

# Research at Macquarie University

Macquarie's focus on excellence in research means that you will be taught by world-class teachers who are among the best in their fields.

World-leading research is undertaken by Macquarie University's faculty and students, and many discoveries are quickly applied to meet the needs of industry, society and the environment.

As well as opportunities to undertake postgraduate coursework degrees, Macquarie University is a leader in providing unique research opportunities.

The University has 18 Concentrations of Research Excellence (COREs), which are outlined on the following pages.

To view pathways to higher research degrees see page 7.

## Scholarships

There are generous scholarships available for research at Macquarie University in key areas of research excellence. For more information visit

[www.hdr.mq.edu.au/information\\_about/scholarships](http://www.hdr.mq.edu.au/information_about/scholarships)

## Cotutelle (Joint PhD Supervision)

In addition to the direct entry PhD, Macquarie University also encourages joint PhD applications with other international universities that are active in research. Simultaneous enrolment at Macquarie University and one of our partner universities enables students to submit one thesis for joint recognition. About half of the student's time is spent at each university and travel funds are provided.

Eligible cotutelle students are entitled to the MQRES (Macquarie University Research Excellence Scholarship) which provides full tuition payment and a living allowance/stipend of around AU\$22,500 per year\* while studying in Australia.

[www.international.mq.edu.au/research](http://www.international.mq.edu.au/research)

### Did you know?

International PhD applications are accepted all year round, allowing greater flexibility for potential applicants.

## Research highlights

- In 2009, Macquarie signed joint PhD agreements with five highly-regarded British universities and several leading universities in Germany and China.
- Macquarie encourages jointly supervised PhD (cotutelle) programs with other research intensive international universities. By October 2009 there were 71 cotutelle agreements with over 54 leading universities in 22 countries.
- In 2009, the Australian Government allocated over AU\$36 million from the Education Investment Fund to two high-profile Macquarie projects in advanced surgical training and marine science.
- The Macquarie Research Excellence Scholarship (MQRES) stipend was increased to AU\$22,500 per annum in 2010, a 10% increase over the 2009 rate.
- AU\$46 million was distributed to faculties to support higher degree research training, including provision of supplementary stipend to PhD candidates.
- The University library provides specific support to researchers and higher degree research students, including dedicated research areas within the new library building, to be opened in 2010.
- Macquarie University's research capacity will soon be enhanced by major infrastructure developments, including the AU\$180 million Macquarie University Hospital and the AU\$130 million Hearing Hub (see page 3).

\* Information given in this publication is correct at the time of printing (December 2009) but is subject to change without notice. The University has the right to alter the content or impose terms and conditions in relation to a program at any time.

*World-class graduates require world-class teachers and many of our teachers are the best in their fields.*



*Macquarie University is a leader in providing unique research opportunities.*



## Concentrations of Research Excellence (COREs)

Macquarie's international reputation rests on distinct research areas of the highest quality. Currently, there are 18 COREs:

### Ancient Cultures

The breadth of coverage and the integration of source studies with historical research makes Ancient Cultures at Macquarie University unique. Our projects advance each of our key areas – excavation (Egypt), inscriptions, numismatics, prosopography (Rome), papyrology (Early Christianity), and editing and translation (Late Antiquity and Silk Road).

### Animal Behaviour

Our research combines insights from sensory, physiological and cognitive processes with genetic and comparative analyses. The goal of this uniquely integrative approach is to understand animal behaviour at all levels, from mechanism to evolution.

### Astronomy and Astrophysics

Macquarie University is a highly active centre of astronomical research excellence and is in close proximity to both the Anglo-Australian Observatory and the Australia Telescope National Facility. Our research strengths include wide-field astronomy, optical, infrared and radio studies of planetary nebulae and supernova remnants, stellar proper motions, theoretical studies of shock-waves, star formation and black holes.

### Biomolecular Frontiers

We undertake world-class research in proteomics, glycomics, genomics, biotechnology and chemical biology related to cell biology, human disease biomarker discovery, agri-food quality trait discovery, microbial physiology and pathogenicity, gene transfer systems, protein post-translational modifications and expression, and bioinformatics. The Biomolecular Frontiers team is underpinned by the state-of-the-art research infrastructure provided by the Australian Proteome Analysis Facility.

### Climate Risk

We are a multi-disciplinary group with expertise in climatology, water, coastal processes, geomorphology, ecology, economics, law and governance, social policy, planning and risk analysis. Our strategy is to use science and impact assessment infused by and packaged within a framework of economic, financial and legal risk.

### Cognitive Science

We study basic processes of cognition – language acquisition, reading and spelling, understanding and producing spoken language, face recognition, thinking, memory and attention – using our results to achieve greater understanding of cognitive disorders such as schizophrenia, autism, dyslexia, aphasia, specific language impairment in children and prosopagnosia.

*Research in Ancient Cultures includes fieldwork for many students.*



*Many discoveries are quickly applied to meet the needs of industry, society and the environment.*

### Earth and Planetary Evolution

By integrating information across traditional discipline boundaries including geochemistry, geophysics, geodynamics and tectonics, Macquarie is now a world leader in mapping the Earth in four dimensions. Our cutting-edge isotope, geochemical and experimental instrumentation and strong industry collaborations attract leading local and international geoscientists.

### Ecology and Evolution

Working under the slogan 'genes to geoscience', we are a coalition of research groups and individual researchers, who believe that exceptionally interesting and important science over coming decades will arise through bridging from molecular technologies and biological detail, up to world-scales in space and geology-scales in time.

### Emotional Health

We focus on understanding, treating and preventing emotional distress, as well as promoting positive emotional health. Research interests of team members focus on emotional difficulties across the lifespan. The team has developed novel interventions through its research clinic.

### Financial Risk

We focus on the financial implications of risk arising out of global capital market fluctuations, climate change, foreign exchange, longevity, retirement, and regulatory risk. Our key research agenda is to better understand, integrate, manage and price financial risks to allow their efficient and equitable distribution within our economic system.

### Language Sciences

We bring a combination of theoretical, experimental and computational approaches to the investigation of live issues in the production and comprehension of languages across the human life span. Central issues include how human language is processed in the brain, how language develops in normal children and the nature of language disorders in children and adults.

### Lasers and Photonics

In Macquarie University's Photonics Research Centre, our internationally-leading researchers pursue a broad range of experimental and theoretical studies in lasers, optics, photonics and optoelectronics. We aim to address fundamental questions and develop new optical technologies for applications such as medical diagnosis and therapy, high-resolution imaging and sensing, and microfabrication.

### Legal Governance

We research legal governance and regulatory problems facing governments, businesses, and communities, including global and national governance, environmental sustainability, corporate social responsibility, and the medico-legal challenges of human health.

### Neuroscience, Vascular Sciences and Surgery

We research the effects of the brain on cardiovascular and respiratory systems; as well as the effects of the cardiovascular system on the brain. Our research group includes leading scientists and clinicians, with a strong emphasis on the neurosciences; particularly how the central

nervous system controls blood pressure and breathing, blood flow in large arteries and pathology of the cerebral vasculature.

### Quantum Information Science and Security

With experts in optics, condensed matter physics, theoretical physics, computer science, statistics and chemistry, we forge discoveries in quantum science and technology. Quantum information science drives a wide range of new technologies such as quantum computers, quantum materials, quantum cryptography, quantum simulations and quantum algorithms. The addition of experimental expertise opens new routes for interdisciplinary research.

### Social, Cultural and Political Change

We are a cross-disciplinary group with expertise in the history of media, culture and politics. We focus on the history of the press, radio and film; the representations of history in various media; feminist and postcolonial studies; culturally constructed notions of gender and sexuality; literary history and critical theory; and historically informed accounts of political culture, citizenship and public opinion.

### Social Inclusion

At the Centre for Research on Social Inclusion, our scholars engage in philosophical, social and cultural inquiry and collaborate in interdisciplinary research on key issues such as work reform, globalisation, cities, migration, multiculturalism, racism and welfare. A distinctive feature of the Centre is its commitment to research that is both socially relevant and theoretically innovative.

### Wireless Communications

We undertake complementary research activities related to wireless communications, ranging from transistor circuits for radios, to telecommunications networking and transmission via optical and radio propagation. The specialist expertise within the team provides a niche capability in the understanding of the interplay between components in telecommunications systems.



Macquarie University's North Ryde campus is set on 126 hectares of peaceful parkland.

## Further areas of study

In addition to the COREs on pages 5 and 6, academics in all faculties can supervise students whose interests fall in the broad discipline areas of the University as shown below.

### Faculty of Arts

- Ancient History
- Anthropology
- English
- Indigenous Studies
- International Studies
- Media, Music and Cultural Studies
- Modern History, Politics and International Relations
- Policing, Intelligence and Counter Terrorism
- Philosophy
- Sociology
- Law

### Faculty of Business and Economics

- Applied Finance
- Accounting and Finance
- Actuarial Studies
- Business
- Business Law
- Economics
- Macquarie Graduate School of Management (MGSM)

### Faculty of Human Sciences

- Australian School of Advanced Medicine (ASAM)
- Education
- Linguistics
- Psychology
- Early Childhood
- Human Cognition and Brain Science

### Faculty of Sciences

- Biological Sciences
- Brain Behaviour and Evolution
- Chemistry and Biomolecular Sciences
- Chiropractic
- Computing
- Earth and Planetary Science
- Environment and Geography
- Mathematics
- Physics and Engineering
- Statistics

## Progression of a Macquarie student

