

2016

# Zoology

## Undergraduate Course Information





# Zoology

Undergraduate  
Course Information

## FOREWORD

Tēnā koe, Nau mai, Haere mai ki Te Tari Mātai Kararehe

Hello and welcome to the Department of Zoology

We in the Department of Zoology seek to make a major contribution to understanding the lives of animals. Our teaching and research span a variety of subject areas, including behavioural ecology, conservation, development, evolution, environmental physiology, freshwater ecology, modelling, molecular ecology, neurobiology, parasite ecology, population genetics, reproduction and wildlife management. Across our varied research areas we aim to ask questions that advance understanding in areas of both theory and practical application, and to do so with statistical rigour.

In terms of animal diversity, our staff and students study species ranging from the microscopic to the very large, and from the well known to the previously unrecognised. Our interests include distinctive native species such as frogs and fish, limpets and lizards, penguins and petrels, sharks and snails, takahē and tuatara, wētā and whales – often with a strong conservation focus. We also have researchers investigating the management of pest species such as possums, the reproduction of eels and other fish species of interest to aquaculture, and the neurobiology of honeybees. We explore animals in habitats including alpine areas, coastlines, forests, grasslands, lakes, rivers, streams, oceans, offshore islands and Antarctica.

We look forward to you joining us in the enterprise of understanding animals.



Associate Professor Gerry Closs  
Head of Department

## A QUALITY LEARNING EXPERIENCE

The papers that make up a degree in Zoology at the University of Otago draw on the expertise and experience of our staff. Part of our mission is to train you in the specific knowledge and skills that will equip you as a well-rounded zoologist, and for this you will have the opportunity to choose from topics including animal diversity, physiology, ecology, neurobiology, marine biology, conservation, evolution and biostatistics.

However, our mission goes much beyond training you in zoological facts and figures. Using a range of teaching and assessment methods, involving lectures, labs and fieldwork, we aim to help you develop the ability to engage in rigorous analysis and criticism, to solve problems, to communicate effectively in writing and in speech, and to work in teams and independently. In short, we anticipate you developing skills that are transferable to a variety of pursuits in life.

A further dimension to our teaching is to impart an awareness of the ethical, social and cultural dimensions of zoological study. We do this by exposing you to, for example, debate about ethical aspects in the use of animals, about pressures on biodiversity (including climate change) and about Māori perspectives and concerns. We encourage you to share your opinions and knowledge to help us in our journey to greater understanding.



## CAREERS IN ZOOLOGY

We aim to produce graduates who are flexible and able to take up a diversity of careers in the biological and environmental sciences and beyond. Like any qualification, a degree in Zoology does not guarantee employment. However, it provides an excellent academic background from which to pursue careers within:

- Government departments (such as the Department of Conservation)
- Crown Research Institutes (such as Landcare and the National Institute of Water and Atmospheric Research)
- Regional and local authorities
- Medical and veterinary laboratories
- Wildlife and fisheries management agencies
- Education and academic research
- Environmental consulting
- Technology companies, especially biotech companies that require bioscience, IT and communication skills.

Many students progress to higher degrees in Zoology before seeking employment.



## SUPPORT FOR STUDENTS

The lecturing staff (Professors, Associate Professors, Senior Lecturers, Lecturers, Professional Practice Fellows and Teaching Fellows) are responsible for the design and teaching of Zoology papers. The combined academic, technical and administrative staff (about 60 in all) take care of the day-to-day running of the Department.

If you have questions about subject matter, or a problem concerning the organisation of a paper, please talk to the lecturer concerned. In addition, you can approach the course convener for your year:

### 100- LEVEL BIOLOGY

Professor Alison Mercer, B111, 479 7961, [alison.mercer@otago.ac.nz](mailto:alison.mercer@otago.ac.nz)

### 200- LEVEL ZOOLOGY

Associate Professor Gerry Closs, MG02, [gerry.closs@otago.ac.nz](mailto:gerry.closs@otago.ac.nz)

### 300- LEVEL ZOOLOGY

Dr Mark Lokman B113, 479 5846, [mark.lokman@otago.ac.nz](mailto:mark.lokman@otago.ac.nz)

### 400- LEVEL ZOOLOGY

Professor Alison Mercer, Room B111, 479 7961, [alison.mercer@otago.ac.nz](mailto:alison.mercer@otago.ac.nz)

For questions about your degree structure, Associate Professor Bruce Robertson is our Chief Undergraduate Student Adviser. Finally, the Head of Department will be happy to resolve any outstanding difficulties.

We place considerable weight on the need to provide effective support for our students. Our Staff Student Liaison Committee (consisting of students from each year of study plus staff representatives) prides itself on the frank discussion of issues and aims to respond in the shortest possible time to student concerns.

Staff are keen to receive feedback from students so they can judge whether the aims of their courses are being achieved. You will be asked periodically to complete questionnaires about Zoology papers – teachers evaluate responses and incorporate any necessary improvements without delay. We hope you will view this task as an important contribution to the Department – without your comments it is difficult to be sure what is working and what isn't.

In the remainder of this booklet you will find out how to plan your degree in Zoology, the papers available in each year and the teaching and research interests of the staff. We look forward to having you join us.

## KAIAWHINA (Māori Student Support)

Associate Professor Alison Cree is the Kaiāwhina (Māori Student Support person) for Zoology. She is a point of contact for Māori students to ask questions, seek support, learn more about Māori scholarships, and in cooperation with other networks, arrange for pastoral and academic support. (Email: [alison.cree@otago.ac.nz](mailto:alison.cree@otago.ac.nz))

## ETHICS IN THE CARE AND USE OF LABORATORY ANIMALS

The use of animals in teaching is monitored by the Animal Ethics Committee of the University of Otago. Dissections occur in a minority of practical classes in BIOL 112 and 200- and 300-level Zoology courses. Departmental policy is that the minimum number of animals should be used to achieve the desired objectives of practical sessions. Experience of dissection is important for those intending to pursue careers in medicine, veterinary science, dentistry, physiology, anatomy and in some areas of zoology and other biological sciences. If a student objects on moral grounds to dissection procedures, alternative exercises are available. Feedback from all students is sought to maximise the value of learning opportunities provided.



## PLANNING YOUR ZOOLOGY DEGREE

There is considerable flexibility in the choice of Zoology courses you can take. When planning your course consider both your career aspirations and personal subject interests. Remember also:

- the importance of developing mathematical, statistical and computing skills.
- the importance of developing a solid science background, not only in biology but also in subjects such as chemistry, physics, geology or geography.
- genetics is a 'core' subject for any biological degree and many zoology students take one or more genetics papers.
- if you're interested in other subjects as well as Zoology it may be a good idea to combine them in your degree – discuss this with a Course Adviser.

Decisions about the overall structure of your degree programme need careful thought. Make sure you read this booklet thoroughly and understand the prerequisites for each year of study. You can also get valuable advice from Zoology staff before or during enrolment.





## UNDERGRADUATE DEGREE IN ZOOLOGY

The undergraduate degree offered in the Department of Zoology is the three year Bachelor of Science (BSc).

### BACHELOR OF SCIENCE

The BSc is a programme of papers with a combined value of not fewer than 360 credit points. The degree must include at least 180 points above 100-level, of which at least 72 points must be done above 200-level.

As a Zoology major, your course will include:

For a Bachelor of Science (BSc) majoring in Zoology you must complete:

Level	Papers	Points
100-level	CELS 191	18
	BIOL 112	18
	STAT 110 or STAT 115	18
.....		
200-level	ZOOL 221	18
	ZOOL 222	18
	ZOOL 223	18
.....		
300-level	Three of ZOOL 313, ZOOL 314, ZOOL 315, ZOOL 316, ZOOL 318, ZOOL 319, GENE 312	54
	One further paper from ZOOL 313, ZOOL 314, ZOOL 315, ZOOL 316, ZOOL 318, ZOOL 319, GENE 312, GENE 314, MARI 301, MARI 302	18
.....		
Plus	180 further points; must include 54 points at 200-level or above. Up to 90 points may be taken from outside Science	
	Students intending to advance to PGDipWLM, PGDipSci or MSc in Zoology are strongly recommended to take ZOOL 316	180
	Students intending to advance to BSc(Hons) in Zoology must take ZOOL 316 and four other 300-level papers from the list provided later in this booklet.	
.....		
Total		360

Students majoring in Zoology must pass STAT 110 (or STAT 115) before completing their degree. Students majoring in Zoology are strongly recommended to take ZOOL 316.

The remainder of the 360 credit points that you require to complete your degree can be made up from a wide range of subjects at 100-, 200- and 300-level in areas as diverse as anatomy, biochemistry, botany, chemistry, computer science, ecology, genetics, geography, geology, mathematics, microbiology, physics, physiology, psychology and statistics. You are also permitted to include up to 90 points from non-science papers. Remember that papers at 200- or 300-level usually have prerequisite papers that must have been passed in earlier years; take this into account when planning your programme. The Guide to Enrolment contains all relevant details of papers and their credit point values. Many students who major in Zoology take more than the minimum 72 points of 300-level Zoology papers.

For a Minor in Zoology you must complete:

Level	Papers	Points
100-level	CELS 191	18
	BIOL 112	18
.....		
200-level	Two of ZOOL 221, ZOOL 222, ZOOL 223	36
.....		
300-level	One of ZOOL 313, ZOOL 314, ZOOL 315, ZOOL 316, ZOOL 318, ZOOL 319, GENE 312	18
	One further paper from ZOOL 313, ZOOL 314, ZOOL 315, ZOOL 316, ZOOL 318, ZOOL 319, GENE 314, MARI 301, MARI 302	18

#### BACHELOR OF SCIENCE WITH HONOURS (BSc(Hons)) IN ZOOLOGY

The BSc(Hons) degree is a one-year programme taken after the completion of a BSc. If you think you might wish to do a BSc(Hons) you must complete the prerequisites listed below during your BSc programme. All students should have a confirmed supervisor before applying for postgraduate courses. Applications for entry to this course should reach the Administrator, Division of Sciences, by 10 December for the following year.

If you are doing a double major you will complete 8, 300-level papers (4 in each subject). Your Zoology 300-level papers should include ZOOL 316. This can lead onto a combined Honours degree.

## WHY TAKE A BSc(Hons) DEGREE?

Most of our PhD candidates were previously Honours students and the BSc(Hons) can be viewed as a fast-track programme for academically-able students who aspire to a PhD degree or MSc by thesis only. Others who do not wish to study for more than four years may take the BSc(Hons) degree simply to provide a stronger qualification that enhances their prospects of a career in Zoology. Many students, however, who wish to continue their studies choose instead the ordinary three year BSc followed by an MSc by papers and thesis, a Postgraduate Diploma in Wildlife Management (PGDipWLM) or a Masters in Science Communication (MSciComm).

### PROGRAMME REQUIREMENTS

#### BACHELOR OF SCIENCE WITH HONOURS (BSC(HONS)) IN ZOOLOGY

Papers:

ZOOL 490

Three of ZOOL 410, ZOOL 411, ZOOL 412, ZOOL 413, ZOOL 414, ZOOL 415, ZOOL 416, ZOOL 417, ZOOL 418, ZOOL 419, ZOOL 420, ZOOL 421

Prerequisites:

At least five 300-level papers including ZOOL 316, two of ZOOL 313- 315, 318, 319, GENE 312, and one further paper from ZOOL 313- 315, 318, 319, GENE 312, 314, MARI 301, 302



## UNDERGRADUATE COURSES

### 100-LEVEL COURSES

Students intending to study zoology must take CELS 191 and BIOL 112 in their first year. These courses introduce general biological principles providing a broad foundation. These 100-level courses have fairly large classes and are very popular with students.

We provide a very high standard of teaching in these larger classes. Teaching methods in BIOL 112 (besides normal lectures and laboratory classes) include student study groups, catch-up and revision workshops, computer based self-assessment tests and many in-house designed computer exercises. The lectures are often complemented by a detailed set of notes (often interactive), lecture slides and other course materials which are accessible via the internet on Blackboard.

For any 100-level biology enquiries please contact Professor Alison Mercer (Academic Convenor) or Andrea Brown (Course Co-ordinator).

#### CELS 191 Cell and Molecular Biology

(18 points, Semester 1)

An introduction to the biology of cells; fundamentals of molecular biology; organismal and molecular genetics; genetic variation; diversity and biology of microorganisms; microbial virulence and disease processes.

#### BIOL 112 Animal Biology

(18 points, Semester 2)

Animals live in a hostile world where they must survive in the face of adverse weather and enemies, find resources to build their bodies and fuel their activities, and mate and rear their young, passing on genes to future generations. In overcoming the challenges, animals have developed an amazing diversity of body plans, physiological tricks and life styles. This introductory course surveys the evolution and diversity of animal life.

It explores the unifying relationships between form and function among animals from different environments. Essential biological principles are illustrated by examples from the New Zealand fauna, issues of environmental, social or economic importance, and cutting-edge research developments at the University of Otago. This course is hands-on, with lecture material complemented by practical classes.

The 200-level Zoology papers are designed to build on CELS 191 and BIOL 112, increase your zoological knowledge and prepare you for 300-level papers. ZOOL 221, 222 and 223 are required papers for a Zoology major.

### **ZOOL 221 Animal Designs for Living** (18 points, Semester 1)

This course uses lectures, labs and field trips to illustrate the diversity of animal life. It examines the relationships between animals, the basic body plans of animals and how these basic body plans have been modified so an animal can make the most of its environment.

### **ZOOL 222 Evolutionary Biology** (18 points, Semester 2)

Evolution has a central place in our understanding of biology. This course provides an up-to-date account of the process of evolution - its mechanisms, its relationship to ecology, behaviour, genetics and systematics and its record with respect to animals as revealed by key fossils and major changes and trends.

### **ZOOL 223 Animal Physiology** (18 points, Semester 2)

Animal physiology is about how animals function in their external environment and how their internal systems work together in an integrated way. In this course we investigate selected physiology topics which focus on reproduction and development. There will be four sections to the course: Development and Growth; Sex and Reproduction; Metamorphosis and Post-natal Development of Sensory Systems.

Zoology staff contribute to the teaching of the following 2nd year Genetics and Ecology papers.

### **GENE 222 Genes, Chromosomes and Populations** (18 points, Semester 2)

An introduction to mechanisms of inheritance, the structure and function of chromosomes, mapping techniques, and aspects of the evolutionary, population and quantitative genetics of fungi, plants and animals.

### **GENE 223 Developmental and Applied Genetics** (18 points, Semester 2)

An introduction to the developmental genetics of bacteria, yeast, animals and plants, as well as the applications, safety and regulation of genetically engineered organisms.

## ECOL 211 Ecology of Communities and Ecosystems

(18 points, Semester 1)

This course focuses on how species interact, how these interactions build communities, how natural and human-induced disturbances affect the integrity and sustainability of communities, and how an understanding of community and ecosystem-level processes can aid the restoration and management of natural areas for conservation.

## ECOL 212 Ecological Applications

(18 points, Semester 2)

Putting ecology into practice: approaches in ecological science; developing a research programme; sampling and experimental design; exploration of the methods used by scientists to communicate their findings to a wider audience.

Remember, when you are selecting your 200-level papers you may need to include prerequisites for 300-level papers:

- ECOL 111 is a prerequisite for MARI 301.
- STAT 110 or STAT 115 is a prerequisite for ZOOL 316.
- Any two of ZOOL 222, GENE 221 and GENE 222 are prerequisites for GENE 312.



### ZOOL 313 Environmental Physiology

(18 points, Semester 1)

This course examines the ways in which animals interact with, and respond to, their environment, and the relationship between physiology and animal distribution, with emphasis on the evolution of unique systems which permit the exploitation of diverse and extreme environments. Topics include homeostasis, thermoregulation and respiration, how animals survive extreme environmental conditions, osmoregulation, seasonality and stress physiology.

### ZOOL 314 Neurobiology

(18 points, Semester 2)

Animals evolved from a common ancestor within the last billion years. Recent molecular developmental studies have revealed that our brains are remarkably similar, not only at a cellular level but at a gross organizational level as well. In the past, nervous systems of “simpler” animals provided key insights into “how the brain works”, most famously when Hodgkin and Huxley used giant squid neurons to find out how action potentials are generated. As neuroscience has advanced more and more rapidly in recent years, studies on the nervous systems of nematodes, molluscs, insects, amphibians and fish, in addition to those of reptiles, birds and mammals, have provided fascinating new information about how nervous systems are designed and how they work.

### ZOOL 315 Behavioural and Evolutionary Ecology

(18 points, Semester 1)

The aim of this paper is to understand why different species behave in different ways and why, within species, there may be individual differences in behaviour. The topics covered include reproduction and survival, animal communication and host-parasite interactions and co-evolution. The paper takes a strong quantitative approach (a background in basic statistics is recommended) including hypothesis testing, experimental design, abstract models and phylogenetics.

### ZOOL 316 Biological Data Analysis and Computing

(18 points, Semester 1)

Statistics and computing are becoming increasingly important in biology. This applied course for biologists emphasises the importance of precise problem formulation in experimental design and data analysis. Using real biological examples and computers, the course deals with various graphical and exploratory data analysis, estimation and hypothesis testing, experimental design, computer-intensive methods, simulation and population modelling.

### ZOOL 318 Freshwater Ecology

(18 points, Semester 2)

In this course we study the interactions among animal and plant species in lakes and streams, the effects of physical and chemical processes on these communities, and issues such as the effects of land-use on water quality. Much of the course is based on local examples, and the practical course is based on experimental studies (conducted in small groups) in the field or in the laboratory.

### ZOOL 319 Conservation Biology

(18 points, Semester 2)

The ecological, genetic and biogeographic principles underlying biological conservation; rationale for conservation; genetics and population dynamics of small populations; threats to species from habitat loss, over-exploitation, invasive species, climate change and genetically modified organisms.

### MARI 301 Marine Ecology

(18 points, Semester 1)

In this course we cover the physiological, behavioural and ecological adaptations needed to live in intertidal, shallow and deep water marine environments. We also study the general processes of reproduction and recruitment in marine organisms, and applied aspects of marine ecology such as fisheries and aquaculture and human impacts on the marine environment. Field work is an integral part of the course.

### MARI 302 Biology and Behaviour of Marine vertebrates

(18 points, Semester 1)

Study of the biology, ecology and behaviour of marine vertebrates (fish, marine reptiles, seabirds and marine mammals), focusing on New Zealand species.

Note: either MARI 301 or MARI 302 (but not both) can be counted towards Zoology major/minor subject requirements.

### GENE 312 Population and Evolutionary Genetics

(18 points, Semester 2)

Taught jointly by staff in Zoology, Botany and Biochemistry this paper deals with evolutionary questions, particularly in the light of recent molecular advances: How much genetic variation is there and why is it there? How do genes evolve? How do genomes evolve? How can we use genetic information to analyse population interactions and reconstruct phylogeny?

All Genetics courses emphasise the contemporary importance of the subject to disciplines as diverse as medicine, agriculture, ecology, sociology and law.



## GENE 314 Developmental Genetics (18 points, Semester 2)

Genetics and epigenetics of development and human disease. Developmental gene regulation. Developmental genetics of plants. Morphogenesis, regeneration and stem cells.

## POSTGRADUATE COURSES IN ZOOLOGY

Postgraduate courses enable students to carry out research work in the field of

Zoology that most interests them. A BSc(Hons), Postgraduate Diploma in Science and Postgraduate Diploma in Wildlife Management are available as one year courses. Master of Science, Master of Wildlife Management and Doctor of Philosophy degrees can also be undertaken in the Department. Details of these courses are in the booklet “Postgraduate Studies in Zoology” available from the Departmental Secretary, Department of Zoology.

## STUDENT EXCHANGE PROGRAMMES IN ZOOLOGY

Some universities with suitable courses in Zoology or Biology for those who would like to participate in an exchange programme are listed below (feel free to suggest others from the University’s list of exchange partners).

- University of British Columbia, Canada
- Mount Allison University, Canada
- Queens University, Canada
- University of Western Ontario, Canada
- University of Glasgow, Scotland
- University of Oregon, USA
- National University of Singapore
- University of Richmond, USA
- University of California, various campuses, USA

You can find more information on the scheme, application forms and links to the websites of exchange partners, on the University of Otago website ([otago.ac.nz/study/studentexchange/index.html](http://otago.ac.nz/study/studentexchange/index.html)). There is also a booklet available from Research and International in the Registry.

You should take courses at the same level and to the equivalent of the points required for your Zoology major and within the same time limits. The courses you take do not have to be the direct equivalent of courses specified for the Zoology major but should be courses in Zoology, Biology, Ecology or Genetics that would be sensible to include in a Zoology major. For your application you need to select three universities. If you are accepted for the exchange programme you then need to confirm your choice of courses with the Chief Undergraduate Student Adviser.

## TEACHING AND RESEARCH INTERESTS OF STAFF



Dr Caroline Beck

### Teaching

- Development, growth and regeneration
- Developmental genetics
- Molecular genetics

### Research

- Limb and lens regeneration in tadpoles
- Mechanisms of organogenesis
- Molecular control of vertebrate development



Professor Phil Bishop (Director, Ecology Degree Programme)

### Teaching

- Ecology
- Biodiversity
- Animal behaviour

### Research

- Chemical and acoustic communication in amphibians.
- Amphibian diseases and their role in declining populations.
- Reproductive behaviour and conservation management of amphibians.



Andrea Brown (Professional Practice Fellow, Biol 112 Co-ordinator)

### Teaching

- Cell and Molecular Biology
- Animal Biology



Emeritus Professor Carolyn Burns

### Teaching

- Aquatic ecology, particularly lakes (limnology)
- Conservation biology

### Research

- Biological processes in lakes, particularly food web interactions.
- Microbial food webs
- Eutrophication of lakes
- Plankton ecology and evolution



Associate Professor Gerry Closs (Head of Department)

**Teaching**

- Animal diversity
- Ecology of freshwater systems
- Approaches to ecological research

**Research**

- Lakes, River & Estuarine Ecology
- Ecology of freshwater fish and invertebrates
- Migration and dispersal in freshwater fish



Associate Professor Alison Cree  
(Kaiāwhina, Māori Student Support)

**Teaching**

- Reproduction and endocrinology of vertebrates
- Environmental and comparative physiology
- Conservation biology

**Research**

- Reproduction and thermal biology of cold-climate reptiles
- Sex determination and sexual differentiation in reptiles
- Biology, conservation and translocation of New Zealand reptiles



Dr Travis Ingram

**Teaching**

- Freshwater ecology
- Applied and evolutionary ecology
- Biological data analysis

**Research**

- Individual variation within populations
- Food web interactions of freshwater organisms
- Phylogenetic comparative methods



Dr Jennifer Jandt

**Teaching**

- Behavioural and Evolutionary Ecology
- Behavioural Ecology and Evolution
- Neurobiology of Behaviour

**Research**

- Behavioural ecology and evolution of social insects
- Development and function of personality differences in social insects – individuals and colonies
- German yellowjacket biology, invasiveness, and population structure
- Group behavioural patterns applied to swarm robotics



Dr Sheri Johnson

**Teaching**

- Animal Behaviour
- Behavioural Ecology
- Evolution

**Research**

- Reproductive ecology, sexual selection and mating system evolution
- Parental effects and epigenetics, particularly in fish



Dr Mark Lokman

**Teaching**

- Reproductive physiology
- Environmental physiology
- Physiology of stress

**Research**

- Comparative physiology and endocrinology of vertebrates, particularly teleosts.
- Evolution of steroid signalling.



Dr Christoph Matthaei

**Teaching**

- Freshwater ecology (fundamental and applied topics)
- Experimental design and statistical data analysis

**Research**

- Disturbance ecology in running waters
- Effects of human land use activities on running waters
- Multiple stressors and their interactions



Professor Alison Mercer

(100 level Academic Convenor, 400 level coordinator)

**Teaching**

- Principles of nerve function
- Comparative physiology and behaviour
- Neurobiology of behaviour

**Research**

- Neuronal development
- Biogenic amines in the insect brain
- The brain and behaviour of honey bees
- Cellular actions of honey bee queen pheromone



Associate Professor Mike Paulin

**Teaching**

- Neurobiology: nerve cells, nerve networks and the neural basis of animal behaviour

**Research**

- Biostatistics: computer simulation methods
- Neurophysiology and computer modelling of nerve cells and brain circuits underlying vertebrate behaviour



Professor Robert Poulin (MSc Research Student Co-ordinator)

**Teaching**

- Parasitology
- Behavioural and Evolutionary Ecology

**Research**

- Evolutionary, ecological and behavioural aspects of host-parasite interactions



Associate Professor Bruce Robertson  
(Chief Undergraduate Student Adviser)

**Teaching**

- Wildlife management
- Conservation genetics
- Molecular ecology

**Research**

- Conservation genetics of NZ native species
- Behavioural ecology of kakapo and NZ sealions
- Use of genetics to inform pest eradication



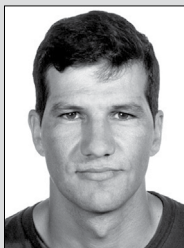
Dr Lisa Russell (Co-ordinator, CELS 191/CELS 199)

**Teaching**

- Cell Biology

**Research**

- Large Class Teaching
- Macroalgal ecology and taxonomy



Professor Philip Seddon  
(Director, Postgraduate Diploma in Wildlife Management)

**Teaching**

- Wildlife management
- Conservation biology
- Harvest management
- Ecology

**Research**

- Restoration of threatened species
- Spatial ecology of pest and native species



Professor Liz Slooten

**Teaching**

- Environmental science
- Conservation biology
- Fisheries biology
- Marine mammal biology and conservation
- Environmental impacts of fishing

**Research**

- Estimating abundance, survival and reproductive rates
- Quantifying sustainable levels of human impact
- Assessment of risk and uncertainty for environmental management decisions
- Marine mammal bycatch and other environmental impacts of fishing



Professor Hamish Spencer

**Teaching**

- Population genetics
- Evolutionary theory

**Research**

- The maintenance of genetic variation in populations
- The evolution and population genetics of genomic imprinting
- History of genetics, including eugenics
- Applications of phylogenetics to New Zealand taxa (especially birds and molluscs)
- Population genetics of epigenetic effects



Dr Sheena Townsend

(Professional Practice Fellow, 200 level Co-ordinator)

**Teaching**

- ZOOL 221 Animal Designs for Living
- ZOOL 222 Evolutionary Biology
- ZOOL 223 Animal Physiology
- ZOOL 411 Behavioural Ecology and Evolution



Associate Professor Yolanda van Heezik

**Teaching**

- Harvest management
- Biology and Behaviour of Marine Birds
- Wildlife management
- Conservation biology

**Research**

- Ecology of wildlife in urban areas
- Resource selection and habitat use
- Ecology of marine birds



Professor Graham Wallis (PhD Co-ordinator)

**Teaching**

- Genetics
- Systematics
- Population genetics and molecular evolution
- Speciation

**Research**

- New Zealand phylogeography and biogeography
- Genetics of hybrid zones
- Systematics of endemics
- Molecular evolution



Professor Jonathan Waters

**Teaching**

- Mendelian genetics
- Phylogenetics
- Conservation biology
- Phylogeography

**Research**

- Ancient DNA: extinction and recolonisation
- Genomics and evolution of alpine insects
- River capture and fish evolution
- Marine biology and dispersal



## FURTHER INFORMATION

For further information on the University of Otago and how to apply for an undergraduate course contact:

Schools Liaison Officer  
University of Otago  
PO Box 56, Dunedin 9054  
New Zealand  
Tel: 03 479 7375  
Email: [sandra.spence@otago.ac.nz](mailto:sandra.spence@otago.ac.nz)

For further information on planning your Zoology degree contact:

Assoc Prof Bruce Robertson  
Chief Undergraduate Student Adviser Department of Zoology  
University of Otago PO Box 56  
Dunedin 9054  
New Zealand  
Tel: 03 479 4110  
Email: [bruce.robertson@otago.ac.nz](mailto:bruce.robertson@otago.ac.nz)

For general enquiries about Zoology contact:

Departmental Secretary  
Department of Zoology, University of Otago  
PO Box 56, Dunedin 9054  
New Zealand  
Tel: 03 479 7976  
Fax: 03 479 7584  
Email: [ronda.keen@otago.ac.nz](mailto:ronda.keen@otago.ac.nz)  
Web: [otago.ac.nz/Zoology/](http://otago.ac.nz/Zoology/)



For further information contact:  
The Departmental Secretary  
Department of Zoology  
University of Otago, PO Box 56  
Dunedin 9054, New Zealand  
Tel 64 3 479 7976, Fax 64 3 479 7584  
Email [zoology@otago.ac.nz](mailto:zoology@otago.ac.nz), Web [otago.ac.nz](http://otago.ac.nz)