The role of a chemist is to try and understand the world at a molecular level. With that understanding, chemists can create new molecules with desirable properties that improve the lives of millions of people. Chemists can enhance the understanding of fundamental processes as varied as ozone depletion, and the reactions of life.

The advancement of chemistry to tackle the challenges that face today’s society is crucial to the health of our environment – finding ways to do chemistry that work better, require less energy and produce less waste, is vital. Chemistry is one of the central sciences.

The School of Chemistry at UNSW is one of the largest and most reputable in Australia. Our School is equipped with new laboratories and world-leading molecular characterisation facilities. We provide first rate learning facilities for undergraduate students, as well as research training to both graduate and postgraduate students.

Staff in Chemistry at UNSW have international reputations in fundamental as well as applied areas of chemical research. Research areas include:
- design and synthesis of new bioactive molecules
- therapeutics and biomaterials
- supramolecular chemistry and crystal engineering
- nanomedicine
- molecular devices and biosensors
- functionalised surfaces
- nanoscience and nanotechnology
- chemometrics and metrology in chemistry
- electrochemistry and electroanalytical chemistry
- chemical and biological catalysts
- organometallic chemistry
- sustainable chemistry
- carbon capture
- hydrogen generation and storage

Our School of Chemistry has a strong commitment to teaching excellence, which is reflected in its up-to-date lecture, tutorial and problem solving class content and innovative laboratory programs. Lectures, delivered by people who are passionate about their science, are attuned to the requirements of students from a wide range of degrees. The School places great emphasis on practical experience, and features:
- a modern first year chemical laboratory where synthetic and instrumental methods are taught
- several well-equipped higher year laboratories located close to research laboratories; and
- a modern undergraduate computer laboratory.

The study of Chemistry will appeal to students with inquiring, analytical minds who are prepared to investigate new, innovative and exciting science. We provide a variety of undergraduate and postgraduate degrees at UNSW and the skills that are developed during these studies make our Chemistry graduates highly sought after in the sciences as well as in areas of management, law and finance.
Undergraduate Degrees

Science
3-4 years full-time

The Bachelor of Science degree with a major in Chemistry is a rigorous degree that will appeal to those with a broad interest in science. It is ideal for those interested in combining their Chemistry major with related fields, such as Pharmacology, or non-science strengths, such as Languages, Information Systems, Marketing or Finance. An optional 4th year Honours course is also available and can be taken jointly with another science subject.

Advanced Science
4 years full-time

This Honours Science degree is for those who have already decided to specialise in Chemistry. The degree starts with a broad foundation of knowledge in Science during the first year, and concentrates on Chemistry in years 3 and 4. During the fourth year, students will undertake an Honours project in a specialised area of Chemistry.

Nanotechnology
4 years full-time

This degree focuses on the structure and behaviour of molecules and materials at the nanoscale, and use of this knowledge to create new devices with unique properties and applications. Students with a strong background in chemistry and physics will be challenged by this exciting and modern degree. Students can choose to complete an Honours nanotechnology project in a chemistry based field. This cutting-edge degree leads to careers in research and industry.

Medicinal Chemistry
4 years full-time

This interdisciplinary, professionally oriented degree focuses on the stages in the development of new pharmaceutical agents, from concept to clinical application. The Medicinal Chemistry degree will ensure that graduates have a strong background in contemporary biology, biochemistry and pharmacology, based upon a solid foundation of essential chemistry, and the degree culminates in an interdisciplinary research project and thesis. Graduates from the Medicinal Chemistry degree will be in high demand both locally and globally in pharmaceutical companies involved in modern drug design, as well as in other science-based industries and related fields.

Environmental Science
4 years full-time

A specialised Science degree for those concerned with environmental issues, Environmental Science is a multidisciplinary degree, which has a Chemistry specialisation. It is focused on delivering strong training in environmental science, covering topics such as environmental impact assessment, conservation biology and biodiversity, population analysis, environmental economics, environmental toxicology and environmental policy and law. The Honours year involves a major research project and thesis.
Postgraduate Research

There are three postgraduate research degrees offered by the School of Chemistry:

**PhD** – Research degree
[1870]  
(minimum 3 years full-time study)

**MSc** – Research degree
[2910]  
(minimum 1.5 years full-time study)

**MPhil** – Research and coursework degree
[2475]  
(minimum 1 year full-time study)

To undertake a research degree, it is necessary to apply for admission to the degree, as well as separately apply for scholarship support. It is important to choose a research topic that really interests you. The research interests of the academic staff are provided in the School of Chemistry Research Booklet or can be viewed online at our home page.

Prospective students are welcome to contact the relevant staff members directly to talk about their research interests. A wide range of scholarships are available to both local and international students. Scholarships are available from the Australian government as well as UNSW.

Postgraduate Coursework

The School of Chemistry offers Graduate Certificates, Graduate Diplomas and Masters Degrees by coursework. These degrees are aimed at graduates of chemistry or related disciplines who want to enter the important field of chemical analysis (including overseas graduates who desire an Australian qualification to enter the workforce), or who need to develop skills in order to progress their careers. A unique blend of modern chemical analytical techniques and management skills (including quality assurance, health and safety, law and entrepreneurial management) provide the graduate with knowledge that is sought-after in industry and government.

Dual Degrees

Chemistry can be taken at UNSW as a major component of several dual degrees. These degrees enable students to match Science or Advanced Science with another field of study, opening up an even broader spectrum of career opportunities.

For students who perform well, there is the option of an extra Honours year. See the table below for the attractive degree combinations that are possible.

<table>
<thead>
<tr>
<th>Degree</th>
<th>UNSW Code</th>
<th>Duration</th>
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<tbody>
<tr>
<td>Commerce/Science</td>
<td>3529</td>
<td>4 years full-time</td>
</tr>
<tr>
<td>Science/Law</td>
<td>4770</td>
<td>5 years full-time</td>
</tr>
<tr>
<td>Science/Arts</td>
<td>3930</td>
<td>4 years full-time</td>
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<tr>
<td>Science/Education</td>
<td>4076</td>
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</tr>
<tr>
<td>Science/Engineering</td>
<td>various</td>
<td>5 years full-time</td>
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</table>
Research in the School

Research in the School of Chemistry focuses on the areas of Molecular Devices, Medicinal Chemistry and Catalysis and Energy. These multidisciplinary research clusters leverage the synergies between researchers in the School to maximise the outcomes of our research. The researchers in each cluster have access to state-of-the-art instrumentation through the Mark Wainwright Analytical Centre, through the equipment housed in the School, and through the world-class research facilities available to the scientific community in Australia such as the Australian Synchrotron and the OPAL reactor.

Molecular Devices

The ability of chemists to control matter on the molecular level is now being exploited to develop a new generation of materials with properties not previously accessible. The functional materials we are developing have important applications in analytical chemistry, electrochemistry and surface science.

Specific projects include:
- Designer surfaces leading to biosensors, optoelectronic devices, organic electronics, biomaterials
- Nanostructured materials for molecular sieves and sensing
- Nanoparticles and nanosheets as nanoscale building blocks for biolabelling, bioelectronics and molecular electronics
- Nanomedicine

Medicinal Chemistry

The need for new therapeutics and drugs is greater than ever, with ever-growing levels of resistance to current antibiotics, high levels of toxicity of current anticancer agents and limited availability of antiviral agents. The dramatic advances in disease prevention have been driven by developments in medicinal chemistry. Specific projects include:
- Synthesis of biologically active naturally occurring molecules
- Development of molecules as biomedical agents
- Heterocyclic chemistry for therapeutic leads
- Chemical biology

Catalysis and Energy

Improved strategies for chemical synthesis are now imperative to achieve the reduction of waste and energy demands as well as provide the capability to create new molecules for the fine chemical industry with high levels of selectivity.

Specific projects include:
- Homogeneous catalysts for efficient and selective synthesis
- Nitrogen fixation, carbon sequestration and hydrogen storage
- Structure and dynamics in catalysis using nuclear magnetic resonance spectroscopy, X-ray crystallography and modelling
- Multimetallic assemblies
- Electrocatalysis

Career Opportunities

Our graduates work in an extremely wide range of careers in research-intensive organisations, in industry, marketing and management, government, environmental science and policy, education and training, intellectual property and patent law.

Within Industry, many UNSW Chemistry graduates remain in scientific employment where they play central roles in areas such as: pharmaceuticals; biotechnology; scientific instrumentation; analytical/consulting laboratories; food and beverage industries; and paint, petroleum, bulk and fine chemicals manufacture.

Increasingly, graduates enter careers in which their scientific and analytical skills are of immense value. Within the field of research, our graduates have also gone on to do research and postgraduate degrees in internationally renowned institutions in North America, Europe and the Asia Pacific Region. Many of our graduates hold senior positions in Australian research institutes, including The Garvan Institute, The Heart Research Institute, Commonwealth Scientific and Industrial Research Organisation, Sydney Water, Environment Protection Authority, National Measurement Institute, Australian National Nuclear Research and Development Organisation and a host of universities.
A Student’s Perspective

Shelley Cass
BSc (Hons)

Shelley is currently employed as a Quality Control Chemist by Parnell Laboratories Australia Pty. Ltd., a global veterinary pharmaceutical company originally founded in Australia.

“The School of Chemistry at UNSW provided a stimulating and sociable environment that allowed me to obtain all the knowledge and skills I needed to become a scientist. By taking advantage of opportunities offered to chemistry students such as summer research scholarships and laboratory demonstrating, I was able to enhance my analytical and research skills and assist in the training of the next generation of chemists. Furthermore, by presenting the results of various research projects in different formats such as posters, oral talks and scientific reports, my oral and written communication skills were substantially improved. I thoroughly enjoyed studying chemistry at UNSW and know that the solid foundation it afforded is now allowing me to make significant contributions to the field.”