

University of Otago

# Sciences at Otago

Te Mātai Pūtaiao ki Ōtākou



# Kia ora, me haere mai ki Te Rohe a Ahikāroa

## I am delighted to welcome you to the Division of Sciences

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Science has been an essential cornerstone of the University of Otago since its establishment in 1869. The disciplines represented by three of the four foundation professors at the University remain represented in the Division of Sciences today – our founders understood that to fulfil their vision of educational excellence in Aotearoa they needed a strong foundation of science.

Today the Division of Sciences is internationally recognised for excellence in all of its activities, with a strong emphasis on research and research-led teaching that is grounded in our location and the collective skills of our people.

Centred on coastal Otago, our natural laboratories are unsurpassed. We also have some of the latest high-end built or upgraded laboratories on campus, allowing us to remain at the forefront of scientific endeavour.

Our staff are stellar, with a very large proportion engaged in or supporting research and scholarship that directly bear on the major issues that face our planet.

We offer a diverse range of quality subjects that can now be studied at both undergraduate and postgraduate levels. As well as our touchstone BSc (Bachelor of Science) and BSc(Hons) degrees with their large assortment of majors, you may also be interested in BAsc (Bachelor of Arts and Science) and BComSc (Bachelor of Commerce and Science), programmes that cut across normal departmental structures.

I feel honoured to head the Division at New Zealand's most science-intensive university. I am also very proud of our staff and the cutting-edge results that they produce each year. As a student in the Division of Sciences you will be taught by leading experts, providing you with the opportunity to gain a world-class qualification whilst at the same time contributing to revolutionary research.

I wish you all the best and look forward to applauding your academic success.

**Professor Richard Barker**  
Pro-Vice-Chancellor (Sciences)

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## **Our people. Our place.**

Our passionate students make a positive impact on our community and our physical surroundings. They learn from experts in unique environments – Otago Harbour, Fiordland, Stewart Island, Antarctica and the Pacific – and leave here with highly sought-after skills and experiences.

Study Sciences at Otago, a place where world-renowned researchers and unique natural resources combine to create a learning environment like no other.

## **Your future in Science starts here.**



# Why Sciences at Otago?

## He aha e whai ai te Pūtaiao ki Ōtākou?

### Quality teaching and research

- Otago is New Zealand's most science-intensive university.
- Science lecturers are regular recipients of national teaching awards.
- #1 in New Zealand and #15 worldwide for sports-related subjects (2022 QS World Rankings).
- Ranked among the best universities in the world in the field of computer science and information systems, and number one for research in New Zealand (PBRF Quality Evaluation, latest evaluation 2018).
- Ample opportunities for volunteering and professional development, even during undergraduate training.
- From the Antarctic to the Arctic, the University of Otago is at the forefront of influential investigations that will help inform decision-making across the world. We recognise the urgency, and we are working to understand the processes and manage the effects of climate change.
- The Division of Sciences is proud to host significant research, including:

#### Coastal People: Southern Skies

The vision of this collaboration is flourishing wellness (mauri ora) of coastal communities. The mission is to connect, understand and restore coastal ecosystems of New Zealand and the Pacific through transformative research and local action, and by unlocking potential through new opportunities and pathways to learning. It aims to build a generation of researchers of

international standing who can apply cross-cultural and multidisciplinary methodology to support coastal economies. It will also provide a diverse cohort of future-focused, career-ready graduates for the maritime sector in Aotearoa and the Pacific.

#### Te Whai Ao Dodd-Walls Centre for Photonic and Quantum Technologies

Aiming to produce the next generation of light sources for scientific and industrial applications, and harness the quantum world of atomic physics for the new wave of quantum technology.

#### The Dunedin Study

This study has followed the lives of 1,037 people born in Dunedin between 1 April 1972 and 31 March 1973. It is now in its sixth decade and has produced more than 1,300 publications and reports, many of which have influenced or helped inform policy makers in New Zealand and overseas.

#### Food Waste Innovation

Reducing the volume and impact of food waste by harnessing the best scientific expertise to provide effective solutions to Aotearoa's food waste problems. Our research is already providing a credible evidence base for decision-makers in New Zealand.

### Graduate employability

- 95% of Otago graduates go directly into work or further study.
- A Sciences degree from Otago is a world-class qualification that opens doors to a diverse range of careers.



Ranked in the top 1% of universities in the world



State-of-the-art laboratories, libraries, lecture theatres, facilities and resources



New Zealand's top university for educational performance



14 residential colleges offer a vibrant and supportive campus community



Dunedin is New Zealand's student city:  
21,000 students



Highest possible international quality rating



One of the most beautiful campuses in the world



Excellent support for local students who are flatting, boarding or living at home

## Unique opportunities

- The only energy-focused undergraduate degree in Australasia.
- National School of Surveying – the only tertiary professional surveying programme in New Zealand.
- New Zealand's only dedicated sports nutrition programme.
- Otago is the only university in New Zealand, and one of a few left in the world, with a true Zoology Department.
- Dunedin is the wildlife capital of New Zealand. The location makes for outstanding field work opportunities in this "natural laboratory".
- Our stunning, natural and unique learning environments include Otago Harbour, Fiordland, Stewart Island, Antarctica and the Pacific.
- The only university in New Zealand specialising in the science of plants. Modern Botany includes research into the biochemistry, ecology, genetics and physiology of plants, plant evolution, the role plants play in ecosystems and plant biotechnology.
- Marine Science students have access to world-class marine laboratories, fully equipped research vessels and field stations in Fiordland and Stewart Island.



# Sciences degrees and majors

## Ko ngā tohu me ngā kaupapa matua

### Bachelor of Science (BSc)

Agricultural Innovation  
Anatomy  
Aquaculture and Fisheries  
Biochemistry  
Botany  
Chemistry  
Computational Modelling\*  
Computer Science  
Data Science  
Ecology  
Economics  
Energy Management  
Energy Science and Technology  
Environment and Society\*  
Environmental Management  
Environmental Toxicology\*  
Exercise and Sport Science  
Food Science  
Forensic Analytical Science  
Genetics  
Geographical Information Systems  
Geography  
Geology  
Human Nutrition  
Information Science  
Land Planning and Development  
Marine Science  
Mathematical Statistics\*  
Mathematics  
Microbiology

Neuroscience  
Nutrition Communication\*  
Pathology\*  
Physical Activity and Health\*  
Pharmacology  
Physical Education, Activity and Health  
Physics  
Physiology  
Plant Biotechnology  
Psychology  
Science Communication\*  
Software Engineering  
Sport Development and Management  
Sport and Exercise Nutrition  
Sports Technology\*  
Statistics  
Supplementary Nutritional Science\*  
Surveying Measurement  
Zoology

(\* indicates minor subject)

### Bachelor of Arts and Science (BASc)

This degree allows you to choose two major subjects – one from the Bachelor of Arts and a different one from the Bachelor of Science.

### Bachelor of Commerce and Science (BComSc)

This degree allows you to choose two major subjects – one from the Bachelor of Commerce and a different one from the Bachelor of Science.

### Bachelor of Surveying (BSurv)

Surveying



# Which degree is right for you?

## Ko tēhea te tohu e tika ana ki a koe?

### Bachelor of Science (BSc)

Science and innovation impact on all our lives. Otago offers a comprehensive range of subjects in undergraduate and postgraduate degrees leading into a host of interesting career opportunities.

Studying Science at Otago gives you the opportunity to participate and learn in an environment where cutting-edge research projects are underway all the time. It's an environment that has earned us our international reputation.

Undertaking a Science degree at Otago will give you a solid base on which to build your career and a chance to enjoy our renowned campus learning experience.

We have world-leading researchers and teachers, as well as unique field sites for environmental sciences. Our research and teaching facilities are state-of-the-art, but you can't beat having the ocean as your lab, or classes taught under the trees of one of the world's most beautiful campuses.

The Bachelor of Science (BSc) is a three-year undergraduate degree that enables you to develop your interests in a science major and related subjects. Students have the flexibility to combine their major subject with other science subjects, as well as subjects from other disciplines across the University.

[otago.ac.nz/sciences](http://otago.ac.nz/sciences)

### Bachelor of Surveying (BSurv)

Surveying is a varied and exciting career that has a great indoor/outdoor balance; it requires design, measurement and interpersonal skills, and the ability to sift through evidence. It is a profession that is in constant demand both in New Zealand and abroad.

The National School of Surveying at the University of Otago provides the only degrees that are recognised as the prerequisite academic education for recognition as a professional land surveyor in New Zealand.

The four-year Bachelor of Surveying meets this requirement, and the Bachelor of Science degrees in Geographic Information Systems (GIS), Surveying Measurement (SURM) and Land Planning and Development (LPDP) can satisfy this requirement when supplemented with one further year of study (usually a Diploma for Graduates).

Intending surveying students must enrol in their first year for the Surveying First Year (BSc) course. You are then required to apply for admission to second-year classes in Surveying. Numbers allowed to advance to second year does not normally exceed 70 each year.

[otago.ac.nz/surveying](http://otago.ac.nz/surveying)



## Bachelor of Arts and Science (BASc)

Science is rapidly changing the way we live and work. But these developments also require us to think carefully about their implications.

The BASc is a four-year degree that recognises that tackling big world issues of health, security, food production and climate change – to name just a few – requires multi-faceted solutions. These solutions may include new technology and scientific breakthroughs, but will also require an understanding of their impact on people and society.

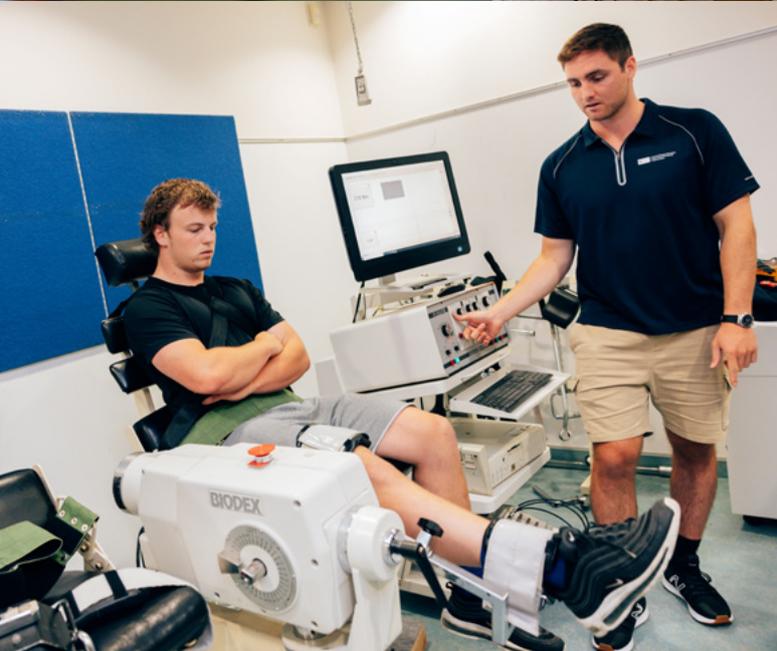
There are no straightforward answers to questions around issues such as these. That's why our best graduates need to have an understanding of science and technology along with an understanding of the opportunities and costs that scientific developments can bring.

The BASc will enable graduates to present themselves to employers, and the world at large, as people who have real expertise in both the sciences and the humanities.

Graduates' scientific capabilities will go hand-in-hand with knowledge of human history, how people think and how societies function.

You'll choose two different majors, one from Arts and one from Sciences. Each major usually consists of between nine and 11 papers.

[otago.ac.nz/combine](http://otago.ac.nz/combine)



## Bachelor of Commerce and Science (BComSc)

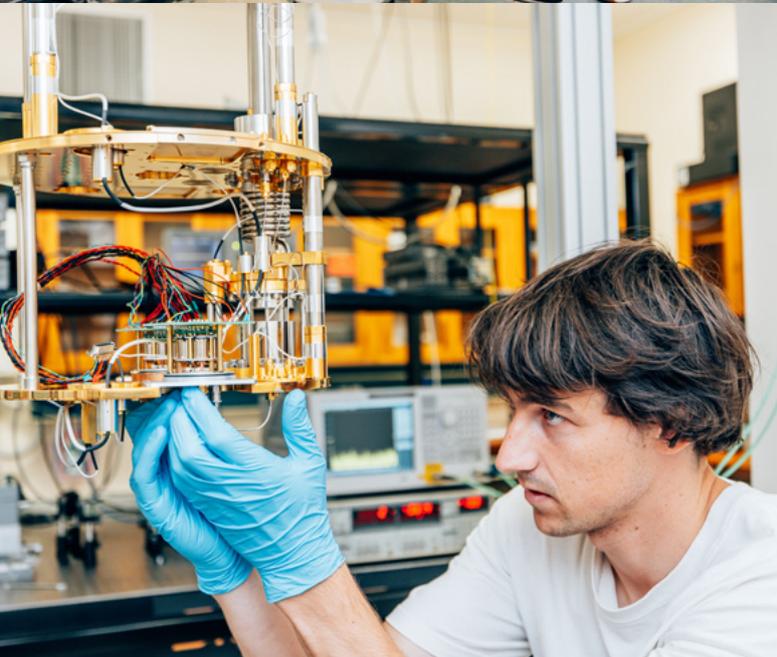
The BComSc is a specialised four-year degree for students facing a rapidly changing world. It is designed for students whose interests span science and commerce. Increasingly, graduates require a broad set of knowledge and skills, and multidisciplinary degrees like the BComSc provide both breadth and depth within a single qualification.

This means you will have a very personalised degree that will make you stand out. Employers are looking for graduates with technical expertise, transferrable skills and the ability to solve problems. The BComSc degree will give you these skills.

The BComSc gives graduates professional and scientific experience. Graduates will develop proficiency across subjects and the ability to apply thinking to both the experimental and industry application of a subject, setting them up for success in areas such as nature, nutrition, animal studies and maths.

You'll choose two different majors, one from Business subjects and one from Sciences subjects. Each major usually consists of a minimum of nine papers.

[otago.ac.nz/combine](http://otago.ac.nz/combine)



# Science graduate careers

## Ararau mahi pūmau

You may have a broad idea of the kind of career you want – or you may have no idea at all! These lists are not meant to be exhaustive, but will give you some idea of possible careers.

In many cases, a single major subject can lead to all sorts of different career pathways. Have a talk to your careers adviser at school or contact the University of Otago Career Development Centre to get a clearer direction on career options.

### Human Performance and Health

- Biological laboratory technician or researcher
- Clinical and health psychology
- Clinical exercise physiologist
- Consumer and sensory food research
- Human performance consultation
- Human resources and policy development
- Māori physical education and health
- Medical and health research
- Nutrition and health promotion
- Physical activity i.e. Green Prescription
- Policy and research analyst
- Social and community work
- Sport science
- Sport and leisure industry
- Wellness consultancy

### Environment and Ecological

- Biosecurity
- Conservation
- Crown Research institutes
- Eco-tourism
- Epidemiology and biostatistics
- Environmental policy development
- Land planning and urban design
- Māori organisations
- Oceanography
- Physical activity in built environments
- Product design
- Regional and local authorities
- Resource exploration and management
- Surveying
- Wildlife management

### Fundamental and Applied Sciences

- Artificial intelligence
- Biomechanics and sports analysis
- Biosecurity
- Computer graphics and animation
- Electronics
- Exercise science
- Financial modelling
- Hazard management
- Health and crop improvement
- Human resources/personnel
- Laboratory technician
- Manufacturing and industrial research
- Network engineering and design
- Product development
- Quality assurance
- Quantitative analyst
- Scientific journalism
- Scientific research

# Study options

## Whiringa ako

The lists below show the study options related to the curriculum areas you are familiar with at school. Follow the colour coding on the opposite page to see how study options and careers match up.

### Biology and Health-related study options

- >> Agricultural Innovation
- > Anatomy
- >> Aquaculture and Fisheries
- >>> Biochemistry
- > Botany
- > Chemistry
- > Ecology
- >> Environmental Management
- >>> Exercise and Sport Science
- > Food Science
- > Forensic Analytical Science
- > Genetics
- > Human Nutrition
- > Marine Science
- > Microbiology
- > Neuroscience
- > Pharmacology
- >>> Physical Education, Activity and Health
- > Physiology
- > Plant Biotechnology
- > Psychology
- >> Science Communication
- > Sport and Exercise Nutrition
- > Sport Development and Management
- > Zoology

### Chemistry-related study options

- >> Agricultural Innovation
- >> Aquaculture and Fisheries
- >>> Biochemistry
- > Chemistry
- > Ecology
- >>> Exercise and Sport Science
- > Food Science
- > Forensic Analytical Science
- > Genetics
- >> Geography
- >> Geology
- > Human Nutrition
- > Marine Science
- > Microbiology
- >> Neuroscience
- > Pharmacology
- > Plant Biotechnology
- > Sport and Exercise Nutrition

### Mathematics-related study options

- >> Agricultural Innovation
- >> Aquaculture and Fisheries
- > Computational Modelling
- > Computer Science
- > Data Science
- > Economics
- >> Energy Management
- >> Energy Science and Technology
- >>> Exercise and Sport Science
- >> Geographic Information Systems

- > Geography
- >> Geology
- > Information Science
- >> Land Planning and Development
- >> Marine Science
- > Mathematics
- > Physics
- > Psychology
- > Software Engineering
- >> Statistics
- > Surveying
- > Surveying and Measurement

### Physics-related study options

- > Computational Modelling
- > Computer Science
- > Data Science
- >> Energy Management
- >> Energy Science and Technology
- >>> Exercise and Sport Science
- >> Geographic Information Systems
- >> Geography
- >> Geology
- > Information Science
- >> Land Planning and Development
- >> Marine Science
- > Mathematics
- > Physics
- > Surveying
- > Surveying Measurement

# How does a bachelor's degree work?

## He aha ngā whāinga o te tohu paetahi?

### The BSc degree is:

- Three years of full-time study (can be studied part-time).
- Made up of at least 360 points.
- Each paper is usually worth 18 points (credits), so 20 papers is the minimum total required for a degree.
- Each paper takes around 12 hours of study time each week.
- You usually study different papers in semester 1 and semester 2, and can also take papers at Summer School (January–February).
- Your degree must have at least one major subject, and can also include a minor subject.

Most general bachelors' degree programmes require you to select a major. Your major is the subject of your degree that will be the main focus of your study. That subject will have a number of papers required at each level. For example, a Bachelor of Science majoring in Marine Science would look like this:

<b>YEAR 1</b>	Major 100-level 18 points	Major 100-level 18 points	Major 100-level 18 points	Science 100-level 18 points	Science 100-level 18 points	Science or other 100-level 18 points	Science or other 100-level 18 points
<b>YEAR 2</b>	Major 200-level 18 points	Major 200-level 18 points	Science 200-level 18 points	Science 200-level 18 points	Science 200-level 18 points	Science or other 200-level 18 points	Science or other Any level 18 points
<b>YEAR 3</b>	Major 300-level 18 points	Major 300-level 18 points	Major 300-level 18 points	Major 300-level 18 points	Science Any level 18 points	Science or other Any level 18 points	

Sciences major subject
  Sciences subjects other than the major
  Subjects either from Sciences or from other degrees

This leaves room for a wide range of additional study. You may decide to build in a second major, or a minor (a minor is usually 90 points – 5 x 18-point papers) or fill up the spaces with a selection of unrelated interest and skills-based papers. If you are completing a Bachelor of Science degree, a maximum of 90 points (5 x 18-point papers) can be non-Science. It is always recommended that you talk to a course adviser.

# Course advice

Otago's course advice experts can help you map out your study plans with confidence to help you achieve your goals.

If you are still at secondary school, a University of Otago Schools' Liaison Officer will visit your school at some point during the year – usually twice a year – to help you start planning your first year of study.

[otago.ac.nz/liaison](http://otago.ac.nz/liaison)

Once you're on campus, course advisers are available on a drop-in basis and by appointment near the AskOtago Central Hub in the Central Library. Course advice is available as many times as you need throughout your time at Otago.

[otago.ac.nz/courseadvice](http://otago.ac.nz/courseadvice)

## What you need to do

### Decide what subjects interest you

The *Undergraduate Prospectus*, *Guide to Enrolment* and our website can help you to choose subjects. You might want to select subjects you have already done at school and are good at, or subjects you haven't tried before but think look interesting. Our Schools' Liaison Officers are also available to talk to if you have any questions.

### Choose papers that you think you will enjoy

Papers are like topics within each subject – the building blocks of your degree. The first courses you take are called 100-level papers or beginner papers. For example, for the Bachelor of Sciences you will need to enrol for either three or four papers in semester 1. If you're feeling confident choose four, if you want time to "find your feet" at uni, choose three.

We strongly recommend that your paper selection avoids any timetable clashes. Our course advisers can help with this.

### Pick a major subject

This is the subject that you think you will specialise in within your qualification and go on to study in your second and third years.

A major subject usually takes up at least nine papers of your 20-paper degree. The *Guide to Enrolment* specifies which papers make up any specific major.

### Choose at least one paper from your major subject for each semester if you can

This makes it easier to cover the requirements for the major as you progress through your degree. However, if you aren't sure what your major will be after semester 1, it's fine to

continue to choose a wide range of papers that interest you in semester 2. This means that you have more choice of majors after your first year.

### If you are not sure what major to choose, a good approach is to include two papers from each of three subjects in your first year

This gives you lots of choice for your major. It also means you will have no problem meeting the prerequisites (first-year papers you are required to complete) for study in the second year of your chosen major.

### Consider a minor

You can also start thinking about a minor subject – but don't worry too much about doing this in your first year. A minor is a subject you have studied at each level but not in as much depth as your major. Your minor can be a subject more commonly taken for a different degree; for example, a BSc majoring in Psychology can include Criminology as a minor subject.

### Remember, Sciences degrees are very flexible

You can always change your major, your minor or even your degree if you decide it isn't right for you.

# Scholarships

## Ngā karahipi

The University of Otago offers a variety of Sciences-specific, new entrance and undergraduate scholarships.

### New entrance scholarships

#### **Elman and Alfred Poole Southland Boys' High School and Southland Girls' High School Science Scholarships**

\$5,000 annually for three years for students graduating from Southland Boys' High School and Southland Girls' High School who intend to pursue a degree and career in science.

[otago.ac.nz/graduate-research/scholarships/otago014644.html](https://otago.ac.nz/graduate-research/scholarships/otago014644.html)

#### **Elman Poole Southland Boys' High School and Southland Girls' High School Science and Music Scholarships**

\$5,000 annually for three years for students graduating from Southland Boys' High School and Southland Girls' High School who intend to pursue a degree and career in science or and have a talent for musical performance.

[otago.ac.nz/graduate-research/scholarships/otago061297.html](https://otago.ac.nz/graduate-research/scholarships/otago061297.html)

#### **Kraft Heinz Food Science Scholarship**

\$1,000 per year for up to three years for an entrance student studying Food Science at the University of Otago.

[otago.ac.nz/graduate-research/scholarships/otago759048.html](https://otago.ac.nz/graduate-research/scholarships/otago759048.html)

#### **Science Horizons Scholarship**

Up to \$3,000 per year for students graduating from secondary school who intend to pursue a degree and career in science.

[otago.ac.nz/graduate-research/scholarships/otago014647.html](https://otago.ac.nz/graduate-research/scholarships/otago014647.html)

### Undergraduate scholarships

#### **Campbell-White Scholarship**

\$6,000 for a student studying full-time towards a degree of Bachelor of Surveying or Bachelor of Science majoring in Geology or Surveying.

[otago.ac.nz/graduate-research/scholarships/otago014588.html](https://otago.ac.nz/graduate-research/scholarships/otago014588.html)

#### **Energy Education Trust NZ Undergraduate/Honours Scholarship**

\$5,000 for students with a specific interest in energy issues.

[otago.ac.nz/graduate-research/scholarships/otago014645.html](https://otago.ac.nz/graduate-research/scholarships/otago014645.html)

#### **Philip Ashton Smithells Memorial Scholarship**

\$3,000 for a student progressing to their third year of study for an undergraduate bachelor's degree programme within the School of Physical Education and Exercise Sciences.

[otago.ac.nz/graduate-research/scholarships/otago014657.html](https://otago.ac.nz/graduate-research/scholarships/otago014657.html)



# Subject guide

## Ko ngā kaupapa ako e āhei ana

Explore human health and behaviour, mental and physical wellbeing, alternative food-based solutions, environmental impacts, sustainable solutions, climate change mitigation and so much more with a Science degree from Otago.

This section lists nearly 50 subjects you can choose from for your Science qualification, including information about 100-level papers and potential career opportunities. You can combine most majors and degrees, or add a minor to create a path that works for you.

Please note, each of the subject headings in this list is a major subject, except for those that are clearly shown to be a minor subject only. See the *Guide to Enrolment* or the University website for full course requirement information.

[otago.ac.nz/sciences](https://otago.ac.nz/sciences)

# List of subjects

## Rārangi kaupapa ako

The following summary table lists the subjects available at the University of Otago and their associated degrees. Information for each subject, including the course and 100-level paper details, is on the following pages.

SUBJECT	MAJOR	DEGREE(S)	MINOR
Agricultural Innovation	M	BSc	m
Anatomy	M	BSc	m
Aquaculture and Fisheries	M	BSc	m
Biochemistry	M	BSc	m
Botany	M	BSc	m
Chemistry	M	BSc	m
Computational Modelling		BSc	m
Computer Science	M	BSc/BA	m
Data Science	M	BSc	
Ecology	M	BSc	m
Economics	M	BCom/BA/BSc	m
Energy Management	M	BSc	m
Energy Science and Technology	M	BSc	
Environment and Society			m
Environmental Management	M	BSc	m
Environmental Toxicology		BSc	m
Exercise and Sport Science	M	BSc	m
Food Science	M	BSc	m
Forensic Analytical Science	M	BSc	
Genetics	M	BSc	m
Geographic Information Systems	M	BSc	m
Geography	M	BA/BSc	m
Geology	M	BSc	m
Human Nutrition	M	BSc	m
Information Science	M	BCom/BA/BSc	m
Land Planning and Development	M	BSc	m
Marine Science	M	BSc	m
Mathematical Statistics		BSc	m
Mathematics	M	BSc/BA	m
Microbiology	M	BSc	m

SUBJECT	MAJOR	DEGREE(S)	MINOR
Neuroscience	M	BSc	m
Nutrition Communication		BSc	m
Pathology		BSc	m
Pharmacology	M	BSc	m
Physical Activity and Health		BSc	m
Physical Education, Activity and Health	M	BSc	
Physics	M	BSc	m
Physiology	M	BSc	m
Plant Biotechnology	M	BSc	m
Psychology	M	BSc/BA	m
Science Communication		BSc/BA	m
Software Engineering	M	BSc	m
Sport and Exercise Nutrition	M	BSc	
Sport Development and Management	M	BA/BSc	m
Sports Technology		BSc	m
Statistics	M	BSc/BA	m
Supplementary Nutritional Science		BSc	m
Surveying	M	BSurv	
Surveying Measurement	M	BSc	
Zoology	M	BSc	m

**Major:** you can major in this subject

**Minor:** you can minor in this subject

**Degree:** the degrees in which this is a specialist subject

**Note:**

- All major subjects available for the BSc are also available for the BAsc and BComSc.



## Claire Flynn

BACHELOR OF SCIENCE WITH HONOURS  
(STATISTICS) GEOGRAPHIC INFORMATION  
SYSTEMS)

METEOROLOGIST, METSERVICE

“Part way through my third year I talked to some people from the MetService Te Ratonga Tirorangi – they were at Otago for a Science Careers Fair. They told me about their training programme for graduates, and recommended I add in some extra Physics papers and give them a call when I finished my degree!

“Maths and Statistics are really important because computer weather models will inevitably be imperfect. You need strong Maths and Stats skills to understand where the models are going wrong and how to improve them.”

## Agricultural Innovation

The Agricultural Innovation programme is designed to develop future leaders in agriculture. The focus is on science and technology, but you will also gain an understanding and appreciation for agriculture in broader contexts including economic, social, cultural and environmental aspects.

### Career opportunities

After graduating with a BSc in Agricultural Innovation you will have the expertise to gain employment in the agricultural and food sectors, such as research and development within scientific or corporate entities; management roles within the many industries that service agriculture, central government or rural financial service agencies; and banking, insurance and accountancy.

### 100-level papers

If you intend to major in Agricultural Innovation (BSc), you must take the following 100-level papers:

AGRI 101 Agricultural Innovation  
CELS 191 Cell and Molecular Biology

plus one of

CHEM 111 Chemistry: Molecular Architecture  
CHEM 191 The Chemical Basis of Biology and Human Health

## Anatomy

Otago is the only university in New Zealand that offers a bachelor's degree in Anatomy – a diverse field of study that explores the relationship between the structure of the human body and its functions, from single cells to multi-organ systems. As an Anatomy student, you have the flexibility to play to your strengths and study aspects of biology that interest and excite you. The department is divided into five key areas of research and teaching expertise: biological anthropology; clinical/functional anatomy; neuroscience; reproduction, genomics and development; anatomical education and learning.

## Career opportunities

Anatomy students gain a high level of knowledge and competencies across a broad range of topics with a range of skills that can be applied to any chosen career. Many graduates proceed to higher degrees, including Master of Science and PhD, or into a health professional course. Our alumni end up in diverse occupations all over the globe.

### 100-level papers

If you intend to major in Anatomy (BSc), you must take all of the following 100-level papers:

CELS 191 Cell and Molecular Biology  
HUBS 191 Human Body Systems 1  
HUBS 192 Human Body Systems 2  
CHEM 191 The Chemical Basis of Biology and Human Health

## Aquaculture and Fisheries

Fisheries and aquaculture scientists require a broad understanding of biology, ecology, oceanography, chemistry, statistics and management. You will learn fundamental aspects of these subjects in first and second years. As you progress through the course, more specialist subjects such as fisheries, aquaculture and food science will be introduced.

### Career opportunities

From salmon and mussel farming to wild fish and fishery habitat management, there is substantial industry demand for skilled and innovative individuals with a strong scientific skill set. Aquaculture and fisheries scientists are essential as the production of food from aquatic environments continues to grow rapidly but is increasingly affected by human activities.

### 100-level papers

First-year papers could include:

MARI 112 Global Marine Systems  
BIOL 112 Animal Biology  
BIOL 123 Plants: How They Shape the World  
CELS 191 Cell and Molecular Biology  
CHEM 191 The Chemical Basis of Biology and Human Health  
EAOS 111 Earth and Ocean Science  
ECOL 111 Ecology and Conservation of Diversity  
STAT 110 Statistical Methods

## Biochemistry

Biochemists explain life in terms of the fundamental building blocks. In this discipline you will learn how organisms read the information in their genes, and what happens when things go wrong and people get sick. As a biochemist, you'll answer these questions by understanding the functions of, and interactions between, the biological molecules that make up all living things – DNA, proteins, sugars and fats. And because the building blocks are essentially the same for micro-organisms, plants and animals, whichever area of biology interests you, you can discover how it works through Biochemistry.

### Career opportunities

During a Biochemistry degree, you will learn knowledge and skills valuable in many different careers, including biomedical research in academia and industry, agricultural research, publishing, pharmaceuticals, patent law, education, and forensic science. Recent Biochemistry graduates have jobs that include wine maker, medical writer, publishing manager, business consultant, information analyst, scientific adviser, portfolio manager, policy analyst, biomedical scientist, forensic scientist, and even a diplomat at Foreign Affairs and Trade.

### 100-level papers

To get started with a major in Biochemistry, you should enrol in:

- BIOC 192 Foundations of Biochemistry
- CELS 191 Cell and Molecular Biology
- CHEM 191 The Chemical Basis of Biology and Human Health

## Biology

Biology studies living organisms and is the basis of all studies in the life sciences. Students taking these papers are often doing majors in Anatomy, Biochemistry, Botany, Ecology, Genetics, Human Nutrition, Marine Science, Microbiology, Plant Biotechnology, Physiology and Zoology. At the University of Otago, Biology is used as a name for courses at 100-level only. There is no Department of Biology or major.

### Career opportunities

There are opportunities in agriculture, forestry and horticulture, as well as conservation and resource management. Students who have studied Biology can obtain positions such as research scientist, university lecturer, school teacher, forest ecologist, science technician, ecological consultant, Ministry for Primary Industries biosecurity officer, resource management co-ordinator, water quality scientist, local government environmental officer, biotechnologist, plant pathologist and marine botanist.

### 100-level papers

The foundation paper in most biological subjects is:

- CELS 191 Cell and Molecular Biology  
Progression to 200-level requires one or more of the following additional first-year papers:
- BIOL 112 Animal Biology
- BIOL 123 Plants: How They Shape the World
- BIOC 192 Foundations of Biochemistry
- ECOL 111 Ecology and Conservation of Diversity
- HUBS 191 Human Body Systems 1
- HUBS 192 Human Body Systems 2



### Chris Hepburn

DIRECTOR OF THE AQUACULTURE AND FISHERIES PROGRAMME

CO-DIRECTOR COASTAL PEOPLE: SOUTHERN SKIES

Chris Hepburn's work focuses on coastal ecosystems in southern New Zealand, and in particular the impacts of human-induced change, including elevated carbon dioxide, nutrient loading, sedimentation, fishing and invasive species. He leads a laboratory that works on diverse topics that focus on habitats and species that support mahinga kai.

Chris is Co-Director of the Centre of Research Excellence Coastal People, Southern Skies (see page 2). "CPSS will support the voice and capability of coastal communities," he says. "They are at the front-line and will provide the leadership we need as our oceans continue to change."



## Taylor Davies-Colley

BACHELOR OF SCIENCE (BOTANY AND ECOLOGY), MASTER OF SCIENCE (BOTANY)  
EDUCATOR AT OROKONUI ECOSANCTUARY

“One thing you learn at university is how much cool research is happening – there are hundreds of people just as stoked about their thing as you are about yours.

“Hopefully my research will help to guide decisions to protect the environments in which the plants species I study live, and in doing so secure them for future generations. I also hope that through telling every person I meet about rare, carnivorous aquatic plants that can catch prey in under 10 milliseconds, I might convince them how cool botany can be!”

## Botany

Botany is the study of plants: their structure and development, physiology, genetics and biochemistry, health and disease, relationships with other organisms and the environment as well as the impacts plants have on our daily lives.

At the University of Otago, the emphasis is on general biology, ecology and physiology of vascular plants, marine algae, phytoplankton, cyanobacteria and fungi, although other groups (plant viruses, lichens, mosses and liverworts) are included in some papers.

### Career opportunities

There is a wide range of employment opportunities for graduates in Botany: these jobs can include research scientists, university lecturers, school teachers, forest ecologists, science technicians, ecological consultants, biosecurity officers, resource management co-ordinators, water quality scientists, local government environmental officers, biotechnologists, geneticists, plant pathologists and marine botanists.

### 100-level papers

A major in Botany requires:

BIOL 123 Plants: How They Shape the World

plus one of

BIOL 112 Animal Biology

CELS 191 Cell and Molecular Biology

ECOL 111 Ecology and Conservation of Diversity

HUBS 191 Human Body Systems 1

HUBS 192 Human Body Systems 2

plus one of

CHEM 111 Chemistry: Molecular Architecture  
CHEM 191 The Chemical Basis of Biology and Human Health

PHSI 191 Biological Physics

STAT 110 Statistical Methods

STAT 115 Introduction to Biostatistics

## Chemistry

Chemists work to understand the nature of the world around us – they study the composition, properties and transformations of matter. However, more than simply mixing chemicals in a lab, chemists invent new chemical reactions, develop new materials, design new drugs, and create new models to understand the world, and then devices to explore it. In many different ways, the discoveries made by chemists help us to improve our lives and our planet.

### Career opportunities

With the problem-solving skills developed as students of chemistry, our graduates have gone on to a variety of roles: they work as patent lawyers, forensic scientists and scientific equipment sales reps; they work for local and regional councils, in industry, schools and start-up companies and as professors and researchers in universities around the world.

### 100-level papers

CHEM 191 The Chemical Basis of Biology and Human Health (semester 1)

CHEM 111 Chemistry: Molecular Architecture (semester 2)

## Introductory Chemistry

Students who have not done Year 13 chemistry (or equivalent), or feel their background in chemistry is weak, can enrol for the Introductory Chemistry catch-up course. This is an online, distance-taught, not-for-credit course that runs throughout the year. It provides a good introduction to the basic ideas of chemistry and is a helpful preparation for 100-level chemistry papers, including CHEM 191 (which is part of the Health Sciences First Year programme). This course may particularly suit students who also need to take the University of Otago's JumpStart Physics course during Summer School.

## CHEM 150 Concepts in Chemistry (Summer School)

This bridging paper provides an introduction to the key concepts of chemistry, and is designed for students who have a limited background in chemistry or who feel they need a catch-up before enrolling for 100-level chemistry courses (CHEM 111 or CHEM 191, which are part of the Health Sciences First Year programme), or to provide an understanding of basic chemistry concepts to complement their current studies. The content of the course is at senior secondary school chemistry level (NCEA Levels 2 and 3).

## Computational Modelling

(minor subject only)

Science, technology, engineering and mathematics (STEM) skills are the backbone of a modern economy. A computational modeller bridges the gap between mathematics and the other STEM disciplines. When industrial scientists want to use mathematics and computing to solve a problem, they need computational modelling.

Computational modellers study problems and processes in the real world and then distill the key features into mathematical equations to construct a model.

### Career opportunities

Career prospects in Computational Modelling are excellent. Opportunities abound in all areas of product development, financial modelling and business, physical and health science, animal and plant science, process engineering, food technology, design, telecommunications, software development and information technology.

### 100-level paper

A minor in Computational Modelling requires:

COMO 101 Modelling and Computation  
MATH 140 Fundamentals of Modern Mathematics 2

plus one of

COMP 151 Programming for Scientists  
COMP 161 Computer Programming  
COMP 162 Foundations of Computer Science

## Computer Science

Computers are more important than ever before. In various forms, from smart technology, through phones, tablets and laptops, to supercomputers, they are essential to how we all work, play and communicate.

### Career opportunities

This is a good time to think of an IT career. Over the past few years, the number of jobs has continued to increase steadily while the number of skilled graduates has lagged behind. A career in the IT sector offers good salaries and job security. It also offers a lot of variety, since computer skills can be combined with any other interests you have.

### 100-level papers

A major in Computer Science requires:

COMP 101 Foundations of Information Systems  
COMP 161 Computer Programming  
COMP 162 Foundations of Computer Science

plus one of

MATH 120 Mathematics for Scientists  
MATH 130 Fundamentals of Modern Mathematics 1  
MATH 140 Fundamentals of Modern Mathematics 2  
COMO 101 Modelling and Computation  
STAT 110 Statistical Methods  
STAT 115 Introduction to Biostatistics  
BSNS 112 Interpreting Business Data  
FINC 102 Business Mathematics

or an approved alternative.

## Computing

The University of Otago offers five computing-related subjects: Computational Modelling (BSc, BComSc, BASc), Computer Science (BA, BSc, BACom, BComSc, BASc), Data Science (BSc, BComSc, BASc), Information Science (available in BA, BCom, BComSc, BACom, BASc or BSc) and Software Engineering (BSc, BComSc, BASc). All of these majors have an associated minor, and there could also be an opportunity to incorporate some papers for both a major and a minor. You can read about each of these elsewhere in this subject guide.



### Yerren van Sint Annaland

BACHELOR OF SCIENCE WITH HONOURS  
(COMPUTER SCIENCE)

DEEP LEARNING ENGINEER, 45 SOUTH

"Although no university or programme can ensure academic success, I feel that I was provided with an environment that enabled and encouraged me to put the best effort into all my work – and achieve great outcomes as a result. This came from both the staff and the students within the Computer Science department who were always great to work with.

"In the first couple of years of my BSc, I found that I had a good introduction to the fundamentals of Computer Science, which included many theoretical concepts. The further I progressed in my studies, the more freedom I had to focus on the topics that interested me, which is how I eventually ended up primarily studying artificial intelligence."



## Stefanie Zollman

SENIOR LECTURER, DEPARTMENT OF  
COMPUTER SCIENCE

WINNER OF THE L'ORÉAL-UNESCO FOR  
WOMEN IN SCIENCE FELLOWSHIP

Developing new ways to experience the world around us is what drives Stefanie Zollmann. Her research involving augmented reality and human computer interaction aims to develop tools and algorithms of relevance to a wide range of industries including transport, architecture, entertainment and tourism.

Stefanie is leading a project to enrich sport spectator experiences by embedding game-related information and statistics into a stadium field-of-view on mobile devices such as phones. She is using augmented reality to enhance outdoor experiences by providing additional geographic data and information, and developing immersive virtual experiences from photographs and videos on mobile phone technology.

## Data Science

Data science brings together techniques and methods from computer science, information science and statistics in order to extract knowledge from large and complex data sets, and to communicate and apply this knowledge. You will learn how to acquire, handle and analyse data to solve problems in a wide variety of areas. You will also learn to think critically and ethically about the increasing role data science plays in society.

### Career opportunities

Working as a data scientist for an organisation means you will be at the heart of decision-making processes. Studying data science leads to opportunities in fields as diverse as banking and biotechnology, entertainment and education, gaming and government, medicine and manufacturing, retail and research.

### 100-level papers

A major in Data Science requires:

COMP 101 Foundations of Information Systems

COMP 120 Practical Data Science

COMP 161 Computer Programming

COMP 162 Foundations of Computer Science

and either

STAT 110 Statistical Methods

or

STAT 115 Introduction to Biostatistics.

You are also strongly encouraged to take

MATH 130 Foundations of Modern Mathematics 1

## Ecology

Ecology is the scientific study of organisms and their relationships within their environments. The diversity of Otago's ecosystems, habitats, plants and animals is reflected in the programme's teaching. Ecology is taught by staff from across the University (Botany, Marine Science, Zoology, Politics, and the Higher Education Development Centre). All Ecology papers have fieldwork components.

### Career opportunities

Pressing environmental and ecological issues combined with government and public concerns mean there is a clear need for scientifically trained ecologists. Our graduates work around New Zealand and the world

for government institutions (Department of Conservation, Ministry for the Environment, Ministry for Primary Industries), Crown Research Institutes (Landcare Research, NIWA, Cawthron), regional and city councils, consultancies, tourism operations, in secondary and tertiary teaching, and for non-governmental organisations.

### 100-level papers

A major in Ecology requires:

BIOL 112 Animal Biology

BIOL 123 Plants: How They Shape the World

ECOL 111 Ecology and Conservation of Diversity

STAT 110 Statistical Methods

or

EAOS 115 Introduction to Biostatistics

plus at least one of

GEOG 101 Physical Geography

EAOS 111 Earth and Ocean Science

MARI 112 Marine Biology: The Living Ocean

## Economics

When you are trying to decide whether to blow your budget and go skiing or stay at home and study, you're using basic principles of economics. Economics is about choice, and is at the heart of decision-making.

### Career opportunities

Graduates work in large industrial and commercial firms and many different branches of the public sector, including the Ministries of Foreign Affairs and Trade, Health, Business, Innovation and Employment, the Reserve Bank, Treasury, Statistics New Zealand, the Department of Internal Affairs, local government and planning authorities, and banks and financial institutions. Some graduates work with health providers, research bureaux and management consultancies, while others have careers in universities, other tertiary institutions and secondary schools.

### 100-level papers

A major in Economics requires:

BSNS 113 Economic Principles and Policy

ECON 112 Principles of Macroeconomics

## Energy Management / Energy Science and Technology

There is a rapidly growing need to reduce the use of fossil fuels to avoid the worst effects of climate change. At the same time advances in energy efficiency and new technologies like solar PV, batteries and electric vehicles are revolutionising the way energy is produced and used in society and could play a major role in reducing fossil fuel use. Otago's unique BSc in Energy Science and Technology, and Energy Management programmes provide graduates with the scientific knowledge, understanding of energy technology, real-world skills and creative problem-solving to play a key role in reducing carbon emissions in New Zealand and globally.

### Career opportunities

Our graduates find successful and fulfilling careers in a diverse range of energy and carbon management areas. These include: designing and implementing renewable energy supply solutions; renewable energy and energy-efficient technology research and development; implementing energy efficiency, carbon reduction and sustainability measures for industry, organisations, or in the residential sector; assessing or managing energy use and carbon emissions at energy-intensive industrial sites or in commercial buildings; and advising on or developing energy, carbon and sustainability policy for national or local government.

### 100-level papers

A major in Energy Management or Energy Science and Technology requires:

One 100-level Physics paper (PHSI 132 is recommended, semester 2)

MATH 130 Fundamentals of Modern Mathematics 1 (semester 1 and 2)

MATH 140 Fundamentals of Modern Mathematics 2 (semester 2)

## Engineering (Intermediate)

Students can take a first-year course at Otago to satisfy the Intermediate Year requirements for the University of Canterbury's Bachelor of Engineering.

### 100-level papers

Otago students enrol for a first-year BSc (EngInt) and take the following 126-point (seven-paper) course:

CHEM 191 The Chemical Basis of Biology and Human Health

or

CHEM 111 Chemistry: Molecular Architecture

and

PHSI 131 Physical Law and its Application

or

PHSI 191 Biological Physics

and

PHSI 132 Fundamentals of Physics II

MATH 130 Fundamentals of Modern Mathematics 1

MATH 140 Fundamentals of Modern Mathematics 2

COMO 101 Modelling and Computation

plus one own-choice 100-level paper.

## Environmental Management

This Bachelor of Science degree provides science-oriented training in environmental management theory and practice, based on a firm understanding of environmental systems and the human context of environmental problems.

The course is based on a core of environmental management papers, but with the flexibility for students to develop a scientific or technical specialisation, with particular relevance to the environment and their own interests.

### Career opportunities

Our graduates may find employment in central, regional or local government departments that deal with the environment, resource management and/or planning, as well as environmental consultancies, private industry and non-governmental organisations. Many have found work in this field overseas.



### Malia Vehikite

BACHELOR OF SCIENCE AND BACHELOR OF APPLIED SCIENCE WITH HONOURS (ENERGY MANAGEMENT)

ENERGY AND SUSTAINABILITY ADVISOR, KIWI RAIL

"My studies made me aware of the importance of energy efficiency, the need for a shift towards more renewable energy and the very real issue that is climate change. I gained the knowledge and tools to help organisations understand their energy consumption and carbon emissions, and to identify opportunities to reduce/optimize through energy efficiency or switching to low-carbon energy sources. KiwiRail has a number of emission reduction targets in place and my role is focused on developing roadmaps towards those targets and tracking our progress towards success."



## Portia Prangley

BACHELOR OF SCIENCE (FOOD SCIENCE)

FOOD SCIENCE ADMINISTRATIVE AND PRODUCTION ASSISTANT, PACIFIC FLAVOURS AND INGREDIENTS

“The subjects offered in Food Science enabled me to expand my knowledge of the function of food and delve into the interactions between food structure and human perception. Plant Biotechnology papers explored ways to enhance crop resilience to environmental stress whilst maintaining quality and yield through studying molecular biology, genetics and breeding technologies.

“My time at Otago gave me a platform to acquire knowledge to take forward into my career and provided hands-on experience through lab classes and field trips, enabling me to develop well-rounded skills in all areas.”

### 100-level papers

A major in Environmental Management requires:

GEOG 101 Physical Geography

GEOG 102 Human Geography

ENVI 111 Environment and Society

plus one of

STAT 110 Statistical Methods

MATH 120 Mathematics For Scientists

MATH 130 Fundamentals of Modern Mathematics 1

MATH 140 Fundamentals of Modern Mathematics 2

## Exercise and Sport Science

Sport and Exercise Science is a growing field with application ranging from maximising athletic potential to enhancing wellbeing through increased physical activity in daily life. We are the first and highest internationally ranked Sports Science programme in New Zealand. The knowledge you will gain in biomechanics, exercise physiology and metabolism, motor control and psychology provide for a broad understanding of human performance (as is necessary for elite sport, clinical or health contexts). You will gain hands-on experience with state-of-the-art laboratories and equipment.

### Career opportunities

Our graduates have forged careers in the following roles: sport scientist, exercise physiologist, mental skills trainer, performance analyst, technique analyst, strength and conditioning trainer, sport/health industry researcher and developer, personal trainer and exercise prescription adviser.

### 100-level papers

A major in Exercise and Sport Science requires:

SPEX 101 Sport, Science and Society

SPEX 102 Principles of Exercise for Health and Performance

ANAT 101 Anatomy for Sport and Exercise (or HUBS 191 and HUBS 192)

PHSL 101 Physiology for Sport and Exercise (or HUBS 191 and HUBS 192)

## Food Science

At the heart of Food Science is understanding food – its components, its quality and its consumer appeal. Food Science prepares people for creative, challenging, diverse and rewarding food industry careers.

### Career opportunities

Graduates in Food Science work in product development, food quality management, food processing management, chemical/nutritional analysis, sensory analysis and research.

### 100-level papers

A major in Food Science requires:

FOSC 111 Food Principles

FOSC 112 Introduction to Food Marketing

CELS 191 Cell and Molecular Biology

either

STAT 110 Statistical Methods

or

STAT 115 Introduction to Biostatistics

either

CHEM 191 The Chemical Basis of Biology and Human Health

or

CHEM 111 Chemistry: Molecular Architecture

## Food Technology

See Food Science (BSc)

## Forensic Analytical Science

The Forensic Analytical Science degree at Otago focuses on modern analytical techniques of forensic biology (taphonomy and DNA) and forensic chemistry (spectroscopy and mass spectrometry). The principal forensic researchers at Otago develop new applications and assist New Zealand and overseas law enforcement agencies with forensic casework such as determining linkages between seizures of illicit drugs.

## Career opportunities

The course supports many possible career opportunities, for example in areas of commercial interest such as primary product traceability (milk powder, meat, wine) and combatting counterfeit materials (pharmaceuticals), applications that are growing rapidly in number, importance and scope. Additionally, many other professional fields, ranging from patent law, investigative journalism and wildlife protection, are becoming increasingly dependent on forensic knowledge and techniques.

### 100-level papers

A major in Forensic Analytical Science requires:

BIOC 192 Foundations of Biochemistry

CELS 191 Cell and Molecular Biology

CHEM 191 The Chemical Basis of Biology and Human Health

HUBS 191 Human Body Systems 1

STAT 110 Statistical Methods, or STAT 115 Introduction to Biostatistics

At least one of the following is recommended:

BIOL 123 Plants: How They Shape the World

CHEM 111 Chemistry: Molecular Architecture

HUBS 192 Human Body Systems 2

MATH 130 Fundamentals of Modern Mathematics 1

PHSI 191 Biological Physics

## Genetics

Genetics is an exciting and increasingly relevant science, and a central theme of modern biology and medicine. Genetics delves into the full diversity of life, zooming in to life's molecular basis yet revealing the big picture of whole organisms, populations and evolution.

### Career opportunities

Genetics is a hands-on, multidisciplinary science that can develop you into a champion problem-solver for society: whether in health, agriculture, biotech, conservation, genomics, or at the frontiers of scientific research. The wide-ranging skills behind a genetics degree could propel you into biologically based industries or research and government organisations.

You could be a researcher, policy analyst, biotechnologist, conservation worker or biosecurity analyst.

### 100-level papers

There are no 100-level papers with a GENE code, but genetics forms a significant portion of CELS 191.

A major in Genetics requires:

CELS 191 Cell and Molecular Biology

CHEM 191\* The Chemical Basis of Biology and Human Health

BIOC 192 and STAT 110 or 115 are also highly recommended.

\*We recommend that if you have not studied chemistry to Year 13 at school, you should take the paper CHEM 150 in Summer School to prepare for CHEM 191.

## Geographic Information Systems

The BSc in Geographic Information Systems (GIS) will appeal to students with an interest in geography, computers, working with maps and applying map data to examine a wide variety of applications and problems. The degree covers all aspects of geographic information from its representation on maps and in aerial survey (including satellite and airborne remote sensing), how different types of information are brought together, techniques of spatial data analysis and approaches to data visualisation. It includes papers from Surveying, Information Science and Geography.

### Career opportunities

Graduates with the BSc in GIS work in private consultancies, local authorities, central government departments and non-government organisations in various analysis, consultancy and management roles.

### 100-level papers

A major in Geographic Information Systems requires:

COMP 161 Computer Programming\* or

COMP 162 Foundations of Computer Science



### Mei Peng

SENIOR LECTURER, DEPARTMENT OF FOOD SCIENCE

SENSORY SCIENTIST

With a research background in experimental psychology (psychophysics), Mei Peng is interested in sensory, cognitive and behavioural factors driving people's food choices and intake.

In particular, Mei focuses her research on individual differences in sensory processing and their links to pathological eating behaviours and obesity, using both behavioural and neuroimaging techniques.

In 2020, Mei joined a group of 550 researchers from 35 countries looking at the effects of COVID-19 on smell and taste. The study revealed that sudden loss of smell and taste can often be the first symptoms of the virus. "We were pleased that the Ministry of Health followed our suggestion to add loss of smell and taste to the case definition of COVID-19," she says.



## Christina Riesselman

DEPARTMENTS OF GEOLOGY AND  
MARINE SCIENCE

WINNER OF THE L'ORÉAL-UNESCO FOR  
WOMEN IN SCIENCE FELLOWSHIP

Christina Riesselman is a paleoceanographer with a focus on the Southern Ocean's response to changing climate. She studies marine sediment cores to reconstruct changes in sea ice, temperature and other conditions during past times when Earth's climate warmed, including the last 11,000 years. This is enabling her to identify key drivers of Southern Hemisphere climate dynamics during intervals of rapid change.

"Since the industrial revolution, tens of thousands of years of change have been packed into just one hundred years," she says. "Researching another example of rapid climate change helps us to understand what the climate could look like in a couple of generations, and gives indicators of what humankind needs to do to address the challenges it will bring."

and  
MATH 130 Fundamentals of Modern Mathematics 1  
or  
MATH 140 Fundamentals of Modern Mathematics 2  
and  
COMP 101 Foundations of Information Systems  
SURV 120 Surveying and Spatial Science  
and at least one of COMP 151, EAOS 111, GEOG 101, 102, GEOL 112, STAT 110, SURV 130, ENGL 228  
\*Students are exempt from COMP 161 if they have gained entry to COMP 162 by passing COMP 151 with a grade of at least B or via an Advanced Placement Test.

## Geography

Geographers study the environment – including the physical processes that shape the natural environment, social and cultural processes that explain patterns of human activity, and the interactions between human activity and the natural world. Geography explores environmental problems and solutions to those problems, and helps us manage human activity and secure the future of our planet.

### Career opportunities

Geography graduates work in the public and private sectors. Their skills and interdisciplinary outlook prepare them for a diverse range of careers. Central government departments, state-owned enterprises, local government and private corporations employ Geography graduates in areas such as regional and resource planning, environmental management, natural resources (especially water) analysis, social and economic research, social services and tourism. Geographers also become teachers.

### 100-level papers

A major in Geography requires:  
GEOG 101 Physical Geography  
GEOG 102 Human Geography  
STAT 110 Statistical Methods

## Geology

Geology, the science of the Earth, is concerned with understanding the geological principles and processes that link the physical, biological and geochemical systems of our planet. This understanding is increasingly essential for those concerned with natural hazards, civil engineering problems, impacts of global change, the responsible stewardship of Earth's natural resources, pollution and waste disposal, and environmental and resource planning and monitoring.

Geology at the University of Otago highlights the exciting and dynamic geological setting of New Zealand and the origin of New Zealand's fauna and flora.

### Career opportunities

Graduates work in the assessment of natural hazards (earthquakes, volcanoes, landslides, floods); site investigations for engineering projects; environmental planning and monitoring; conservation and management of soil and groundwater resources; exploration for energy and mineral resources; research into Earth processes and history; Antarctic geology; oceanography and climate change.

### 100-level papers

A major in Geology requires:  
EAOS 111 Earth and Ocean Science  
GEOL 112 Dynamic Earth, a New Zealand Perspective  
plus one of MATH 120, 130, 140,  
COMO 101, STAT 110, 115

## Human Nutrition

The knowledge and skills you will gain during your Human Nutrition degree will allow you to make a real difference at the global, national, community and whānau levels. It is also an excellent opportunity for those seeking graduate entry into Health Sciences professional programmes, e.g. Medicine, Dentistry.

Human Nutrition papers are useful and interesting additions to a degree in Food Science, Physical Education, Psychology, Marketing, Physiology, Microbiology, Biochemistry and many other disciplines.

## Career opportunities

Human Nutrition will equip students with skills that can be used in a number of careers. Our graduates work in the health sector, government organisations, corporations, research, teaching, high performance sport, private practice and the food industry.

### 100-level papers

HUNT 141 Understanding Human Nutrition

A major in Human Nutrition requires:

BIOC 192 Foundations of Biochemistry

CHEM 191 The Chemical Basis of Biology and Human Health

HUBS 191 Human Body Systems 1

HUBS 192 Human Body Systems 2

It is recommended that you take

POPH 192 Population Health

## Information Science

Information Science sits at the intersection of technology, people and organisations. It is an exciting and rapidly changing field that solves problems through using computing technology to help people and organisations work more effectively. An understanding of Information Science is important in order to succeed in business, and in order to develop effective innovative technology solutions: creating the latest gadget is pointless if we can't also understand how it will be used by people and organisations to meet their needs.

## Career opportunities

Graduates of Information Science are sought after in a range of fields such as business, science, education, health, music and mass media, with roles from data analysis to building large-scale software systems. Careers in information and communications technology (ICT) are exciting, engaging and well-rewarded; examples of careers of our graduates may be found at [infosci.otago.ac.nz/careers](http://infosci.otago.ac.nz/careers)

### 100-level papers

If you intend to major in Information Science, you must start your study by taking:

COMP 101 Foundations of Information Systems

plus one of

COMP 161 Computer Programming

COMP 162 Foundations of Computer Science

## Land Planning and Development

Land planning, land administration and the process of land subdivision have significant impacts on the layout and function of human and natural landscapes. These activities influence the way land is used, patterns of urban development and assessments of the economic potential of land. For some, land also has an important cultural value.

## Career opportunities

This is a foundation degree for a career in aspects of surveying that relate to land development. This can lead to work in local government and in surveying and other land development companies.

*Note: While this degree is a stepping-stone to a career in surveying and planning, membership of the New Zealand Planning Institute at a professional level currently requires an additional postgraduate qualification. Likewise, to become a full professional member of Surveying + Spatial NZ (formerly the NZ Institute of Surveyors), a minimum of a one-year Diploma for Graduates is required.*

### 100-level papers

A major in Land Planning and Development requires:

MATH 130 Fundamentals of Modern Mathematics 1

SURV 120 Introductory Surveying

SURV 130 Geospatial Sciences

*Note: ENGL 228 Writing for the Professions should be taken in the second semester of the first year of study.*

## Marine Science

Marine Science at Otago includes marine biology, physics, chemistry and geology. We focus on the practical and field skills you will need to study and understand the ocean. In Marine Science, multidisciplinary teaching is carried out by research-active staff. Hands-on lab and field activities, including on the marae, are fundamental to our approach at every level – our boats, field stations and labs take advantage of the Southern Ocean being right on our doorstep. Students in Marine Science develop their passion for the wonders



## Nichola Salmond

BACHELOR OF SCIENCE (ECOLOGY AND MARINE SCIENCE), MASTER OF SCIENCE (MARINE SCIENCE)

MARINE ECOLOGY TECHNICIAN, NIWA

"Following my MSc in Marine Science, focusing on estuarine ecology, I began working at NIWA in Hamilton, as a Marine Ecology Technician. As part of this role, I work alongside scientists and other technicians to collect, process and analyse an array of environmental samples that help to inform councils and scientists about the health of coastal ecosystems and how they are changing. This work helps to determine how what we do on land affects our estuaries and harbours.

"The hands-on application of theoretical concepts through fieldwork and laboratory experiments undertaken during my BSc and MSc at Otago gave me valuable skills that I apply to my role every day."

and importance of the sea, while learning the values, skills, cultural perspectives and knowledge necessary for a marine scientist to act positively and contribute, through management and education, to understanding, repairing and protecting the marine environment.

### Career opportunities

Marine Science graduates go on to careers in science research and consulting, in local or national government, and in education, museums and schools. Otago Marine Science graduates have been successful in developing careers with employers such as NIWA, Ryder Consulting, Cawthron Institute, Department of Conservation, Otago Museum, various regional councils, Ngāi Tahu and the Ministry of Primary Industries.

#### 100-level papers

Marine Science students must take:  
**EAOS 111 Earth and Ocean Science**  
**MARI 112 Global Marine Systems**  
 plus one of **COMO 101, MATH 120, 130, 140, STAT 110, 115**

## Mathematics

The Department of Mathematics and Statistics includes some of New Zealand's top mathematicians: researchers and teachers with prominent international reputations. The Department offers comprehensive graduate and undergraduate programmes in Mathematics. The undergraduate programme introduces students to all major areas of mathematics, from applications to analysis, from modelling to relativity, from algebra to computation.

The Department offers papers at 100-level and 200-level that teach skills in Mathematics central to many disciplines. We work closely with other departments to keep these papers relevant and engaging.

### Career opportunities

Our mathematics graduates go on to careers in a wide range of areas, including finance, insurance, data science, consulting, education and transition engineering. Many go on to postgraduate study at Otago or their choice of top-ranking universities internationally.

#### 100-level papers

A major in Mathematics requires:  
**MATH 130 Fundamentals of Modern Mathematics 1**  
**MATH 140 Mathematics 2**

Mathematics majors are required to take 18 points of Statistics, usually **STAT 110, STAT 115 or STAT 270**, and are strongly encouraged to take **COMO 101 Modelling and Computation**.

## Microbiology

Microbiology is the study of microscopic organisms (bacteria, viruses, fungi and protozoa). Microbes are best known as the causative agents of infectious diseases, but in fact they're essential to the complex biochemical and geochemical networks that sustain our planet. They're used in producing foods such as cheese, wine and beer, as well as in many pharmaceutical, chemical and agricultural products.

Microbes comprise more than 50 per cent of the life forms on Earth, yet only around 1 per cent have been identified and studied. Current research is revealing the vast reservoir of untapped knowledge of the microbial world, showing huge promise for many exciting new discoveries in the 21st century. As one of the core biological sciences, microbiology is at the forefront of research into life processes.

### Career opportunities

Ongoing technological advances in fields such as biotechnology, agriculture, aquaculture, molecular biology, food technology, microbial genetics and genomics, immunology, and medicine mean that demand for microbiologists is increasing every year. The range of job opportunities continues to expand and diversify. For example, microbiologists are employed in medical and veterinary laboratories, food and biotechnology companies, universities and government agencies.

#### 100-level papers

A major in Microbiology requires the following papers or their equivalent:  
**CELS 191 Cell and Molecular Biology**  
**CHEM 191 The Chemical Basis of Biology and Human Health**  
**HUBS 191 Human Body Systems 1**

## Neuroscience

Neuroscience is the study of the nervous system, including the brain, spinal cord, and the networks of neurons that transmit signals around the body. You will study normal nervous systems as well as situations in which the nervous system does not work properly. Problems studied include mental illness, neurodegeneration (e.g. Alzheimer's or Parkinson's disease), and brain injury (such as from a stroke or a car accident).

The University of Otago is the only New Zealand university that offers an undergraduate major in Neuroscience.

### Career opportunities

A major in Neuroscience prepares you to work as a laboratory technician, research assistant, research manager or policy analyst. It also provides a convenient first degree if you later want to specialise in professional or applied fields such as medicine, pharmacy, physiotherapy, optometry, audiology or nursing. You may also enter the general scientific or business workforce, as employers value the generic skills acquired while studying science.

#### 100-level papers

A major in Neuroscience requires:  
**CELS 191 Cell and Molecular Biology**  
**HUBS 191 Human Body Systems 1**  
**PSYC 111 Brain and Behaviour (can be taken in the second year)**

one of

**CHEM 191 The Chemical Basis of Biology and Human Health**

**PHSI 191 Biological Physics**

and one further from

**BIOC 192 Foundations of Biochemistry**

**BIOL 112 Animal Biology**

**CHEM 191 The Chemical Basis of Biology and Human Health**

**HUBS 192 Human Body Systems 2**

**PHSI 191 Biological Physics**

*Note: You must complete at least one of either CHEM 191 or PHSI 191.*

## Pharmacology and Toxicology

Pharmacology is the study of drugs and how they alter biological systems. As new diseases emerge, and older medicines fail to work, the contribution of pharmacology to the discovery and development of better and safer drugs becomes all the more important. Pharmacology lies at the centre of the biomedical sciences at Otago, and our pharmacologists work closely with a wide variety of other disciplines, including neuroscience, molecular and cell biology, physiology, immunology and cancer biology.

Toxicology is the study of the adverse effects of chemicals, including medicines and recreational drugs. This can apply to humans, animals or the environment. Toxicologists aim to determine why things are toxic, conduct risk assessments and provide information on the reduction of harm.

### Career opportunities

Graduates in Pharmacology and Toxicology are employed in a variety of careers including drug-discovery, biotechnology, regulatory affairs and management. Our graduates have pursued careers within government agencies, private companies, universities and research organisations, and have gone on to careers in medicine and dentistry.

### 100-level papers

A major in Pharmacology requires:

CHEM 191 The Chemical Basis of Biology and Human Health

BIOC 192 Foundations of Biochemistry

and at least two of

CELS 191 Cell and Molecular Biology

HUBS 191 Human Body Systems 1

HUBS 192 Human Body Systems 2

## Physical Education, Activity and Health

Physical Education, Activity and Health is a multidisciplinary major underpinned by a bio-social conceptualisation of health which combines theoretical knowledge with applied experience. The major draws from diverse fields, and links together Physical Education, Māori Physical Education and Hauora, Coaching, Physical Activity and Health including behavioural perspectives of physical activity. Students will analyse physical activity interventions aimed at disease prevention and the advancement of wellbeing.

### Career opportunities

Career opportunities exist within the areas of health promotion, physical education, community health and wellness, physical activity, sport coaching and research.

Specific roles include health promotion co-ordinator, exercise programme adviser (e.g., green prescription), wellness coach, physical education teacher, physical activity and health promoter, medical and health researcher, sport coach and physical education officer.

### 100-level papers

A major in Physical Education, Activity and Health requires:

SPEX 101 Sport, Science and Society

SPEX 102 Principles of Exercise for Health and Performance

ANAT 101 Anatomy for Sport and Exercise (or HUBS 191 and HUBS 192)

PHSL 101 Physiology for Sport and Exercise



### Anne-Marie Jackson

NGĀTI WHĀTUA, NGĀPUHI, NGĀTI KAHU  
O WHANGAROA, NGĀTI WAI

ASSOCIATE PROFESSOR, MĀORI PHYSICAL  
EDUCATION AND HEALTH; CO-DIRECTOR  
TE KORONGA AND COASTAL PEOPLE:  
SOUTHERN SKIES

Anne-Marie Jackson was named joint winner of the 2020 University of Otago Rowheath Trust Award and Carl Smith Medal, given to recognise outstanding research performance of early career staff. Her research into Māori health and wellbeing focuses on supporting the hopes and aspirations of Māori communities.

“Otago is a wonderful place to do this mahi. We are a well-connected campus with strong linkages to our communities; a place where whānau and whanaungatanga can flourish.”

Anne-Marie co-leads the new national Centre of Research Excellence Coastal People: Southern Skies, which connects communities with world-leading, cross-discipline research to rebuild coastal ecosystems and those communities.



## James Douglas

BACHELOR OF SCIENCE (MATHEMATICS),  
MASTER OF SCIENCE (PHYSICS)  
CTO, MEETOPTICS

“At Otago I enjoyed the freedom to study whatever interested me, and in my first year tried Physics, Maths, Philosophy and Computer Science. I really loved pure mathematics, along with physics, and took as many courses from those programmes as I could. As my studies went on, I came to know many of the Maths and Physics staff, and my knowledge really accelerated through being able to go to their offices and chat with them.

“One thing I particularly enjoyed at Otago was the opportunity, in my later years, to assist in teaching tutorials and lab sessions. I found it very rewarding to help the younger students learn and understand new concepts. It’s always great to see that flash of understanding in someone, and teaching also pushed my own understanding to another level.”

## Physics

Physics addresses our questions about the fundamental laws that govern nature and it provides the concepts and experimental methods to seek the answers. It is also a very practical subject with application in virtually every sphere of human activity, from medicine to advancing sustainable forms of energy production, and it has been completely central to the development of modern technology. The papers in a Physics degree cover topics as diverse as the quantum mechanical theory of light and matter, Einstein’s theory of relativity, optics, electromagnetism, thermodynamics, wave phenomena and global warming.

### Career opportunities

Physics training develops highly transferable skills in problem-solving and critical thinking, as well as technical capabilities that are greatly valued by employers. Our graduates are found all over the world, and have used their Physics degree as a springboard to pursue a wide range of rewarding careers in fields such as computational modelling, instrumentation, scientific research, renewable energy, software development, teaching, medical technology and finance.

#### 100-level papers

A major in Physics requires:

MATH 130 Fundamentals of Modern Mathematics 1

MATH 140 Fundamentals of Modern Mathematics 2

PHSI 131 Fundamentals of Physics I

PHSI 132 Fundamentals of Physics II

## Physiology

Physiology explores how living things work. Physiology at Otago is focused on the biological processes occurring within and between human cells, tissues and organs, and the effects that these interactions have on our health and behaviour. Through knowledge of the normal functions of living systems we are better equipped to understand and respond when function is abnormal, such as in diseases.

## Career opportunities

Physiology gives you the opportunity to develop the skills and lifelong learning strategies crucial for careers in science – such as in universities, polytechnics, hospitals, government and agricultural research agencies – or even in military or space agencies. Physiologists are also well placed to pursue additional training for biomedical-based careers such as in medicine, dentistry, pharmacy, physiotherapy, medical laboratory science, nursing, optometry or audiology.

#### 100-level papers

A major in Physiology requires:

HUBS 191 Human Body Systems 1

HUBS 192 Human Body Systems 2

and at least two of

BIOC 192 Foundations of Biochemistry

CELS 191 Cell and Molecular Biology

CHEM 191 The Chemical Basis of Biology and Human Health

PHSI 191 Biological Physics

## Plant Biotechnology

Plant Biotechnology encompasses plant physiology, plant biochemistry and plant molecular biology. Plant scientists in Botany and Biochemistry teach the structure and function of the whole plant and how to apply modern molecular and biochemical techniques to manipulate plants of agronomic importance.

### Career opportunities

There are opportunities in at least three of the Crown Research Institutes (dealing with horticultural, arable, pastoral and forestry products), private sector companies, university research groups, and in secondary and tertiary teaching.

#### 100-level papers

BIOL 123 Plants: How They Shape the World

and at least one of

BIOC 192 Foundations of Biochemistry

CELS 191 Cell and Molecular Biology

CHEM 191 The Chemical Basis of Biology and Human Health

ECOL 111 Ecology and Conservation of Diversity

## Psychology

Psychology is the science of behaviour and how its associated thoughts, emotions, sensations, and all other aspects of our complex lives are represented in the brain. Psychologists study the way humans and other animals interact with the world and each other. They investigate human behaviours and learned abilities, including the spectrum from normal to abnormal behaviour; what might underlie abnormal behaviour; how information is processed through our senses; how our complex behaviours are shaped by diverse factors including our experiences, early family environments, genetic vulnerability, drugs, hormone levels, diet, exercise and healthy lifestyles; how our experiences are stored as memories; and how social connections develop and influence our behaviour.

### Career opportunities

Graduates have gone on to secure jobs in universities, health and social services, business and industry, safety, communications and planning, and various government agencies. Clinical Psychology graduates have gone on to work in the public health sector or in private practice.

#### 100-level papers

A major in Psychology requires:  
PSYC 111 Brain and Behaviour  
PSYC 112 Human Thought and Behaviour

## Science Communication

(minor subject only)

The Science Communication minor provides you with a background in communication theory and practice, an understanding of the societal context within which science and science communication operates, as well as the practical skills required to become a capable science communicator.

#### 100-level papers

A minor in Science Communication requires:  
MFCO 103 Introduction to Communication Studies  
SCOM 109 Communicating Science: An Introduction

## Software Engineering

Software Engineering emphasises those aspects of computer and information science that are concerned with the principles and techniques required to produce high performing, reliable ICT (Information and Communication Technology) systems. Students learn the skills to manage the design, development, application and maintenance of complex software systems, as well as an understanding of the business and social context of these systems.

### Career opportunities

There is a growing need for technical professionals who are able to manage the construction of such systems. Study in this area provides students with excellent national and international career employment opportunities.

#### 100-level papers

A major in Software Engineering requires:  
COMP 101 Foundations of Information Systems  
COMP 161 Computer Programming  
COMP 162 Foundations of Computer Science  
and one of MATH 120, 130, 140 or FINC 102

## Sport and Exercise Nutrition

The links between diet, physical activity, exercise and athletic performance are recognised in many areas of sport, nutrition and human health. The BSc Sport and Exercise Nutrition major is the first qualification in New Zealand that focuses on these fundamental links.

Sport and Exercise Nutrition provides a thorough knowledge base in all aspects of nutrition and relevant areas of exercise and sport science, drawing on interdisciplinary content from the Department of Human Nutrition and the School of Physical Education, Sport and Exercise Sciences.

### Career opportunities

Students from this programme have gone on to careers within elite sporting organisations both in New Zealand and overseas.



### Hitaua Arahanga-Doyle

NGĀI TAHU, TE ĀTI HAUNUI A PĀPĀRANGI  
LECTURER, DEPARTMENT OF PSYCHOLOGY

Reflecting on his transition from taura to kaiako in the Department of Psychology, Hitaua says that culturally, Otago is where he came to learn how to become an adult.

“The transition period from high school to university is massive, but the environment that is fostered and facilitated at Otago means that I didn’t go through that by myself. I met lifelong friends that were, and still are, a huge part of any successes that I am fortunate enough to receive.”



## Matt DeVries

BACHELOR OF APPLIED SCIENCES (PHYSICAL EDUCATION, ACTIVITY AND HEALTH)

SPORTS HUB MANAGER, THE ELMWOOD CLUB

“Sport is a unique industry that requires a lot of enthusiasm; I saw that by studying at Otago I could learn everything I needed to be successful. The course was rewarding and challenging and covered everything from health information to the development and management of sports.

“I’d advise future students to commit to the degree, put the work in and put themselves out there. Sports organisations like volunteer helpers who can show they are willing to do the work. Have those informal conversations with the teaching staff. They give fantastic advice, and challenge them with your thoughts and opinions.”

### 100-level papers

CHEM 191 The Chemical Basis of Biology and Chemical Health

BIOC 192 Foundations of Biochemistry

HUBS 191 Human Body Systems 1

HUBS 192 Human Body Systems 2

HUNT 141 Understanding Human Nutrition

It is recommended that you take

POPH 192 Population Health.

## Sport Development and Management

Sport is a rapidly expanding industry that intersects with education, culture, commerce, health, events, media, politics and tourism. Sport Development and Management is founded on the global growth in sport science degrees and sport management specialisations. Papers examine the spectrum of people, institutions and policies that influence the structure, management and experience of sport.

### Career opportunities

Careers in this sector include sport development officers, administrators and managers in national sports organisations, regional sport organisations, community trusts, commercial sport entities, professional sport administration, government ministries and local councils. It also provides pathways into teaching, coaching, youth work, sports marketing, school sport co-ordination and sports journalism – all of which are involved in improving individuals and environments.

### 100-level papers

A major in Sport Development and Management requires:

SPEX 101 Sport, Science and Society

SPEX 102 Principles of Exercise for Health and Performance

## Statistics

Data is being generated at an astonishing rate in science, business and government. Statistics is the collection, analysis, interpretation and visualisation of data; all crucial skills for society and business in the 21st century.

### Career opportunities

Statistical thinking and quantitative reasoning are highly valued by employers. Our graduates know how to design ways to collect data, to visualise data, to analyse data and to communicate the results of their analyses.

Statisticians are key contributors to decision-making by business and government. They also work with researchers in a wide range of disciplines, including biological, environmental, health and social sciences.

Employers include banks and insurance companies, consulting firms, Crown Research Institutes (e.g. Scion, AgResearch, Plant & Food Research, and Landcare), health organisations, local government, marketing and market research companies, the New Zealand government (e.g. ACC, Treasury and Statistics New Zealand) and all data-intensive industries.

### 100-level papers

STAT 110 Statistical Methods

or

STAT 115 Introduction to Biostatistics and

MATH 130 Fundamentals of Modern Mathematics 1

MATH 140 Fundamentals of Modern Mathematics 2

## Surveying

Surveyors work in a range of land, property and construction related areas. Using modern technology such as GPS and laser instruments, surveyors precisely measure land, buildings and features in the environment for mapping, development and spatial analysis. Because of this close association with land and property, the roles of the surveyor extend to land development engineering and urban design, resource management and land planning, property boundary surveying and the determination of land ownership and rights.

## Career opportunities

The BSurv degree is the only academic qualification offered in New Zealand that will lead to licensing by the NZ Cadastral Surveyors Licensing Board – a licence to carry out land title surveys that is also recognised in all Australian states. It can also lead to full professional membership of Surveying + Spatial NZ (formerly the NZ Institute of Surveyors).

Graduates are employed in such diverse areas as measuring land and built-structure deformation; the design, layout and construction of subdivisions and services; property management; planning; hydrographic surveying; mining and construction surveying; and the application of geographic information systems.

### 100-level papers

If you wish to be considered for admission to second-year studies leading to a BSurv, you must normally have passed the following papers:

- MATH 130 Fundamentals of Modern Mathematics 1
- SURV 120 Surveying and Spatial Science
- SURV 130 People, Place and the Built Environment
- ENGL 228 Writing for the Professions

and three further elective papers worth at least 54 points.

*Note: ENGL 228 Writing for the Professions should be taken in the second semester of the first year of study.*

## Surveying Measurement

The BSc degree in Surveying Measurement focuses on the precise measurement of position applied to land, the sea floor and built structures. This degree may also be used as a basis for becoming an internationally qualified hydrographic surveyor.

### Career opportunities

Career opportunities exist wherever there is a need for accurate spatial information or precise position measurement. Graduates may specialise in engineering surveying including road and building set out, underground mining or tunnelling, and hydrographic surveying. As these skills are internationally generic and may be applied in any country and in a variety of contexts,

they are particularly useful for international students who will not be practising surveying in New Zealand.

### 100-level papers

In order to be admitted to the second-year studies of the BSc in Surveying Measurement, you must have passed the following papers:

- MATH 130 Fundamentals of Modern Mathematics 1
- SURV 120 Surveying and Spatial Science
- SURV 130 People, Place and the Built Environment
- ENGL 228 Writing for the Professions

*Note: ENGL 228 Writing for the Professions should be taken in the second semester of the first year of study.*

## Zoology

Zoology studies the biology of animals at many levels: molecular, physiological, structural, evolutionary, behavioural and ecological. Zoology at the University of Otago emphasises the diversity and conservation of New Zealand's unique animals and gives an appreciation of how animals function, whether they live on land, in fresh water, in the sea or as parasites.

### Career opportunities

Graduates work in government departments, Ministry for Primary Industries, the Department of Conservation, Crown Research Institutes, regional and local authorities, medical and veterinary laboratories, wildlife and fisheries management, environmental consultancy and education.

### 100-level papers

There are no 100-level Zoology papers. If you intend to major in Zoology (BSc or BAsc), you must take the following 100-level papers:

- CELS 191 Cell and Molecular Biology
- BIOL 112 Animal Biology

and either

- STAT 110 Statistical Methods

or

- STAT 115 Introduction to Biostatistics



### Lachie Scarsbook

BACHELOR OF SCIENCE (GEOLOGY AND ZOOLOGY), MASTER OF SCIENCE (ZOOLOGY)  
STUDYING FOR A DPHIL IN ARCHEOLOGICAL SCIENCE

"While studying for my master's, I was also lucky enough to be selected as a BLAKE Ambassador, where I worked with the Takahē Recovery Programme down at Burwood Bush in their annual trap bait and husbandry activities (including daily supplementary feeding). One of the trip highlights was catching young takahē in the snow and transporting them in little boxes for release into another part of the reserve. Watching a species once considered extinct sprinting out into their new predator-free safe haven was so satisfying."

# Hands-on experience for secondary students

Alongside the community engagement programmes developed by individual departments, the Division of Sciences has developed three important programmes to support secondary school students: Otago Science Academy, Science Wānanga and what has now evolved into Hands-on at Otago.

## Otago Science Academy

The Science Academy is an exciting programme aimed at Year 13 students from rural/provincial and lower decile schools with a passion for science and the potential to excel in their final year NCEA and/or scholarship science exams. It provides you with the opportunity to work alongside, and be challenged by, leading scientists across a wide range of disciplines.

You will attend two residential science camps on the University of Otago campus – a summer science camp in January and a winter science camp in July. Between science camps you will work collaboratively in small teams on a science communication project that you will present at the end of the July camp. Following the July camp you will be supported by our online tutors, who will present 10 online tutorials targeted at NCEA/scholarship physics, chemistry and biology in the run up to your externals at the end of the year.

[otago.ac.nz/ouassa/index](http://otago.ac.nz/ouassa/index)



## Tuia i Hawaiki, tuia i te Uru – Science Wānanga

Tuia i Hawaiki, tuia i te Uru – weaving together the strengths of western science (te Uru) and matauranga Māori (i Hawaiki) to navigate new ways forward for our people and to bring the best of both worlds together.

A three-day noho marae full of fun, interactive science activities for rangatahi Māori Years 7–10 students.

Staying on marae with university student tuākana, scientists and kaumatua, rangatahi Māori get to hang out and do real science in their local communities. The supportive partnerships between iwi, kura and Te Whare Wānanga o Ōtākou, the Division of Sciences, are the strength of the programme.

Wānanga encourage us all to explore the connections between science, matauranga Māori and our lives, especially the links between human health and environmental health. If you're a Māori student who's passionate about the world around you, we'll help you get to where you want to be.

The below statement is one of the whakatauki we have embedded to guide our kaupapa.

*"Poipoiā te kākano kia puawai – nurture the seed and it will blossom."*

[otago.ac.nz/science-wananga](http://otago.ac.nz/science-wananga)

## Hands-on at Otago

Experience a week of the Otago student life over the summer holidays.

Each morning, students participate in a research project in one university department. Allocation to these projects is based on the five projects you selected at registration. For each project we also try to achieve a good balance of skills and backgrounds, while accommodating the specific requirements of individual projects and supervisors.

The Snack programme allows students to have a small taste of a variety of other research activities, both on and off campus, during the afternoon programme. Each afternoon Snack comprises two hours of interactive, fun opportunities for students to see researchers in action in real-life situations.

The learning programme is balanced by a variety of social and recreational activities in the afternoons and evenings.

[otago.ac.nz/hands-on-at-otago](http://otago.ac.nz/hands-on-at-otago)

# Contact us Whakapā mai

## AskOtago

AskOtago is your one-stop shop for all questions about studying at Otago.

You can find answers with our searchable knowledgebase, or call, email or chat with us.

You can also find us at our hub in the Information Services Building, or at one of our other hubs around campus.

[ask.otago.ac.nz](http://ask.otago.ac.nz)

## Schools' Liaison Officers

Our liaison staff visit secondary schools around New Zealand to provide you with information and advice about courses and life at Otago.

[otago.ac.nz/liaison](http://otago.ac.nz/liaison)

## Course advice

Course advice is available as many times as you need throughout your time at Otago.

[otago.ac.nz/courseadvice](http://otago.ac.nz/courseadvice)

## Useful additional information

Your future in Science starts at Otago

[otago.ac.nz/sciences](http://otago.ac.nz/sciences)

General information for new students

[otago.ac.nz/future-students](http://otago.ac.nz/future-students)

Applying to study at Otago

[otago.ac.nz/enrolment](http://otago.ac.nz/enrolment)

Accommodation at Otago

[otago.ac.nz/accommodation](http://otago.ac.nz/accommodation)

Locals Programme

[otago.ac.nz/locals](http://otago.ac.nz/locals)

Te Huka Mātauraka – the Māori Centre

[otago.ac.nz/maoricentre](http://otago.ac.nz/maoricentre)

Pacific Islands Centre

[otago.ac.nz/pacific](http://otago.ac.nz/pacific)

The Division of Sciences Māori and Pacific support offices provide ongoing support to students throughout their academic studies.

## Māori Sciences Otākou

Nau mai haere mai ki te tari Pūtaiao Māori ki Otākou.

Māori Sciences at Otago are committed to growing Māori in all science areas. We have a dedicated team who provide a range of activities, programmes and support for tauira Māori to reach their potential in tertiary education and enhance their Māoritanga. We also work alongside iwi, Māori communities and kura around Aotearoa to inspire rangatahi. Our mahi is guided by tikanga Māori.

[otago.ac.nz/sciences/maori](http://otago.ac.nz/sciences/maori)

## Sciences Pacific student support

Our aim is to grow successful Pacific Sciences students by providing an environment in which you can achieve your academic aspirations by maintaining and growing your cultural identity.

We hold workshops, programmes and activities specifically designed for Pacific Sciences students. We facilitate support and academic services across the University, liaising with other university wide support services. We have strong links within communities and can connect students with them.

[otago.ac.nz/sciences/contacts/pacific](http://otago.ac.nz/sciences/contacts/pacific)

While all information in this booklet is, as far as possible, up to date and accurate at the time of production, the University reserves the right to change courses and course requirements, and to make any other alterations, as may be deemed necessary. Printed April 2023.



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