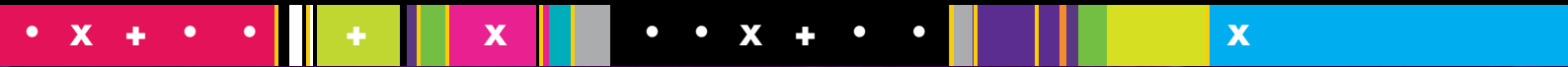


CAREERS WITH STEM™



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MEDICAL PHYSICIST

Discover fast-growing and crucial
careers saving lives with science

SUPPORTED BY

QUT



Kickstart your career in physics.

In her senior school years, Sarah Bradbury was torn between pursuing a future in science or focusing on art, with both paths feeding her curiosity and creativity.

Having completed an internship in QUT's astrophysics laboratory during a school holiday break, Sarah loved the experience and chose to study a Bachelor of Science majoring in Physics with minors in Mathematics and Astrophysics.

During her studies, Sarah enjoyed interacting with, and learning from real-world researchers and found undertaking a month-long CSIRO internship an invaluable experience. Moving forward, Sarah hopes to forge a career in the field of physics and contribute to discoveries that help humanity.

To discover more of Sarah's story and learn about studying science at QUT, visit our website.

qut.edu.au/study-science

QUT
the university
for the real world

SAVE LIVES WITH PHYSICS

A career in medical physics means you can apply physics every day whilst making the world a better place



ANDREW FIELDING
MEDICAL PHYSICIST

**THIS IS A CAREER PATH THAT
ALLOWS YOU TO APPLY CUTTING-
EDGE PHYSICS AND USE STATE-OF-
THE-ART TECHNOLOGY EVERY DAY."**

At QUT Open Days, parents often ask, "What kind of job will my child get with a physics degree?" Their uncertainty is understandable, because even though a physics degree equips you with skills and qualifications that are highly transferable and relevant to a number of industries and organisations, the career path for a physics graduate isn't as immediately obvious as, say, that of a mechanical engineer.

That's because, within a few years of finishing their degree, very few physics graduates are still calling themselves 'physicists' – they're applying their skills in roles such as project manager, software engineer and entrepreneur.

But medical physics is an exception. This is a career path that allows you to apply cutting-edge physics and use state-of-the-art technology on the job every day – not to mention play an important role in diagnosing and treating cancer, and therefore save lives.

When I was at school, I loved physics and maths, and was also fascinated by medicine, but I was less keen on the biology and chemistry needed to become a doctor! When I discovered medical physics, it seemed like the perfect fit.

This is a rewarding and important career, with the health sector paying generous salaries to the right talent.

As the only university in Queensland – and just one of six in Australia – offering an accredited Master's degree in Medical Physics, QUT is a great place to kickstart your career in this field. QUT is recognised for its clinical links and, since joining QUT in 2004, I've enjoyed watching graduates progress to becoming some of Australia's most respected and recognised medical physicists. You'll meet some of them in these pages.

If you're considering a career as a medical physicist, my advice is to learn as much as you can about the career, including meeting medical physicists in clinical environments, to make sure it's the right path for you.

It's also important to take initiative during your studies – by networking and seeking out mentors and work experience opportunities. And if you're reading this, you're off to a good start!

Andrew Fielding,
Senior Lecturer, School of Chemistry
and Physics, Faculty of Science, QUT

**Check out [CareerswithSTEM.com](https://careerswithstem.com) for more insights, information,
inspiration and advice about a medical physics career!**

Where medicine meets maths

Equal parts keen on medicine and physics? Medical physics careers combine the best of both worlds – face-to-face patient care and some seriously cutting-edge science

What is radiation?

According to ANSTO, radiation is energy or particles from a source that travel through space or other mediums – light, heat and the microwaves and radio waves used for wireless communications are all forms of radiation.

Health science gigs are often associated with waiting rooms, stethoscopes and years and years of study, but there are loads of medical jobs that require a different kind of white coat and a whole lot more hands-on lab work.

As postgrad scientists, medical physicists are keen researchers, extremely specialised experts in their niche field of study. They spend 9-5 applying the principles of physics to medicine, with the ultimate goal of ensuring all procedures involving radiation (think: CT scans and radiotherapy) are administered with correct, safe and effective doses.

You can find medical physicists hanging out anywhere that radioactive material is used in a health context – dental surgeries, X-ray clinics, GP practices, private and public radiography services, mines, veterinary clinics and solarium services – applying their advanced science smarts to assess safety standards and advise best practice.

And if you catch them working overtime? Chances are they're out of the lab advising governments and agencies, responding to incidents and emergencies or teaching the next generation of career scientists.

Pathway time!

Being such a niche and high-risk area of applied science, medical physics pathways are pretty well established and almost always involve a Master's or PhD qualification.

Entry-level grads would typically have completed a Bachelor of Science (majoring in physics or maths) along with a Master of Medical Physics or equivalent.

A hospital or clinic placement in the final year is also pretty standard, along with picking a specialisation – either radiation oncology (radiotherapy and cancer treatment) or diagnostic imaging (CT scans and X-rays), both a vital part of a patient care team.

With careers in nuclear medicine growing and diversifying at a rapid rate, there is so much room to specialise, grow and curate your own exciting pathway – as long as you knuckle down at uni and hang in there with maths and physics after high school. – Cassie Steel



More women in STEMM

The second **M** in **STEMM**? **Medicine!** With women currently making up just 28% of the medical physics workforce in Australia and NZ, diversity demand = high!

FACT FROM FICTION

Don't know loads about medical physics? We sort the real from the rumour and bust some curly career myths

FICTION!

#1 It's a lot of working with equipment... and not patients

Yes, and no. Although they do a lot of behind-the-scenes assessment, analysis and lab-based research work, medical physicists have an important role in a hospital's patient care team. With a cancer patient, for instance, there'd be an initial face-to-face treatment planning, followed by a handover to nurses, doctors and technicians.

FICTION!

#2 It's loads of snoozy lab work

An average day for a physicist is fast-paced, ever-changing, seriously rewarding and never fully lab-bound. Their epic to-do list includes:

- Planning radiation treatments for cancer patients
- Studying how radiation affects the body
- Ensuring equipment is safe, effective and working properly
- Developing new safety procedures
- Consulting with physician colleagues
- Researching new treatment options for cancer, heart disease or mental illness
- Teaching and training future medical physicists

FACT!

#3 It's legit dangerous

Well, sort of. The job of a medical physicist is pretty high-risk – which is why it requires six-plus years of training and pays a pretty sweet salary (\$70K+ at entry level).

As a medical facility's designated radiation safety officer, their ultimate goal is to seek maximum benefits with minimum risks of radiation exposure – for patients and themselves, too.

FICTION!

#4 Employers are always hospitals!

Although the majority of clinical scientists working in medical physics are employed by public hospitals, other employers include:

- Private hospitals
- Medical equipment manufacturers
- Nuclear medicine companies
- Regulatory authorities
- Universities and research organisations
- Research and development labs

Get certified!

Training the next gen of medical physicists is serious business. ACPSEM (the Australasian College of Physical Scientists and Engineers in Medicine) is responsible for overseeing the accreditation of degrees in Oz, making sure courses (and grads) are up to scratch!

SOURCE: SALARIES ACCORDING TO Payscale.COM

UNBOGGGLING THE BRAIN

THROUGH SIMULATIONS, **SEBASTIAN RAISON** SEARCHES FOR TRUTHS



SEBASTIAN RAISON
MEDICAL PHYSICIST

While a medical physicist like Sebastian doesn't deal with patients directly, his skills and qualifications keep the community healthy through disease modelling and computer simulation.

"My interest is neurological physics," Sebastian says. "The brain is a physical system: lots and lots of neurons interacting with each other. I like disentangling the complex system and trying to analyse it."

Having studied a Bachelor of Science at QUT, Sebastian credits his subsequent Honours year as his first taste of research: "I was solving a really interesting problem that not many people had directly tackled. It didn't immediately suggest an approach I'd encountered before, so I had to figure it out."

Sebastian's Honours research involved using data from EEGs (short for electroencephalogram – a diagnostic tool that uses electrodes to record brain activity) for a simulation to detect patterns that were previously difficult to observe.

Better understanding the healthy brain means better understanding why things go wrong, such as in mental illness and neurological disease.

Alternate realities

After graduating from QUT, Sebastian landed a role as a research assistant at Brisbane's QIMR Berghofer Medical Research Institute, where he used his data simulation skills to help inform important COVID-19 policy decisions. So if you were one of the people happy to finally sashay over Queensland's border in December 2021, you have Sebastian's work to thank!

**BACHELOR OF SCIENCE
(HONOURS), QUT**

**VOLUNTEER, QIMR BERGHOEFER
MEDICAL RESEARCH INSTITUTE**

**RESEARCH ASSISTANT, QIMR BERGHOEFER
MEDICAL RESEARCH INSTITUTE**

**I LIKE DISENTANGLING THE
COMPLEX SYSTEM AND TRYING
TO ANALYSE IT"**

"One of our questions with the border opening was: if we left it a little longer, would that help? The answer ultimately was no. Opening the border later would have just delayed the same outcome," he says.

While Sebastian's simulations unfold on a desktop, they connect directly to the daily lived experience of millions, whether shedding light on brain dysfunction or influencing whether you get to hug your grandma on her birthday.

"Everything I do, I keep in mind how it is going to be used in practice," he says. – *Emily Howes*

A day in the life of a... MEDICAL PHYSICIST

Fighting cancer with physics is all in a day's work for **Lucy Sim**

You can learn from Lucy!

Lucy teaches the Bachelor of Radiation Therapy and Master of Applied Science (Medical Physics) at QUT.

At school, Lucy couldn't wait to do maths and science full-time. Now, as Assistant Director of Radiation Oncology Medical Physics at a Queensland Health cancer ward, she's living that dream and saving lives along the way.

Lucy found her future career while researching ultrasound technology in her Honours year at QUT.

"I was hooked," she says. "I realised there are scientists who work in a real-world clinical environment and make a difference in the field of cancer."

Ongoing learning opportunities and technology advancements keep Lucy engaged. This has included establishing Queensland's only paediatric radiation oncology services.

"Because we had the rare privilege of starting from scratch, we designed brand-new treatment techniques with state-of-the-art technology, such as total body irradiation for leukaemia patients," she explains. — *Emily Howes*

I REALISED THERE ARE SCIENTISTS WHO WORK IN A REAL-WORLD CLINICAL ENVIRONMENT AND MAKE A DIFFERENCE IN THE FIELD OF CANCER"

While there's no such thing as a 'typical' day for Lucy, any given day might include:

6:00am

I grab a coffee and am out the door.

7:00am

I like to start the week sketching out an action plan, including remaining tasks from last week and anything coming up.

9:00am

Meet with trainee medical physicists. They have the chance to raise issues, we might do a deep dive into fundamental theoretical concepts or I might assess their knowledge with a pop quiz!

12:00pm

I go for a walk around the neighbourhood. South Bank and Kangaroo Point are really picturesque. It breaks up the day and I get my steps in.

12:30pm

The overlap between morning shift and late shift is the best time for interdisciplinary meetings. We might discuss a patient's treatment plan, the implementation of new techniques or ways to address clinical problems or improve processes.

2:00pm

I call the afternoons my "golden hours", my time to do anything needing deep thinking, such as data analysis, reading reports or writing results. I am not a morning person at all!

4:00pm

After clinical hours, the medical equipment is free for the physics component of the job. This might include quality assurance on the linear accelerators, verifying treatment plans, or experiments and measurements for research projects.



Get the job!

Ready to tackle a career in medical physics? Start here



FILL YOUR FEED

Double tap these socials to fill your feed with career inspo:

TikTok: @nuclearsciencelover

Keen for bite-sized careers info? This guy will get you clued up – fast! As a certified health physicist, his explanations are pretty wordy. But if you're a physics undergrad? You'll totally geek out!

Instagram: @BiOMSQUT

QUT's Biomedical Society 'grams on the regular! On offer: funny med student memes, career profiles, internship opportunities and IRL meet-ups.

Twitter: @ANSTO

Follow local nuclear science organisation ANSTO for industry news, employment opportunities and epic employee CVs.



@BiOMSQUT



NETFLIX AND SKILL



Forget chilling! Load up on plenty of hospital-based dramas before you become a medical physicist for real.

Grey's Anatomy: Get old-school and marathon some Grey's! If there's an ep featuring a cancer patient, chances are they're treated by a medical physicist. Highly dramatised but good for a glimpse of hospital life.

Medical Police: Cops that double as doctors? This show is equal parts ridiculous and great! Not super-educational, but good for a LOL between epic study sessions.

The Most Unknown: If straight-up physics is your thing, *The Most Unknown* has dedicated every ep to tackling a different scientific theory or question. One of the nine scientists featured is an awesome physicist who is total #CareerGoals.

Electives checklist

Choosing high school electives? These subjects will set you on the right path to a career in medical physics:

- ✓ Maths
- ✓ Extension maths
- ✓ Biology ✓ Physics
- ✓ Engineering studies

IN YOUR EAR

Hormesis Podcast: Woohoo! An entire podcast dedicated to all things medical physics that's both fun and informative. Eavesdrop on four medical physicists as they chat about literally everything. So interesting if you're studying it at uni!

The Physics Podcast: Studying medical physics but keeping your pathway options open? Get a taste of all types in this weekly deep-dive on literally every subject in the physics sphere.

Out of the Gray (GY): Get a glimpse of the world of radiation oncology through the eyes of those on the front lines of cancer care. So many interesting interviews and discussions. TW: pretty confronting at times, too.