GRADUATE PROFILE

Blake Harahush came to UQ from the US to complete the Bachelor of Science (BSc) program. Her interest in sharks prompted her to stay in Australia and complete a PhD.

Blake is now studying the growth and visual development of brown banded bamboo sharks from embryo to adult.

She has found that baby sharks grow slowly, changing their fins as they grow and can see a month before they leave their eggs.

Blake, who graduated with honours in 2004, is now in the third year of her PhD.

Her study of sharks, from Underwater World at Mooloolaba on Queensland's Sunshine Coast, is believed to be only the second comprehensive scientific study of sharks from embryo to adult.

"It's still a mystery why they develop their eyes so early before they hatch," Blake said.

"I can't say all their internal organs are mature, but externally, the developing sharks appear just like hatchlings at about 115 days.

"Sharks are not out to hunt humans. Bamboo sharks might suck on your toe but only if you put it in their mouth."

Blake's fascination with sharks began while completing the BSc.

The Marine Science major within the BSc offers students the opportunity to pursue specialised plans in areas such as marine biology or marine geology.

UQ has the largest and one of the most well-equipped marine research facilities of any Australian tertiary institution.

SCIENCE & INFORMATION TECHNOLOGY

Degrees in this discipline






Why choose UQ for studies in Science & Information Technology?

Students not only study science and IT at UQ, they experience it. In addition to lectures and tutorials, students participate in field trips, industry placements and research projects utilising the latest state-of-the-art facilities.

UQ science and information technology programs allow students to combine a number of interest areas. Together with dual program choices, this maximises employment opportunities.

With strengths in all areas of the biological and chemical sciences and in information technology, our programs are interdisciplinary in nature and at the forefront of emerging disciplines. They provide a challenging and rewarding environment for our students while maximising employment opportunities.

UQ has one of the most comprehensive ranges of science specialisations in Australia, offering students more choices in science courses than other institutions.

Our programs are informed by research, with world-class scientists incorporating their latest discoveries into their teaching, which means you are learning as they are discovering. Hands-on experience and opportunities for field and laboratory work means you are putting your acquired knowledge to practical use.

UQ is also a hub for major science initiatives in the Asia-Pacific region for the bioscience, neuroscience, nanotechnology and biotechnology fields. Our location also provides unique opportunities to study environmental disciplines in a subtropical environment, with ready access to arid, temperate, tropical and marine systems including World Heritage rainforests, the Great Barrier Reef and outback Australia.

UQ's facilities and special features include:

> a reputation as Australia's top biological sciences research university
> Australia's most extensive marine science teaching and research facilities, with field stations on the Great Barrier Reef (Heron Island), Low Isles and Moreton Bay (North Stradbroke Island)
> commercial aquaculture facilities
> Australia's most comprehensive range of electron optical instrumentation, within UQ's Centre for Microscopy and Microanalysis
> innovative and integrated research facilities, including the Institute for Molecular Bioscience (IMB), the Australian Institute for Bioengineering and Nanotechnology (AIBN), and the Queensland Brain Institute (QBI)
> an award-winning IT research centre, the Distributed Systems Technology Centre (DSTC), with industry participants such as Boeing, Microsoft, IBM and Sun Microsystems
> specialist laboratories for studying robotics, electronics, computer systems, communications, power systems, optics, signal-processing and microwaves
> six fully-equipped multimedia studios and two dedicated Mac Video/Animation workshops with high-end dual CPU G4 machines and dual-head monitors, and
> 24-hour student access to IT facilities.

Career opportunities in this discipline

Characterised by rapid advancements and new discoveries, careers in Science and Information Technology are exciting and fulfilling. UQ graduates in these disciplines are in high demand by a broad range of private and public sector employers, in areas including:

> aquaculture
> architecture
> banking
> biotechnology
> chemical industries
> commerce
> commercialisation
> computer programming
> conservation
> diagnostics
> economics
> ecotourism
> education and research
> engineering
> environmental consulting
> fisheries
> food and agriculture
> forensic science
> healthcare and insurance
> intellectual property management
> interaction design
> law enforcement
> media and publishing
> mining and manufacturing
> multimedia/Web design
> museums
> national parks
> natural resources
> patent law
> pathology
> pharmaceuticals
> planning and consulting
> quarantine
> software consulting
> sports industry
> surveying systems development
> systems support
> teaching
> sales and marketing
> textiles
> usability consulting
> video games modelling

Eligibility for visa
International students must undertake programs on campus at UQ on a full-time basis to be eligible to apply for an Australian student visa.
See page 96 for more information.

BACHELOR OF
Biomedical Science

Location St Lucia
Commencement semesters 1, 2
Duration 4 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95), Mathematics B plus one of Chemistry or Physics
Honours Available as part of the standard program
Additional program information is provided in the tables on pages 84-86

Program outline
This new four-year program capitalises on the research-intensive environment at The University of Queensland. It aims to train future research scientists in the investigation of the human body at the molecular, cellular and whole body levels. Students study courses across the disciplines of biochemistry and cell biology, physiology, developmental biology, microbiology, pharmacology and neuroscience. Students learn about the latest research from leading scientists based at the research institutes located on campus. In the fourth year, an honours research project is conducted within one of the University's research laboratories or institutes.

Career opportunities
The degree can lead to multiple career paths. It can be a springboard into work in academic and research positions in universities, in pharmaceutical and biotechnology companies developing diagnostics for disease and new drugs for treatments; research institutes; and hospitals. The science training can also lead to wider opportunities working in government advising, in sales and marketing.

Professional memberships
Depending on the area of specialisation, graduates may be eligible for membership of the:
> Australasian Society for Human Biology
> Australia and New Zealand Society for Cell and Developmental Biology
> Australia and New Zealand Society for Cell Biology
> Australian Physiological Society
> Australian Society for Clinical and Experimental Pharmacology and Toxicology
> Australian Society for Clinical Biochemists
> Australian Society for Microbiology
> AusBiotech Ltd.
> Vascular Biology Society of Australia

Sample first year courses
> Analysis of Scientific Data
> Biochemistry and Molecular Biology
> Biomedical Science
> Cells to Organisms
> Cell Structure and Function
> Chemical Energetics and Reactivity
> Chemical Structure and Reactions
> Chemical Reactions and Mechanisms
> Further Perspectives in Science Research
> Genes, Cells and Evolution
> Genetics
> Introduction to Research
> Mechanics and Thermal Physics
> Physiological Processes
> Physical Basis of Biological Systems

Contact details
International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF
Biotechnology

Location St Lucia
Commencement semesters 1, 2
Duration 4 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95), Mathematics B plus one of Chemistry or Physics
Honours Available as part of the standard program
Additional program information is provided in the tables on pages 84-86

Program outline
Biotechnology applies scientific and engineering principles to living organisms in order to produce products and services of value to society. It is used in processes ranging from cheese production, brewing, and wastewater management, through to drug design and gene therapy. The program examines micro-organisms, plants and animals in the context of the discovery, understanding, improvement and development of viable products or activities. The discipline combines elements from many areas such as molecular genetics, microbiology, immunology, physics, chemistry, engineering and mathematics.

Courses in the first three years establish a foundation of basic knowledge for the study of biotechnology, and also offer flexibility through electives. Students take many of the core technical skill courses offered in the Bachelor of Science, but also complete a number of courses with a commercial focus. The fourth year can be taken at honours or pass level. Each student completes a substantial research project addressing the industrial, regulatory and management issues surrounding biotechnology.

Supplementary information
The Bachelor of Biotechnology (Honours) year commences four weeks prior to the start of Semester 1 in the standard academic calendar.

In Semester 2, the Bachelor of Biotechnology (Honours) year commences at the start of the standard academic calendar.

Majors
Bioinformatics
The field of bioinformatics is designed to produce graduates with a strong understanding of bioinformatics and computational biology. Students explore aspects of microbiology, biochemistry, chemistry, genetics and the commercialisation aspects of biotechnology.

Chemical Biotechnology
Chemical biotechnology is designed to produce graduates with a strong understanding of chemistry alongside aspects of microbiology, biochemistry, pharmacology, and the commercialisation aspects of biotechnology.

Drug Design and Development
Drug design and development equips students with a solid background in pharmacology, chemistry and biochemistry, appropriate for a career in the pharmaceutical industry.

Microbial Biotechnology
Microbiology is the oldest core discipline of biotechnology and one in which The University of Queensland has a great depth of knowledge. As an area of study it holds established employment opportunities in diverse bioindustries.

Nanotechnology
Nanotechnology is the ability to manipulate individual atoms, molecules and groups of molecules to produce the smallest human-made objects. As a new frontier of science, it is receiving worldwide attention.

Plant Biotechnology
Plant biotechnology is an exciting and rapidly developing field. Gene technologies are used to develop improved plants for more nutritious foods, and as renewable biofactories, allowing the production of sustainable industrial products and inexpensive drugs for medical and veterinary use.

Process Technology
The field of process technology is designed to produce graduates with a strong understanding of process engineering and process technology. It incorporates aspects of microbiology, biochemistry, chemistry, and the commercialisation of biotechnology.

Career opportunities
Work in biotechnology crosses several industrial and service sectors including health, agricultural, diagnostic, environmental, forestry, legal and commercial. The Bachelor of Biotechnology leads to career paths in:
> Agriculture (plant breeding and engineering)
> Chemical companies (nanotechnology and biosensor applications)
> Diagnostics companies (diagnostic test design and production)
> Government agencies
> Legal and consulting companies (business plan analyst)
> Pharmaceutical companies (drug design and development or pharmaceutical production)
> Research with research institutes, universities or in industry

Professional memberships
Depending on field:
> Australian Society for Microbiology
> Australian Society for Medical Research
> Australian Society of Biochemists and Molecular Biologists
> AusBiotech

Dual programs
> Engineering

Sample first year courses
> Analysis of Scientific Data
> Biodiversity and Our Environment
> Calculus and Linear Algebra I
> Cells to Organisms
> Chemical Energetics and Reactivity
> Chemical Structure and Reactions

> Electromagnetism, Optics, Relativity and Quantum Physics I
> Engineering Thermodynamics
> Genes, Cells and Evolution
> Introduction to Information Systems
> Introduction to Psychology: Developmental, Social, and Clinical Psychology
> Introduction to Psychology: Physiological and Cognitive Psychology
> Introduction to Software Engineering I
> Introductory Chemistry
> Mathematical Foundations
> Mechanics and Thermal Physics I
> Multivariate Calculus and Ordinary Differential Equations
> Physical Basis of Biological Systems
> Physics and Engineering of Materials

Contact details

International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF

Environmental Science

Location St Lucia
Commencement semesters 1, 2
Duration 4 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95), Mathematics B and one of Chemistry or Physics
Honours Available as part of the standard program
Additional program information is provided in the tables on pages 84-86

Program outline

The program centres on the understanding of fundamental processes in the environment, and the way in which they can be described, monitored and predicted. Human impact is placed in the context of all the processes that occur in the physical and biological environment. Students examine the legal, political and social aspects of environmental management, and develop skills in systems analysis and planning. This enables the environmental scientist to contribute rigorous analyses to environmental decision making and management.

The first three years of the program provide a comprehensive coverage of the basic sciences relevant to environmental problems. The fourth year focuses on the application of these principles, and can be taken as an honours research year or as advanced coursework at pass level. Students are able to complete a substantial research project in either an environmental impact assessment or an environmental audit. Students are also able to attend field trips to environmental areas of interest during the four-year program.

Supplementary information

The Bachelor of Environmental Science (Honours) year commences four weeks prior to the start of Semester 1 in the standard academic calendar (ie, end of January).

For Semester 2, the Bachelor of Environmental Science (Honours) year commences at the start of the standard academic calendar (ie, end of July).

Majors

Earth Resources

Earth Resources is concerned with the physical environment. Students develop expertise in the assessment of impacts of geological phenomena and of activities related to the extraction and use of the Earth's resources.

Ecology

Courses focus on the interrelationships between plant and animal species and their environments and how their populations may be modified by environmental changes.

Molecular and Microbial Science

Molecular and microbial sciences involves applying tools of analytical chemistry and microbiology to the study and improvement of the environment.

Natural Resource Science

Natural resource science focuses on the various components of the landscape (soils, water and vegetation) and on correcting the adverse effects of human use of this resource.

Career opportunities

Graduates from this program find employment in government departments, universities, in industrial organisations, or in commercial consultancies dealing with environmental monitoring, impact assessment and environmental management. Monitoring work may be associated with licence compliance requirements or initiatives such as green production or greenhouse challenge policies. Graduates are likely to be engaged on environmental impact studies for urban, industrial and rural development of animal feedlots, abattoirs, mining and mineral processing operations, industrial developments, facilities in or bordering on national parks, or residential or agricultural developments adjacent to areas of environmental value.

Professional memberships

Graduates are qualified for membership of:
> Australian Institute of Agricultural Science and Technology
> Australian Society of Soil Science
> Environmental Institute of Australia
> Soil and Water Conservation Association of Australia

Sample first year courses

> Analysis of Scientific Data
> Animal Production Systems
> Biodiversity and Our Environment
> Calculus and Linear Algebra I
> Cells to Organisms
> Chemical Energetics and Reactivity
> Chemical Structure and Reactions
> Environment and Society
> Genes, Cells and Evolution
> Geographical Information and Analysis
> Mathematical Foundations
> Mechanics and Thermal Physics I
> Planet Earth: The Big Picture
> Theory and Practice in Science

Additional cost

Some courses (eg, field trips) will incur additional costs to cover transport, accommodation and food.

Contact details

International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF

Information Technology

Location St Lucia, Ipswich
Commencement semesters 1, 2
Duration 3 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95). Mathematics B is recommended (and is compulsory for admission from 2011 onwards)
Honours Available as an extra year of study
Additional program information is provided in the tables on pages 84-86

Program outline

Students study information and communications technology (ICT) for a variety of reasons – to be a computing professional, to use ICT to be a better scientist, or to empower themselves to better understand the technology behind many of today's careers. Increasingly, employers see an ICT qualification as a sign of academic well-roundedness. ICT drives innovations such as the human genome project, vaccine research, environmental modelling and games design. Emerging areas include electronic security, Earth simulation (related to the mining boom) and bioinformatics. Independent job market surveys show that demand for graduates is escalating, along with salaries. Industry is concerned about a shortage of talent.

The BInfTech builds on a solid foundation in software and hardware and through flexible study plans allows students to specialise if desired. Examples of available majors include bioinformatics, computer systems and networks, software design, scientific computing, geographical information systems, multimedia, enterprise information systems and games modelling. Health informatics is available through the Ipswich campus. With teaching informed by the latest research, the program is project-focused. Students study programming languages, algorithms and information structure and develop the ability to process data or information in order to solve problems. Besides technical skills, students learn team dynamics, presentation skills and project management. There is significant industry input and opportunities for industry placements and internships. It is possible to gain credit for industrial certification courses licensed by major commercial software developers.

Supplementary information

Industry-sponsored scholarships and prizes are available. Details are available in the Information Technology prospectus and on the School of Information Technology and Electrical Engineering website (www.itee.uq.edu.au).

Majors

Bioinformatics (St Lucia)
The extended major in Bioinformatics prepares BInfTech students for a career in the computing behind the new biology. The extended major includes the necessary programming and computer science background, as well mathematical and biological electives necessary to enter emerging industrial or research applications of bioinformatics.

Computer Systems and Networks (St Lucia)
This major gives students a strong background in understanding how software is controlled on one or many computers, including security, networking and operating systems. It is a strongly technical major, requiring strong conceptual and programming skills. Courses focus on programming, computer architecture, computer networks, networks programming, operating systems, distributed computing, systems security, as well as distributed software applications involving Internet applications and ubiquitous computing applications. Graduates can look forward to careers in security, design of new cutting edge computer systems and integration of large-scale systems based on networked machines.

Economic Modelling (St Lucia)
Economics is a field of continuing importance. Modelling economic systems on a computer is a skill which can apply in a number of sectors including banking and government. This major provides students with options to learn enough economics to develop computer models, and work with specialist economists to develop software solutions to their problems.

Enterprise Information Systems (St Lucia, Ipswich)
Business applications of computers demand a combination of IT and business skills. The Enterprise Information Systems extended major provides students with both: a strong foundation in designing enterprise-wide and multi-enterprise information systems; and a range of business electives to complete their degrees. This major may be studied at either the Ipswich or St Lucia campuses.

Games Modelling (St Lucia)
Games development is a big local industry but demand for graduates is limited to those with top coding skills. This major develops graduates for a career in developing high-end games and similar software with hard-core technical skills to succeed as a games developer, but sufficient general skills to be able to work in any area of software development. Courses include mathematics, physics, 3D graphics and C++ programming.

Geographic Information Systems (St Lucia)
Specialists in geographical information systems can work in government, or for organisations which deal in clients over wide geographical spread. Application areas include security, mapping systems and remote sensing. The Geographic Information Systems extended major prepares students for careers in managing large scale geographical and spatial information by providing them with a strong base in the information systems area, including some software engineering, as well as a range of geographical electives.

Health Informatics (Ipswich)
The Health Informatics extended major gives graduates an understanding of the collection, storage, retrieval, communication, and optimal and responsible use of health related data, information and knowledge. It also gives graduates the skills to promote effective and efficient health care, policy and planning through being able to interact productively with health informatics professionals. Employment areas include public and private hospitals, community health centres, large group practices, government, health departments, research organisations, commercial companies and universities.

Human-Computer Interaction (St Lucia)
The Human Computer Interaction major develops knowledge and skills in human-centred design of ubiquitous computing systems. Course material covers networks, operating systems, interaction design, social computing, mobile computing and a physical computing design studio.

Multimedia (St Lucia)
The Multimedia major produces graduates for a career in designing highly sophisticated multimedia. Students develop knowledge and skills in computer modelling, visualisation, animation and games design and learning is through project work, lectures, assignments and a design studio.

Scientific Computing (St Lucia)
Scientific computing covers a range of mathematical applications of computers, including traditional sciences like physics, but is increasingly applicable to emerging sciences like bioinformatics as well as in modelling of the real world eg, weather prediction. This extended major prepares graduates for a career in solving scientific problems, modelling, simulation and visualisation. Students will develop strong mathematical and programming skills, with a range of electives designed to allow choice of application areas.

Software Design (St Lucia)
This major is aimed at students who wish to follow a career in the creation and management of software applications. Courses in this major focus on programming, software engineering, project management, requirements analysis, specification, and the software process, as well as software applications involving Internet design, human-computer interaction, algorithms, data structures and concurrency.

Software Information Systems (St Lucia)
This major is designed for students who wish to pursue a career in developing and managing database-oriented information systems. Learn about cutting-edge approaches to large-scale database design, including systems which span multiple organisations. Courses focus on database systems, information systems analysis and design, programming, e-commerce, Web technologies, business and organisational issues. Employers include large organisations, especially those in the commercial field.

Career opportunities
Graduates find employment in a range of organisations. Some specific careers available include:
> Computer programmer
> Computer science researcher
> Information technology applications specialist
> Project Manager
> Systems analyst
> Systems architect
> Systems developer
> Systems designer
> Systems software programmer
> Software consultant
> Software designer
> Software engineer
> Technology manager

Professional memberships
> Australian Computer Society

Dual programs
> Arts
> Business Management
> Commerce
> Economics
> Engineering
> Laws
> Science

Sample first year courses
> Basic Mathematics
> Calculus and Linear Algebra I
> Discrete Mathematics
> Electromagnetism, Optics, Relativity and Quantum Physics I
> Introduction to Computer Systems
> Introduction to Electrical Engineering
> Introduction to Information Systems
> Introduction to Software Engineering I
> Mathematical Foundations
> Multivariate Calculus and Ordinary Differential Equations

Additional cost
There are no additional charges levied on this program, but students may need to purchase materials, computing equipment and printing.

Contact details
International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF
Marine Studies

Location St Lucia
Commencement semesters 1, 2
Duration 4 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95), Mathematics B and one of Chemistry or Physics
Honours Available as part of the standard program
Additional program information is provided in the tables on pages 84-86

Program outline
This program integrates the study of a range of disciplines relevant to understanding, researching and managing the marine environment. Students benefit from the University's breadth and depth of expertise in aquaculture and marine biotechnology, coastal management, marine biology and ecology, marine geology and coastal processes.

UQ's extensive Marine Science infrastructure includes field stations on the Great Barrier Reef (Heron Island), Low Isles and Stradbroke Island in Moreton Bay. Students also benefit from the University's regular involvement in scientific research into coral reef ecology and geology, marine botany and marine biotechnology.

Supplementary information
The Bachelor of Marine Studies (Honours) year commences four weeks prior to the start of Semester 1 in the standard academic calendar (ie, end of January).

In Semester 2, the Bachelor of Marine Studies (Honours) year commences at the start of the standard academic calendar (eg, end of July).

Majors

Aquaculture and Marine Biotechnology
We can satisfy the world's growing need for food, drugs and materials from the ocean without the over-exploitation and destruction of its habitats by applying advanced technologies to the cultivation of marine organisms. Students will develop expertise in the advanced biology of cultivable marine organisms, including a diverse range of areas in marine biotechnology, including genomics, microbial biotechnology and marine natural products.

Coastal Management
Coastal management produces graduates with expertise in a range of disciplines, including geomorphology, climatology, ecology, economics, demography, coastal processes, planning and management, spatial information systems and remote sensing. Importantly, students are taught to integrate and apply these disciplines effectively in a management context. Currently Australia's coastlines are under extreme stress, resulting from climate change as well as human impact. This specialisation will equip graduates to work effectively at the boundaries between science, law, government and industry to find solutions to the complex issues involved. It will include study of maritime law, marine geography, remote sensing, oceanography and human factors impacting on coastlines.

Marine Biology and Ecology
Studies in marine biology span areas as diverse as the discovery and understanding of the basic biology of plants and animals, the behaviour, physiology, and biochemistry of marine organisms, and the functioning of, and interactions within, marine communities. The University has one of the strongest records in Australia in marine biology. Staff have expertise spanning coral reef biology, fish and fisheries, marine botany, marine parasites and aquaculture in particular. Students acquire a broad knowledge of marine biology together with the skills and knowledge necessary to undertake basic and applied research in marine science. Practical research experiences at the research stations will be emphasised.

Marine Geology and Coastal Processes
The field of marine geology and coastal processes involves studies in the physical sciences necessary to tackle the concerns facing our coastal and marine environments. This specialisation examines the connections between the solid Earth, the hydrosphere and the atmosphere. Students will learn to apply scientific techniques in the study of coral reefs, sediment and nutrient cycles, aspects of seafloor and ocean-island volcanism, offshore petroleum and mineral resources, and climatology.

Career opportunities

Marine scientists find employment with organisations including Commonwealth Scientific Industrial Research Organisation (CSIRO) and other government authorities in areas such as:

- Aquaculture
- Biotechnology
- Ecotourism
- Engineering
- Marine resource development
- National heritage work and environmental impact studies
- Research and education
- Wildlife conservation, planning and management

Professional memberships

Depending on Field of Study:

- Australian Coral Reef Society
- Australian Marine Science Association
- Australian Society for Fish Biology
- Ecological Society of Australia
- Estuarine Research Federation
- Estuarine and Coastal Sciences Association
- Society of Wetland Scientists

Sample first year courses

- Analysis of Scientific Data
- Biodiversity and Our Environment
- Calculus and Linear Algebra I
- Cells to Organisms
- Chemical Energetics and Reactivity
- Chemical Structure and Reactions
- Discrete Mathematics
- Electromagnetism, Optics, Relativity and Quantum Physics I
- Environment and Society
- Genes, Cells and Evolution
- Geographical Information and Analysis
- Human Settlements
- Introduction to Anthropology
- Introduction to Environmental Management
- Introduction to Planning
- Introductory Microeconomics
- Mathematical Foundations
- Mechanics and Thermal Physics I
- Multivariate Calculus and Ordinary Differential Equations
- Physical Basis of Biological Systems
- Planet Earth: The Big Picture
- Theory and Practice in Science

Additional cost

Courses that have a field component may incur additional costs to cover transport, accommodation and food.

Contact details

International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF

Multimedia Design

Location St Lucia
Commencement semester 1
Duration 3 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95). Mathematics A or B recommended
Additional program information is provided in the tables on pages 84-86

Program outline

The Bachelor of Multimedia Design is a studio-based program providing students with the knowledge and skills to become the designers, architects and implementers of highly sophisticated multimedia projects. Whether it is building a corporate presence on the Web or designing new formats for interactive television, multimedia design is central to creatively engaging an audience.

The major focus of the program is on the integration of theory and technology and their practical application in design projects. Areas include animation, graphic design, sound production, 3D modelling, Internet authoring, game design and interactive media design. An important feature of the program is its focus on teamwork and team projects undertaken in a studio environment. Students can also gain credit for industrial certification courses licensed by major commercial software developers. During the program students build a portfolio of many different projects and often undertake projects with industry based clients. In particular, final year students have the opportunity for advanced study and research projects with significant industry partners through UQ participation in the Australasian Cooperative Research Centre for Interaction Design (ACID) which is investigating new forms of human interaction with emerging technologies. Graduates are in demand within the education, arts and commercial industries, which want to engage audiences, and demand for this level of expertise is increasing worldwide.

Supplementary information

Areas of study include: animation, special effects, sound production, three-dimensional modelling, Internet authoring, game design, and all interactive media design. Bachelor of Multimedia Design Bursaries are available. Details can be found in the Information Technology prospectus (www.epsa.uq.edu.au).

Career opportunities

Career opportunities exist in creation, development and technology management roles in interactive media, in:

- Advertising
- Broadband interactive online networks
- Business promotion
- Computer networks
- Instructional design
- Integrated computer and communication infrastructure for global networking
- Integration of telecommunications systems
- Online entertainment industries
- Training
- Video games design

Sample first year courses

- 3D and Interactive Media
- Discrete Mathematics
- Introduction to Information Systems
- Introduction to Software Engineering I
- Introduction to Web Design
- Multimedia Studio 1

Additional cost

There are no additional charges levied on this program, but students may need to purchase some materials, computing equipment and printing.

Contact details

International Recruitment Manager
www.uq.edu.au/international/enquiry
Phone (outside Australia) + 61 3 8676 7004
(within Australia – Free Call) 1800 671 980

BACHELOR OF
Science

Location St Lucia
Commencement semesters 1, 2
Duration 3 years full-time
Admission requirements Queensland Year 12 (or equivalent) English (see also pages 94-95), Mathematics B plus one of Chemistry or Physics
Honours Available as an extra year of study
Additional program information is provided in the tables on pages 84-86

Program outline

The Bachelor of Science is a versatile degree that provides students with the optimal balance between a defined sequence of study and flexible course options. This innovative program has been redesigned to develop graduates with the key practical skills and interdisciplinary knowledge required to address today's global challenges. Students will study an extensive range of courses underpinned by cutting-edge research and develop high levels of personal initiative, independent thinking and communication skills. Graduates will be qualified for employment opportunities in a wide array of science and non-science industries.

Supplementary information

The Bachelor of Science (Honours) commences three weeks prior to the start of Semester 1 in the standard academic calendar (ie, end of January).

For Semester 2, the Bachelor of Science (Honours) commences at the start of the standard academic calendar (ie, end of July).

Majors

Biochemistry and Molecular Biology

Biochemistry and Molecular Biology is the study of the chemical basis of life and underpins all disciplines of biology. A major in this area will provide students with a detailed understanding of the molecular events that control growth and development of all living things. In addition, students will develop an appreciation of how such events go wrong in certain disease states and also how they can be exploited in the development of diagnostic tools, new drugs and improved agricultural processes. A major in Biochemistry and Molecular Biology will enable students to appreciate current issues in medicine, the environment, agriculture and industry. For example, metabolic diseases (including diabetes), heart disease, infectious disease and cancer, are all now being investigated and treated using biochemical and molecular approaches. Biochemistry and molecular biology also form the basis of the biotechnology industry. In the course of their studies students will develop an understanding of: Proteins, their structures and functions in cells; molecular genetics – the structure and organisation of genes; DNA replication and repair – the control of gene expression and mutagenesis; and metabolism and nutrition – how cells extract energy from food and store it, and how animals and plants obtain their nutrition and manufacture new molecules.

Bioinformatics

Bioinformatics is a multidisciplinary science which applies computers to enhance our understanding of biology. Computational biology is changing the way we manage our health and the environment and how research in biological science is conducted. Biologists everywhere will increasingly require a working knowledge of this area as industries move more deeply into genetic technologies and the use of computing to simulate biological processes.

Biomedical Science

The biomedical sciences encompass study areas relevant to the understanding of health and treatment of disease. Biomedical research receives, both nationally and internationally, around half the total research dollars available to all of science. This high representation underscores the relevance of basic biomedical research to health care and the natural curiosity shared by all humans about understanding the mechanisms of our own bodies. Breakthroughs in understanding human disease or its control (vaccines for polio, measles, influenza, antibiotics, cancer and genetics) have been, and continue to be, dependent on fundamental research into biological mechanisms at the cellular and molecular level. The study of biomedical science commences with a broad foundation in the biological sciences in the first two years. In the third year students choose specialised study in subject areas including physiology, pharmacology, anatomy, developmental biology, human genetics, neuroscience, human immunology and infectious diseases.

Biophysics

Biophysics is a scientific discipline at the crossroads of biology, physics, and chemistry. Biophysicists study structure and function of biological molecules, cells and organisms using the principles and methods of physics. Biophysicists do not only study biological systems, they also develop and build new instruments and tools for research and biomedical applications. These are very exciting times for biophysics. Following the human genome project, a milestone in molecular biology and genetics, a growing number of biophysicists will be needed to decipher the structures of all the gene products and the complex interactions between them. Biophysics contributes to a more fundamental understanding of the life sciences and their foundation in physics. It encompasses such rapidly developing fields as biomolecular modelling, crystallography, spectroscopy, radiology, medical physics, ultrasound, and nanotechnology (the science of working with and building structures to the scale of 10–10,000 atoms). In addition to courses in biophysics students will take courses from a range of fields including physics, chemistry, neuroscience, physiology, biochemistry and structural biology.

Chemical Sciences

Chemistry is a discipline that interfaces with many other disciplines; particularly biology and materials science and nanotechnology. This creates some of the most dynamic and rapidly expanding areas of research both within UQ and worldwide. Biological Chemistry Stream: a clearer and more precise understanding of the molecular processes that occur in biological systems is empowering researchers in the biological fields. Students will gain a comprehensive understanding of the core chemical principles and how they can be applied to and enrich biological research. In addition, students will have a profound knowledge of the structure and functions of complex biological systems which is essential in modern pharmaceutical and medical research. Nanotechnology Stream: an understanding of the underlying chemical principles in nanotechnology enables preparation of advanced materials and the exploration of their properties. With the striking rate of recent advances in this area, nanotechnology is having a major impact on the life sciences, biotechnology, the electronics industry and materials science.

Chemistry

Chemistry is the central science. Chemistry encompasses the synthesis and study of molecules and materials, the exploration of their properties and the development of ways to use them in real life. This involves an understanding of the mechanisms of reactions and processes that occur at the molecular level. An understanding of the principles of chemistry underlines disciplines such as biochemistry, engineering, food science, materials science, nanotechnology and pharmacy. Some of the major areas of study in chemistry are: synthetic chemistry – the development of new synthetic methodologies to explore the synthesis of new drugs, new materials or new molecular devices; polymer chemistry – the preparation and study of new polymers with uses as materials, electronic devices, and in medicine; computational chemistry – understanding and predicting the structures and reactivities of molecules and short-lived intermediates using high-level theoretical calculations and powerful supercomputers; surface chemistry – chemistry occurring at interfaces, this is important in many biological processes, in the study of catalysts, and in nanotechnology; and spectroscopy – examining the interactions between matter and electromagnetic radiation to determine chemical structures and reactivities, this encompasses the whole range of molecular entities, from individual molecules through to biological macromolecules such as enzymes, spectroscopy has applications in analytical chemistry, biology, physics, astronomy and remote sensing.

Computational Science

Computational science applies skills from information technology and mathematics to solve problems that can only be tackled through computation. Such problems occur increasingly in all areas of the physical and biological sciences and engineering. Recent advances in technology give scientists the ability to collect and process vast amounts of data and build sophisticated models that would previously have been impossible. Computational Science is a dual major that builds on any single major, and is specifically designed to provide all Science students with cutting-edge computational and quantitative skills that are relevant to their own particular needs. Students will complete a single major in any area of their choice (eg, Computational Science and Genetics), and supplement these studies with additional core courses in information technology, mathematics and computational methods. The program trains students to formulate and analyse problems, and use computer software packages and programs to develop models to solve these problems. The major will involve project work on simulations and modelling, mathematical and numerical analysis, high-performance computing, graphics, visualisation and programming. A major in Computational Science will equip students with the knowledge and skills from

their area of specialisation, as well as core quantitative skills that are increasingly in demand in modern science. UQ graduates will be differentiated from other graduates by having developed the cutting-edge skills greatly valued by industry, which will help them remain up-to-date with technology throughout their professional careers.

Computer Science

Information and communications technology drives modern science. Students that major in computer science will study the science of computing and its application to other scientific disciplines. As part of the highly flexible Bachelor of Science degree program the computer science major begins with courses that provide a solid grounding in computational, scientific and mathematical skills. Subsequent courses cover areas such as software, information systems and management, Web design, artificial intelligence and human-computer interaction. Skills such as teamwork, presentation and project management are a key component of several courses in the computer science major. Students who wish to develop a larger set of computing knowledge and skills can proceed to an extended major in Computer Science within the Bachelor of Science. Alternatively, a dual major in Computational Science allows for specialisation in computational and mathematical problem-solving together with significant studies in another field or science (eg, Biology or Physics). Further options for students who have a keen interest in computing include the bachelor degree programs in Information Technology, Software Engineering, or Multimedia Design. Dual programs are also available.

Ecology

Ecology is the scientific study of how organisms interact with each other and their environments. Ecological knowledge underpins our capacity to use Australia's natural wealth sustainably and is essential for solving the environmental problems that face us in a new millennium. Studies include: behavioural ecology, physiological ecology, population and community ecology, conservation ecology, landscape ecology and evolutionary ecology and mathematics. Field courses are a key feature of the study of ecology at UQ. Students gain first-hand practical experience in solving ecological problems in rainforest at Lamington National Park, outback Queensland, on the Great Barrier Reef at Heron Island, and on Stradbroke Island in Moreton Bay.

Genetics

Genetics, more than any other discipline, is transforming modern biology. Genetics is the study of inheritance: the structure and expression of genes, the genetic basis of traits, and the interaction between genes and the environment at the population and species level. The growing availability of completely sequenced genomes, computational analysis and molecular analytic tools is allowing unprecedented discoveries in areas as diverse as human medicine, agriculture, conservation biology and biotechnology. The analysis of vast collections of genomic data has spawned the new discipline of bioinformatics that has required the development of new analytical and programming tools. Genetics is an appropriate major to be taken on its own or in combination with any other biological major or Computer Science.

Geographical Sciences

Geographical Science investigates the spatial patterns of physical and human phenomena at local, national and global scales. It examines the patterns and processes of natural and built environments and human activity, how they change over time and how they interact. In the Geographical Sciences major, students are able to study courses in Physical Geography, Human Geography and Geographical Information Science. Physical Geography is concerned with the patterns and processes in climate, landforms, soils, plants, animals as well as the impact of human activities on these systems. Human Geography examines how people interact with the environment. While physical geography is concerned with the means of life such as climate, water and minerals, human geography is about applying these means to human ends. Human geography involves applied studies in urban and rural settlement, location and land-use, human spatial behaviour and demography. Geographical Information Science is the study of geographic information systems and remote-sensing for modelling, managing, analysing and applying geo-referenced information in a variety of contexts. It is concerned with the interpretation and analysis of geographical information obtained from airborne and satellite images, land surveying, field observation and data systems. It has applications in Earth, biological and environmental sciences, built environments, human settlements, planning and natural resources.

Geological Sciences

Geology is the study of the interacting systems of the solid Earth, atmosphere, hydrosphere and biosphere as they evolve through time. Geologists discover, develop and responsibly manage minerals, energy and other Earth resources. Geological knowledge underpins our capacity to ensure a sustainable supply of natural resources and the use of these resources responsibly, and it is essential for solving environmental challenges such as global climate change. UQ offers a wide range of core courses in geology, chemistry, mathematics and physics, which provide a foundation for the study of fundamental geologic methods and problems, both in the laboratory and in the field. You may specialise in economic geology, mining geology, energy resources, geophysics, environmental geology, geochemistry, palaeobiology, marine geology, surficial processes and landscape evolution, tectonics, and remote sensing. Most students complete advanced courses in field geology, culminating with a trip to the Mt. Isa region. Field and laboratory based projects during honours year solidify geologic skills and provide essential training for independent research.

Marine Science

Marine science is the scientific study of our oceans and coastal habitats, and includes a wide range of disciplines in the biological, chemical, physical and Earth sciences. Students can pursue a general study plan or a more specialised plan in an area such as marine biology or marine geology. With an increasing focus on the role of our oceans to provide food and resources for our growing populations, the next generation of UQ marine scientists will play a major role in ensuring that we protect and profit from our oceans. UQ has the largest and best marine research facilities of any Australian tertiary institution, and also possesses the largest assembly of marine scientists in the State, and possibly Australia. Students of marine science have an opportunity to undertake studies at the Moreton Bay Research Station (MBRS), Heron Island Research Station (HIRS) in the southern Great Barrier Reef and the Low Isles Research Station in the far northern Great Barrier Reef.

Mathematics

Mathematics is one of the most enduring fields of study, and is essential in an expanding number of disciplines and professions. Many mathematicians continue to develop new mathematics for its own sake. But today mathematicians also combine their knowledge of mathematics and statistics with modelling and computational skills and use the latest computer technology to solve problems in the physical and biological sciences, engineering, information technology, economics, and business. UQ offers a wide range of courses in mathematics and its applications. In first year, students study essential topics in calculus, linear algebra and differential equations. In later years students select from more specialised courses. These emphasise new ideas in mathematics, and include recent applications in coding and cryptology, mathematical physics, mathematical biology, bioinformatics and finance.

Microbiology

Microbiology is the study of microscopic living organisms: bacteria, viruses, fungi, algae and protozoa. These organisms have a major impact on all aspects of life. Diseases caused by microbes are well-known and can involve viruses (eg, influenza and HIV), bacteria (eg, meningococcus, staphylococcus, E. coli) and protozoa (eg, malaria). Our understanding of these organisms is directly linked to the control and prevention of infectious diseases. Immunology plays a key role in understanding how humans and animals respond to the challenge of these disease-causing organisms. Removal of pollutants using micro-organisms and the recognition that they play a key role in the cycling of molecules in the biosphere has led to major growth of environmental microbiology. This area of bioremediation requires a grounding in microbial physiology and ecology. Plant pathology is an important aspect of plant–microbe interactions and microbiologists have a key role to play in this area of agriculture and quarantine. Using modern, flexible approaches to teaching and learning, students learn about such areas of study as: the basis of immune recognition and vaccine design; infectious diseases and methods of control; microbial biotechnology; and parasitology.

Physics

Physics is one of the fundamental sciences and involves solving the big questions that have always intrigued humankind; where did we come from and where are we headed? Physics embraces the study of the most basic natural laws and is about explaining how and why things work on scales ranging from the sub-nuclear, through the everyday, and on to the entire cosmos. Physicists explore and identify basic principles governing the structure and behaviour of matter, the generation and transfer of energy, and the interaction of matter and energy. Some physicists use these

principles in theoretical or experimental studies on topics such as the nature of time and the origin of the Universe; others apply their physics knowledge to practical areas, developing advanced materials, electronic and optical devices, and equipment for a wide range of fields such as medicine, mining, astronomy and geophysics. Physics is also at the heart of new interdisciplinary areas such as information technology, nanotechnology, quantum technology and biophotonics. In newly developing areas in the biosciences, an understanding of basic physical principles is one of the keys to advancing knowledge. Courses in physics include: astronomy, biophysics, electromagnetism, laser physics, mathematical physics, mechanics, optics, quantum physics and thermodynamics.

Plant Science

Plant sciences are among the most relevant scientific disciplines today. Think about two of the most important problems facing humankind: global warming and dependency on fossil fuels. Using a variety of approaches, plant scientists are addressing both problems – from the production of biofuels from plant origin to the use of plants in carbon sequestration. Animals and humans depend utterly on plants, and not only for food. Today, plant science has demolished the classic barriers of being confined to farm and food production. With the advent of modern biotechnology, plants are being used to decontaminate land and air, produce industrial products, designer molecules, biopharmaceuticals and energy (biofuels). In addition, designer plants are producing biodegradable plastics, new healthier sugars and anti-cancer drugs. Plant scientists need to understand how plants work, from molecules to ecosystems to improve the production of food, pharmaceuticals and timber, to control diseases, pests and noxious weeds, to allow them to cope with drought, salinity and pollutants and to design new plants for innovative purposes such as biofactories. Courses cover: ecology – relationships between organisms and their environments, from rainforest to desert and problems of conservation, human impact and rehabilitation; evolution and conservation – application of molecular genetics to evolution and conservation of plants, especially endangered species; plant pathology – the study of diseases in plants, especially those caused by fungi and disease prevention and control in crop plants; plant physiology – the control of processes in cells and whole plants, ranging from solar energy captured in photosynthesis, to the responses of plants to stresses such as drought and saline soils; and plant biotechnology – genetic manipulation of plants to increase their value, produce biofuels, increase nutrition and yield.

Psychology

Psychology is the scientific study of how people behave, think and feel. It is a broad ranging discipline that spans topics including brain function, memory, conscious experience, lifespan development, social behaviour and the full spectrum of functional and dysfunctional behaviour. Undergraduate students will gain an understanding of how to apply the scientific perspective to psychological phenomena in the laboratory and in the real world.

Statistics

Statistics is an essential part of science, providing the mathematical language and techniques necessary for understanding and dealing with chance and uncertainty in nature. Statistics involves the design, collection, analysis and interpretation of numerical data, with the aim of extracting patterns and other useful information. Examples include the analysis of DNA and protein sequences, the construction of evolutionary trees from genetic data, the improvement of medical treatments via experimental designs, and the assessment of drought conditions through meteorological data. A main feature of statistics is the development and use of statistical and probabilistic models for random phenomena, which can be analysed and used to make principled predictions and decisions. Examples of such models can be found in biology (genetics, population modelling), finance (stock market fluctuations, insurance claims), physics (quantum mechanics/computing), medicine (epidemiology, spread of HIV/AIDS), telecommunications (Internet traffic, mobile phone calls), and reliability (safety of oil rigs, aircraft failure), to name but a few. The statistics major offers an in-depth knowledge of modern statistics, with a comprehensive treatment of both theory and applications, including the use of popular statistical and data analysis packages.

Zoology

Zoology is a branch of biology that deals with the scientific study of animals. Fundamental to this science is an appreciation and understanding of animal evolution and diversity, gained through research into aspects of the morphology, development and genetics, behaviour, ecology, physiology, biochemistry and molecular biology of animals. Zoologists explore the relationships and interactions of animals with their physical and biological environments at individual, population, community and ecosystem levels, and utilise modern comparative and experimental approaches to investigate the evolution and diversity of animals. The study of Australia's unique fauna provides exciting and rewarding opportunities for zoologists to understand and appreciate animal life. Students seeking qualifications as professional zoologists are guided in selection of combinations of courses that lead to training in the specialisations of wildlife and conservation biology, entomology, environmental physiology, marine biology, fisheries biology and aquaculture, terrestrial ecology, molecular ecology and mathematical applications in biology. Field courses are offered in arid zone ecology, rainforest ecology, marine ecology, and coral reef biology.

Professional memberships

Membership of professional bodies is available to graduates according to their area of specialisation in the degree. Depending on the field, the following memberships are available:

- Anatomical Society of Australia and New Zealand
- Australasian Institute of Mining and Metallurgy
- Australasian Society for Human Biology
- Australian Computer Society
- Australian Coral Reef Society
- Australian Institute of Food Science and Technology
- Australian Institute of Physics (graduate grade)
- Australian Marine Sciences Association
- Australian Mathematical Society
- Australian and New Zealand Society for Cell Biology
- Australian Society for Fish Biology
- Australian Society for Microbiology
- Geological Society of Australia
- Institute of Australian Geographers
- Institute of Biology in Australia
- Institute of Foresters of Australia
- Petroleum Exploration Society of Australia
- Royal Australian Chemical Institute
- Vascular Biology Society of Australia

Honours graduates with approved study may be eligible for membership to the Australian Institute of Geoscientists.

Honours graduates with approved sequence of study in Psychology and two years approved postgraduate study including supervised work experience:

- Australian Psychological Society
- Board of Clinical Psychologists
- Psychologists' Registration Board of Queensland

Dual programs

- Arts
- Business Management
- Commerce
- Economics
- Education (Secondary)
- Engineering
- Information Technology
- Journalism
- Laws
- Medicine/Surgery

Sample first year courses

- Analysis of Scientific Data
- Biodiversity and Our Environment
- Calculus and Linear Algebra I
- Cells to Organisms
- Chemical Energetics and Reactivity
- Chemical Structure and Reactions
- Discrete Mathematics
- Electromagnetism, Optics, Relativity and Quantum Physics I
- Environment and Society
- Genes, Cells and Evolution
- Geographical Information and Analysis
- Introduction to Computer Systems
- Introduction to Information Systems
- Introduction to Psychology: Developmental, Social, and Clinical Psychology
- Introduction to Psychology: Physiological and Cognitive Psychology
- Introduction to Software Engineering I
- Mathematical Foundations
- Mechanics and Thermal Physics I
- Multivariate Calculus and Ordinary Differential Equations
- Perspectives in Science
- Physical Basis of Biological Systems
- Physics and Engineering of Materials
- Planet Earth: The Big Picture
- Psychological Research Methodology I
- Theory and Practice in Science

Additional cost

Courses with a field trip component may incur additional costs to cover transport, accommodation and food.

Contact details

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