

# International

MONASH SCIENCE







# Welcome to Monash Science

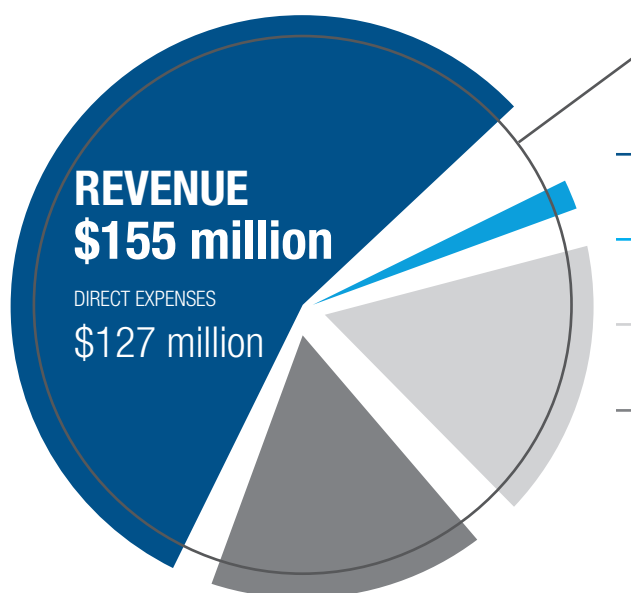
Conducting innovative research, making new discoveries about the world we live in, **nurturing and empowering** the next generation of scientists to build a better world for the future – **this is what we do at Monash Science.**

## OUR RANKINGS

As one of the premier Science faculties in Australia and in the world, Monash Science has an outstanding reputation for both teaching and research.

The Times Higher Education World University Rankings has ranked our Schools of Biological Sciences, Chemistry, Mathematical Sciences, Physics and Astronomy within the top 100.

Our academics' high-impact research has contributed to Monash University's Number 1 ranking in the prestigious Nature Index.



## Key statistics

COMMONWEALTH GOVERNMENT GRANTS

**\$91 million**

COMMERCIAL INCOME

**\$5 million**

RESEARCH INCOME

**\$26 million**

STUDENT FEES

**\$25 million**

Total Faculty Australian student enrolments:

HIGHER DEGREE BY RESEARCH

**540**

**6500**

UNDERGRADUATE & POSTGRADUATE

Total staff (FTE) in 2017:

**292**

ACADEMIC

**136**

PROFESSIONAL

## OUR COURSES UNDERGRADUATE

### Bachelor of Science

Shape your degree and create your future with our flagship degree.

If you want to make a difference, studying a science degree at Monash will give you the opportunity to learn from leading experts whose cutting-edge research is influencing the world's future.

The choice, flexibility and depth across the huge range of science disciplines available at Monash means that you will graduate with a degree unique to you, tailored to your individual expertise, interests and career aspirations.

The comprehensive range of majors, extended majors and minors on offer provides you with a broad education and allows you to explore varied interests before focusing in the one or two areas that most inspire you.

# Shape your degree and **create your future.**

### SCIENCE MAJORS

Choose from 26 majors



APPLIED  
MATHEMATICS



ASTROPHYSICS



ATMOSPHERIC  
SCIENCE



BIOCHEMISTRY



DEVELOPMENTAL  
BIOLOGY



CHEMISTRY



EARTH SCIENCE



COMPUTATIONAL  
SCIENCE



ECOLOGY AND  
CONSERVATION BIOLOGY



ENVIRONMENTAL  
SCIENCE



GEOGRAPHICAL  
SCIENCE



FINANCIAL AND  
INSURANCE MATHEMATICS



HUMAN  
PATHOLOGY



GENETICS



IMMUNOLOGY



MATHEMATICAL  
STATISTICS



MICROBIOLOGY



MATHEMATICS



PHARMACOLOGY



MATERIALS  
SCIENCE



PHYSICS



PHYSIOLOGY



PURE  
MATHEMATICS



PLANT  
SCIENCES



ZOOLOGY



PSYCHOLOGY

## DOUBLE DEGREES

Double degrees allow you to study two separate degrees at the same time. The way they are structured enables you to graduate with both awards in a much shorter time than it would take to complete the two degrees individually.

Combining science with other disciplines, including professional areas such as law or engineering opens up many career options.

- > Bachelor of Science and Bachelor of Arts
- > Bachelor of Science and Bachelor of Biomedical Science
- > Bachelor of Science and Bachelor of Computer Science
- > Bachelor of Science and Bachelor of Global Studies
- > Bachelor of Science and Bachelor of Music
- > Bachelor of Commerce and Bachelor of Science
- > Bachelor of Commerce Specialist and Bachelor of Science
- > Bachelor of Engineering (Honours) and Bachelor of Science
- > Bachelor of Information Technology and Bachelor of Science
- > Bachelor of Laws (Honours) and Bachelor of Science
- > Bachelor of Education (Honours) and Bachelor of Science

### **Bachelor of Science Advance – Global Challenges (Honours)**

The Bachelor of Science Advanced – Global Challenges (Honours) includes all the elements of a Bachelor of Science, but with more. The only one of its kind in Australia, this course will provide you with all the opportunities available to a Science honours graduate, plus many more. In addition to studying the scientific discipline of your choice – from the broad range available at Monash – you'll receive high-level training in leadership, persuasive communication, entrepreneurship, policy, ethics and corporate social responsibility.

### **Bachelor of Science Advanced – Research (Honours)**

Do you see yourself making a difference in the world through the advancement of scientific research? If so, then this is the course for you. As a scientist, you will play an important role in developing cutting-edge technologies, therapies and initiatives that address some of the greatest challenges to society. You may be instrumental in policy-making, research and teaching, addressing issues associated with health care and social well-being. You may also be employed in traditional and emerging areas where expertise in life sciences, chemistry, geosciences, mathematics and statistics, computer sciences and the physical sciences is important.

## GRADUATE

**Master of Environment and Sustainability**

The Master of Environment and Sustainability is a forward-thinking, interdisciplinary, two-year course that integrates the knowledge needed to mitigate and adapt to global change with sustainability principles. Central to its approach is an understanding of the scale of dependence of social, economic and environmental systems for effective environmental governance. The course focuses on developing a diverse vocational skill set, and provides evidentiary and interdisciplinary approaches to problem solving. You will choose one of five specialisations and have the opportunity to work in real-world contexts, combining theory and practice, to respond to local and international, corporate, government and social environmental concerns. Graduates are strongly placed to provide strategic leadership in a wide range of settings, such as policy formulation, regulation, advice, management, extension and capacity building.

**Master of Financial Mathematics**

This master's program is designed to suit graduates with a sound foundation in mathematics and statistics. The program offers training in the core areas of stochastic, financial and insurance modelling, statistical analysis and computational methodology, as well as in a wide range of elective topics from economics, econometrics, finance, mathematics and probability. Graduates of the program will gain a comprehensive understanding of stochastic and statistical analysis, partial differential equations and computational methods in finance, financial econometric techniques, and financial and risk modelling.

You will develop the quantitative, mathematical, statistical and computing skills needed in financial, insurance and other related careers.

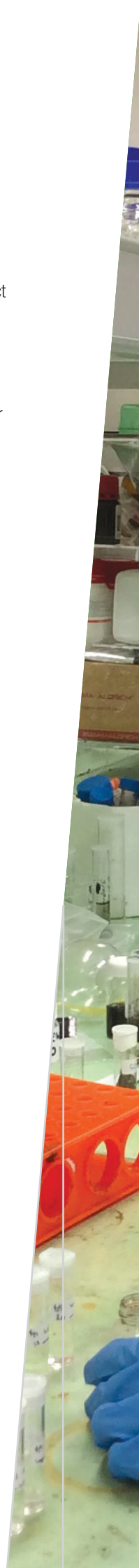
**Master of Mathematics**

The program is designed for graduates with a bachelor degree and a strong foundation in mathematics. You will acquire advanced knowledge and skills in mathematics, and the capacity to use them to tackle complex problems in a variety of situations. The flexible coursework offering ensures that you can create a program to suit your interests, from pure mathematics that develops the core theory, to statistics and applied and computational mathematics that extend this theory to bring practical solutions to real-world problems. All these fields contribute to a far-reaching and comprehensive master's program. The combination of coursework and project equips graduates of the program with advanced knowledge and skills that make them employable in industry, or prepare them for doctoral studies.

**Master of Science**

The Master of Science is an advanced program for science graduates with an undergraduate degree in a cognate discipline. It is designed for two distinct groups of students: the professional scientists aiming to extend their industry-related knowledge and skills for career advancement, and those considering a research degree. In the first year of the course, students will complete advanced studies in their chosen field as well as a project in their chosen topic. In the second year of the course, students will complete further studies to deepen their knowledge in their chosen field.

These studies will culminate in a capstone unit involving a research project which could be theoretical in nature or applied to an industry context. The Master of Science is available in: Astrophysics, Atmospheric Science, Earth Science, Physics.







## OUR RESEARCH STRENGTHS

### Energy and materials

Developed societies stand on a cusp where traditional energy-production methods are being replaced by a wide range of renewable methods for energy production, storage and transport. Our researchers are pursuing advances in atomic-scale technology and materials which will be integral to future devices, and will help to shape a sustainable energy economy.

### Genetics, genomics and health

Advances in genetics and in genome sequencing are revolutionising our understanding of biology and our approaches to improving human and environmental health. Researchers in the Faculty of Science are at the forefront of these advances due to their expertise in state-of-the-art gene manipulation techniques, high-throughput sequencing and phenotyping, and mathematical modelling of biological processes. Their work is leading to new approaches in areas such as bioremediation and prospecting, biological pest and disease control, crop modification, conservation, disease mechanisms, nutrition, gene drives, phage therapy, and assisted reproduction.

### Environmental change and adaptation

Climate, habitats, and renewable and non-renewable resources are all changing at a pace faster than ever before. The well-being of humanity will depend on how both we and the life around us respond to this change. Research across the Faculty of Science spans the breadth and depth of global environmental change. Our researchers are at the forefront of identifying, advancing and communicating the knowledge and solutions humanity needs to manage and adapt to the changing world around us.

### Evolution of the Earth and Universe

Our researchers are redefining our understanding of how the Earth has evolved, how the biosphere influenced that evolution, and how the universe has evolved around us. Science has dramatically redefined our understanding of our place in the universe by showing us how the Earth and stars formed and evolved over billions of years. Today there continue to be many exciting advances including the discovery of gravitational waves, detection of planetary systems around nearby stars, and exploration of new frontiers within our Solar System and on Earth.

### Solutions for a big data world

The deluge of data available in the modern world is reshaping science, technology, and business. Although large data sets carry a wealth of information, their size makes them difficult to analyse. Researchers across the Faculty of Science are working to develop the new tools that are needed to extract useful information from these large data sets. Their work is providing key insights into areas such as traffic flow management, social networks, the production of elements in stars, supply chains, image analysis, and health science.

### Synthesis for function

The ability to design and construct molecules never before seen on earth is critical to the discovery of new materials able to meet future challenges in health and energy. Synthesis has the capacity to redefine the world that we live in. Our researchers are developing new methods to build unique molecules that transform the world and addressing grand challenges ranging from the development of new materials with biological activity, to the discovery of materials with energy storage properties.

### Mathematical networks, space, and symmetry

Much of the technology we use, and our improved understanding of the world, is underpinned by mathematics. Fundamental mathematics research is thus crucial to stimulate new developments in science and technology. Our researchers have particular strengths in the pure mathematics areas that investigate mathematical networks (combinatorics), spaces with constraints in three or more dimensions (topology and geometry), the ways spaces and functions change over time (analysis), and symmetries (algebra).

### New ways of seeing and understanding the world

Modern science is underpinned by our growing capability to “see” in wavelengths far beyond visible light. At the smallest scales, our researchers exploit capabilities with visible light, X-rays and electrons via world-class facilities at the Monash Centre for Electron Microscopy (MCEM), the New Horizons Centre and the Australian Synchrotron. Insights achieved via X-ray phase contrast imaging of lung function have improved patient outcomes for congenital respiratory conditions and acute illnesses.

At the largest scales, astrophysicists exploit km-scale instruments to probe the most distant and violent events in the universe. In addition to a worldwide network of telescopes covering the radio to gamma-ray bands, Monash researchers can now access instruments capable of detecting gravitational waves, a key prediction of Einstein’s theory of general relativity.



## GRADUATE RESEARCH

Monash Science also provides a range of opportunities for graduate research, including:

### Doctor of Philosophy

Doctor of Science – based on career research achievement and examined by expert peer assessment

Learn more at: <https://www.monash.edu/science/future-students/graduate-options>

### Our Research Centres

- > Centre for Quantitative Finance and Investment Strategies
- > The ARC Centre of Excellence in Future Low-Energy Electronics Technologies (FLEET)
- > Monash Centre for Atomically Thin Materials (MCATM)
- > Centre for Geometric Biology
- > Monash Academy for Cross & Interdisciplinary Mathematical Applications (MAXIMA)
- > The Monash Centre for Astronomy (MoCA)
- > Centre for Modelling of Stochastic Systems (CMSS)

### Our Schools

**Bi**

School of  
Biological  
Sciences

**Ch**

School of  
Chemistry

**Ea**

School of Earth,  
Atmosphere &  
Environment

**Ma**

School of  
Mathematical  
Sciences

**Ph**

School of  
Physics &  
Astronomy

**Sc**

School of  
Science  
Malaysia

## OUR STATE-OF-THE-ART FACILITIES

Monash University has invested more than \$200 million in the last few years to transform the Clayton-based Science Faculty into one of the leading science precincts in the southern hemisphere.

### HIGHLIGHTS INCLUDE:

#### Jock Marshall Reserve

The Jock Marshall Reserve is a world-class teaching and research ecological sanctuary integrated with the latest technology. The Reserve is also home to an integrated learning facility – a seminar style building which facilitates the teaching of undergraduate classes with onsite access to the reserve grounds and lake. See: <http://jockmarshallreserve.com.au/>

#### Green Chemical Futures

Green Chemical Futures is a multidisciplinary innovation hub dedicated to supporting researchers and industries innovating within the chemicals manufacturing sector. The hub positions Monash as a world leader in green and sustainable chemistry research and teaching. See: <http://www.monash.edu/green-chemical-futures>

#### Monash Earth Sciences Garden

A new Monash Earth Sciences Garden comprises a stunning arrangement of nearly 500 rock specimens. This school has two of the most advanced earth science laboratories in Australia. See: <http://www.monash.edu/science/schools/earth-atmosphere-environment/facilities/garden>

#### New Horizons Centre

The New Horizons Centre is a \$175M research and training complex, housing the research laboratories of the School of Physics and Astronomy. The New Horizons Centre brings together world-class researchers from Monash and CSIRO.

#### Hutton-Westfold Observatory

Located at our Clayton campus, the Hutton-Westfold Observatory enables our students to observe stars and distant galaxies that are ten thousand times fainter than what can be seen with the unaided eye. This allows students to discern much about these celestial objects and the Universe in which we reside.

#### Monash Micro Imaging

The Monash Micro Imaging (MMI) is a world-class optical imaging core facility, consisting of advanced imaging laboratories on the Monash University Clayton campus (MMI-Clayton) and specialised Imaging Nodes at the Monash Health Translation Precinct (MMI-MHTP, Clayton) and the Alfred Medical Research and Education Precinct (MMI-AMREP, Prahran).





# State of-the-art Facilities

**Monash University** has invested more than \$200 million in the last few years to transform the **Clayton-based Science Faculty** into one of the leading science precincts in the **southern hemisphere**.

Take a virtual tour of the Monash Science Precinct:  
<https://www.monash.edu/monash-science-precinct>



Monash Online  
**[monash.edu/science](https://monash.edu/science)**

Find a course  
**[study.monash/courses](https://study.monash/courses)**

International students  
**[monash.edu/study/international](https://monash.edu/study/international)**

Scholarships  
**[monash.edu/scholarships](https://monash.edu/scholarships)**

Monash Science on Twitter  
**@Monash\_Science**

Monash Science on Instagram  
**@monashscience**

Monash Science Facebook  
**@MonashUniScience**

#### **Future student enquiries**

**Australian citizens, permanent residents, and New Zealand citizens**

Tel: 1800 MONASH (666 274)

Email: [future@monash.edu](mailto:future@monash.edu) [monash.edu/study/contact](https://monash.edu/study/contact)

#### **International students**

Australia freecall tel: 1800 181 838

Tel: +61 3 9903 4788 (outside Australia)

Email: [study@monash.edu](mailto:study@monash.edu)

The information in this brochure was correct at the time of publications (April 2018).

Produced by the Faculty Marketing, Media and Communications division. Monash University reserves the right to alter this information should the need arise.

You should always check with the relevant Faculty office when considering a course.

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