Imperial College London

GLOBAL CHALLENGE:

Discovery and the natural world

Postgraduate courses
2020–21 entry

Top 10

Consistently ranked amongst the top 10 universities in the world

Times Higher Education
World University Rankings 2019/
QS World University Rankings 2020

1st

in the UK for graduate employability

The Guardian University Guide 2020

1st

Most innovative university in the UK (3rd in Europe)

Reuters' Europe's Most Innovative Universities 2019

No.1

Located in the world's best student city

QS Best Student Cities 2019

Find your way to Imperial

You can use this guide to explore our Master's and Doctoral courses relating to our global challenge of **discovery and the natural world**. This is one of Imperial's four global challenges. It brings together our expertise – in areas ranging from biosciences to resource management – to help us gain a better understanding of the world around us.

Our global challenges (see back cover) guide the way we work together across subject boundaries to find solutions to some of humanity's biggest problems – like air pollution and climate change, species extinction and overpopulation.

Find the right course for you

We're building a community of creative problem solvers who can use their diverse talents to address these challenges.

That's why, in this guide, you'll find our Master's courses grouped by theme, rather than by department. These broader categories are designed to help you navigate all the ways you could contribute to making the world a better place – it may not be in a way you previously considered or in the department that matches your first degree.

What's more, it may lead to a career you never imagined or a job that doesn't yet exist. That's the exciting thing about studying at a place whose work is transforming the future.

Many of our departments welcome students whose background is not in the same area of science or engineering.

If you already know which department or course you're interested in, visit our Study website to learn more:

- **www.imperial.ac.uk/study/pg/courses**

Our Doctoral students have the chance to be true pioneers in their field by creating brand new knowledge. See pages 20–21 to discover your options relating to discovery and the natural world.

A UNIQUE

science community

Imperial is home to a global community of scientists, engineers, medics and business experts who are using their diverse talents to find solutions to some of the world's biggest challenges – like developing sustainable energy sources, protecting the world's endangered species and combatting food insecurity.

Our work to help find a balance between our human-centric society and the environment relies on us building a better understanding of how to optimise and conserve the world around us. We're guided in this work by a number of open questions.

What if we could...

- identify the unknown 95% of the universe?
- quantify and reduce the impact of environmental and climate change?
- deliver water, energy and minerals that are secure, sustainable and affordable?
- understand the mechanisms which influence how humans make decisions?

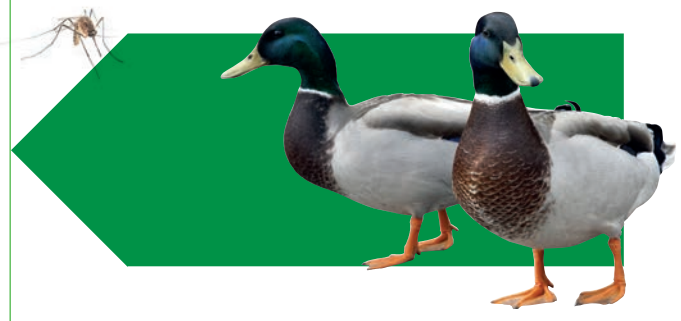
Read more about the work we're already doing to address these challenges (see right).

Making an impact

Our research-led approach also shapes the way we educate our students through teaching that opens everything up to question. It's a style of education that relies on learning by discovery, rather than memorising facts.

▲ Dr Richard Gill and his team from the Department of Life Sciences have found that bees exposed to common pesticides fly only a third of the distance that unexposed bees are able to achieve. This can lead to bee colonies pollinating fewer crops and going hungry. The research team hopes the ecological applications of their findings can help to prevent further bee decline.

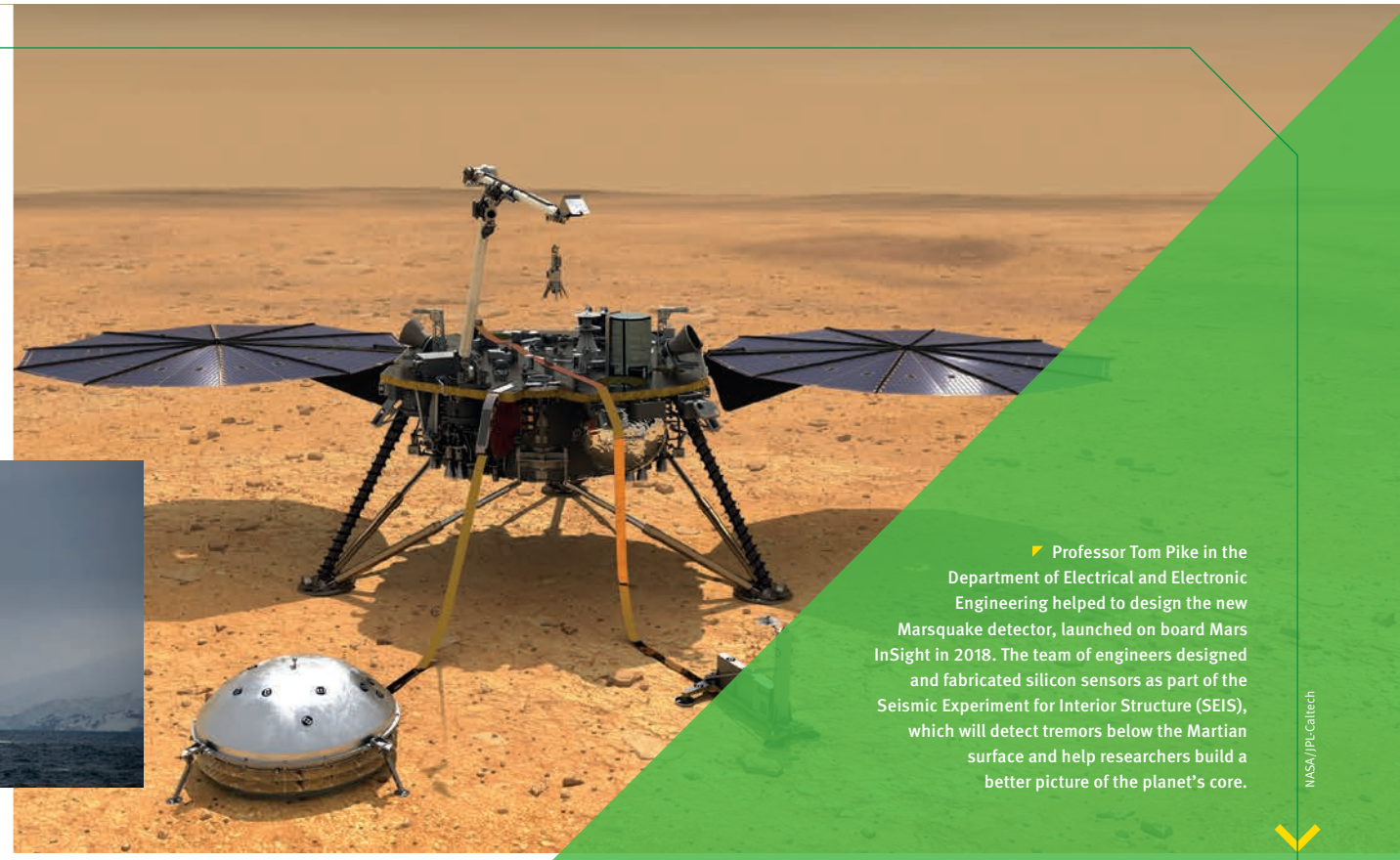
▼ Professor Andrea Crisanti from the Department of Life Sciences has used 'gene drive' technology to block female reproduction in malaria-carrying mosquitos in caged lab experiments. The hope is that mosquitoes carrying the altered gene will be released in the future, spreading female infertility in local mosquito populations, causing them to collapse. This could eventually help to prevent the estimated 445,000 deaths per year from malaria worldwide.



◥ Professor Vincent Savolanien from the Department of Life Sciences is using new approaches to understand why same-sex behaviour is so common across the animal kingdom. By carrying out field work, genomic sequencing and new theoretical models, Professor Savolainen and his team hope to unravel how, and why, homosexuality is found in many species across nature.

▼ Imperial experts have predicted that sustained Antarctic warming of just 2°C could melt the largest ice sheet on Earth. Professor Tina van de Flierdt from the Department of Earth Science and Engineering, who is co-author of the international research study, has warned that the melting of the ice sheets will lead to global sea level rise and threaten coastal regions around the world.

Christina Riesselman



◥ Professor Tom Pike in the Department of Electrical and Electronic Engineering helped to design the new Marsquake detector, launched on board Mars InSight in 2018. The team of engineers designed and fabricated silicon sensors as part of the Seismic Experiment for Interior Structure (SEIS), which will detect tremors below the Martian surface and help researchers build a better picture of the planet's core.

NASA/JPL-Caltech

WHERE COULD AN

Imperial degree lead you?

A postgraduate degree from Imperial will provide you with an excellent foundation for your future. Explore how some of our 200,000-strong global alumni community are building on their Imperial education.

As the UK's most innovative university, a natural career path for many Imperial graduates and students is using their creative and entrepreneurial talents to launch new ideas into the world.

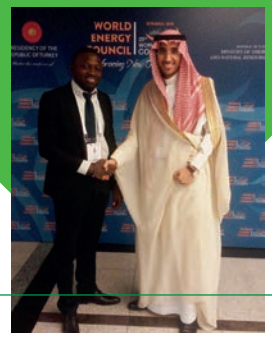
Kerry O'Donnelly Weaver (MRes Chemical Biology of Health and Diseases 2011, PhD Chemical Engineering Research 2015) and **Angela de Manzanos** (MRes Chemical Biology of Crop Sustainability and Protection 2012, PhD Chemistry Research 2016) developed FungiAlert, a device that can detect pathogens in soil and water before they infect plants, which they are hoping will help tackle global crop loss.

Nick Paget, Emile De Visscher, Christophe Machet and **Audrey Gaulard** (MA/MSc Innovation Design Engineering 2012) are the founders of The Polyfloss Factory. The process, inspired by candy-floss machines, transforms waste plastic into a new raw material, whose uses include insulation for emergency shelters in refugee camps, packaging and product design.

Max Grell (MRes + PhD Plastic Electronic Materials 2019), **Michael Kasimatis** and **Giandrin Barandun** (both PhD Bioengineering 2019) founded BlakBear.com and developed a credit card-sized paper air sensor that integrates with smartphones to measure deadly exhaust gases.

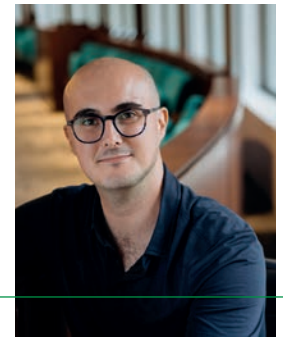
Yin Noe (MSc Innovation, Entrepreneurship and Management 2018) launched Coillection, a social enterprise tackling the improper disposal of household cooking oil waste. Instead of pouring oil down the drain, Coillection's technology converts used cooking oil into biodiesel, a carbon neutral fuel and an important renewable energy source.

Melissa Schiele (MSc Conservation Science 2018) is a Drone Technician for the Zoological Society of London. As part of her research, Melissa pilots a drone to help identify and study the different marine life and illegal 'fisherfolk' in tropical marine protected areas around the world.



Yousef Alshammari (PhD Chemical Engineering Research 2013, pictured right) is Research Scientist, Oil Market Analyst and the Editor-in-Chief at CMarkits. His current work focuses on understanding oil market dynamics and price trends. He also sits as an expert with organisations including World Energy Council and United Nations Economic Commissions for Europe.

Jackie Turner (MSc Ecological Applications 2017) led a team of ecologists and biologists in Costa Rica to document alternative systems to produce bananas. Jackie was inspired to make the documentary *Bananageddon* after living on a commercial banana plantation. She hopes it will help educate people on the more sustainable methods of production of the fruit.



Luis Munuera (MSc Environmental Technology 2009, PhD Civil Engineering 2013) is the Smart Grids Technology Lead at the International Energy Agency. Luis is responsible for helping to identify innovations in electricity systems that can be used across the energy sector to meet Paris Agreement targets and other sustainable development goals.

Want to know more?

Delve into the data about what our graduates do on our Careers website at:

- **www.imperial.ac.uk/careers/exploring-your-options/destinations/postgraduates**

Master's courses by theme

Our interdisciplinary approach means our expertise often spans departmental boundaries. And so do our courses, so you may find a course of interest in an unexpected area of the College, or a way to follow your interests you never previously considered.

Themes in this guide

This guide contains Master's courses relevant to our global challenge, **discovery and the natural world**. To help you search your study options in this area, we've grouped our Master's courses together under the following themes:

- **Artificial intelligence, robotics and machine learning**
- **Big data, computational modelling and mathematical methods**
- **Biomedical science**
- **Biosciences**
- **Ecosystems and the environment**
- **Energy futures and resource management**
- **Entrepreneurship**
- **Fluid mechanics**
- **Material science and product innovation**
- **Medical technology**
- **Molecular science**
- **Policy and communication**

To learn more about all our Master's courses visit:

- **www.imperial.ac.uk/study/pg/courses**

Artificial intelligence, robotics and machine learning

The design and engineering of robotic technology and computer software that can learn and adapt to its environment without being programmed.

Course		Department	Faculty	Entry requirements
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MSc	Artificial Intelligence	Computing	Engineering	First class Honours in mathematics, physics, engineering or other degree with substantial mathematics content.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.

Big data, computational modelling and mathematical methods

The analysis of large data sets to reveal trends and patterns and make predictions.

Course		Department	Faculty	Entry requirements
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Applied Mathematics	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics, engineering or physics.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	2:1 in a life sciences or physical sciences subject. A suitable grounding in mathematics is desirable e.g. A-level grade B or higher.
MSc	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	As above.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Environmental Engineering and Business Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Hydrology and Business Management	Civil and Environmental Engineering	Engineering	As above.

Continued on the next page

Big data, computational modelling and mathematical methods (continued)

Course		Department	Faculty	Entry requirements
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	See Environmental Engineering, page 7.
MSc	Mathematics and Finance	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics or physics.
MRes	Molecular Science and Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences with a suitable grounding in mathematics.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MSc	Pure Mathematics	Mathematics	Natural Sciences	2:1 in mathematics or applied mathematics.
MSc	Quantum Fields and Fundamental Forces	Physics	Natural Sciences	First class Honours in physics or mathematics with theoretical physics options.
MSc	Statistics streams: ▸ Applied Statistics ▸ Biostatistics ▸ Data Science ▸ Statistical Finance ▸ Statistics ▸ Theory and Methods	Mathematics	Natural Sciences	2:1 in statistics, mathematics, engineering or physics.

For a directory of courses by A–Z and by department, please see our Study website:

▸ **www.imperial.ac.uk/study/pg/courses**

Biomedical science

▸ **A highly interdisciplinary field of biology with practical applications in medicine, healthcare and laboratory diagnostics.**

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Science and Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences with a suitable grounding in mathematics.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

Biosciences

▸ **The scientific study of living organisms (humans, plants and animals) – from molecules and cells to human health and disease.**

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Biosystematics	Life Sciences	Natural Sciences	2:1 in a biological or environmental subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Plant and Microbial Sciences	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.
MSc	Taxonomy, Biodiversity and Evolution	Life Sciences	Natural Sciences	2:1 in biology or a related subject.

Ecosystems and the environment

The interdisciplinary study of the environment and the solutions to the environmental problems we face.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MRes	Biosystematics	Life Sciences	Natural Sciences	2:1 in a biological or environmental subject.
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MRes	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	2:1 in a life sciences or physical sciences subject. A suitable grounding in mathematics is desirable e.g. A-level grade B or higher.
MSc	Computational Methods in Ecology and Evolution	Life Sciences	Natural Sciences	As above.
MSc	Earthquake Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Ecological Applications	Life Sciences	Natural Sciences	2:1 in a science subject.
MSc	Ecology, Evolution and Conservation	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecology, Evolution and Conservation Research	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecosystems and Environmental Change	Life Sciences	Natural Sciences	2:1 in a science subject. Applicants will ideally have experience in environmental research or policy and a strong interest in pursuing a research career.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Environmental Engineering and Business Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MRes	Hydrology and Business Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	As above.
MRes	Molecular Plant and Microbial Sciences	Life Sciences	Natural Sciences	2:1 in a science subject.
MSc	Petroleum Geoscience	Earth Science and Engineering	Engineering	2:1 in earth sciences. Applicants with closely related earth/environmental science degrees (such as physical geography or oceanography) or industrial experience will also be considered.
MRes	Plant Chemical Biology: Multidisciplinary Research for Next-Generation Agri-Sciences	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MSc	Soil Mechanics	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Soil Mechanics and Business Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Soil Mechanics and Engineering Seismology	Civil and Environmental Engineering	Engineering	As above.
MSc	Soil Mechanics and Environmental Geotechnics	Civil and Environmental Engineering	Engineering	As above.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.
MSc	Taxonomy, Biodiversity and Evolution	Life Sciences	Natural Sciences	2:1 in biology or a related subject.
MRes	Tropical Forest Ecology	Life Sciences	Natural Sciences	2:1 in a science-based subject.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Energy futures and resource management

Exploring how sustainable technologies and the management of energy and natural resources can help to address global energy issues.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	As above.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Chemical Engineering with Structured Product Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MSc	Ecological Applications	Life Sciences	Natural Sciences	2:1 in a science subject.
MRes	Ecology, Evolution and Conservation Research	Life Sciences	Natural Sciences	As above.
MSc	Ecology, Evolution and Conservation	Life Sciences	Natural Sciences	As above.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Environmental Engineering and Business Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Future Power Networks	Electrical and Electronic Engineering	Engineering	First class Honours (minimum of 75% overall) in electrical/electronic engineering or a related subject with a substantial electrical/electronic engineering component.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MSc	Hydrology and Business Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Metals and Energy Finance	Earth Science and Engineering	Engineering	2:1 in engineering, physical sciences or economics with a substantial mathematics component. Appropriate experience, while not essential, would be an advantage.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Plant Chemical Biology: Multidisciplinary Research for Next-Generation Agri-Sciences	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Plastic Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Entrepreneurship

Developing the knowledge and skills to design, launch and manage a new business or startup.

Course		Department	Faculty	Entry requirements
MSc	Climate Change, Management and Finance, delivered in partnership with the Grantham Institute – Climate Change and the Environment	Imperial College Business School		**www.imperial.ac.uk/business-school/programmes/msc-programmes**
MSc	Environmental Engineering and Business Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Hydrology and Business Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Mathematics and Finance	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics or physics.
MSc	Metals and Energy Finance	Earth Science and Engineering	Engineering	2:1 in engineering, physical sciences or economics with a substantial mathematics component. Appropriate experience, while not essential, would be an advantage.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

For a directory of courses by A–Z and by department, please see our Study website:

- **www.imperial.ac.uk/study/pg/courses**

Fluid mechanics

The application of the laws of force and motion to liquids and gases.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MSc	Applied Computational Science and Engineering	Earth Science and Engineering	Engineering	2:1 in engineering or a science-based discipline.
MSc	Applied Mathematics	Mathematics	Natural Sciences	2:1 in mathematics, applied mathematics, engineering or physics.
MSc	Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	Civil and Environmental Engineering	Engineering	2:1 in science or engineering. A suitable grounding in mathematics required e.g. A-level grade B or higher.
MRes	Molecular Science and Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences with a suitable grounding in mathematics.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.

Material science and product innovation

Understanding the physical and chemical properties of materials to create innovative new products.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Chemical Engineering with Process Systems Engineering	Chemical Engineering	Engineering	As above.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Mechanical Engineering	Mechanical Engineering	Engineering	First class Honours in science or engineering.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MSc	Concrete Structures	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MSc	General Structural Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MRes	Molecular Science and Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences with a suitable grounding in mathematics.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Plastic Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MSc	Structural Steel Design	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.

Medical technology

Developing technology to diagnose, monitor and treat the diseases and conditions that affect us.

Course		Department	Faculty	Entry requirements
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MRes	Bioimaging Sciences	Chemistry	Natural Sciences	2:1 in a science, technology, engineering or medicine subject.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MSc	Optics and Photonics	Physics	Natural Sciences	2:1 in physics, mathematics or electrical engineering. Evidence of appropriate qualifications may also be considered.
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Molecular science

The study of molecular materials, including our cells and DNA, and their application in the real world.

Course		Department	Faculty	Entry requirements
MSc	Advanced Chemical Engineering with Biotechnology	Chemical Engineering	Engineering	2:1 in an engineering, physical sciences, mathematical, life sciences or biomedical sciences subject.
MSc	Advanced Materials Science and Engineering	Materials	Engineering	2:1 in materials, mechanical/civil/chemical engineering, physics or chemistry.
MSc	Advanced Materials for Sustainable Infrastructure	Civil and Environmental Engineering	Engineering	2:1 in an engineering or science-based discipline.
MRes	Advanced Molecular Synthesis	Chemistry	Natural Sciences	2:1 in chemistry or chemical engineering.
MRes	Bioimaging Sciences	Chemistry	Natural Sciences	2:1 in a science, technology, engineering or medicine subject.
MSc	Bioinformatics and Theoretical Systems Biology	Life Sciences	Natural Sciences	2:1 in a biological, physical sciences, computational or mathematical subject.
MRes	Catalysis: Chemistry and Engineering	Chemistry	Natural Sciences	2:1 in chemistry or engineering. A modest level of background chemistry or engineering knowledge is assumed.
MRes	Chemical Biology and Bio-Entrepreneurship	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Drug Discovery and Development: Multidisciplinary Science for Next Generation Therapeutics	Chemistry	Natural Sciences	2:1 in chemistry, pharmacy, physics, biochemistry, medicine or an appropriate subject.
MRes	Green Chemistry, Energy and the Environment	Chemistry	Natural Sciences	2:1 in chemistry, engineering or a related subject.
MRes	Molecular and Cellular Biosciences	Life Sciences	Natural Sciences	2:1 in a biosciences-based subject. Applicants also need to demonstrate a commitment to a career in biosciences research.
MRes	Molecular Science and Engineering, delivered by the Institute for Molecular Science and Engineering (IMSE)	Chemical Engineering	Engineering	2:1 in engineering or physical sciences with a suitable grounding in mathematics.
MRes	Nanomaterials	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, materials, biochemistry, engineering or an appropriate subject.
MRes	Photonics	Physics	Natural Sciences	First class Honours in physics, electrical or electronic engineering or a relevant scientific discipline.
MSc	Physics	Physics	Natural Sciences	First class Honours in physics with a strong mathematical content. Other scientific disciplines with significant physics and mathematics content will also be considered.
MSc	Physics with Extended Research	Physics	Natural Sciences	As above.
MSc	Physics with Nanophotonics	Physics	Natural Sciences	As above.
MSc	Physics with Quantum Dynamics	Physics	Natural Sciences	As above.
MRes	Plant Chemical Biology: Multidisciplinary Research for Next-Generation Agri-Sciences	Chemistry	Natural Sciences	2:1 in chemistry, physics, mathematics, biophysics, biochemistry or bioengineering. Additionally, your degree must include at least 50% physical science content.
MRes	Plastic Electronic Materials	Physics	Natural Sciences	2:1 in physics, chemistry, chemical engineering, electrical engineering, materials science or a related subject.
MRes	Structural Molecular Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences-based subject.
MRes	Systems and Synthetic Biology	Life Sciences	Natural Sciences	2:1 in a physical sciences, engineering, mathematical, life or biomedical sciences-based subject. A suitable grounding in mathematics is desirable e.g. A-level grade A or higher.

Policy and communication

Exploring how effective communication strategies and cultural policies can help address global and regional problems.

Course		Department	Faculty	Entry requirements
MSc	Applied Biosciences and Biotechnology	Life Sciences	Natural Sciences	2:1 in biochemistry, biology or an appropriate subject.
MSc	Environmental Engineering	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Environmental Engineering and Business Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Environmental Technology	Centre for Environmental Policy	Natural Sciences	2:1 in science, engineering, humanities or a social science subject.
MSc	Hydrology and Business Management	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Hydrology and Water Resources Management	Civil and Environmental Engineering	Engineering	As above.
MSc	Science Communication	Science Communication Unit		2:1 in a scientific or science-related subject.
MSc	Science Media Production	Science Communication Unit		2:1 in a scientific or science-related subject.
MSc	Sustainable Energy Futures, delivered by the Energy Futures Lab	Mechanical Engineering	Engineering	2:1 in engineering or physical sciences.
MSc	Transport	Civil and Environmental Engineering	Engineering	2:1 in civil engineering, natural sciences, earth sciences or other numerate disciplines. A suitable grounding in mathematics required e.g. A-level grade B or higher. Relevant industrial/professional experience may also be considered.
MSc	Transport and Business Management	Civil and Environmental Engineering	Engineering	As above.

For a directory of courses by A–Z and by department, please see our Study website:

www.imperial.ac.uk/study/pg/courses

Doctoral courses

PhD (traditional route)

An intensive academic qualification involving a series of progression milestones which you must meet along the way. Find out more and check whether funded studentships are available at:

www.imperial.ac.uk/study/pg/courses/doctoral-courses/phd

Course		Department	Faculty	Entry requirements
PhD	Cellular Bionics, offered by the Leverhulme Centre for Cellular Bionics	Chemistry	Natural Sciences	**www.imperial.ac.uk/leverhulme-centre-cellular-bionics**
PhD	Chemical Engineering Research	Chemical Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Chemistry Research	Chemistry	Natural Sciences	As above.
PhD	Civil Engineering Research	Civil and Environmental Engineering	Engineering	As above.
PhD	Clinical Sciences Research	Institute of Clinical Sciences	Medicine	2:1 in an appropriate subject, or equivalent. Master's degree is preferable, but not essential: **www.lms.mrc.ac.uk/study-here/phd-studentships**
PhD	Earth Science and Engineering Research	Earth Science and Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Electrical Engineering Research	Electrical and Electronic Engineering	Engineering	As above.
PhD	Environmental Research	Centre for Environmental Policy	Natural Sciences	As above.
PhD	Life Sciences Research	Life Sciences	Natural Sciences	As above.
PhD	Mathematics Research	Mathematics	Natural Sciences	As above.
PhD	Medical Research Council Studentships, offered by Imperial College Medical Research Council Doctoral Training Partnership (DTP)	Various	Various	**www.imperial.ac.uk/mrc-dtp-studentships**
PhD	Petroleum Engineering Research	Earth Science and Engineering	Engineering	2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.
PhD	Physics Research	Physics	Natural Sciences	As above.
PhD	Science and Solutions for a Changing Planet, funded by NERC and hosted by the Grantham Institute – Climate Change and the Environment	Various	Various	**www.imperial.ac.uk/grantham/education/science-and-solutions-for-a-changing-planet-dtp**
PhD	Science Communication Research	Science Communication Unit		2:1 in an appropriate subject. Applicants must also normally hold or be studying towards a Master's degree.

Integrated PhD (1 + 3)

Integrated PhD courses typically consist of a one-year Master's course (MSc or MRes) which leads straight into a three-year PhD.

The following opportunities are covered by funded studentships, which are available to Home students, and currently to EU students who meet certain eligibility criteria. Self-funded Overseas applicants should enquire directly to the relevant centre for information on eligibility.

www.imperial.ac.uk/study/pg/courses/doctoral-courses/integrated-phd

Course		Department	Faculty	Entry requirements
MRes + PhD	Advanced Molecular Synthesis, offered by the EPSRC Centre for Doctoral Training (CDT) in Next Generation Synthesis and Reaction Technology	Chemistry	Natural Sciences	**www.imperial.ac.uk/next-generation-synthesis-reaction-technology**
MRes + PhD	BioDesign Engineering, offered by the EPSRC Centre for Doctoral Training (CDT)	Life Sciences	Natural Sciences	**www.imperial.ac.uk/synthetic-biology/cdt-biodesign-engineering**
MRes + PhD	Chemical Biology: Innovation in Life Sciences, offered by the EPSRC Institute of Chemical Biology Centre for Doctoral Training (CDT)	Chemistry	Natural Sciences	**www.imperial.ac.uk/chemical-biology/cdt**
MRes or MSc + PhD	Medical Research Council Studentships, offered by Imperial College Medical Research Council Doctoral Training Partnership (DTP)	Various	Various	**www.imperial.ac.uk/mrc-dtp-studentships**

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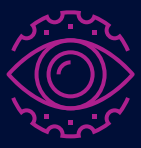
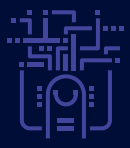
Discovery and the natural world



Engineering novel solutions

Health and wellbeing



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