

What can I do with a degree in Chemistry?

Chemistry.



What is Chemistry?

Chemistry deals with the composition, structure and behaviour of the atoms and molecules that make up all forms of matter. Understanding the world at an atomic level helps us see how things are interconnected and work together, and how they are essential to all areas of science.

Chemistry contributes to medicine, geology, materials science, molecular physics, biology and astronomy. Its central role is emphasised by the fact that chemistry merges with biological sciences (the field of biochemistry) at one extreme and with physics (physical chemistry and chemical physics) at the other.

Chemistry propels advances in modern society and has an important role to play in solving major global challenges in areas such as energy, food supply, health and the environment. Every day we utilise products developed by experimental chemists such as paints, plastics, fabrics, petrol, and pharmaceuticals.

Practising chemists make important contributions to almost all fields of applied science.

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 Chemistry
<https://nzic.org.nz>
- Royal Society of Chemistry
www.rsc.org
- Royal Australian Chemistry Institute
www.raci.org.au
- Te Apārangi Royal Society of New Zealand
www.royalsociety.org.nz
- New Zealand Association of Scientists
<http://scientists.org.nz>
- Science Communicators Association of New Zealand
www.scanz.co.nz

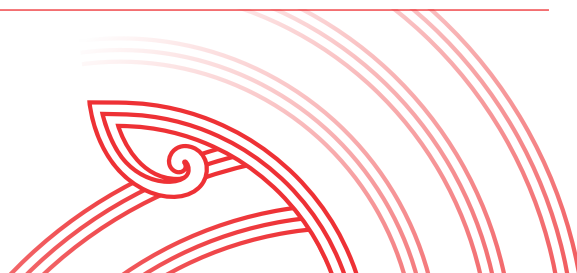
Career and study information

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/chemistry
- 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 Chemistry, graduates develop a valuable set of skills and competencies, which can include:

- Research, development, and presentation; applying the scientific method
- Observation, monitoring and maintenance of data
- Mathematical/numerical ability
- IT and technology competencies
- Analytical and critical thinking
- Problem solving
- Logical and quantitative thinking
- Time management, planning and organisation
- Oral and written communication
- Collaboration and teamwork.

Applied learning

Applied learning opportunities are available through laboratory sessions. 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?

Many types of organisations employ Chemistry graduates, including those within the chemical and environment-related industries, such as:

- Agrochemicals
- Metallurgical
- Petrochemicals
- Materials (including plastics and polymers), pharmaceuticals, personal products, and biotechnology.

Other various sectors that have roles linked to chemistry also employ graduates, such as:

- Crown Research Institutes (CRIs)
- Other research and development organisations and laboratories
- Environmental consultancies
- Health and medical organisations
- Government departments and agencies
- Manufacturing firms
- Food and drink producers
- Forestry and dairy resources
- Industrial plants
- Energy, including those focused on developing new sources of energy
- Secondary schools and universities
- Tech sector including nanotechnology, app development and data science.

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?'

Laboratory manager

- Manage laboratory staff, budgets, workloads
- Maintain and update lab documentation
- Ensure safety and quality standards
- Review methods and validate results

Research scientist / associate

- Design and conduct research experiments
- Analyse the data and results
- Publish journal papers, file patents, and present information at conferences

Toxicologist, chemical consultant

- Identify toxic substances and evaluate potential harmful effects
- Conduct laboratory and field experiments
- Produce research reports and advise business, government and industry

Environmental scientist / consultant

- Apply knowledge of atmospheric, water and soil chemistry to the environment
- Carry out field and lab tests and record data e.g. measure level of pollutants
- Conduct analysis and write technical reports
- Develop and oversee policy and procedures
- Interpret regulations and monitor compliance

Field / laboratory technician

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

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

Science communicator

- Present science topics to various audiences e.g. publicise research findings
- Manage educational programmes e.g. exhibitions, outreach events, seminars
- Produce content e.g. media releases, videos

Patent attorney / advisor

- Research technical or scientific documents to assess if a product is new and innovative
- Maintain knowledge of laws and regulations
- Write patent applications for new chemical inventions, including medicines and materials
- Advise businesses, government and industry

Quality manager

- Ensure that products, processes and systems meet quality standards
- Develop policies and procedures
- Solve problems, make decisions and support others to achieve these standards

Data analyst / technician

- Analyse data and model techniques to solve problems
- Use software and computer programs, may develop these for new products
- Gain insights for decision-making purposes

Examples of other job titles and careers include:

- Analytical / medicinal / product development chemist
- Lab technician / assistant
- Lab demonstrator
- Scientist
- Researcher
- Clinical scientist
- Forensic technician / scientist
- Crime scene investigator
- Biotechnologist
- Pharmacologist
- Toxicologist
- Nanotechnologist
- Colour technologist.

Further study options

Chemistry graduates can progress into a number of programmes from honours through to master's and PhD level. These degrees provide advanced research and writing skills.

Some prepare for a career through further training e.g. in Teaching and Learning, Waterways, Applied Data Science, Engineering Management, and Business.

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



Joel

Studying towards a PhD in Chemistry
Master of Science in Chemistry
Bachelor of Science in Chemistry

Why did you choose to study Chemistry?

I actually came to UC originally to study some preliminary science papers that I could use towards becoming a veterinarian. It wasn't long before I realised that chemistry was a much stronger interest than biology and so I decided to switch my focus! Completing my Masters is really when I learned to be a scientist as I was able to start applying the fundamental knowledge that I gained from my undergraduate degree. I really enjoy that chemistry offers a mix of practical work and intellectual skills. I find the Chemistry world fascinating which is why I've continued through to my PhD.

What are some of your highlights in the field so far?

One of the biggest highlights would be a teaching award that I won for teaching 400 level lab classes. I enjoy this work as I get to share my passion with others. My research is also a highlight as it's where I get to discover unknown things and explore things people don't normally think about. You know you're on the right track with research when you can't find it on Google!

What are some of the important skills you've gained so far?

Along with improving generic skills like reading and writing, I have gained critical thinking and problem solving skills. I feel like I am able to assess why I think what I think, which helps me to justify my thoughts and opinions. These are great skills not only for my career, but in everyday life.

What does your future in Chemistry look like?

My PhD subject is at the forefront of solar cell development. Clean and green energy is a big focus of the science world at the moment and it's great to be a part of ensuring we're doing things better.

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

