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.
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, thereby playing a key role in Australia’s ability to compete scientifically on the world stage.

The faculty has a long history of nurturing research and innovation, and producing some of the finest minds in academia and the professional world. Regardless of the work you do here, 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 at the University of Sydney.

The Faculty of Science attracts leading, influential researchers and is one of the most successful faculties in gaining prestigious funding awards and grants. The facilities and opportunities within the faculty are a major advantage for those seeking to undertake the highest quality research and enhance early career prospects. We cover almost all areas of science and our research varies from the most fundamental to strongly industry linked.

We are fortunate to have an extraordinarily talented group of students and researchers, working with dedicated academic staff, most of whom are world renowned in their research fields. This creates an environment that is stimulating and fun, and equips research students with the skills and confidence to engage in research anywhere in the world.

In addition to undertaking dynamic and innovative research projects, you will develop essential skills in communication, leadership, management and commercialisation. These opportunities provide invaluable and transferable skills to pursue an academic career or move into industry, government, business or elsewhere.
Why study here?

Our degrees offer more than knowledge. You’ll join Australia’s largest postgraduate community and a global network of leading thinkers to challenge the known and explore the unknown.

Research excellence

At the University 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 prestigious Group of Eight network and the Association of Pacific Rim Universities. The latter partners us with others that excel in research, including Stanford, 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 interdisciplinary research centres, including several dedicated to deepening our understanding of China and Southeast Asia, and increasing Australia’s engagement in these regions.

We’re home to more than 90 research and teaching centres and we have a proud track record of excellence.

Our reputation for scientific excellence attracts the best researchers, significant research funding and prestigious prizes.

Find out more about our current research:
− sydney.edu.au/research
Our reputation

The University of Sydney is ranked number one in Australia and 29 in the world in terms of research impact, according to the 2017 CWTS Leiden Rankings. These rankings focus on the scientific impact of universities, as well as their involvement in scientific collaboration.

The Australian Government ranked all of our research at world standard or above in its latest Excellence in Research for Australia ratings.

In the sciences, we achieved the following rankings in the 2017 QS World University Rankings by Subject.

**Life Sciences and Medicine:** 17
- Agriculture and Forestry 42
- Biological Sciences 51-100
- Psychology 23
- Veterinary Science 11

**Natural Sciences:** 36
- Chemistry 50
- Earth and Marine 51-100
- Geography 17
- Environmental Studies 51-100
- Mathematics 45
- Physics and Astronomy 51-100

The QS survey also reveals the strength of our global reputation. Academics around the world viewed our research and teaching so highly, we gained an overall score of 99.3 percent for academic reputation. For employer reputation, we gained a score of 98.3 percent. Learn more about our world rankings:

- sydney.edu.au/world-rankings

Our research degrees

Embarking on a research degree at Sydney is an opportunity to work alongside some of the world’s brightest and most accomplished academics. We offer exceptional facilities – the latest innovative technology across the physical, medical, life and engineering sciences, the humanities and social sciences.

We are investing in major new facilities to support collaboration and partnerships with researchers from diverse disciplines who are tackling society’s most challenging problems.

We have the drive to challenge traditional ways of thinking. You will have the support you need to contribute to research that makes a meaningful, real-world impact and changes lives.

We offer several higher degrees by research – the Doctor of Philosophy (PhD) is the highest qualification that you can attain in Australia.

Learn more about our research degrees:

- sydney.edu.au/study/pg-research
Research centre highlights

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

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**Charles Perkins Centre**

Our $385 million world-renowned Charles Perkins Centre research and education hub is the focal point of our efforts to address humanity’s greatest health challenges.

The hub provides state-of-the-art facilities and technology for more than 1500 undergraduate students, 900 researchers, and higher degree by research students. We also maintain strong links with nearby affiliated medical research institutes and hospitals in close proximity, including the Royal Prince Alfred Hospital (RPA).

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

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**Sydney Nanoscience Hub**

The Sydney Nanoscience Hub is one of the world’s most advanced research and teaching facilities in the field of nanoscience. It is the only building of its kind in the Southern Hemisphere, and one of a handful in the world. This project is the centrepiece of a University-wide commitment to 21st century science and innovation in one of the most promising modern research disciplines. It is also the headquarters of the Australian Institute for Nanoscale Science and Technology.

Funded jointly by the Commonwealth Education Infrastructure Fund and the University of Sydney, this building houses academic laboratories, core nanofabrication and characterisation facilities, and state-of-the-art teaching spaces, all underpinning our core mission in research and education.

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 cleanroom, and a Transmission Electron Microscope (TEM) Suite. The TEM Suite has been cut into a hillside to form one of the most electromagnetically and mechanically stable environments on Earth.

- sydney.edu.au/nano

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Brain and Mind Centre
The Brain and Mind Centre’s multidisciplinary research aims to set new standards in brain and mind sciences both in Australia and internationally. The centre is dedicated to finding solutions that will lead to generational change by conducting research that advances understanding of diseases of the brain and mind.

We study conditions that impact on child development (such as autism), youth mental health (schizophrenia, depression, and addiction, substance misuse, for example) and brain ageing (Alzheimer’s disease and dementia, multiple sclerosis, Parkinson’s disease, motor neurone disease, and more).

In addition to imaging, microscopy and computing facilities, the centre runs clinics in child and youth mental health; child behaviour; healthy brain ageing; neurodegeneration; and adults and family.

Marine Studies Institute
The University of Sydney’s Marine Studies Institute provides a cross-disciplinary focus for undergraduate and graduate teaching, and training in marine science. Our research and connections across a wide range of disciplines in biological, geographical and earth sciences create enhanced training opportunities for our students.

The institute is an umbrella organisation for eight existing research groups, including the Centre for Research on Ecological Impacts of Coastal Cities; the Coastal Studies Unit; the Ocean Technology Group; Australian Ocean Drilling Program; and the Centre for Geotechnical Research. We coordinate the efforts of these centres and help to organise research that crosses disciplinary boundaries.

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.

Our specialist equipment for field research includes seismic equipment, environmental monitoring, super-computing for modelling and visualisation, the Australian Centre for Microscopy and Microanalysis, and the Macintosh Quaternary Dating Centre.

− sydney.edu.au/brain-and-mind
− sydney.edu.au/msi
Research centres and institutes
- Australian Institute for Nanoscale Science and Technology
- Charles Perkins Centre
- Centre for Carbon, Water and Food
- Centre for Medical Psychology and Evidence-Based Decision Making
- Centre for Complex Systems
- Institute of Medical Physics
- Institute of Photonics and Optical Science
- Key Centre for Polymers and Colloids
- Psycho-Oncology Co-operative Research Group
- Sydney Institute for Astronomy (SIfA)
- Marine Studies Institute (MSI)
- University of Sydney Institute for Innovation in Science and Mathematics Education.

Affiliated centres
- Australian Centre for Microscopy and Microanalysis
- Centre for All-Sky Astrophysics
- Centre for Engineered Quantum Systems
- Centre for Quantum Computation and Communication Technology
- Centre for Particle Physics at the Terascale
- Centre for Ultrahigh Bandwidth Devices for Optical Systems.
Research highlights
Creating leaders, making breakthroughs

The quantum computing race
It’s been dubbed “the space race of the computer era”, and Australia is on its way to playing a big role. Quantum machines could become the centre of artificial intelligence networks, blow open existing security systems, and lead to totally secure online shopping.

Microsoft recently announced it will build a quantum computer (a billion-dollar project, according to one source), and some of that spend is coming to Sydney. The computing giant has hired University researcher Professor David Reilly to build its new systems, along with another four of the best quantum minds in the world.

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VetCompass, Dogmanship creator gains Lifetime Achievement Award
University of Sydney Professor Paul McGreevy has received one of the largest and most prestigious veterinary awards in the world for his pioneering contribution to canine welfare and behaviour – the UK Royal College of Veterinary Surgeons’ Lifetime Achievement Award.

Professor McGreevy’s work has focused on the behaviour and welfare of horses and dogs, including extensive research into canine dementia. In 2011, he co-developed the Canine Cognitive Dysfunction scale, the first data-driven, validated tool designed for a reliable diagnosis of dementia in dogs.

Superstar of STEM
Associate Professor Muireann Irish from the Brain and Mind Centre and School of Psychology and Dr Nicky Ringland from the School of Information Technologies were among the 30 dynamic female scientists and technologists chosen by Science and Technology Australia for their pioneering work in the fields of science, technology, engineering and mathematics (STEM).

Associate Professor Irish is an ARC Future Fellow who is conducting pioneering research into dementia and memory as part of the Frontier Research Group. She was named one of the 2017 International Rising Talents at the L’Oréal-UNESCO for Women in Science fellowships for her clinical medicine work, and recently received the Edgeworth David Medal for her contribution to the advancement of Australian science.

Cannabinoid researchers unite
The University of Sydney and Thomas Jefferson University have officially agreed to collaborate on education and research on the therapeutic uses of cannabinoids. Both universities have dedicated centres, supported by the generous funding of the Lambert family*, to conduct their work on medicinal cannabis.

“This is an exciting opportunity for a game-changing research collaboration in the medicinal cannabinoid space, particularly in identifying novel cannabis-derived treatments for epilepsy, pain and metabolic disorders,” said Professor Iain McGregor, a director of the Lambert Initiative at the University of Sydney’s Brain and Mind Centre.

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* Barry and Joy Lambert donated $33.7 million to create the University of Sydney’s Lambert Initiative in 2015, and in 2016 they supported the Lambert Center for the Study of Medicinal Cannabis and Hemp in the US with a US$3 million donation.
Research in Chemistry

The School of Chemistry has a well-deserved international reputation for excellence in research and teaching. It is consistently placed in the top echelon of chemistry departments in Australia.

About us

As a postgraduate student, your training will be intimately linked with research activities. You can take advantage of the school’s collaborative links with industry through our Advanced Catalysis for Sustainability Lab and the Key Centre for Polymers and Colloids.

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

We greatly value our postgraduate community and 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 – underpinning and supporting all research programs – includes in-house mechanical and electronic workshops.

Our SciTech Library holds all of the main chemistry titles and provides online access to national and international databases. All students have access to the latest instruments, and work in newly renovated laboratories and offices.

Research highlights

In many areas 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 such as the NIST Center for Neutron Research in the USA and the Rutherford-Appleton Laboratory in the UK.

Staff and research students maintain our 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 make compelling presentations to an audience.

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

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

The School of Geosciences encompasses study in geography, geology and geophysics. Our long tradition of rigorous postgraduate research is complemented by active geophysics, geography and geology programs. The skills you acquire will enable you to launch a career with the potential to travel and work in exotic locations and contribute to a sustainable future.

Geography

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

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

The University of Sydney’s expertise in geography encompasses a breadth 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 that populations adapt to the uncertainties of climate change and food insecurity.

Our geographers are key participants in the Sydney Southeast Asia Centre at the University and various forums and institutions connected to sustainability, urban futures and global development.

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

Our geographers have extensive linkages to government departments, other universities and research institutes within Australia and overseas. Our research community is richly diverse, comprising postgraduate students from Thailand, China, Laos, the Philippines, Nepal, India, Vietnam, Iran, Germany, the Netherlands, Taiwan, Tonga, Indonesia and Cambodia.

We have international research collaborations with the US, UK, New Zealand, India, China, Burma, Indonesia, Germany, and many other countries.

- sydney.edu.au/science/geosciences

Research strengths

Extensive international collaborations, with particular expertise in South Asia and Southeast Asia.

Strong interdisciplinary relationships across the University and with industry and government.

Specialisations

- Natural hazards and disaster risk reduction
- Natural resource management and its governance in Southeast Asia
- Geographies of development, globalisation, and global value chains
- Environmental histories and climate change adaptation
- Sustainability, citizenship and cultural spaces in urban environments
- Social, economic and environmental sustainability in regional Australia, water management and farm futures
- Environmental and ethical issues associated with animal industries
Geology and geophysics

Take advantage of a well-established and interdisciplinary research community. Our research spans a wide range of fields and has established collaborations across the world.

We are a leader in the development and application of advanced computational solutions for geoscientific research. Under the direction of Professor Dietmar Müller, the EarthByte group leads the development of the GPlates Paleo-Geographic Information software (www.gplates.org). It has become the global standard for analysing Earth’s evolution in a plate tectonic context and is being used in 137 countries.

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

The school supports the scientific and policy development activities of the United Nations Environment Programme through an association with an implementing agency.

Research strengths/facilities

The EarthByte Group, one of the world’s leading research groups for global and regional plate tectonic reconstructions and for studying the interplay between the deep earth and surface processes.

Urban geography, focusing on housing, planning, transport and sustainability in Sydney and other cities.

The Geocoastal Research Group, which focuses on the full spectrum of coastal sedimentary environments.

The Natural Hazards and Disaster Risk Research Group, which focuses on a wide range of natural and technological hazards.

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

The Basin Genesis Hub focuses on connecting ‘big data’ analysis and high-performance computing in an open innovation framework.

Specialisations

- Marine processes
- Natural hazards
- Global food security
- Asia-Pacific geographies
- Early Earth evolution
- Environmental geology and geochemistry
- Mineral and petroleum resources
- Geophysics
- Geocoastal research
- e-research
- Tectonics
- Urban geography

sydney.edu.au/science/geosciences
Research in
History and philosophy of science

Situated at the crossroads of science and 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 ramifications.

About us

The researchers associated with our History and Philosophy of Science unit have excelled in developing interdisciplinary, new, innovative approaches to investigating and analysing developments in science, medicine and technology.

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

Our unit regularly hosts international researchers who contribute new insights and innovative thinking. Both our researchers and postgraduate students are involved in international collaborative research projects.

Our program emphasises self-motivated learning, with close, personalised guidance from academics who are active researchers in the field.

The program is designed so that you develop your knowledge of the field and practical skills, such as how to structure research projects that manage your time efficiently and effectively. You will also develop expertise in a particular research area of interest.

- sydney.edu.au/science/hps

Research strengths

Our community of active researchers in this field is one of the largest in the world, and the unit’s research attracts significant funding from both Australian and international sources.

Our researchers are actively engaged in international research projects and have a broad range of international connections.

Specialisations

- History and philosophy of science and medicine
- Early modern science
- Science and technology studies
- History and Philosophy of Modern Physics
- Colonial and post-colonial science and medicine (with a focus on Asia)
- History and philosophy of the human sciences
Research in Life and environmental sciences

For the first time, we’ve brought together researchers in the life, earth and environmental sciences 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, beginning in 2016, the disciplines themselves have a long history of academic excellence at the University of Sydney.

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

- [sydney.edu.au/science/soles](http://sydney.edu.au/science/soles)

**Research strengths**

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

We are applying innovative technology and techniques to improve the health, welfare and productivity of all animals. In animal sciences, we have international leaders in companion animal health, genetics, welfare, and behaviour research.

Specialist areas in animal sciences include genetics and genomics, animal welfare, animal physiology, parasitology, microbiology that impacts vertebrates, veterinary pharmacology. They also include 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
The Biochemistry, Cellular and Molecular Biology cluster focuses on delineating the molecular mechanisms and describing cellular phenomena that underpin all forms of life, and using that knowledge to realise economic, therapeutic and technological outcomes.

Areas of active research in the cluster 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 model organisms such as the mouse, the roundworm *C. elegans*, fruit flies and Arabidopsis.

Nutrition and Dietetics
Dietetics includes the study of the food that people eat and its effects on wellbeing and 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 the group are the design and validation of instruments and technologies to assess food intakes and interpretation of dietary intake data. In addition, the design of mobile health nutrition interventions is a strength of the group.

Ecology, Evolution and Environmental Science
Evolution is a theme that unifies the biological sciences and provides the framework for understanding the diversification of life on earth. Ecology investigates the processes that govern the biological interactions between individuals and operate on ecosystem scales.

We study life at all levels, from viruses and genes, through 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 in 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 cluster 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.

We take a One Health approach, by recognising the interconnectedness of health in humans, animals and the environment. Microbiology is a diverse offering, focusing not just on human pathogens, but taking a broader approach to microbiology. It includes environmental bioremediation that uses microbes, healthy gut microbiome in humans, agricultural microbiology and veterinary microbiology.

Plant Sciences
The Plant Sciences cluster researches 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 in both protected agriculture 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 undergraduate and higher degree students to experience plant science in context.

Specialist areas in 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 mathematics schools in Australia. We pursue a vigorous program of teaching and scholarship, and our postgraduate research is varied and flexible, catering for students from many backgrounds.

About us

Since 2010, the school has published more than 790 papers in refereed journals, 28 book chapters and four books. Moreover, 30 staff from the school received ARC Discovery Grant funding of about $15 million via 34 distinct projects, plus an ARC Linkage award of $165,000 with the NSW Institute of Sport to study the dynamics of diving.

The school values your professional development and holds regular seminars, workshops and conferences that ensure you stay abreast of the latest developments. It also supports an active program of long-term and short-term visits by distinguished international academics, to broaden your global outlook.

- Sydney.edu.au/science/maths

Research highlights

The school has extensive collaborations with China, Canada, France, Germany, Japan, Russia, the United Kingdom and the United States.

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

The school has five Fellows of the Australian Academy of Science, one Georgina Sweet Australian Laureate Fellow, three Future Fellows, six ARC Discovery Early Career researchers and a recipient of the New Horizons Prize in Mathematics.

Specialisations

- Algebra and representation theory
- Applied mathematics
- Bioinformatics
- Financial mathematics
- Computational algebra
- Non-linear analysis
- Geometry, topology and analysis
- Statistics
Research in
Medical sciences

The School of Medical Sciences is part of the University of Sydney Medical School and the Faculty of Science, meaning we teach a range of disciplines to medical and dental students and discipline-based courses in the sciences.

About us

Our research arm is the Bosch Institute, a major centre for medical science research at the University. For information about any higher degree by research (PhD, Master of Philosophy, graduate diploma) or honours in the medical sciences, refer to the relevant discipline website (listed below) or the Bosch Institute site:

- sydney.edu.au/medicine/bosch

PhD and MPhil programs are administered by the Sydney Medical School. For administrative enquiries about honours and graduate diplomas in science, please contact the Faculty of Science.

- sydney.edu.au/science

When you have decided on a project, you should contact one of the laboratory heads to meet and discuss joining their research team. Once you have been accepted, contact either the honours coordinator or the postgraduate coordinator.
Specialisations

Anatomy and histology
Anatomy and histology has internationally renowned researchers offering exciting research projects for students wishing to undertake postgraduate programs. The research labs within the discipline are well funded and have an outstanding track record of research being published in top international journals. The discipline is one of the largest in the University, and the largest of its type in Australia.

Biomedical science
Biomedical science, located at the Cumberland Campus, Lidcombe, is active in a broad range of research 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. All of these areas reflect the diverse interests and expertise of staff.

Pharmacology
Pharmacology is a vibrant and research active department. Research groups use the latest technology to understand how drugs affect the body and also to develop new drugs to treat disease. The discipline attracts research funds from the National Health and Medical Research Council (NHMRC) and similar groups.

Physiology
Physiology has a strong tradition in research. Our staff’s commitment to understanding the function of the human body is reflected in the discipline’s high research profile.

Pathology
Pathology has very active research groups investigating a large number of human diseases. To investigate the causes and processes, a wide variety of modern techniques is used on both human tissue and experimental animals.

The discipline has a highly regarded science honours offering and a large number of students in the PhD program.

- sydney.edu.au/medicine/anatomy
- sydney.edu.au/medicine/biomedical-science
- sydney.edu.au/medicine/pharmacology
- sydney.edu.au/medicine/physiology
- sydney.edu.au/medicine/pathology
Research in Physics

The School of Physics at the University of Sydney is the leading physics department in Australia, with outstanding staff and students undertaking teaching and research that pioneers 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

You will have the opportunity to learn from internationally recognised experts, contribute to original research, and become part of our community of scientists and scholars.

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

The quality of research within the school is recognised through our leadership in national and international research programs, including ARC and NHMRC Centres of Excellence. In addition, prominent domestic and international collaborations with the United States, Europe, and Asia – funded through multi-year competitive awards – present a range of invaluable opportunities.

You can also study and be involved in research projects focused on nanoscience at our major research and teaching facility, the Sydney Nanoscience Hub, headquarters of the Australian Institute for Nanoscale Science and Technology.

– sydney.edu.au/science/physics
Research strengths

We are renowned in Australia and internationally, for our research, and provide high-profile research projects and substantial research and infrastructure funding that supports the following initiatives:

- major programs in astrophysics and space physics, including University-operated telescopes and linkages with the Square-Kilometre Array
- leading international projects in both experimental and theoretical quantum physics, including opportunities in quantum computing through our new partnership with Microsoft Research.
- large-scale efforts on photonics and optical science for next-generation communications technology
- innovative interdisciplinary efforts in biological and medical physics, spanning computational physics, materials science, brain dynamics, and clinical application
- 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

We were Australia’s first established School of Psychology and are one of the country’s largest and most prestigious schools. Our graduates have a strong track record of success. Many are now department heads and senior staff in universities and clinical settings worldwide, and have achieved excellence in industry, the media, and politics.

About us

The School of Psychology currently has more than 130 research students, forming a vital part of our energetic community. Postgraduate research students joining the school will enjoy a supportive environment within their area of research specialisation and the wider school community.

Graduate students experience 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 aspects of professional development.

While all research students entering the school have direct access to discipline-specific research facilities, you are also encouraged to participate in the University’s broader research student community, and develop your methodological and professional skills. Our weekly seminars, colloquia and social events are attended by many graduate students.

There is also a highly successful Annual Postgraduate Conference, organised entirely by research students.

− sydney.edu.au/science/psychology
Research strengths

Our research is internationally renowned. The School of Psychology currently holds more than $7 million in competitive research funding from government and industry sources, and many of our staff are supported by prestigious research fellowships.

In addition, our school recently received a donation of nearly $34 million to study the medicinal use of cannabinoids. This donation has placed us at the forefront of medicinal cannabinoid research, and makes Australia an international leader in this field.

Our school and its researchers have been brought together with other disciplines into Special Priority Areas for Collaboration (SPARCs). We have strong connections with three SPARCs:

- 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 burden of obesity, diabetes, cardiovascular disease and related conditions (see page 6).
- the oncology SPARC, where our world-renowned research group on psycho-oncology is based.

We have a large number of well-equipped research laboratories and a large number of our current graduate students have been invited into the research collaborations – both international and local – of their mentors.

Many past students maintain professional contacts with their former mentors in the school.

Specialisations

- Clinical psychology (including anxiety and eating disorders)
- Cognitive psychology
- Developmental psychology
- Psycho-oncology
- Learning and behavioural neuroscience
- Psychopharmacology
- Perception
- Health psychology
- Organisational and coaching psychology
- Social psychology
- Personality and intelligence
- Human factors
We are recognised internationally as a leading provider of 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, focused on the health, production efficiency and welfare of animals.

**About us**

The University of Sydney School of Veterinary Science is one of a small elite group of veterinary schools outside North America to receive accreditation from the American Veterinary Medical Association. This accreditation encourages support from international students interested in studying here.

Our veterinary school has a broad and well respected research profile, providing unique opportunities for our students in preclinical, paraclinical and clinical disciplines, including those relevant to animal industries, wildlife and animal welfare.

We encourage high-level research performance, providing strong guidance, inclusion and support for our postgraduate students at both personal and professional levels. The school fosters strong supportive bonds between students to support one another, develop high-level communication skills and present their research for international recognition.

Once they finish their studies with us, our postgraduate research students continue to excel as independent researchers in a wide variety of research and education endeavours in government, industry and higher education.

The school has established strong links to the production animal industries, welfare and wildlife organisations and the veterinary profession. These networks support our students’ development and extend their career opportunities.

– sydney.edu.au/vetscience

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**Research in Veterinary science**

For more than 100 years we have developed outstanding research, clinical facilities and strong reciprocal links with academic peers around the world. We were recently ranked as number one in Australia and equal 11th in the world by the QS World University Rankings by Subject.
Research strengths

The two faculty clinics (Camperdown and Camden) have world-class facilities and support research in feline and canine epidemiology, disease diagnosis and control.

The Camden clinic is used for research on equine physiology, infectious diseases, behaviour and welfare, as well as livestock, avian, reptile and exotic animals research. Research in the faculty has attained world recognition in many areas.

Specialisations

- Animal production industries (dairy, sheep, poultry, pigs and aquaculture)
- Animal welfare
- Wildlife research
- Farm animal health
- Companion animal health
Our research degrees involve in-depth study in a specialised area. They have two purposes:
- for you to prepare a substantial piece of work that represents a significant contribution to a particular field of study
- to train you in general research methodology and equip you with transferable research skills to pursue an academic career, or take to a career in industry, business or elsewhere.

**Honours**

Honours is an additional year of undergraduate study available after you complete an undergraduate course. It’s a unique opportunity to explore your research potential and put theory into practice.

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

To apply for admission to honours, you need to have:
1. qualified for (or be a graduate with) a relevant bachelor’s degree from the University of Sydney; or equivalent
2. completed a relevant major (a minimum of 24 credit points of 3000-level units of study) relating to the intended honours discipline
3. achieved a Science Weighted Average Mark (SCIWAM*) of at least 65.00 or have a credit average (65.00) in 48 credit points of relevant** 2000-level and 3000-level units of study; and
4. satisfy any additional criteria set by the relevant head of school or discipline.

Please note that, in some schools and disciplines, the minimum SCIWAM requirement is higher than 65.00, particularly where entry is competitive. For example, a minimum SCIWAM of 75.00 is generally required for entry into honours in psychology.

Admission to honours is subject to an appropriate supervisor and project being available. However, willingness of a member of academic staff to act as your supervisor does not guarantee entry.

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

With similar content, structure and assessment to the science honours year, this full-fee-paying postgraduate coursework program is offered as a one-year full-time or a two-year part-time course.

For more information, please visit sydney.edu.au/courses/programs/graduate-diploma-in-science.

* SCIWAM is the average over all second- and third-year units attempted. For details, refer to the Faculty of Science Handbook and our SCIWAM calculator: sydney.edu.au/handbooks/science_PG and sydney.edu.au/science/cstudent/ug/wam

** Relevant units of study need to be nominated and backed up by strong written support by the school or discipline.
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 projects, use advanced scientific tools and write reports fit for publication. Your skills as an independent researcher will enable you to go on to prominent careers, not just in research, but also in policy, industry, management, government, business and international development.

If you are a high-achieving student who has not yet completed research studies (for example, 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 research from a wide range of areas in which the faculty has expertise.

The degree has two purposes: to prepare a substantial piece of work representing a significant contribution in a particular field of study, and to train candidates in general research methodology and equip them with transferable research skills.

The PhD is aimed at those who intend to pursue careers in scientific research or who wish to gain a competitive edge by demonstrating superior ability and research experience.

As a PhD candidate you will complete your degree in three to four years, during which time you will undertake research culminating in the submission of an 80,000 word thesis.

Research degrees

<table>
<thead>
<tr>
<th>Course name</th>
<th>Entry</th>
<th>Duration</th>
<th>CRICOS code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honours</td>
<td>March/July</td>
<td>1 year full time</td>
<td>07462M</td>
</tr>
<tr>
<td>Bachelor of Environmental Systems (Honours)</td>
<td>March</td>
<td>1 year full time</td>
<td>07462W</td>
</tr>
<tr>
<td>Bachelor of Liberal Arts and Science (Honours)</td>
<td>March/July</td>
<td>1 year full time</td>
<td>07462W</td>
</tr>
<tr>
<td>Bachelor of Medical Science (Honours)*</td>
<td>March/July</td>
<td>1 year full time</td>
<td>040575G</td>
</tr>
<tr>
<td>Bachelor of Science (Honours)**</td>
<td>March/July</td>
<td>1 year full time</td>
<td>036745F</td>
</tr>
<tr>
<td>Graduate diploma</td>
<td>March/July</td>
<td>1 year full time</td>
<td>012846K</td>
</tr>
<tr>
<td>Master's degrees</td>
<td>March/July</td>
<td>1 year full time</td>
<td>086400F</td>
</tr>
<tr>
<td>Master of Philosophy (Science)</td>
<td>January/July/October</td>
<td>1.5-2 years full time</td>
<td>008426J</td>
</tr>
<tr>
<td>Master of Veterinary Clinical Studies</td>
<td>January/July/October</td>
<td>1-2 years full time</td>
<td>008426J</td>
</tr>
<tr>
<td>PhD</td>
<td>January/July/October</td>
<td>3-4 years full time</td>
<td>000722K</td>
</tr>
</tbody>
</table>

* Only available to internal applicants who completed a Bachelor of Medical Science at the University of Sydney.

** All Medical Science applicants can apply for the Bachelor of Science (Honours).
Scholarships
Supporting your success

The table below shows some of the most popular scholarships available for our research students.

As these are subject to change, we strongly recommend you review our website for up-to-date information. Please check the criteria, application details and closing dates carefully.

For details on specific Faculty of Science scholarships, visit:
- sydney.edu.au/science/pg-research-scholarships
- sydney.edu.au/science/honours-scholarships

<table>
<thead>
<tr>
<th>Name of scholarship</th>
<th>For study towards</th>
<th>Discipline or faculty area</th>
<th>Domestic students</th>
<th>International students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honours Scholarship</td>
<td>Honours</td>
<td>All</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Honours Relocation Scholarship*</td>
<td>Honours</td>
<td>All</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Westmead Honours Scholarship**</td>
<td>Honours</td>
<td>Medical science disciplines at Westmead</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Yim Family Foundation Scholarship</td>
<td>Honours</td>
<td>Physics, chemistry, biochemistry, or molecular biology</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Philip Thomas Collins Scholarship</td>
<td>Honours</td>
<td>All science subjects other than physics, chemistry, biochemistry, or molecular biology</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Research Training Program Stipend and Fee Offset (RTP)‡</td>
<td>Master’s, PhD</td>
<td>All</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>University of Sydney Postgraduate Awards (UPA)+</td>
<td>Master’s, PhD</td>
<td>All</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Vice-Chancellor’s Research Scholarships (VCRS)+</td>
<td>PhD</td>
<td>All</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>China Scholarship Council^</td>
<td>PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Endeavour Postgraduate Awards*</td>
<td>Master’s, PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Sydney Achievers International Scholarships</td>
<td>Master’s, PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>The Dean’s International Postgraduate Research Scholarships*</td>
<td>Master’s, PhD</td>
<td>Faculty of Science</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>New Colombo Plan Scholarships</td>
<td>Honours</td>
<td>Faculty of Science</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>University of Sydney International Scholarship (USydIS)</td>
<td>Master’s, PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Vietnamese Scholarships ( nominated via VIED)^</td>
<td>PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Brazil Scholarship – Science Without Borders (SWB)^</td>
<td>PhD</td>
<td>All</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

* Recipient must be from interstate
** Not available to currently enrolled students - external applicants only
‡ Offered by the Commonwealth/Australian Government
+ Offered by the University of Sydney
^ Offered by an international funding body/government
To apply for a PhD, you need to demonstrate sufficient prior research experience and capability.

In most cases, to be eligible to apply for a PhD you will have:

- a bachelor’s degree with first or upper second class honours or
- a master’s degree completed at a high academic standard, and which includes a substantial component of original research, or
- an equivalent qualification that demonstrates research experience, excellence and capability.

These criteria constitute the minimum requirements for eligibility and do not guarantee admission. That remains at the discretion of the Associate Dean (HDR) for a given faculty.

If you do not have this experience, then you should consider applying for honours, a Master of Philosophy or master’s by coursework.

### Application deadline

Domestic students apply directly to the University of Sydney by following the steps below. International students can either apply directly to the University, following the steps below, or apply through a University representative (agent).

Applying for a research degree requires time and preparation. You need to take the following steps to apply:

1. **Identify and establish an academic contact/potential supervisor**

   Firstly you need to contact a suitable member of the academic staff and present them with an initial proposal outlining your proposed topic of research. If you need help, use our Research Supervisor Connect tool:
   - sydney.edu.au/research-opportunities

   When you contact the academic staff member, you should provide them with some initial details to help them advise you on your study plans.

   For example, you could outline your educational background, relevant work experience and the research area you are interested in pursuing.

2. **Develop and submit an initial research proposal**

   Once you have initiated discussions with an academic contact, you should prepare an initial research proposal. This should be around two to four pages in length (at least 1000 words) and be developed in conjunction with your potential academic supervisor. Your initial proposal should include the following information:

   - Title: Working title for the project
   - Academic staff contact: Name(s) of the academic staff with whom you have discussed your proposal and, if relevant, a potential supervisor
   - Area: The subject area of your proposed research
   - Objectives: What aims does the work have?
   - Synopsis: Briefly describe the key aspects of what you will be investigating.
   - Background: Describe what research has already been done in relation to your topic.
   - Significance: Why is the topic important?
   - Methodology: The approach or methodology to be used in the research
   - Resources: Provide details of the resources required for you to carry out your research project.
   - Work plan: An initial plan for completion, with annual milestones.
3. Revise and finalise your research proposal

In conjunction with your academic contact(s), refine your research proposal ready for submission with your formal application.

4. Identify and contact two academic referees

To support your application, we will need to receive references from two academic referees who are familiar with your previous academic qualifications and achievements.

Ensure they are available and willing to complete a reference for you, and acquire their correct and current contact details. They will need to complete the academic referee report and submit it to the University. Instructions are provided within your online application.

5. Complete the application form

All research applications are made online through the ‘Find a course’ website at:

- sydney.edu.au/courses

For PhD applications, visit sydney.edu.au/courses/phd/Doctor-of-Philosophy-PhD and select your faculty. Click the ‘apply now’ button and follow the instructions.

For applications to all other research programs, go to sydney.edu.au/courses and search for your research course. Click the ‘apply now’ button and follow the instructions.

To ensure your application is complete and can be processed as quickly as possible, please ensure you have included all of the required supporting documentation.

If you are sending a copy of an official document (such as an academic transcript), the copy needs to be correctly certified by an appropriate authority. More details are available on the application website.

If you are an international applicant, you will need to include an application processing fee of $100, unless you are exempt from this fee, or it has been waived.

University of Sydney staff representatives at overseas exhibitions and interview programs are authorised to waive the application processing fee. Applicants with a fee waiver can upload this with their application.

For more details, see:
- sydney.edu.au/study/how-to-apply

Please note:
Incomplete or ill-prepared applications will take longer to process and may be rejected by the relevant faculty or school. If you have any questions about preparing your application, please contact:

**Domestic**
1800 SYD UNI (1800 793 864)
- sydney.edu.au/ask-domestic

**International**
1800 SYD UNI (1800 793 864)
(in Australia)
+61 2 8627 1444 (outside Australia)
- sydney.edu.au/ask-international

6. Submit your application

Once you have completed the proposal and had it reviewed by your supervisor, you’re ready to submit your application.
Affiliations
The University of Sydney is one of the world’s top research universities and a proud member and affiliate of the following organisations.

**Group of Eight**
The Group of Eight (Go8) is a coalition of leading Australian universities that are intensive in research and comprehensive in general and professional education. The Go8 exists to enhance the contribution of its member universities to the nation’s social, economic, cultural and environmental wellbeing and prosperity. Currently, the Go8 receives more than 70 percent of national competitive research grants, conducts more than 60 percent of Australian university research, has produced all Australian-educated Nobel Prize winners and dominates university links with industry.

www.go8.edu.au

**National Health and Medical Research Council (NHMRC)**
The NHMRC is a government organisation that administers both research funding and development of recommendations relating to this research. It aims to raise the health standards of all Australians and fosters the development of consistent health standards between states.

www.nhmrc.gov.au

**Australian Research Council (ARC)**
The ARC was established to enable the Australian Government’s vision of improving the lives of Australians through research. The organisation is responsible for furthering quality and ethical research through the dissemination of substantial research grants, while also nurturing partnerships between educational institutions and industry.

www.arc.gov.au

**The Association of Pacific Rim Universities**
This association includes 36 universities from 16 countries located on the Pacific Rim, with the diversity of nations represented ensuring a beneficial exchange of ideas. All member universities are deemed to be at the forefront of higher education in their own countries and deliver pioneering programs across their range of disciplines. Research and an international focus are critically important to association members as they service local and global communities.

www.apru.org
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 research staff who are among the best in their fields.

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