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THE POWER OF SCIENCE

Consider a rewarding career in STEM to shape the future and help tackle the world's biggest problems.

When Australian Prime Minister Malcolm Turnbull launched the Federal Government's National Innovation and Science Agenda in 2015, he was ushering in what I perceived to be an exciting new era for careers in science, technology, engineering and mathematics (STEM) in Australia.

With a greater focus on science and innovation we can expect to see both short- and long-term benefits for Australia and the rest of the world.

If you're someone who'd like to help develop new ideas and innovative solutions to shape the future for Australia, it's a great time to consider a career in STEM.

You could improve human health and the way we manage our environment, contribute to innovation in industry, and shape how we live and connect with each other now, and in the future.

When reflecting on my own career, I can see how fortunate I've been to benefit from a diverse, intellectually challenging and immensely rewarding career.

Just ask any of the scientists or engineers at the Australian Nuclear

Science and Technology Organisation (ANSTO), the operator of a large portion of Australia's most advanced scientific infrastructure including the OPAL research reactor in Sydney and the Australian Synchrotron in Melbourne. Each day they focus on delivering solutions for big issues relating to health and the environment, and finding new ways to help Australian industries be the best in the world.

ANSTO scientists and engineers have important qualities and skills that lead to success in research and in life. They have the capacity to work together effectively and connect with others, are naturally curious about the world, and most importantly, have a passion for excellence.

If you have these qualities I'd encourage you to consider a rewarding career in STEM. If we are to effectively tackle some of the seemingly insurmountable issues facing the world today, we're going to need the best minds and hearts to harness the power of science to do it.

DR ADI PATERSON, CEO, ANSTO



CAREER GOALS

Land a unique job by combining your skills with your passion. Laura Boness reports

Becoming a lab scientist or a mathematician could lead you to find a cure for cancer or discover a new galaxy. And by studying engineering or technology, you could create the next generation of smartphone or maybe your own personal robot. But even if studying straight science, technology, engineering and maths (STEM) subjects isn't for you, there's a growing number of exciting careers that require these skills.

By combining STEM skills with your interests, you can set yourself up for some of the most amazing and in-demand careers, or create an entirely new career.

Research shows that an estimated 75% of the fastest growing occupations require STEM knowledge and skills. According to a US survey by Career Cast, the top 10 jobs for 2015 were: computer systems analyst, occupational therapist, software engineer, dental hygienist, data scientist, biomedical engineer, statistician, mathematician, audiologist and actuary (mathematical problem solver and strategist).

Many of the industries where STEM skills are required, such as data science and engineering, are also evolving in response to the changing needs of society. This means we don't really know what the jobs of the future will be. If you combine your passion and skills with STEM, you're likely to be highly employable.

Maddalena Gabrielli, a sustainability engineer at the Brisbane Airport Corporation and a recent graduate from the University of Queensland, says employers favour flexibility, open-mindedness and skills that have been developed outside of study.

"They're looking for people with life experience, who've travelled, learned a language or done other interesting things."



Maddalena went on exchange in France, as part of her combined Bachelor of Engineering and Master of Engineering, after realising that she also wanted to travel and learn languages.

She studied for two years at the École Centrale Paris, as part of the Top Industrial Managers for Europe exchange program – a network of more than 50 engineering schools, facilities and technical universities where students spend two years at a partner university.

"You have to constantly grow and develop yourself. My advice is to find other interests outside of study and work – and go on exchange because it's awesome!"

Job ads and employer surveys often mention the importance of communication skills, as well as initiative, energy and the ability to work in a team.

Maddalena says networking is one of the most important skills in building her career. "Talk to everyone around you and take an interest in what they have to say. Because when you're new, you can guarantee that everyone around you has something valuable they can teach you."

MY ADVICE IS TO FIND OTHER INTERESTS OUTSIDE OF STUDY AND WORK – AND GO ON EXCHANGE BECAUSE IT'S AWESOME!

COMBINE AND CONQUER

It takes a team of creative thinkers and skilled problem-solvers to change the world. Fran Molloy reports

Studying science and engineering is all about problem solving, which often leads to practical, hands-on careers. But there's also plenty of room to unleash your creativity by combining science or engineering degrees with humanities, business, or creative arts.

Combined (or double) degrees allow students to do two degrees at the same time. Many unis now allow students to choose their own pair of degrees, though most also have standard combination degrees on offer. It's a powerful way to follow your passion while gaining expertise in a career-focused discipline.

People with broad skill sets who can work well with others are going to be in high demand. In 2015, the Australian Government announced \$127 million in funding to increase partnerships between universities and industry – part of a worldwide trend toward collaboration in research. See pp. 20–21 for just some of the available Bachelor degrees and double degrees in which you can study science.

Ecology and statistics

The work of influential Australian environmental scientist Dr Jane Elith serves as an example of collaboration across disciplines.

She works with statisticians, computer scientists and ecologists to 'clean up' species data from databases containing more than 50 million records.

"I don't like to get things wrong. That's why I team up with experts," she says.

With this data, Jane creates advanced computer modelling that can directly influence the survival of endangered species, like the greater glider – a large gliding marsupial found in the ranges and coastal plains of eastern Australia.

Jane's models are used worldwide by government, in agriculture and in environmental management to map the spread of invasive species, determine the impact of development on threatened plants and animals, and predict the impact of climate change on ecosystems and habitats.

Astronomy and film production

Following a PhD in extragalactic astronomy at the University of Sydney, and research on supermassive black holes in distant galaxies, Dr Tanya Hill took up a role at Melbourne Planetarium. There she collaborates with animators, designers, writers, actors, composers, musicians and sound designers to produce exciting and interactive planetarium shows for the public.

Tanya's presentations appear in more than 20 countries and include up-to-the minute research from scientists at the ARC Centre of Excellence for All-Sky Astrophysics. "The telescopes that we're building here in Australia are the next generation of astronomy," she says.



BUILD YOUR OWN DEGREE

There's a growing number of ways that students can combine undergrad degrees and gain skills leading to new and exciting careers.

Kaveh Ghezeli, head of undergrad recruitment at the University of Sydney, says combined degrees are increasingly popular, allowing students to substitute subjects from each course for electives, often completing two three-year qualifications in just four years.

"Employers prefer combined degrees because students tend to be well-rounded and have great communication skills. They become more creative thinkers when they broaden their areas of specialisation," he says.

Double up

Learning science at Monash is a unique experience tailored to your interests and skills – and ultimately to your future career

Ranked in the top 1% of universities worldwide, and home to the Australian Synchrotron and the Australian Stem Cell Centre, Monash University is at the cutting-edge of scientific research. But what's it like to study science at Monash?

"All the lecturers are keen to get students involved," says recent grad Tim Newport.

The science facilities and learning environments are pretty amazing too.

"The social spaces are superb and the classrooms are fresh, colourful and innovative," says Dr Chris Thompson, Associate Dean of Education in the Faculty of Science.

"The result is an active learning environment, providing hands-on experience and support, that students really engage in."

The new Monash Earth Sciences Garden is a stunning arrangement of nearly 500 rock specimens, weighing up to 14 tonnes. It's a hands-on approach to teaching geology, physical geography and atmospheric sciences. The Jock Marshall Reserve is a three-hectare wetland reserve at Monash Clayton that is home to amphibians and aquatic birds, where students can do practical activities like biodiversity comparisons.

In their first year, students explore a range of disciplines before pinning down a major. "You're not locked into a subject area until well into your third year," says Tim.

What if you have a passion for science but also want to explore another subject?

"I transferred to Monash in my first year because of their double degree," says Tim, who has since studied a range of other subjects from international history and linguistics to atmospheric science and philosophy. "Every one of the extra units counted towards my degree," he says.

"A science degree can be coupled with just about any other degree, which can double or quadruple your career options," adds Chris.

Preparing you for your chosen career is a central element of a science degree at Monash, says Lisa Happell, the science career education consultant. "There are loads of student programs available that can boost your employability after your degree," she says.

Science Student Ambassadors, for example, attend events like open days and school visits, and social media and marketing activities. This develops a network of contacts, and gives workplace-relevant training and skills in marketing, communications and social media.

There's also the Science Future Leaders Program, which prepares students for leadership roles. Activities include a series of leadership seminars and workshops and opportunities to practise leadership within the university, a chosen profession or the wider community. – Ben Skuse



TO GET THERE:
monash.edu/science

PHOTOS BY MARK CHEW

EXPLORING CLIMATE

MONIKA MARKOWSKA EXPLORES CAVES TO UNCOVER CLUES ABOUT CLIMATE

Exploring Earth's climate throughout the ages – palaeoclimatology – helps us understand how climate change will affect the planet in the future.

As a palaeo-environmental scientist at the Australian Nuclear Science and Technology Organisation (ANSTO), Monika studies palaeoclimate by looking at the growth of stalagmites. These limestone formations grow on the floor of caves from the accumulation of mineral-rich water that drips down from the ceiling.

"As stalagmites grow, they record the climate and rainfall variability," says Monika. "They grow in layers like tree rings that we can analyse."

Monika did a Bachelor of Science at Murdoch University and a Bachelor of Science (Hons) at UNSW Australia.

In 2011, she joined ANSTO's Graduate Development Program, which provides grads with hands-on experience, opportunities for fieldwork, guidance and mentoring from industry experts.

Monika loved the experience at ANSTO and decided to follow her passion for science through a postgrad degree in palaeoclimate research.

"The position with ANSTO has given me the opportunity to develop my research abilities and a broad range of other skills," she says.

"A real highlight has been the opportunity to travel and explore caves in England and China. I've also had the opportunity to unravel part of Australia's past climate variability." – *Carl Williams*

TO GET THERE:

Bachelor of Science (Environmental Science),

Murdoch University bit.ly/1VpSYzh

Bachelor of Science (Hons),

UNSW Australia bit.ly/1LfN4B7

ANSTO Graduate Development Program,
bit.ly/1QwcybW



Amazing jobs

From decoding million-year-old climate records to looking at a Tyrannosaur's last meal, ANSTO offers some of the most exciting projects in science and engineering. Cathal O'Connell reports

Protected by a futuristic steel mesh, the Open Pool Light-water (OPAL) reactor at the headquarters of ANSTO, the Australian Nuclear Science and Technology Organisation in Sydney, is surely one of the coolest buildings in the country.

ANSTO is home to Australia's most important national science facilities, and to scientists and engineers with some of the hottest jobs going.

OPAL is Australia's only nuclear reactor and one of the most advanced research reactors in the world. OPAL produces beams of neutrons for powerful imaging techniques – penetrating enough to detect a hidden crack deep inside an aircraft engine.

ANSTO's science facilities, including the Australian Synchrotron and the Centre for Accelerator Science, performs research addressing some big questions in science.

There are exciting opportunities for science and engineering students to kickstart their careers with ANSTO, through scholarships and industry placements for undergrads and through ANSTO's graduate development program.

Tracking air pollution

Atmospheric scientists do important work around climate change. It's also one of the most adventurous careers, says physicist Scott Chambers (pictured above), who recently returned from a five-week trip to Antarctica, where the sea ice in some regions is 2.5 m thick, and the only way through it is by icebreaker – a ship designed to navigate ice-covered waters.

Scott took the journey in December 2015, shepherding a unique instrument capable of tracking atmospheric radon – a naturally occurring radioactive gas.

As radon is generated over land but not over the sea, scientists can use radon measurements to figure

out if the air has passed over land recently, which is vital for understanding global air currents and how atmospheric pollution is transported around the Earth.

"We've developed the most sensitive detectors of atmospheric radon presently available in the world," says Scott.

When researchers at Korea's Polar Research Institute wanted to set up a radon detector at their new Jang Bogo Station in Antarctica's Terra Nova Bay, they called ANSTO.

"They want to find out how much pollution comes to Antarctica and where it comes from," says Scott.

ANSTO's expertise in radon detection complements its world-leading facilities for isotope analysis at its Centre for Accelerator Science.

ANSTO's four accelerators (Antares, Star, Vega and Sirius) sift out atoms with different atomic weights for use in environmental science, from geology to archaeology.

TO HAVE A FOSSILISED EMBRYONIC DINOSAUR, AND ACTUALLY SEE ITS FACIAL MUSCLES – IT'S JUST AMAZING.



Anti-leukaemia drug development

The Australian Synchrotron, owned by ANSTO, is the size of a football field (pictured right). It works like an incredibly powerful microscope, using X-ray and infrared light a million times brighter than the Sun to reveal the super small world of atoms and molecules.

As electrons whizz around the 216 m circumference ring of the Synchrotron they emit high energy X-ray and infrared light, which are directed down nine beamlines for use in nine different state-of-the-art instruments.

Dr Tom Caradoc-Davies is a beamline scientist helping researchers who come to the Synchrotron to study everything from ancient artworks to anti-cancer treatments.

Tom works on two instruments dedicated to figuring out the atomic structure of proteins.

"Proteins are molecular machines, and when you understand their structure you can understand how they work," he says.

Scientists at the Walter and Eliza Hall Institute of Medical Research in Melbourne recently discovered a form of drug that stopped the growth of leukaemia in its tracks. The drug was previously causing serious side effects because it affected proteins in the body not involved in the cancer. So the researchers used the Australian Synchrotron to figure out the atomic structure of the proteins they didn't want to affect, and modified the drug – reducing its side effects.



This kind of breakthrough is what makes Tom want to come to work.

"Seeing these drugs come through the lab and into the clinic, and knowing the Synchrotron played a role, is fantastic," he says.

Dino bones

Dr Joseph Bevitt (pictured above top) took an instrument designed for engineering applications, and used it on fossilised biological samples, revealing a new way for palaeontologists to study dinosaur bones and the preserved soft-tissue remains of ancient organisms.

When palaeontologists carve a dinosaur bone out of the rock, they lose valuable information that may lie preserved in the rocks. But, as Joseph explains, using beams of neutrons generated by OPAL, scientists peer into the depths of the rock itself, and see surprising features. "You can actually see remnants of ancient skin, muscle, feathers, blood vessels and nerves."

The precise imaging technique is called neutron tomography, and it

works in a similar way to medical X-ray imaging. But while typical X-rays only show dense materials like bone, neutrons can reveal soft tissue, signs of disease and the process of decomposition. The technique was first developed as an engineering tool, but it's also useful for studying rare biological samples.

ANSTO's neutron imaging instrument, nicknamed Dingo, is the only one in Australia.

"This instrument is really world class," says Joseph, adding that people send samples from all over the world to be imaged on Dingo.

Joseph has also been looking inside the ancient skulls of early mammal-like reptiles to investigate brain structure, a Tyrannosaurus stomach to figure out what its last meal was, and even the earliest-known fossilised dinosaur eggs to study the embryos and how they developed within the egg.

"To have a fossilised embryonic dinosaur and actually see its facial muscles – it's just amazing," says Joseph.

TO GET THERE: www.ansto.gov.au

Mass data

Choose a career in the wide-open field of bioinformatics, and help save the world. Fran Molloy reports

Torn between science and maths, and tempted by computer science? You could be a candidate for one of the most fascinating and fastest-moving areas of science: bioinformatics.

Bioinformaticians study massive datasets of biological information, which can help us to create personalised medical treatments and better understand diseases.

They are doing groundbreaking work in Australia and around the globe, and bioinformaticians are in high demand, with graduates needed across industry, government and research.

Top Australian bioinformaticians include Professor Terry Speed, from Melbourne's Walter and Eliza Hall Institute of Medical Research, who was recently awarded a major science prize for his work to better understand how cancer cells grow and replicate.

CSIRO research scientist Dr Jen Taylor is using bioinformatics to support international teams that are developing more resilient cowpea crops – staple foods in Sub-Saharan Africa, where there are critical food shortages.

Dr Tim Kahlke works with the CSIRO's Marine and Atmospheric Research team in Tasmania doing environmental work. He's using next-generation gene sequencing – mapping the genes that make up an organism's 'blueprint' – to identify miniscule marine microbes.

Professor Graham Farquhar, from the Australian National University's Research School of Biology, has mathematically decoded the process of photosynthesis, leading to methods to produce drought-resistant wheat crops.

Graham's research found that wind speeds are decreasing under climate change and reducing evaporation rates.

"Our future planet will be wetter, and some ecosystems will respond to this more than others," he says.

Professor Nadia Rosenthal was the Founding Director of the Australian Regenerative Medicine Institute at Monash University and Scientific Head of EMBL Australia. Her work looks at how human cells can regenerate, rather than decline, with age and disease.

"Regenerative medicine is a relatively new way of looking at health. It's not waiting for the problem to happen, but trying to diagnose the underlying issue instead," she says.

Bioinformatics experts have been key to solving some of the world's biggest problems – such as containing the 2014 outbreak of Ebola in West Africa; predicting near-extinction for endangered animals to prioritise conservation efforts; and producing solutions to complex agricultural problems to help feed the world's growing population.

If you want to be at the frontier of world-changing battles against disease, climate change and more, studying bioinformatics could pave your way.

GET INTO SCI + BIOINFORMATICS

CAREERS

Bioinformatician, biostatistician, computational biologist, environmental scientist, gene analyst, genomics bioinformatician + more!

BACHELOR OF...

Engineering (Hons) (Bioinformatics), **UNSW Australia** bit.ly/1PvlyKU

Science (Bioinformatics), **University of Sydney** bit.ly/1TjFkPF

Check out some work and study options...

Science (Advanced) (Hons) (Bioinformatics), **Griffith University** bit.ly/1Pwzzs3

Biotechnology (Hons) (Bioinformatics), **University of Queensland** bit.ly/1OIQlGy

Genetics (Hons) (Bioinformatics), **Australian National University** bit.ly/1lJeX8k

Biomedical Science, **University of Technology, Sydney** bit.ly/1S50S3I

SCIENCE MEANS BUSINESS

RESEARCH OUTCOMES IN THE LIFE
SCIENCES CAN HAVE A HUGE IMPACT

UNSW Australia graduate and entrepreneur Dr Elisa Mokany says bringing together biological, environmental and medical sciences can change humankind.

"Research in the life sciences has a huge impact on our health. Without amazing developments in this area, we'd still be having surgery without anaesthesia or dying of smallpox," she says.

While working in industry research, Elisa was involved in the commercialisation of a method to detect certain combinations of genes associated with disease.

"We applied the technology to the detection of leukaemia, predicting relapse of a patient up to six months earlier," she says.

Elisa followed up her industry experience with a postgrad degree at UNSW, where she had her

proudest moment. With Dr Alison Todd, she co-invented MNazymes, a new DNA enzyme that transforms the way we detect DNA.

Elisa has made a career of combining business with science, joining forces with Alison once again to set up medical diagnostic company SpeedX, which uses MNazymes "to develop diagnostic kits that test for viruses and

bacteria associated with infectious diseases like meningitis".

According to Dr Gavin Edwards, Associate Dean of the UNSW Faculty of Science, business and science go hand-in-hand. He adds that employers are searching for "flexible, open-minded people, who can adapt to new technology and think holistically and critically".

– Rachael Oku

TO GET THERE: Bachelor of Science, UNSW Australia bit.ly/1KBJhgS

Why UNSW Science?

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Stand Still

Science



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AUSTRALIA



Top World Ranking

The University is ranked 46th in the 2015 QS World University Rankings.



Top Choice

UNSW graduates are the most hired by LinkedIn's top 30 most in-demand employers in 2015.



Campus Development

UNSW has invested \$1.2b in student facilities.



New Facilities

\$150m invested in new Life Sciences building, opening in 2017.



Highest NSW ATAR

UNSW Bachelor of Science has the highest ATAR cutoff in NSW.

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Smarter futures

There are many important challenges ahead of us, but science and technology will be ready with clever solutions. Chereese Sonkkila reports

Healthcare, agriculture, and scientific and technical services are among the fastest growing industries, according to the Employment Outlook to November 2019 report by the Australian Government Department of Employment.

It's easy to see why, as global warming, an ageing population and an increasing demand for food are just some of the big issues that demand keen, problem-solving minds.

Karl Braganza, climate monitoring manager at the Bureau of Meteorology, says his field is integral in battling global warming, and brings together disciplines of science and technology.

"You need people who are across physics, statistics and supercomputing," says Karl.

Karl says studying climatology at Monash University taught him essential analytical skills. "Scientists will always trust data over their own gut feeling," he says.

Karl's team analyses the data from climate monitoring instruments – such as weather balloons and thermometers – across Australia to produce detailed reports like the annual climate report, for government agencies, researchers and emergency services. This information, says Karl, is vital in future planning – for fire and drought responses, research on the effects of emissions, policy concerning climate

change and predicting rainfall for agricultural land.

"If you like the idea of large-scale planning and resource management, then agribusiness or agricultural engineering could be the career for you," says Karl.

Anika Molesworth, the 2015 Young Farmer of the Year, says agricultural science will be integral in ensuring there is enough food for the world's growing population.

Anika recently completed a Masters degree in sustainable agriculture at Charles Sturt University, spending time in Laos to research the reuse of the plant material left over after harvesting crops. Instead of burning leftover plant material or biomass, contributing to greenhouse gases, it can be treated to be more nutritious and used as livestock feed. "It's about recycling what we've got and making optimal use of it," says Anika.

The Australian Innovation Challenge 2015 winners developed new concepts in food science, green energy, health technology and programming.

These included corn crops with higher nutrient content, technology to harness the power of the ocean's waves, a smarter irrigation system, and a microscope that fits inside a needle to assist in surgery.

With a science degree, perhaps you too will come up with ideas to help protect our future.

**IT'S ABOUT
RECYCLING WHAT
WE'VE GOT AND
MAKING OPTIMAL
USE OF IT.**

GET INTO SCI + FOOD SECURITY!

CAREERS

Biomedical engineer, climate change analyst, emergency management specialist, hydroelectric plant technician, meteorologist, soil and water conservationist + more!

BACHELOR OF...

Engineering Science
(Biomedical Engineering),
Flinders University
bit.ly/23mRmMJ

Environmental Studies,
Australian National University
bit.ly/1ZMrbu4

Emergency Management,
Charles Sturt University
bit.ly/1nILJYF

Economics/Science,
University of Queensland
bit.ly/1JwyNPI

Computer Science,
Deakin University
bit.ly/1UIm020

Science (Mathematics),
University of Sydney
bit.ly/1OQYEi0

Check out some work and study options...

BIG DATA ATTACK

MODERN PROBLEMS REQUIRE A MULTIDISCIPLINARY APPROACH

Could genetic testing help doctors diagnose and treat cancer more efficiently? How can we sustainably harvest our fisheries? What's the best way to manage invasive species like cane toads?

To equip the next generation of scientists with the skills to tackle 21st Century problems like these, the University of Melbourne is introducing a computational biology major, which focuses on big data within their Bachelor of Science degree.

Big data problems require special analysis techniques to tackle the sheer volume of data. They also need people whose expertise sits at the intersection of the biological sciences, maths and computer science.

"Students gain the necessary training methods to analyse and attack big data," says James McCaw, from the School of

Mathematics and Statistics.

By the end of the degree, each student will have specialised in a chosen area of biology – like biochemistry or ecology – and learned analytical skills in maths, statistics or computer science.

By integrating theory and practical issues in this unique way, students gain an understanding of how to tackle major problems

in the life sciences.

"This major is in the context of biology, but the data skills students learn – like how to receive data, analyse it, interpret it and exploit it – are so much more," says James.

"This has great currency across areas of business, and people with these skills are in high demand in government." – *Brett Szmaida*

TO GET THERE: Bachelor of Science (Computational Biology),
University of Melbourne bit.ly/1UX9HKr

SHUTTERSTOCK

Future Science Detectives: we need you!

**Do you want to save one life, or an entire population?
One animal, or the whole species?**

Big data has become so large and complex that traditional data processing and analysis just doesn't work. A new science, 'Computational Biology', brings together mathematics, computer science and biology to find ways to deal with this data and solve some of the world's greatest challenges, from climate change to species conservation to new treatments for cancer and more.

- Join one of Australia's most flexible and diverse Science degrees
- Follow your passion for maths, computing and biology in a single major
- Computational Biology is one of the most rapidly developing and entrepreneurial fields of modern day science
- The opportunity to train for jobs that don't even exist yet provides graduates with the potential for explosive career growth

Discover more:

www.bsc.unimelb.edu.au/computational-biology



Be agile

When a degree in science or engineering is paired with skills in business and leadership, it can lift you to the penthouse suite of professions.

Ben Skuse reports

For many technical or specialist jobs, there's a clear career path from school to the desired job. And for positions not requiring specialist knowledge, the minimum educational requirements combined with a winning personality and work experience can often seal the deal.

But the transition to leadership positions presents a more blurred picture. CEOs with years of education and experience in management from large corporate organisations now mix with fresh graduates with multi-billion-dollar ideas.

Almost half of today's jobs could be taken over by machines over the next 10–20 years, and 75% of the world's most valuable companies will be replaced by 2027. So how can you prepare for such an unclear future?

"The answer is STEM," says the Hon Karen Andrews MP, Assistant Minister for Science.

"It's the ability to think methodically about your work; to solve problems critically and systematically. Employers want to know that you have the skills to navigate new environments quickly and authoritatively."

Leonie Walsh, Lead Scientist to the Victorian Government, adds that employers of tomorrow are looking for "a better balance of skills including academia, active learning and business competencies".

"A changing marketplace requires students to be more adaptable and flexible, and have good interpersonal and communication skills," she adds.

You may want to start a business based on your STEM skills and business knowledge. Traditionally, this has been seen as an unusual choice, with around 1200 tech startups currently in Australia – a mere 0.06% of all Australian businesses.

But in December 2015, Australian Prime Minister Malcolm Turnbull announced a \$1.1 billion package to fund ideas and innovation to support high-impact entrepreneurship.

Many Australian universities are already developing programs that encourage solutions-based learning and facilitate an entrepreneurial mindset.

"There's no best option, but we're moving into a period where there's more support to explore becoming an entrepreneur, and risk-taking is seen as a positive thing," says Leonie.

Whichever path you choose, there's no better place than a university to pick up the key skills and opportunities you'll need for a successful career.

"Grab any opportunity you can, and where one doesn't exist, create it," says Karen.

GRAB ANY OPPORTUNITY YOU CAN, AND WHERE ONE DOESN'T EXIST, CREATE IT.

GET INTO SCI + LEADERSHIP!

Check out some work and study options...

CAREERS

App developer, bioeconomist, chief scientific officer, consultant, data analyst, director, entrepreneur, tech investor, management analyst, mining and forestry manager, R&D manager + more!

BACHELOR OF...

Business Management/Science, University of Queensland
bit.ly/23hxxwm5

Commerce/Science, University of Sydney bit.ly/1SAb4AK

Science/Business, University of Technology, Sydney
bit.ly/1RWGYC

Commerce/Science, UNSW Australia bit.ly/20hC75f

Business/Science, University of Tasmania bit.ly/1nBeNBw

Commerce/Biomedical Science, Monash University
bit.ly/1ZF8jx3

Commerce/Science, Deakin University bit.ly/1S820l4

COOL AS ICE

STUDYING PHYSICS TOOK RHEA BARNETT
ON AN UNEXPECTED ADVENTURE

Rhea left high school early and stumbled into science when she enrolled in the University of Newcastle's Open Foundation course at age 24.

"I ended up doing physics and thought, 'This is really cool, I'm going to give it a go.'" Shortly into the course, Rhea bought a telescope – and was hooked.

Four years on, Rhea is finishing off a Bachelor of Science majoring in physics, and is undertaking an Honours project in collaboration

with the University of Newcastle's Centre for Space Physics.

She recently returned from a research trip to Antarctica's Casey Base camp, one of four Australian research stations in Antarctica and the Subantarctic.

There she helped calibrate magnetometers – devices used to measure micro-scale changes in the Earth's magnetic field.

Despite hating boats and the cold, Rhea says it was "not the type of opportunity you turn down".

Dedicated teachers and supportive science lecturers at the uni helped her immensely. "The academics help you get what you want out of your degree."

Rhea now spends around 80% of her time researching, and hopes to continue her work in physics through academia. "There's always something new to discover to keep things interesting." – Susan Hely

TO GET THERE: Open Foundation, University of Newcastle bit.ly/1QPMOHI

Join the ideas boom

There has never been a more exciting time to study science.

The Faculty of Science and Information Technology at The University of Newcastle (UON) is a world-class centre for scientific and technology research and innovation. UON is ranked in the top 3% of universities in the world* and has been empowering bright ideas for over 50 years.

Most of the critical issues that face our society today require science to help solve these key concerns. Study with us and you will be helping deliver innovative solutions to real-world problems that are challenging our current and future generations.

Open doors to the cutting-edge jobs of the future and realise your potential with a UON science degree.



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newcastle.edu.au



THE UNIVERSITY OF
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Bold moves

Want to make a better world?
Here's how. Laura Boness reports

The world is rapidly changing and we face challenges that call for fresh ideas, creativity and enthusiasm. "We need local representatives and people in politics who can keep up," says 29-year-old politician, town planner and 2013 Queensland Young Planner of the Year, Brittany Lauga.

"Young people understand technology, have the capabilities to keep up in a fast-paced world, and have innovative and entrepreneurial minds. We need bright minds to make positive changes in our communities."

Brittany completed a Bachelor of Urban Development, with a major in urban and regional planning, at QUT. She worked in a planning firm in Brisbane as a student and then at the Department of Public Works as a graduate before returning to Central Queensland to work in a planning, environmental and engineering firm.

"I had the amazing opportunity to work on so many challenging projects as a young planner," she says.

The State Member for Keppel, Brittany was inspired to get into politics while working as a planner, when she received government and council funding for a waterplay area in her community.

Now Brittany is working on funding to make the beach accessible for people with disabilities or mobility issues, and parents with prams.

Social media is another powerful tool for change. Lizzy Lowe, a PhD

Candidate in the Integrative Ecology Lab at the University of Sydney, says social media makes it quick and easy for scientists to communicate with a large audience.

"It makes their work more accessible and reminds them about what was really important about it in the first place," she says.

Lizzy has practised this herself, using Twitter to share aspects of her research into how spiders adapt to city life.

"When we build cities we destroy native vegetation and drastically alter the world around us, but despite this some animals manage to thrive in urban areas," she says.

Lizzy adds that young, enthusiastic scientists on platforms like Twitter can help increase the scientific literacy of the general public.

"It also strengthens networks between scientists – I often hear about the latest in my research field first on Twitter."

Brittany says upcoming graduates will have jobs available to them that we can't even imagine yet. "It's even possible to put entrepreneurial skills to good use and become a pioneer of a new industry!"

Lizzy's advice to students is to take any and every opportunity on offer. "This means creating networks through avenues like social media, and not being afraid to tell the world about the amazing work that scientists do," she says.

GET INTO SCI + SOCIAL CHANGE!

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CAREERS

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BACHELOR OF...

Science/Information Technology, QUT

bit.ly/1ZQ4CKy

Urban, Rural and Environmental Planning, La Trobe University

bit.ly/1PILAGQ

Information and Communications Technology/Business, Western Sydney University

bit.ly/1OADFSI

Information Technology (User Experience Design), University of Queensland

bit.ly/1SAuUM6

Regional and Town Planning, University of Queensland

bit.ly/1IAFEvM

Science (International), UNSW Australia

bit.ly/1pvu6N9

Environments (Engineering Systems), University of Melbourne

bit.ly/1P5vq11

Commerce (Business Analytics), Deakin University

bit.ly/1dsprWn

Science (Analytics), University of Technology, Sydney

bit.ly/1JmMOzq

Science (Biomedical Science), Murdoch University

bit.ly/1Ufcee2m

Engineering (Electronic and Communication Engineering)/ Science (Computer Science), Curtin University

bit.ly/1nBKam3



TRACKING DUST

JAMES HOOPER HAS A PASSION FOR ADVENTURE AND DISCOVERY

James was co-named Adventurer of the Year in 2008 by National Geographic after traversing from the North Pole to the South Pole to raise awareness of climate change.

As part of his PhD at the University of Wollongong in collaboration with ANSTO, James is investigating how different land uses like farming and grazing affects the amount of dust produced and emitted to the atmosphere, and the impacts of this on the ecosystems where the dust lands.

Dust can fertilise oceans with an influx of nutrients, for example, causing a shift in the variety of organisms like phytoplankton.

James travels to remote locations around the world, collecting soil core samples containing dust, which he analyses using specialised scanning equipment at ANSTO. He says making discoveries in science is hugely exciting. "You get to do things no one has done before."

James looks at the cores to identify the quantity of dust through time and the elements it is composed of. He also uses carbon dating to determine how old the biological materials are.

By comparing samples from different locations, he can determine the movement of dust from one location to another, and whether new sources have become active.

His adventures have allowed James to experience, first-hand, the impacts of human activity on the environment.

"Seeing these spectacular places makes me think it would be a huge shame if they were lost."

– Sue Min Liu

TO GET THERE: Bachelor of Science (Hons) (Geography), **Kyung Hee University, South Korea** bit.ly/1mKSyb1

ON CLOUD NINE

NATHALIA TAN'S UNIQUE SKILL SET HELPED HER FIND THE PERFECT JOB

Nathalia began her new role as a technology consultant in Deloitte's cloud computing team in March 2016. It was secured, she says, as a direct result of the knowledge and skills she gained while studying for her double Bachelor of Science and Bachelor of Computer Science at Monash University, which she completed in 2015.

Nathalia chose the course at Monash because it involved a lot of practical work and, according to

Nathalia, the chance to "get my hands dirty," she says.

"I was lucky to gain a unique set of skills, from problem solving and lateral thinking to communication and collaboration, as well as how to approach issues in a diplomatic manner," says Nathalia. "These skills were all key to my being offered the job with Deloitte."

She says choosing to study both science and computing was a wise decision. "There are lots of instances

these days, with the rise of big data, where science and computing come together in this fantastic way that we've never seen before – such as finding associations between air quality and health, or using genetic data to help breed drought-resistant crops like rice," says Nathalia.

– Carl Williams

TO GET THERE: Bachelor of Science/
Bachelor of Computer Science,
Monash University bit.ly/1ncPCV6

AMELIA GREVIS-JAMES, MONASH UNIVERSITY

ADVENTUROUS SPIRIT

WILLEM HUISKAMP HAS ATMOSPHERIC AMBITIONS

Willem's favourite part of his Bachelor of Advanced Science degree at UNSW Australia was the excitement of "finding the next piece in the puzzle when reaching the limit of knowledge on a topic".

Inspired by an "excellent lecturer" to explore his interest in oceanography, Willem is currently undertaking a PhD at UNSW Australia researching the impacts Southern Hemisphere winds have on our climate.

As part of his PhD, in 2013 Willem had the opportunity to take part in the Australasian Antarctic Expedition, travelling to the Subantarctic islands in the Southern Ocean. Assisting world-class researchers in what Willem describes as "the coolest experience", the team gathered a treasure trove of data that promises major new insights into how our planet works.

"We broadcast science from the very edge of the world," says expedition organiser and UNSW Professor of Climate Change and Earth Sciences, Chris Turney.

Adventurous UNSW undergrads are in luck. "You can get amazing research experience – even as a second or third year undergrad," says Willem. – Rachael Oku

TO GET THERE: Bachelor of Advanced Science (Hons),
UNSW Australia bit.ly/1QJkpF5

WHERE WILL YOUR DEGREE TAKE YOU?

STUDYING SCIENCE AT ANU OPENS UP A WORLD OF OPPORTUNITY

Science degrees aren't just for scientists. A degree in science is what took Joey Clarke from ANU to the wildlife sanctuaries of the Australian Wildlife Conservancy, working as a science communicator.

It's also the degree that took Elliot McBride from ANU to Pakistan to work for UNICEF. He manages projects that use SMS technology to collect data from remote areas to improve the effectiveness of UNICEF aid projects.

A degree in science gives you the opportunity to define your future.

"Universities are no longer places you go to learn one thing and then get a career and do it for the rest of your life," says Professor Brian Schmidt, Vice-Chancellor of ANU and winner of the Nobel Prize for Physics.

"At ANU you can take your science degree and combine it with economics, arts, or whatever you want to give you this incredibly broad foundation.

"It's a great experience. You're going to meet some of the most amazing people here: some of the smartest people you're ever going to meet in your life, and some of the most widely dispersed people, from all over the world.

"You won't get a better opportunity in Australia," he adds. "And very few opportunities like this exist in the world." – *Cherese Sonkkila*

TO GET THERE: Bachelor of Science, ANU bit.ly/1Lcjdto

So far following my passion at each point in the journey has led to fantastic opportunities and a very rewarding professional life.

Laura Grundy, ANU Bachelor of Science (Physics)
Now: Operations Manager for Southern Innovation

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anu.edu.au/study/events/anu-open-day-2016



Australian
National
University

IT STARTS HERE...

Here are just some of the available Bachelor degrees where you can study

SCIENCE

SCI + WORK IN HEALTH

biomedical, genetics, optometry...

Australian Catholic University

>>> Exercise Science/Public Health

Australian National University

>>> Biotechnology

>>> Genetics

>>> Medical Science

>>> Psychology

Charles Sturt University

>>> Medical Radiation Science

CQUniversity Australia

>>> Medical Sonography/Graduate

>>> Diploma Medical Sonography

Deakin University

>>> Biomedical Science

Edith Cowan University

>>> Science (Nursing)/Science

>>> (Midwifery)

>>> Science (Paramedical Science)

Federation University

>>> Biotechnology

Griffith University

>>> Medical Laboratory Science

>>> Pharmacology and Toxicology

La Trobe University

>>> Nanotechnology/Science

Macquarie University

>>> Chiropractic Science

Murdoch University

>>> Laboratory Medicine

QUT

>>> Biomedical Science

>>> Medical Laboratory Science

RMIT University

>>> Biomedical Science

>>> (Laboratory Science)

Southern Cross University

>>> Biomedical Science

University of Canberra

>>> Science (Psychology)/Sport

>>> and Exercise Science

University of Melbourne

>>> Science (Chemistry)

>>> Science (Genetics)

Macquarie University

>>> Biodiversity and Conservation

>>> Environment/Laws

Monash University

>>> Commerce Specialist and Science

>>> Science Advanced - Global

>>> Challenges

QUT

>>> Science/Business

RMIT University

>>> Applied Science (Aviation)/

>>> Business (Management)

University of Canberra

>>> Politics and International

>>> Relations/Science (Psychology)

University of Melbourne

>>> Science (Climate and Weather)

>>> Science (Biotechnology)

University of New England

>>> Business/Laws

University of Notre Dame

>>> Education (Early Childhood

>>> & Care)/Behavioural Science

University of Queensland

>>> Economics/Science

University of South Australia

>>> Sustainable Environments

University of Southern Queensland

>>> Commerce/Science

University of Tasmania

>>> Science/Economics

University of Technology, Sydney

>>> Medical Science/Business

UNSW Australia

>>> Environmental Management

>>> Science and Business

Victoria University

>>> Science (Science For Teaching)

Western Sydney University

>>> Science/International Studies

SCI + BE CREATIVE

design, global studies, music...

Charles Sturt University

>>> Wine Science

Monash University

>>> Education and Science

>>> Science and Global Studies

>>> Science and Music

University of Melbourne

>>> Science (Bioengineering Systems)

>>> Science (Physics)

University of Newcastle

>>> Arts/Science

University of Queensland

>>> Music/Science

>>> Science/Journalism

University of Sydney

>>> Science/Arts

University of Tasmania

>>> Science/Arts

>>> Science (Computer Science)

University of Technology, Sydney

>>> Science/International Studies

UNSW Australia

>>> Music/Science

>>> Science/Education (Secondary)

>>> Science/Fine Arts

Western Sydney University

>>> Natural Science (Advanced)

SCI + MAKE A SMARTER FUTURE

agriculture, food science, security...

Australian Catholic University

>>> Biomedical Science/Business

>>> Administration

Australian National University

>>> Mathematical Science

>>> Resource and Environmental

>>> Management

>>> Science (Forest Sciences)

Charles Darwin University

>>> Engineering Science

>>> Environmental Science

Charles Sturt University

>>> Science (Plant Science)

>>> Viticulture

CQUniversity Australia

>>> Health Science (Allied Health)

La Trobe University

>>> Agricultural Science

>>> Science (Wildlife and

>>> Conservation Biology)

Macquarie University

>>> Actuarial Studies with Science

>>> Commerce with Science

Monash University

>>> Commerce and Biomedical Science

>>> Pharmaceutical Science Advanced

>>> Science Advanced (Research)

Murdoch University

>>> Environmental Science

>>> Science (Crop and Pasture

>>> Science)

QUT

>>> Science (Earth Science)

University of Adelaide

>>> Teaching/Mathematical

>>> and Computer Sciences

University of Canberra

>>> Sport and Exercise Science/

>>> Information Technology

University of Melbourne

>>> Science (Environmental Science)

>>> Science (Spatial Systems)

University of Newcastle

>>> Environmental Science

>>> and Management

>>> Food Science and Human Nutrition

University of New England

>>> Agribusiness (Rural Science)

University of Queensland

>>> Agribusiness/Sustainable

>>> Agriculture

>>> Science/Education

University of South Australia

>>> Science (Nano- and Biomaterials)

University of Tasmania

>>> Biotechnology

>>> Surveying and Spatial Science

University of Technology, Sydney

>>> Environmental Biotechnology

University of The Sunshine Coast

>>> Environmental Management

Charles Sturt University

>>> Clinical Science

>>> Health Science (Mental Health)

Edith Cowan University

>>> Science (Occupational Therapy)

Griffith University

>>> Psychological Science/Criminology

>>> and Criminal Justice

Monash University

>>> Psychological Science Advanced

University of Melbourne

>>> Science (Computational Biology)

>>> Science (Ecology and

>>> Evolutionary Biology)

University of Notre Dame

>>> Counselling/Behavioural Science

University of Tasmania

>>> Natural Environment and

>>> Wilderness Studies

University of Western Australia

>>> Science (Natural Resource

>>> Management)

>>> Science (Population Health)

UNSW Australia

>>> Psychological Science/Law

>>> Science (International)

>>> Science/Law

>>> Science/Social Research and Policy

SCI + GET INTO TECH

biotechnology, computer science...

Curtin University

>>> Computer Science/Computer

>>> Systems Engineering

Edith Cowan University

>>> Counter Terrorism Security

>>> and Intelligence

James Cook University

>>> Science (Aquaculture Science

>>> and Technology)

Macquarie University

>>> Information Technology/Laws

Monash University

>>> Science/Computer Science

University of Newcastle
 >>> Exercise and Sport Science
 >>> Medical Radiation Science (Nuclear Medicine)
University of Notre Dame
 >>> Biomedical Science/Preventive Health
University of South Australia
 >>> Medical Radiation Science (Nuclear Medicine)
University of Sydney
 >>> IT/Medical Science
University of Tasmania
 >>> Biotechnology
 >>> Medical Research
University of Technology, Sydney
 >>> Advanced Science in Pre-Medicine
 >>> Medicinal Chemistry/Creative Intelligence and Innovation
University of The Sunshine Coast
 >>> Biomedical Science
University of Western Australia
 >>> Science (Microbiology and Immunology)
UNSW Australia
 >>> Medical Science
 >>> Medicinal Chemistry
 >>> Optometry/Science
Western Sydney University
 >>> Health Science (Public Health)
 >>> Podiatric Medicine

SCI + BE A LEADER
education, sustainability, policy...

Australian National University
 >>> Interdisciplinary Studies (Sustainability)
 >>> Science/Master of Teaching
Charles Sturt University
 >>> Environmental Science and Management
Edith Cowan University
 >>> Science/Business
 >>> Sustainability
Federation University
 >>> Mathematical Science
Flinders University
 >>> Science Policy and Communication
Griffith University
 >>> Laws/Science in Environment
James Cook University
 >>> Science in Environmental Earth Science Advanced

Curtin University
 >>> Science/Arts
Deakin University
 >>> Forensic Science
 >>> Teaching (Science)/Science
Edith Cowan University
 >>> Arts/Science
 >>> Forensic Investigation
Griffith University
 >>> Exercise Science/Business Urban and Environmental Planning/Science
La Trobe University
 >>> Psychological Science
Macquarie University
 >>> Science/Education (Secondary)

Curtin University
 >>> Applied Geology and Environmental Biology
Deakin University
 >>> Forensic Science/Criminology
Edith Cowan University
 >>> Science (Cyber Security)
Federation University
 >>> Environmental and Conservation Science
 >>> Science/Education
Flinders University
 >>> Science (Clean Technology)
 >>> Science (Nanotechnology)
Griffith University
 >>> Pharmacology and Toxicology/Laws

UNSW Australia
 >>> Economics/Science
 >>> Environmental Management/Arts
 >>> Food Science and Technology
 >>> Science/Engineering
Western Sydney University
 >>> Sustainable Agriculture and Food Security

SCI + CREATE SOCIAL CHANGE
ecology, philosophy, research...
Australian National University
 >>> Philosophy/Science
Bond University
 >>> Biomedical Science/Laws

Murdoch University
 >>> Science (Networking and Network Security)
University of Melbourne
 >>> Science (Biotechnology)
 >>> Science (Computing and Software Systems)
University of Tasmania
 >>> Science/ICT
University of Technology, Sydney
 >>> Biomedical Physics/Creative Intelligence and Innovation
UNSW Australia
 >>> Commerce/Science (Computer Science)
 >>> Information Systems (Co-op)

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