



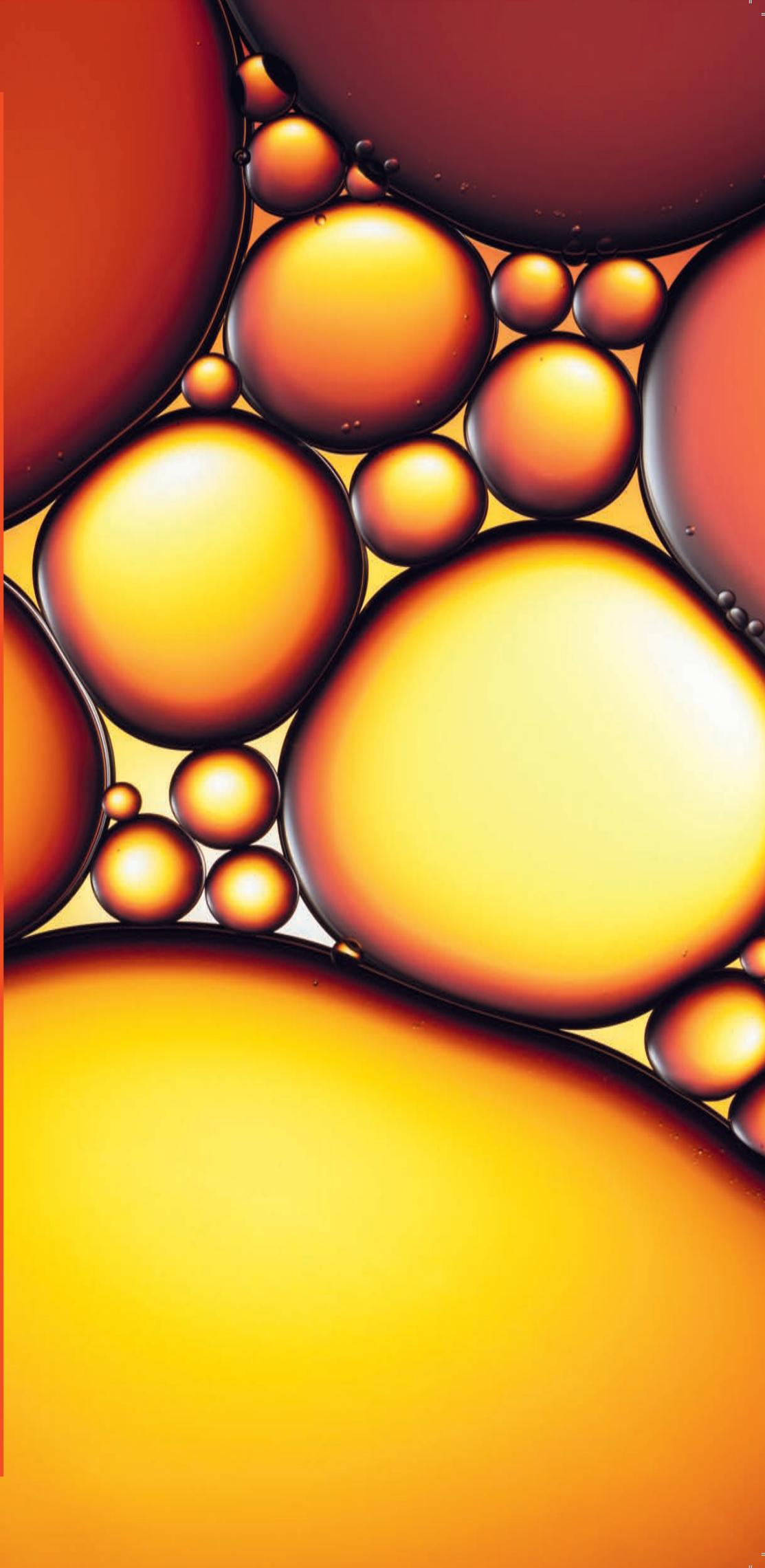
THE UNIVERSITY OF  
**SYDNEY**

**Contact us**

[sydney.edu.au/science](http://sydney.edu.au/science)  
1800 SYD UNI (1800 793 864)  
+61 2 8627 1444 (outside Australia)

**Science research**

Chemistry, Geosciences, History and Philosophy  
of Science, Life and Environmental Sciences,  
Mathematics and Statistics, Medical Sciences,  
Physics, Psychology, Veterinary Science



Cover image: heterogeneous solution of oil and water

We acknowledge the tradition of custodianship and law of the Country on which the University of Sydney campuses stand. We pay our respects to those who have cared and continue to care for Country.



Forest Stewardship Council (FSC®) is a globally recognised certification overseeing all fibre sourcing standards. This provides guarantees for the consumer that products are made of woodchips from well-managed forests and other controlled sources with strict environmental, economical and social standards.



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# Science research

Chemistry, Geosciences, History and Philosophy of Science, Life and Environmental Sciences, Mathematics and Statistics, Medical Sciences, Physics, Psychology, Veterinary Science

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# Where will research study lead you?

Whether you want to gain new professional qualifications, change your career direction or pursue a personal ambition, the University of Sydney will steer you to places you never imagined.

We make it easy for you to tailor your degree to your goals and needs. Our research degrees offer far more than knowledge. You'll join leading thinkers to challenge the known and explore the unknown in a stimulating environment that encourages both learning and networking. To support research and teaching excellence, we are investing in the latest innovative technology and exceptional facilities.

The University's people drive our greatest feats. We give you access to leading research supervisors, industry networks, research and teaching centre staff from Australia and worldwide across many disciplines.

Our graduates are among the world's most sought-after employees – we are ranked first in Australia and fourth in the world for graduate employability.\*

The University's regular ranking in the top 50 universities worldwide reflects our outstanding reputation.\*\*

\* QS Graduate Employability Rankings 2018  
\*\* QS World University Rankings 2019



# Research at the University of Sydney

At the University of Sydney, we are tripling our investment in research by 2020 to change the way we think about the world and how we live and work in it.

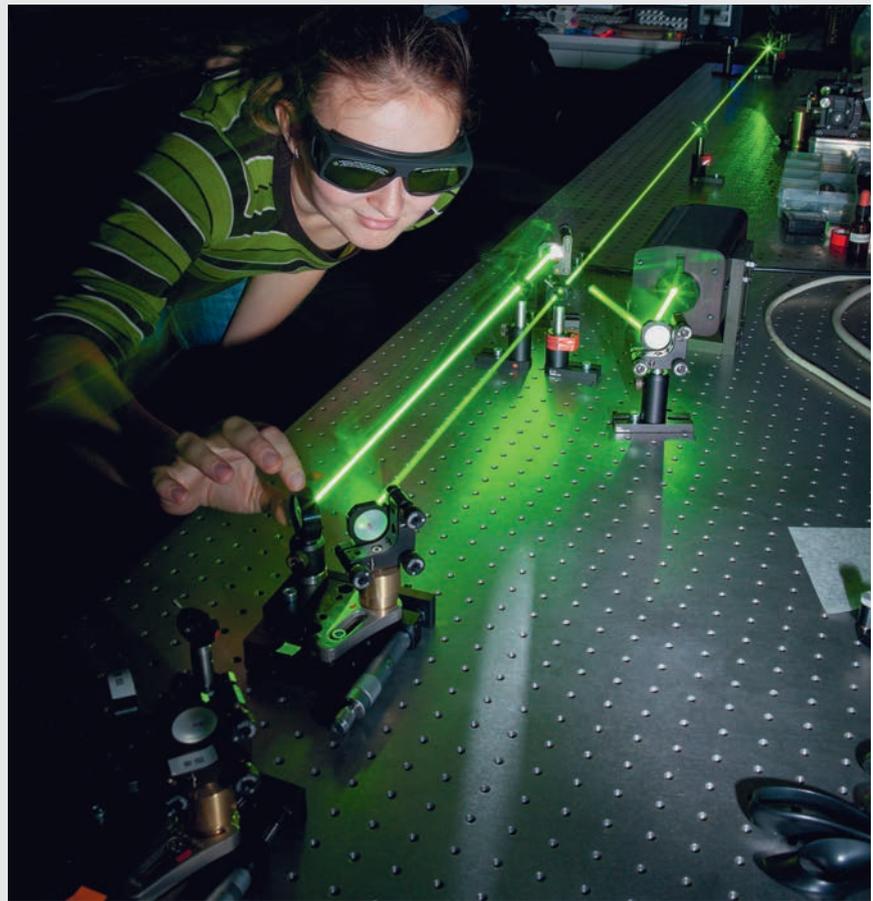
We are one of the world's top research universities and a member of Australia's Group of Eight network and the Association of Pacific Rim Universities. The latter partners us with global universities that excel in research, including Stanford University, UCLA, Shanghai Jiao Tong University and the University of Hong Kong.

Our research is shaped by the big picture. We look at real-world problems from all angles, combining the expertise and talents of scholars from many disciplines.

This collaborative spirit drives our multidisciplinary research centres, including the Charles Perkins Centre and Sydney Nano. We're home to more than 90 research and teaching centres and we have a proud track record of excellence. The Australian Government ranked all of our research at world standard or above in its latest Excellence in Research for Australia ratings.

Read about our current research:

– [sydney.edu.au/research](https://sydney.edu.au/research)



## Our research degrees

Embarking on a research degree at the University of Sydney is an opportunity to work with some of the world's brightest and most accomplished academics. As a student here, you will have the opportunity and support to contribute to meaningful research with real-world impact.

We offer several science degrees that are research-based or have a research component:

- Bachelor of Science (Honours)
- Bachelor of Liberal Arts and Science (Honours)
- Bachelor of Medical Science (Honours)
- Graduate Diploma in Science
- Master of Philosophy (Science)
- Master of Veterinary Clinical Studies
- Doctor of Philosophy (Science)

The Doctor of Philosophy (PhD) is the highest qualification you can attain in Australia.

Learn more about our research degrees:

- [sydney.edu.au/study/pg-research](https://sydney.edu.au/study/pg-research)
- [sydney.edu.au/honours](https://sydney.edu.au/honours)

# Science at Sydney

It has never been more important to conduct quality research and create the next generation of science talent in Australia. The Faculty of Science accomplishes both, playing a key role in Australia's ability to compete scientifically on the world stage.

The Faculty of Science has a long history of nurturing research and innovation and of producing some of the finest minds in academia and industry. Regardless of your research interests, you'll be encouraged to think, challenge, explore, extend and express in an environment where there is never a shortage of inspiration. We encourage you to take your time and discover the right opportunity for you at the University of Sydney.

We consistently attract leading, influential researchers and are one of Australia's most successful faculties in securing prestigious funding awards and grants.

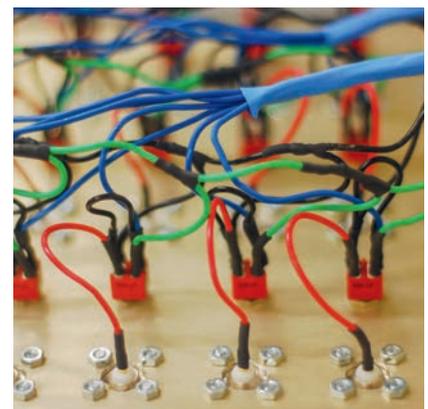
Our world-class facilities and the opportunities we offer afford a significant advantage to those seeking to undertake the highest quality research and enhance their career prospects.

We work in almost all areas of science, and our research ranges from the most fundamental to the strongly industry linked.

We are home to an extraordinarily talented group of students and researchers who work directly with our dedicated academic staff, many of whom are internationally renowned in their fields.

This creates an environment that is stimulating and equips our students with the skills and confidence to engage in research anywhere in the world.

In addition to undertaking innovative research projects, you will develop highly transferable skills in communication, leadership, management and commercialisation. This ensures you will graduate fully prepared to pursue an academic career or move into industry, government or business.



# Why choose Sydney for research in science?



**1** in Australia and **30** in the world for impact of scientific research

CWTS Leiden Ranking 2018



**1** in Australia and **4** in the world for graduate employability

QS Graduate Employability Rankings 2018



**36** in the world for innovation

Thomson Reuters Asia Pacific's Most Innovative Universities 2018



In the **top 50** universities worldwide

QS World University Rankings 2019



We're **tripling our investment** in research by 2020



More than **\$150 million** in research funding on average per year

## QS World University Rankings by Subject 2018

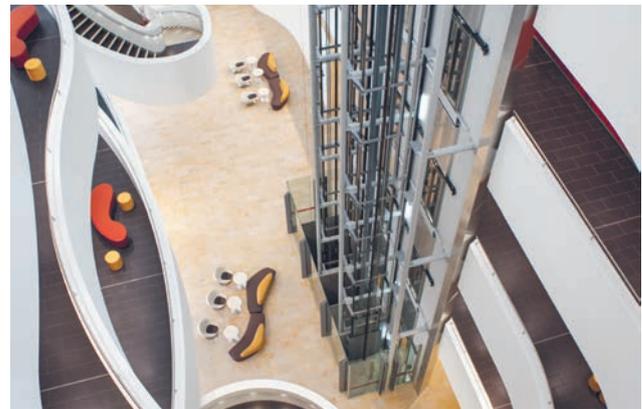
**1** in Australia and **11** in the world for Veterinary Science  
**10** for Anatomy and Physiology  
**15** for Life Sciences and Medicine

**18** for Pharmacy and Pharmacology  
**24** for Geography  
**25** for Psychology  
**42** for Agriculture and Forestry  
**43** for Natural Sciences

**43** for Chemistry  
**45** for Mathematics  
**51-100** for Biology, Earth and Marine Sciences, Physics and Astronomy

# Our research facilities

We have some of the best scientific research facilities in the world, including several multidisciplinary research hubs. Here are just a few.



## Sydney Institute of Agriculture

The Sydney Institute of Agriculture is at the forefront of research and outreach for agricultural innovation, business and policy. It brings together experts from disciplines across the University of Sydney to address the biggest challenges in global food production.

One of the most imperative challenges is how to equitably provide safe and nutritious food for more than 7 billion people. Agriculture is the main source of our food, fibre and biofuel, and remains the primary livelihood of most families in the developing world, including many of the world's poorest.

We have a leading role in the design and integration of components for the 'new agriculture': a high-tech, ecosystem-aware, value-added and consumer-connected food production framework with benefits for consumers, producers and the environment.

– [sydney.edu.au/agriculture](https://sydney.edu.au/agriculture)

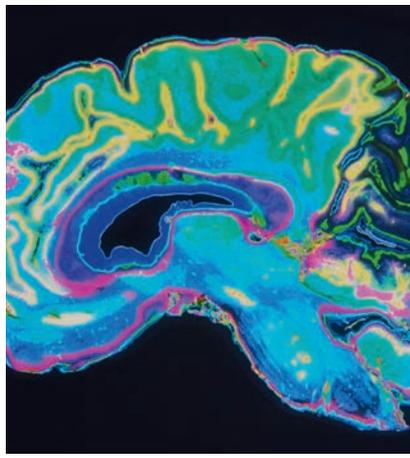
## Charles Perkins Centre

The globally renowned \$385 million Charles Perkins Centre is a research and education hub that forms the focal point of our efforts to address humankind's greatest health challenges.

The centre provides exceptional facilities and technology for more than 1500 undergraduate students, 900 researchers and numerous higher degree research students. It also maintains strong links with affiliated medical research institutes and hospitals, including the Royal Prince Alfred Hospital.

The facilities for our researchers and students include open-plan wet and dry laboratories, lecture and class spaces, computer labs, exercise physiology gym facilities, and core facilities in cellular imaging, preclinical and clinical imaging, cytometry, genomics and proteomics.

– [sydney.edu.au/perkins](https://sydney.edu.au/perkins)



## Sydney Nano Institute

With combined expertise from across the University and access to purpose-built facilities, Sydney Nano is taking research in the field of nanoscience to new levels.

The institute is housed in the Sydney Nanoscience Hub – one of the world’s most advanced nanoscience research and teaching facilities. It is the only building of its kind in the southern hemisphere and one of only a handful in the world.

The hub houses academic laboratories, core nanofabrication and characterisation facilities, and state-of-the-art teaching spaces.

To enable our researchers to fabricate electronic, photonic and mechanical devices small enough to access the exotic phenomena that arise on the nanoscale, the hub contains a high-precision research and prototype foundry and clean room.

We also have a transmission electron microscope (TEM) suite, which is cut into a hillside to form one of the most electromagnetically and mechanically stable environments on Earth.

– [sydney.edu.au/nano](https://sydney.edu.au/nano)

## Brain and Mind Centre

Our teams partner across borders and disciplines in the pursuit of a common goal: the development of better treatments for conditions of the brain and mind, improving health outcomes now and for future generations.

The centre takes a patient-centred approach to understanding and treating conditions of the brain and mind, integrating clinical practice and research to pioneer new systems of care.

A global leader in research and treatment, the centre focuses on conditions that affect child development, youth mental health, brain ageing and neurodegeneration, gambling, neuroimmunology and cannabinoid therapeutics. The aim is to understand individual circumstances and develop solutions that improve the quality of life of both patients and their loved ones.

Our work spans preclinical, clinical and translational research. It extends beyond laboratories and clinics to strong partnerships with industry, government, the community and other healthcare providers and researchers.

– [sydney.edu.au/brain-and-mind](https://sydney.edu.au/brain-and-mind)

## Marine Studies Institute

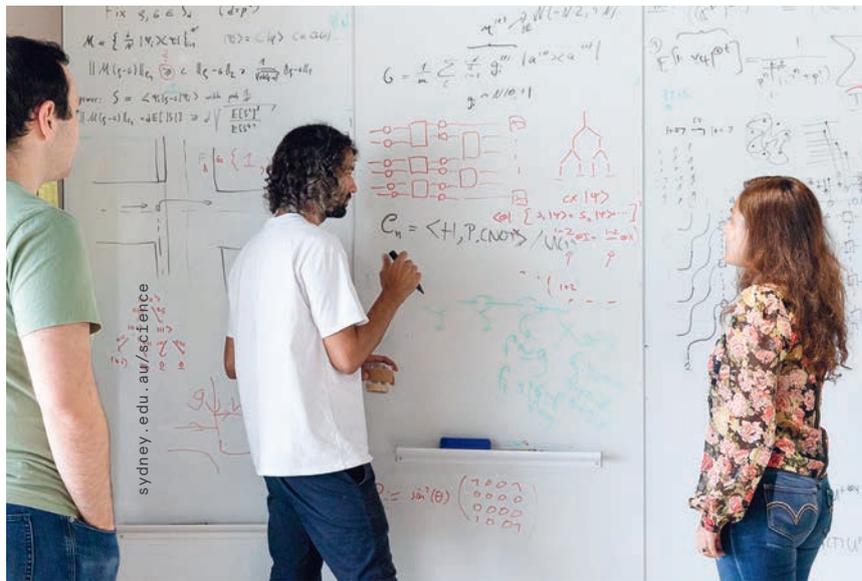
The Marine Studies Institute provides a cross-disciplinary focus for undergraduate and graduate research, teaching and training in marine science. Its connections across a wide range of disciplines in biological, geographical and earth sciences create opportunities for students and researchers alike.

The institute is an umbrella organisation and facilitator for eight research groups, including the Centre for Research on Ecological Impacts of Coastal Cities, the Coastal Studies Unit, the Ocean Technology Group, the Australian Ocean Drilling Program, and the Centre for Geotechnical Research.

Through the institute, our students have access to unique and world-class marine research facilities, including One Tree Island Field Station on the Great Barrier Reef, the Crommelin Biological Field Station in Broken Bay, the SIMS Research Station in Sydney Harbour and the Cape Banks Scientific Marine Research Area.

Specialised equipment for field research includes seismic equipment, environmental monitoring equipment, supercomputing for modelling and visualisation, the Australian Centre for Microscopy and Microanalysis, and the Macintosh Centre for Quaternary Dating.

– [sydney.edu.au/msi](https://sydney.edu.au/msi)



### Research centres and institutes

- Centre for Complex Systems
- Centre for Medical Psychology and Evidence-based Decision Making
- Centre for Translational Data Science
- Charles Perkins Centre
- Institute for Astronomy
- Institute for Innovation in Science and Mathematics Education
- Institute of Agriculture
- Institute of Medical Physics
- Institute of Photonics and Optical Science
- Key Centre for Polymers and Colloids
- Marine Studies Institute
- Sydney Nano Institute
- Psycho-oncology Co-operative Research Group.

### Affiliated centres

- Australian Centre for Microscopy and Microanalysis
- Centre for All-Sky Astrophysics
- Centre for Engineered Quantum Systems
- Centre for Particle Physics at the Terascale
- Centre for Quantum Computation and Communication Technology
- Centre for Ultrahigh Bandwidth Devices for Optical Systems.



# Where can a PhD take you?



## **Dr Brendan McMonigal**

Bachelor of Science (Advanced) with Honours Class I,  
and Bachelor of Arts  
PhD in Physics  
Software Engineer at Google

“In my PhD, I studied the formation and evolution of galaxies, and now in my work at Google, I study the expansion and evolution of their network.

“The skills I gained in my physics studies are highly transferable, and I now use them at Google to improve its network, ensuring a more digitally connected society. I completed my PhD and got a full-time job offer from Google on the same day.”



## **Dr Alice Klein**

Bachelor of Science (Advanced) with Honours Class I  
PhD in Chemistry  
Australasia Reporter at *New Scientist*

“In my PhD in chemistry, I designed new drugs for prostate cancer and tested them on artificially grown tumours. Now as the Australasia reporter at *New Scientist*, my job has involved climbing volcanoes in Hawaii, chasing endangered tortoises in Myanmar and giving my DNA over to science.

“I’ve always loved science, and I think my scientific training has helped me to become a more analytical journalist. Possibly more cynical too – I don’t take things at face value because I’ve learned to always check the facts.”

# Research in Chemistry

The School of Chemistry has an international reputation for excellence in research and teaching, and consistently ranks among the top chemistry departments in Australia.

## About us

As a research student, your training in chemistry will be intimately linked with research activities. You will benefit from our collaborative links with industry through our Laboratory of Advanced Catalysis for Sustainability and our Key Centre for Polymers and Colloids.

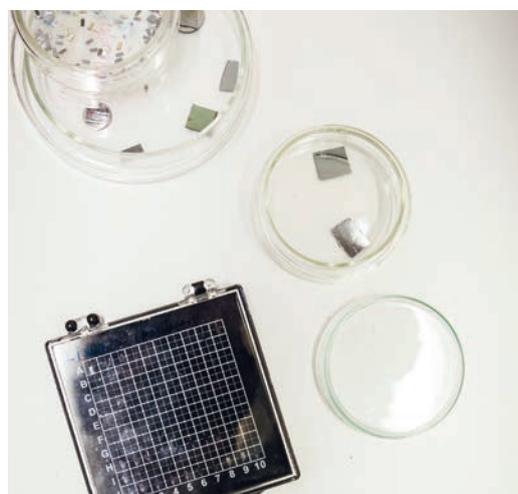
In 2016, members of the school secured more than \$7 million in new research funding from the Australian Research Council and National Health and Medical Research Council, more than \$1 million in other competitive research funding and \$21 million in private-sector investment in its spin-off companies.

We greatly value our research student community and will provide you with academic and professional support through your candidature.

You will have access to modern research instrumentation, including major research facilities for nuclear magnetic resonance spectrometry, mass spectrometry, vibrational and optical spectroscopy, x-ray crystallography, separations, thermophysical properties and high-performance computing.

Our research infrastructure, which underpins and supports all our research programs, includes in-house mechanical and electronic workshops. All our students have access to the latest instruments, and work in newly renovated laboratories and offices.

Our SciTech Library holds all the main chemistry titles and provides online access to national and international databases.





## Research highlights

Our research leadership is built on our collective expertise and experience with major national and international research facilities. These include the Australian Synchrotron and the Australian Nuclear Science and Technology Organisation's OPAL research reactor, as well as international collaborations and facilities including the NIST Center for Neutron Research in the US and the Rutherford Appleton Laboratory in the United Kingdom.

Our academic staff and research students maintain a significant presence at national and international conferences, and many of our research students have been awarded prizes for their presentations at such conferences. This track record reflects the excellence of the research they are undertaking and their ability to deliver compelling presentations to an audience.

The school has 37 academic staff, more than 50 postdoctoral research fellows and more than 125 postgraduate students. These include four Fellows of the Australian Academy of Science, five ARC Future Fellows, two Westpac Fellows and four other funded Fellowships.

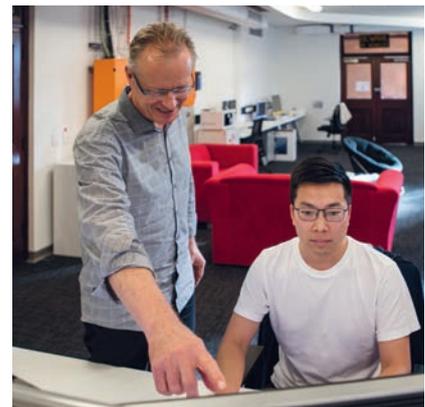
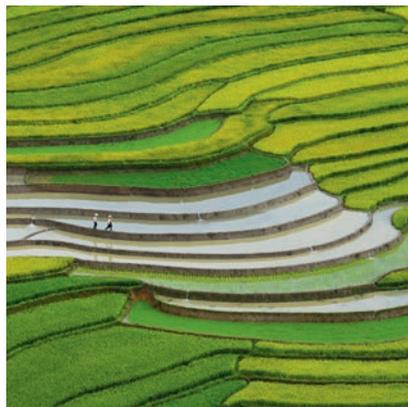
## Areas of research

- Biological chemistry and chemical biology
- Chemical education
- Computational and theoretical chemistry
- Drug discovery and medicinal chemistry
- Green chemistry and renewable energy
- Materials chemistry
- Molecular design and synthesis
- Molecular spectroscopy and photonics
- Neutron and synchrotron diffraction and spectroscopy
- Soft matter
- Supramolecular chemistry.

# Geosciences

The School of Geosciences encompasses the fields of geography, geology and geophysics.

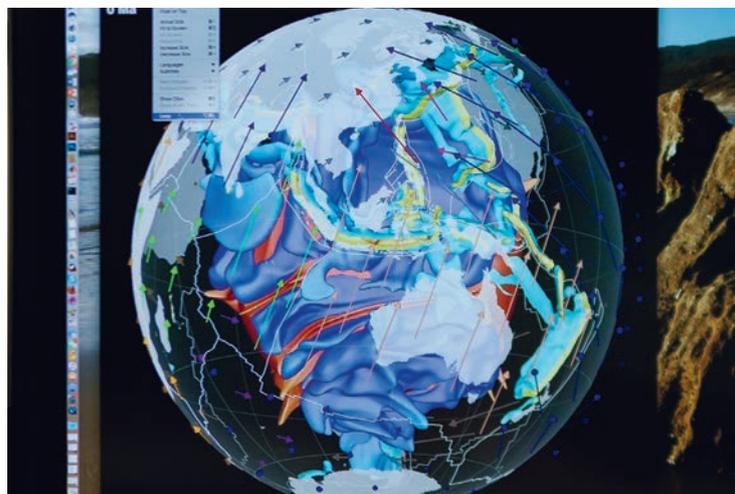
Our long tradition of rigorous research is complemented by active geography, geology and geophysics teaching programs. The skills you acquire through your research in the geosciences will enable you to build a career with the potential to travel and work in interesting locations and contribute to a sustainable future.



# Research in geosciences

## Geography

As the need to find solutions to issues of environmental sustainability, population growth and globalisation becomes more urgent, the skills and knowledge of geographers are coming to the forefront.



Research study in geography provides a toolkit to think critically about the relationships between people, environments and places, and work towards resolving complex real-world problems.

Our expertise in geography encompasses a broad range of research fields, including:

- the challenges of managing environment and development in the Asia-Pacific region
- making our cities sustainable places to live
- understanding the restructuring of populations and economies across the world
- forging sustainable futures for communities in rural Australia
- creating knowledge about the ways in which populations adapt to the uncertainties of climate change and food insecurity.

Our geographers are key participants in the University's Sydney Southeast Asia Centre and in various forums and institutions with a focus on sustainability, urban futures and global development.

As a researcher, you will have the opportunity to work alongside academic staff with high-profile international reputations in a tight-knit and supportive research community.

### Research strengths

Our geographers have strong interdisciplinary relationships across the University and with industry and government, as well as extensive links to other universities and research institutes within Australia and overseas.

Our research community is richly diverse, including postgraduate students from Cambodia, China, Germany, India, Indonesia, Iran, Laos, Nepal, the Netherlands, the Philippines, Taiwan, Thailand, Tonga and Vietnam.

We engage in international research collaborations with Myanmar, China, Germany, India, Indonesia, New Zealand, the United Kingdom and the United States, among many other countries.

### Specialisations

- Asia-Pacific geographies
- Citizenship, democratisation and public space in global cities
- Climate change policy, politics and markets, including adaptation and resilience
- Environmental histories, processes and protection
- Environmental pollution, monitoring and remediation
- Farm futures, global food security, animal industries and water management
- Geographic information system (GIS) science and environmental remote sensing
- Geographies of development, globalisation and global value chains
- Natural hazards and disaster risk reduction
- Natural resource management and its governance
- Social, economic and environmental sustainability in urban and regional Australia.

# Research in geosciences

## Geology and geophysics

We are leaders in the development and application of advanced computational solutions for geoscientific research. Our well-established and interdisciplinary research community in geology and geophysics spans a wide range of fields and engages in active collaborations across the world.

Under the expert direction of Professor Dietmar Müller, our EarthByte research group leads the development of the GPLates Paleogeographic Information software – the global standard for analysing Earth’s evolution within a plate tectonics context that is currently used in 182 countries.

We have ongoing collaborations with researchers in Canada, China, France, Germany, India, Indonesia, Japan, Norway, Portugal, Singapore, South Korea, Switzerland, Taiwan, Thailand, the United Kingdom, the United States and Vietnam.

We also support the scientific and policy development activities of the United Nations Environment Programme through an association with an implementing agency.

### Research strengths

Our Geocoastal Research Group focuses on the full spectrum of coastal sedimentary environments.

EarthByte is one of the world’s leading research groups for plate tectonic reconstructions and studying the interplay between deep earth and surface processes.

Our Natural Hazards and Disaster Risk Research Group investigates a wide range of natural and technological hazards.

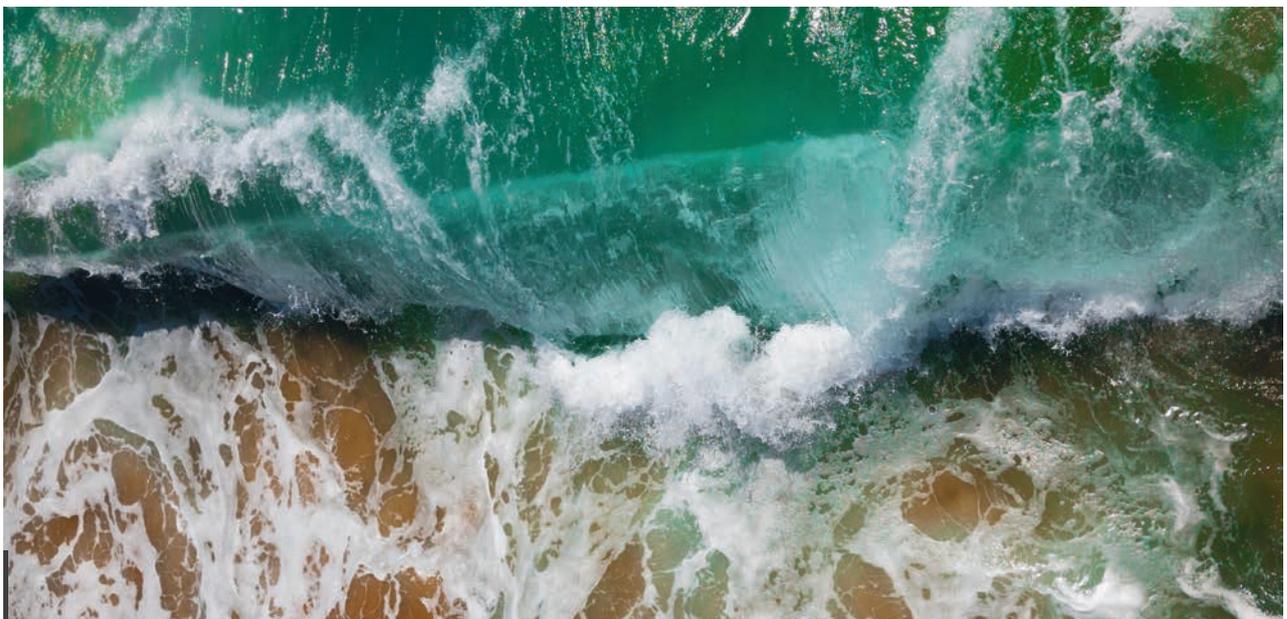
Strong integration with the University of Sydney’s Marine Studies Institute connects our geocoastal research with the related fields of coastal marine ecology, marine robotics and coastal engineering.

We also have research strengths in urban geography, with a focus on housing, planning, transport and sustainability in Sydney and beyond.

Our Basin GENESIS Hub connects big data analysis and high-performance computing in an open innovation framework.

### Specialisations

- Early Earth evolution
- Environmental geology and geochemistry
- e-Research
- Geocoastal research
- Geophysics
- Marine processes
- Mineral and energy resources
- Natural hazards
- Tectonics.



# Research in History and philosophy of science

Situated at the crossroads of science and the arts, this fascinating discipline provides the framework to critically engage with the social and cultural significance of the sciences that shape our world.



The field of study examines past and current developments in all areas of science, technology and medicine from a range of humanistic perspectives, using sociohistorical and philosophical techniques to explore their social, political, cultural and conceptual implications.

## About us

Our history and philosophy of science researchers have developed innovative interdisciplinary approaches to investigating and analysing developments in science, technology and medicine.

Publishing widely and enjoying international recognition, their active research records have attracted significant funding from both Australian and international sources, and they bring the latest scholarship to their teaching and research.

We regularly host international researchers who contribute new insights and ways of thinking, and both our researchers and our postgraduate students are involved in internationally collaborative research projects.

We emphasise self-motivated learning, with close, personalised guidance from academics who are active researchers in your chosen field.

Our research programs are designed to ensure that you develop specialised knowledge and expertise in your chosen area of interest, as well as transferable practical skills, such as how to structure research projects to manage your time efficiently and effectively.

## Research strengths

Our community of active researchers in the history and philosophy of science is one of the largest in the world; their research attracts significant funding from Australian and global sources.

They are actively engaged in international research projects in this specialised field, and have a broad range of international connections.

## Specialisations

- Colonial and post-colonial science and medicine (with a focus on Asia)
- Early modern science
- History and philosophy of modern physics
- History and philosophy of science and medicine
- History and philosophy of the human sciences
- Science and technology studies.

# Research in Life and environmental sciences

Our researchers in the life, earth and environmental sciences work together in a single school to research the biggest issues facing our planet.

## About us

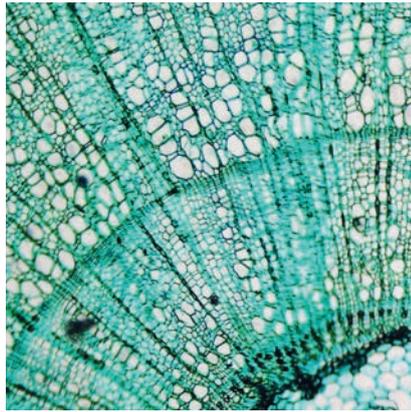
While the School of Life and Environmental Sciences is our newest school, these specialisations have a long history of academic excellence at the University of Sydney.

Our research and teaching activities are shaping new approaches to tackling a variety of increasingly important global challenges, including health and disease, antibiotic-resistant bacteria, ecosystem degradation and food security.

## Research strengths

- Leading researchers, many of whom hold prestigious fellowships and prizes
- Research links with leading international organisations, including top universities and research organisations such as Oxford, Cambridge, Princeton, the Chinese Academy of Sciences and EMBL Heidelberg, and with local groups such as the Australian Museum, Grains Research Development Corporation, Marine Studies Institute and CSIRO
- Members of University-wide interdisciplinary initiatives including the Charles Perkins Centre, Sydney Nano Institute, Bosch Institute, Marie Bashir Institute and Sydney Institute of Agriculture
- Field stations at the Great Barrier Reef, NSW Central Coast, Northern Territory and Simpson Desert.





## Specialisations

### Animal Sciences

Spanning the molecular to the whole-ecosystem, animal sciences covers the health, nutrition, reproduction and genetics of vertebrate animals. Research and teaching includes the health and management of wildlife, domestic and companion animals, and production animals in agriculture.

Our international leaders in companion animal health, genetics, welfare and behaviour research apply innovative technology and techniques to improve the health, welfare and productivity of all animals.

Specialist areas within animal sciences include genetics and genomics, animal welfare, animal physiology, parasitology, microbiology that impacts vertebrates, and veterinary pharmacology, as well as animal biochemistry, wildlife population management, zoonoses, veterinary epidemiology, production animal care research, animal husbandry, computational biology, systems biology, nutrition and reproduction.

### Biochemistry, Cellular and Molecular Biology

Biochemistry, cellular and molecular biology are focused on understanding the molecular mechanisms and cellular processes that underpin all forms of life. Our researchers apply this knowledge to realise economic, therapeutic and technological outcomes that help society.

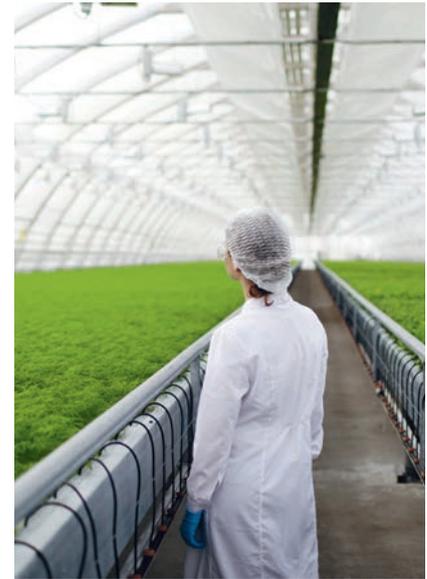
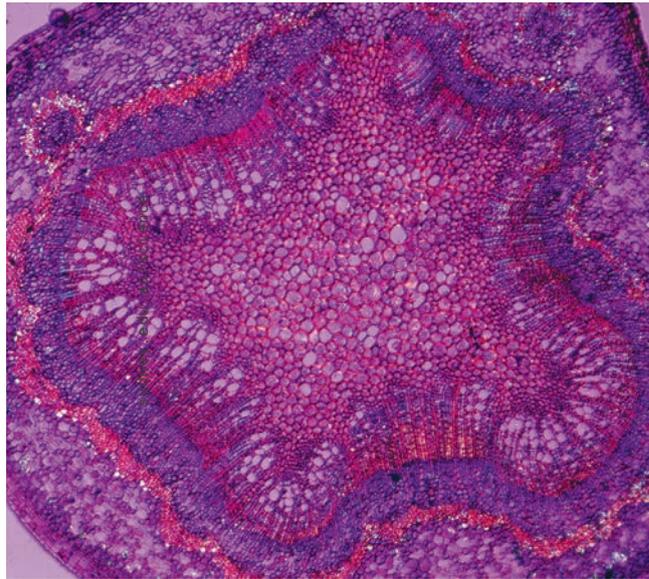
Areas of active research in this area encompass human, plant and agricultural biochemistry; the molecular and cellular mechanisms underlying human diseases such as cancer, diabetes and neurological disorders; molecular biotechnology; and metabolism and human nutrition. Core capabilities include functional genomics, mass spectrometry, live cell imaging, structural biology, biophysics and leading model organisms.

### Ecology, Evolution and Environmental Science

While ecology investigates the processes that govern the biological interactions between individuals and operate on ecosystem scales, evolution is a theme that unifies the biological sciences and provides the framework for understanding the diversification of life on Earth.

We study life at all levels, from viruses and genes to individuals and whole ecosystems, both natural and manufactured. We examine the living world from an evolutionary perspective and use approaches from a number of disciplines to provide a bigger picture of how life functions and adapts to changing conditions.

Specialist areas within this field include behavioural ecology, behavioural genetics, conservation biology, ecophysiology, epidemiology and infectious diseases, landscape ecology, marine science, molecular biology, molecular evolution and soil science.



### Microbiology

Microbiology is the study of organisms that are too small to be seen with the human eye, including bacteria, fungi, viruses and protists. These organisms are involved in diverse processes that underpin our ecosystems, cause health and disease, and result in useful products ranging from beer to biofuels.

The microbiology group studies microorganisms, how they affect our lives, our environment and our planet, how we can harness them for our use, and stop them from causing us harm.

Microbiology is a diverse offering. We take a One Health approach by recognising the interconnectedness of health in humans, animals and the environment. Current research includes environmental bioremediation, the gut microbiome in humans, analysis of human bacterial, viral and fungal pathogens, antimicrobial drug development and drug resistance, food and agricultural microbiology, and veterinary microbiology.

### Nutrition and Dietetics

This field includes the study of the food we eat and its effects on our wellbeing and on the prevention and management of disease. Areas of active research include nutritional epidemiology to determine diet and disease relationships and monitor the intake of the Australian population, especially at-risk groups such as adolescents, young adults and the elderly.

Through careful systematic review of the existing nutrition literature, we formulate dietary recommendations and translate them into behavioural nutrition interventions.

Core capabilities of this group include the design and validation of instruments and technologies to assess food intakes and interpretation of dietary intake data, as well as the design of mobile health nutrition interventions.

### Plant Sciences

Our plant sciences researchers study the full range of plant sciences, from molecular biology and plant physiology through to the interactions of natural and managed plant communities with biotic and abiotic environments.

Our research outputs cover fundamental aspects of plant growth all the way through to plant-based foods in our diet. With research sites in central Sydney, Camden and Narrabri, and field sites in many other locations, our research involves plants both in protected agricultural regions and out in the field.

We have strong relationships with plant-based industries, enabling our research to be funded by and engaged with industry and our students to experience plant science in context.

Specialist areas within this field include plant genetics and breeding, production of commercial cultivars, plant pathology, agronomy, characterising chemical constituents of plants, bushfire ecology and plant physiology.

# Research in Mathematics and statistics

The School of Mathematics and Statistics is one of the largest mathematical sciences schools in Australia, and the University of Sydney is the only Australian university to have received the highest rating (5 out of 5) for research in the mathematical sciences in every Australian Research Council (ARC) Excellence in Research for Australia assessment to date. Our research study is varied and flexible, catering for students from many backgrounds and with a range of research interests.

## About us

In the past three years alone, our researchers have secured more than \$12 million in funding from the Australian Research Council and the National Health and Medical Research Council to fund 30 separate research projects, and have published more than 400 refereed journal articles as well as eight books.

We value your professional development and hold regular seminars, workshops and conferences to ensure that you stay abreast of the latest developments in the mathematical sciences. We also support an active program of long-term and short-term visits by distinguished international academics in order to broaden your global outlook.

## Research highlights

We engage in extensive ongoing research collaborations with leading researchers in a number of countries including Canada, China, France, Germany, Japan, Russia, the United Kingdom and the United States.

We developed Magma, a world-leading computational algebra and number theory package that is used both in industry and in many branches of pure and applied mathematics.

Among our academic staff are a Fellow of the Royal Society, six Fellows of the Australian Academy of Science, one Georgina Sweet Australian Laureate Fellow, four ARC Future Fellows and six ARC Discovery Early Career researchers.

## Specialisations

- Algebra and representation theory
- Applied mathematics
- Bioinformatics and biometrics
- Computational algebra
- Data science
- Financial mathematics
- Geometry, topology and analysis
- Non-linear analysis
- Statistics
- Tertiary mathematics and statistics education.



# Research in Medical sciences

As part of both the Faculty of Science and the Faculty of Medicine and Health, the highly regarded School of Medical Sciences covers a range of disciplines relevant to the medical, dental and related sciences.

## About us

Our research arm is the Bosch Institute, a major centre for medical science research at the University of Sydney.

Honours and graduate diploma programs are administered by the Faculty of Science, while Master's and PhD programs are administered by the Faculty of Medicine and Health.

You can choose to conduct your research at Westmead, where you'll learn from leading experts who are conducting critical research into the causes and mechanisms of disease.

Scientists at Westmead work in close collaboration with clinicians, giving unparalleled opportunities for 'bench to bedside' translational research.

## Specialisations

### Anatomy and histology

Our internationally renowned anatomy and histology research team has access to well-equipped research laboratories and an outstanding record of research published in top international journals. The discipline is one of the largest at the University of Sydney and the largest of its type in Australia.

### Biomedical science

Our biomedical science researchers – located at the Cumberland Campus in Lidcombe – are active in a broad range of areas including anti-cancer drug discovery and therapy, antimicrobial resistance, cardiovascular control, cellular and reproductive toxicology, elite music performance, neurophysiology (including molecular neuroscience and neurodegeneration), respiratory motor control, sensory systems, shoulder function and dysfunction, and vision and visual neuroscience.

### Pathology

To investigate the causes and processes of a large number of human diseases, our active pathology researchers use a wide range of the latest techniques on both human tissue and experimental animals.

### Pharmacology

Pharmacology is a vibrant and active research area, with research groups using the latest technology to understand how drugs affect the body and to develop new drugs to treat disease. The discipline attracts research funds from the National Health and Medical Research Council and other groups.

### Physiology

Our commitment to understanding the functions of the human body is reflected in the strong tradition and high profile of our physiology research program.



# Research in Physics

The School of Physics at the University of Sydney is one of the leading physics departments in Australia, with outstanding staff and students who are pioneering new ways of thinking and innovative approaches.



With access to supercomputers, modern laboratory facilities and observatories locally, nationally and internationally, this is the premier environment for physics education and research.

## About us

Our research students have the opportunity to learn from internationally recognised experts, contribute to original research in physics and become part of our community of scientists and scholars.

Many of our academic staff are leaders in their fields, providing you with the opportunity to learn physics from the dynamic individuals and groups defining the discipline.

The quality of our research is recognised through our leadership in national and international research programs, including Australian Research Council and National Health and Medical Research Council Centres of Excellence.

In addition, prominent domestic and international collaborations with researchers in the United States, Europe and Asia, funded through multi-year competitive awards, present a range of invaluable research opportunities.

You can also be involved in nanoscience research projects being undertaken at the Sydney Nanoscience Hub, headquarters of Sydney Nano.

## Research strengths

We are renowned in Australia and internationally for our high-profile research initiatives, which include:

- major programs in astrophysics and space physics, including University-operated telescopes and links with the Square Kilometre Array (SKA)
- leading international projects in both experimental and theoretical quantum physics, including opportunities in quantum computing through our new partnership with Microsoft Research

- large-scale research into photonics and optical science for next-generation communications technology
- interdisciplinary research in biological and medical physics, spanning computational physics, condensed matter and materials science, brain dynamics and clinical applications
- a leading role in international research efforts at the Large Hadron Collider, contributing to fundamental tests of nature and work towards the discovery of the Higgs boson.

## Specialisations

- Astrophysics, space and solar physics
- Biological and medical physics and systems neuroscience
- Condensed matter and materials physics and nanotechnology
- Energy and sustainability
- High energy and particle physics
- Photonics and optical sciences
- Quantum science.

# Research in Psychology

The School of Psychology is one of Australia's largest and most prestigious psychology schools. Many of our graduates are now department heads and senior staff in universities and clinical settings around the world, while others have achieved excellence in industry, the media and politics.

## About us

Our research is internationally renowned. We consistently rank among the best psychology schools in the world, attract more than \$14 million in competitive research funding annually from government and industry, and have many academic staff supported by prestigious research fellowships.

Our research students are vital contributors to our excellence in research. They enjoy a supportive and rigorous environment within both their area of specialisation and the wider school community.

We offer a well-resourced and stimulating intellectual environment for research, which includes competitive top-up scholarships, teaching fellowships and financial support to attend national and international conferences and other forms of professional development.

As well as having direct access to discipline-specific research facilities, our students are encouraged to participate in the University's broader research student community, and to develop their methodological and professional skills.

Weekly colloquia, along with scheduled seminars and social events, provide opportunities to expand both the depth and the breadth of your knowledge.

There are also opportunities to showcase your research, including the Annual Postgraduate Conference, which is organised entirely by postgraduate research students.





## Research strengths

We have a history of exceptional research in experimental psychology that has expanded over the years into key specialist areas of expertise and various multidisciplinary research strengths.

Our researchers actively collaborate with other researchers across the University through multidisciplinary initiatives, including:

- the Brain and Mind Centre, where researchers work together on mental health, cognition and brain sciences (see page 7)
- the Charles Perkins Centre, which tackles the global issues of obesity, diabetes, cardiovascular disease and related conditions (see page 6)
- a world-renowned psycho-oncology research group based at the Chris O'Brien Lifehouse.

In addition, we received a donation of more than \$30 million to study the medicinal use of cannabinoids, placing us at the forefront of medicinal cannabinoid research and making Australia an international leader in this field.

We offer a large number of well-equipped research laboratories and many of our current postgraduate students are involved in important research collaborations both nationally and internationally.



## Specialisations

- Clinical psychology (including anxiety and eating disorders)
- Cognitive psychology
- Developmental psychology
- Health psychology
- Human factors
- Learning and behavioural neuroscience
- Organisational and coaching psychology
- Perception
- Personality and intelligence
- Psycho-oncology
- Psychopharmacology
- Social psychology.

# Research in Veterinary science

Our outstanding research activities, clinical facilities and reciprocal links with academic peers around the world have seen us recently ranked No. 1 in Australia and 11th in the world by the QS World University Rankings by Subject.

We are one of a small group of elite veterinary schools outside North America to receive accreditation from the American Veterinary Medical Association.

## About us

The University of Sydney's School of Veterinary Science is recognised internationally as a leading provider of veterinary science education and a key contributor to the world's best practice in the care and welfare of animals. Our vision is to continue to be a leader in veterinary education, animal science and research, focusing on the health, production efficiency and welfare of animals.

We have a broad and well-respected research profile, providing unique opportunities for researchers in preclinical, paraclinical and clinical disciplines, including those relevant to animal industries, wildlife and animal welfare.

We encourage high-level research performance by providing strong guidance, inclusion and support for our postgraduate students at both personal and professional levels. We also foster strong and supportive bonds between students, and assist you to develop high-level communication skills and present your research for international recognition.

We have strong links to the production animal industries and to welfare and wildlife organisations as well as to the veterinary profession. These networks support our students' development and extend their career opportunities.

## Research strengths

Our veterinary clinics (at Camperdown and Camden) have world-class facilities and support research in feline and canine epidemiology, disease diagnosis and control.

Our Camden clinics are also used for research into equine physiology, infectious diseases, behaviour and welfare, as well as livestock, avian, reptile and exotic animals research.

## Specialisations

- Companion animals
- One Health
- Production animals
- Wildlife.



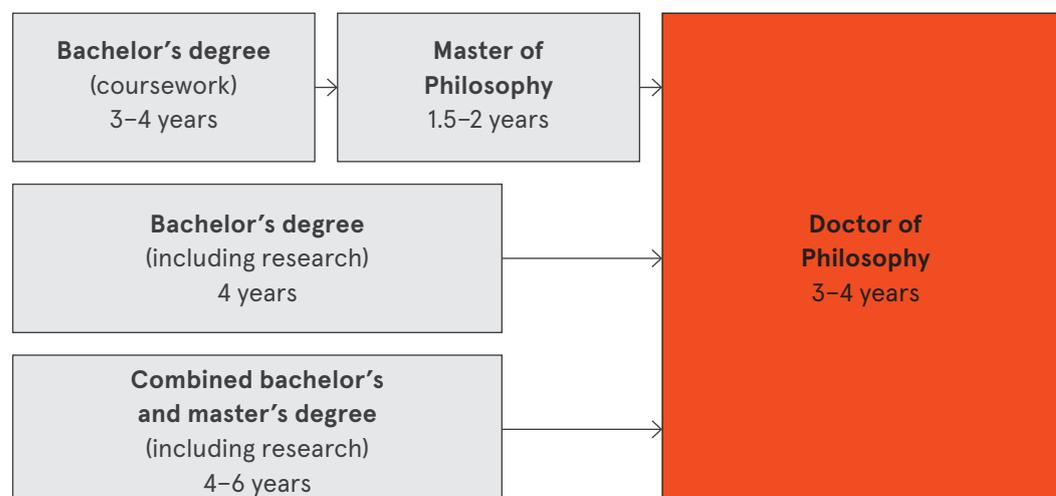
# Pathways to research

Our research degrees involve in-depth study in a specialised area. This has two purposes:

- 1** To enable you to prepare a substantial piece of work that represents a significant contribution to a particular field of knowledge.
- 2** To train you in general research methodology and equip you with transferable research skills to pursue an academic career or move into industry, government, business or elsewhere.

## Your road to research

There is more than one pathway to a research degree.



## Honours

Honours is an additional year of undergraduate study available to eligible students after completing an undergraduate degree. It's a unique opportunity to explore your research potential and put theory into practice.

An honours qualification is highly regarded not only in academia but also in industry, where concentrated study in a specialised area is greatly valued.

If you are not admitted to the honours program, you may consider the Graduate Diploma in Science as an alternative.

## Master of Philosophy (Science)

The Master of Philosophy (Science) opens the door to the world of scientific research. In most cases you will also be required to complete some coursework.

You will learn to manage extensive research projects, use advanced scientific tools and write reports fit for publication. Your skills as an independent researcher will enable you to go on to a prominent career in academic research or in policy, industry, management, government, business or international development.

If you are a high-achieving student who has not yet completed any research studies (such as an honours year), you can apply for this program to gain research experience.

## Doctor of Philosophy (Science)

The Doctor of Philosophy (PhD) in Science allows you to pursue scientific research from a wide range of areas in which the faculty has expertise.

It enables you to prepare a substantial piece of work representing a significant contribution to a particular field of scientific knowledge, and trains you in general research methodology and transferable research skills.

The PhD is aimed at people who intend to pursue a career in scientific research or who wish to gain a competitive edge by demonstrating superior ability and research experience. It culminates in the submission of an 80,000 word thesis.

## Research degrees

Course name	Entry	Duration	CRICOS code
<b>Honours</b>			
Bachelor of Liberal Arts and Science (Honours)	March, July	Full time: 1 year Part time: 2 years	074884B
Bachelor of Medical Science (Honours)	March, July	Full time: 1 year Part time: 2 years	040575G
Bachelor of Science (Honours)	March, July	Full time: 1 year Part time: 2 years	036745F
<b>Graduate diploma</b>			
Graduate Diploma in Science	March, July	Full time: 1 year Part time: 2 years	012846K
<b>Master's degrees</b>			
Master of Philosophy (Science)	January, March, July, October	Full time: 1.5–2 years Part time: 3–4 years	086400F
Master of Veterinary Clinical Studies	February, August	Full time: 3–4 years	008426J
<b>PhD</b>			
Doctor of Philosophy (Science)	January, March, July, October	Full time: 3–4 years Part time: 4–8 years	000722K

## Supporting your research success

A wide variety of generous scholarships are available to our research students.

As details are subject to change, we suggest that you review our website regularly for current information on eligibility criteria, application details and closing dates.

– [sydney.edu.au/scholarships/research](https://sydney.edu.au/scholarships/research)

# How to apply

## Domestic and international students

### These steps will guide you in applying for a research master's or PhD degree at the University of Sydney.

You need to secure the support of a supervisor before you can proceed to the application stage. This is an important step, and we encourage you to think carefully about your research proposal and how it aligns with the work of your potential supervisor.

This is your opportunity to showcase your previous experience and the strength of your research project.

#### Step 1: Choose a degree

Start by reviewing the types of degrees we offer and check the admission criteria for the research degree you want to apply for.

We encourage you to apply well ahead of time, even before completion of your current qualifying degree. In these circumstances, referee reports are essential as part of the application for admission.

– [sydney.edu.au/study/pg-research](https://sydney.edu.au/study/pg-research)

#### Step 2: Develop your research ideas

Carefully consider the subject of your research and find out if your interests align with any academic members of staff. At this point you need to develop an initial research proposal. While it is unlikely this proposal will capture all the details of your project, it is important to think seriously about it, and clearly explain your ideas. It should not be a generic or vague proposal but should actively show why your research is noteworthy and how it aligns with your proposed supervisor's own work.

For guidelines on preparing your research proposal for admission, refer to our website:

– [sydney.edu.au/study/pg-research](https://sydney.edu.au/study/pg-research)

#### Step 3: Find a supervisor

You'll need a staff member who has agreed to mentor you for the duration of your research. Use the Research Supervisor Connect database to search for current supervisors and projects.

– [sydney.edu.au/research/opportunities](https://sydney.edu.au/research/opportunities)

Use the 'Contact research expert' button to contact a potential supervisor. To support your enquiry, describe your academic background and research experience, the topic you'd like to research and how your proposed research project aligns with their background. Include your resume, academic transcript for all completed degrees and your initial research proposal (up to 2000 words).

#### **Step 4:** **Submit your application**

When you have secured a supervisor, you will discuss and refine the project together. Once your research proposal is finalised, you can submit a direct online application to the University of Sydney through our website.

- [sydney.edu.au/courses](https://sydney.edu.au/courses)

You will need to include the following documents:

- academic transcripts
- English language proficiency if required
- resume
- referee reports
- finalised research proposal
- evidence of an academic staff member's agreement to supervise you.

You can save and return to your application, upload documentation, and formally accept an offer if your application is successful.

We accept applications all year round and offer four research periods each year when you can start your study with us.

For key research dates, visit:

- [sydney.edu.au/study/admissions-timeline](https://sydney.edu.au/study/admissions-timeline)

If you are an international student, you can also engage the services of a University agent (representative) to help with your application.

- [sydney.edu.au/study/overseas-agents](https://sydney.edu.au/study/overseas-agents)

## **Important dates**

Here are some key dates to add to your calendar for the year ahead.

**Open Day**  
25 August 2018

**Postgraduate Studies Expo**  
12 September 2018

**Postgraduate Study and Research Week**  
10-14 September 2018

**Academic Advice Day**  
Wednesday 16 January 2019

**Postgraduate Study and Research Information Evening**  
May 2019

#### **Degree entry times:**

For the Doctor of Philosophy (Science) and Master of Philosophy (Science), you can choose from four research period entry points each year: January, March, July or October.

To find out about other important University of Sydney dates, visit

- [sydney.edu.au/dates](https://sydney.edu.au/dates)

### **Research is your gateway**

Our research programs are designed to help you advance your research interests while developing professional skills and networks.

We have a global reputation for research excellence, top international rankings and award-winning researchers and projects.

As a postgraduate student, you will work alongside world leaders, have the opportunity to conduct research overseas, and develop a comprehensive perspective on applying research in the real world.

[sydney.edu.au](http://sydney.edu.au)

The University of Sydney

CRICOS 00026A

**[sydney.edu.au/ask](http://sydney.edu.au/ask)**  
1800 SYD UNI (1800 793 864)

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