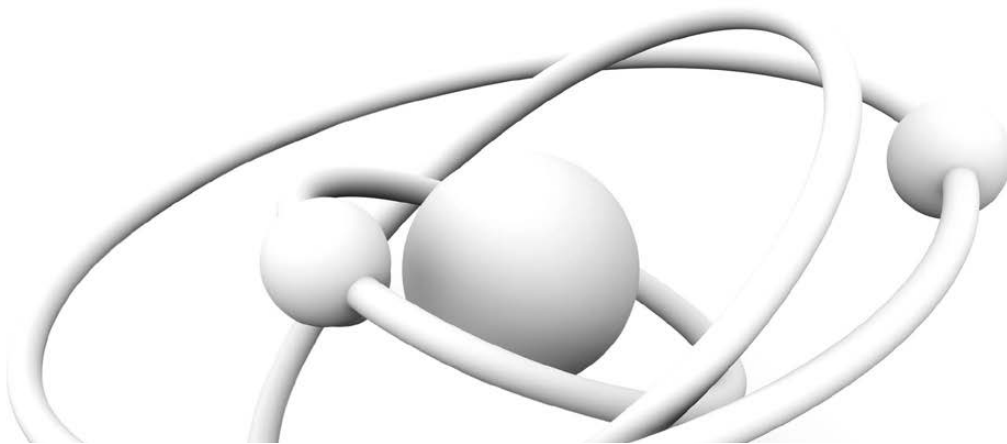


What can I do with a degree in Physics?

Physics.



What is Physics?

Physics aims to understand the behaviour of matter and energy from the scale of subatomic particles to that of the Universe itself. From fridges and cars to computers and communication systems, and water supplies and electrical systems, modern life is built using the understanding of nature that physics provides.

Physics underpins the technological advances that have and continues to improve our lives massively, leading to wide-reaching societal benefits. For example, architecture, the various fields of engineering, nursing, medicine and other health professions, and agricultural science all use aspects of physics.

Modern physics provides a framework for understanding – and contributing to – major advances in technology now and in the future.

Physics is a very broad discipline: it encompasses everything from building huge laser equipment to creating tiny nanoelectronic devices that can act as transistors or sensors, to measuring the behaviour of the upper atmosphere in order to understand global warming.

Learn more

It is important to do some research when planning a future career. Speak with, ask questions of, and follow relevant professional bodies, organisations, companies, thought leaders and industry professionals to learn more about:

- Career opportunities, work environments and salary information
- Education and training requirements.

Examples of professional bodies

- New Zealand Institute of Physics
www.nzip.org.nz
- Te Apārangi | Royal Society
www.royalsociety.org.nz
- Institute of Physics www.iop.org
- Science Communicators Association of New Zealand www.scanz.co.nz

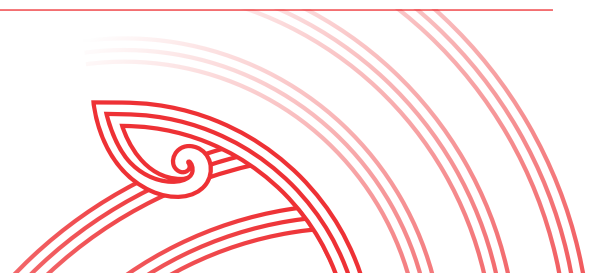
Career and study information

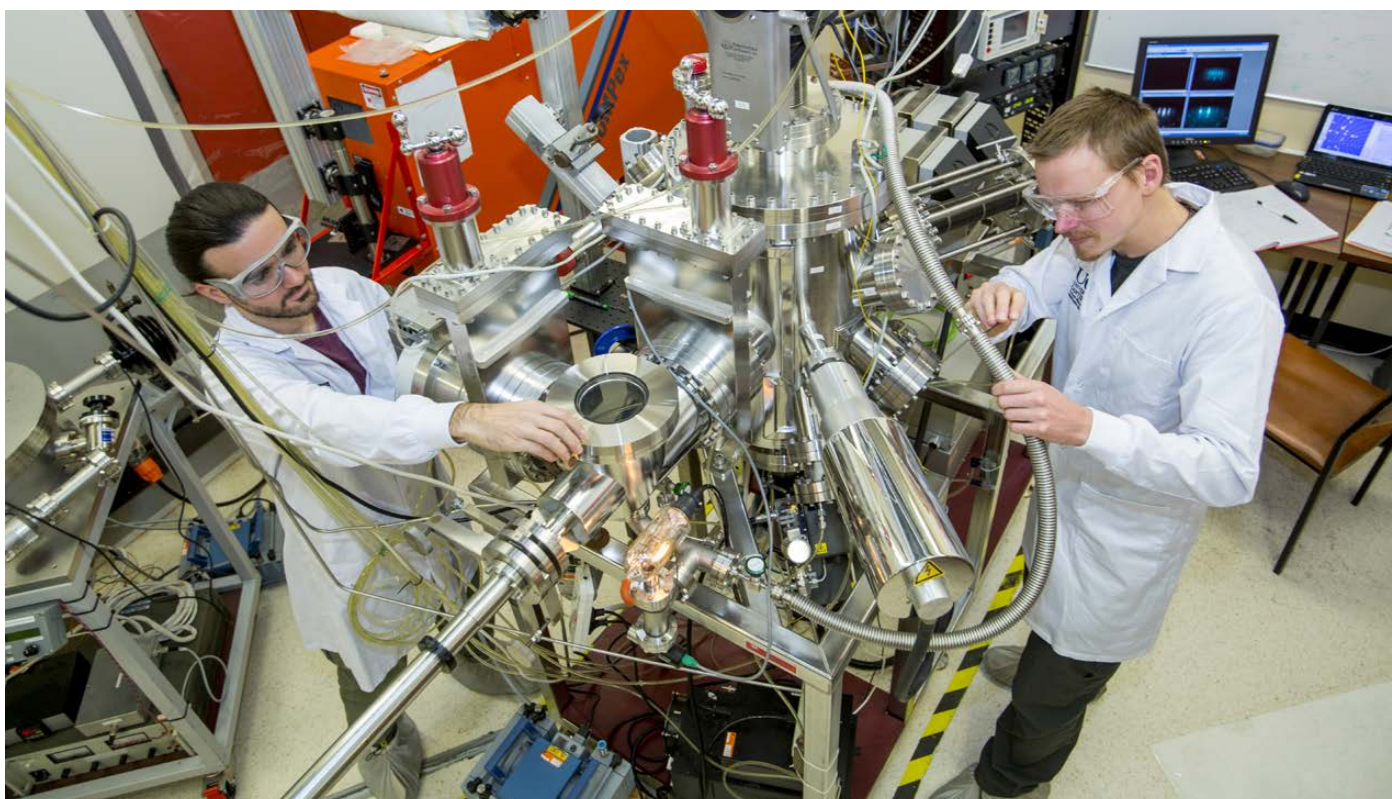
Some study pathways and degrees have a recommended school background, and some careers may require further study beyond a first degree or additional experience.

Gather helpful information from:

- Subject-specific content at
www.canterbury.ac.nz/study/academic-study/subjects/physics
- Job profiles on career websites like
www.careers.govt.nz
- Job adverts/vacancy descriptions
- Industry professional bodies.

This resource is part of a set of brochures focused on subject majors; many can also be studied as minors.





What skills can graduates gain?

Through studying a degree in Physics, graduates develop a valuable set of skills and competencies, which can include:

- An understanding of how to apply scientific methodologies
- Mathematical confidence
- Technology and computer literacy; able to use specialist software
- Practical skills, such as using technical equipment
- Problem-solving and pragmatic and analytical thinking
- Reasoning and the ability to construct logical arguments and grasp complex problems
- Research and data analysis
- Time management, planning and organisation
- Oral and written communication
- Collaboration and teamwork
- Capacity to think creatively and be innovative and imaginative.

Applied learning

Applied learning opportunities are available such as laboratory sessions, field trips and internships with potential employers. These experiences deepen graduates' skillset, awareness of others, working knowledge and employability.

What do employers look for?

Many employers look for generic skills such as communication, client/customer-focus, bicultural competence, cultural awareness, teamwork and initiative.

With technology, globalisation, and other drivers changing society, skills such as resilience, problem solving, and adaptability are important.

Skills that are likely to grow in importance include analytical and creative thinking, systems thinking and technological literacy.*

*World Economic Forum: www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills

How can these skills be developed?

- Some skills are gained through studying
- Extra-curricular activities can help, such as getting involved in clubs, mentoring, cultural groups, part-time work or volunteering
- Be open to professional and personal development opportunities, whether it is undertaking work experience, overseas exchange, skills seminar, or joining an industry group.

Where have graduates been employed?

Physics graduates have been employed in a wide range of industries that include:

- Aerospace and aeronautics (including airlines)
- Agribusiness
- Business, banking and finance
- Defence; armed services and police
- Education e.g. Universities and school teaching
- Energy and sustainable energy
- Engineering
- Geotechnical
- Government and regional councils
- Health and medical sectors
- Instrumentation
- Manufacturing
- Environmental, weather and climate services; meteorology and the study of climate change
- Nanotechnology
- Oil and gas industries
- Science
- IT, computer and electronics
- Telecommunications
- Research institutes.

UC alumni have done postgraduate study or postdoctoral research at universities around the world including China, Germany, Malaysia, the Netherlands, Pakistan, and the USA.

What jobs and activities might graduates do?

Many Physics graduates are not employed as specific scientists — their physics can be applied to a range of jobs. See some job examples below.

Note: This list is not exhaustive, and some jobs may require further study, training or experience. It is recommended to start with the section 'How can I gain a sense of career direction?'

Field / laboratory technician

- Plan and carry out research experiments
- Maintain and calibrate equipment
- Liaise with scientists and industry personnel
- Collect and collate data, and draft reports

Research scientist, postdoctoral researcher

- Organise and conduct research
- Test theories and operate instruments
- Analyse data and scientific phenomena to develop explanatory theories
- Write reports and publish articles
- Consult with and advise industry

Telecommunications / software engineer

- Analyse customer needs, evaluate computer software and research new technologies
- Develop software programs for new products
- Manage software development projects

Programmer, software developer

- Determine specifications and write code
- Build prototypes of software programs
- Test and fix computer programs and systems
- Maintain and upgrade programs and systems

Medical physics registrar

- Operate and improve diagnostic and therapeutic equipment
- Use knowledge and skills to help prevent, diagnose and treat different diseases/ conditions
- Ensure radiology, nuclear medicine and radiation treatments are safe and effective
- May develop and integrate technical aspects of websites/mobile apps along with other workers

Patent advisor

- Research technical or scientific documents, to assess if a product is new and innovative
- Maintain knowledge of laws and regulations
- Advise businesses, government and industry

Meteorologist

- Monitor weather systems and atmospheric patterns
- Analyse data and use forecasting models to predict weather conditions and climate trends
- Prepare weather maps, forecasts and alerts
- Design tests to measure air quality, ozone etc

Examples of other job titles and careers include:

- Actuary
- Acoustic consultant
- Astronomer
- Assistant professor
- Data analyst / scientist
- Engineer
- Electronics assembler / tester
- Game developer / designer
- Geophysicist
- Instrument technician
- Lab demonstrator
- Medical technician
- Private wealth assistant
- Metallurgist
- Operational researcher
- Patent attorney / examiner
- Secondary school teacher
- System and application development
- Seismologist.

Further study options

Physics graduates can progress into a number of programmes from honours to master's and PhD level. These degrees provide advanced research and writing skills. Advanced study can lead to an academic career in teaching and research.

Qualifications in Medical Physics are offered at UC — a postgraduate diploma, honours, master's and PhD.

UC also has a range of conversion degrees e.g. in Teaching and Learning, Journalism, Applied Data Science, and Business.

Further study may facilitate career benefits such as specialist skills, entry into a specific occupation, higher starting salary, faster progression rate, and advanced research capability.

It is important to determine which, if any, further study options align with future career aspirations.

For further UC study options visit:

www.canterbury.ac.nz/study/academic-study

How can I gain a sense of career direction?

Understanding yourself and others is important to gain a sense of direction. This grows with experience; therefore, trying new things and reflecting on an ongoing basis is important.

Career planning checklist

Discover and reflect on:

- Your values, interests, strengths, abilities, and aspirations
- Your connection to whānau, people, and places
- Lifestyle preferences and location
- The skills you want to gain, use, or enhance

Engage in a variety of experiences to learn about:

- How you want to contribute to society, the environment, and global challenges
- The tasks, responsibilities and work environments you prefer
- Your work values, priorities and interests

Learn more and gather career and study information

(refer to page one of this resource)

- Speak with people working in careers that interest you; check the realities of a job/career
- Gather information from various sources

Identify your next steps

- Talking to a career consultant can help you to identify your next steps. Visit: www.canterbury.ac.nz/life/jobs-and-careers



What have other students and graduates done?

Explore career stories of students' university experiences and UC alumni who make a difference globally in varied ways.

Visit: www.canterbury.ac.nz/about-uc/why-uc/our-students/student-stories



Toby

YouTube Content Creator

Honours Degree in Physics

Bachelor of Science in Physics and Mathematics

What led you to study physics and mathematics?

I was attracted to the challenge of studying physics and maths as I saw these subjects as a way to seek answers to interesting questions about the world around us. At school I had been inspired by science communicators on TV, through books and on YouTube who helped open my eyes to science. Like many aspiring physicists I was attracted to the big mysteries of science such as dark matter, black holes and quantum physics, and I wanted to gain a deeper understanding of these ideas at university.

Why did you decide to create a YouTube channel?

I started my YouTube channel 'Tibeets' in 2011 while I was still in high school. I started uploading videos just as a hobby - it would take another 7 years until it became something that could be my job. I have kept uploading videos for so many years because I enjoy finding creative ways to present science. My channel grew very slowly for the first few years but once I found my niche and became more consistent with videos I started to see growth. This year I passed 500,000 subscribers and 50 million total views.

What have been some of the highlights of your career?

I'm grateful that other educational creators have been really welcoming and friendly to me and I've loved getting to know many of them at annual VidCon events (a convention for online video). I've collaborated on videos with some of my favourite creators including Vsauce3 and Physics Girl.

What do you enjoy about being self employed?

Working for myself, I have a lot of creative freedom. I get to choose which topics to cover in videos so I pick something that I would enjoy researching, although I do need to consider what topics will perform well with my audience and follow YouTube trends to some extent.

What advice do you have for prospective physics students?

Enrolling in a physics degree will help you to establish a career in the field but you don't need to wait until you are at university to learn physics. There are lots of resources both online and offline including books, lectures and YouTube videos which you can use to get a head start.

Career guidance

Career services are available for future and current students, and recent graduates. To learn more, contact:

Te Rōpū Rapuara | Careers

T: +64 3 369 0303

E: careers@canterbury.ac.nz

www.canterbury.ac.nz/life/jobs-and-careers

Helpful career insights

- Speaking with employers is key to finding opportunities; not all jobs are advertised
- Developing an online presence is useful as employers can search for future employees online
- Learning about recruitment patterns and where to find opportunities is important.

Study advice

Student Advisors at UC help with questions focused on starting, planning and changing studies. To connect with Student Advisors, visit:

www.canterbury.ac.nz/study/study-support-info/study-support

Future students – contact:

The Future Students team

T: 0800 VARSITY (0800 827 748)

E: futurestudents@canterbury.ac.nz

First year students – contact:

Kaitoko | First Year Student Advisors

T: +64 3 369 0409

E: firstyearadvice@canterbury.ac.nz

Continuing students – contact:

Te Kaupeka Pūtaiao | Faculty of Science

T: +64 3 369 4141

E: science@canterbury.ac.nz

www.canterbury.ac.nz/study/academic-study/science

