Out in force

The defence industry is one of Australia's biggest employers of engineers – developing cutting-edge technology away from the frontline

Future submarines, Joint Strike Fighter jets and Hawkei armoured vehicles are just some of the exciting defence projects in Australia right now – and engineers are in high demand to make them happen.

Joyce Mau, a research engineer with Defence Science and Technology (DST) – an organisation within Australia's Department of Defence – says she didn't set out to work in defence but became intrigued at her university's career fair. "The technology being showcased looked so impressive back then and it is even more so now," she says.

Defence is a booming area for technology advances in areas such as advanced threat detection through laser and radar technology, blast-proof materials, cybersecurity, artificial intelligence (AI) and autonomous vehicles.

TECHNOLOGY TEAMWORK

Initially hesitant to study engineering, Joyce began at ANU with a Bachelor of Science and later added a Bachelor of Engineering (research and development) after trying out an engineering course during her first semester.

"I always thought I didn't have the talent to design things," she says. "But I learned designing is a mixture of coming up with ways to improve your piece of technology, as well as trying out other people's ideas on a different technology and seeing if it works on yours."

Joyce now works on technology called Single Photon Avalanche Diode cameras. These cameras will be attached to undersea drones to capture detailed, images of underwater objects.

DEFENCE PATHWAYS

Many engineering degrees and specialisations are relevant to defence, including mechanical and industrial, electrical and electronic, aerospace, marine and software. And engineers wanting to work for the defence force or defence industries have lots of opportunities, whichever specialisation they choose.

There's plenty of employment opportunities for engineers within the Australian Defence Force and the broader defence industry, too. Plus, trades and TAFE options that can kickstart your defence career. The options are endless. – *Claire Harris*

START YOUR CAREER HERE

ENG+DEFENCE STUDY

Bachelor of Engineering (Mechanical) (Hons), UNSW ADFA bit.ly/CwSUNSWADFA

Advanced Diploma of Engineering – Technical (Mechanical), TAFE NSW bit.ly/MechEngTAFE

Bachelor of Engineering (Hons), ANU bit.ly/CwSANUEng

ENG+DEFENCE JOBS

Electrical engineer: $49K–$83K

Marine engineer: $46K–$91K

Aerospace engineer: $51K–$98K*

Joyce Mau
Research Engineer

PHD CANDIDATE, ANU

RESEARCH ENGINEER, DST

CADET, DST

BACHELOR OF SCIENCE / BACHELOR OF ENGINEERING, ANU

Find out how maths could also land you a military career!
bit.ly/CwSMilitaryMathsJobs

UP, UP AND AWAY

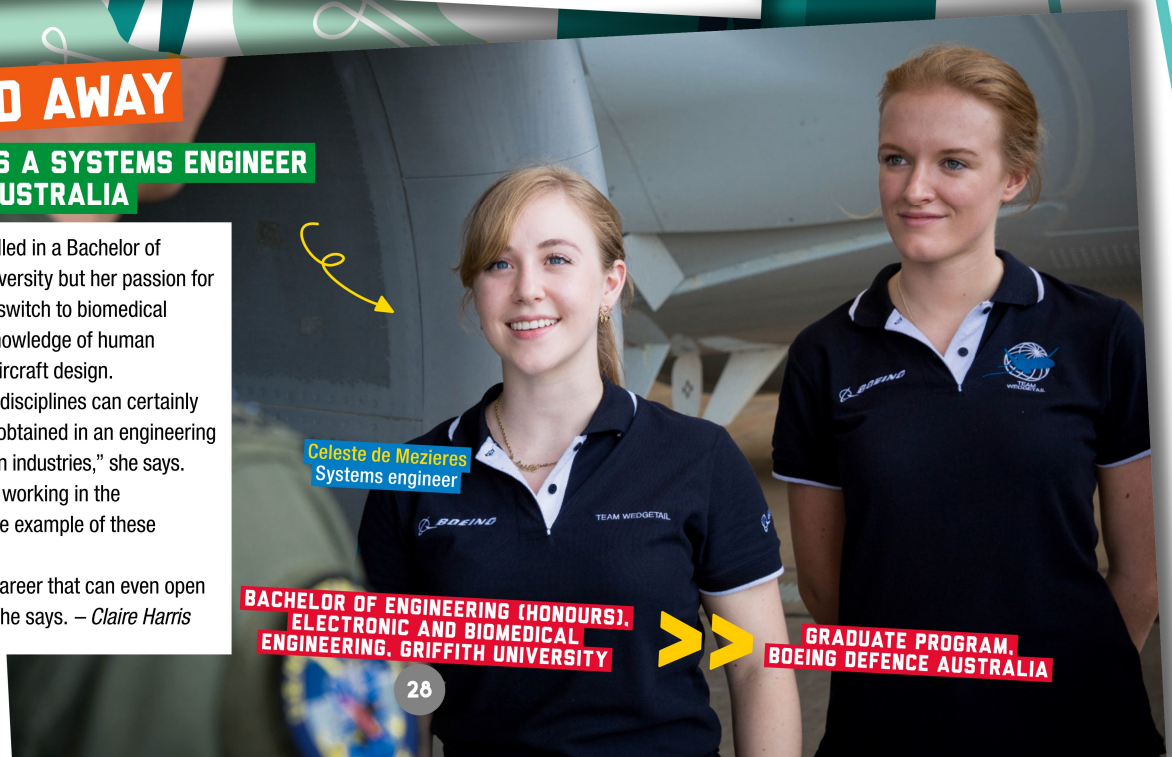
CELESTE DE MEZIERES IS A SYSTEMS ENGINEER WITH BOEING DEFENCE AUSTRALIA

Celeste de Mezieres originally enrolled in a Bachelor of Biomedical Science at Griffith University but her passion for problem-solving and design saw her switch to biomedical engineering. Celeste now uses her knowledge of human anatomy and physiology to improve aircraft design.

"The diverse range of engineering disciplines can certainly be overwhelming, however the skills obtained in an engineering degree are highly transferable between industries," she says.

A biomedical engineer like Celeste working in the aerospace/defence industry is a prime example of these diverse career opportunities.

"Engineering is a truly rewarding career that can even open up opportunities to work overseas," she says. – *Claire Harris*



BACHELOR OF ENGINEERING (HONOURS), ELECTRONIC AND BIOMEDICAL ENGINEERING, GRIFFITH UNIVERSITY >> GRADUATE PROGRAM, BOEING DEFENCE AUSTRALIA

REACH FOR THE STARS

MONIQUE HOLLICK
SPACE SYSTEMS ENGINEER, DST

Monique is hooked on space. She was always interested in how things work and at high school she was good at maths and physics, so decided to explore opportunities in science and engineering.

Now, as a space systems engineer, she works with two satellites – one that was launched in 2017 and one that is still being designed – as part of the Buccaneer program with Defence Science and Technology (DST).

These 'CubeSats' are mini-satellites that help scientists and engineers, like Monique, understand the space environment, how satellites orbit (to avoid collisions) and how to improve radar technology.

Monique and her team design daily mission plans, check the health and performance of the satellites and conduct maintenance on the ground stations, which are located in Canberra and Adelaide.

Students who aren't sure about STEM careers because of stereotypes such as the idea you have to be a "genius" to work in the field, should think again, says Monique. "In reality, STEM fields require passion and hard work to gain proficiency more than anything," she says."Engineering is not just about building bridges!"

Monique says her job doesn't really feel like a job to her because she enjoys it so much, which is pretty cool!

To get there: bit.ly/DSTCareers

BACHELOR OF SCIENCE (PHYSICS) (HONS) / BACHELOR OF ENGINEERING (MECHANICAL) (HONOURS), UNIVERSITY OF WESTERN AUSTRALIA >> MASTER OF ENGINEERING SCIENCE (SATELLITE SYSTEMS), UNSW >> RESEARCH AND INNOVATION GRADUATE, DST >> SPACE SYSTEMS ENGINEER, DST

GUARDING THE FUTURE

MEET TWO ENGINEERING GRADUATES DRIVING THEIR DEFENCE CAREERS WITH DETERMINATION, PASSION AND FUN

GO WITH THE FLOW

DANIEL BUTLER
HYDRODYNAMICIST, DST

Daniel Butler took his childhood love of Lego, aeroplane models and puzzles and turned it into a career. He's now a hydrodynamicist working on the Navy's $90 billion future submarine and frigate programs with DST.

Daniel helps design experimental methods and equipment, as well as running computer simulations to analyse the water flow around new submarines and ships. While spending most of his time in DST's Melbourne office, he also travels regularly to the Australian Maritime College in Launceston to carry out experiments.

He says there is a growing demand for STEM skills (particularly engineering skills) in the defence industry, which means a massive opportunity. "There is a skills gap and that means well-paying jobs," he says.

Daniel recommends giving engineering a go to see if you might enjoy it. That could mean doing a free university course online or taking a gap year to do work experience, such as the one offered by the Australian Defence Force.

Daniel says he has always been passionate about practical engineering and when he left high school he went into an apprenticeship as a maintenance fitter at a Weet-Bix factory. He took night classes at TAFE to earn an engineering diploma, which meant he got to work on interesting projects designing new factory equipment. While he admits he wanted more of a mental challenge, prompting him to go on to university, Daniel tips his hat to TAFE as a way to get practical skills and broad experience that will be useful for your career.

"For some reason these days people want to go straight to university but there are many useful courses available at TAFE to consider, too," he says.

"Even if you are definitely planning on going to uni, doing a practical course at TAFE – such as drafting – could help you secure good part-time work in the industry while studying." – *Claire Harris*

Hot Career Tip: Check out the Naval Shipbuilding Plan!
"It's pretty big right now and will continue to be for the rest of my, and your, careers," says Daniel. "It will employ more than 15,000 personnel in the naval shipbuilding enterprise through a number of continuous-build programs of submarines, frigates, patrol boats and others. There are going to be a lot of great jobs in that, not just for naval architects, but mechanical, electrical and material engineers, as well as countless trade roles and many others."
Find out more: bit.ly/CwSNavalShipbuilding

MAINTENANCE FITTER AND DRAFTSMAN >> ENGINEERING DIPLOMA, TAFE (INCOMPLETE)

BACHELOR OF ENGINEERING (MECHANICAL AND AEROSPACE) (HONS), UNIVERSITY OF QUEENSLAND >> HYDRODYNAMICS RESEARCHER, DST

Did you know?
Defence Science and Technology (DST) – part of Australia's Department of Defence – is one of Australia's largest employers of scientists and engineers, with about 2300 staff.

DAVID KILMARTIN, DST GROUP / SHUTTERSTOCK