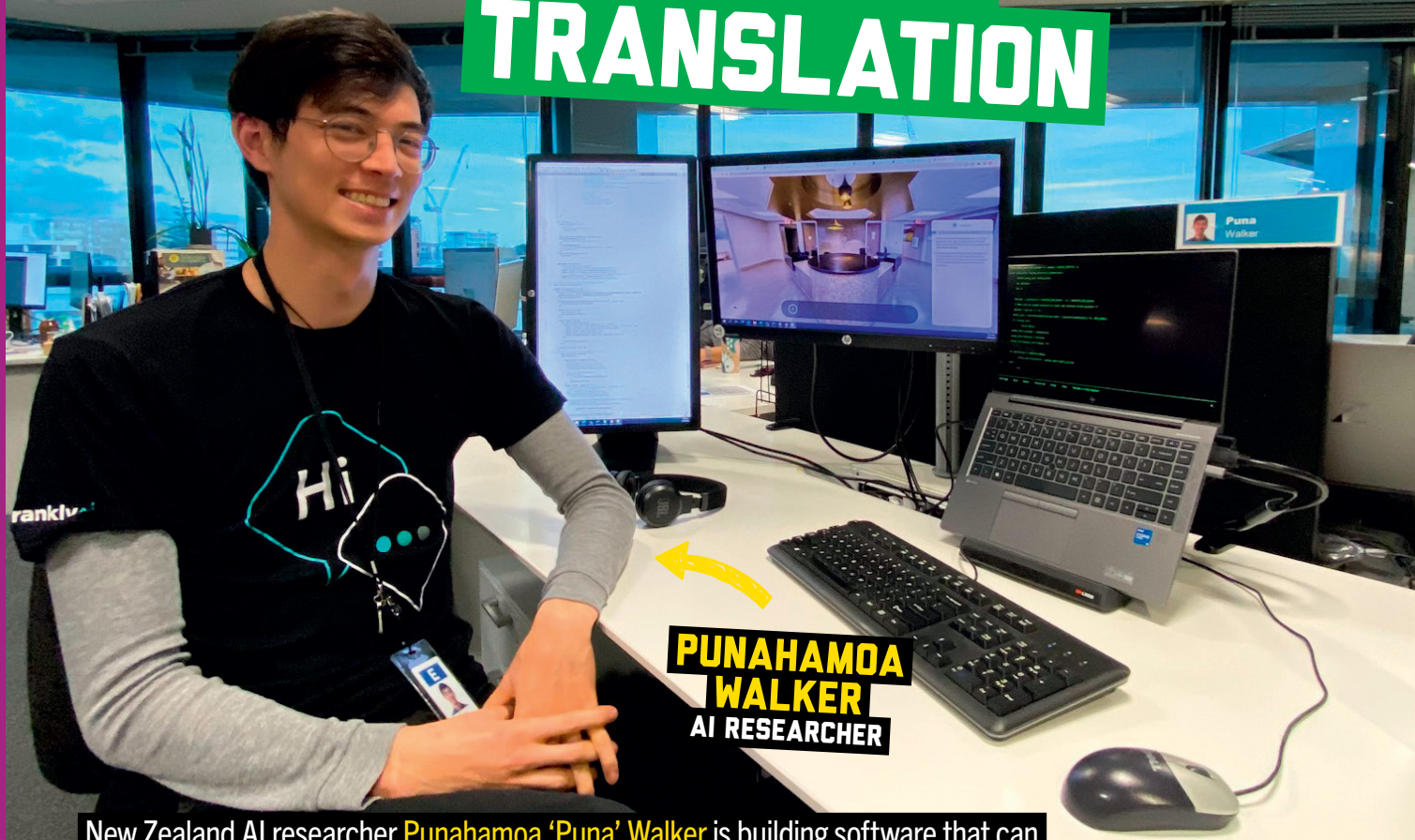
Archivist
A\$56K-A\$98K /
NZ\$53K-NZ \$68K

Museum curator
A\$44K-A\$90K /
NZ\$47K-NZ \$84K

Software developer
A\$51K-A\$104K /
NZ\$50K-NZ \$94K*

*Source: salaries according to payscale.com

FOUND IN TRANSLATION



New Zealand AI researcher Punahamoa 'Puna' Walker is building software that can speak to Indigenous communities in their language

Anyone who's tried to learn a language knows how tricky cultural nuances can be. So what if you're trying to teach a robot? Chatbots and the like are becoming part of daily life, but if they only speak English, lots of users will be left behind.

Artificial intelligence (AI) researcher Puna is hoping to change that. He works for FranklyAI, a New Zealand chatbot-like platform that can speak Te Reo Māori and its iwi (or tribal) dialects. It also converses in Samoan, Mandarin and Torres Strait Creole, with more languages to come, and is used by governments, universities and other organisations to consult with students, customers and the public.

"One of the biggest barriers to getting people involved is language and culture," says Puna. "We want to make the experience as good as possible, like you're talking to a real person. Different iwi dialects use different spellings or prefer different words. It means we need to put more effort into how we train it."

TRANSFERABLE SKILLS

In some cases, there are words that don't translate well into other languages and generational differences.

"We did a project for the University of Auckland, but we realised our translators don't necessarily know how an 18-year old speaks," he says. "We had to find students who were fluent in the languages to help us."

Puna originally studied electrical engineering and was pursuing a PhD in the US when the pandemic hit. He returned to New Zealand with a master's instead, but it was hard to find a job that matched his research – specifically, looking at how certain sounds can aid in health problems like seizures and dementia. Fortunately, he had transferable skills.

"Being in electrical engineering for so long, you do pick up some software and coding skills," he says.

The best part of Puna's job? Learning about other languages and cultures, as well as his own.

"I grew up in Auckland, away from my iwi (Whakatōhea), so this has been a good opportunity to reconnect with my people and my language. It's been a bit of a journey of self-discovery!" – Chloe Walker

WE WANT TO MAKE THE EXPERIENCE AS GOOD AS POSSIBLE

BACHELOR OF ENGINEERING (HONOURS)
(ELECTRICAL AND ELECTRONIC ENGINEERING).
UNIVERSITY OF AUCKLAND

PRODUCT DEVELOPMENT
INTERN, FISHER + PAYKEL
HEALTHCARE

MASTER OF ENGINEERING
(ELECTRICAL AND ELECTRONIC ENGINEERING).
UNIVERSITY OF AUCKLAND

SIGNAL PROCESSING ENGINEER.
HYLAND CONSULTANTS LTD

MASTER OF SCIENCE
(ELECTRICAL AND ELECTRONIC ENGINEERING).
GEORGIA INSTITUTE OF TECHNOLOGY

AI RESEARCHER.
FRANKLYAI

Community connections

Monash University research fellow **Delvin Varghese** designs tech to empower local communities

**DELVIN
VARGHESE**
RESEARCH FELLOW

RESEARCH FELLOW,
MONASH UNIVERSITY

PHD (TECHNOLOGY AND
COMMUNITY DEVELOPMENT),
UNIVERSITY OF NEWCASTLE

MASTER OF RESEARCH
(DIGITAL CIVICS),
UNIVERSITY OF NEWCASTLE

MASTER OF SCIENCE
(COMPUTER SCIENCE),
BANGOR UNIVERSITY

BACHELOR OF SCIENCE
(COMPUTER SCIENCE),
BANGOR UNIVERSITY, WALES

At uni, Delvin studied bachelor's and master's degrees in computer science. Then he turned to research to meet his dream of having a positive impact in the world. He completed a Master of Research and a PhD, both focused on using digital tech for social good.

"Discovering that I could do research in highly practical ways was exciting," Delvin says. "It wasn't as theoretical as the stereotypes."

Today, Delvin continues to make an impact with his research at Monash University's Department of Human-Centred Computing's Action Lab, where he engages with non-profits and NGOs (like Oxfam and the Red Cross/Crescent), as well as local communities, to help design and develop culturally appropriate technology and digital strategies.

**YOU NEVER KNOW
ALL THE OPTIONS UNTIL
YOU START EXPLORING"**

Meeting cultural needs

Delvin says his work is all about asking the community or group he's partnering with what *their* needs are and how they can be met – be they cultural, environmental, financial or any other type of need.

For example, one project involved developing new technology to enable health workers in rural India to remotely take part in training and mentoring sessions.

More recently, Delvin worked on a set of social media activities to enable NGOs who work with vulnerable young people to connect with them on the platforms they actually use, like TikTok and WhatsApp.

Delvin's global career has drawn not just on his computer skills and qualifications, but his skills in collaboration, project management, languages and international development.

"You never know what all the options are until you start exploring," he says. – Cassie Hart

On your marks, get set... GO!

Hop, skip or jump your way into an exciting career using technology to make sports safer, more competitive and more fun

Australia punches well above its weight in sports. We might only have the 53rd-largest population in the world, but we're the 10th most successful country in terms of Summer Olympic medals, second in tennis Davis Cups and number one in cricket World Cups. But did you know that Australia is also home to one of the best sports technology (sportstech) industries in the world?

It's worth \$3.1 billion a year and employs 10,850 people in about 600 companies. That's up from just 200 companies a decade ago! Sportstech is any technology that makes sport better. This can mean assessing an athlete's performance or health, engaging with fans in a more interactive way, improving equipment and clothing or even creating completely new esports.

For instance, Quipmo, based in Perth, is an online platform where users can rent adventure sports



3 SPORTSTECH CAREERS

1 Sports engineers design and develop technologies for the sporting industry – mainly gear, tools and equipment – that improves athletes' performance. This might mean making tennis balls that stay bouncy no matter how much you hit them, or designing sportswear that better protects the body.

2 Sports statisticians record and assess results from sports events to make predictions about future performance. They analyse data on a number of levels, including the sport, team and player performance, to identify trends that teams can use to their advantage.

3 Game developers (esports) use their imagination and coding skills to build and maintain game content in video games played in esports competitions. They make esports experiences unique, realistic and fun.



Making the right call at the World Cup

Victoria University sport scientists and their commercial company, Track, developed a 'limb-tracking' technology called Semi-Automated Offside Technology (SAOT) for FIFA. SAOT will allow referees to make offside calls in less than 10 seconds at the 2022 World Cup in Qatar.



A CHAMPION'S MENTALITY

SARAH WALL – A WINNER OF THREE NATIONAL NETBALL CHAMPIONSHIPS – IS NOW SCORING CAREER GOALS WITH HER DIGITAL COMPANY NETFIT NETBALL

Sarah has always been determined, having been selected for the Melbourne Phoenix netball team at a young age, balancing training with uni and a part-time job. About halfway through her 12-year career, however, she realised there were very few netball-specific resources to support and guide the community. To fill the void, she created NETFIT Netball in 2012.

“Building a business from scratch was just me doing and seeing what worked,” she says, “but, at the same time, utilising my exercise and sports science, and education research, as well as my own elite netball experience.”

Through the NETFIT App, downloaded by more than 61,000 people in 67 countries, the company offers netball-focused fitness, skills, coaching and nutrition advice.

Sarah puts her success down to adopting an athlete's mentality in everything she does.

“I want to be an example for women that, with hard work, consistency and fearlessness, you can build a career that's right for you,” she says. – Ben Skuse

SARAH WALL
FOUNDER + CEO,
NETFIT NETBALL

WITH HARD WORK, CONSISTENCY AND FEARLESSNESS, YOU CAN BUILD A CAREER THAT'S RIGHT FOR YOU"

ELITE NETBALL
PLAYER

BACHELOR OF EXERCISE
AND SPORTS SCIENCE,
AUSTRALIAN CATHOLIC
UNIVERSITY

DIPLOMA OF TEACHER EDUCATION
(PRIMARY AND SECONDARY),
THE UNIVERSITY OF MELBOURNE

FOUNDER AND CEO,
NETFIT NETBALL

gear and equipment for surfing, cycling and snow sports. Sydney-based Rugby.com.au is an online platform and app for rugby news, giving users behind-the-scenes stories and photos, match stats, commentary, player profiles, radio broadcasts and more. Catapult, which began in Melbourne and now employs more than 300 people in 25 countries, provides more than 2500 sports teams and organisations with wearable devices to monitor athlete health and performance.

Launch your sportstech career

With so many sports and ways technology can benefit them, the career options can be daunting. Where to start? Bachelor degrees in sport and exercise science are available at most unis, but people in the industry tend to begin with a broad science, engineering or computer science degree. Any degree in these areas will give you a strong base from which to launch your sportstech career. You'll gain

technical, programming and data analysis skills that can be applied in the sports industry and others, as well as soft skills like teamwork and problem-solving.

After graduating, a sports-focused master's or diploma can give your CV that extra pop to get you into this highly competitive field. UTS, for example, has a Postgraduate Diploma in Sports Media and master's degrees in High Performance Sport and Sport Management. From 2023, the Global Institute of Sport will also offer graduate degrees and professional education, including the Master of Science (Football Communications & Digital Marketing), delivered online and in Melbourne, with some teaching taking place at the MCG!

For the budding entrepreneurs out there, the Australian Sports Technology Network offers world-class facilities, education, connections and coaching through the Australian Sports Innovation Centre of Excellence next to Melbourne Olympic Park. – Ben Skuse

**START YOUR
CAREER HERE**

**TECHNOLOGY
+ SPORTS
+ STUDY**

Bachelor of **Applied Science in Sports Technology**,
University of Otago

Bachelor of **Biomedical Science**/Master of **Data Analytics**,
QUT

Bachelor of **Sport and Recreation**/
Bachelor of **Business**,
Auckland University of Technology

Diploma in **Esports**, QUT

Master of **Science (Football Communications and Digital Marketing)**, Global Institute of Sport

Master of **Sport Management**, UTS

**TECHNOLOGY
+ SPORTS
+ JOBS**

App developer
A\$52K-A\$153K /
NZ\$70K-NZ \$123K

Data engineer
A\$66K-A\$133K /
NZ\$60K-NZ\$122K

Statistician
A\$61K-A\$134K /
NZ\$44K-NZ\$98K*

*Sources: payscale.com /
salaryexpert.com

SAVE LIVES WITH TECH

From virtual reality cancer analysis to programming robot arms for surgery, technology and health can go hand in hand

Australia's digital technology workforce is growing. By 2026, experts predict there will be more than 1.1 million technology workers across the economy. During the COVID-19 pandemic, we saw the important role technology played in keeping us safe and healthy. And while contact-tracing apps have taken a back seat, telehealth and e-prescriptions are here to stay.

As technology advances, digital technology, data analysis and artificial intelligence (AI) skills will be in demand. Tech grads will be writing apps to monitor and collect data, keeping that data safe from cyber criminals, and helping clinicians interpret it accurately and efficiently. – *Nadine Cranenburgh*

COOL HEALTH TECH

Want to know how tech skills can save lives? Check out these inspiring examples:

GETTING VIRTUAL

Australian researchers designed a digital platform with VR-compatible software that lets medical specialists study cancer mutations and pathogens in interactive 3D.

DIGITAL HEART

A team at the University of Sydney developed a cloud-based 'digital heart' that uses AI to analyse data from wearable heart sensor patches and diagnose heart conditions.



STOPPING SEIZURES

Australian startup Epiminder combined an implant with a wearable device, machine learning software and a smartphone app to monitor brainwaves and predict epileptic seizures.

MORGAN WINDSOR
PHD RESEARCHER

BUILDING SURGICAL ROBOTS

MORGAN WINDSOR'S PATH IS FULL OF TWISTS AND TURNS AND THE SKILLS HE'S GAINED ALONG THE WAY HAVE LED TO THE EXCITING PROJECT HE'S WORKING ON NOW

Morgan's PhD project is a robot arm that will help surgeons place shoulder implants in the right spot. Robotic arms for hip- and knee-replacement surgery track optical markers drilled into bones – similar to those used on motion-capture suits in the movie industry. But this is harder to do in the shoulder, partly because the bones are smaller. "We're trying to come up with a system where the robot uses a camera without having markers artificially attached to the patient," Morgan explains.

Learning experiences

After high school, Morgan worked for a year, then started a Bachelor of Science (Physics). Three years in, he wasn't close to completing, so he took a job in a call centre. "A month after I did that, I said, 'I have to go back to school; I don't want to do this for the rest of my life'," says Morgan.

Morgan then enrolled in a Bachelor of Engineering at QUT, majoring in mechatronics engineering – a combo of mechanical and electrical engineering, with a focus on robotics. Upon graduating, he started as an electrical engineer at a company called Wave International, where he worked on projects in mining and resources.

But he "really missed working with robots and writing software" so, when the opportunity arose to do a PhD in robotic surgery at QUT, Morgan jumped at the chance! He says it's important to evaluate whether your career is going in the right direction and not be afraid to change it up. "You can put it down to a learning experience and try something else." – *Nadine Cranenburgh*

BACHELOR OF ENGINEERING
(MECHATRONICS), QUT

ELECTRICAL ENGINEER,
WAVE INTERNATIONAL

PHD RESEARCHER,
QUT

**THE ROBOT USES
A CAMERA WITHOUT HAVING
MARKERS ARTIFICIALLY
ATTACHED TO THE PATIENT"**



HEALTHY TECH JOBS

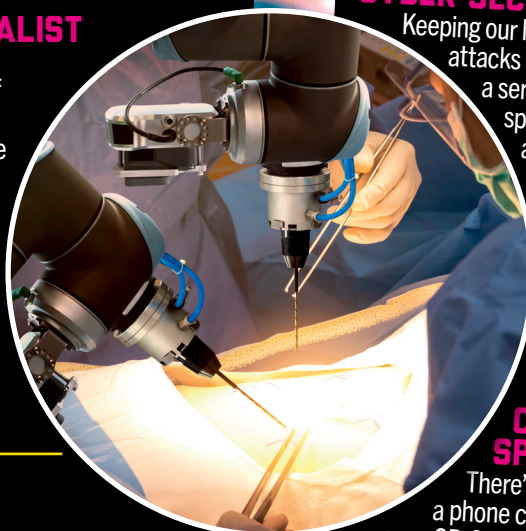
There are heaps of opportunities to combine tech skills with a career in health. Here are just a few:

AI AND MACHINE LEARNING SPECIALIST

Doctors and other health specialists process a lot of information to make their diagnoses. AI and machine learning specialists develop tools based on clinical experience that can speed up the process of data analysis and interpretation by providing automated analysis to be checked by medical specialists.

HEALTHCARE DATA ANALYST

Electronic patient health information is growing by the second and data analysts with clinical smarts have an important role to play. Healthcare data analysts work in government, hospitals, insurance companies and the pharmaceutical industry, so there are a lot of options!



HEALTH APP DEVELOPER

Whether you're looking for a better night's sleep, to monitor your exercising heart rate or keep tabs on a serious medical condition, there's an app for that. Health app developers will be in demand as we use more wearable devices to monitor patients remotely, so this is a career worth looking into.

ROBOTICS AND AUTOMATION ENGINEER

Robots can help perform precision surgery and keep an eye on vulnerable patients. They could also improve healthcare for patients in remote areas via remote ultrasounds and physical examinations. If you like the idea of working with robots, software skills are the key to programming them for specialist health applications.

CYBER SECURITY ANALYST

Keeping our health data safe from cyber attacks is a top priority. There's a serious shortage of skilled cyber specialists across every industry and healthcare is no exception. If you have an interest in outsmarting the bad guys and designing security systems to protect patients' data, this may just be the perfect career for you.

CLOUD NETWORKING SPECIALIST

There's more to telehealth than a phone call or Zoom consultation with your GP. Cloud networking specialists work with health providers to design systems that store and share patient information, medical images and test results. And emerging technology is opening up opportunities to collaborate with app developers, AI specialists, medical specialists and wearable tech designers to create systems that provide life-saving remote monitoring and diagnosis.

TECHNOLOGY + HEALTH + STUDY

Bachelor of **Health Sciences**, University of Auckland

Bachelor of **Health Sciences (Digital Health)**, Flinders University

Bachelor of **Health Information Management**, LaTrobe University

Bachelor of **Advanced Computer Science**, University of Western Australia

Bachelor of **Science (Information Technology)**, UTS

TECHNOLOGY + HEALTH + JOBS

Information technology specialist

A\$54K-A\$141K /
NZ\$49K-NZ\$102K

App developer

A\$53K-A\$116K /
NZ\$51K-NZ\$95K

Robotics engineer

A\$59K-A\$108K /
NZ\$49K-NZ\$80K

Cyber security analyst

A\$54K-A\$115K /
NZ\$51K-NZ\$144K

Data analyst

A\$54K-A\$107K /
NZ\$49K-NZ\$87K*

*Salaries according to
payscale.com

PARTNERS IN CRIME

Technology + crime and justice are the perfect career match – find out how you can combine them for a cool career that makes a difference!

Find yourself binge-watching true-crime documentaries and coding up a storm on the weekend or after school? You could be laying the foundations for a super-exciting career in tech + crime and justice! You might think these two areas have nothing to do with each other, but they're actually the perfect combo. Studying law sharpens your analytical, research and resolution skills, and gives you an edge in understanding ethics and how the legal system works. Pair it with tech knowhow – like understanding how IT systems and artificial intelligence (AI) can aid in legal procedures, or using computer science to boost your employability in cyber criminology – and you've future-proofed your career. Want more reasons to choose this cool career path? Here are five! – Louise Meers

2

YOU WANT TO WORK WITH INVENTORS

You could be an **INTELLECTUAL PROPERTY AND TECHNOLOGY LAWYER**

Assist innovative companies – from startups to big business – in registering, protecting and managing their intellectual property (think big tech ideas and inventions), as well as resolving disputes around it.

Tech used: Technical knowledge allows these types of lawyers to 'speak the language' of their clients.

1 **YOU DON'T WANT TO SIT AT A DESK ALL DAY**

You could be a **FORENSIC SCIENTIST**

Use scientific and technical knowledge to collect, examine and analyse information and evidence from crime scenes that can then be used in court.

Tech used: High-speed ballistics photography, 3D facial reconstruction and automated fingerprint identification.

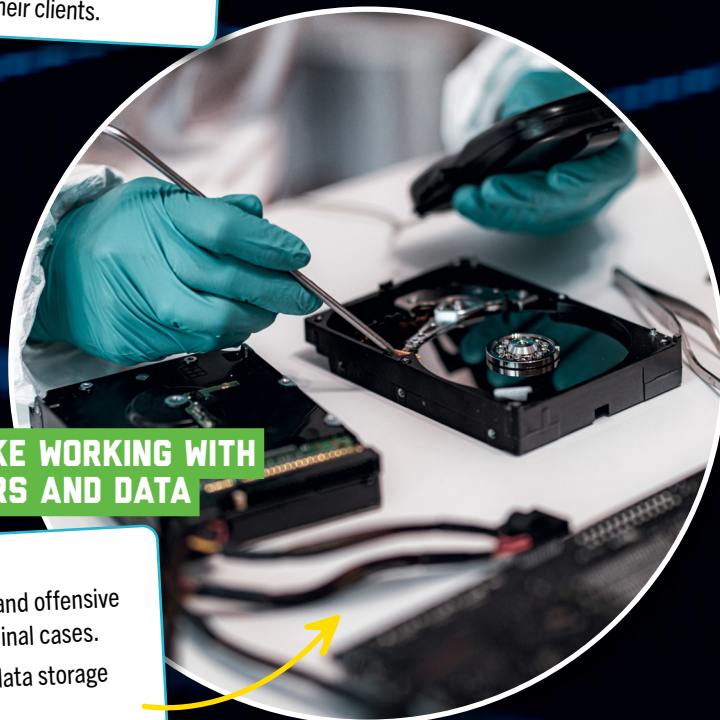
3

YOU LIKE WORKING WITH NUMBERS AND DATA

You could be a **DIGITAL FORENSIC EXAMINER**

These experts examine electronic evidence (aka data!) like graphic and offensive material, and present findings to the courts in computer-based criminal cases.

Tech used: Computer hardware and software, operating systems, data storage and encryption, and file recovery.



**TECHNOLOGY
+ CRIME +
JUSTICE
+ STUDY**

Bachelor of **Science**/
Bachelor of **Laws**,
University of
Auckland

Bachelor of
**Information
Technology**/
Bachelor of **Laws
(Honours)**, QUT

Bachelor of **Science
(Computer
Science)/Law**,
UNSW Sydney

**TECHNOLOGY
+ CRIME AND
JUSTICE
+ JOBS**

Forensic scientist
A\$58K-A\$103K /
NZ\$76K average
salary

Criminologist
A\$40K-A\$98K /
NZ\$57K average
salary

Data analyst
A\$54K-A\$107K /
NZ\$49K-NZ\$88K*

*Source: salaries according
to payscale.com

4

**YOU WANT TO STUDY A
COMPUTER SCIENCE DEGREE**

You could be a CYBER CRIMINOLOGIST

Use your computer science skills to investigate and understand cybercrime to help businesses, governments, banks and the general public find ways to protect themselves online.

Tech used: Penetration testing, data recovery and computer systems and networks.

5

**YOU WANT TO
WORK WITH AI**

You could be a LEGAL DATA ANALYST

They provide insights by analysing large sets of legal data, including making predictions about future behaviour based on past data.

Tech used: AI, databases and statistical programming.

**5 MINUTES WITH ...
PAIGE McELHINNEY FORENSIC SCIENCE
CONSULTANT AND DIRECTOR AT THE FORENSIC GROUP**



Read more about Paige's epic job
at careerswithSTEM.com



CwS: Hi Paige! Why did you want to become a forensic scientist?

Paige: We had a computer program at school where you could enter your interests and it would provide you with possible career options. I entered 'science' and 'outdoors', and it gave me 'forensic scientist'. From that moment, I was committed and never had a thought that I would do anything else. At university, I found a course that allowed me to study all the things I was interested in and got my dream job upon graduation.

CwS: What kind of tech skills are used in forensic science?

Paige: Some examples of the tech used in forensic science include:

- Laser scanning of crime scenes to capture and record detail
- High-speed photography to study blood-stain pattern creation
- Alternate light sources to visualise fluids
- DNA sequencer for DNA profiling
- Gas chromatography-mass spectrometry to identify different substances

**BACHELOR OF TECHNOLOGY
(BIOMEDICAL SCIENCE),
UNIVERSITY OF AUCKLAND**

**FORENSIC SENIOR TECHNICIAN,
INSTITUTE OF ENVIRONMENTAL
SCIENCE AND RESEARCH**

**FORENSIC SENIOR SCIENTIST,
INSTITUTE OF ENVIRONMENTAL
SCIENCE AND RESEARCH**

**FORENSIC SCIENCE CONSULTANT,
THE FORENSIC GROUP**

**FORENSIC SCIENCE CONSULTANT
AND DIRECTOR, THE FORENSIC GROUP**

6

ways to kickstart your tech career today

Keen on a career in tech and want to do something about it right now? Here are six things you can do to get things moving... while you're still in high school!



#1

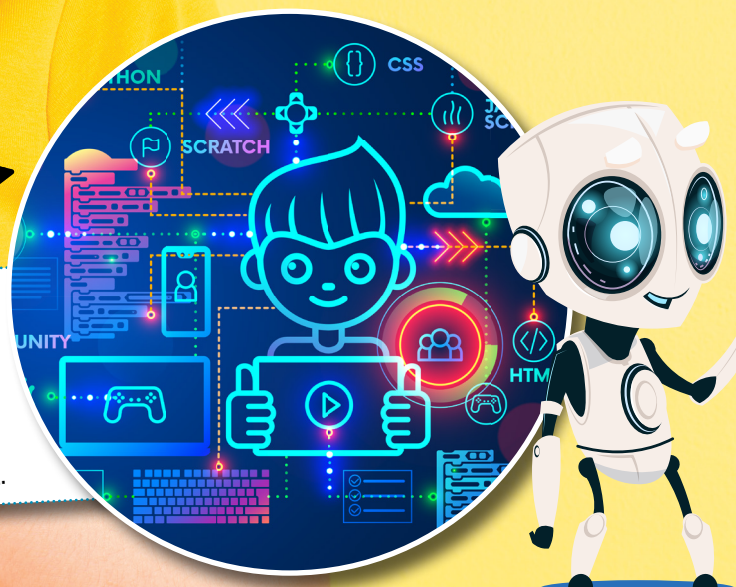
Choose the right electives

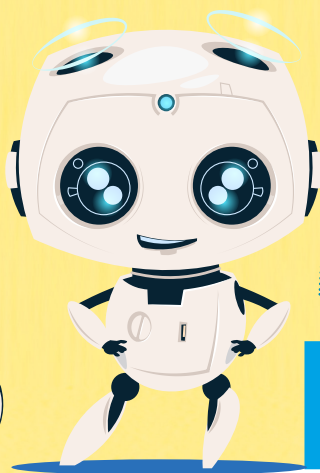
Maths and science will give you transferable STEM skills to take to any tech career. Then techy senior electives like computer science, digital solutions/technologies and information and processes technology will get you skilled. And don't forget to think about the specific future-focused tech career you might like and the electives that could help get you there. Fascinated by the ethics of emerging tech? Consider a philosophy elective! Want to get into user experience (UX) design? Choose design & technology as an elective.

#2

Teach yourself to code

Take advantage of all the free resources out there to help you learn to code. You'll be a programming pro before you even finish school! Go to bit.ly/cws-coding-resources for our full list.

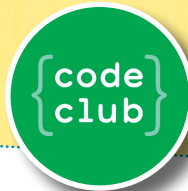




#3

Join a coding club

Keep your skills up and make new friends by joining an after-school coding club. Find one near you at codeclubau.org or codecamp.au

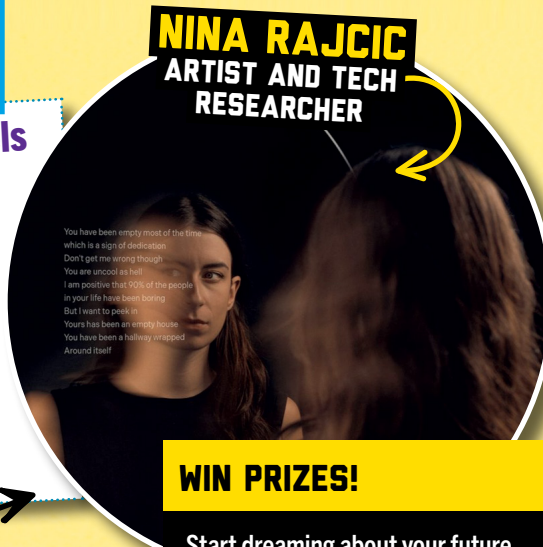


#4

Find mentors and role models

The best way to know what kind of tech career you want is to speak to people who have gone before you! You can browse all our profiles of real-life people in tech at CareerswithSTEM.com/tech-role-models

Find someone living your dream job? You could try connecting with them on socials like Twitter or LinkedIn. You might be surprised who is willing to give you first-hand advice, or even be a mentor!



NINA RAJCIC
ARTIST AND TECH RESEARCHER

#5

Learn about different tech jobs

It's hard to prepare for your future tech career when you don't have a handle on the kinds of jobs that are out there. We've put all the ones we can think of over at CareerswithSTEM.com/tech-careers-list so you can

start thinking about what might be a good fit for you. You could also head to CareerswithSTEM.com/job-kits and download one of our free eight-page guides with everything you need to know about specific jobs, including Game Designer & Developer, Information Security Analyst and Robotics & Automation Engineer (and we're adding new ones all the time!).



#6

Quiz yourself

Still stuck on which area of tech you should study or work in? Take our quiz to find the perfect pathway based on your skills and interests: bit.ly/tech-career-quiz

QUIZ!

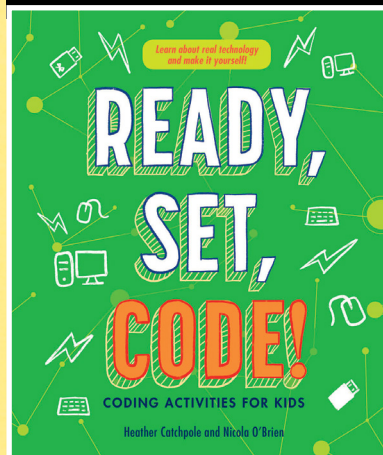
WIN PRIZES!

Start dreaming about your future tech career for the chance to win this awesome book prize

We want to know (in 50 words or less): What would your dream job in tech be, and why?

Send your full name, postal address and your entry to info@refractionmedia.com.au. The most creative entries will win signed copies of *Foresight* by Craig Ford (about a secret teen hacker) and *Ready, Set, Code!* by Heather Catchpole and Nicola O'Brien – full of fun, practical coding activities.

Check out the full deets and T&Cs at: CareerswithSTEM.com/terms-and-conditions

**REFRACTION**
MEDIA**CAREERS**
WITHSTEM.COM**Google**

Commonwealth Bank

Careers with STEM: Technology 2022 is a publication and trademark of Refraction Media. Copyright © 2022 Refraction Media, all rights reserved. No part of this publication may be reproduced in any manner or form without written permission. If you would like to reproduce anything from this magazine, email: info@refractionmedia.com.au.

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

This issue went to press on 5 October 2022. Printed in Australia by IVE.

Cover image: Lauren Trompp

Produced and published by: Refraction Media

Co-founder, CEO & Publisher:

Karen Taylor-Brown

Co-founder, CEO & Head of Content:

Heather Catchpole

Managing Editor: Gemma Chilton

Digital Editor: Cassie Steel

Digital Content Strategist: Louise Meers

Sub Editor: Karl Mayerhofer

Art Director: Katherine Power

Writers: Ben Skuse, Cassie Hart, Cassie Steel, Chloe Walker, Craig Ford, Gemma Chilton, Louise Meers, Nadine Cranenburgh

SUBSCRIBE AND ORDER COPIES:

CareerswithSTEM.com/subscribe

EDITORIAL & ADVERTISING ENQUIRIES:

Email: info@refractionmedia.com.au or +612 9188 5459

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

CareerswithSTEM.com

ISSN 2209-1076

