

NOVEMBER 2018

**AUT**

Pūtaiao i AUT  
**SCIENCE AT AUT**  
SUMMER UPDATE



# A MESSAGE FROM THE HEAD OF SCIENCE

Kia ora koutou,

Welcome to the second edition of our science newsletter for 2018, where I highlight the new programmes available to students next year.

AUT is now ranked first in New Zealand for global research impact and I'm very excited about 2019. We're offering three new majors within the Bachelor of Science and a completely new four-year direct entry degree, the Bachelor of Advanced Science (Honours). The new majors provide more options for those wanting to study science in a strongly student-focused environment and the new Bachelor of Advanced Science (Honours) will fill a gap in university options for the highest achieving students.

In 2019 we will also be continuing the mentor programme we introduced this year through which every student meets regularly with an academic in small groups (5-6 students) for the duration of their degree. Feedback from our students has shown that this mentor programme has made a significant difference to their sense of belonging and general wellbeing, along with providing practical solutions to little problems that crop up from time to time. The students that I mentor have told me they're impressed by how collaborative the learning environment is at AUT and how supported they feel, not only by staff but also by other AUT students.

I hope you enjoy reading this newsletter, and feel free to reach out to us if you have any questions about any of the majors or programmes covered below. I also look forward to hearing your thoughts on the professional development survey at the end.

Ngā mihi

## Professor Len Gillman

Professor of Biogeography  
Associate Dean, International  
Head of School, School of Science



Our science students have access to the latest technology and labs



Get out of the classroom with science field trips as far as the Antarctic



Nationally and internationally recognised lecturers



Collaborative and interactive classes

# A NEW SCIENCE DEGREE AT AUT

## Bachelor of Advanced Science (Honours)

The new four-year (480 points) Bachelor of Advanced Science (Honours) is a response to the needs of high-performing students. It provides direct entry for selected students from high school into a postgraduate degree.

Students can study some second-year papers in their first year, some third-year papers in their second year and some postgraduate papers in their third year. The fourth year consists of postgraduate papers and a one-semester research project.

### Entry requirements:

Admission is restricted to applicants who have completed NCEA level 3 with at least 260 points (or 310 in CIE, or 33 in IB) and at least 16 credits each in two of the following subjects: biology, chemistry, earth and space science, physics, science, calculus, mathematics and statistics.

### Why study this degree?

This new degree has several advantages over the standard route of doing a three-year Bachelor of Science followed by a one-year Bachelor of Science (Honours):



It gives high-performing students the opportunity to take on a greater challenge by completing a larger proportion of papers at higher levels than is possible by taking a Bachelor of Science followed by the Bachelor of Science (Honours).



The new degree contains a 60-point research component, whereas the standard Bachelor of Science (Honours) only has a 45-point dissertation.



Students completing the Bachelor of Advanced Science (Honours) with satisfactory grades will have direct entry into a PhD



## Bachelor of Advanced Science (Honours) specialisations

We are offering eight specialisations as part of this degree:

### Applied Conservation

The specialisation focuses on identifying and solving conservation problems through working with communities. For this reason, it includes papers on socio-ecological systems and conservation planning. It also includes papers in geographical information systems, which is proving to be an essential tool for conservation planning, along with biology and ecology papers normally associated with conservation.

### Biomedical Science

This specialisation develops the range of skills required for graduates to continue biomedical research in New Zealand and internationally. This specialisation is designed to reflect current needs of the pharmaceutical/nutraceutical industry.

### Chemistry

This specialisation develops the range of skills required for graduates to continue in chemistry research or to gain employment in industry both within New Zealand and internationally.

### Environmental Science

Environmental science is a strong research area within the School of Science and there has been strong growth in the environmental majors within the Bachelor of Science over the last few years. This specialisation includes papers in a broad range of areas, including marine biology, terrestrial ecology, plant physiology and animal behaviour.

### Food Science

Food science is one of the largest majors in the Bachelor of Science and one of the largest specialisations in the Master of Science. It's

particularly relevant for New Zealand, as food products make up the bulk value of our exports. AUT's School of Science has strong links to industries that provide students with research opportunities in the fields of food microbiology, food chemistry and sensory evaluation. Research opportunities for students within this specialisation include food microbiology, food chemistry and sensory evaluation.

### Geospatial Science

Geospatial science is a strong research area within the School of Science. We have pioneered high-resolution 3D mapping for conservation purposes using drones in Antarctica, Australia, Africa and New Zealand. Currently, we're developing a major partnership with NASA in the USA.

### Microbiology

We offer a curriculum of advanced coursework and research in molecular microbiology, environmental microbiology, food microbiology, microbial biotechnology and viral plant pathology. The School of Science has a number of international collaborations in this field that have involved extended exchanges of professorial staff.

### Molecular Genetics

This field of research has seen major technological advancements in recent years with ever-increasing career opportunities. Molecular genetics is a strong research area within the School of Science as it complements microbiology, environmental science, biomedical science and medical laboratory science. The state-of-the-art equipment provides a solid platform for our research and teaching in molecular genetics. Staff teaching in this major have strong international and national collaborations.

# NEW MAJORS IN THE BACHELOR OF SCIENCE

We have introduced three new majors that will staircase into the Bachelor of Science (Honours), Postgraduate Diploma in Science and Master of Science offered by AUT.

## Geoscience

Our Geoscience major emphasises aspects of geology, including geo-hazards and risk, geological applications to the environment, geological field skills, and rocks, minerals and the processes that produce earth materials. It focuses on the Earth as a planet and how it has evolved through 4.6 billion years of time. Different papers examine how the Earth formed, the early Earth, how continents were created and evolved, how life became an integral part of Earth systems and links between mountains, oceans, volcanoes, earthquakes and mineral deposits.

A Geoscience major in conjunction with AUT's Geospatial Science, Environmental Sciences, Applied Conservation or Marine Biology majors will produce strong degree combinations.

### Why major in geoscience?

The major will contribute to advancing educational opportunities and success in the diverse communities of Auckland and New Zealand by continuing to provide educational opportunities that meet the needs and aspirations of these communities. Society, culture and place are very important to all, but it is a fact that indigenous peoples such as NZ Māori, Australian Aborigines and Pacific Island peoples in particular place great emphasis on the inter-connectedness of land, place, people, deity and spirit-based religion, time, ancestors and culture. Geology as a highly space-time focused science, together with other disciplines, provides enlightening insights into this relationship.

## Molecular Genetics

This major is designed to stand alone as a Bachelor of Science in Molecular Genetics but also enables students to select it as part of a double major and complete a qualification specific to their areas of interest.

The Molecular Genetics major complements other majors, including Environmental Sciences, Applied Conservation, Marine Biology, Microbiology and Biomedical Science. Graduates with double majors including the new Molecular Genetics major will have enhanced employability.

### Why major in molecular genetics?

Because of the cross-over between genetics for population ecology, biogeography, taxonomy, biomedical science and medical laboratory science, the new major will increase the availability of inter-professional and multi-disciplinary study. This major will deliver skills for employers, particularly in conservation, biosecurity and biomedical science.

## Psychology

A Psychology major is currently offered elsewhere in the university, and is now also being offered within the Bachelor of Science, which means science students will be able to undertake other science subjects to complement their qualification.

### Why major in psychology?

This new offering within the Bachelor of Science will enable students to complete a double major in Applied Conservation and Psychology. NGOs such as Conservation International and government agencies like the Department of Conservation have an increasing need for graduates that can apply behaviour change theory and practice to better achieve conservation goals. This makes this double major a particularly useful combination.

# OUR LECTURERS

Our programmes are taught by experts in their fields, who combine practical experience with sound theoretical knowledge. Our academic staff are successful in conducting world-changing research and in developing new technologies. Their national and international connections with employers and research institutions help to provide graduates with excellent career pathways.



## **Professor Michael Petterson**

Professor Petterson's expertise in change management, strategic leadership and negotiation within a number of international environments placed him in good stead for the task of developing AUT's Geoscience major within the Bachelor of Science. He is carving out a new approach to geological study, combining excellent science with the human dimension to equip students not only with a good scientific grounding, but also with experience of the real-life application of geoscience.

Professor Petterson's ultimate goal is to inspire the next generation of scientists, and give them what they need to succeed and make a difference in the 21st century.



## **Dr Colleen Higgins**

Dr Higgins' area of expertise lies in the areas of plant viruses, plant molecular biology and molecular microbiology. She teaches in genetics, molecular genetics, bioinformatics and ethics. She gained her PhD at the University of London in 1989, and was later employed by the CSIRO in Canberra, Australia. Dr Higgins has also worked at the Queensland Department of Primary Industries and in the biotechnology industry as a senior scientist at Genesis Research and Development Corporation. Students undertaking the Molecular Genetics major will benefit greatly from her extensive experience in the field.



## **Dr Donnabella Lacap-Bugler**

Dr Lacap-Bugler is a senior lecturer who teaches papers in microbiology, molecular biology, general biology and applied sciences. Her areas of research expertise include the ecological and evolutionary dynamics of microorganisms, metagenomics, microbial stress and oral microbiology (human, equine and canine). Students can come to her with any questions about their science programme.

**Professor Michael Petterson, Dr Colleen Higgins and Dr Donnabella Lacap-Bugler are just three examples of the expert teaching staff here at AUT. The AUT School of Science employs a large number of New Zealand's best science researchers and thinkers.**

# SOME OF OUR STUDENTS

Find out a bit more about what some of our science students are getting up to below.

## Heather Braid

Research Fellow,  
AUT Doctor of Philosophy  
Master of Science



There's something romantic about doing science in the same way scientists have for over a hundred years, says Heather.

"I've always liked the idea of taxonomy – finding new species and naming things. There are very few places to do this type of research, and AUT has the highest concentration of squid taxonomists in the world, in a country that has one of the highest biodiversities of squid and octopus. Our lab has actually found over a dozen new squid species.

"For my PhD thesis, I used integrative taxonomy to study a few obscure squid families, which are highly abundant in the ocean but not well studied. This research will help improve our understanding of cephalopods here in New Zealand, and globally."



## Ticiana Fettermann de Oliveira

Master of Science student



For her master's research, Ticiana is using drones to study dolphin behaviour.

"My main research interest is the behaviour interactions of bottlenose dolphins, an endangered species in New Zealand. I'm investigating the use of small unmanned aerial vehicle (UAV) technology to safely collect behavioural data on these dolphins without harming them. My aim is to use this research to help develop best practices and guidelines for the use of drones in studies on marine mammals."

Ticiana came to AUT based on a friend's recommendation.

"A friend recommended AUT and as soon as I saw what she was talking about, I knew it was the place to be. AUT is a modern university with the latest technology and amazing student support."



# EVENTS

## FIRST-YEAR SCIENCE EDUCATORS COLLOQUIUM 2018

Mon 3 Dec - Tue 4 Dec 2018

We would like to invite you to FYSEC 2018 hosted by The University of Auckland and AUT. It is the only forum in New Zealand that brings together the instructors of first-year science students with secondary school science teachers to discuss the unique challenges they face and explore solutions.

Cost: Free. Spaces are limited.

[FIND OUT MORE](#)

## TELL US WHAT YOU THINK

We would like to invite you and your department colleagues to our City Campus for a free session on professional development in 2019.

Fill out our survey below and tell us when would suit you, and which topics you would be interested in learning more about. The survey should only take about two minutes to complete.

[TAKE THE SURVEY NOW](#)



[View our AUT LIVE highlights](#)

# NEWS

## Virtual reality

Members of the School of Science put up their exhibition at our open day, AUT LIVE, earlier this year. To demonstrate innovative methods to study the natural environment, geospatial staff Dr Bradley Case and Graham Hinchliffe used VR to offer a virtual fieldtrip. Prospective students were able to explore an historic lava flow on Rangitoto Island or the shores of Botany Bay in the Antarctic all from the comfort of the lab.

While we can't fit a VR kit into this newsletter, you can explore a Basalt flow on Rangitoto through [your web browser](#) (Chrome recommended).

Data collected during a student field trip led by Professor Michael Petterson. You can pick out Professor Petterson's trusty hammer which serves as a 30cm ruler.

## Making our way from Namibia to NASA

Over the past couple of years, School of Science Associate Professor Barbara Bollard has led expeditions to locations across the globe known for their extremes. She has battled the icy chills of Antarctica as well as the scorching heat of the Namibian desert – all with the goal of gaining some insights into how life flourishes in extreme conditions.

Rather than surveying the land on foot (and risk damaging the fragile environment), Barbara and her team use specialist drones – custom-made at an AUT lab to handle the elements – to photograph and monitor the landscape from the air.



[Check out the video](#)



# CONTACT US

In collaboration with the AUT Future Students Team, our science staff offer the opportunity to come into your school to talk about AUT's undergraduate programmes.

To find out more please contact the Future Students Team:

 [secondary.schools@aut.ac.nz](mailto:secondary.schools@aut.ac.nz)

 **09 921 9239**  
(Margaret Temese, Team Administrator)

**TOP**  **1.2%**  
UNIVERSITIES  
WORLDWIDE

**#1** IN NEW ZEALAND  
FOR  
**GLOBAL  
RESEARCH  
IMPACT**

 **90%**

9 out of 10 students would recommend AUT as a great place to study

 **5/5**

**QS STARS 2018/19**

For Employability, Facilities, Inclusiveness, Internationalisation & Teaching

 **60+**

60+ research centres and institutes with world-class expertise

**AUT**