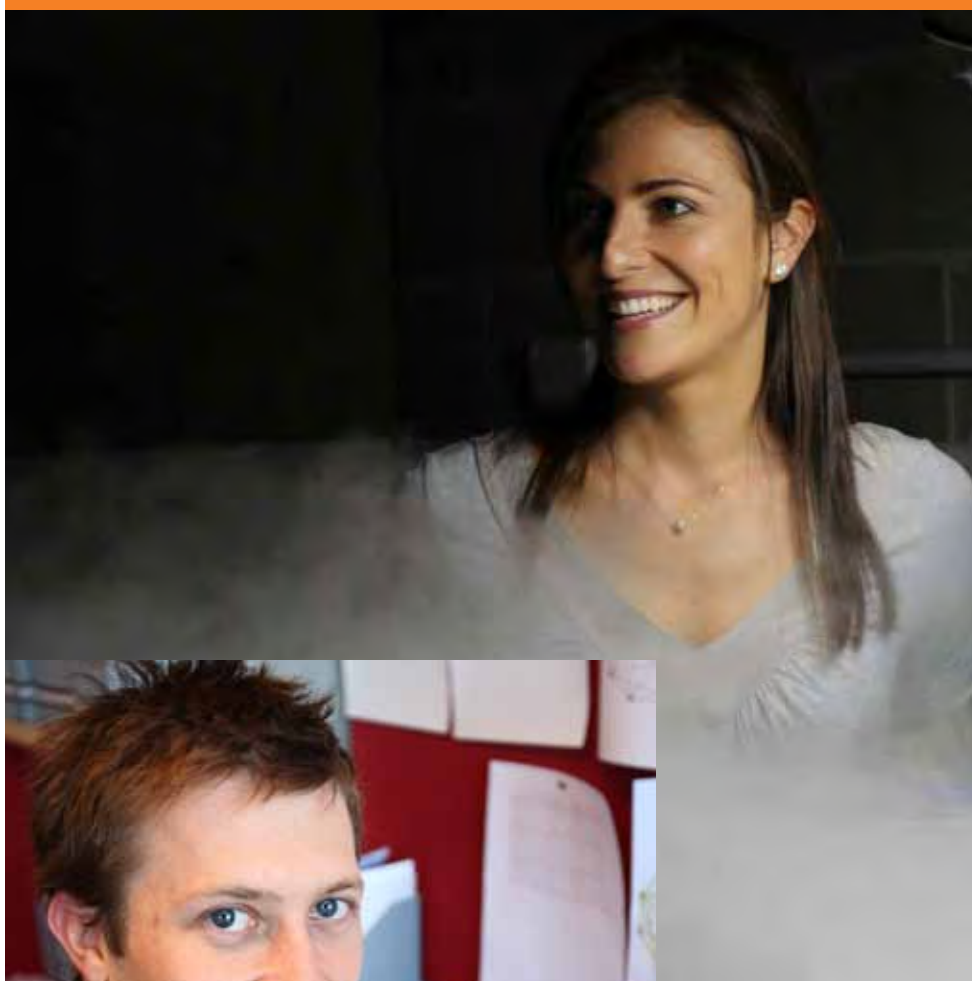


POSTGRADUATE RESEARCH
IN THE NATURAL SCIENCES

AGRICULTURE, SCIENCE &
VETERINARY SCIENCE
2012



THE UNIVERSITY OF
SYDNEY

IMPORTANT DATES

FIRST SEMESTER 2012

5 MARCH

Lectures begin

6 - 13 APRIL

Mid-semester vacation

11 - 15 JUNE

Study vacation

18 - 30 JUNE

Examination period

30 JUNE

Semester ends

SECOND SEMESTER 2012

30 JULY

Lectures begin

24 - 28 SEPTEMBER

Mid-semester vacation

5 NOVEMBER - 9 NOVEMBER

Study vacation

12 - 24 NOVEMBER

Examination period

24 NOVEMBER

Semester ends

SUMMER SCHOOL 2012

3 JANUARY

Lectures begin

2 MARCH

Summer School ends

EVENTS IN 2011

19 - 23 SEPTEMBER 2011

Honours Information Week

22 SEPTEMBER 2011

GO Expo

The University of Sydney is a proud member and affiliate of the following organisations:

GROUP OF EIGHT (G08)

The University of Sydney is a member of the Group of Eight (Go8), a coalition of leading Australian universities, 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 well-being and prosperity. Currently the Go8 receives over 70% of national competitive research grants, conducts over 60% of Australian university research, has produced all Australian-educated Nobel Prize winners and dominates university links with industry.

For further information, please visit: www.go8.edu.au



Group of Eight

THE ASSOCIATION OF PACIFIC RIM UNIVERSITIES (APRU)

36 universities from 16 countries located on the Pacific Rim constitute APRU with the diversity of nations represented ensuring a beneficial exchange of ideas. All member universities are deemed to be at the educational forefront in their own country, delivering pioneering programs across their range of disciplines. Research and an international focus are of utmost importance to members who strive to be of service to the local and global communities.

For further information, please visit: www.apru.org

THE NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL (NHMRC)

The NHMRC is a government organisation, which 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.

For further information, please visit: www.nhmrc.gov.au

AUSTRALIAN RESEARCH COUNCIL (ARC)

The ARC was established to facilitate the Government's vision of improving the lives of all Australians through research. The organisation is responsible for furthering quality, ethical research through the dissemination of substantial research grants while also nurturing partnerships between educational institutions and industry.

For further information please visit: www.arc.gov.au



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WELCOME TO THE NATURAL SCIENCES



*Professor Mark Adams,
Dean of the Faculty of
Agriculture, Food and
Natural Resources*



*Professor Trevor Hambley,
Dean of the Faculty of
Science*



*Professor Rosanne Taylor,
Dean of the Faculty of
Veterinary Science*

This is a particularly fascinating time to study science. Major technological advances are opening up many new areas, from ecosystems to nanotechnology, and the boundaries between traditional areas are blurring as interdisciplinary research leads to rapid progress on a wide range of issues in environmental, health and technology related industries that underpin the future prosperity and quality of life in Australia.

In many areas of science, it is now essential that students undertake further study or research in order to ensure comprehensive coverage of a discipline.

The natural sciences at the University of Sydney consistently deliver the breadth and depth of scientific knowledge necessary to produce world-class scholars and academics.

Postgraduate research at the University of Sydney prepares students to become the scientists and science-based professionals of the 21st century. The sciences play a key role in the sustainable development of our planet and our society. As our energy sources change we must tackle the problems of conservation and development of new and existing sources. The sciences seek to prevent and cure diseases, and are critical for understanding human behaviour, natural resources, and ecosystems.

In a similar vein, the agricultural sector is moving with these interesting and challenging times. Global demographics and consumer trends indicate that we will need to double food production in the next twenty years using less land and water available for agriculture than at present. The Faculty of Agriculture, Food and Natural Resources are addressing this challenge through research and training of graduates who will provide leadership in ensuring food security and sustainable natural resource management.

Veterinary science is also mindful of the need to respond to the changing needs of the Australian community and country. Knowledge in the broad area of veterinary science and animal bioscience is expanding at a tremendous rate, and it is important to have access to information on new diseases and animal related topics not only in Australia but internationally as well.

We invite you to discover more about the world-class research in the natural sciences at the University of Sydney.

Mark Adams, Trevor Hambley and Rosanne Taylor

THE UNIVERSITY OF SYDNEY & THE NATURAL SCIENCES

THE UNIVERSITY OF SYDNEY

Founded in 1850, the University of Sydney was Australia's first university and has built an international reputation for excellence over the past 160 years. It is one of Australia's leading educational institutions, playing a key role as a member of both the Group of Eight (Go8) and the Association of Pacific Rim Universities (APRU). The University consistently demonstrates its research dominance by annually securing substantial funding from the Australian Research Council (ARC) which in 2010 totalled \$62.7 million which was 10.3% of total national funding. In addition to this the University employs 17 ARC Future Fellows and three ARC Laureate Fellows. The University of Sydney also receives strong support in the form of grants from the National Health and Medical Research Council (NHMRC) with which it has close ties.

For further information, please visit:
<http://sydney.edu.au>

FACULTY OF AGRICULTURE, FOOD AND NATURAL RESOURCES

The faculty's prestigious international reputation for research excellence, significant funding success and state of the art facilities make the faculty a world leader in agricultural research spanning science and economics.

Our research community are dedicated, imaginative and creative; addressing the key questions of tomorrow particularly food, water, energy and climate security. We anticipate, and respond to, local national and international needs for new knowledge in these areas. Our graduates are highly sought after and have gone onto diverse careers in the areas of research, resource management, consultation, commerce, agribusiness, government, policy and international development.

The faculty's extensive collaborative relationships with research and industry partners give our students an exceptional learning experience during their postgraduate studies. Our major research strengths include but are not limited to plant improvement and pathology, resource economics, natural resource management, cereal science, soil science, international development, agricultural economics and precision agriculture. The support for such a comprehensive range of research activities is provided by the Plant Breeding Institute, the Australian Centre for Precision Agriculture, The Agricultural and Resource Economics research group, and the Sydney University Nitrogen Fixation Centre.

The faculty is fast becoming one of Australasia's best housed and supported research groups. Our research and teaching community have access to sophisticated infrastructure and field stations. We offer students education, training and experience that will set them up for a place in the world.

For further information, please visit:
<http://sydney.edu.au/agriculture>

FACULTY OF SCIENCE

Diverse specialisations, an enduring commitment to research, and extensive liaison with other institutions and industry have positioned the Faculty of Science as a leading provider of education across the spectrum of the sciences. A significant level of funded research through the Cooperative Research Centres and the Australian Research Council, amongst other bodies, underpins this commitment.

Major facilities that support the faculty's research include astronomical field stations, the Australian Centre for Microscopy and Microanalysis, Institute of Photonics and Optical Science, the University of Sydney Institute of Sustainable Solutions, One Tree Island

Field Station on the Great Barrier Reef, state-of-the-art spectrometry facilities, specialist workstations and database networks, and computer graphics systems.

In addition to the range of specialisations offered by the faculty's schools and departments, innovative interdisciplinary programs are offered, and these include studies in the areas of molecular biotechnology, bioinformatics, history and philosophy of science, marine studies, environmental science, medical physics and sustainability science.

For further information, please visit:
<http://sydney.edu.au/science>

FACULTY OF VETERINARY SCIENCE

A national leader in veterinary research, the Faculty of Veterinary Science is the only Australian institution to be accredited by the American Veterinary Medical Association. In order to support comprehensive teaching and research in veterinary science the faculty provides on site education with four farms across NSW, the University Veterinary Teaching Hospitals at the Camperdown and Camden campuses and through the Wildlife Health and Conservation Centre.

The faculty's research interests span animal production; applied animal reproduction; companion animal health, behaviour and welfare; educational research and practice management; equine research; farm animal health and welfare; genetics and genomics; immunology, photobiology and pharmacology; veterinary microbiology and parasitology; and wildlife biology, health and conservation.

For further information, please visit:
<http://sydney.edu.au/vetscience>

PATHWAYS TO RESEARCH

OVERVIEW

Research programs are self-directed, independent study programs that contribute new knowledge to a particular field and are examined by a written thesis. Both your statement of research interest and your research proposal should demonstrate adequate language skills and your ability to successfully complete such a program.

WHAT PROGRAM SHOULD YOU APPLY FOR?

There are a range of research programs available. The one for which you should apply depends on the stage you are at in your academic career.

Research experience is mandatory for entry into a research program such as the Doctor of Philosophy (PhD) or master's programs, normally via completion of an honours research training year which includes a written thesis. Or, if you have not completed an honours research training year, you should contact the relevant faculty to ascertain procedures for satisfying this requirement. Normally this will require entry into a one year graduate program in order to satisfy entry requirements, but this requirement may be waived under appropriate circumstances by the dean.

THE FIRST STEP

Research Supervisor Connect (RSC) is a university wide system that has been developed in order to better link potential research students with our academic staff. Collaboration is the key to successful and innovative research; to that end we are dedicated to matching the best students with the best researchers, as easily and seamlessly as possible. For more information, please visit: <http://sydney.edu.au/research/opportunities>

Alternatively, please contact the relevant graduate adviser whose details

are listed in this booklet.

ADMISSION PROCEDURES

Admission to a research program differs slightly between faculties and schools. In order to expedite processing of your application it is important to clearly outline your research interests.

STATEMENT OF RESEARCH INTEREST

The goal of this statement is to determine whether your research interests are aligned with the research interests of the academic staff and whether you have sufficient familiarity with research to be able to undertake a research study resulting in a master's or PhD thesis.

It is also advisable to go to the school/discipline website listed for more in-depth information about research areas. If you are unsure who to contact, you should email the postgraduate adviser a brief CV including the areas of research you are interested in, and ask for advice on suitable potential supervisors who can assist you in the preparation of the statement of research. The statement of research interest should be approximately 1000-1500 words long (two to four pages) and should accompany your application for admission to the master's or PhD program.

Please note that research programs developed without any contact with a potential supervisor are generally not accepted and you are strongly advised to nominate a supervisor in your application with whom you have had contact. Please visit **Research Supervisor Connect** (see left).

GUIDELINES FOR THE STATEMENT OF RESEARCH INTEREST

A statement of research interest should include:

- the area of focus of the proposed research

- any prior research experience and, where appropriate, copies of papers already published
- key literature references which may be seen as establishing a conceptual framework for the study (references should be cited)
- details of any prior, relevant work experience
- a possible methodology or approach to the research, as well as value and potential outcomes if the research is successful
- the name of the potential supervisor(s) that you have contacted regarding your research proposal.

PROBATION AND PROGRESSION

In most science related areas, the first year of a PhD is probationary. You need to demonstrate that you are capable of carrying out master's or doctoral-level research at the University of Sydney and to satisfy any other probationary requirements set by your supervisor in order to move beyond probationary candidature. During this first year you are expected to demonstrate your capacity to undertake research at a doctoral degree level. You will also be required to complete an Annual Progress Form and attend an interview with a postgraduate panel.

Satisfactory evidence of achievement, research potential, evidence of scientific writing ability and a committed work ethic are assessed. This feedback is viewed as highly beneficial by postgraduate students and it is very rare that students do not satisfy probation conditions.

THE RESEARCH PROPOSAL

The development and management of research proposals differs between faculties and schools. You should consult with the associate dean of the relevant faculty for details of management procedures.

RESEARCH PROGRAMS 2012

DOCTOR OF PHILOSOPHY (PHD)

Minimum duration: 3 years

The Doctor of Philosophy is a research program awarded for a thesis considered to be a substantially original contribution to the subject concerned. Some coursework may be required (mainly in the form of seminars) but in no case is it a major component. Applicants would normally hold a master's degree or a bachelor's degree with first class honours (although you should check with the faculty concerned about the level of honours required) from a recognised university or institution. The program may be taken on either a full-time or part-time basis. Normally the minimum period of candidature will be determined on the recommendation of the faculty but in any case will not be less than three years; the maximum period of part-time candidature is normally eight years.

MASTER BY RESEARCH

Minimum duration: 1 year

Graduates with first or second class honours and candidates in the final year of an approved honours course in their bachelor's degree from a recognised institution may apply for admission to candidature for the master's program. Once admitted, candidates proceed full-time or part-time, by supervised research and thesis, or in some cases by coursework and essay. Some candidates must satisfy a preliminary examination before being admitted to full candidature. Full-time candidates should expect to spend a minimum of one year to a maximum of two years studying this program. Part-time candidates have between two and four years to complete the master's program.

Please note that entry requirements into research master's in other faculties are different and you should consult with the relevant graduate adviser or associate dean.

MASTER OF VETERINARY CLINICAL STUDIES

Minimum duration: 2 years

As a candidate for this program you shall engage in full-time supervised advanced veterinary clinical study and research and submit a thesis embodying the results of an original investigation. Entry requires a degree of Bachelor of Veterinary Science. Candidates shall be registered by the Board of Veterinary Surgeons of New South Wales, unless exempted by the faculty.

MASTER OF PHILOSOPHY

Minimum duration: 2 years

New for 2012 in the Faculty of Agriculture, Food and Natural Resources, the Master of Philosophy (MPhil) is a master degree by research whereby students may choose an area of specialisation on completion. This exciting new course is designed to allow students greater flexibility, cross-disciplinary study and collaboration across a broad range of topical issues in economics and science such as climate change, resource management, food security, environmental sustainability and applied economics. The course prepares students for a range of exciting careers including but not limited to research, the private sector, international development and policy.

HONOURS

Please note while honours is a research program, it is not a postgraduate degree.

The undertaking and achievement of honours in the three faculties is different. Generally, the honours year consists of the following three components, however there may be variations to this, depending on the faculty, school or discipline area in which you complete honours:

- a supervised independent research program

- additional units in experimental design/technical training
- some coursework study (classes).

Honours in the Faculty of Science* Minimum duration: 1 year

Honours in the Faculty of Science is a widely recognised and highly regarded additional year of undergraduate study available to students who have recently completed their undergraduate degree. Honours is a unique opportunity for students to explore their research potential by designing an independent project and producing a thesis of their work. Generally the honours year consists of the following three components:

- a supervised independent research program
- additional units in experimental design/technical training
- some coursework study (classes and seminars).

**Honours is not available in some science areas of study*

GRADUATE DIPLOMAS

Minimum duration: 1 year

Graduate diplomas are also available in other faculties and their requirements will differ from those of the Faculty of Science. Please consult the relevant faculty for details.

Graduate Diploma in Science (GradDipSc)^

Minimum duration: 1 year

The Graduate Diploma in Science serves as an entry qualification for the Master of Science or PhD programs. It is a one year research training program that consists of work equivalent to that carried out in the fourth-year honours units, and it is normally available to candidates who may not be eligible to enrol in those units. The normal duration is one year full-time or two years part-time.

^GradDipSc is not available in some science areas of study (eg psychology).

APPLICATION INSTRUCTIONS

HOW TO APPLY

If you are a domestic student you are required to lodge your completed, current application form online, or with the relevant faculty office, unless otherwise stated. International students must lodge their completed, current application form online or with the International Student Office:

International Student Office
Level 4, Jane Foss Russell Building, G02
The University of Sydney
NSW 2006, Australia

P 1800 899 376 (within Australia - future students only)
 +61 2 8627 8300 (outside Australia)
F +61 2 8627 8387
E io.info@sydney.edu.au
<http://sydney.edu.au/io>

APPLICATIONS

Online applications can be submitted through the following websites:

Domestic students

http://sydney.edu.au/future_students
 or by directly contacting the relevant faculty.

International students

http://sydney.edu.au/future_students
 or by contacting the International Student Office directly.

APPLICATION PROCESSING FEE (APF) FOR INTERNATIONAL STUDENTS

Please note that international applications are required to pay a non-refundable AUD\$100 Application Processing Fee (APF). If your application is not accompanied by the APF it will NOT be processed.

The University will accept payment of the APF by bank drafts made payable to the University of Sydney in Australian dollars or by Visa or MasterCard.

The APF is not required if you are:

- a sponsored student, eg. recipients of Australian Development Scholarships (AusAID) and other nominated full tuition fee scholarships
- an exchange student on a student exchange program
- a study abroad student or
- a cotutelle student.

CLOSING DATES

Unless otherwise stated on the relevant program page, closing dates are as follows:

Domestic applicants:

For semester one, 2012 enrolment:
 31 October 2011

For semester two, 2012 enrolment:
 11 May 2012

International applicants:

For semester one, 2012 enrolment:
 31 October 2011

For semester two, 2012 enrolment:
 30 April 2012

Please note that quotas apply to most programs and some schools may accept applications after the closing dates, however priority is given to applications that are received on time. Also please note that some programs have closing dates prior to those stated and do not accept late applications. To avoid disappointment it is advised that you double check the closing date for applications for your preferred program.

If the results of your first degree will not be known by the closing date this should not stop you from submitting an application provided that you forward your results as soon as they are available.

RESULT OF APPLICATION

The result of your application will be a formal response sent by the faculty office/International Student Office. This offer of admission should be checked

carefully and any questions about the terms of the offer should be referred to the faculty office/International Office or the appropriate school as necessary.

IF YOU CANNOT ACCEPT AN OFFER

If, for any reason, you are unable to take up an offer of admission please notify the relevant faculty immediately.

UNSUCCESSFUL APPLICATIONS

Unsuccessful applicants will be sent a formal response. Unsuccessful applications and applications where an offer has been declined are not kept so a new application will be required if you reapply in a later semester.

APA AND SCHOLARSHIP DEADLINES

While faculties may accept late applications for admission, students seeking scholarships must submit on time.

Please visit the scholarships website for details:

<http://sydney.edu.au/scholarships>

APPLICATION CHECKLIST

- applications WILL NOT be processed until all relevant documentation is supplied
- you must present an ORIGINAL of the supporting documentation to the faculty office (for domestic students) or International Student Office (for international students) when you submit your application. Firm offers WILL NOT be issued until all original documents are supplied
- if you cannot supply original copies to the faculty office/International Student Office, you should have all copies certified by a Justice of the Peace (JP registration number required) AND you must present the originals prior to enrolling.

You must supply:

Statement of research interest

(2-4 pages in length). Please see page 4 for more details.

Details of tertiary qualification including ALL of the following:

- a complete academic transcript in original language of issue
- a certified translation of your academic transcript (if not originally in English)
- a guide to the awarding institution's grading system
- a testamur or proof of completion stating degree awarded
- a certified translation of your testamur or proof of completion stating degree awarded (if not originally in English).

English qualifications

- you must supply proof that you have satisfied the University of Sydney English requirements of the program you wish to study if your qualifications were obtained from a university in a country where English is not the official language. Please refer to the English Language Requirements box and also to the page of the program you wish to pursue, for the level of English proficiency required.
- you should attach an official statement from your overseas university if your studies at university were conducted in English
- you should retake the English proficiency test if you last took the test more than two years ago
- English language requirements are subject to change annually and could be different for individual courses. You should contact the relevant faculty to obtain this information.

Details of any change of name

official evidence will be required.

Domestic students must also provide:

- Evidence of your residency status such as your passport, birth certificate, or certificate of citizenship.

Important note

If you still have to complete one semester of your current course of study, you should include transcripts up until your final semester, and official documentation from your institution stating that you will finish at the end of the semester, and the name of the qualification you will be awarded. If you have completed your course of study but have not yet been awarded your testamur, you should include official documentation from your institution stating the name of the degree you have completed and the date of completion.

ENGLISH LANGUAGE REQUIREMENTS

If English is not your first language you must demonstrate your English language proficiency before admission can be confirmed. If the language of instruction of a prior degree was English, proof of language of instruction may be required.

Unless otherwise stated the following are the acceptable English language qualifications for the sciences (please see individual program pages for specific English requirements):

- Academic IELTS: Overall band score of 6.5 or better with no band below 6.0
- TOEFL: 577 or better plus Test of Written English (TWE) at 4.5+
- CBT (Computer-based TOEFL): 233 with an Essay Rating of 4.5
- IBT (Internet-based TOEFL): Overall score of 90 with a writing section minimum of 23 and no other band below 22
- Cambridge Certificate of Proficiency in English: Grades A or B
- CULT: 75 or better with a minimum of 17.5 in each skill

Scores over two years old will not be accepted. If you are taking TOEFL, your results must be sent directly to the University of Sydney from TOEFL/TSE Services at Princeton USA and the TWE must also be taken.

If you do not hold any acceptable language qualifications, you can take courses in English for Academic Purposes at the Centre for English Teaching (CET). Please check their website for details:

<http://sydney.edu.au/cet>

AGRICULTURE, FOOD & NATURAL RESOURCES

The growing human population, climate change, carbon trading, nutrition, human health and food security are just some of the challenges facing modern agricultural science, environmental science, and agricultural and resource economics. The Faculty of Agriculture, Food and Natural Resources offers a range of exciting graduate programs that are tailored for the modern application of science and economics in a changing world. The interdisciplinary nature of the faculty presents exceptional opportunities to broaden your interests and learning experience. An emphasis on innovative development and applied research has placed the faculty at the forefront of its field.

COURSE OFFERINGS

The faculty offers a selection of research opportunities allowing you to further your research training in specific areas. Our research offerings are diverse, and include some of the following: the economics of agriculture, natural resource management, agribusiness, international development, resource economics, applied microbiology and biotechnology, climate change, carbon accounting and digital soil mapping, environmental risk management, plant breeding and plant molecular genetics, sustaining land and water resources and catchment hydrology, agronomy, crop physiology and nutrition, entomology and many more.

SYDNEY ADVANTAGE

Postgraduates have the opportunity to work alongside the faculty's dynamic research community who offer expertise spanning a range of fascinating subjects. Research programs attract high levels of funding, industry partnerships and are supported by national and international collaborations.

FACILITIES

Our students are offered a wide range of learning environments. The faculty has substantial field stations in western and northern New South Wales offering exceptional large-scale plant growth facilities. The Plant Breeding Institute is a world-leader in biotechnology, genetics, specialist plant breeding and horticulture. Postgraduate students have the opportunity to work alongside our international research community. You will enjoy all the benefits of a modern and vibrant department, including a specialist library, laboratories and an extensive computer network.

RESEARCH LINKAGES

The faculty's commitment to research excellence and significant linkages with national and international industry and institutions make the faculty a leader in applied research. The faculty has significant involvement with the Grains Research and Development Corporation and several cooperative research centres. The Sydney University Centre for Nitrogen Fixation (SUnFix) and the Australian Centre for Precision Agriculture (ACPA) conduct research at the cutting edge of agricultural and environmental technology, while considering issues of sustainability through its membership in the Institute for Sustainable Solutions.

The faculty also enjoys excellent collaborative relationships with CSIRO, National and State government departments, Australian Bureau of Agricultural and Resource Economics (ABARE), and important corporate stakeholders in agriculture, which present opportunities for cross-instructional and disciplinary research. We continue to maintain strong international linkages supported by ACIAR, AusAID, GRDC and IDP. The faculty has collaborative associations in South East Asia, India, Central and South America, China, the Asia-Pacific

region, the European Union and the USA.

AREAS OF RESEARCH

Our main research areas include:

Sustainability

- carbon sequestration
- pollution targets and control
- the affect of climate changes on agriculture and natural resources
- environmental soil ecology
- natural resource management
- crop water management
- soil conversation
- grazing productivity.

Agricultural and resource economics

- carbon and water trading
- agricultural trade
- economic issues of developing countries
- agribusiness and agricultural marketing
- economics of sustainable development.

Production systems

- crop protection
- biological nitrogen fixation
- post harvest biology and technology
- plant breeding
- plant pathology
- limnology and water ecology
- food chemistry and biochemistry
- plant cryogenics.



“I am passionate about finding a balance between the needs of humans and the sustainability of a healthy environment, particularly within the bounds of plant pathology. I can utilise my skills to support research and development both in Australia and abroad.”

ZOE-JOY NEWBY
PHD STUDENT IN
AGRICULTURE

COURSES AVAILABLE

Honours
Master of Philosophy (MPhil)
Doctor of Philosophy (PhD)

ACADEMIC CONTACT

Ms Pamela Stern, Coordinator, Postgraduate Services, the Faculty of Agriculture, Food and Natural Resources, Australian Technology Park
P +61 2 8627 1002 E pamela.stern@sydney.edu.au
<http://sydney.edu.au/agriculture>

ENGLISH REQ

Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.

BIOLOGICAL SCIENCES

The School of Biological Sciences was formed in 1962 by the amalgamation of the departments of zoology (founded 1890) and botany (founded 1913). It has evolved and grown with the discipline of biology and now has a strong representation in the fields of plant and animal physiology, cell biology, evolution, ecology, genetics, molecular biology, genomics and bioinformatics, as well as in the classical aspects of the diversity of plants, animals and fungi. The school's graduate programs are at the forefront of research, attracting high levels of competitive funding.

SYDNEY ADVANTAGE

The school is currently home to an ARC Federation Fellow, Professor Peter Waterhouse, whose research focus is viruses and gene-silencing in plants. The school is also home to one of the first ARC Laureate Fellows - Professor Steve Simpson, an influential researcher in the fields of ecology, insect behaviour and physiology; two ARC Professorial Fellows - Professor Chris Dickman, a leading ecologist in distribution and abundance of terrestrial vertebrates, and evolutionary biologist Professor Matts Olsson; and has five Fellows of the Australian Academy of Science among its staff - Professors Simpson, Waterhouse, Rick Shine, Ian Hume (emeritus), Tony Underwood (emeritus), and Dr Marianne Frommer (Honorary). Our graduate students regularly publish papers during and immediately after their studies at the University of Sydney, and recently several have published in *Nature* and *Science*. The school also has an internationally renowned group of postdoctoral fellows.

FACILITIES

The School of Biological Sciences has Class PC2 laboratories for work with recombinant organisms; glasshouses and growth cabinets for plant biology;

insect-rearing facilities; an animal house; and extensive fresh water and marine aquarium facilities for animal and algal biology. The school is well equipped with excellent centralised facilities for molecular biology and light microscopy.

For field studies, the school provides access to a number of terrestrial and marine sites for which there is excellent baseline information available. These include the Crommelin Biological Field Station, 60km north of Sydney, which provides access to wet and dry sclerophyll forests, mangroves, sandy beaches and intertidal rock platforms; sites in Ku-ring-gai and Royal National Parks just north and south of Sydney, and sites in the Simpson Desert. You can access many other university facilities including One Tree Island Field Station on the Great Barrier Reef, the University Animal House, the DNA Sequencing Service, Australian Centre for Microscopy and Microanalysis and the Institute of Wildlife Research. You also have access to the Sydney Institute of Marine Sciences (SIMS), a collaborative marine research station on Sydney Harbour. The school has established collaborations with many outside institutions, including the Australian Museum, the NSW Department of Environment and Climate Change, the various divisions of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Department of Agriculture and Fisheries, the National Herbarium and Botanic Gardens, Taronga Zoo and the Sydney Aquarium.

AREAS OF RESEARCH

- animal behaviour, behavioural ecology, evolution of sociality, social insects
- plant development, genes and genetic interactions, regulation of gene expression
- molecular mechanisms of photosynthesis in cyanobacteria,

- evolution of chlorophylls, artificial photosynthesis
- behavioural ecology of marine invertebrates, herbivore-plant interactions, defence against predation
- ecology, conservation and management of vertebrates, especially mammals; ecology of arid ecosystems
- fish population ecology
- mobile genetic elements and exchange; molecular biology and significance in bacterial evolution
- systematics, phylogeny, biogeography and evolution of plants
- ecology of terrestrial arthropods, insect-plant interactions, conservation biology, restoration ecology
- molecular evolution, phylogenetics, molecular clocks, and ancient DNA
- ants, foraging behaviour, honeybees, optimal foraging theory, slime mould
- soil chytrid morphology and function, in vitro soil microbial interaction, fungal biofilms
- arthropod-bacterial symbioses, phylogenetics, enzyme molecular biology
- molecular genetics of microbial pathogenesis in animals and plants
- hormonal and environmental stress signalling in plants, cellular / molecular biology of signaling based on phospholipase - cytoskeleton interactions
- plant-herbivore interactions, foraging ecology and conservation of mammals
- ecology of fungi: conservation, rehabilitation and sustainable use of ecosystems
- honey bee biology: population, conservation, behavioural genetics, genomics of behavioural traits
- the cytoskeleton, plant development
- flying-fox ecology and conservation, life history and nutrition
- molecular genetics of root branching patterns, the interaction of microbes with plant roots
- evolutionary and ecological physiology:



“Brush-tailed rock-wallabies are an endangered species in eastern Australia. I am investigating how food-related factors are affecting their decline.”

KATHERINE TUFT
PHD STUDENT IN
BIOLOGICAL SCIENCES

- how do animals respond to changing environments?
- mathematical modelling, house-hunting in honeybees
- evolutionary ecology of reptiles, conservation biology, impacts of cane toads and vegetation change
- why locusts swarm, integrative nutrition: from insect-plant relationships to human obesity
- molecular analysis of phloem, symbiotic nitrogen fixation,

- mitochondria, oxidative stress and molecular analysis of legume allergens
- tropical rainforest biology/plant-animal interactions
- environmental physiology of vertebrates, evolution of viviparity in reptiles, egg physiology
- cellular signalling, physiology and stress in animals, studying deep sea biology from oil rigs
- social recognition and social organisation in fishes, ecotoxicology,

- collective decision-making
- plant ecology, population biology, life history evolution
- how do plants and ecosystems function?
- conservation biology, wildlife management, ecology, reptile biology, physiological ecology, ecosystem management
- dietary essential nutrition in carnivores.

COURSES AVAILABLE	ACADEMIC CONTACT	ENGLISH REQ
<p>Honours Graduate Diploma in Science (GradDipSc) Master of Science (MSc) Doctor of Philosophy (PhD) See page 5 for details</p>	<p>Roslyn Malin, Graduate Adviser, School of Biological Sciences, Level 5, Carlaw Building, F07 P +61 2 9351 2369 E roslyn.malin@sydney.edu.au http://sydney.edu.au/science/biology</p>	<p>Standard. See page 7 for details</p>
<p>For course codes and fee information see the inside back cover of this booklet.</p>		

CHEMISTRY



CAMERON WEBER
PHD STUDENT

"I am currently researching salts that are liquids at room temperature. These are called ionic liquids and are useful as solvents for chemical reactions. The strength of ionic bonding and the huge number of other interactions between ionic liquid molecules mean they are more highly structured than traditional solvents used for organic chemistry. What I am interested in doing is trying to find a way to use this structure to rationally increase the rate of reactions and, when multiple products are possible, engineer conditions to favour one product over another. In the future, this could have potential applications in the synthesis of fine chemicals, such as pharmaceuticals."

The School of Chemistry was the first in Australia and is now one of the largest with over 2500 undergraduate and over 110 graduate students. The diversity of research interests, as well as talented teaching staff and supervisors, place the school at the forefront of development and research. In 2010, the school published 240 papers in refereed journals, six book chapters and one book and was awarded \$10.6 million in research funding.

SYDNEY ADVANTAGE

The School of Chemistry has long had a well-deserved international reputation for excellence in research and teaching. It is consistently placed at or near the top of chemistry departments in Australia. Postgraduate research training is intimately linked with research activities. The school has strong collaborative links with industry mainly through the Advanced Catalysis for Sustainability Lab and the Key Centre for Polymer Colloids.

FACILITIES

The school is one of the best equipped for chemical research in Australia and has specialised equipment, such as: gas chromatographs, high pressure liquid chromatographs, ultrasonic equipment, cryogenic spectrophotometers, matec electroacoustic analyser (1 MHz), electrochemical instrumentation, electrophoresis, moving boundary and particle apparatus, thermal analysis instrumentation, including Hiden-Isochema IGA, atomic absorption spectrometers, centrifuge equipment and single crystal and powder x-ray diffractometers.

Spectrometric facilities include infrared and UV/visible, kinetic, raman laser, Fourier transform IR (Bruker IFS 66V and RFS100) and raman (Renishaw 2000) spectrometers, stopped flow CD absorption and emission spectrometer (applied photophysics) laser light-scattering apparatus, mass spectrometers, NMR spectrometers (DDX-400, DRX-400, PDX-300, PDX-200 and AMX-600), EPR Spectrometers, optical rotation and dispersion instruments, rheometers and circular and linear dichroism spectropolarimeter.

AREAS OF RESEARCH

The School of Chemistry's areas of research include, but are not limited to:

Biological and medicinal chemistry

- design and pharmacology of new drugs
- design and synthesis of improved drugs, enzyme mimics, pesticides and herbicides
- drug-DNA and drug-protein interactions
- biophysical chemistry including artificial light harvesting systems
- environmental chemistry.

Computational and theoretical chemistry

- quantum chemistry of organic molecules, biomolecules and metal complexes
- statistical mechanics
- molecular modelling
- molecular electronics
- polymer and colloid chemistry
- colloid and surface chemistry
- polymerisation chemistry
- polymer colloids in food science
- artificial polymer colloids
- phospholipids and surfactants.



Reaction dynamics and kinetics

- molecular dynamics
- chemical kinetics and reactions mechanisms
- laser spectroscopy and the kinetics of very fast reactions.

Spectroscopy and structural analysis

- NMR spectroscopy
- vibrational spectroscopy of inorganic and biological systems
- surface analysis and surface spectroscopy
- solid state chemistry.

Supramolecular chemistry

- host-guest interactions
- molecular engineering
- biosensors
- metal ion and small molecular recognition
- design and synthesis of new materials
- crystal engineering
- porphyrin based molecular wires.

Synthesis, catalysis and materials

- organometallic chemistry
- synthetic organic chemistry
- asymmetric catalysis

- polymerisation catalysts
- amino acid and peptide chemistry
- chemistry at very high pressures
- combustion and fuel chemistry.

COURSES AVAILABLE

Honours
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
 See page 5 for details

ACADEMIC CONTACT

Graduate Adviser, School of Chemistry, Chemistry Building, F11
 P +61 2 9351 3328 E jody.cutler@sydney.edu.au
<http://sydney.edu.au/science/chemistry>

ENGLISH REQ

Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.

GEOGRAPHY



SEREYROTHA KEN
PHD STUDENT

Sereyrotha (Rotha) Ken won the Australian Leadership Award Scholarship and started his PhD studies at the School of Geosciences in July 2008. Based in the Australian Mekong Resources Centre, Rotha's research project investigates the role of social capital in community based natural resource management in Cambodian communities.

"From my research, I hope to contribute to the development of Cambodia and the region by establishing area-specific natural resource management as a domain in which to consider social capital themes."

Rotha has a masters degree in environmental management and development studies as well as an engineering degree. He has worked for over 15 years in fields as varied as environmental planning, policy and sustainable development, biodiversity conservation, resource management, participatory action research, environmental education and people's responses and adaptation to climate change.

There is a long tradition of rigorous graduate research in geography. The University had the first geography department in Australia - now called the School of Geosciences. Graduate research in geography at the University of Sydney can be undertaken in a range of areas relevant to the spatial dynamics of the human population and its connections to the biophysical environment. The University of Sydney Institute of Marine Science (USIMS) draws research and technical expertise from throughout the school (geography, geology and geophysics).

SYDNEY ADVANTAGE

Geography staff at the University of Sydney are active researchers in their various fields, with linkages to government departments and instrumentalities; and other universities and research institutes, both within Australia and overseas (especially South-East Asia and the Pacific region, but also North America and Europe). International postgraduates in recent years have come from Thailand, Laos, Nepal, Vietnam, Iran, Germany, Tonga, Indonesia and Cambodia.

FACILITIES

Reflecting its status as a field-based discipline, most graduate students in geography undertake research outside of offices and libraries. There is a strong community of geography graduate students with a wealth of experience on matters of how to conduct field-based research. Additionally, modern Geographic Information System (GIS) facilities enable the combined computer analysis of satellite imagery, aerial photographs and map data. GIS facilities are based upon fully featured workstations linked with Arc-Info and IDRISI.

AREAS OF RESEARCH

The school's areas of research include, but are not limited to:

- the globalisation of food and agriculture, the economic geography of trade and production systems in agri food industries, and their social and economic impacts for farmers, rural communities and food security
- spatial and urban change in contemporary Australia - analysis of economic and population changes across the cities and regions of Australia, with emphasis on equity issues and cultural transformations
- cities and citizenship - the implications of contemporary urbanisation processes for rights to the city, and the politics of urban governance
- sustainable cities - exploring the application of sustainable development to cities, their hinterlands and other areas affected by urban processes. This research includes urban planning history, population, transport, industrial ecology and urban agriculture
- coastal management - the application of knowledge of coastal processes and response to the management of coastal systems, including use of advanced GIS techniques to enable prediction and environmental reconstruction through combined use of field data and computer modelling with the application of formal methods for managing uncertainty, relevant to coastal management and coastal impacts of climate change, geological exploration, and morphodynamics of sand islands on coral atolls
- impact of tourism on cultural heritage in arid Australia - deterioration assessment and management of visitors and their impacts
- GIS - the exploration of spatial and temporal patterns in understanding physical and human environments. Fundamental questions relating to



- the application of GIS include the representation of spatial landscapes, handling data uncertainty, and decision support
- weathering processes - the nature and rate of deterioration of (mainly) sandstone buildings/structures/monuments in urban environments, including visitor-generated impacts
 - water and river basin development in the Mekong region - catchment management processes; approaches to vulnerability and risk in infrastructure development; political ecology of river basins
 - human impact on the environment
 - impacts of dams; impacts of deforestation; protected area management
 - Asia Pacific development - with strong regional expertise in the Mekong region, Indonesia and the South Pacific
 - Indigenous resources rights and mining companies - analysis of negotiation processes and socio-economic outcomes of resource projects in Australia and the Pacific.

COURSES AVAILABLE	ACADEMIC CONTACT	ENGLISH REQ
<p>Honours Graduate Diploma in Science (GradDipSc) Master of Science (MSc) Doctor of Philosophy (PhD) See page 5 for details</p>	<p>Dr Derek Wyman, Graduate Adviser, Madsen Building, F09 P +61 2 9351 2924 E derek.wyman@sydney.edu.au http://sydney.edu.au/science/geosciences</p>	<p>Standard. See page 7 for details</p>

For course codes and fee information see the inside back cover of this booklet.

GEOLOGY & GEOPHYSICS



PATRIC HORNE
MSC, GEOLOGY STUDENT

I completed my undergraduate BSc geography and geology degree at the University of Johannesburg, South Africa after which I decided to head to Australia and focus on the formation of ore deposits and processes. In 2008 I completed my honours degree on Broken Hill type deposits and am currently enrolled in a 2 year MSc by research program.

My project involves studying igneous rocks from New Britain and Papua New Guinea. Their geochemical, isotope and petrographic characteristics establish their original tectonic settings and clarify both magma genesis and the evolution of metal enrichment processes.

New Britain and the associated island arc formed by subduction processes are of special interest to the mining industry as the tectonic setting has generated a range of porphyry and epithermal copper, gold and molybdenum deposits. Through an industry-based scholarship, together with the University of Sydney and the collaboration of local stakeholders, I have been able to undertake several expeditions into the Papua New Guinean rainforest to study and collect my samples.

The School of Geosciences was formed in 1998 to encompass study in geology and geophysics along with geography. There is a long tradition of rigorous graduate research at the University of Sydney: research in geology commenced in 1866. Current research in these areas is now complemented by an active geophysical program.

SYDNEY ADVANTAGE

The School of Geosciences is a leader in the development and application of advanced computational solutions for geoscientific research. The school has expertise in a wide range of geoscience disciplines as demonstrated by its industry-recognised honours program and active partnerships in a diverse range of collaborative organisations. These include the University of Sydney Institute of Marine Science (USIMS) and BlueNet - the Australian Marine Science Data Network. The school is also associated with the Shelf Programme, which is a United Nations Environmental Programme partnership of international organisations, established to assist developing states and small island developing states in defining the outer limits of their continental shelf. The school is developing collaborative research ties with the Danish Hydrological Institute (DHI), which now has offices located on site. The school also administers the University of the Sea, a unique ship-based training and research program for students, initiated by the University of Sydney. It brings together students from across the Asia-Pacific region to participate in hands-on marine science instruction.

FACILITIES

The school is well equipped for research in most fields of geology and geophysics, and hosts desktop computer laboratories that are interfaced with the University Computer Centre. Modern Geographic Information System (GIS) facilities enable the combined computer analysis of satellite imagery, aerial photographs and map data. GIS facilities are based upon fully featured workstations linked with Arc-Info and IDRISI.

The techniques applied to research in geology and geophysics are diverse and range from those of the traditionally central earth sciences of mineralogy, petrology and palaeontology, through fundamental and applied geophysics to coastal studies and sea-borne marine geology studies of the continental margin. Facilities include sedimentology and environmental geochemistry laboratories, instrumentation for oceanographic shelf and deep-sea work.



AREAS OF RESEARCH

The school's areas of research include:

Marine processes

Research encompasses coastal studies, geology and geophysics of the ocean basins, and palaeoceanographic and palaeoclimatic modeling.

Early Earth evolution

Understanding the origin and evolution of early life on Earth, the emergence and dynamic histories of continents, and the links between fluid-rock interactions, tectonics, and igneous rocks.

Environmental geology and geochemistry

Research in this field concentrates on the Sydney region, principally examining marine and estuarine contamination, storm water remediation, river-bank stability and sediment dynamics.

Mineral and petroleum resources

Research includes all aspects of resource exploration, including coal, petroleum, and mineral resources based on petrographic, geochemical, computational and geophysical methods.

Geophysics

Research in geophysics ranges from petroleum exploration geophysics to exploration and global, planetary-scale geophysics based on interactions between the Earth's mantle, crust, sediments and the oceans, including the modeling of long-term sea level change.

COURSES AVAILABLE

Honours
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
 See page 5 for details

ACADEMIC CONTACT

Dr Derek Wyman, Graduate Adviser, Madsen Building, F09
 P +61 2 9351 2924 E derek.wyman@sydney.edu.au
<http://sydney.edu.au/science/geosciences>

ENGLISH REQ

Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.

HISTORY & PHILOSOPHY OF SCIENCE

The Unit for History and Philosophy of Science (HPS) examines the practice of science in its historical and social contexts and examines how science differs from other forms of knowledge. It also critically examines concepts and theories of science, and the assumptions underlying scientific research. It is a valuable field of study for any career requiring an understanding of science, with particular relevance for careers in science administration, science policy, science education and science communication. HPS has a challenging and rewarding postgraduate program. A combination of structured units and a thesis project provides you with considerable experience in undertaking research in the constituent disciplines of HPS (including history, philosophy, sociology, and public understanding of science), in developing your written and verbal skills and in structuring critical arguments. The 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 but also develop skills such as how to structure research projects and manage your time in a way which enables you to perform to the best of your abilities and to develop expertise in a research area of particular interest.

SYDNEY ADVANTAGE

HPS offers a lively intellectual atmosphere provided by an enthusiastic group of scholars working in innovative areas of HPS. The unit's academic staff publish widely in their fields of expertise and have attained national and international recognition for their research. They bring the latest scholarship to their teaching and maintain high standards for postgraduate students. Visiting researchers of international standing also contribute to the unit's scholarly environment.

Facilities in HPS are second to none in Australia. In addition to the unit's dedicated staff, HPS is linked with nearly a dozen well-qualified teachers and supervisors in different departments and schools within the university. In addition to this cross-disciplinary approach, the university library contains over five million volumes, including rare books in the history of science and medicine, ensuring you have access to both current and historical resources.

AREAS OF RESEARCH

- history and philosophy of biology and medicine
- bioethics
- public understanding of science and medicine
- history of psychology, psychiatry, and the human sciences
- history and philosophy of mathematics and the physical sciences
- sociology of science
- history of early modern science
- philosophy of science.

COURSES AVAILABLE

Honours
Graduate Certificate in HPS (GradCertHPS)
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
 See page 5 for details

ACADEMIC CONTACT

Dr Hans Pols, Graduate Adviser, Unit for History and Philosophy of Science, Carlsaw Building, F07
 P +61 2 9351 3610 E hans.pols@sydney.edu.au
<http://sydney.edu.au/science/hps>

ENGLISH REQ

Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.



MARINE SCIENCE



EZEQUIEL MARZINELLI
PHD GRADUATE

I am from Buenos Aires, Argentina, where I did my Licenciatura in biological sciences (6 year degree; equivalent to a master's here) at the University of Buenos Aires. For my thesis, I studied the reproductive biology of *Pseudechinus magellanicus*; a sea-urchin from Patagonia.

I always wanted to work on experimental ecology and do my PhD abroad, so I could learn from top researchers around the world. In particular, I was/am inspired by the work of Professor Tony Underwood, who has been publishing brilliant papers on experimental ecology since the 1970's and is one of the best in the field and worked at the University of Sydney. My PhD research at Sydney concentrated on how experimental ecology (doing manipulative experiments in the field) not only increased our understanding of the distribution, abundances and diversity of organisms in different environments, but also generated practical advice that can be used to minimise and/or mitigate the adverse effects of human activities.

The University of Sydney Institute of Marine Science (USIMS) provides a cross-disciplinary focus for marine science undergraduate and graduate teaching and training. Opportunities for graduate training are enhanced by the wide range of disciplines in biological, geographical and earth sciences connected with the institute. Graduate students are supervised in individual departments under the direction of the institute. Staff liaise closely with several research units (where most of the graduate training occurs), including the Ocean Sciences Institute, the Coastal Studies Unit and the Centre for Ecological Impacts of Coastal Cities. This multidisciplinary approach to marine research training is a unique feature of the marine sciences program.

SYDNEY ADVANTAGE

USIMS is an umbrella organisation for eight existing research centres 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. USIMS coordinates the efforts of these centres and helps to facilitate research that crosses disciplinary boundaries. These research centres attract a significant amount of funding annually, which in turn attracts top local and international students, thus producing a challenging academic atmosphere that brings out the best that research students have to offer. USIMS is a partner in the Sydney Institute of Marine Science (SIMS), a consortium involving all of the prominent universities in the Sydney region.

FACILITIES

Specific facilities for marine research include 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. Equipment in the institute includes an 8m research boat, numerous smaller boats, a side-scan sonar, an acoustic doppler current profiler (ADCP), CTDS, a vibro-corer, deep and shallow-sea seismic equipment and a comprehensive range of environmental monitoring equipment available within the individual departments. The institute also has access to the university's super-computing facilities for modelling and visualisation, the Australian Centre for Microscopy and Microanalysis and the Macintosh Quaternary Dating Centre.

AREAS OF RESEARCH

Biological sciences

There are research programs in temperate and tropical marine ecology, with a major emphasis on experimental coastal ecology, the behaviour and ecology of fish, photosynthesis in marine phytoplankton and the effects of pollution on coastal or marine environments.

Earth and geographical sciences

There are research programs in the dynamics of beaches and surf zones, the impact of climatic change on coastal environments, the evolution of coastal margins, modelling at the University Computer Centre, Modern Geographic Information System (GIS) of the coastal environment, continental margins and deep sea basins, marine geophysics, and the processes of marine sediment deposition.



COURSES AVAILABLE

Honours
Master of Science (MSc)
Doctor of Philosophy (PhD)
See page 5 for details

ACADEMIC CONTACT

Associate Professor Ross Coleman, Centre for Research on Ecological
Impacts of Coastal Cities, Edgeworth David Geology, A11
P +61 2 9351 2590 E ross.coleman@sydney.edu.au
<http://sydney.edu.au/usims>

ENGLISH REQ

Standard. See page 7
for details

For course codes and fee information see the inside back cover of this booklet.

MATHEMATICS & STATISTICS

The School of Mathematics and Statistics is one of the largest mathematics schools in Australia and pursues a vigorous program of teaching, scholarship and research. In particular, the postgraduate research program is varied and flexible, catering for students of many backgrounds. The school supports a policy of active research, proudly insisting on the highest standards of academic achievement.

SYDNEY ADVANTAGE

The school is one of the most successful mathematics schools in Australia. It attracts prestigious research grants and has a high profile internationally. In addition to its achievements in research, the school is also notable for its development of MAGMA, a world class computational algebra and number theory package which is used both in industry and by many branches of pure and applied mathematics. The school also supports an active program of long and short term visits by distinguished international academics.

FACILITIES

The school has all the facilities of a well-established and progressive teaching and research institution, including access to a modern library and an extensive computer network of workstations. The network supports a number of high-speed processors, colour graphics systems and a wide variety of software packages for computation in algebra, numerical analysis and statistics for use in both teaching and research.

The school is proud of its students and is committed to providing you with excellent research facilities and office space in which to work. Financial aid is available to allow you to attend relevant conferences and workshops. Further support is offered in the form

of part time teaching, assignment and examination marking.

All staff and postgraduate students are equipped with an office computer connected to the school network which runs a mixture of Linux and Microsoft Windows.

AREAS OF RESEARCH

Algebra

- algebraic geometry
- algebraic combinatorics
- finite groups
- Hecke algebras
- Lie groups and algebraic group
- representation theory of groups and algebras
- quantum groups and Yangians
- semigroups and formal language theory.

Analysis

- harmonic analysis
- functional analysis
- random walks on groups
- groups acting on trees and buildings.

Astrophysical and geophysical modelling

- numerical geophysical fluid dynamics
- pattern formation in the atmosphere
- solar physics
- nonlinear waves
- chaotic advection
- stellar and planetary dynamo theory
- magnetohydrodynamics
- geomagnetism.

Computational algebra

- finitely presented groups
- permutation and matrix groups
- soluble groups
- Lie groups and representation theory
- factorisation of integers and primality testing
- local and global fields
- homological algebra
- polynomial factorization
- Groebner basis methods
- algebraic geometry and schemes
- finite geometry, designs, codes and graphs

- algebraic programming languages
- cryptography and coding theory
- signal processing and quantum computation.

Financial mathematics

- market microstructure models
- high-frequency equity price modelling
- real and exotic options
- stochastic volatility
- interest rate derivatives
- computational finance
- financial econometrics.

Geometry and topology

- geometry of surfaces
- harmonic maps
- Ricci flow
- 3-manifolds
- differential geometry
- real and complex singularities
- stratifications and subanalytic sets
- Hodge theory
- topology of algebraic varieties.

Mathematical biology

- collective behaviour and social insects
- cancer and atherosclerosis modeling
- communication in neurons
- phylogenetics.

Mathematical physics

- general relativity
- quantum field theory
- supersymmetry
- Lie algebras and Lie superalgebras
- quantum groups.

Nonlinear analysis and applications

- completely integrable partial differential equations
- singularity analysis
- Painlevé equations
- boundary value problems
- nonlinear elliptic and parabolic equations
- integrable systems
- solitons in nonlinear optics and fluid dynamics.

Dynamical systems

- chaos
- asymptotic methods
- perturbation theory
- Hamiltonian dynamics



“I have a passion for people and would like to help humanity through my studies in statistics.”

ANNA CAMPAIN
PHD STUDENT IN
STATISTICS

- slow-fast systems
- pattern formation.

Statistics

- probability theory
- limit theorems and approximations
- martingale theory
- exchangeability
- stochastic processes
- saddlepoint approximations
- limit results for U-statistics and M-estimators
- Levy processes
- bioinformatics
- motif finding

- biological modelling
- mixture models
- ruin theory
- computational statistics
- Markov chain Monte Carlo algorithms
- resampling analysis
- time series analysis
- generalised linear mixed models
- multivariate analysis
- change-point models.

COURSES AVAILABLE

Honours
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
 See page 5 for details

ACADEMIC CONTACT

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<http://sydney.edu.au/science/math>

ENGLISH REQ

Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.

MEDICAL SCIENCES

The following four research disciplines may be of interest to science students, however the PhD and MPhil programs are administered by the Sydney Medical School. For administrative enquiries for honours and Graduate Diploma in Science please contact the Faculty of Science.

Sydney Medical School

Edward Ford Building, A27

The University of Sydney NSW 2006

T +61 2 9351 3132

F +61 2 9351 3196

E medicine.info@sydney.edu.au

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 from government and corporate bodies and have an outstanding reputation for publications in top international journals. The discipline is one of the largest in the university, and indeed the largest of its type in Australia. The discipline is most interested in attracting talented and determined students for its research programs.

Areas of research include, but are not limited to:

- stem cell biology
- chronic pain and disability
- neurochemistry
- neural structure and function
- developmental biology
- retinal biology
- Alzheimer's disease
- physical anthropology
- muscle research
- vision research
- cataract (lens) research
- Parkinson's Disease
- female reproduction
- teratology

PHARMACOLOGY

Pharmacology is a vibrant and research active department. Research groups use cutting edge 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 other similar bodies.

Areas of research include, but are not limited to:

- cancer therapeutics
- drug discovery
- neuropharmacology of cannabinoids
- chronic and inflammatory pain
- opioid pharmacology
- pharmacoinformatics
- molecular pharmacology of transporters
- smooth muscle pharmacology
- respiratory pharmacology

PHYSIOLOGY

Physiology has a strong tradition in research and this commitment to understanding the function of the human body is reflected in the discipline's high research profile.

Areas of research include, but are not limited to:

- andrology
- auditory neuroscience
- basic and clinical genomics
- cardiovascular neuroscience
- cortical development
- developmental physiology
- epithelial transport
- human reproduction
- vision and cognition
- molecular neuroscience
- muscle cell function
- muscle research
- neurobiology
- Vitamin D, skin and bone
- systems neuroscience

PATHOLOGY

Pathology has very active research groups investigating a large number of human diseases. A wide variety of modern techniques, using both human tissue and experimental animals, are employed to investigate disease causes and processes. The discipline has a highly regarded science honours program (run by the science faculty) and a large number of students in the PhD program (run by the Sydney Medical School). Areas of research (in alphabetical order) are:

- atherosclerosis
- cancer
- dementia
- heart muscle disorders
- immunology of blood vessels
- inflammatory bowel disease
- malaria
- motor neuron disease
- viral encephalitis

If you are interested in honours or PhD research in any of these areas you should first check the discipline websites to get more information about projects.

<http://sydney.edu.au/medicine/anatomy>

<http://sydney.edu.au/medicine/pharmacology>

<http://sydney.edu.au/medicine/physiology>

<http://sydney.edu.au/medicine/pathology>

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



COURSES OFFERED BY MEDICINE Master of Philosophy (MPhil), Doctor of Philosophy (PhD)

COURSES OFFERED BY SCIENCE Honours, Graduate Diploma in Science (GradDipSc)

SUBJECTS AREAS	ACADEMIC CONTACT	ENGLISH REQ
Anatomy and Histology	Associate Professor Frank Lovicu , Discipline of Anatomy and Histology, Anderson Stuart Building, F13 P +61 2 9351 5170 E frank.lovicu@sydney.edu.au http://sydney.edu.au/medicine/anatomy	Standard. See page 7 for details
Pharmacology	Associate Professor Renae Ryan , Discipline of Pharmacology, Blackburn Building, D06 P +61 2 9351 2669 E renae.ryan@sydney.edu.au http://sydney.edu.au/medicine/pharmacology	Standard. See page 7 for details
Physiology	Dr Margot Day , Discipline of Physiology, Anderson Stuart Building, F13 P +61 2 9036 3312 E margotd@physiol.usyd.edu.au http://sydney.edu.au/medicine/physiology	Standard. See page 7 for details
Pathology	Dr Paul Witting , Discipline of Pathology, Blackburn Building, D06 P +61 2 9114 0524 E p.witting@sydney.edu.au http://sydney.edu.au/medicine/pathology	Standard. See page 7 for details

For course codes and fee information see the inside back cover of this booklet.

MICROSCOPY & MICROANALYSIS

Research within the Australian Centre for Microscopy and Microanalysis (ACMM) involves the application and development of techniques and new methods in microscopy and microanalysis. This includes microscopy, tomography, diffraction and spectroscopy and imaging science. Breakthroughs in these areas provide the gateway to discovery for researchers in many fields of research endeavour. With the growth in fields such as biotechnology and nanotechnology, microscopy and microanalysis is set to play an increasingly important role. This is a particularly exciting time as there are many new instruments, approaches and technologies currently being developed. In addition to developing new approaches and techniques, the ACMM is active in research to understand and design the properties and functions of materials, both organic and inorganic.

SYDNEY ADVANTAGE

The ACMM is the premier research facility in Australia in microscopy and microanalysis. It has the country's most comprehensive array of imaging, analysis and specimen preparation equipment. While the ACMM prides itself on its state-of-the-art instruments, it supports a full range of conventional instruments for optical, electron and x-ray imaging. The ACMM is a node of the Australian Microscopy and Microanalysis Research Facility (AMMRF) and serves as the facility headquarters. Therefore, you undertake your study in a national research facility with access to a national grid of facilities including over \$100M worth of infrastructure, over 180 staff, world-class equipment and support for understanding nanomolecular characteristics of materials. You are encouraged to develop interactions with staff and students from other nodes of the facility and support is available for this.

FACILITIES

Instruments available in the ACMM include:

- optical and confocal microscopy
- conventional scanning electron microscopes (SEM) and transmission electron microscopes (TEM)
- field emission SEM for high-resolution surface studies
- dedicated scanning transmission electron microscope for high-resolution analytical studies
- field-emission TEM for atomic-resolution imaging and high resolution analysis
- x-ray diffraction, including high-temperature stage
- x-ray fluorescence
- micro-CT for non-destructive high-resolution x-ray tomographic studies
- dual beam focused ion beam (FIB), SEM
- local electrode atom probe (LEAP)
- scanned probe microscopy
- a wide range of specimen preparation equipment for both biological and physical specimen preparation.

AREAS OF RESEARCH

The staff of the ACMM conduct research in a diverse range of fields and collaborate widely with colleagues from other departments throughout the University. We have a unique role, often forming a bridge between different fields and initiating a multi-disciplinary approach to research. A summary of our research areas is given below and a full description of research projects within the ACMM can be found at:

<http://sydney.edu.au/acmm>

Physical sciences

- light alloy design
- design of advanced steels
- grain boundary segregation and embrittlement
- structure-property relationships in optical fibre materials
- characterisation of quantum well nanostructures

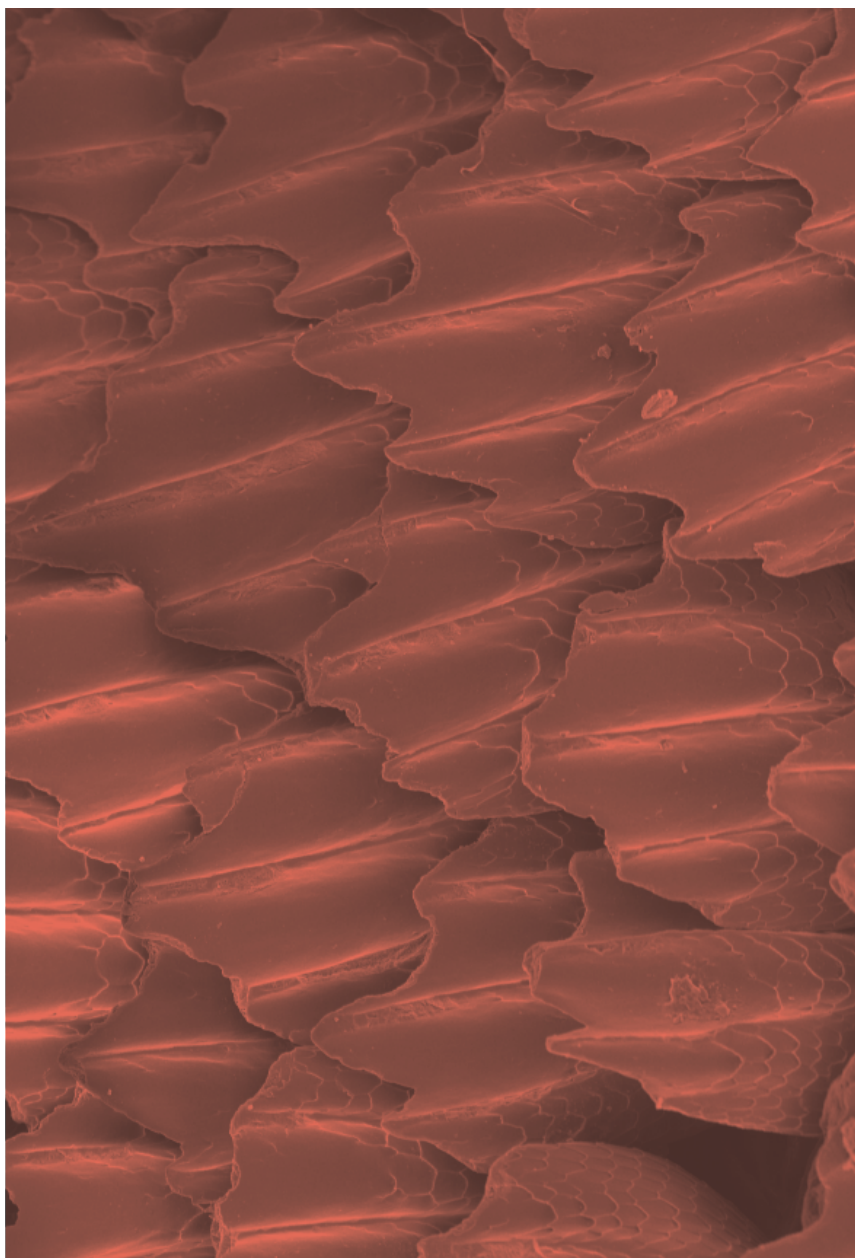
- dopant distributions in semiconductors
- zeolite nanocrystals
- porous clay nanostructures, metal oxide nanoparticles, nanofibres and nanotubes
- advanced applications of microscopy for the design of new nanomaterials
- developing key engineering nanocomposites by new synthesis techniques
- adsorption and catalysis for environmental protection
- novel application of microscopy in chemistry
- reactions of metal oxide and hydrous oxides in wet chemistry processes.

Biological sciences

- live cell imaging
- fluorescent lifetime spectroscopy
- structure and dynamics of the plant cytoskeleton
- targeting enzymes for optimising drug efficacy
- understanding the mechanisms of arsenic-induced cancers
- nanoprobe investigations of cellular processes
- bio-organic, bio-mimetic and supramolecular chemistry
- bio-electronics and bio-nanotechnology
- emergence: origin of life and other complex systems
- structure and function of colour in reef corals and other marine organisms
- diseases of Great Barrier Reef corals
- algal symbioses of corals and other marine organisms
- microcellular control and stress responses of coral symbiosis
- biology and morphology of symbiotic dinoflagellates
- cellular adaptations for light capture of deep water marine organisms
- anthozoan cellular adaptations for light creening and amplification
- imaging and biotechnological applications of anthozoan GFP-type proteins
- second-harmonic microscopy of natural biological polymers.

Technique development

- atomic resolution imaging and analysis
- super-resolution in confocal and non-linear microscopy
- image analysis for microscopy
- 3D visualisation and quantification
- x-ray microtomography
- atom probe tomography
- electron energy loss spectroscopy
- spectrum imaging in microanalysis
- computational microscopy and microanalysis
- calculation and measurement of electronic structure and bonding
- novel methods for phase imaging
- microanalysis of cellular processes.

**COURSES AVAILABLE**

Master of Science (MSc)
Doctor of Philosophy (PhD)
See page 5 for details

ACADEMIC CONTACT

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ENGLISH REQ

Standard. See page 7 for details

MOLECULAR BIOSCIENCE

**BIOCHEMISTRY, BIOPHYSICS, MOLECULAR BIOLOGY,
STRUCTURAL BIOLOGY, NUTRITION, MICROBIOLOGY,
CELL BIOLOGY AND PROTEOMICS**

The University of Sydney houses one of the first and largest schools in Australia undertaking research and teaching in the areas of biochemistry, molecular and cell biology, microbiology, and nutrition and metabolism. Research interests span macromolecular structure, studies of protein interactions, the molecular biology of bacteria and viruses, yeast and mammals, human genetic disease, cancer, cardiovascular disease, central nervous system inflammation, metabolism and human nutrition. The school cultivates a research-based culture and promotes collaboration among groups. A student society, AMOEBA, organizes social activities such as trivia evenings and barbecues.

FACILITIES

The school houses high quality infrastructure for a wide range of experimental approaches, including recombinant DNA technology, the generation of transgenic animals, tissue and cell culture facilities, fluorescence microscopy, as well as excellent facilities for the study of metabolism and nutrition.

The school houses instrumentation for structural biology and biophysics with X-ray diffraction facilities and a nuclear magnetic resonance (NMR) facility containing state-of-the-art 400 MHz, 600 MHz and 800 MHz spectrometers. A proteomics facility contains several mass spectrometers and gel imaging equipment. Instrumentation for analytical ultracentrifugation, calorimetry and surface plasmon resonance also is available. Newly installed climate-controlled glasshouses facilitate the study of plant biochemistry.

AREAS OF RESEARCH

Biochemistry, biophysics, molecular biology, structural biology, cell biology and proteomics

- protein structure determination by NMR and X-ray crystallography and the molecular basis of disease
- radical probe protein footprinting studies of protein interactions
- assembly of human elastic tissue
- cellular signaling in health and disease
- mechanistic and structural analysis of gene regulation and DNA repair
- transgenic modelling of cytokine induced neurological disease
- mechanisms of action of anticancer agents and diagnosis of leukaemias
- biochemical basis of brain function in health and disease
- genomic and proteomic profiling of brain inflammation
- proteomic profiling of heart disease
- structural biology of molecular communication
- RNA-based viral response in plants.

Microbiology

- genetics of the bacterial cell envelope
- experimental evolution in chemostats
- evolutionary origins of variation in bacterial species
- mobile genetic elements in bacteria
- hydrocarbon and xenobiotic degrading bacteria
- development of microbial biocatalysts
- proteomic and bioinformatic profiling of infectious disease pathogens
- surveillance and evolutionary studies of the influenza virus
- studying virus/host interactions using advanced imaging techniques
- modification of host signalling pathways and cell behaviour during viral infection
- population genetics and proteomics of pathogenic fungi
- chromosomal integrons in bacteria.

Nutrition and metabolism

- nutritional requirements in chronic illness
- glycaemic index
- satiety, weight loss, exercise performance and fuel selection in exercise
- diet, obesity and diabetes
- lipid nutrition and metabolism
- epidemiology, aetiology and management of obesity
- nutrient-sensing mechanisms
- interactions between trace elements and lipid metabolism
- minor dietary constituents and cardiovascular disease
- the definition and causes of the metabolic syndrome
- the fetal origins of adult disease.



“While studying here it is interesting to observe research in other fields and to attend school seminars that canvass a wide range of scientific topics.”

MEIKA FOSTER
PHD STUDENT
IN MOLECULAR
BIOSCIENCE

COURSES AVAILABLE

Honours
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
See page 5 for details

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PHYSICS

Physics at the University of Sydney offers you the opportunity to study the exciting fundamental concepts on which all sciences rely, and make contributions to cutting-edge research. Physics has been taught at the University of Sydney for over 140 years, the longest of any University in Australia. Today, the School of Physics provides world-class educational opportunities through its postgraduate degree offerings.

Postgraduate degree programs are at the heart of a modern education in physics. Students have the opportunity to learn from internationally recognised experts, contribute to original research, and become part of the community of scientists and scholars within the School of Physics.

SYDNEY ADVANTAGE

The School of Physics at the University of Sydney is the leading physics department in the country, with outstanding staff and students undertaking world-leading teaching and research. The academic staff within the school are true leaders of their fields, and include multiple recipients of prestigious ARC Fellowships, including Laureate, Federation, Professorial, Future, and QEII Fellowships.

The quality of research within the School is recognised by its housing of five ARC-funded Centres of Excellence and one NHMRC Centre of Excellence. These include two ARC Centres headquartered in the school: CUDOS and the Centre for All-Sky Astrophysics (CAASTRO), three ARC Centre nodes: the Centre for Engineered Quantum Systems, the Centre for Particle Physics at the Terascale, the Centre for Quantum Computation and Communication Technology, and the NHMRC Centre for Integrated Research and Understanding of Sleep. In addition, prominent international collaborations with the United States,

Europe and Asia, funded through multiyear competitive awards, as well as linkages to domestic government research agencies, present a range of opportunities unmatched in the region.

Research-led and coursework-based educational opportunities are supplemented by the school's unique efforts in physics education research, led by SUPER (Sydney University Physics Education Research). This group studies the complex ways in which students go about understanding physics, and in collaboration with educational researchers around Australia and overseas, encourages the implementation, inside and outside the University, of the findings of research in physics education.

FACILITIES

With access to supercomputers, modern laboratory facilities, and high-tech observatories, the School of Physics is the premier environment for physics education and research. Major observational infrastructure includes the Molonglo Observatory Synthesis Telescope (MOST) and the Sydney University Stellar Interferometer (SUSI), operated by the School of Physics. These telescopes cover the radio and optical spectra and provide a technical foundation for observational astronomy.

In addition, the school is currently constructing a major new research and teaching facility, the Australian Institute of Nanoscience (AIN). The AIN will be world-leading, designed from the ground up to meet the demanding requirements of nanoscience research in decades to come, and the only building to house such an advanced research capability alongside comprehensive facilities postgraduate training and education. This investment will support basic and applied research aimed at understanding nature at a fundamental level, and translating this new knowledge into next generation

technological outcomes underpinning revolutionary new electronic and optical devices, biomedical sensors, and material systems.

AREAS OF RESEARCH

Research at the school consists of a vibrant program of computational, experimental, observational, and theoretical physics. Our 100 staff and 150 postgraduate students conduct research across a vast range of interests from single trapped atoms to clusters of galaxies. Research at the school is grouped into broad areas, including:

Astronomy and astrophysics

The school's research activities span various scales, from the solar system to the galaxy. Work in astrophysics covers a broad range of observational and theoretical topics, as well as the development of cutting-edge instrumentation. This includes studies of the extreme environments of pulsars and black holes, the interstellar medium, the seismology of stars and stellar lifetimes. On the largest scales, research focuses on the evolution of galaxies, cosmic magnetism, the nature of dark matter and cosmology.

Biological and medical physics

Biological physics is an emerging cross-disciplinary area in which physicists apply their knowledge and skills to analysing, modeling and quantifying biological data in an effort to better understand living systems. Related to this, research in biophysics involves the modeling of biomolecules using a variety of simulation methods on fast supercomputers. The aim is to understand the function of proteins, especially those that are of medical and pharmacological significance. Current areas of interest are ion channels and protein interactions. Medical Physics spans diagnostic medical imaging techniques and radiation therapy in

cancer research. Specific research themes include: bio-acoustics, medical imaging, MRI physics, radiation physics and dosimetry, radiotherapy, radiobiology, and nanomedicine.

Brain dynamics and computational neuroscience

Research in this area includes interdisciplinary research involving expertise from physics, mathematics, IT, medicine, engineering, and biology to better understand the multiscale dynamics, activity, information processing, and imaging of the brain and allied systems. Complex networks in brains and artificial systems are investigated, with studies ranging from the behavior of ensembles of neurons to emergent dynamics of the whole brain, including sleep, alertness, and biomedical imaging signals.

Complex systems

Complex systems draws together researchers with interests in complex natural and artificial systems, including multiscale dynamics and emergent phenomena. Its interests range from theoretical and computational work, including development of new areas of theoretical and mathematical physics and new computational methods, to observation, experiment, and commercialisation.

Condensed matter and materials physics

Research in condensed matter includes theory and experiment in mesoscopics, nanostructured materials, spins in solids, soft condensed matter, superelasticity in amorphous materials, and ab initio investigations of materials and surface science phenomena. Our goal is to acquire a detailed understanding of the fundamental science required to engineer and design

nanomaterials, advanced electronic and biomedical devices.

High energy/particle physics

High energy physics probes the subatomic world by observing the collisions of particles accelerated to extreme energies, either naturally (as in cosmic rays) or using giant accelerators. The school's high energy research program involves participation in overseas collaborative experiments (at CERN in Europe and KEK in Japan) and Australian-based programs involving simulations, development and testing, and the analysis of results.

Photonics and optical sciences

The Institute of Photonics and Optical Science and CUDOS have substantial research across most areas of photonics. Fundamental research in the most exciting and vibrant areas of photonics science includes: metamaterials, nonlinear optical materials, quantum photonics, photonic crystals, micro-structured optical fibres and micro-photonics. This science underpins important research applications in telecommunications, health, environment, security and information processing.

Plasma physics

Research in plasma physics covers a wide variety of phenomena, important in fundamental science, applied physics, materials science, and industry. Our efforts include work on theoretical problems in the areas of nonlinear wave-wave and wave-particle processes, statistical plasma dynamics, quantum, space, and astrophysical plasmas, and plasma nanoscience. Experimental studies are carried out on gas discharges, plasma fusion, cold nonneutral plasmas, technological plasmas for materials processing, and

nanoscale plasma phenomena.

Quantum science

Quantum Science in the School of Physics focuses on learning how to engineer and manipulate quantum systems, addressing challenges at both the hardware and 'software' levels, as well as understanding basic aspects of quantum physics. Research in this area, which is at the forefront of international efforts, includes experimental and theoretical work in atomic physics (ion trapping), mesoscopics (spins in semiconductor nanostructures), quantum control, quantum information, quantum photonics, materials for quantum computation, and the foundations of quantum mechanics.

Space and solar physics

Space physics research ranges from the solar surface to the boundaries of the solar system and heliosphere. It includes the solar corona and solar wind, the ionospheres and magnetospheres of planets and moons, and the space weather that results from violent disturbances on the Sun. Research ranges from theoretical and computational studies of fundamental physical processes, to simulations of large-scale systems in space, and membership of international space exploration teams, including the twin-spacecraft STEREO mission, and the planned INSPIRE nanosat and Solar Orbiter probe.

Sustainability

The Centre for Integrated Sustainability Analysis (ISA) develops leading-edge research and applications for environmental and broader sustainability issues, bringing together expertise in environmental science, economics, technology and social science.

COURSES AVAILABLE

Honours
Graduate Diploma in Science (GradDipSc)
Master of Science (MSc)
Doctor of Philosophy (PhD)
See page 5 for details

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PSYCHOLOGY

The University of Sydney's School of Psychology was the first established in Australia, and it is currently one of the largest and most prestigious. There are a number of postgraduate programs available. Research programs are offered at PhD and MSc level.

SYDNEY ADVANTAGE

The school has extensive computer resources and technical support, and each postgraduate student is provided with a personal computer. The school also has a large number of well-equipped specialised research laboratories for studies in perception, neuroscience, developmental psychology, cognition, human performance, human and animal learning, social psychology and clinical psychology.

These include:

- clinical psychology facilities including audiovisual facilities, observation and interview rooms, equipment for recording psychophysiological variables and a comprehensive test library
- access to clinical participants at a number of Sydney hospitals
- access to observational facilities for studying infant behaviour
- joint research facility with Royal Prince Alfred Hospital including a Servo-Med Human Centrifuge
- facilities for conducting behavioural and psychopharmacological

- experiments with rats and mice
- facilities for small animal surgery, immunohistochemistry, 2-DE proteomics, gas chromatography, mass spectrometry (GC-MS) and high performance liquid chromatography (HPLC)
- the Peter Beumont Centre for Eating Disorders - one of the world's leading clinical research units of its kind
- the Centre for Medical Psychology and Evidence-based Decision-making (CeMPED) is a cross-faculty, multidisciplinary organisation sitting within the School of Psychology, School of Public Health and the Sydney Medical School
- cognitive testing facilities including: individual testing cubicles, data presentation and acquisition software, linguistic databases, speech-recording and editing software and eye-tracking equipment
- Vision labs using high performance computers and graphics processors to produce tightly controlled experimental stimuli
- computer-controlled research driving simulator
- a transcranial magnetic stimulation (TMS) lab, equipped with a Magstim Rapid2 stimulator and a neuronavigation system for precise localisation of TMS sites.

AREAS OF RESEARCH

- Clinical psychology
- Cognitive psychology
- Developmental psychology
- Health psychology
- Learning and motivation
- Method and theory in psychology
- Neuroscience and psychopharmacology
- Organizational psychology
- Perceptual systems
- Personality and intelligence
- Social psychology.

COURSES AVAILABLE

Honours
Master of Science (MSc)
Doctor of Philosophy (PhD)
See page 5 for details

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For course codes and fee information see the inside back cover of this booklet.

Please note Processing of postgraduate applications can take 6 - 8 weeks, and international scholarship applications cannot be considered unless the applicant has received a firm offer of admission into a postgraduate program. Applicants should check with the Faculty of Science and the International Office for the relevant deadlines and submit their candidature application as early as possible.



VETERINARY SCIENCE

The Faculty of Veterinary Science officially opened in March 1910, making it the oldest continuously running veterinary science faculty in Australia. It has grown enormously since the first 16 students enrolled and today its students continue to be taught by skilled practitioners and world class academics. Opportunities are available to conduct research in a variety of preclinical, paraclinical and clinical disciplines with strengths concentrated in the areas of production animal research (especially pigs, poultry, cattle and sheep), immunopathology, reproduction and genetics, companion animal medicine, wildlife conservation biology and research into optimising racehorse performance and health.

SYDNEY ADVANTAGE

The Faculty of Veterinary Science at the University of Sydney is one of a small elite group of veterinary schools outside North America to receive accreditation from the American Veterinary Medical Association (AVMA) and it was the third faculty to be awarded such an honour in Australasia. It has always encouraged strong research performance and continues to have outstanding success in attracting competitive research grants, industry-based research contracts and producing research papers of high calibre. This performance is reflected in postgraduate research students trained in the faculty, many of whom have continued to excel in their own right in a wide variety of research and higher education endeavours.

FACILITIES

The faculty has two main campuses, which together provide the world class facilities required to pursue research in a variety of species. These range from both basic cell and molecular biology to individual animal research models; to the broader issues of

herd and flock health management, animal behaviour and the constraints on animal health and production imposed by commercial management systems. Available for University use are a variety of specialised centres and sites which cater for a diverse range of research and study opportunities. The Camperdown campus is home to the Sydney University Veterinary Centre and other facilities for research primarily into small animals, including a clinical pathology laboratory. It has excellent facilities for research into anatomy, animal science (genetics, nutrition and reproduction), physiology and pathology and boasts a modern conference centre with state of the art audio-visual capabilities.

At the Camden campus, there is a university veterinary centre, which is equipped with its own diagnostic laboratories and has been designed to service a wide range of companion and production animals. The Camden Farms provide enviable facilities for research in animal science and disease in production animals. The 1200 hectares of farmland encompass a Dairy Research Unit, a Poultry Research Unit, a Horse Unit, a Sheep Unit and associated laboratories. There are three commercial dairy farms operated by the University of Sydney on the Cumberland Plain, southwest of Sydney. The faculty also has links with a number of other partner farms for research purposes. Applied science postgraduates often use the commercially operated 'Arthursleigh' farm for research into pasture agronomy and animal science and it is also used to provide access to wildlife areas. In addition, the faculty has links with the Australian Marine Mammal Research Centre (AMMRC) located at Taronga Zoo.

AREAS OF RESEARCH

The faculty has a number of industry links and is able to offer a variety of technical services which have been developed by their own staff and students.

The faculty's areas of research include, but are not limited to:

Animal genomics and genetics

- mapping and characterisation of genes influencing economically important traits, biomedical conditions and inherited disorders
- evolutionary origin and phylogeny of domesticated animals
- conservation and management of Australia's native fauna
- building comparative genomic maps between diverse animal species
- prospects of safely using animal cells and tissues for treatment of human diseases.

Applied reproduction in farm animals

- artificial insemination and embryo transfer
- in vitro embryo production
- sex preselection in spermatozoa
- preservation of mammalian semen.

Companion animal research

- epidemiology, pathogenesis and diagnosis of feline and canine diseases
- treatment and therapeutic control of illness.

Equine research

- racehorse physiology and performance
- equine infectious disease exercise physiology
- epidemiology
- behaviour and welfare.

Farm animal health

- aquatic animal epidemiology and diagnosis
- farming systems in developing countries
- Ovine Johne's Disease
- infectious diseases of animals and man.

Poultry research

- nutritional requirements and feed evaluation
- epidemiological approaches to disease management
- avian immunology.

Ruminant nutrition and dairy science

- foraging and pasture utilisation
- feed management systems
- milking systems
- practical implications and social impacts of new technologies.

Wildlife conservation and animal welfare

- disease prevention and treatment in koalas
- ecological causes and impacts on disease in koalas
- marine mammal health and disease
- reptile systematics and biology.

Research is also undertaken in:

- anatomy
- animal behaviour
- animal nutrition
- clinical practice
- immunobiology
- management of feral animals
- parasitology
- pathology
- pharmacology
- veterinary practice management.

FINANCIAL SUPPORT FOR STUDENTS

Tax-exempt stipends (scholarships) are available for outstanding students. The Government, University and faculty offer tax-exempt stipends to support you while you study. These are highly competitive and you will require an honours undergraduate degree or have a qualification that is equivalent to first class honours.

Scholarships and application processes vary for domestic and international students, so please check carefully when you are considering which to apply for.

Scholarship information

There are strict deadlines for scholarship applications. Please check with the Research Office for relevant dates. APA deadlines are:

For semester one entry:
31 October 2011

For semester two entry:
Mid June 2012

<http://sydney.edu.au/ro>

For more information please contact the veterinary science faculty office.



LISA BLACK
PHD STUDENT

Lisa began her PhD in 2010, studying the pharmacokinetics of commonly used antimicrobial drugs in the koala. The drugs being studied are those routinely used to treat the commonly encountered and devastating infectious diseases of koalas, *Chlamydiosis* and *Cryptococcosis*. It is intended that through this work, appropriate dosing schedules for these drugs will be developed in order to enable a more effective treatment protocol for koalas suffering from these diseases.

COURSES AVAILABLE	ACADEMIC CONTACT	ENGLISH REQ
<p>Master of Veterinary Science Master of Science in Veterinary Science Master of Veterinary Clinical Studies* Doctor of Philosophy (PhD) For general information about Academic Programs, please refer to page 5. *Requires a degree registrable with the NSW Veterinary Practitioners Board unless exempted by the Faculty.</p>	<p>Please contact a Faculty researcher in the area you are interested in to obtain additional information before making an application. Descriptions of a variety of available postgraduate research projects, some of which come with funding already, can be found at: http://sydney.edu.au/vetscience/research/postgraduate/opportunities.shtml or look at the various faculty research groups at: http://sydney.edu.au/vetscience/research/research_groups.shtml P +61 2 9351 6933 E vetscience.pg@sydney.edu.au http://sydney.edu.au/vetscience</p>	<p>IELTS of 7.0 with no band below 7.0 TOEFL 600 plus TWE 5.0, OR: Computer-based TOEFL 250 plus Essay Rating 5.0</p>

For course codes and fee information see the inside back cover of this booklet.

APPLICATION CLOSING DATES:

Domestic students Application closing dates: Semester one, 2012: 18 February 2012 / Semester two, 2012: 12 June 2012
International students Application closing dates: Semester one, 2012: 31 October 2011 / Semester two, 2012: 30 April 2012
 Late applications will be considered, however priority will be given to applications received on time.

SCHOLARSHIPS

UNIVERSITY SCHOLARSHIPS

Australian Postgraduate Awards (APA) scholarships are awarded to students of exceptional research potential to undertake a higher degree by research at an Australian university. The scholarships are provided to assist with general living costs.

The Vice-Chancellor's Research Scholarships (VCRS) are offered to attract students with an outstanding track record of academic achievement and research potential to pursue full-time PhD study at the University of Sydney. Up to 20 VCRS will be awarded every year.

A separate application for the VCRS is not required and highly ranked applicants for the APA or UPA (see below) will be automatically considered.

University of Sydney Postgraduate Awards (UPA) are similar to APA in terms of tenure and benefits. Eligible APA applicants are automatically considered for these awards. Some faculties and departments also offer postgraduate research scholarships and/or supplementary scholarships. APA/UPA applicants may also be considered for these awards where funding is available.

Applications close on the last working day of October each year. The application form for the next round will be available in late August.

Domestic students

Domestic students should contact the University Research Office or visit:

<http://sydney.edu.au/ro>

International students

While international students are not eligible for APAs, they are encouraged to look for funding from any source available to them, or to apply for one of the many scholarships detailed through the University's International Office website:

<http://sydney.edu.au/fstudent/international/postgrad/costs/scholarships.shtml>

FACULTY SCHOLARSHIPS

For information on currently available scholarships within the faculties of agriculture, food and natural resources, science or veterinary science please visit:

<http://sydney.edu.au/scholarships>

SCIENCE COURSEWORK COMMONWEALTH SUPPORTED MERIT PLACES

The Faculty of Science is pleased to announce that a limited number of merit places may be available for semester one, 2012, for students commencing their first postgraduate master's program within the Faculty of Science.

For more details please visit:

<http://sydney.edu.au/science/fstudent/postgrad/scholarships.shtml>

SCHOLARSHIP APPLICATION CLOSING DATES

Applications for most scholarships must be received in full to the Research Office by 28 October 2011. Please check the scholarship website for full details and closing dates.

Please note that while faculties may accept late applications for admission, students seeking scholarships must submit on time.

International students should indicate when lodging their application for admission that they wish to be considered for relevant scholarships.



FEE TABLE

Course code	CRICOS code	Course name	Duration in years	Domestic fee / year \$A	2012 International fee / year \$A
BB000	000665C	Doctor of Philosophy (PhD) in Agriculture	3	N/A	\$35,280
BC080	074191J	Master of Philosophy in Agriculture	2	N/A	\$35,280
LB000	000722K	Doctor of Philosophy (PhD) in Science	3	N/A	\$35,040
LC080	039030F	Master of Science	1	N/A	\$35,040
LF008	012846K	Graduate Diploma in Science	1	\$14,160	\$33,360
NB000	006461M	Doctor of Philosophy (PhD) in Veterinary Science	3	N/A	\$35,280
NC003	008425K	Master of Science in Veterinary Science	2	N/A	\$35,280
NC001	008426J	Master of Veterinary Clinical Studies	2	N/A	\$35,280
NC000	008427G	Master of Veterinary Science	2	N/A	\$35,280

IMPORTANT NOTE ABOUT FEES

- All fees stated in this booklet are in Australian dollars.
- The above indicative costs are for a normal full-time year (48 cp) or equivalent and reflect the typical pattern of enrolment for this program. The University's tuition fees are reviewed annually and may be varied during the period of study.
- The exact tuition fee for your program may depend on the specific units of study in which you enrol.
- All fees stated in this booklet do not include additional program costs such as text books or additional programs/ equipment.

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**NATURAL
SCIENCES**



THE UNIVERSITY OF
SYDNEY

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The University reserves the right to make alterations to any information
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