



## MONASH ENGINEERING A GLOBAL LEADER

**TOP 100 RANKINGS** 

#01

ENGINEERING SCHOOL IN AUSTRALIA

(Times Higher Education World University Rankings 2019) #25

REUTERS TOP 75
ASIA PACIFIC'S MOST
INNOVATIVE UNIVERSITY

#**50** 

IN THE WORLD FOR ENGINEERING AND TECHNOLOGY

(QS World University Rankings 2019) **#59** 

QS GRADUATE EMPLOYABILITY RANKINGS (2019)

**OUR STUDENTS AND STAFF** 

562

STAFF (2019)

218 Teaching and Research

117 Research Support

146 Research only

143 Professional staff

1,031

PHD STUDENTS FROM OVER 50 COUNTRIES (2019) 347

PHD SUPERVISORS

**WORLD-WIDE CONNECTIONS** 

 $100^{+}$ 

PARTNER UNIVERSITIES 27K+

ALUMNI FROM MORE THAN 75 COUNTRIES (2019)



TOP 50 IN THE WORLD IN ACADEMIC RANKING OF WORLD UNIVERSITIES SUBJECT RANKINGS (2019)

# O
IN METALLURGY
(#1 in Australia)

#10
IN MINING
AND MINERAL
ENGINEERING

#27
IN REMOTE SENSING

#29
IN ENERGY SCIENCE
AND ENGINEERING
(#1 in Australia)

#35
IN TRANSPORTATION SCIENCE AND TECHNOLOGY



TOTAL RESEARCH INCOME MONASH ENGINEERING (2018)





Monash Engineering is an outstanding global centre for engineering research and education. We are Australia's number one engineering school, and are ranked among the world's most prestigious universities. Our team is truly world-class – committed to purposeful scientific discovery, collaboration, entrepreneurial activity and strong partnerships across the industry, government and not-for-profit sectors. At Monash, we invest in research excellence and our equipment and research facilities are state of the art.

By pursuing a Graduate Research degree, you will join our talented and diverse community of ambitious Monash Engineering researchers, who are driven and committed to leaving a more sustainable legacy for future generations. If you are passionate about tackling global challenges and collaborating with some of the brightest minds, Monash is the place where your ideas and actions can gain momentum.

Graduates leave with a greater sense of purpose, a global outlook, and the skills and confidence to create positive change. When you join Monash Engineering, you'll become part of a bold research community committed to using knowledge to serve and transform society.

#### PROFESSOR ELIZABETH CROFT

Dean, Faculty of Engineering

#36
IN WATER
RESOURCES

#39
IN CHEMICAL
ENGINEERING
(#1 in Australia)

#50
IN CIVIL
ENGINEERING

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Research with impact	
Research infrastructure	
Industry and collaboration	
Our Graduate Research degrees	
Doctor of Philosophy (PhD)	
Master of Engineering Science (Research)	1
Scholarships	1
English language requirements	1
How to apply	1
Student life at Monash	1:
Living in Melbourne	1

## RESEARCH WITH IMPACT

As the world grapples with ever more complex challenges, engineers through their leadership and research will be needed to create the practical, sustainable solutions that will change the world.

Currently ranked in the top 50 universities worldwide for engineering and technology\*, Monash Engineering focusses on researching solutions to address the UN Sustainable Development Goals and solve global challenges.

#### **OUR RESEARCH FOCUS AREAS**



#### **Automation and robotics**

As we enter a more roboticised and data-driven future, it is increasingly important to design systems and technologies to serve all of society. Be at the forefront of leading-edge technologies in artificial intelligence, robotics, virtual and augmented reality, advanced reasoning and automation.

**Photo:** RMCR a skeletal prototype of robotic arm developed by Mechanical Engineering PhD researcher, Shao Liu, for promoting patient safety in minimally invasive surgery.



#### **Biomedical technology**

From tissue engineering and stem cells, to nanobiotechnology, 3D printing body parts and mind-machine interfacing. Interdisciplinary research is playing a critical role in accelerating these innovations to improve people's lives.

Photo: A demonstration of Monash Vision Group's (MGV) wireless circuit boards receiving data from a transmitter and displaying an array of symbols using green LEDs. The same technology has been implemented in the wireless implants developed for the MVG's Bionic Eye.



#### **Cities**

Delivering real-world impact in transport, water, structures, information and communications, planning and management. Developing smarter, sustainable technologies and cutting-edge solutions for infrastructure challenges in the world's cities.

**Photo:** In the Level Crossing Removal Project academics and postgraduate students helped authorities monitor bridges' responses to the 'super loads' passing overhead to verify they could carry repetitive loading.



#### **Defence**

Protecting national security and anticipating tomorrow's risks requires constant innovation. Access world-class expertise in metals and alloys, additive manufacturing and human decision-making to build defence capability and safeguard the nation.

Photo: A world-leading lab in particle image velocimetry and its application to fluid mechanics and turbulence. The Laboratory for Turbulence Research in Aerospace and Combustion (LTRAC) researchers test the influence of surface roughness on wake structures of submarines.



#### Energy

With the world's growing population and changing climate, demand for solutions to the sustainable generation, storage, distribution and use of energy has never been higher. Our researchers are finding real solutions and unlocking innovative, renewable and cleaner energy technologies that drive development without further harming the health of the planet.

Photo: Fluorescent Synthesis liquids or colloidal nanocrystal quantum dots in Monash Energy Materials and Systems Institute (MEMSI) Energy Lab. Although you can't see them, these solutions contain nanocrystals that are only 10 nanometers in size! At this size they can very efficiently convert UV light into different colours simply by changing their composition.



#### Food and water

Our research advancements are delivering global solutions to water and food security. From sustainable food and water systems for a growing world population, value-enhanced food and bio-products, managing the environmental resource footprint, harnessing natural filtration systems and alternative urban water sources, to large-scale farm testing and technological innovations.

**Photo:** Water Sensitive Urban Design researchers in the Living laboratory's greenhouse for water technologies.





### Materials and advanced manufacturing

Making discoveries in alloy and metallurgical science, creating new materials, solving materials manufacturing, durability and design problems or using 3D printing for mechanical or human body parts, our research is making an impact and delivering innovative, cost-effective solutions.

**Photo:** Erin Brodie, PhD student creating new 3D printed implant materials for jaw and facial reconstruction surgery using additive manufacturing.



#### Mining and resources

From mine exploration to rehabilitation and sustaining the future supply of the earth's natural resources, our research is developing solutions to expand the value of the resource base, optimise existing mining infrastructure and operations and bring together advanced technologies including drones, sensors and analytics.

Photo: Professor Ranjith Pathegama Gamage in the Deep Earth Energy Research lab, researches ways to mitigate climate change through geological sequestration of carbon dioxide and extraction of oil and gas from geological formations.

## **Monash Engineering** is an outstanding global centre for engineering research and education. Collaboration is at the heart of our research, pushing boundaries through interdisciplinary research.

We engage with industry and other world-leading research institutes to carry out pioneering research that benefits society and changes the world around us. Our world-class researchers are driven by passion and a commitment to leaving a more sustainable legacy for future generations. The combination of our impressive facilities, research excellence and enterprising industry connections make us the ideal place to solve the greatest engineering challenges of our time.

#### **Chemical Engineering**

- Biotechnology
- Food
- Modelling
- Nanomaterials
- Fuels and Energy
- Membranes

#### **Civil Engineering**

- Deep Earth Energy
- · Engineering for Extremes
- Model-Data Fusion
- · Sensing Technologies
- Smart Structures
- · Sustainable Infrastructure
- Water Sensitive Urban Design

### **Electrical and Computer Systems Engineering**

- Wireless Telecommunications
- Optical Communications and Networking
- Internet of Things
- Smart Power Systems
- Robotics and Artificial Intelligence
- Biomedical Engineering
- · Electromagnetics and Electronics
- Optimization, Information Processing, Control and Decision Systems

#### **Materials Science and Engineering**

- Additive Manufacturing
- Biomaterials
- Functional and Energy Materials
- · Metals and Alloys
- Polymers
- Materials Theory, Modelling and Characterisation

#### **Mechanical and Aerospace Engineering**

- Advanced Manufacturing
- · Micro/Nano Engineering
- Robotics and Control
- Solid Mechanics
- Thermofluids

## RESEARCH INFRASTRUCTURE

World-class research demands state-of-the-art facilities. The Monash Technology Precinct is at the centre of innovation, bringing together powerful research infrastructure and connecting our networks of top talent, government and industry. Here at Monash we host some of the most advanced facilities in the world, such as:

#### **New Horizons Centre**

The \$175 million facility brings Monash and CSIRO together to research the future in renewable energy, biological engineering and more.

#### The Cave2™

A next-generation immersive hybrid 2D and 3D virtual reality environment.

#### **Monash Centre for Electron Microscope**

Our Centre for Electron Microscopy is home to the TITAN, one of the world's most powerful electron microscopes and provides research and expertise in electron microscopy.

#### **Monash Wind Tunnel**

The largest wind tunnel in the southern hemisphere, which has been used to test the aerodynamics and strength of elite athletes such as Australian Olympian, Anna Meares.

#### **Monash Centre for Additive Manufacturing (MCAM)**

A world-leading centre for additive manufacturing and 3D printing of metals, polymers, multimaterials, such as 3D printed jet engines for the aerospace industry.

#### X-ray Analytical Platform

The Monash X-ray Analytical Platform characterises natural and novel materials using three complementary techniques: environmental powder X-ray diffraction, small angle X-ray scattering, and X-ray texture analysis.



#### **Australian Synchrotron**

The Australian Synchrotron is right on our doorstep. Monash researchers can access the national research facility that uses accelerator technology to produce a powerful source of light — x-rays and infrared radiation — a million times brighter than the sun.

#### **Melbourne Centre for Nanofabrication (MCN)**

The MCN is a world-class nanofabrication centre, combining cutting-edge technologies with the knowledge and skills of expert process engineers.

### Multi-modal Australian ScienceS Imaging and Visualisation Environment (MASSIVE)

MASSIVE is Australia's specialised high performance computing facility for imaging and visualisation.

#### **Monash Maker Space**

The creative, collaborative maker-space is a dedicated area for students of all engineering disciplines to come together to build, design and create and encourage entrepreneurial activities.

#### **Woodside Building for Technology and Design**

The new Woodside Building for Technology and Design will provide a world-class learning environment with the latest dynamic and interactive learning spaces, labs and technology.

#### RESEARCH INSTITUTES AND CENTRES

Monash Engineering supports a number of research institutes who work with different disciplines across the university:

- Monash Institute of Medical Engineering (MIME)
- Monash Energy Materials and Systems Institute (MEMSI)
- Monash Infrastructure (MI)
- Monash Institute of Transport Studies (ITS)
- Maintenance Technology Institute (MTI)
- Institute of Railway Technology (IRT)
- Bioresource Processing Institute of Australia (BioPRIA)

We are also home to a wide range of centres with expert research capabilities and facilities, including:

- Food Innovation Centre
- Monash Centre for Membrane Innovation (MCMI)
- Woodside Innovation Centre
- Monash Robotics (opening soon)













#### **GRADUATE RESEARCH INDUSTRY**

## **PARTNERSHIPS**

Graduate Research Industry Partnerships (GRIPs) bring together graduate research students and academics from various fields with industry partners. These partnerships focus on solving real-world issues through interdisciplinary, research-industry collaboration. There are GRIPs in food and dairy, sustainable public transport, chemicals and plastics manufacturing, water and sustainability in Asia.

#### PhD RESEARCH

## **INTERNSHIPS**

PhD research internships offer you the opportunity to apply your research skills and boost your employability by working on short-term projects in industry. Our partnership with Australian Postgraduate Research (APR) Intern, Australia's only graduate research internship program with internships across all disciplines and sectors, means you'll have access to hundreds of research internships each year.

#### INTERNATIONAL COLLABORATION

### GRANTS

Monash Engineering offers opportunities for graduate research students to conduct their research in esteemed universities or institutions around the world. Travel grants and awards of up to \$10,000 are available to fund travel for 3-6 months to support international research collaborations and joint publications.

#### JOINT PhD

## **AWARDS**

With strong research and international collaborations comes the connections to create impact both locally and globally. Monash Engineering international partnerships offer students an opportunity to participate in joint PhD award programs where students carry out research at world-renowned institutions and build an international network of mentors and collaborators.

Professor Xinhua Wu, Director of ARC Research Hub for high value additive manufacturing is a world-leading expert in aeroengine and aircraft materials manufacturing.



#### **ARC Research Hubs and Centres of Excellence**

Our researchers address some of the world's most complex challenges by collaborating Australian Research Council (ARC) centres, industrial transformation research hubs and cooperative research centres. Monash proudly hosts several Hubs and Centres, including:

- Computational Particle Technology
- Transforming Australia's Manufacturing Industry through High Value Additive Manufacturing
- Nanoscience-based Construction Material Manufacturing
- Energy-efficient Separation
- Processing Lignocellulosics into High Value Products (PALS)
- Smart Pavements Australia Research Collaboration (SPARC)
- Future Low-Energy Electronics Technologies (FLEET)
- Robotic Vision
- Integrative Brain Function
- Exciton Science

## OUR GRADUATE RESEARCH DEGREES

Are you driven to pursue a passion in a world-class research environment? Do you want to take your knowledge to new heights and expand your career options? Seeking an opportunity to impact the world?

Monash Engineering's graduate research degrees give you an opportunity to conduct research that is transforming the future. Take this opportunity to make an impact and solve real world issues in a stimulating, supportive environment in areas such as climate change, transport congestion, water supply security, sustainable energy, artificial intelligence, robotics and more.

We are committed to training the next generation of research leaders and have over 1,000 PhD students engaged in our areas of expertise.

#### Be mentored by an expert supervisor

At the core of your graduate research degree is the relationship with your supervisors. We ensure that you are mentored by at least two actively engaged researchers who are leaders in their field.

We have a supervision accreditation program in place. Supervisors are provided with ongoing professional development opportunities to mentor and support you and your research.

Our research supervisors are at the heart of everything we do. They welcome those who question the answers, strive for excellence, and are committed to solving the greatest challenges of the age.

monash.edu/engineering/find-a-supervisor

#### **Career outcomes**

**SANDEEP SARATHY** 

We recruit the best talent for our graduate research programs and prepare students for rewarding careers with a mindset geared towards calculated risk-taking, multi-disciplinary engagement, entrepreneurship and ethical practice. A graduate research degree opens doors not just in industry and academia but also in roles outside your research area.

On completion of your graduate research degree, you'll become an expert in your research field and also obtain diverse transferable skills. These skills, such as leadership, project management, data analytics e-learning and digital processing are highly desired by other professions.

Many of our alumni have become research and engineering leaders in some of the world's most reputable organisations, such as Ford Motor Company, Microsoft, Rio Tinto, Procter & Gamble, Harvard University and Sony Pictures.

"The world is rapidly changing and we must be prepared to adapt and play new roles. The most important skill is not WHAT you learn, but learning HOW to learn. Master that and your career choices could be endless."

Dr Chao Chen, research supervisor to Keenan Granland and Zijue Chen, directs the Laboratory of Motion Generation and Analysis (LMGA). His research interests are in innovative motion generation for versatile edge-cutting applications, and also conducting fundamental researches on motion analysis. LMGA maintain strong national and international collaborations that include France, US, China and Canada.



## DOCTOR OF **PHILOSOPHY (PhD)**

A graduate research degree is a truly global qualification; one that provides an opportunity to delve deeply into engineering challenges and develop solutions for the future.

The Monash Doctoral Program combines the proud tradition of an original research project with innovative training options. Complete your research project with excellence, develop a broad range of skills and professional attributes, and make an impact in academia, industry, government, or community after graduation.

At the core of the PhD is the completion of a research thesis based on a research project carried out under the supervision of a team of world-class researchers. Your research training is further enhanced by coursework units designed to support you in your academic and professional development.

We offer generous scholarships to support you and your graduate research, so you can focus on what's important. It's our investment in ideas and people that will change the world – and it covers more than just the cost of study.

This is a PhD designed to set you up for success, giving you a competitive edge no matter what career path you choose to pursue in a rapidly evolving world.

#### **Entry requirements**

A four year bachelor's degree in a relevant field, which includes a significant research component or an Honours year, leading to an honours 1 or 2A or equivalent;

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A master's degree in a relevant field that includes a significant research component (at least 25% of one full time equivalent year of work), including a thesis with a minimum of H2A or equivalent.

#### **English language requirements**

You'll also need to meet minimum English language requirements. See page 11.

Find out more at monash.edu/engineering/ graduate-research



**ON CAMPUS** Clayton, Malaysia

**OFF CAMPUS** Clayton



3-4 years full-time (or part-time equivalent)

Mechanical Engineering PhD students, Keenan Granland and Zijue Chen are developing an Agricultural Robot for apple picking with an adaptive gripper for use in complex outdoor environments. It uses a convolutional neural network to detect apple in trees and calculate the 3D location of the apples. The signal is then transferred to the processor, which finally controls the robot arm to pick the apples. Detecting the apples efficiently and accurately is the main barrier to realizing auto-picking. We are trying to accelerate the system and make it work better. This may benefit other agricultural robots in the future, as they need 'eyes' to work.







**ON CAMPUS** 

Clayton, Malaysia

**OFF CAMPUS** 

Clayton



2 years full-time (or part-time equivalent)

"My PhD project is on additive manufacturing of porous titanium scaffolds for orthopaedic implants. I look at the mechanical and biological properties of the 3D printed scaffolds with different topologies. My biggest motivation for my work is knowing that I can improve the quality of patients' lives by developing orthopaedic implants. I have a passion for solving current healthcare issues by using my engineering skills."

# MASTER OF ENGINEERING SCIENCE (RESEARCH)

Engineering researchers develop profound specialised knowledge and skills in their chosen area that enable them to address global needs and improve the way of life in the communities they serve.

A Master of Engineering Science by Research degree from Monash provides you with the grounding to delve deeply into engineering challenges and develop solutions for the future.

The master's by research degree involves the under the supervision of a team of world-class researchers. It is expected the research you undertake will make a contribution to your

independent investigation of a research problem chosen discipline and produce a thesis.

#### **Entry requirements**

A four year bachelor's degree in a relevant field, which includes a research component or Honours year, leading to an upper H2B (65% or above) or equivalent.

#### **English language requirements**

You'll also need to meet minimum English language requirements. See page 11.

Find out more at monash.edu/engineering/



## **SCHOLARSHIPS**

Monash University and the Engineering faculty offer a range of scholarships for domestic and international graduate research students, including tuition fees, stipends, travel grants and relocation allowances. Scholarships are awarded based on academic merit with priority given to high calibre, first class honours or equivalent students who can demonstrate strong research capability. Applications with the following will be looked upon favourably:

- Graduated in the top 10% of year level
- Have authored peer-reviewed research publications
- · Possess excellent written and verbal skills
- Scored well in a national graduate entrance exam.

#### Scholarship application closing dates

ROUND	APPLICANT Type	APPLICATIONS OPEN	APPLICATIONS CLOSE	ENROLMENT PERIOD
1	International	1 September	31 March	July – December of the current year
2	Domestic	1 November	31 May	July – December of the current year
3	International	1 April	31 August	January – June of the following year
4	Domestic	1 June	31 October	January – June of the following year

#### monash.edu/engineering/graduate-research-scholarships

#### **ENGLISH LANGUAGE REQUIREMENTS**

You need to be proficient in the English language for graduate research courses. If your first language is not English (ie. you are not from a country where English is an official language), you must satisfy at least one of the following:

#### **Previous studies in English**

Must have completed tertiary studies for at least two years conducted entirely in English, within the five-year period prior to application, from a recognised English language country.

#### **Monash English Bridging (MEB) Program**

#### **English Language Test**

Achieved the minimum score in one of the below English language tests in the past two years.

IELTS (Academic English only)	Overall 6.5	With no band less than 6.0
TOEFL (paper-based)	550+	Test of Written English (TWE) 4.5
<b>TOEFL</b> (internet-based)	79+	Writing: 21 Speaking: 18 Reading: 13 Listening: 12
PEARSON Test of Academic English	58+	Communicative score: 50 or greater
<b>CAMBRIDGE</b> English	176+	No skill below 169

#### monash.edu/graduate-english-language



## **HOW TO APPLY**

1

#### Check your eligibility for your program

Before beginning the application process, make sure to check you meet both academic and English language requirements.

2

#### Find a supervisor

Visit **monash.edu/engineering/find-a-supervisor** and find a research supervisor who works in an area that interests you.

3

#### **Submit an Expression of Interest**

Get in contact with a suitable supervisor and discuss your research with them. Submit an Expression of Interest form on our website.

4

#### **Obtain an Invitation to Apply**

If you're deemed eligible, a supervisor will issue you an Invitation to Apply. This invitation is necessary to apply and must be uploaded with your application. This can take up to 6 weeks so start early.

5

#### Apply

Lodge an application for admission and scholarship using the online application system.

For more details on how to apply and links to the Expression of Interest form, visit **monash.edu/engineering/graduate-research/how-to-apply** 

## STUDENT LIFE AT MONASH

University study takes commitment and drive, especially if you're moving to a new city or country. We can help you settle into university life by providing an extensive range of support programs and services.

#### Airport pick-up service

Commencing students can pre-book our free airport pick-up service prior to arriving in Melbourne.

#### monash.edu/study/international/preparing/ reception

#### Support services

Monash support programs and services include:

- Academic support
- Family support
- Campus security
- Monash Connect
- Monash Professional
   Wellbeing
- Pathways
- Clubs and societies
- English Connect Disability support
- Monash Postgraduate

Association

- services e-Research services
- monash.edu/study/student-life

#### **Orientation**

Orientation activities happen before the semester starts and are designed to help you settle in. Some orientation activities focus on providing more information about your studies, while others help you meet new people and adjust to a new country and the Monash University environment.

#### monash.edu/orientation

#### Clayton campus

Twenty kilometres from the centre of Melbourne, Monash's Clayton campus combines a vibrant research, technology, and manufacturing precinct with first-rate sporting facilities, shops, a student centre, libraries, a post office, banks, medical services, and religious centres.

"Monash was the university of my choice because it is among the world top universities, particularly in Engineering. As an international student, I enjoyed the diverse, welcoming and friendly environment of Monash University during the course of my Bachelor and PhD. I received a Monash university postgraduate full scholarship, which allowed me to fully focus my attention and dedicate my time to my research.

My research focuses on the manipulation of fluid and suspended particles at the microscale. using surface acoustic waves. The applications of my research span a broad range including tissue engineering, cell sorting, and biomedical diagnostics."

#### DR ARMAGHAN (AMY) FAKHFOURI

Mechanical Engineering PhD Postdoctoral Research Fellow, Leibniz Institute for Solid State and Material Research



## LIVING IN MELBOURNE

Our Australian base is a vibrant, multicultural city that offers an abundance of cultural festivities, international sporting events, cafés and restaurants with cuisines from around the world, beautiful parks and beaches, and an eclectic mix of music and arts. You couldn't pick a better place to live.

As one of the world's most liveable cities\*, you can expect excellence in public transport and healthcare, as well as opportunities for casual work while studying. Plus, Melbourne is renowned as a welcoming environment for international students, providing a home away from home.

#### **Cost of living**

Living in Melbourne is affordable if you plan ahead and know what your needs will be. Your tuition and study fees do not include personal costs such as accommodation, food and miscellaneous items. These costs can add up to approximately A\$22,900+ per year. For information on budgeting for your lifestyle, visit **monash.edu/cost-of-living** 

#### **Student accommodation**

Living on-campus is a great way to experience university life and make connections while you study. On-campus accommodation is available at the Clayton campus and our Residential Services support team is available to help you through the application and transition process. If you prefer a little more independence, there is plenty of off-campus accommodation available. For more information on accommodation, visit **monash.edu/accommodation** 

\* Economist Intelligence Unit 2011-2018.















#### **Graduate Research Office**

Monash Engineering
E: eng-gradresearch@monash.edu
T: +61 3 9905 5222
monash.edu/engineering/graduate-research

**FACEBOOK** 

MonashEngineering

**INSTAGRAM** 

@monashengineering

**TWITTER** 

@monashengineers

**WECHAT** 

Monash\_Engineering



#### **MONASH ENGINEERING**

monash.edu/engineering @monashengineers

#### **FUTURE STUDENT ENQUIRIES**

Australian citizens, permanent residents and New Zealand citizens Tel: 1800 MONASH (666 274) Email: future@monash.edu monash.edu/study/contact

International students

Australia freecall tel: 1800 MONASH (666 274) Tel: +61 3 9903 4788 (outside Australia)

Email: study@monash.edu Wechat: MonashUniAus Youku: Monash 蒙纳士大学

The information in this brochure was correct at the time of publication (July 2019). Monash University reserves the right to after this information should the need arise. You should always check with the relevant faculty office when considering a course. CRICOS provider: Monash University 00008C Monash College 01857J

**Cover photo:** Microalgae cultivation for wastewater treatment and clean fuel production. Chemical Engineering PhD student Fanghua 'Flora' Li's research project has a focus on the bio-oil production and upgrading for transport application from the renewable biomass of microalgae.