

WANT MORE?
This Careers with STEM series is part of the Careers with STEM series – mags, quizzes, videos and more on the hottest jobs in science, technology, maths and engineering (STEM). Go to CareerswithSTEM.com to find more career ideas and browse hundreds of cool study options.

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Careerapedia: the A-Z of STEM jobs

From astrophysicists to zoologists, here are the coolest science roles in the job-verse. And nope, they don't require a lab coat!

A's for astrophysicist
These folk use physics and chemistry to test their theories about space.
Perk alert: Travelling the world to present at conferences becomes part of the gig!

B's for biotechnologist
Generally lab-bound, biotechnologists work on modifying things like living organisms to develop new products and improved systems.
Career crush: Keston Hingoran, with a PhD from the ANU, is working on recreating the way plants harness the Sun's energy.

C's for conservationist
Daily to-do lists include: managing natural habitats, introducing new ways to protect environments and advising farmers on land-based issues such as erosion control.
Study up: Look out for degrees in conservation biology, natural resource management and biomedical science.

D's for dietician
Dietitians help people understand the relationship between their health and food.
Salary spill: \$60,000 on average.

E's for ecologist
Like conservationists, ecologists are concerned with preserving ecosystems, balancing the needs of landowners and environmental priorities.
F's for food technologist
Setting and improving the standards for the production of food is all in a day's job. And the non-glamorous part? Studying food deterioration – yep, smelly.

L's for lab technician
Technicians head up the maintenance of lab tools and equipment, capture and sort data and ensure efficiency and accuracy.
Salary spill: Up to \$78,000 a year, depending on the field.

K's for kindergarten science teacher
Kindergarten teachers introduce STEM concepts to the next gen of talented scientists. Warning: experiments can get, er, seriously messy.

J's for journalist
Specialised writing for mags, newspapers and online.
Career crush: Alice Klein! As the Australian correspondent for *New Scientist*, climbing a dormant volcano – and writing about it – is all in a day's work.

I's for immunologist
These specialist physicians manage the treatment of patients with diseases compromising the immune system.
Perk alert: Due to an increase in the prevalence of allergies, there's currently a shortage of immunologists in Australia and New Zealand, which means job opportunities galore.

H's for hydro metallurgist
How to turn them into higher value products.
Salary spill: Metallurgist salaries can get up to \$158,000.

G's for geoscientist
Geoscientists study the Earth's history and are often hired to hunt down gems, oils and other hidden resources.
Study up: Employers look favourably on honours degrees in science, engineering, maths and statistics. Check out the government-run Geoscience Australia Graduate Program, too.

N's for neonatologist
These hospital-based specialists deal primarily with sick or preterm babies.
Career crush: Dr Adrienne Gordon! With a medical and public health degree in the bag, she's currently leading the BABY1000 project – a ground-breaking developmental study of a baby's first 1000 days.

O's for oceanographer
Oceanographers use biology, chemistry, geology and physics to conserve, manage, harvest and protect our oceans.
Study up: A degree in marine science is usually a minimum requirement.

P's for physiologist
With detailed knowledge of the human body, physiologists treat serious medical conditions through targeted exercise programs.
Salary spill: It depends on whether you work in a practice, gym or hospital, but you can expect around \$65,000.

Q's for quantum physicist
Quantum physicists manipulate atoms, electrons and photons to stretch the boundaries of physics.

R's for roboticist
Fluent in computer science and human-computer interaction design, roboticists contribute to a variety of industries.
Career crush: Associate professor, Denny Orlowski! The deputy head of Monash University's engineering department has devoted his career to developing medical robots that assist clinical professionals in providing better patient care.

S's for solar scientist
Solar scientists advise companies, corporations and governments on cutting-edge systems.
Study up: Start with a Bachelor of Science; you can specialise from there.

T's for telecommunications technician
These peeps help telcos to instal, create, repair and monitor their networks.
Salary spill: Advertised gigs can go up to \$83,000.

U's for urban statistician
Statisticians live for data. They play with numbers and stats to aid decision making in science, technology, medicine and government fields.
Perk alert: You're basically solving problems all day.

V's for volcanologist
Apart from frothing over volcanoes, these specialised geoscientists study their formation and activity to help predict future eruptions.
Career crush: Macquarie University's associate professor in volcanology and geochemistry, Heather Handley! She's smashed a Bachelor of Science in geology, completed a PhD on the geochemistry of Indonesian volcanoes and now takes on eruption prediction projects.

W's for weather forecaster
Using specialised scientific techniques to understand what's up with the weather, is all in a day's work.
X's for X-ray expert
Medical imaging professionals operate X-ray and imaging equipment to diagnose, monitor and treat patients.
Salary spill: Average pay is around \$86,000.

Z's for zoologist
These guys study the origin, development, behaviours and habits of different living species.
Perk alert! Um, they have animals for co-workers! – Cassie Steel



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EXPLORE QUANTUM

Discover why studying quantum physics is a great choice + see what career paths it can take you down.

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UNCOVER A WORLD OF QUANTUM CAREERS

WHAT IS QUANTUM PHYSICS?

Quantum physics is all about understanding the world at its tiniest scale, and it started with the first quantum revolution. In the early 20th century, scientists discovered that light and matter behave like both particles and waves. This idea, known as wave-particle duality, challenged everything we thought we knew about how things work. It helped us create technologies like lasers and semiconductors, which power the devices we use every day. The first quantum revolution showed us that the tiniest particles in the universe don't behave the way we expect, and that opened the door to so many amazing discoveries.

The second quantum revolution (which, FYI, is happening right now!) goes even deeper. This time, scientists are exploring superposition and entanglement – amazing things where particles can be in multiple states at once, or instantly affect each other over long distances. These discoveries are the basis for new tech that could change our world. These include quantum computers that might solve problems too difficult for today's machines, quantum sensors that have measured gravitational waves through the universe and could make our navigation systems more accurate, and even quantum communication networks that are nearly impossible to hack!



FIND OUT MORE ABOUT QUANTUM SCIENCE HERE

QUANTUM APPLICATIONS

Take a look at some of the areas quantum knowledge and skills can be applied to...

QUANTUM + COMPUTING + AI

If you're interested in artificial intelligence and machine learning, you could combine these fields with powerful quantum computing algorithms to research, create and improve technologies. Think: increasing the speed of AI, handling larger amounts of data, and solving even trickier problems.

QUANTUM + HEALTH

Quantum computers can help to model and simulate complex natural phenomena, which is a huge advantage in developing new drugs and medical treatments.

QUANTUM + SPORT

Did you know that quantum sensors could provide incredibly precise tracking of athletes' movements and biomechanics, helping coaches optimise training? Researchers also plan to use new quantum tech to enhance the Brisbane 2032 Olympic and Paralympic Games in everything from athlete health monitoring and injury diagnostics to spectator transport!



QUANTUM + SECURITY

Another huge application of quantum physics in the security sector is for data protection and ultra-secure information processing and transmission. Quantum security can also help detect cyber-attacks early on, paving the way for the cyber security of tomorrow.

QUANTUM + CLIMATE CHANGE

Some of the biggest quantum companies around the world, including some in Australia, plan to use quantum technologies to develop climate change solutions, including delivering more efficient energy storage or next-generation batteries for the vehicles of the future, with little or no carbon footprint. These companies, like Google, IBM, PsiQuantum, and more will need bright minds dedicated to tackling the world's biggest problems.

WHAT'S NEXT?

Here's what to study and check out as you kickstart your quantum career journey

WHERE?	WHAT?
SCHOOL	Study subjects like Engineering, Maths, Physics, Design, and Digital Solutions.
VET	Enrol in a Coding in Python short course via TAFE Queensland.
UNIVERSITY	Take on a Bachelor of Science (Physics) at QUT, Griffith University, or the University of Queensland. Consider a Honours or Master specialisation at Griffith or UQ. And don't forget to reach out to your favourite quantum academics, who can help you get hands on with quantum at university.
ONLINE LEARNING	Sign up for an online course like 'UQx: Quantum Technologies for Decision Makers' by The University of Queensland, 'Preparing for a Quantum Future Course' by The University of Sydney's Centre of International Security Studies, or check out the educational resources on the Centre for Quantum Computation & Communication Technology website (cq2t.org).
SOCIAL MEDIA	Follow Australian quantum researchers like Professor Andrew White, Professor Michelle Simmons and Professor Howard Wiseman on LinkedIn. Subscribe to @QCTRL on YouTube.



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QUANTUM CAREERS

MEET THREE PEOPLE RESEARCHING AND WORKING IN QUANTUM!



DR NORA TISCHLER
ARC DECRA FELLOW + ASSISTANT DIRECTOR, CENTRE FOR QUANTUM DYNAMICS AT GRIFFITH UNIVERSITY

CwS: What's your top tip for students considering a career in quantum?
N: A career in quantum can take on many different forms and suit different personalities. Work as a quantum physicist could, for example, involve tinkering with equipment such as lasers, it might be proving things with pen and paper, or could consist of programming. If you are an engaged, motivated, and hard-working student, then you will almost definitely be welcomed with open arms.

CwS: What do you like most about quantum physics?
N: I find it meaningful to seek answers to really big questions, such as "What are the basic principles underlying the laws of physics?". It is exciting to be the first to observe some novel phenomena. And quantum physics is particularly fun because quantum theory clearly predicts behaviour, but many of its implications are still open for exploration.



A/PROFESSOR JACQUI ROMERO
CHIEF INVESTIGATOR, AUSTRALIAN RESEARCH COUNCIL'S CENTRE OF EXCELLENCE FOR ENGINEERED QUANTUM SYSTEMS (EQUS)

CwS: What do you enjoy about researching quantum physics and technologies?
J: I enjoy the endless problem solving, and the fact that the implications of quantum physics really challenge our everyday intuition. The combination of these two make this field super fun. There's a lot of possibilities.

CwS: What exciting opportunities do you see coming up in this field?
J: I am waiting for quantum to have a ChatGPT moment, when quantum technologies really go out there and affect our everyday lives. Maybe it's not too far – there is a lot of work going on in quantum sensing, quantum communications, and quantum computing.



PROF HALINA RUBINSZTEIN-DUNLOP
DIRECTOR OF QUANTUM SCIENCE LABORATORY, SCHOOL OF MATHEMATICS AND PHYSICS AT THE UNIVERSITY OF QUEENSLAND

CwS: What's it like working in quantum?
H: I have a great research career in quantum physics, including quantum atom optics and laser micro manipulation, amongst other things, and I really enjoy working with large interdisciplinary research groups. Within one of these groups we have used the physics and photonics technique of optical trapping, using laser micromanipulation to move the tiny ear stones in zebrafish, producing a sensation of movement without moving the animal. By tricking an animal into thinking it's moving while the brain remains stationary, we can now study the cells and circuits across the brain responsible for motion processing. This is a combination of neuroscience and optical physics!

CwS: Advice for those who want a career in quantum?
H: Knowledge of quantum science and technology will lead us to building a better world around us and provide humankind unprecedented access to technologies we can't imagine today. My top tip is knowing that quantum physics will lead you to your dream career! Go for your dreams, learn quantum and see where it takes you.

WHERE QUANTUM PHYSICS CAN TAKE YOU

Considering a career in STEM, especially in quantum physics, opens doors to impactful and innovative opportunities. Quantum physics is the backbone of many everyday technologies we rely on. It plays a critical role in lighting solutions like fluorescent bulbs, the functioning of computers and mobile phones, and even the humble bread toaster.

Transistors, vital for numerous electronic devices, depend on quantum principles. Advanced systems like GPS and medical imaging technologies such as MRI machines are also deeply rooted in quantum physics.

By pursuing a career in quantum physics, you're positioning yourself at the forefront of technology and innovation, contributing to advancements that will shape our daily lives. It's a field ripe with potential for discovery and innovation, making it a rewarding and exciting career path.

