What can I do with a degree in Astronomy?

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Astronomy.

What is Astronomy?

Astronomy and astrophysics are concerned with the study of the nature and distribution of matter and radiation throughout all time and space in the Universe.

Astronomers harness the latest technological advances in their quest for ever more precise and revealing observations. As a consequence, astronomy in recent years has been one of the most rapidly expanding of all physical sciences and many exciting and unexpected discoveries continue to be made.

A degree in Astronomy provides broad training in many branches of Physics as well as Astronomy, enabling graduates to develop their skills in science, technology and computing.

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

- International Astronomical Union 💻 www.iau.org
- Te Apārangi Royal Society of New Zealand 💻 www.royalsociety.org.nz
- Royal Astronomical Society of New Zealand 💻 www.rasnz.org.nz
- New Zealand Institute of Physics 💻 www.nzip.org.nz
- New Zealand Association of Scientists 💻 http://scientists.org.nz
- 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/astronomy
- 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 Astronomy, graduates develop a valuable set of skills and competencies, which can include:

- The ability to apply fundamental physics laws and principles
- Knowledge of astronomy, physics, statistical data analysis, and mathematical modelling
- Programming and software development skills
- Ability to use technology such as spectroscopic and photometric detector systems
- Research and analysis
- Critical, logical and quantitative thinking
- Problem solving and innovation
- Oral and written communication and presentation
- Project management
- Cooperation, teamwork and leadership.

Te Waipounamu, the South Island as your lab

Applied learning happens in laboratory sessions and on fieldtrips, using facilities that include:

- An internationally important astronomical observatory at Ōtehīwai, Mount John in Takapō, with computer-controlled instruments and cryogenic detectors
- UC-constructed Hercules, a high resolution spectrograph for stellar astrophysics.

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?

Astronomy graduates may follow traditional paths and work within a:

- Tertiary institution
- Research institute
- Observatory, planetarium or star-gazing facility
- Astro-tourism destination or agency
- Scientific publishing house
- Aerospace company.

Related fields

Astronomy graduates can move into related fields like:

- Computing and information technology
- Education
- Data analysis or data science
- Defence forces
- Science communication
- Energy and renewable energy
- Engineering
- Health and medicine
- Instrumentation
- Manufacturing
- Meteorology and climate change
- Nanotechnology
- Science communication
- Science and telecommunications.

With additional study, graduates can get into meteorological services, geophysical consultancy, optics, or medical physics.

What jobs and activities might graduates do?

Graduates with this degree are employed in a range of jobs — see some 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?'

Observatory technician/engineer

- Design, maintain and repair all technical equipment in astronomical and radio astronomical observatories

Observatory manager

- Develop and implement plans for connecting the general public with professional astronomy
- Manage organisational operations e.g. staff, building, equipment maintenance, budgets
- Ensure the centre attracts visitors and funding

Field / laboratory technician

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

Science writer / editor

- Research specialist or technical stories
- Interview scientists, medical personnel
- Write and edit scientific articles/publications

Science communicator, communications advisor

- Present science topics to various audiences e.g. publicise research findings

Tour guide

- Use technology to showcase the night sky
- Help guests discover new knowledge
- Ensure visitors have a memorable, enjoyable experience
- Manage educational programmes e.g. exhibitions, outreach events, seminars
- Produces content e.g. media releases, videos

Patent advisor

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

Optical assistant

- Serve optical retail customers and works with optometrists
- Use devices and product knowledge to assist
- Keep customer details up-to-date and schedules aftercare.

Secondary school teacher

- Prepare and deliver learning experiences in specialised subjects
- Understand the learning needs of rangatahi, observe progress to personalise support
- Promote the wellbeing of rangatahi

Examples of other job titles and careers include:

- Business and consulting e.g. Business technologies associate, Business analyst / consultant
- Communications and media e.g. Planetarium lecturer / interpreter, Scientific journalist / photographer, Technical writer
- Data, analytics and performance e.g. Data analyst / engineer, Performance analyst
- Instrumentation and inspection e.g. Instrumentation researcher and developer, Radiation inspector, Remote sensing technician
- Science and research e.g. Astrophysicist, Climate scientist, Geophysicist, and Meteorologist
- Technology and engineering e.g. Laser technician, Nanotechnologist technician, Software engineer / developer, Associate technologist, Development engineer, Satellite technologist, Systems engineer, Financial software developer, Solutions developer.

Postgraduate role example:

Astronomer (Research scientist)

- Study astrophysical objects or theories
- Organise and conduct research
- Analyse data and scientific phenomena to develop explanatory theories
- Communicate discoveries and engage with different groups e.g. enthusiasts, media, schools
- Collaborate with other research scientists or organisations, and applies for funding
- Write reports, publish articles and make recommendations
- Consult with and advise industry

Further study options

Graduates can continue their study of Astronomy and astrophysics. Students with good honours or master's degrees can proceed to a PhD.

UC research students have access to state-of-the-art technology and benefit from international collaborations. Research programmes are available in fields such as stellar astrophysics, planetary science, galactic archaeology, neutrino astronomy and cosmology.

Students can also take a conversion masters in a range of areas including teaching, business and Antarctica studies.

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

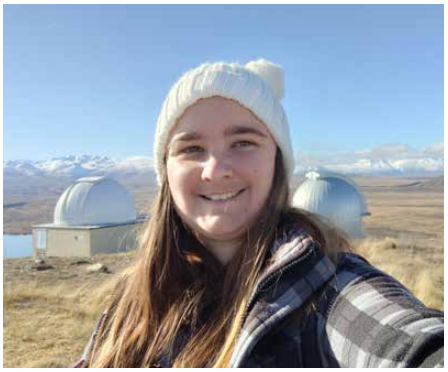
❑ **Identify your next steps**

- 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



Emma

Secretary (Volunteer), Royal Astronomical Society of New Zealand

Bachelor of Science in Astronomy

Why Astronomy?

It was never really a conscious decision that I made to study Astronomy. I have always been fascinated by the stars and the universe as I grew up in a very dark and rural environment. I've also had ancestors who were also interested in nature and learning so you could say that it's in my blood.

What did you most enjoy about UC and your studies?

The thing I enjoyed about my time at UC was the atmosphere of university. There is flexibility outside of your lectures and tutorials to incorporate other things into your day. There is no other environment anywhere else in life where you have that sort of freedom.

I also enjoyed getting to go down to the Mt John Observatory at Lake Tekapo to use the telescopes and collect real data.

How have your studies prepared you for your career?

My studies have mostly helped with defining what sort of scientist I want to be. I'm not a classic academic who does research with brand new data that I collect. I prefer to learn from research that has already been done and explain it to the layperson about what our researchers have found. My studies showed me my strengths are in my writing ability, in explaining difficult topics and supporting other people's learning rather than in data reduction and research.

What does your role involve?

My job mostly involves working with and discussing ideas with most of the Astronomical affiliated Societies from around the country.

What insights can you share about careers in Astronomy?

Most students try to continue with postgraduate studies in Astronomy and Physics, others choose to go into teaching and many others find jobs in areas of society that want people with really good mathematics skills (like analytic jobs relating to business and economics) since Maths is a massive part of our degree. Astrotourism is slowly picking up around the country, but graduates may find more volunteer roles that interest them.

What are your career aspirations?

My aspirations are to learn from researchers and leaders and translate that into something the layperson can understand. I have spent the last year improving my creative writing ability as I want to combine all my passions for astronomy, history, earth sciences, reading and writing, so that I can teach others about how amazing our universe is and hopefully inspire others to learn more.

Do you have any advice for those considering Astronomy?

Advice I would give to anyone wanting to study Astronomy (and in general) is to not be afraid to ask for help. Many people are likely going to have the same questions as you, the same problems as you. The lecturers are there to help. They may seem intimidating at first, but they are people just like you.

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

UC UNIVERSITY OF CANTERBURY | Te Rōpū Rapuara Careers

Career profiles and the information in this brochure were correct at the time of creation but are subject to change.