Faculty of Science
TE WĀHANGA PŪTAIAO
“I’VE ALWAYS BEEN INTO THE ENVIRONMENT SO GEOLOGY SEEMED TO MAKE SENSE. YOU GET TO BE INTELLECTUAL BUT YOU ALSO GET TO BE EXTREMELY CREATIVE IN A SORT OF GEOMETRIC, SPATIAL SENSE. FOR ME, IT’S THE CLOSEST THING TO BEING AN EXPLORER YOU COULD POSSIBLY BE.”

YOU’LL FIND MORE ABOUT WHAT SAM WEBBER HAS TO SAY OF HIS EXPERIENCE AT VICTORIA AT WWW.VICTORIA.AC.NZ/SAM

KNOW YOUR MIND
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Welcome to Science at Victoria

I would like to welcome you to the Faculty of Science at Victoria University of Wellington. Victoria is one of New Zealand’s top universities in terms of both the quality of the student experience and the excellence of its research, as produced by one of the foremost groupings of scientists in New Zealand. I hope that you will be excited at the prospect of studying in the Faculty, and helping Victoria carry out its mission of educating the country’s next generation of scientists.

Victoria is one of New Zealand’s top research institutions. In the 2012 national assessment of research excellence it was ranked first in New Zealand. Furthermore, all Schools in the Faculty of Science were rated either first or second in their subject areas. Research is at the core of our learning and teaching and this is reflected in the content of your lectures and seminars, which will be delivered by some of the most respected academics in the world. Our staff are in demand around the globe, but first and foremost, they are at Victoria to use their knowledge and experience to shape your learning and ensure you have the best possible experience.

The Faculty is well known for its expertise in nanotechnology, and research success in this area is linked to the presence of the MacDiarmid Institute for Advanced Materials and Nanotechnology—a New Zealand Centre of Research Excellence—which has been hosted by the School of Chemical and Physical Sciences since 2003. Other areas of research strength are in the Antarctic Research Centre and the Climate Change Research Institute, each hosted by the School of Geography, Environment and Earth Sciences. The Faculty is also strong in applied research through the Ferrier and Robinson Research Institutes, which carry out research in the areas of drug discovery, and superconductivity and magnetism respectively.

Wellington is fortunate to have the highest concentration of scientific research organisations in New Zealand—the Malaghan Institute for Medical Research and Crown research institutes that include GNS Science, Callaghan Innovation, Environmental Science and Research and the National Institute of Water and Atmospheric Research. These organisations have close links with Victoria and contribute to our education and research programmes. These research collaborations enhance the experience we provide to our students, either directly through opportunities for research placements, by making sure that the content of our courses is at the cutting edge of knowledge, or indirectly through future employment opportunities.

Once again, may I take this opportunity to welcome you to the Faculty of Science, Te Wāhanga Pūtaiao, and wish you every success in your future study.

Professor Mike Wilson
Dean and Pro Vice-Chancellor
Faculty of Science, Victoria University of Wellington
Āwhina kaumātua welcomes you to Science at Victoria

Mā te rongo, ka mōhio; Mā te mōhio, ka mārama; Mā te mārama, ka mātau; Mā te mātau, ka ora.

Through resonance comes cognisance; through cognisance comes understanding; through understanding comes knowledge; through knowledge comes life and wellbeing.

Āwhina’s results in the Science, Technology, Engineering, Architecture and Design (STEAD) disciplines are phenomenal: 1,015 Māori and Pacific degree completions, including 27 PhDs, nine fully funded postdoctoral Fellowships, six secondary STEAD teachers and $8.3 million of nationally and internationally contested scholarships.

I continue to support Āwhina’s on-campus and outreach activities in low socioeconomic communities and secondary schools. They are initiatives that help break the deprivation and negative cycles of those communities. We especially need well-grounded Māori and Pacific STEAD graduates as positive role models and leaders who will contribute to their communities. Āwhina has produced many of these and is an excellent model for Māori and Pacific success in education. It is critically important that these successes continue.

Āwhina’s kaupapa (goal) to “produce Māori and Pacific scientists, technologists, mathematicians, statisticians, engineers, architects, and designers” will always remain a major focus for me. These knowledge-intensive disciplines are critical to Māori and Pacific whānau and communities, and Aotearoa New Zealand.

Doug Hauraki
Principal
Āio Whakatara Ltd
Turning up the success gene: the Āwhina effect

Kia ora, Fakaalofa lahi atu, Fakatalofa atu, Halo oketa, Kia orana, Malo e lelei, Mauri mauri mauri, Namaste, Ni sa bula, Talofa lava, Taloha ni.

Te Rōpū Āwhina (Āwhina) was created in 1999 to achieve Faculty of Science strategic equity goals. Āwhina extends across the Faculties of Science, Engineering, Architecture and Design, and is the on-campus whānau for Māori, Pacific and other Āwhina kaupapa-driven students undertaking degrees and majors in the Science, Technology, Engineering, Architecture and Design (STEAD) disciplines.

The kaupapa (goal) of Āwhina is Māori and Pacific community development, in part by producing a generation of leaders with expertise in the STEAD disciplines. Underpinning Āwhina’s successes (see www.emeraldinsight.com/books.htm?issn=1479-3644&volume=15) is the notion that it represents a significant shift in institutional culture (see www.springerlink.com/index/6644G08K8H657932.pdf). For example, while Āwhina whānau is accepted and supported by the STEAD faculties, it also has the autonomy to decide and implement its kaupapa in strategic and day-to-day work. Importantly, the whānau works alongside the communities from which it draws its members to enhance their capability and capacity in areas of interest to those communities.

The focus of Āwhina remains on academic success, career development and leadership roles for graduates and alumni in their chosen professions. Achieving these goals is critical to building the equitable society New Zealand needs to meet social, economic and environmental challenges.

For more information, see www.victoria.ac.nz/awhina

Vinaka va levu.

Liz Richardson
Deputy Dean (Equity)
Faculties of Science, Engineering, Architecture and Design
Successful initiatives for students

The Faculty of Science has a number of well-established, effective initiatives that focus on students working collectively to succeed and working with communities to improve secondary and tertiary educational outcomes.

**Equity-Help**

These weekly, subject-specific small-group sessions are available to all students struggling with 100-level science courses. Sessions are facilitated by senior undergraduate or postgraduate students with first-hand experience of all aspects of the course. Some facilitators are past Equity-Help attendees.

Students are expected to attend all course lectures, labs and tutorials and work together between Equity-Help sessions. Each year, up to 30 percent of students enrolled in 100-level science courses attend Equity-Help sessions. The pass rates and grades of regular Equity-Help attendees are always 15–20 percent higher than non-Equity-Help attendees.

Big Sister, the Science, Technology, Engineering, Architecture and Design (STEAD) online early alert tool, provides another level of support for students and is an important addition in a managed enrolment environment.

**Te Rōpū Āwhina**

Te Rōpū Āwhina (Āwhina) is the on-campus whānau for Māori, Pacific and other Āwhina kaupapa-driven students in the STEAD faculties. Āwhina whānau values are high expectations, aspirations and achievements, reciprocity and collective success.

The development of Māori and Pacific community STEAD capability is a key focus for Āwhina. Achievements include an iwi chief executive and an acting iwi director of Fisheries, Āwhina schools and Māori and Pacific Community Clusters, an incubator model to grow more Māori and Pacific STEAD professionals, an Āwhina research team to mentor and assist emerging Māori and Pacific STEAD researchers to develop strong partnerships with their communities through relevant research, and to disseminate Āwhina results through international and national publications, community hui and fono.

**Āwhina schools and community outreach**

These initiatives enable Āwhina mentors to work closely with pupils in low- to mid-decile secondary schools and the communities they come from. The development of the ‘Āwhina cluster’ of secondary schools and community groups that share the Āwhina kaupapa and whānau values is significant. The involvement of pupils’ whānau brings schools and community outreach together to engage with STEAD disciplines through hands-on activities. Large on- and off-campus Āwhina events attract 750 to 100,000 participants. Smaller annual ‘Cybrospace Summer Wānanga’ four-day events held in January involve a maximum of 40 Years 12 and 13 rangatahi (pictured opposite). All events expose participants to the breadth and depth of the STEAD disciplines, and viable STEAD-related career options.

Four essential outreach resources, three volumes of *Cybrospace* booklets and a *Step into STEAD* DVD with its “If we can do it so can you!” message, are designed to increase and normalise Māori and Pacific involvement and success in STEAD. All are available free from teropuawhina@vuw.ac.nz

Profiles from the *Cybrospace* booklets are available at www.victoria.ac.nz/awhina

For further information, contact:

**VIVIAN WEI**

Senior Administrator (Equity)
Phone 04-463 5987
Email vivian.wei@vuw.ac.nz
Make science your future

Tena koutou katoa, Nau mai haere mai.

Ko Shona de Sain ahau, Te Kaiako whakahaere hoamahi o ngā Tauira mo Te Wāhanga Pūtaiao.

E watea ana koe ki te Korerorerotia tā koutou ākoranga ia wā katoa.

A very warm welcome to the Faculty of Science, Te Wāhanga Pūtaiao, at Victoria University of Wellington.

We offer what we think is the best of both worlds in science at Victoria: a strong academic programme, delivered by staff passionate about their subject within New Zealand’s leading scientific community, combined with an absolute commitment to student support to enable you to reach your full potential—and all from the top research university in Aotearoa New Zealand.

Take your OE while continuing your study internationally on an overseas exchange programme. Apply for a Summer Research Scholarship of $6,000 (tax free) and undertake research at an external agency that, with approval, you can credit back to your degree; include an ‘outside major’ such as design or a language; and still complete your studies in three years, finishing with an overseas field course.

At Victoria we will educate you in science that is exciting, challenging and highly relevant, opening your eyes to new ways of thinking and the knowledge to help shape our future.

No reira.

Tenā koutou, Tenā tatou katoa.

Shona de Sain
Associate Dean (Students and Postgraduate Research)
Faculty of Science
shona.desain@vuw.ac.nz
Bachelor of Science

Victoria’s Bachelor of Science (BSc) offers you the depth of a strong science education in one or two specialised science subjects (majors) combined with the breadth to take a major from outside science, a significant interest area recognised as a minor, or to select a variety of elective courses.

The BSc is a flexible degree that will give you the knowledge and skills required for direct entry into the workforce or to continue on to postgraduate science study.

Employers recognise that science graduates with adaptable skills and the ability to think critically and creatively about challenging issues are especially suited to the jobs of the twenty-first century.

Science is a global discipline. Studying science at an overseas university can be a great experience—socially, culturally and academically—and looks great on your CV. See page 15 for more information on Victoria Overseas Exchange.

www.victoria.ac.nz/bsc

Science minor

Requires 60 points with one course at 300 level and at least two further courses above 200 level in the same subject.

Science in Context—a new minor

The Science in Context minor will develop and demonstrate your scientific literacy as well as your understanding of the role of science in society. It is based around a suite of courses that explore the relationship between science and different aspects of society while exploring scientific concepts as well as related societal fields such as history, philosophy, economics, social science, ethics and social psychology. This minor is available to students from all disciplines, and many of the approved courses are delivered fully online.

www.victoria.ac.nz/science-in-context

Forensic Science—an international minor

This minor is available to Victoria students in Chemistry, Biomedical Science, Cell and Molecular Bioscience during a semester of exchange study at the National University of Singapore.

http://vicoe.dotnous.com/#Singapore

BSc degree structure

Year one: 120 points

Major Major Major Major Elective Elective Elective Elective

*Year two: 120 points

Major Major Major Elective Minor Minor

*Year three: 120 points

Major Major Major Elective Elective Elective Minor

*For combinations of courses that are 15 points rather than 20, two further courses are required in each of years two and three. Courses can be shared at years one and two to meet major/minor requirements.

Major

Actuarial Science ** .............. 56
Applied Physics ................ 36
Biology .......................... 22
Biotechnology ................... 22
Cell and Molecular Bioscience .. 22
Chemistry ................. 34
Computer Science ............. 68
Development Studies ......... 42
Ecology and Biodiversity ..... 28
Electronic and
    Computer Systems ........ 68
Environmental Science* ........ 42
Environmental Studies ....... 42
Geography .......................... 43
Geology .......................... 43
Geophysics ......................... 44
Marine Biology ................. 26
Mathematics ...................... 52
Physical Geography ............. 44
Physics ............................ 36
Psychology ........................ 58
Statistics .......................... 55

*Must be taken in conjunction with another approved major.

**Subject to approval.
The Bachelor of Biomedical Science (BBmedSc) is a three-year degree linking the understanding of the fundamentals of modern molecular and cell biology with training in the clinical practices of current health services.

Biomedical science is an area of scientific research that looks at the relationships between humans, health and disease, including human genetics, immunology, pharmacology, and physiology and environmental health. Victoria’s close relationship with the Capital and Coast District Health Board and the on-campus Malaghan Institute of Medical Research (see page 25) ensures students gain first-hand experience of biomedical and clinical research.

BBmedSc graduates are equipped for a variety of biomedically related fields, such as work in the pharmaceutical industry and genetic counselling or management. Biomedical science also provides an excellent base for study at medical school or for postgraduate medical and clinical training programmes, as well as further biomedical science research degrees.

www.victoria.ac.nz/bbmedsc
Conjoint programmes

A BSc or BBmedSc degree can be combined with any other degree from Victoria under the conjoint programme. To remain in the conjoint programme you must maintain a B– grade point average (65–69 percent). Completing a conjoint degree gives you the benefit of requiring fewer courses than for two degrees completed outside the conjoint regulations. See www.victoria.ac.nz/conjoint-degrees for further information.

Three examples of conjoint programmes are outlined on this page.

Conjoint BSc/Bachelor of Commerce (BCom)
The conjoint BSc/BCom combines business skills and scientific knowledge that can prepare you for a variety of specialised fields.

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<th>Possible careers</th>
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<tr>
<td>BSc in Geography combined with a BCom in Public Policy</td>
<td>Work in national and international resource management, trade and enterprise and local government</td>
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<tr>
<td>BSc in Mathematics or Statistics combined with a BCom in Finance or Economics</td>
<td>Work in business and financial sectors</td>
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Conjoint BSc/Bachelor of Design Innovation (BDI)
The conjoint BSc/BDI combines scientific knowledge and technology with design skills and strategies that can prepare you for specialised fields of innovation.

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<th>Examples</th>
<th>Possible careers</th>
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<tbody>
<tr>
<td>BSc in Computer Science combined with BDI in Media Design</td>
<td>Work in web-based design, interactive media, computer graphics and the film industry</td>
</tr>
<tr>
<td>BSc in Physics combined with BDI in Industrial Design</td>
<td>Work in areas such as product interface design and physical interaction design</td>
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Conjoint BSc/BBachelor of Teaching (BTeach)
The four-year conjoint BSc/Bachelor of Teaching (BTeach) qualifies you to teach at any New Zealand primary or secondary school and also allows you to take your qualification and teach overseas for a period.

The conjoint programme combines university study, teacher training and curriculum studies, and features teaching experience in schools from the end of year one.

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<th>Examples</th>
<th>Possible careers</th>
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<td>BSc in Physics with Mathematics to 200 level/BTeach with curriculum studies in Science and Mathematics</td>
<td>Physics, science and maths teacher at secondary level</td>
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<td></td>
<td>Maths and science expert at primary school</td>
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<td>Science and technology role in education policy</td>
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<tr>
<td>BSc in Biology with Computer Science to 200 level/BTeach with curriculum studies in Science and Technology</td>
<td>Biology teacher in secondary school science and computer technology expert at primary school</td>
</tr>
<tr>
<td></td>
<td>Science and technology role in education policy</td>
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www.victoria.ac.nz/bcom
www.victoria.ac.nz/bdi
www.victoria.ac.nz/bsc-bteach
Postgraduate study

Studying at postgraduate level at Victoria within New Zealand’s largest science community is an excellent career move to be successful in science in New Zealand and worldwide.

You will benefit from the international expertise of Victoria’s academic staff, many of whom are also leaders in our research institutes. You will also have access to staff associated with Crown research institutes, private research institutes and the Government, many of whom give lectures and seminars at postgraduate level as well as supervising research projects and theses. Summer internships are also available.

Key
- Undergraduate
- Graduate (enables transfer on completion to postgraduate study in another subject)
- Postgraduate—course work and research (Honours/Master’s Part 1/Named course work Master’s)
- Postgraduate—research
Victoria Overseas Exchange

Victoria Overseas Exchange (Vic OE) offers both domestic and international students the opportunity to broaden their personal, academic and cultural horizons. Study towards your degree for one or two trimesters on an exchange to complete part of your degree at one of more than 100 prestigious exchange partners in over 30 countries. You can attend an institution overseas and study for credit towards your degree while still paying normal Victoria fees. Upon selection, you will be eligible for some funding assistance with the exchange. Participants in the Victoria International Leadership Programme (VILP) can count an overseas exchange as a component and can receive extra funding.

As a Faculty of Science student, you will have the opportunity to study in many locations worldwide (eg. Royal Holloway, UK; Technical University of Munich, Germany; University of Hawai’i, USA) at both undergraduate and postgraduate level. A list of institutions is at www.victoria.ac.nz/exchange/partners

www.victoria.ac.nz/exchange/apply

STUDENT EXCHANGE OFFICE, VICTORIA INTERNATIONAL
Level 2, Easterfield Building, Kelburn Campus
Phone 04-463 5667, 04-463 6794
Email vicoe@vuw.ac.nz
Website www.victoria.ac.nz/exchange

Genna Boyle
BSc graduate in Development Studies and Geography with a minor in Spanish

“I was lucky enough to go on a Vic OE for a year at Universidad Carlos III de Madrid, Spain, with support from the Dominion Post Global Citizen’s Scholarship. The vibrancy of Madrid, coupled with the amazing people I met, made this year without a doubt the best of my life to date.”

Genna was initially a little unsure of what course of study to pursue at university, but in retrospect, her three years at Victoria were “fantastic!” Her first year was spent studying a number of subjects across different faculties to gain an appreciation of what was on offer and enable her to decide what she wanted to pursue.

“I was drawn to Geography and Development Studies because of their relevance to creating a sustainable world. I am now pursuing a career through which I hope to develop innovative solutions to address the challenges the world is facing.

“Wellington is a beautiful city and I love living here. Victoria is a fabulous university with a range of great courses and a very high calibre of teaching. The stand out for me during my time at Victoria was the extra opportunities students have, such as Vic OE and VILP.”
Scholarships

Victoria has a range of scholarships and awards for students, including hundreds of scholarships awarded each year for school leavers.

The two main school leaver scholarships are the Victoria Excellence Scholarship (with at least 400 to be awarded for 2015) and the Victoria Achiever Scholarship (with 75 to be awarded for 2015). Both scholarships are valued at $5,000 for the first year of study. The top 20 Excellence applicants and the top five Achiever applicants will be awarded a $20,000 Vice-Chancellor’s Scholarship, over three years of study, provided a certain grade point average is maintained.

To see if you are eligible to apply, and for up-to-date information and application forms, see the Scholarships webpage

www.victoria.ac.nz/scholarships

Dean’s List

In recognition of high academic achievement in each year of study, you may be awarded a place on the Dean’s List. This is a significant award and is noted on your degree certificate. In 2013, over 8 percent of our undergraduate students achieved this award.

Scholarships and prizes for science students

Scholarships and prizes for science students

Science is one of the areas at Victoria that attracts a large amount of funding from valuable scholarships and prizes, at both undergraduate and postgraduate level. As well as the Victoria Graduate Awards, Victoria Master’s (by thesis) and Victoria Doctoral Scholarships, awards specifically for science students include the Curtis-Gordon Scholarships in Chemistry and the Ernest Marsden Scholarship in Experimental Physics.

Scholarships are also offered at all levels by Crown research institutes: for example, Callaghan Innovation, Environmental Science and Research (ESR) and National Institute of Water and Atmospheric Research (NIWA).

Wellington Rotary Club Science Prizes are awarded to undergraduate students studying Biology, Chemistry, Computer Science, Geography, Geology, Mathematics, Physics, Psychology and Statistics. www.rcw.org.nz

Tutoring positions and internships are offered through individual Schools to well-qualified students after their second year of study.
Summer Scholars Scheme
The Summer Scholars Scheme offers students an opportunity to acquire research experience during the summer break and insight into what studying for a research degree is all about.

If you are currently enrolled full time at a university and will have completed at least two years of your undergraduate degree, you can get a head start now!

Each research scholarship offers you a minimum tax-free stipend of $6,000 and the experience of working with established researchers at Victoria or in industry. You will be expected to conduct a research project of approximately 10 weeks’ duration (400 hours) under the supervision of an academic staff member or a research team.

www.victoria.ac.nz/summer-scholarships

Rachel Barrett
BSc student in Geophysics and Geology
Āwhina mentor

“I’m studying Geophysics and Geology, which combines my love of nature with that of physics and physical processes. I’m particularly interested in earthquakes, so New Zealand is one of the best places in the world for me to live and study!

“My summer research in 2013–14, which was supervised by Professor Euan Smith, involved researching slow slip events (SSEs). These events are similar to earthquakes but they happen over days to months, rather than instantaneously. I focused on SSEs in the Hikurangi margin, studying their variation and evolution with time.

“When I found out about the Āwhina whānau and the values they stood for, I was excited to get involved. I have enjoyed being part of this supportive whānau and helping others. I was honoured to be offered an Āwhina summer scholarship and I would encourage anyone who gets the opportunity to do summer research to take it up—it was an amazing experience!”
Human influence on climate change

Human influence on the climate system is clear—this is a key conclusion from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report. The report confirms that warming of the climate system is unequivocal, pointing particularly to observed changes since 1950, including warming of the atmosphere and oceans, decreases in the amount of snow and ice and rises in sea level. It also confirms and strengthens many of the findings from the Fourth Assessment Report, published in 2007.

Three climate science experts from Victoria played a central role in this latest global report on the state of the world’s climate. Professor David Frame, Professor Tim Naish and Associate Professor James Renwick were lead authors on Working Group One of the IPCC Fifth Assessment Report (AR5), Climate Change 2013: The Physical Science Basis.

Professor Dave Frame, director of the New Zealand Climate Change Research Institute at Victoria, said the report largely consolidates the findings of the previous report, due to improvements in climate modelling and observational records. “Thousands of recent scientific research papers have been assessed by the panel of more than 250 scientists, and the resulting report is the world’s most comprehensive evaluation of the science of climate change. The upshot is that globally, we expect further change in coming decades, consistent with the rate of change we’ve observed over the last 30 or 40 years,” he says.

The report also describes the changes observed to some of the world’s largest ice sheets. Professor Tim Naish, director of Victoria's Antarctic Research Centre, says, “It is very likely the Arctic sea ice cover will continue to shrink and thin as the region is expected to warm more rapidly than other areas of the world. In addition, the volume of the polar ice sheets and glaciers globally will continue to decrease, contributing to a global mean sea-level rise between 26–82 centimetres by the end of the century, depending on the greenhouse gas concentration pathway we end up following.”

Dr James Renwick, a Southern hemisphere climate expert, says that climate change will be ongoing this century and will bring significant changes to New Zealand and the Pacific. “By the end of this century, extreme heavy rainfalls are likely to become more intense and more frequent in many places, while at the same time the risk of drought is set to increase substantially, notably in the east and north of New Zealand. An increased frequency of high temperature extremes and fewer cold extremes is virtually certain almost everywhere.”
Uncovering the secret life of cats

Whether domestic cats living around Zealandia, Wellington’s urban sanctuary, are preying on native birds, lizards and insects should become clearer as a result of a project, jointly funded by Victoria and the Wellington City Council (WCC), and carried out by Victoria. It is believed to be the first study of its kind in New Zealand.

A pilot study for the project was undertaken last summer as a community partnership, with the cats taking part having been volunteered by their owners. Dr Heidy Kikillus, a post-doctoral fellow, along with Master’s student Mya Gaby, carried out the pilot project. Dr Kikillus says the idea for the study came from attending a public meeting held by Gareth Morgan early in 2014, where he called for Karori, where Zealandia is located, to become the first “confined cat only” suburb.

Dr Kikillus’ work is part of a three-year collaboration between the WCC and Victoria that is designed to explore issues around the city’s resilience, ecology and urban environment.

Mya said, “I was very fortunate to be offered this Summer Research Scholarship, funded through Victoria and the WCC, for the project titled ‘What does your cat get up to?’ The pilot study involved attaching small video cameras onto cat collars and observing domestic cat behaviours. The cameras were attached for several hours, twice a week to record what the cats got up to when no one was looking. I thoroughly enjoyed being part of this study and gained a variety of skills from the experience that was a great lead-in to my own post-graduate studies. I am extremely grateful to Victoria and the WCC for the opportunity.”

Many of Gareth Morgan’s opponents said that there is little New Zealand research on cat behaviour. The project is designed to provide information on the impact cats are having on native wildlife and will also give cat owners insights into what their pets are doing.

For more information on the domestic cat study, visit these Forest and Bird blogs:

School of Biological Sciences

Te Kura Mātauranga Koiora

New Kirk Building, Kelburn Parade
Head of School: Associate Professor Simon Davy
Enquiries: Room 506, Kirk Building
Phone   04-463 5207, 04-463 5339 or 0800 22 77 55
Email   biosci@vuw.ac.nz
Website  www.victoria.ac.nz/sbs

Study
Reasons to study in the School of Biological Sciences (SBS):

→ Courses and programmes across biology, biotechnology, biomedical science, ecology and biodiversity and marine biology are taught by research leaders.

→ The School was placed first in research quality in Ecology, Evolution and Behaviour and in Biomedical Science in the 2012 New Zealand Performance-Based Research Fund Quality Evaluation Report.

→ Areas of strength include biodiversity, cancer, conservation biology, drug discovery, marine biology, molecular evolution, neurobiology and systems biology.

→ A network of collaborators includes the Capital and Coast District Health Board, Department of Conservation, Environmental Science Research, Malaghan Institute of Medical Research, Ferrier Institute, Callaghan Innovation, National Institute of Water and Atmospheric Research, Te Papa and Zealandia.

Bachelor of Science majors
→ Biology
→ Biotechnology
→ Cell and Molecular Bioscience
→ Ecology and Biodiversity
→ Marine Biology

Bachelor of Biomedical Science specialisations
→ Human Genetics
→ Molecular Pathology
→ Molecular Pharmacology and Medicinal Chemistry

Other teaching areas
→ Clinical Research
→ Conservation Biology
→ Ecological Restoration
→ Marine Conservation
→ Molecular Microbiology

Major research centres and institutes
→ Centre for Biodiscovery
→ Centre for Biodiversity and Restoration Ecology
→ Malagahan Institute of Medical Research
It’s an exciting time for biological sciences

It is difficult to imagine a better time to study biology, the science of life. Recent advances in cell and molecular biology, along with a rising interest in biodiversity, conservation and the impact of humans on plant and animal communities, have provided momentum to a knowledge explosion that has dramatically changed the way we view our natural world. From genomics and proteomics, to physiology, ecology and evolution—the pace of discovery in the biological sciences over the past decade has been breathtaking.

It’s exciting for biology at Victoria too. The School was acknowledged in 2013 as the national research leader in our discipline by the Tertiary Education Commission. The School has state-of-the-art facilities that have been significantly enhanced by the addition of several sophisticated laboratories in the Alan MacDiarmid Building.

The School hosts two applied research centres, has strong ties with the on-campus Malaghan Institute of Medical Research and the Ferrier Institute, and has shared clinical and biomedical research facilities at Wellington Hospital and the Medical Research Institute of New Zealand. We are also closely linked with New Zealand’s science research community, much of which is based in Wellington.

Science and biomedical science graduates from SBS can expect to find employment in a variety of research, development, policy and technical positions at institutions including museums, government agencies, veterinary and clinical laboratories and a wide range of medical, ecological, marine, genetic, agricultural, pharmaceutical and biotechnological industries.

In addition to undergraduate courses, we teach many specialised Master’s and PhD programmes, including molecular microbiology, clinical research, conservation biology, marine conservation and ecological restoration. Our MSc and PhD graduates often gain employment as scientists in areas such as biochemistry, molecular biology, fisheries, entomology, marine and terrestrial ecology, conservation, medical research, crop research and forestry, as well as in teaching at tertiary level.

Welcome to our world—and your world.
Biology
A BSc in Biology enables you to take a wide selection of courses from across the biological sciences and provides a broad grounding in the subject. It is a great option if you want to combine Biology with another major in the BSc, or the BSc with another degree such as a BCom or LLB. The BIOL major is not recommended for students wishing to progress into a BSc(Hons) or MSc in Biological Sciences.

Many of the career options that apply to other majors also apply here. Some examples are teaching, technical positions, development and policy roles, management and communications.

Biomedical Science
The School offers the Bachelor of Biomedical Science (BBmedSc) degree, in which you specialise in one of Human Genetics, Molecular Pathology or Molecular Pharmacology and Medicinal Chemistry.

Biomedical science is a wide-reaching area of scientific research. It looks at the relationships between humans, health and disease, including human genetics, immunology, biological and medicinal chemistry, and physiology. The BBmedSc teaches courses in the fundamentals of modern molecular and cell biology relevant to the clinical practices of current health services.

BBmedSc graduates have the knowledge base to move into a variety of biomedically related fields, such as genetic counselling or management and the pharmaceutical industry. Further study can be undertaken in Victoria’s BBmedSc(Hons) and Master of Biomedical Science programmes. The degree also provides an excellent base for study at medical school, or for postgraduate medical and paramedical training programmes.

A Master’s programme in Clinical Immunology is planned from 2016.

Biotechnology
Biotechnology is the application of science and technology to living organisms. While it has been used for decades—to provide insulin for diabetes, for example—its potential is only just being realised by the public and by industry. With this major you have the opportunity to work at a technical level within a laboratory or industrial setting. You also consider cultural, regulatory and ethical issues associated with bringing biotechnological developments to the marketplace.

Cell and Molecular Bioscience
Cell and molecular bioscience is one of the most sought-after and exciting areas in modern science, and covers:

- Biochemistry and Molecular Biology—the science of living organisms at the molecular level
- Cell Biology—the structure and interactive function of cells in animals, plants and bacteria
- Genetics—the structure, function and regulation of genetic material
- Physiology and Pharmacology—the integrated function of human organ systems, cellular physiology and the effect of drugs.

A BSc in Cell and Molecular Bioscience, or a BBmedSc, provides a wide variety of employment opportunities. Environmental Science and Research (ESR) has research programmes in environmental toxicology and communicable diseases. There are medical research programmes in institutions such as the Malaghan Institute of Medical Research, the Wellington School of Medicine and the Medical Research Institute of New Zealand. These institutions offer jobs for technicians with BSc or BBmedSc degrees and for researchers with advanced research degrees.

Positions as laboratory assistants may be available in hospital clinical laboratories as well as in the pharmaceutical industry. There are also many opportunities for scientifically literate managers in business, government and local government organisations, particularly in related areas such as patent law and biosecurity.
Centre for Biodiscovery
The Centre for Biodiscovery is one of Victoria's research centres, and has major emphases on marine natural products, cell biology, microbiology, chemical genetics and proteomics. Our mission is to enhance human health and wellbeing through discovery of unique natural products and biological pathways and processes. Developing strategies for diagnosis and treatment of cancer, neurological and infectious diseases are areas of major emphasis.

Current research spans and interfaces the work of 17 members of the academic staff from the School of Biological Sciences (SBS) and the School of Chemical and Physical Sciences (SCPS), with up to 50 associated PhD and Master’s research students and externally funded research staff. The Centre’s strength is based on interactions that provide unique capability for New Zealand. There are multiple research links involving different combinations of the participating staff and their national and international collaborations.

www.victoria.ac.nz/biodiscovery
James Bell
Associate Professor in Marine Biology

With a PhD in Zoology from University College Cork, Ireland, James joined Victoria in 2006 as a senior lecturer in Marine Biology and programme director of the Master of Marine Conservation programme. He was promoted to Associate Professor in 2014.

“My primary research is focused on sponge ecology, specifically the potential for sponges to deal with climate change, ocean acidification and habitat degradation. There is increasing evidence worldwide that, as coral reefs are declining in response to human activities, sponge abundance is increasing and able to tolerate conditions that corals are not. Our primary research sites are in Indonesia and on the Great Barrier Reef in Australia, where I am working closely with colleagues at the Australian Institute of Marine Sciences.”

James’s other main research area relates to marine conservation and management. He teaches many aspects of applied marine biology, from marine reserve ecology, conservation and fisheries genetics, to invasive species ecology. His teaching is very much research-driven. He supervises PhD and Master’s students and believes it is important to provide students with skills, knowledge and experiences to prepare them for a range of future study or work opportunities.

Joe Bracegirdle
BSc student in Cell Molecular Bioscience and Chemistry

Joe came to Victoria from New Plymouth. Originally enrolled in a Bachelor of Biomedical Science, he is now in his third year of a Bachelor of Science, majoring in Chemistry and Cell Molecular Bioscience.

“I had always loved chemistry, right from a young age, and knew that I was going to take it into tertiary study. The fact that the theory we get taught can be observed experimentally right in front of our eyes really draws me into the field. I was told that Victoria had very strong Chemistry and Biology programmes, and I love Wellington, so the decision to come here was easy.

“The lecturers are very approachable, and the facilities and labs are more than we could ask for. The laboratory and the theoretical courses all fit extremely well together, and this helps us to get a clear understanding of the bigger picture.”

Joe also loves Victoria’s location being so central to the city. “There aren't too many other universities in New Zealand where you can do everything you need to as a student by simply walking.”
Malaghan Institute of Medical Research

The Malaghan Institute of Medical Research, on Victoria’s Kelburn campus, is New Zealand’s leading independent medical research facility.

“The Institute undertakes cutting-edge research into developing immunological approaches for treating cancer, allergy, parasitic disease and autoimmune syndromes,” says Institute director and Professor of Immunology at Victoria, Graham Le Gros. “For the foreseeable future the study of immunology looks set to continue to be one of the most exciting and active areas of biological discovery, impacting on human and animal health, biotechnology and science.

“We are also highly committed to the development of New Zealand scientists and clinicians. Victoria’s postgraduate biology students have a tremendous opportunity to do supervised research within the Institute. The experience they gain here means they can virtually walk into a job anywhere in the world.”

The laboratories at the Institute, purpose-built in 2004, range from containment systems for working with infectious materials to a controlled sterile laboratory in which researchers can produce clinical vaccines for patients.

Malaghan Institute staff participate in research activities and teaching within the School of Biological Sciences. Competitive summer internships are also available to Victoria science students.

www.malaghan.org.nz
Joanna MacKichan  
Senior lecturer in Microbiology

Joanna completed a PhD in Microbiology and Immunology at Stanford University, California, before becoming a Postdoctoral Fellow in the Department of Medicine, UCLA, San Francisco. She then worked for several years conducting research on infectious diseases at the Institute of Environmental Science and Research (ESR) before joining Victoria in 2013.

“My main research interest is the study of the interaction of bacterial pathogens with their hosts. The goal of our research is to identify and understand bacterial factors that make them more virulent. This research is carried out in two bacterial pathogens: Neisseria meningitidis (meningococcus) and Bartonella henselae, the vector-borne causative agent of cat scratch disease. Our research with N. meningitidis is taking place at ESR, and the work with Bartonella henselae is taking place at Victoria.”

Joanna teaches at undergraduate and postgraduate level in BMSC 117 Biology of Disease, BMSC 301 Medical Microbiology and MBIO 434 Honours Microbiology. She is also a staff member at the Centre for Biodiscovery.

Marine Biology

Victoria University is perfectly equipped to study Marine Biology with a campus close to the sea, the state-of-the-art Coastal Ecology Laboratory (pictured right) situated on the Taputeranga Marine Reserve and our own marine research vessels.

The School of Biological Sciences is one of New Zealand’s leading centres for marine biology research. Staff work locally in areas such as the establishment and review of marine reserves, coastal and tidal ecology, larval biology, fish ecology and fisheries science. International areas include sponge ecology, population genetics of marine animals, coral reef biology and ecology and Antarctic sea ice and plankton ecology.

When studying for a BSc in Marine Biology, you will learn about marine invertebrates and vertebrates, and marine plants and algae. You will gain an understanding of the marine environment through significant field studies and learn about marine resources through the study of aquaculture and fisheries.

A BSc in Marine Biology is ideal for work in areas such as fisheries, marine biodiversity, eco-tourism, marine conservation (in which New Zealand is a world leader), environmental sciences (including the atmosphere and climate change), marine law and public policy, and oil, gas and minerals exploration (New Zealand’s most lucrative marine industry) and its related technologies.

Growing opportunities exist with institutions such as NIWA and the Ministry of Fisheries, in areas such as fisheries, aquaculture and marine ecology. Iwi require expertise in these fields, as do regional and local councils.

A Master’s programme in Fisheries Science is planned from 2016.
Centre for Biodiversity and Restoration Ecology

Launched in 2006, the Centre is based in the School of Biological Sciences, but includes researchers from the Schools of Geography, Environment and Earth Sciences, Architecture and Design, Mathematics, Statistics and Operations Research, History, Philosophy, Political Science and International Relations, as well as research associates from institutions outside the University.

Research is undertaken on a wide range of topics under the themes of reservation, restoration and reconciliation ecology. Our specialist topics include: pest mammal management, other invasive species (plants and insects), urban, coastal and wetland ecology, translocation and meta-population management of threatened wildlife, and human dimensions of wildlife management, habitat and wildlife monitoring.

The main research themes for the Centre are:
- biodiversity conservation and monitoring
- pest mammals
- reconciliation ecology in human and natural landscapes
- habitat restoration (island, coastal, wetland and forest ecosystems)
- biological responses to climate change
- invasive species and biosecurity.

Keep current with the research and teaching in the Centre through the online writing of its members and students:

Research: [http://ecologyvictoria.wordpress.com](http://ecologyvictoria.wordpress.com)
Postgraduate teaching: [http://biol420eres525.wordpress.com](http://biol420eres525.wordpress.com)

Staff have teaching or research collaborations in place with many overseas universities. In New Zealand, the Centre collaborates with Zealandia, the New Zealand Centre for Conservation Medicine and with various zoos, including Auckland, Hamilton and Wellington. External funding comes from multiple sources including government ministries, local and regional councils, TBfree New Zealand and philanthropic donations.

[www.victoria.ac.nz/biodiversity](http://www.victoria.ac.nz/biodiversity)

Ecology and Biodiversity

There has probably never been a more critical time to study ecology. Many parts of the world are facing unprecedented problems resulting from human activities. These include polluted land and waterways, soil salinisation, ocean acidification, elevated UV levels, burgeoning atmospheric CO₂ concentrations and changes to the global climate. Ecologists worldwide are uniting in a concerted effort to address these problems with urgency. The study of Ecology and Biodiversity at Victoria includes the study of the impact on the environment and plant, animal and marine communities.

A BSc in Ecology and Biodiversity unites the subject of ecology—the interactions of living things and their environment—with the study of the animals and plants that make up various distinctive communities. Victoria is uniquely placed for the study of ecology, having good access to exceptional marine and terrestrial environments and to nearby Zealandia. In studying ecology you will be introduced to the physical processes (eg. climate, landforms) that influence ecosystems. You will also study animal behaviour, which relates to the way animal species organise themselves in communities, with many courses having a field component.

Ecology and biodiversity is a growing area of employment in New Zealand and overseas. Research or administrative positions may be found with the Department of Conservation, the Ministry for the Environment, Landcare Research, Plant and Food Research and the Environmental Risk Management Authority. Local and regional councils are also likely to need people skilled in the areas of ecology and biodiversity, as do iwi.

An international field course in Ecology and Biodiversity is planned for the future.
Shanna Rose  
**MSc student in Ecology and Biodiversity**

Shanna is in the second year of her MSc in Ecology and Biodiversity, balancing her study with being a teaching assistant for first-year animal biology laboratories. Her research is looking at how the interactions between New Zealand species can facilitate the spread of disease.

“During my previous career as a veterinary nurse, I became involved in the rehabilitation of injured, native birds. This experience reinforced a long-standing interest in New Zealand’s native fauna and the conservation of these unique animals. Studying the interactions between animals and their environments was a natural progression for my career and the study of Ecology was a perfect fit.

“Studying at Victoria has given me some amazing opportunities. I have studied lizard ecology on several beautiful offshore islands through my own research and through a summer scholarship with the Department of Conservation. I also had the opportunity to work with wētā and bats in the Eglington Valley, Fiordland.”

After her Master’s, Shanna hopes to enrol in a PhD in Ecology and eventually use her education to contribute to the conservation of New Zealand’s unique wildlife.

Peter Edwards  
**MSc student in Marine Biology**

**Āwhina mentor**

“I’ve grown up around the ocean and I’ve always been fascinated by marine life. I’m currently in my first year of a Master’s degree, studying the effects of suspended sediment on the growth of fish.

“I am the first in my whānau to go to university. I have six siblings and I hope I can set an example for my younger brother and motivate him to go to university.

“Āwhina supported me when I was a mentee in my first year at Victoria. I became a mentor in my second year, and had knowledge to give back to the whānau. I enjoyed being involved in Āwhina outreach and Cybrospace events; it’s exciting to see some of those kids coming through the Victoria University Coastal Ecology Laboratory Marine Incubator.

“I hope to work for my iwi—Ngāi Tahu, Ngāti Toa and Ngāti Kahungunu—and pass on my knowledge as a Māori marine scientist.”
Ariane Chan
Matakina Technology Limited

“Science has always been one of my strongest subjects, and I knew from early on that I would do something science related. I actually started studying veterinary science but soon realised that isn’t for me, and returned to Wellington. I became interested in drug development and the Molecular Pharmacology and Medicinal Chemistry specialisation at Victoria sounded perfect. After finishing my BBmedSc, I approached Professor John Miller, who wanted a research assistant to work on Peloruside A, a novel compound Victoria was developing for potential anti-cancer use. Everything just fell into place and I ended up doing Honours and a PhD studying the cellular mechanisms underlying Peloruside A's anti-cancer effects.

“Choosing to do a PhD, in any field, is a huge commitment. I was very lucky to have such an amazing supervisor in Professor Miller and be able to work with some extremely talented and passionate individuals with whom I shared the ups and downs of lab-based research. Shortly after I started we moved into the new Alan MacDiarmid building and it was great being able to do research in brand-new labs. Victoria definitely gave me some great experiences and also the skills to transition into the ‘real world’. One real benefit of studying science at Victoria, was that I had to learn to think outside the box and be a bit more innovative in the way I carried out my research.”

Ariane was about to finish her PhD when she went on a site visit organised by the student-led Victoria group, Chiasma. The medical device company they visited, Matakina Technology Ltd, happened to be advertising for a research coordinator. “My job application was successful, and after six months I was permanently employed as their Global Medical Affairs Lead.

“I help manage strategic research activities and it’s important that I have a good grasp of the industry and all relevant research. The communication, data analysis and critical thinking skills that I acquired from Victoria have served me very well at work.”

Ariane took the difficult decision to go from a research environment to industry and though she is not now actively researching, she has no regrets about her PhD. “Victoria PhD graduates gain such a diverse skillset, and regardless of whether I chose to stay in academia or follow the industry route, I would have been more than capable of succeeding. Aside from cold southerlies, Wellington’s a great place to live! It’s hard to beat the coffee.”
Study

The School of Chemical and Physical Sciences (SCPS) offers:

- modern chemistry and physics departments with a vibrant academic atmosphere and well-equipped laboratories
- exposure to cutting-edge theoretical concepts and experimental techniques
- research-led teaching with a strong interdisciplinary focus
- access to state-of-the-art research equipment for senior undergraduates
- strong and effective learning support.

The School hosts the MacDiarmid Institute for Advanced Materials and Nanotechnology.

Bachelor of Science majors

- Applied Physics
- Chemistry
- Physics

Major research institutes

- Ferrier Research Institute
- MacDiarmid Institute for Advanced Materials and Nanotechnology
- Robinson Research Institute

Chemistry and physics the cornerstone of technological society

Victoria’s School of Chemical and Physical Sciences (SCPS) is world renowned for its teaching and research in pure and applied chemistry, physics and related areas such as materials science and nanotechnology. You’ll find the School a great place to study, with modern, well-equipped laboratories and supportive academic staff.

Our courses are taught by world-class researchers, many of whom have received prestigious national and international science awards. In 2000, Victoria alumnus the late Professor Alan MacDiarmid was awarded the Nobel Prize in Chemistry. His Nobel Medal is on display in the Alan MacDiarmid Building, which houses a number of modern laboratories for researchers from the School.

Our teaching is innovative, interactive and inspired by research, and we believe in developing the intellectual curiosity and leadership qualities of our students. Senior undergraduates and research students tutor in first-year laboratories, which is an invaluable learning experience for all involved. Equity tutorials, run by senior students, and a special Physics Helpdesk, are available for students who need assistance.

The School maintains strong links with the Schools of Geography, Environment and Earth Sciences and Biological Sciences, particularly through the Bachelor of Biomedical Science (BBmedSc) and the Centre for Biodiscovery. There are good collaborations with the Malaghan Institute for Medical Research, located next to the School at the Kelburn campus.

Wellington has New Zealand’s highest concentration of scientists, particularly in chemistry, physics and technology, and the School interacts closely with Crown research institutes, notably GNS Science and NIWA.

Come and be at the cutting edge of science.
MacDiarmid Institute for Advanced Materials and Nanotechnology

The MacDiarmid Institute for Advanced Materials and Nanotechnology is New Zealand’s premier materials research organisation. Science projects undertaken in the Institute are focused on controlling and manipulating materials from the atomistic through to the macroscopic length scale. Electronic, optical, molecular and soft materials are synthesised and investigated. Linkages between the physical and biological worlds at the nanoscale and the interplay of theoretical and experimental frameworks are established and utilised to advance our knowledge.

Named after 2000 Chemistry Nobel Laureate and Victoria alumnus, the late Alan MacDiarmid, the MacDiarmid Institute is one of seven Centres of Research Excellence originally established by the New Zealand government in 2002–03 and formed in recognition of its importance to the scientific and economic advancement of New Zealand. In 2014, the MacDiarmid Institute obtained funding for another six-year period based on its successful rebid as part of a competitive selection process administered by the Royal Society of New Zealand.

A collaborative venture between Victoria, Canterbury, Massey, Auckland and Otago Universities, Callaghan Innovation and GNS Science, the MacDiarmid Institute encompasses the knowledge and expertise of leading researchers throughout the New Zealand scientific community.

Led by Victoria’s Professor Kathryn McGrath, the Institute works closely with staff and students at Victoria’s School of Chemical and Physical Sciences in a wide range of research programmes including opto-electronics, superconductivity, organic conductors, light harvesting, biomaterials and energy storage materials.

www.macdiarmid.ac.nz
Nicola Gaston  
Senior lecturer in Chemistry

With a PhD from Massey and having previously worked at the Max Planck Institute for the Physics of Complex Systems in Dresden, Germany, and IRL, Nicola came to Victoria in 2012. Her areas of research are in quantum chemistry in nanomaterials and physical and quantum chemistry.

“My main research interest has developed out of my Marsden Fast Start grant, where we looked at how we can explain the strange way that melting temperatures can increase when you decrease the size of a particle. We showed that each electron makes a difference to the melting temperature when you make a material small enough—and now we are applying our models for electronic structure to a range of nano-sized systems. We use a lot of computational infrastructure for these calculations, both the Science Faculty computer cluster and the National eScience Infrastructure, NeSI.”

Nicola is a principal investigator in the MacDiarmid Institute for Advanced Materials and Nanotechnology and the president of the New Zealand Association of Scientists. She teaches undergraduate and postgraduate Chemistry and supervises postgraduate students in both Physics and Chemistry programmes.

Chemistry

Chemistry is everywhere. It underlies all the functions of the human body, the physical and biological world, our food, the consumer goods we use, pharmaceuticals, the buildings we live and work in, the energy we generate and consume and the air we breathe. It also underlies new nanomaterials and nanotechnologies that are intense areas of global development.

Chemistry is a pivotal science, and at Victoria, a Chemistry major provides comprehensive knowledge and skills covering theory, practical laboratory courses and real-world applications. The teaching programmes are led by academic staff with international research reputations.

The career opportunities in chemistry are enormous. Graduates are employed in pharmaceutical industries, biomedicine and biotechnology, analysis and monitoring, environmental protection, teaching at secondary and tertiary level, service industries, government departments, the energy sector and a wide range of manufacturing, from agriculturally based industries to advanced materials and nanotechnology.

In industry, chemists are involved in the research and development of new materials, products and processes, process optimisation, production management, process and environmental monitoring and quality assurance.

If you are thinking about a management career in industry, the conjoint BCom/BSc with majors in Chemistry and Management or Marketing would be an excellent choice, as would progressing to the new Master in Advanced Technology Enterprise. If you are considering a career in research and development, you usually need a BSc(Hons), MSc or PhD degree. In New Zealand, research is carried out mainly in universities and Crown research institutes, but industry plays an increasingly important role. Staff in the School have strong international connections and postgraduate students are encouraged to interact with the international chemistry research community and attend and present their work at international conferences.
When Alex came to Victoria from high school in Whakatane, she was looking for something that would appeal to both her humanities and scientific interests. She found that Chemistry was well suited to her mind as it required her to think mathematically and also be able to explain concepts in writing.

“I was drawn to the Chemistry programme at Victoria after hearing about the work of Professor Jim Johnson and Kerstin Lucas on wool fibres dyed various colours for high fashion garments using only gold nanoparticles—the scientific side of something so creative really interested me.

“The greatest opportunity I have gained from being at Victoria has been the opportunity to enrol in a conjoint BSc in Chemistry and an LLB. The possibilities that combine both Law and Chemistry seem endless and could change at any moment. I have considered continuing my Chemistry further with Honours or a Master’s degree, but I am also considering going into patent law, with a focus on pharmaceuticals.”
Physics and Applied Physics

Physics is the study of matter and energy in all their forms: from the kinetic energy of a speeding car to the nuclear energy released by fusion in the core of a star. The concepts you learn in physics can be applied to mechanical, electrical, magnetic, astronomical, chemical and biological situations. The principles of physics are essential in many applied disciplines such as engineering, architecture, environmental studies and information technology.

In addition to the long-standing BSc major in Physics, the School of Chemical and Physical Sciences also offers a major in Applied Physics. The Physics major gives a thorough grounding in all aspects of physics, including quantum mechanics, electromagnetism, thermal physics and condensed matter physics. The Applied Physics major includes the application of physics to, for example, the environment, energy issues, electronics and modern materials science.

Physics is also an integral component in the Electronic and Computer Systems Engineering specialisation for the Bachelor of Engineering Honours (BE(Hons)).

The School is a leader in many areas of physics research, including condensed-matter and materials physics, magnetic-resonance imaging and spectroscopy, nano-electronics and optics, radioastronomy, environmental/geophysics, theoretical physics and educational physics.

There are many exciting collaborative research projects with chemistry staff within the School, with biology and engineering staff from outside the School and with Crown research institutes, Wellington Hospital and national and international astrophysics consortia.

Physics graduates are employed in technology-focused companies (in management or in research and development), government laboratories, hospitals (as medical physicists), traffic and aviation engineering and teaching. Some move into related fields such as environmental or Earth science, meteorology, finance/economics or computing.
New Zealand Physics Teachers’ Resource Bank

Check out the New Zealand Physics Teachers’ Resource Bank, an online resource established by Victoria Physics lecturers and students to provide interesting and fun physics experiments, demonstrations and activities for secondary schools and universities. Thermodynamics, mechanics, fluids, electricity, optics, oscillations and waves, modern physics—it’s all there and more is on the way. The website also hosts online physics demonstrations in te reo Māori—a first for Aotearoa New Zealand.

www.victoria.ac.nz/scps-demos

Ferrier Research Institute
Robinson Research Institute

Two Callaghan Innovation research teams joined Victoria in early 2014 as the Ferrier Research Institute led by Professor Richard Furneaux and the Robinson Research Institute led by Professor Bob Buckley. These teams will further strengthen the University’s research capabilities, particularly in the fields of biomedical science, chemistry, physics and engineering.

www.victoria.ac.nz/ferrier
www.victoria.ac.nz/robinson

Eric Le Ru
Associate Professor in Physics

After completing a PhD in Physics at École Polytechnique in Paris, Eric worked at Imperial College London on semiconductor quantum dots for telecom applications. He moved to Victoria in 2004 as a postdoctoral fellow of the MacDiarmid Institute, working with the late Professor Pablo Etchegoin, before becoming an Associate Professor in Physics.

“My research focuses on both theoretical and experimental aspects of nano-photonics, with a particular emphasis on nano-plasmonics; that is, the study and applications of the optical properties of sub-wavelength metallic objects, and related applications in surface-enhanced spectroscopies (Raman and fluorescence). Our work in the Raman Laboratory at Victoria has in particular been at the forefront of research on single-molecule detection via Raman spectroscopy.”

Eric was awarded a Rutherford Discovery Fellowship in 2010 and the New Zealand Association of Scientists Research Medal in 2012. He teaches Quantum Mechanics at Honours level and supervises several PhD students.
Hamish Hirschberg
BSc student in Physics and Geophysics

Hamish is in his final year of a BSc in Physics and Geophysics. He chose to study at Victoria because of the quality of the Physics and Geophysics programmes, and because it wasn’t far from his home on the Kapiti Coast.

“I have always had an interest in many areas of science. In recent years, this interest has focused on topics such as seismology, plate tectonics and quantum physics. Studying Physics and Geophysics has allowed me to pursue and learn more about these interests.

“At the end of my second year, I was awarded a Summer Research Scholarship to look at the 2013 Cook Strait earthquakes. This was a great opportunity to get some first-hand experience of research and to get contacts that could prove useful looking ahead to postgraduate study. I was also awarded a Victoria Excellence Scholarship before I started, which has significantly reduced any financial pressures.”

Hamish hopes to become a researcher, hopefully at a university, so that he can pass on his passion and knowledge to future students.

Rhia Stone
MSc student in Chemistry
Āwhina mentor

“I’m currently studying towards a Master’s in Chemistry. I admit I’m a bit of a ‘studyholic’. I enjoy academia and I love university life.

“I enjoy Chemistry because it just makes sense to me and I love the hands-on element. Chemistry can be difficult, but the material does get easier as you progress from first to third year.

“It was difficult settling into first year and not knowing anyone. But Āwhina offered a whānau environment where I could meet new people and give back as a mentor. I found that being a postgraduate student also offered a supportive environment, and it’s cool when lecturers know you by name.

“I’ll finish my Master’s degree at the end of 2015. I hope to do a PhD and then postdoctoral study overseas. There’s always new stuff to learn.”
Martin Heeley
Medicines evaluator, Ministry of Health

Martin Heeley is a medicines evaluator at the Ministry of Health. “I
am in a team that assesses the safety, quality and effectiveness of all
prescription medicines and some over-the-counter medicines proposed
for supply in New Zealand. We also assess any changes to currently
supplied medicines in New Zealand.”

Medicines evaluators assess the medicines through extensive analysis of
data supplied by the organisation that wishes to supply the medicine in
New Zealand. The data can be as little as a few pages for a minor change
or boxes full of ring-bound dossiers for new medicine applications.

“Depending on the change proposed, we could be evaluating against
appropriate international guidelines such aspects as:

→ labelling or container design and assurance that the medicine is
compatible with the proposed packaging
→ transportation of reagents or substances between manufacturing
plants
→ sterility and safety maintenance
→ medicine stability and shelf-life
→ formulation of medicines (strength, dose form and non-active
ingredients)
→ the source, manufacture and quality of active ingredients
→ quality control testing completed by a manufacturer
→ proof that the quality control testing is accurate
→ reproducibility and quality assurance of the manufacturing process.

“As a medicine evaluator, most of our work is pre-market assessment,
evaluating the new or changed medicine before it reaches the market.
We work closely with many of the other branches of Medsafe, such as
clinical risk and compliance, to ensure New Zealanders get the best
possible access to safe and effective medicines.”

Martin has a Master of Science in Chemistry from Victoria that was
directly relevant to his appointment to the Ministry. He originally started
studying for a Bachelor of Science and Technology but converted to a
Bachelor of Science in his second year and then went on to complete a
BSc(Hons) before embarking on study for his Master’s degree.
Study

The School of Geography, Environment and Earth Sciences (SGEES) is New Zealand’s leading research school in earth science and geography. It has:

- close relationships with key national organisations based in Wellington, such as GNS Science, NIWA, the MetService and various government departments
- strong collaboration with institutions in the Pacific, Southeast Asia and Latin America
- strong and effective learning and research that cuts across interdisciplinary boundaries
- field-based and lab-based study in geoscience
- postgraduate study in meteorology
- key research affiliations in Antarctic science and climate change.
How environments and human activities interact

The School of Geography, Environment and Earth Sciences looks at these relationships in lectures and in the field—two very different learning environments.

Our students come from different backgrounds and nationalities, and our staff members are highly acclaimed—nationally and internationally—for their excellence in teaching and research.

We have excellent relationships with key national organisations based in Wellington such as GNS Science, NIWA, the MetService and the Earthquake Commission, and with local and national government and non-government organisations (NGOs). These institutions provide excellent resources; for example, in the study of urban and population geography and the geography of social and economic change in New Zealand. Development Studies takes full advantage of these and has ongoing research projects in the Pacific, Malaysia and Chile. Environmental Studies draws together areas of study as diverse as ecology and biodiversity, economics, environmental law, Māori resource management, sociology and social policy, and political science.

If you’re studying physical geography, geology or geophysics, where better than Wellington, situated within a major faulted region, within easy access of the volcanic plateau to the north and many other unique geological, geographic and climatic features. We believe that all of these subjects are linked. To address the key issues of today requires a deeper understanding of the interaction between the physical and cultural environment. Our programmes of study therefore provide maximum opportunity for students to explore the interconnectedness of the environment, society and the economy.

Similar principles underpin our extensive postgraduate programme, where students engage in research projects of national and international importance—and it’s the only university in New Zealand where you can study a postgraduate qualification in meteorology.
Development Studies
Where in the world do Asia, gender studies, Latin America, earthquakes, the Pacific Islands and globalisation meet? The answer is a BSc or BA major in Development Studies, the first major of its kind in New Zealand.

In the Development Studies programme you can study almost any aspect of the development of human societies and their relationship to the Earth. This multidisciplinary field examines the inequality between people and nations and the ethical issues that poverty and inequality create.

Development Studies combines the approaches of the social sciences (geography, economics, sociology, anthropology and psychology) to find out why there are vast differences in living standards, how the inequalities between countries and within countries occur and how to provide solutions to reduce poverty and promote greater equality.

Because Development Studies investigates the world and the people who live here, it encourages you to be confident and tolerant with cross-cultural issues, and to analyse and solve global problems. A student exchange programme to another country can provide unique insight into another culture while complementing your Victoria degree.

An understanding of the issues of poverty and social inequality can lead to many diverse and interesting career opportunities locally, nationally and internationally in government and non-government organisations.

Studying the environment
The School offers two majors for students interested in studying the environment. Students who are primarily interested in learning about the science and scientific issues of the environment can enrol in an Environmental Science major. Those interested in learning about the social, management and policy dimensions of the environment can enrol in an Environmental Studies major.

Environmental Science
Environmental Science is a major offered across the sciences, drawing on the extensive expertise of staff in the Faculty of Science and from the science community of Wellington.

Graduates of the Environmental Science major will have obtained one of the highest quality BSc degrees available, as they will have the opportunity to combine a physical, biological, mathematical or earth sciences major with the Environmental Science major.

The Environmental Science major in the BSc is unique because it requires both a research project and a further core 300-level course in which Environmental Science topics are selected that complement the partner major, and is taught by experts in that particular area of environmental science research.

Environmental Studies
If your interests in the natural world are diverse and your passions for it are strong, a major in Environmental Studies is for you. You can study a range of topics from architecture to Māori resource management, from Antarctica to urban land use. You can study almost anything to do with the environment, from a scientific, social, cultural or economic perspective.

This multidisciplinary nature is reflected in the wide range of courses with environmental content offered for the degree, including courses in Architecture, Biological Sciences, Design, Earth Sciences, Law, Economics, Geography, Māori Studies, Marine Biology, Political Science and Public Policy.

This range reflects the breadth and depth of expertise at Victoria and the University’s recognition of the importance of environmental issues to our future. The growth in environmental awareness creates many career opportunities in local and national government and the private sector.
Geography
Geography is the study of what places are like and what gives them that character. Geography has a broad appeal, from general world issues and the environment, to specialist qualifications in, for example, cultural studies, geographic information systems, land management, hydrology, environmental monitoring and urban transport policies. Geographers have many opportunities for fieldwork and research in exotic places.

Geography courses are full of field trips—you may find yourself out and about studying such diverse topics as conservation and development on the West Coast, globalisation in Wellington, the landforms and hydrology of Wellington, the geomorphology of the central volcanic plateau and the biogeography of the Nelson Lakes region.

Students from more than 20 countries in our graduate programmes are working internationally on such topics as human rights in Fiji, food security in French Polynesia, famine in Ethiopia, poverty in Chile, migration in Easter Island, environmental problems in Malaysia and globalisation in India.

Geology
Geology brings together a range of science subjects—Physics, Chemistry and Biology—in order to understand the makeup and history of the Earth. It looks at the Earth’s internal structure, plate tectonics, earthquakes, mountain building and volcanic eruptions. It also covers the origin and evolution of life, the extinction of the dinosaurs, the formation of sedimentary basins, climate and sea-level change, glaciation and landscape evolution. Importantly, it considers the origin and conservation of the Earth’s natural resources, such as minerals, fossil fuels, soils and water.

Nowhere on Earth are active geological processes more obvious and accessible than in Wellington. That it sits between two active faults on a major plate boundary and is only a few hours’ drive from the North Island’s active volcanoes is a bonus. Being a ferry ride away from the Marlborough Sounds and the South Island makes the region internationally famous as a natural laboratory in which to study earth movements, faulting, earthquakes, landscape development and many other active geological processes.

Geology appeals to you if you enjoy a mix of laboratory and field-based studies. After completing your degree you will be able to find employment in resource companies around the world. You may also wish to continue your research at Victoria and laboratories in New Zealand or overseas. Geological training is also very useful for a career in teaching or in government departments.

Juliet Sefton
MSc student in Geology

Juliet is in the second year of her MSc in Geology, looking at past sea-level change recorded in marine sediments from the Wanganui Basin. She also finds the time to reach out to students who may need a little help, through her involvement in the School of Geography, Environment and Earth Sciences Student Wellbeing Support Group.

“The fantastic thing about Geology is even though the rocks we study hold a record of what has happened in the past, analysing these records and the processes behind them has huge application and benefit to understanding how our environment is changing today and how it might do in the future.

“New Zealand really is one of the best places in the world to study Geology—we have it all, from volcanoes, earthquakes, mountains, rivers, ice, all kinds of rocks—and Victoria is right in the middle of it all!”

Juliet also worked on soils from the Dry Valley in Antarctica as part of a Summer Research Scholarship.
Physical Geography

Victoria is the only institution in New Zealand to offer an undergraduate major and a graduate programme in Physical Geography.

Physical geography is the understanding of the interaction of processes involving the Earth’s climatic system, oceans and landforms, animals, plants and people. It is the scientific study of relationships between the various earth surface processes that have a bearing on economic, social and environmental sustainability.

You will undertake courses in the study of the environment, hydrology, glaciology, climate and climate change, techniques for geographic analysis (GIS), natural hazards, Quaternary glaciation and coastal and land management. Field and laboratory work lie at the heart of many of these courses. Graduates in Physical Geography are highly regarded by employers because of their breadth of knowledge and skills and their adaptability to a broad range of employment situations, making them highly employable.

Geophysics

Geophysics uses physics and mathematics to explore the mysteries of the sky above us and the ground beneath our feet. Geophysicists work at understanding some of the biggest and most exciting physical phenomena we know—such as earthquakes, volcanoes, mountain-building, the Earth’s magnetism, gravity, the deep structure of our land and New Zealand’s and the Earth’s atmosphere and weather.

A BSc in Geophysics usually focuses in one of two areas: meteorology, the science of weather and the Earth’s atmosphere; or solid earth geophysics, the structure and properties of the Earth. A degree in Geophysics provides a good background for postgraduate training in meteorology, taught only at Victoria in conjunction with staff from the MetService.

Recent graduates in Geophysics have found employment in emergency management, oil and mineral exploration, the IT industry, weather forecasting, engineering, seismology and, with a postgraduate qualification, in research laboratories.

Wokje Abrahamse
Lecturer in Environmental Studies

After obtaining a PhD in Social and Behavioural Sciences at the University of Groningen, the Netherlands, Wokje took up postdoctoral fellowships in England, New Zealand and Canada. She was appointed as a lecturer in Environmental Studies at Victoria in 2013.

“My research focuses on human behaviour in relation to environmental issues. I study the barriers people may have to engage in environmentally friendly actions. I also evaluate the effectiveness of various approaches (such as information campaigns) to encourage environmentally friendly behaviours, to find out what works, what doesn’t work so well, and why.

“In our Environmental Studies programme we encourage students to view environmental issues from different perspectives. My students come from a range of majors and backgrounds. This diversity in the classroom is a great way to highlight the importance of interdisciplinary approaches.

“I am passionate about facilitating learning for students with disabilities. I have a visual disability myself, and know from experience that a little extra support can make all the difference.”
New Zealand Climate Change Research Institute

The New Zealand Climate Change Research Institute (CCRI) develops interdisciplinary climate change research, with particular emphasis on work that spans the natural and social sciences. Our aim is to produce high-quality, decision-relevant climate change research, and to deliver this to private and public sector decision-makers in New Zealand and overseas.

To do this, CCRI draws on the skills and experience of high-quality researchers in New Zealand and abroad to produce collaborative research that is of international scholarly significance, as well as of policy relevance. We work closely with New Zealand’s Crown research institutes and universities to enhance the capacity of New Zealand to govern, anticipate, mitigate and adapt to climate change. The Institute comprises a small core team, a local network of senior adjunct positions, a Victoria University network of climate-related academics as well as visiting fellows from outside New Zealand.

www.victoria.ac.nz/climate-change

James Crampton
Associate Professor in Geology

With a PhD in Geology from Cambridge, James worked as a principal scientist and programme leader at GNS. During this time he did some part-time teaching in the School of Geography, Environment and Earth Sciences (SGEES) and also held an adjunct position at the Antarctic Research Centre. Since mid-2012 James has held half-time positions in both SGEES and GNS.

“My research interests currently focus on how we can exploit New Zealand’s superb fossil record to understand major patterns of evolution and biodiversity change through time. We need to look at patterns of change over geological time scales, relating these to environmental changes and processes of speciation. We also need to understand controls on the nature and quality of the fossil record, and the ways in which that record is biased. This involves interrogating large databases using ever more complex and imaginative quantitative approaches.

“That said, palaeontology is fundamentally a field-based discipline, and bashing rocks in some remote stream in order to extract fossils is absolutely necessary, scientifically rewarding and hugely enjoyable!”
Antarctic Research Centre

The School is associated with the Antarctic Research Centre (ARC), directed by internationally renowned Professor Tim Naish. Since 1957, more than 250 staff and students from Victoria have gone to the ice to carry out field studies for a variety of research projects.

The Centre seeks to improve understanding of Antarctic climate history and processes and their influence on the global climate system, especially New Zealand and the Southwest Pacific region. We believe this field provides exciting opportunities and challenges attractive to young researchers, and is needed to provide a sound basis for international debate and policy development on global change issues.

Most of our recent research is in the area of earth science with a particular focus on paleoclimate reconstructions from Antarctic and New Zealand ice cores, sediment cores from the Antarctic continental margin, Southern Ocean and Southwest Pacific, glaciology and glacier and climate modelling. The ANDRILL Drilling Project and the Roosevelt Island Climate Evolution (RICE) ice core project have been, and continue to be, major commitments for the Centre over the past few years. Staff at the Centre contribute to the teaching of courses at the School, including ESCI 132 Antarctica: Unfreezing the Continent, ESCI 201 Climate Change and New Zealand’s Future, ESCI 202 Sedimentology and Palaeontology and ESCI 301 Global Change: Earth Processes and History, as well as fourth-year courses ESCI 412 Paleoclimatology and ESCI 403 Stratigraphy and Paleoenvironments.

www.victoria.ac.nz/antarctic

Joint Antarctic Research Institute

Headed by Professor Tim Naish from Victoria’s Antarctic Research Centre, the Joint Antarctic Research Institute (JARI) is a joint venture between the Institute of GNS, NIWA, Victoria University of Wellington and the University of Otago. With more than 40 associated researchers, its aim is to facilitate the development and coordination of common interests and objectives in relation to scientific research in Antarctica and Antarctica’s relationship to New Zealand in the fields of climate change, glaciology, geology and geophysics, and oceanography.
National Ice Core Facility

The National Ice Core Facility is a state-of-the-art centre at GNS and run by JARI. The Facility enables New Zealand climate scientists to examine ice samples to determine past weather patterns—vital information for the world’s understanding of climate change. The $1.4 million project was developed by GNS and Victoria University, with involvement from NIWA and Antarctica New Zealand. The Facility brings together staff and students from Victoria’s Antarctic Research Centre and GNS’s Antarctic research programme as well as international visitors from around the world.

Headed by Victoria scientist and PhD graduate Dr Nancy Bertler, the Facility is leading New Zealand to the forefront of world-class ice research, most recently with the New Zealand leadership in the nine-nation Roosevelt Island Climate Evolution Project.

“Our Facility really is a jewel; and one of perhaps five such facilities worldwide,” Dr Bertler says.

The Lower Hutt building now has 2,000 m of ice cores in its freezers; approximately 200 m from New Zealand glaciers and the remainder drilled to depths of 760 m in Antarctica.

“Ice cores are the most detailed and continuous record of past climate that we have,” Dr Bertler says.

Through data gleaned from the ice samples, scientists can reconstruct past environmental conditions to almost one million years and look for what triggered them. Climate patterns can also be tracked and scenarios drawn up to predict the likely impact of a warmer globe on New Zealand’s rainfall patterns.

www.victoria.ac.nz/ice-cores
Matthew Reeve
BSc student in Geology and Physical Geography

Matthew came to Victoria from New Plymouth in 2013 and is currently enrolled in a BSc majoring in both Geology and Physical Geography.

“I always liked geography at school and geology offers jobs that I find interesting, such as in the oil industry.”

Coming from another city has had its challenges, one of which is the price of rent, but Matthew still finds it enjoyable to study and live in Wellington as everything is so close. He has taken advantage of some of the extracurricular activities at Victoria through involvement in the Geology Society and social netball.

“Some of the opportunities Victoria offers include the chance to be involved in a seemingly endless number of societies and groups, sports teams and the ability to reside in a new city and make lots of friends through the first year halls of residence.”

On completion of his degree Matthew will consider both employment and further study options.

Jamie Tarawa-Bailey
BSc student in Geology and Human Geography
Āwhina mentor

Kia ora. I moved down to Wellington from Tauranga four years ago to study Science at Victoria University. Sciences for me have always been a subject of interest. The more I study, the greater my appreciation for the amazing and complex processes that Earth is home to.

My roots will always hold strong, but Wellington and Victoria are my home away from home. Te Rōpū Āwhina has been my whānau on campus, providing me with invaluable support and advice throughout my degree. As an Āwhina mentor, I’m able to give back to Āwhina and help other students progress through their university careers.

There’s a low representation of Māori and Pacific students within science, so I encourage younger generations of Māori and Pacific students to get into the sciences and secure a brighter future for our people.
Laura McKim
Wellington Regional Council

Laura McKim has a Master of Environmental Studies with Distinction from Victoria, which links in perfectly with her love of the environment and interest in the connections and tensions between economic and environmental policy objectives and outcomes.

“The postgraduate Environmental Studies programme spans a wide range of disciplines and research areas—economics, public policy, ecology, psychology, geography and conservation biology. This teaches you to look at complex, challenging issues—say climate change—from different perspectives and through various lenses so as to get a better grasp of the problem and how it might be addressed.

“I work at Greater Wellington Regional Council as a policy advisor in the Strategic Planning team. I first had contact with the council in 2010 while doing a 200-hour practicum for my degree in the Council’s Sustainable Transport team. I then had a series of contracts in a number of different council teams, before starting my current permanent role in 2013.

“In my job, the skills and knowledge I learnt are used all the time—whether it be conducting research, designing surveys and engagement materials, analysing policies or making presentations—and are applied to strategic issues in environmental management. I feel like I’ve got a lot of mileage out of my thesis. My Master’s has given me a grounding in critical thinking and research with which I aim to have a good crack at addressing the strategic policy issues that come my way.

“Wellington is a special city and Victoria occupies a special spot atop a hill, gazing down upon the CBD and the harbour. I always loved early morning yoga classes in the Recreation Centre—the view of the city at sunrise is amazing! I love Wellington’s compact urban form, hemmed in by hills and water—it’s so easy to walk and cycle around and it has great public transport. When I was studying, the Kelburn campus was beset by construction noise. Earlier this year I returned for a summer course and I saw that all the noise and disruption had been worth it with the fantastic new Hub, complete with an excellent book shop and eateries.”
Study

The School of Mathematics, Statistics and Operations Research (SMSOR) offers:

→ a wide range of engaging and challenging courses
→ world-leading research groups
→ strong academic links with other sciences, engineering, economics and the humanities
→ external links with government and private sector organisations
→ academic pathways with emphasis in pure or applied mathematics and statistics, including operations research
→ extensive learning support
→ the opportunity to develop key attributes for employment and postgraduate study.

Bachelor of Science majors

→ Actuarial Science*
→ Mathematics
→ Statistics

* Subject to approval.

Other areas of study

→ Applied Statistics
→ Logic and Computation
→ Statistics for Finance and Insurance

Research institute

→ Centre for Logic, Language and Computation

The Age of Mathematics and Statistics

The School has a reputation for excellence in its research and teaching—so if you are keen to explore the mathematical sciences and how they are used in many other fields, consider a major from our School, or include one of our minors in your degree to add a distinctive second focus.

The mathematical sciences form a vibrant and vast field of study in which new research and ideas are constantly expanding its scope. We confront some of the most difficult intellectual problems, which may have remained unsolved for decades or even centuries, concerning prime numbers, the structure of space and the limits of computing. At the same time we are inventing new ways to model, analyse and explain the physical and human world around us, from fisheries to finance, quantum theory to cosmology, sand dunes to sea ice, reliability to robotics. It is no exaggeration to say that we are in the Age of Mathematics and Statistics, as more and more employers come to rely on these skills to make sense of big data and to develop analytics tools to improve performance.

Our Mathematics group is recognised as an international research leader and has attracted numerous external grants and competitive awards for its staff and students. Research fields include the theory of computation, logic, number theory, algebra, analysis, geometry, combinatorics, cosmology and modelling with differential equations.
The Statistics and Operations Research group covers a wide range of areas in both theoretical and applied statistics, including probability, simulation, optimisation, computational modelling and evidence-based decision making. Research interests include statistical analysis of time series, clustering, numerical and categorical data, forecasting with applications to ecology and fisheries, genetics, health, finance, risk and insurance, scheduling, queuing, routing, optimisation and evolutionary computation with applications to visual object recognition, warranty analysis and reliability.

Our degree programmes provide a strong foundation in the mathematical sciences and reflect the range of research undertaken by our staff. There is a range of entry levels depending on a student's background and we provide extensive support through diagnostic testing, core skills classes, tutorials, regular assignments and helpdesks. Our staff and students come from a wide variety of countries and cultures and we recognise and support the individual needs of students, especially Māori and Pasifika.

The School's courses serve a wide range of fields, including biological sciences, computer science, engineering, geophysics, philosophy, physics and psychology. We combine with the School of Economics and Finance to provide a programme in actuarial science (subject to confirmation for 2015). In the applied areas we maintain strong links with Callaghan Innovation, National Institute of Water and Atmospheric Research (NIWA), Statistics New Zealand and other government and independent research organisations. Senior undergraduate and postgraduate students are often involved in multidisciplinary research.

Whether your passion is for solving challenging theoretical problems or finding ways to explore, conserve and improve our world, there are rich opportunities for you in the School.
Mathematics

Mathematics is supreme in requiring precise and logical thinking. It provides a wide array of techniques for solving problems in a variety of disciplines, scientific and otherwise. It is one of the oldest academic disciplines, yet one of the most contemporary in its development of new knowledge and applications.

The School has some of New Zealand’s best research mathematicians in areas such as logic and computation, matroid theory and combinatorics, and general relativity and cosmology. Mathematics graduates are highly valued for their numeracy, problem-solving skills and ability to think logically and independently. They are frequently employed in the public and private sectors as research mathematicians, scientists, systems analysts, financial and policy analysts and software developers.

Starting from core courses in calculus, algebra, logic and discrete mathematics, you can progress through pathways that emphasise theoretical or applied aspects and also discrete or continuous branches. You can enrol in Mathematics as a major for a BSc and a BA.

Centre for the Study of Logic, Language and Computation

Logic is the broad field concerned with all aspects of reasoning. It is fundamental to computer science, mathematics, philosophy, linguistics and other disciplines. The Centre for Logic, Language and Computation (CLLC) was established in 2001 to provide focus for this activity and maintain Victoria’s position as one of the world’s leading universities for research in logic. Logic and Computation is available as a subject for Honours, Master’s and PhD degrees.

www.clcc.vuw.ac.nz

Nokuthaba Sibanda
Lecturer in Statistics

After completing a PhD in Statistics at Imperial College, London, Nokuthaba worked as a medical statistician during a research fellowship at the London School of Hygiene and Tropical Medicine. She joined the staff at Victoria in 2007 as a consulting statistician and became a lecturer in 2009.

“My main area of research and teaching is in Bayesian inference and associated computational techniques, with applications in medical statistics, ecology and fisheries modelling. Following on from my work as a medical statistician, a second stream of research is in statistical process control with particular applications in monitoring of healthcare outcomes.”

Nokuthaba enjoys interacting with students at all levels and, in particular, helping students to develop as researchers. She is the course coordinator for STAT 293 Applied Statistics, STAT 432 Computational Statistics and STAT 482 Bayesian Inference.

Nokuthaba is also the patron of the recently formed Victoria African Students Association of New Zealand, which aims to build a community of African students at Victoria.
Mark Johnston  
Senior lecturer in Mathematics and Operations Research

With a PhD in Operations Research from Massey, Mark came to Victoria as a lecturer in 2005. He was promoted to a senior lecturer in 2013.

“My research is in building and solving mathematical models related to industry, business and sport. I am particularly interested in optimisation and simulation models and their application to machine scheduling, supply-chain logistics, computer vision, classification, environmental modelling and anything to do with sport.

“My main teaching is in Operations Research and Mathematics, particularly how to build and solve optimisation and simulation models and the foundational mathematics that makes it all work. I particularly enjoy teaching first-year students and those with a mixture of mathematics and computer science backgrounds.”

Mark has participated in the application of mathematics beyond the university environment. Since 2011 he has worked closely with the New Zealand Rugby Union to schedule the national provincial championship. “Constructing a schedule that satisfies all the requirements of teams, sponsors and television is mathematically pretty tough and this provides the challenge that interests applied mathematicians like me.”

Fatimah Mohamad Tabarani  
BSc student in Mathematics  
Āwhina mentor

Fatimah is in the final year of her BSc in Mathematics. She came to Victoria from Malaysia, thanks to a Malaysian Government Sponsorship. She balances her study with being an Āwhina mentor.

“Being an Āwhina member and mentor has given me the chance to meet new people and work together as part of a community. Besides mentoring, being part of the School’s outreach programme has given me the chance to give back to society. It is so much fun to see school students excited about mathematics and its application.

“I have enjoyed maths since I was at school. I like how most of the things in the world have a mathematical concept behind them. That patterns in flowers are related to calculus, and an algorithm itself is fascinating.”

Once Fatimah has completed her degree, she will return to Malaysia to teach. “I enjoy teaching and sharing my experiences with people. My time spent studying at Victoria will definitely be an experience I’ll be sharing.”
Sam Olivecrona
BSc(Hons) student in Mathematics

After completing a BSc in Mathematics and Operations Research at Victoria, Sam decided to enrol in a BSc(Hons) in Mathematics. A contributing factor for him continuing to study was his experience working with staff in a research environment on a summer research scholarship.

“I know maths can be a bit intimidating for people (judging by the looks I get when I tell people what I study), especially if they don’t have a good grounding in the basics. It isn’t all calculus and arithmetic though: most of my favourite courses are the ones that I had no idea about originally, such as graph theory, game theory and operations research.

“Maths requires you to think critically and creatively at the same time, especially while trying to prove something. Although it took a bit of getting used to proving theorems, now it’s very satisfying—it’s just nice to know something is true no matter what.”

Te Aomihia Walker
BSc student in Statistics and Marine Biology
Āwhina mentor

“I’m currently in my last year of study towards a Bachelor of Science, majoring in Statistics and Marine Biology. Statistics has played a major part in my life: it has helped me develop my problem-solving skills, opened up job opportunities and assisted greatly with my marine studies.

“I’ve been a part of Te Rōpū Āwhina for the past four years. As a mentor in Āwhina I’ve built a lot of close friendships and enjoyed helping my fellow whānau members to succeed.

“In the future I see myself working alongside my iwi, Ngāti Porou, to gain a better understanding of how and why our kai moana has fluctuated over the years. Being raised completely in te ao Māori, where my whānau, hapū and iwi have always been constant, I would like to give back by preserving the marine life that has shaped the history of the people that we are today.”
**Statistics and Operations Research**

Statistics is the science of collecting, analysing and interpreting data. A statistician distils and organises facts from data and makes inferences about the nature of the process or population from which the data were drawn.

Statistics as a discipline is closely related to both mathematics and operations research. It can be valuable for students in Biology, Psychology, Finance, Economics and the Social Sciences as a second major or a minor.

Graduates in Statistics are employed in many areas in both the public and commercial sectors. They are in demand as policy and data analysts in government departments, including the Ministries of Education, Social Development and Health. The financial sector requires graduates with strong quantitative skills. Banks, stockbrokers and similar institutions need analysts who work closely with their dealers to give them technical advice. Actuaries work in insurance companies or with consultants or stockbrokers. In these areas, the demand is often for a combination of statistics and computational modelling with economics, computer science, management or other commerce subjects. Increasing numbers of graduates are employed in the health, conservation and agricultural sectors, where they are needed for monitoring and forecasting. Such skills are also needed in social science areas such as psychology, criminology and education.

Students who study operations research and computational modelling can find work in scheduling, transportation, supply chain management, manufacturing, industrial engineering, business analytics, management consultancy, finance, revenue management and public policy modelling. Staff at Victoria have particularly strong research connections with Statistics New Zealand and many Victoria graduates begin their careers there.
Actuarial Science*

We live in a world in which we are increasingly conscious of risks, whether from natural hazards such as earthquakes and storms, personal risk related to health, disease and lifestyle, or financial risks related to investment or asset management. Hence, the need to analyse, forecast and manage risk is ever more important. Actuarial science concerns the models and methods for undertaking this analysis, which come primarily from economics, mathematics and statistics.

Professional actuaries are traditionally involved in superannuation, insurance and banking but there is growing demand for actuarial skills across a diverse range of business disciplines such as management consultancy, investment, finance and stockbroking as well as in government, education, health and software development.

Students enrolling in this major, available in both the BCom and BSc, may consider taking it alongside a second major in Economics, Finance, Mathematics or Statistics. Graduates will be well prepared to become qualified actuaries or to enter a wide range of risk management positions.

*New programme offered subject to approval in 2015.
Syafiq Ikhwan
IBM, Malaysia

“Since I was in high school I have always been passionate about mathematics and statistics. Taking my mathematical and analytical skills through to tertiary education was always my aim and priority. I always considered that mathematics and statistics had a role in almost any field of work, be it economics, engineering, small business and so on. It has thus made graduates in those subjects high in demand in the current job market.”

Syafiq came to Victoria in 2008 and initially gained a BSc degree with a double major in Applied Statistics and Mathematics, which he followed with a fourth year of study to emerge with a BSc(Hons) in Applied Statistics. Upon returning to his native Malaysia, Syafiq was appointed to his current role in the multinational company, IBM, as a human resources workforce analytics reporting analyst.

“My current role applies prescriptive and predictive analytics to workforce data that drive informed decision-making, as well as providing valuable insights, advice and support to both human resources and business leadership. My Victoria University qualification has embedded in it an analytical culture that was available throughout the programme as well as early exposure to statistical tools such as SPSS, which enables in-depth data access and interpretation, analysis and graphical and modelling capabilities to produce better data understanding.”

While in Wellington, Syafiq was a member of the Wellington Malaysian Student Organisation and at the 2008 New Zealand University Games held in Rotorua, he was a member of the winning Victoria University men’s soccer team. He remembers his time in Wellington and at Victoria “was indeed a marvellous and memorable experience” and he now “misses Victoria and Wellington so much”.

Syafiq’s future plans are to build his career in big data and analytics by studying for a Master’s-level qualification. Hopefully, he will return to Victoria for postgraduate study.
School of Psychology
Te Kura Mātaï Hinengaro
Levels 3–6, Easterfield Building
Head of School: Associate Professor Marc Wilson
Enquiries: Room 630, Easterfield Building
Phone  04-463 5373
Email   psyc@vuw.ac.nz
Website  www.victoria.ac.nz/psyc

How do we learn, think and remember?
What is the relationship between thinking and behaviour? How do children acquire language and knowledge of the world around them? Why do we conform to peer-group pressure? What does ageing entail? What is the relationship between behaviour and the brain? How does disturbed or criminal behaviour develop and what can be done to remedy it?

The study of psychology spans both science and the humanities. It overlaps with education, linguistics, economics, design, statistics, geography, environmental studies, biology and biomedical science, criminology, law, linguistics, management, Māori studies, marketing, political science and sociology.

Psychology students at Victoria are part of an exciting and active research community. You’ll do practical lab work in all of your courses and participate in research conducted at the School that is later presented at conferences or published in international scientific journals. You will be taught by leading international researchers—the last government review of university research reported, once again, that Psychology at Victoria is the top psychology unit in the country.

We have excellent facilities, with laboratories in many of our specialty areas: cognitive, social, developmental, physiological, cross-cultural, clinical, criminal justice, animal behaviour and psychological measurement. The School has its own test library, and the University’s Kelburn Library provides access to any psychology book or journal you might need.

Psychology at the first-year level covers topics such as the relationship between our brain and our behaviour, our environment and our behaviour, social psychology, developmental psychology, cognitive psychology, abnormal psychology and how psychologists conduct research to answer questions about the world of behaviour.

Come and find out what makes people who they are.
Research in the School

The School of Psychology has a large group of postgraduate students who benefit in their coursework and research from our excellent facilities and the support of our experienced and dedicated staff.

Current research by School staff and graduate students reflects a diverse range of topics, including the role of social groups in how we make decisions, the role of culture in psychology and behaviour, the use and effects of language across various real-world settings, gender and identity, how memory works (or sometimes lets us down), how we develop socially and cognitively, neuropsychology, abnormal and criminal behaviour, addiction, drug effects on behaviour and cognition and processes of reward and punishment in humans and other species.

Wellington offers tremendous opportunities for academic research, applied research and clinical experience in psychology. The School maintains excellent links with Capital Coast Health and its mental health units, the Department of Corrections, Environmental and Scientific Research (ESR) and senior psychologists in private practice and the public sector.

Many researchers in the School maintain relationships with other groups within the University such as the School of Biological Sciences, the Institute of Criminology and other Schools, as well as international collaborations with influential people in their fields. The School is also home to the Centre for Applied Cross-cultural Research, the Roy McKenzie Centre for the Study of Families and the Victoria Psychology Clinic.
Since arriving at Victoria in 1999, Jason has taught and done research on changes in children’s cognition. His PhD (1998) from the University of Western Australia is in Developmental Psychology.

“I am interested in human beings’ ability to infer what others are thinking, wanting or intending, and the limits of our social sense. I specialise in research comparing children’s automatic eye movements with their controlled verbal reasoning to solve the mystery of how we come to develop an understanding of the minds of others. Given my interests in the evolutionary foundations of complex thought, I also engage in interdisciplinary research on behavioural manifestations of social and numerical cognition in non-human animals.”

Jason’s lab is leading international research in the discovery that human beings have not one but two cognitive systems for tracking and evaluating other people’s beliefs. He and his students regularly publish in top-ranking journals such as Child Development, Psychological Science and Animal Cognition and he is an associate editor for The British Journal of Developmental Psychology. Jason coordinates and teaches PSYC 324 Child Development and PSYC 415 Early Cognitive Development.

Lauren is in her third year of a BSc in Psychology with a minor in Biology. She came to Victoria from the Waikato, living at Weir House in her first year, before going flatting.

Lauren’s interest in human behaviour and cognition—something not taught at school—led her to enrol in Psychology at Victoria. Biology was one of her favourite subjects at secondary school, so making the decision to continue studying it at a tertiary level was easy.

“During my second year I volunteered in one of the Psychology labs. This was a great experience as I got to interact with Psychology postgraduate students and find out about the research that they were involved in at the time.

“I am currently enrolled in SCIE 306 Directed Individual Study, with Dr Gina Grimshaw. This is a great course to take if you want to gain a better understanding of the processes underlying psychological research and also get some experience in a lab.”

Lauren’s two study areas mean that options for future study could go down either track—changing her minor in Biology to a major or applying for Honours in Psychology.
Brain and behaviour
There are two main research interests in this group. One focus is on psychopharmacology and behaviour analysis, with studies of the function of the dopamine system in the brain, the neurochemical circuits for goal-oriented control of action, the initiation and maintenance of drug abuse, the relapse to drug abuse and the effects of various drugs on memory and learning processes. Here, the research objective is to increase our understanding of the basic mechanisms involved in diverse challenges to the brain such as drug addiction, schizophrenia and Parkinson’s disease.

Additional research focuses on cognitive psychology, including studies of language and hemispheric specialisation. This research includes case studies of brain-damaged patients aimed at developing new diagnostic tests and designing tests for aphasia rehabilitation. Other research aims to further our understanding of how the hemispheres of the brain interact in both cognitive and affective processes.

The School offers a specialised Master’s degree in Cognitive and Behavioural Neuroscience.

www.victoria.ac.nz/msccbns

Clinical psychology
Clinical psychology involves the assessment, diagnosis and treatment of psychological disorders, including depression, anxiety and eating disorders, as well as serious psychotic disorders such as schizophrenia and bipolar disorder. Research within clinical psychology attempts to investigate the emotional, behavioural and cognitive factors that are important in determining the onset and the maintenance of these conditions.

In addition, research staff are interested in researching the efficacy of various treatment models that have been developed for a range of psychological disorders. Disorders of interest are depression and anxiety, and early interventions for children’s development in cognitive and socio-emotional domains. Clinical staff have research interests that include both children and adults.

The School also offers a very popular graduate programme in Clinical Psychology, combining applied research and clinical practice, which qualifies graduates to register as a clinical psychologist in New Zealand. The programme is based on the scientist/practitioner model in which research and practice are integrated and provides a broad-based grounding in the fundamentals of clinical practice and research. The principal theoretical model is a cognitive-behavioural one, with particular strength in adult mental health, child and family and forensic psychology, and is supplemented with exposure to cutting-edge therapies such as dialectical behavioural therapy and acceptance and commitment therapy.

For more information, see www.victoria.ac.nz/pgdipclinpsyc

The Victoria Psychology Clinic
The Victoria Psychology Clinic was established in 2004. The Clinic provides a range of psychological services to members of the public and aims to provide services that are professional and accessible to those who need them. Both clinical psychology and clinical neuropsychology services are offered, and the Clinic is used as a training-based facility for the School’s Clinical Psychology programme.

For more information, see www.victoria.ac.nz/psyc/centres-and-institutes
Tadhg Daly
PhD student in Psychology

Tadhg came to Victoria after completing a BSc at Otago. He initially enrolled in a BSc(Hons) in Psychology before embarking on a PhD.

"Originally I was simply curious about what Psychology was all about. After studying it for a few years I did a 400-level course on Criminal Psychology and I found it so interesting I decided to do a PhD in the subject area.

"Victoria opened up a lot of opportunities for me. I have been able to conduct new and interesting research, teach Psychology to other students through tutorials and lectures and present research at local and international conferences—not to mention learning from some of the best in the business."

Tadhg has taken advantage of some of the extracurricular activities while at Victoria. He has been involved in the Victoria Plus Award, was a Postgraduate Students’ Association representative on the University Research Committee from 2012 to 2014 and is a member of the Victoria University of Wellington Psychology Society and the International Honor Society in Psychology: Psi Chi.

In the future, Tadhg would like to continue to do research in some capacity; he hopes some of this will be overseas.

Cognition

The cognition group’s research expertise cuts across the sub-areas of perception, attention, memory and language. Research on attention and visual working memory attempts to shed light on processing in the ventral (what) and dorsal (where) information streams of the brain.

For memory, there is research on implicit memory and learning with normal and special populations (eg. individuals with Parkinson’s disease), basic processes (automatic vs. controlled) underlying recognition and recall memory of words and faces, subjective experiences during memory retrieval and memory for more applied materials or in more applied settings, with considerable stress on false memory phenomena. The language domain is focused primarily on theories of language production, and this work is informed by research on individuals suffering from different types of aphasias. Other research in the language domain is aimed at examining the effects of emotional prosody on language processing and the relationship between anxiety and attention.
Cross-cultural psychology
Cross-cultural psychology is the study of the impact of culture on individual- and group-level psychological functioning. It involves cross-cultural comparison, where the psychological functioning of people from different nations or ethnic groups is compared, and acculturation, the study of changes in culture and individual functioning as a consequence of contact between cultural groups.

The impact of cultural diversity on such issues as national identity and inclusiveness is another important area of study, and a focus on indigenous systems of knowledge constitutes a fourth major area of study.

The School offers a specialised Master’s degree in Cross-cultural Psychology. For more information, see www.victoria.ac.nz/msccrosscultural

Centre for Applied Cross-cultural Research
Cross-cultural psychology at Victoria is associated with the Centre for Applied Cross-cultural Research (CACR), which links cross-cultural psychologists to other social scientists interested in culture from other disciplines such as sociology, cultural anthropology, linguistics, international business and developmental studies.

The Centre has links to community groups, government and international associations such as the Asian Association of Social Psychology and the Centre for Cross-cultural Research at Western Washington University. Staff in this area are internationally recognised scholars engaged in researching issues of managing cultural diversity in New Zealand. For more information, see www.victoria.ac.nz/cacr
Forensic psychology

Forensic psychology is defined by the use of psychology in legal settings. The forensic group has a variety of research interests that range across issues of offender behaviour patterns, classification of subtypes, risk assessment, rehabilitation and public policy.

The focus on offender behaviour patterns involves the contribution of cognitive distortions, affective states and interpersonal and contextual variables to produce individual offence cycles among violent and sexual offenders. Interest in the relationship between personality variables, including psychopathy and narcissism, and offending behaviour, leads to the investigation of offender sub-types. These variables, along with other static and dynamic risk factors, are also used to study the prediction of recidivism among various types of offenders. Research is being conducted on the efficacy of treatment programmes in reducing recidivism, including both theoretical and empirical foundations for offender rehabilitation.

The School offers a specialised Master’s degree in Forensic Psychology. For more information, see www.victoria.ac.nz/forensic

Libeau Mokomoko
BSc student in Psychology and Criminology
Āwhina mentor

“I’m currently in my second year at Victoria studying Psychology and Criminology. I didn’t know what I was going to study at university until I attended Victoria for the Āwhina Cybrospace event in Year 12. I really enjoyed the psychology experiments, although I’d never thought about psychology as a study choice.

“It was a big jump going from first-year to second-year Psychology, but Āwhina was and remains my on-campus whānau support. Having a mentor to help me with my studies was great. I also knew that if I had a question or was a bit lost, I could rely on Āwhina for guidance.

“When I’m not studying I enjoy playing netball for Victoria’s netball club and also for a social team. I’d love to get into forensic investigation one day—I think I’m on the right path.”
Developmental

Research interests amongst the developmental group include social and cognitive development. There are two areas looked at within social development. One area focuses on cross-sectional and longitudinal research on how children and adolescents cope with, and adjust to, changes in their lives. Recent research has expanded to include issues of cross-cultural and cross-national investigations of how adolescents cope with stressors. A second area uses feminist and social constructionist frameworks to examine messages about gender and the body found in popular culture, and how young people represent that information.

Specific topics of research within the area of young people’s gender and sexuality include ‘dating’ relationships and abuse, sexual coercion, sexuality education and teenage pregnancy. For cognitive development, the research objective is on how knowledge in the mind develops, specifically how young children come to use their knowledge structures to solve problems in flexible and imaginative ways.

The research aims to find out the format of children’s knowledge structures (implicit or explicit), and how theory of mind and executive functioning precisely underpin problem-solving. The cognitive development domain is further informed by research investigating the internal mechanisms that support imaginative thinking in children with autism and Asperger’s syndrome.

Further developmental research investigates the ways that discussion between children and the adults in their life, before, during or after an event, shape the child’s understanding and memory of their experiences.
Social psychology
According to Gordon Allport (1954), social psychology is “an attempt to understand and explain how the thought, feeling and behaviour of individuals is influenced by the actual, imagined or implied presence of others”.

Research conducted by many individuals in the School represents this endeavour. Areas of research in the School include judgement in social settings, causal attributions, how we form impressions of others and think about people and groups, how we identify with particular things or groups and the role this (and other individual differences) plays in intergroup relations and our attitudes towards the world around us.

Research in the School also goes well beyond traditional boundaries through the adoption of critical, often discursive, approaches to the traditional and contemporary topics of social psychology.

Under the broad umbrella of social psychology, research in the School includes studies of the role of the social environment on the development of psychological problems; factors that influence eating disorders; how NCEA affects student motivation; how our understanding of history plays out in our thought and behaviour, political attitudes and behaviour; and gender and sexuality.

Environmental psychology
Environmental psychology research focuses on the environmental conditions that affect or are caused by people’s behaviour. Environmental psychology is thus the scientific study of the reciprocal relationship between human behaviour and the natural environment.

Research interests amongst the environmental group include the understanding of the causes and consequences of environmental problems, understanding the barriers against and triggers of pro-environmental lifestyles and sustainability (and psychological factors influencing these barriers and triggers), and people’s beliefs about current and emerging environmental issues (eg. electricity shortages, climate change).

Clare-Ann Fortune
Lecturer in Psychology

After completing her MSc(Hons) at the University of Auckland, Clare-Ann worked at University College Dublin, Ireland, as a research assistant in Criminology before returning to Auckland to complete her clinical training and PhD in Psychology. She worked as a clinical psychologist for a specialist youth forensic service for a number of years before coming to Victoria in 2011 as a teaching fellow on the Clinical Psychology programme. She has held the position of lecturer since 2013.

“My particular areas of research interest are risk assessment and rehabilitation of youth offenders and ethical issues related to competency of young people in the youth justice system.”

Clare-Ann is one of two staff dedicated to New Zealand’s first MSc programme in Forensic Psychology. The programme covers a range of issues such as youth offending, risk assessment and psychopathy and brings together theory, research and practice issues in the areas of forensic and correctional psychology.
In 2010, Seini completed a Master of Science in Cross-cultural Psychology at Victoria. Her thesis brought together areas of personal interest—youth development, cultural differences and community engagement—and used robust statistical analyses to show positive psychological advantages to young people (aged between 9 and 17) who were engaged in extracurricular activities outside school. Under a partnership agreement with Victoria, Seini was able to study for half of her degree at the University of Hawai‘i, where she became a student affiliate of the East West Centre and supplemented her degree with courses in Pacific Island Studies and Community Psychology.

“I had good learning experiences at Victoria and some particularly excellent professors such as Colleen Ward and Paul Jose—they were encouraging and inspiring academics. I also had the opportunity to work with younger professors, such as Taciano Milfont and Ron Fischer, who have lots of energy and are involved in many different areas of research! My only regret is that I couldn’t take more courses—I would have liked to really learn more about cultural and indigenous psychology.

“My current job in Pacific regional planning at the Pacific Islands Forum Secretariat in Suva is not directly related to psychology, but in applying for the position I think it was an advantage that I had a Master’s degree and that I’d studied in Hawai‘i, which has strong Pacific linkages. In a setting where the job involves contact with many different Pacific communities and having to travel often to work in different cultural settings, I think it was also an advantage that I had a strong background in cross-cultural understanding.

“Although I love the warmth, lushness, colour, chaos and friendly faces of Suva, I do miss all the art, music, cafés and restaurants that can be found in Wellington’s winding inner-city streets, as well as the fantastic town belt tracks that provide an escape from it all. The weather can be cruel at times but I found it an easy city to get around by bike and foot, and a spectacular place to be on a sunny day. I enjoyed Victoria’s resources—the great gym (and yoga classes!), the Library with the beautiful view and good coffee spots.”
As society’s dependence on the reliability and correctness of computer-based systems increases, so does the need for experts to design and build the systems.

Victoria’s Bachelor of Science (BSc) has a three-year programme in Computer Science (COMP) and in Electronic and Computer Systems (ELCO), enabling careers in computer graphics and games development, distributed systems, software engineering, artificial intelligence, logic and computation, communications, electronics, computer systems and mechatronics. These programmes can also lead to postgraduate diplomas, Honours, Master’s and PhDs.

As a Computer Science (COMP) student your focus will be on programming, artificial intelligence and graphics design, implementation and maintenance of software systems that behave reliably and efficiently. You’ll graduate with a Bachelor of Science (BSc COMP).

As an Electronics and Computer Systems (ELCO) student your focus will be on learning the design, theory, techniques and tools of electronics and computer systems. You’ll graduate with a Bachelor of Science (BSc ELCO).

The School also offers a Bachelor of Engineering with Honours (BE(Hons)) programme in Electronic and Computer Systems Engineering, Network Engineering and Software Engineering. Courses in Computer Graphics are also offered in association with the School of Design.
The future relies on the expansion of computing and technology to meet the needs of people, be it for industry, in hospitals or for your security and entertainment. There are boundless applications for computing that are waiting for you to imagine, invent and realise. As a student at Victoria, you will train to become the next generation of computer scientists who will design and build the new computer programs that will drive these applications of computers, to design and build the networks and to invent new algorithms and technology that will be the basis for the next wave of computing applications.

A BSc in Computer Science from Victoria is an entry into a wide range of jobs in software development, networking, computer graphics, computer games, artificial intelligence and other applications of computing. It is also a basis for postgraduate study in Computer Science, leading to research and innovation that will invent new ways of using computers to solve the problems facing the world.

The BSc in Computer Science is a flexible three-year degree that can include your selection of courses from Software Engineering, Network Engineering and other areas of Computer Science such as artificial intelligence, computer graphics and the design of programming languages. It starts with courses where you will learn the fundamental skills of computer programming and understanding algorithms. In the later courses, you will build on these skills while learning new concepts and techniques for applying computing to many different kinds of tasks and problems. The BSc allows you to focus entirely on computer science, or to combine computer science with other disciplines in the University, giving you a broad interdisciplinary foundation for working in jobs that apply computing to new areas.
Mitchell Lane
Web developer with Touchtech

Mitchell Lane’s software development path started off with an interest in games, and developing them has become his passion for the future. “I also have plans to one day build an amazing software-based product that integrates some of my artificial intelligence research, create a start-up company out of it and move to Silicon Valley to learn from the best and to make my millions!

“When mucking around in Adobe Flash one day, I discovered that I could apply ‘actions’ to objects in a scene through code. I then found that by writing code I could make this object in front of me move using the appropriate keys, such as making a circular object appear to fall and bounce when it hit the ground. I was hooked!

“I found in the BE(Hons) a programme that suited my interests and taught me everything I wanted to learn more about. There was a lot of theory in the programme, but it was crucial to my understanding of how to develop flexible, maintainable and modular software in a world of harsh deadlines and forever-changing requirements. The theory was always backed up with a large dose of fun and challenging practical exercises. The degree improved my public speaking, writing and research skills. It also enhanced my ability to work effectively as part of a team.

“I came to my current job as a web developer knowing very little about web development itself, let alone the new set of programming languages and frameworks that I would be working with. My BE(Hons) helped me to adapt the software development skills I had learnt at university and apply them to this area of web development. I was able to quickly pick up the new skills necessary to develop quality web applications for real clients.

“Victoria was a great place to study. The lecturers were genuinely passionate about their areas of expertise and taught us all with utmost respect. During my Honours year I got to work with Professor Mengjie Zhang and Doctor Bing Xue, developing novel feature selection methods, some of which were published in leading artificial intelligence journals.”
Rebecca Ford  
Lecturer in Engineering and Computer Science

Rebecca holds a Master of Engineering (Class I) from the University of Oxford and then went on to complete a DPhil in Engineering, also at Oxford, where she held an Engineering and Physical Sciences Research Council doctoral scholarship. Her DPhil thesis, Reducing Domestic Energy Consumption through Behaviour Modification, focused on the development of technological solutions for appliance disaggregation to enable detailed energy-use information to be provided to households.

“I am now a lecturer in the School of Engineering and Computer Science, teaching first-year Engineering Technology and Engineering Modelling and Design; courses that can provide a foundation for both Computer Science and Engineering students. I am interested in how households interact with emerging energy-related technologies, and how social science insights can be applied to develop technological solutions to improve energy efficiency (at the household and grid level), reduce carbon emissions and explore new mechanisms for implementing demand management to improve energy resilience at the local, regional and national level.

“I am also part of the Energy Cultures interdisciplinary research team within the School, to which I bring the skills and perspectives I honed as an Engineering student plus my interests in the use of computer-based technology to help make energy use more efficient and effective.”

David Pearce  
Senior lecturer in Computer Science

David studied Computer Science at Imperial College London, received a Master of Engineering degree in 2000 and completed his PhD there in 2005. During this time, he was lucky enough to undertake internships at Bell Labs in New Jersey, USA, and at IBM in Hursley, UK. In 2004 David joined Victoria University.

“I specialise in programming language design and implementation. This includes developing tools that identify errors in existing programs (eg. written in Java), as well as developing new ideas to improve existing programming languages.

“My current project is to develop a programming language that automatically eliminates many software bugs. Such a language would be particularly useful for developing safety-critical software (eg. for airliners, power plants, cars).

“We have a world-class programming languages research group that publishes regularly at top international conferences and journals, and collaborates with people from around the world.

“I supervise a number of postgraduate students in my area. Our students often get to attend conferences overseas (typically in the USA or Europe), and many end up getting jobs at places such as Google, Mozilla and Microsoft, to name a few.”
Connor Findlay
BSc student in Computer Science
Āwhina mentor

“I’m currently studying towards a Bachelor of Science, majoring in Computer Science. I’ve learnt how to approach problems in a different manner. The questions I ask have changed from simple ones, such as ‘How can I fix it?’ to ‘Why does this happen?’ And, of course, I get to make games and build robots, which is a major factor in my enjoyment of Computer Science.

“Through Āwhina I’ve met so many interesting people studying a diverse range of subjects; I’ve met biologists, architects, chemists and psychologists. I became an Āwhina mentor in 2013 and it has been one of the most rewarding and fulfilling things I’ve done at Victoria. I was also awarded a Summer Research Scholarship from Āwhina in 2013–14. This opportunity has introduced me to the world of research and the possibility of postgraduate study.”
Who to contact

Faculty Student and Academic Services Office
Visit the office for help with anything from enrolment to graduation.
Get help with choosing your degree, planning your courses or changing your degree programme. This office should be your first point of contact for any enquiries you have about your studies.

Room 144, Cotton Building, Kelburn Campus
Phone 04-463 5101
Fax 04-463 5122
Email science-faculty@vuw.ac.nz
Website www.victoria.ac.nz/science

Accommodation Service
Advice on our halls of residence, renting and other accommodation options.

www.victoria.ac.nz/accommodation

Campus Care
24/7 Campus Security.

0800 VIC 8888 (if calling from outside the University)
8888 (if calling from within the University)

Career Development and Employment
Also known as Vic Careers—find out what you need to know to get a job, what career options are open to you and what your ideal future might look like.

www.victoria.ac.nz/careers

Career Hub
24/7 access to part-time jobs, graduate jobs, contract work, tutoring positions, internships, work experience/volunteer opportunities, an ePortfolio and a CV-building tool. Use your student computing account to log in.

www.victoria.ac.nz/careerhub

Counselling Service
Professional, confidential counselling available at all campuses for any issue that is impacting on your personal or academic success.

www.victoria.ac.nz/counselling

Disability Services
If you have a temporary or ongoing impairment, you can access coaching and advice, liaison with academic staff, adaptive equipment, technology and training, sign language interpreting, note-taking assistance, mobility parking, ergonomic furniture and access to rest and study rooms.

www.victoria.ac.nz/disability

Early Childhood Services
Victoria Kids has been providing excellent childcare for families for more than 30 years and offers a range of childcare options to suit your needs.

victoriakids.co.nz

Enrolment Office
If you are a prospective student, you can get information, advice and support with enrolment.

www.victoria.ac.nz/2015
If you are a current student, go to www.victoria.ac.nz/reenrol for information on how to re-enrol for 2015.

Fees and payments
Get information and advice related to fees, payments, student levies, scholarships and liaising with StudyLink.

www.victoria.ac.nz/fees

Financial Support and Advice
Get information on all money matters, and in particular, StudyLink. Financial Support and Advice also manages the Hardship Fund.

www.victoria.ac.nz/finadvice

Health Services
Get access to a full range of general practice medical services.

www.victoria.ac.nz/studenthealth
Information Technology Services
ITS supports the use of technology for learning, research and administration across all campuses. ITS also provides access to student-focused applications, shared computer suites, personal laptop clinics and Office 365, the student email and collaboration service.

www.victoria.ac.nz/its

Law Student coordinators
If you are a Māori or Pacific Island student studying law, get help with tutorials, mentoring and study skills sessions.

erin.carr@vuw.ac.nz (Māori) and ella.risati@vuw.ac.nz (Pacific)

Language Learning Centre
Self-study facilities, resources and friendly advice on independent language learning.

www.victoria.ac.nz/llc

Libraries
The Library can support you with all your study and research needs and provides access to quality information resources, collaborative learning spaces and friendly and supportive staff.

www.victoria.ac.nz/library

Marae
Te Herenga Waka Marae
Te Herenga Waka Marae, the University marae on our Kelburn campus, is a gathering place as well as a teaching facility. Resources, support and activities include Te Whanake Mauri Tū Computer Suite, lunches in the wharekai (Tuesday to Thursday) and whānau housing.

Ako Pai Marae
Ako Pai is the University marae on our Karori campus. Te Kura Māori and the staff and students of the Faculty of Education are able to use the marae as a place to study and relax, as well as attend classes in the marae classroom. The marae is available for hire by Victoria groups and non-university groups.

www.victoria.ac.nz/marae

Overseas Exchange
See page 15.

Physiotherapy Clinic
The on-campus physiotherapy clinic is run by Willis Street Physiotherapy. Appointments are available at Kelburn campus, Pipitea campus and at 57 Willis Street, Wellington. Our experienced physiotherapists specialise in treating all kinds of pain, discomfort and injury. No GP referral necessary. Same day/next day appointments are usually available. Freephone 0800 842 749.

www.victoria.ac.nz/physio

Student Interest and Dispute Adviser
If you need support or guidance on any matter involving safety, conflict or misconduct, make contact to discuss what assistance is available to deal with the problem.

www.victoria.ac.nz/disputes-advice

Student Learning Support Service
Group and one-to-one academic support—useful at any stage of your study.

www.victoria.ac.nz/slss

Student Recruitment, Admission and Orientation
If you are a prospective or new student, get course advice and your admission questions answered.

www.victoria.ac.nz/study

Te Rōpū Āwhina
See page 8.

Vic Books and Student Notes
Buy your textbooks (new and used), and student notes online or instore at Kelburn campus and Pipitea campus.

www.vicbooks.co.nz
Victoria Clubs
There are over 130 clubs at Victoria providing a unique extracurricular community for students to get involved.

www.victoria.ac.nz/clubs

Victoria Info Ihonui
Victoria Info Ihonui are places where you can ask questions and get the information you need. They are located in the Hunter Building and at the Kelburn Library entrances on Levels 1 and 2 of the Hub. Friendly staff will answer your questions and refer you to the right place as needed.

www.victoria.ac.nz/students/international

Victoria International
If you are an international student, Victoria International is here to help while you are studying and living in Wellington. We can help with personal, cultural adjustment or academic support, connecting with other students, advice of university services, specialised scholarship support, student visa renewal, insurance claims and advocacy.

www.victoria.ac.nz/students/international

Victoria Recreation
Get access to recreation, fitness and sports, to stay healthy and happy during your studies.

www.victoria.ac.nz/recreation

Victoria University of Wellington Students’ Association
Victoria University of Wellington Students’ Association (VUWSA) is a Victoria student association that provides advocacy, support and advice for all students.

www.vuwsa.org.nz

Publications
The course finder has the most up-to-date course information:

www.victoria.ac.nz

Publications can be downloaded from www.victoria.ac.nz/publications or requested in hardcopy by contacting Student Recruitment, Admission and Orientation.

→ Your Introduction to Victoria (February) gives a brief overview to Victoria’s degrees and student life.
→ Guide to Undergraduate Study (July) includes all information students need about first-year courses, degrees, student life and how to apply.
→ Guide for Parents (May) answers questions parents have about sending their children to university.
→ Accommodation Guide (May) gives information about each hall of residence and how to apply.

Admission
There are various ways you can gain admission to Victoria University of Wellington. For full details of admission and enrolment requirements, see www.victoria.ac.nz/2015

Online enrolment will be open from 1 October 2014. Applications for limited-entry programmes and limited-entry courses are due before 10 December 2014, and applications for open-entry degrees and open-entry courses are due before 10 January 2015.
WE ARE LOOKING FOR PEOPLE WHO ASK US QUESTIONS WE CAN’T ANSWER, WHO CHALLENGE THE STATUS QUO AND MAKE THE WORLD STOP AND THINK.

KNOW YOUR MIND