

Imperial College  
London

**WE ARE**

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**FUTURE  
LEADERS**

**WE ARE**

**THE DEPARTMENT  
OF BIOENGINEERING**

### **Why should you study biomedical engineering?**

Of all the engineering disciplines, none has the power to transform lives quite so dramatically as bioengineering. Our dedication to improving human health and tackling global challenges attracts the world's finest students and researchers, each keen to make a difference in this exciting and fast-developing field. As engineers with medical and biological understanding, we're able to solve the problems doctors can't, ultimately saving lives and improving people's overall wellbeing. Medicine is now so advanced that highly technological solutions are required at every stage, from diagnosis and treatment to recovery and beyond. This has led to the development of many biomedical innovations, including Lab-on-a-Chip diagnostic devices, MRI and CT scanners, pacemakers, hearing aids, artificial ventilators, prosthetic joints and limbs, radiotherapy and key-hole surgery equipment, to name but a few.

**BIOMECHANICS &  
MECHANOBIOLOGY**

**DETECTION, DEVICES  
& DESIGN**

**IMPLANTS &  
REGENERATIVE MEDICINE**

**MOLECULAR & CELLULAR  
BIOENGINEERING**

**NEURAL  
ENGINEERING**

**HUMAN & BIOLOGICAL  
ROBOTICS**

The Department of Bioengineering at Imperial College London is among the best in the world. We returned excellent results in the last three Research Assessment Exercises\*, making us the UK's leading Department of Bioengineering. Imperial itself was ranked ninth in the QS World Rankings in 2016.



\* In the 2001 and 2008 Research Assessment Exercise 75% and in the 2014 Research Excellence Framework 95% of Department's research was judged as world leading or internationally excellent.

Housed in newly refurbished purpose-built space within the historic Royal School of Mines and its adjacent Bessemer buildings, our Department boasts state-of-the-art laboratories, from 'wet labs' for cell culture, chemistry, histology, flow studies, biosensors and electrophysiology to 'dry labs' for modelling, 3D printing, electronics and imaging. The space has been designed to promote greater interaction among researchers, exactly what is needed for the interdisciplinary field that is modern bioengineering.

## WHAT WE DO

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Our academic staff have a wide range of research interests that fall under six themes:

- Biomechanics and mechanobiology
- Molecular and cellular bioengineering
- Detection, devices and design
- Implants and regenerative medicine
- Neural engineering
- Human and biological robotics

est. **1991**

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The MSc in Biomedical Engineering was first established at Imperial in 1991. The pioneering course has continued to evolve with the discipline over the last twenty years.

## STUDYING WITH US

The Department offers a number of postgraduate study and research options. Including taught MSc programmes, research or innovation focussed MRes programmes or PhD programmes. We offer:

Two MSc programmes:

- MSc Biomedical Engineering
- MSc Human and Biological Robotics

Two MRes programmes:

- MRes Bioengineering
- MRes Medical Device Design and Entrepreneurship

Our PhD programme covers a range of bioengineering research areas, MD(Res) programme for clinicians interested in doing bioengineering research and a CDT in Neurotechnology which combines a one year MRes with three year PhD.

- PhD in Bioengineering
- MD(Res) in Bioengineering
- CDT in Neurotechnology for Life and Health

### The Biomedical Engineering MSc course at Imperial trains students in the breadth and depth of Biomedical Engineering.

The course offers four stream options to allow students to delve deeper into their biomedical engineering-related areas of interest.

- **Biomechanics & Mechanobiology**
- **Neurotechnology**
- **Medical Physics & Imaging**
- **Biomaterials & Tissue Engineering**

These stream options allow specialisation for those students who want to develop their expertise in a particular growth area.

Through excellent education and training in biomedical engineering, in a world-class institution with world-leading academics, the course provides students with a solid basis for a career in bioengineering.

**“A strong engineering foundation is at the core of all of our taught courses in the Department. The MSc programme combines this firm basis with the opportunity to develop skills in a specialist area of biomedical engineering.”**

**Dr Darryl Overby**  
Director of Postgraduate  
(Taught) Studies

RESEARCH  
PROJECT

SPECIALIST  
STREAM

BIOMECHANICS & MECHANOBIOLOGY | NEUROTECHNOLOGY |  
MEDICAL PHYSICS & IMAGING | BIOMATERIALS & TISSUE ENGINEERING

CORE BIOMEDICAL ENGINEERING  
KNOWLEDGE & SKILLS



# 2.1

Upper second class honours degree or equivalent in a degree based on physical science, mathematics or engineering

## ENTRY REQUIREMENTS

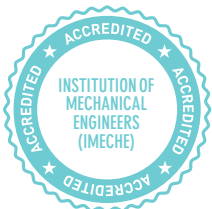
Engineers use physical principles to understand the problems that face them. Biomedical engineers use engineering skills to solve biological and medical problems. Students must demonstrate excellence in engineering or physical science disciplines before entering the course to ensure they have the aptitude to develop their engineering skills for healthcare applications.

The minimum requirement for entry is an Upper Second Class Honours Degree or equivalent in a degree based on physical science, mathematics or engineering. For GPA based degree qualifications the GPA requirement for the MSc is related to the ranking of the Institution. For further information please contact the admissions tutor.

## ACCREDITATION

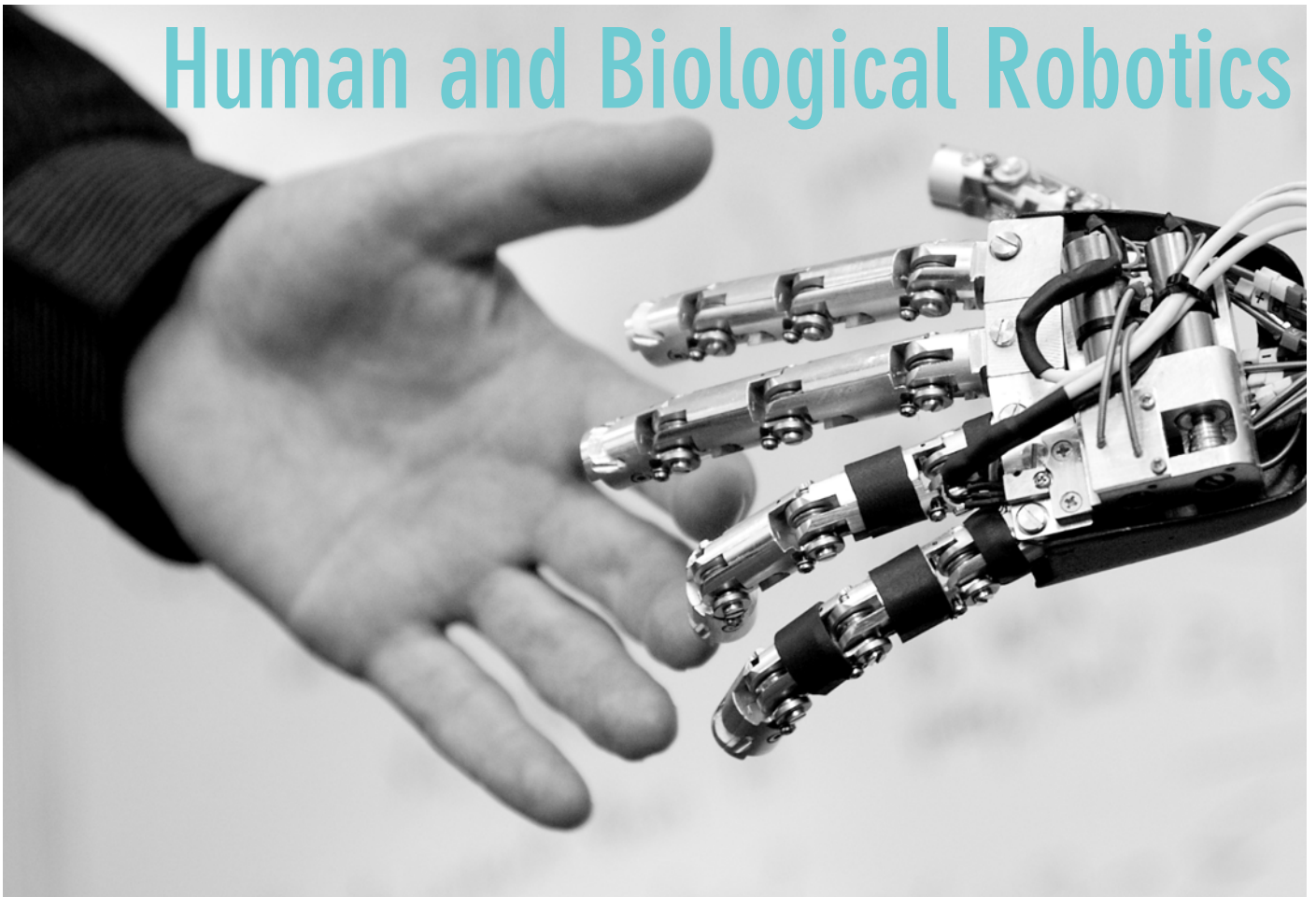
Graduates from our course have a deep understanding of fundamental engineering principles, with extensive training in complex quantitative methods for analysis and design. The course provides the opportunity to study biomedical engineering in greater detail while exploring how the discipline offers further insights into medicine now as well as the vital role engineering will play in driving future innovations.

The Institution of Engineering and Technology, Institution of Mechanical Engineers, Institute of Materials, Minerals and Mining and the Institute of Physics and Engineering in Medicine have all accredited the MSc course.





# Human and Biological Robotics



## STUDYING WITH US

Students of the MSc Human and Biological Robotics programme will have a unique focus on engineering methods which investigate human and animal sensing and sensorimotor control, and on the design of biomimetic systems and assistive devices for humans. It is a wide-ranging programme covering robotics for humans and society, service and social robotics, rehabilitation technology, as well as related machine vision, artificial intelligence and machine learning.

## PROGRAMME STRUCTURE

The programme is structured to ensure students develop their engineering skills, enhance their creativity and boost their entrepreneurial skills. Core modules provide a firm grounding in critical topics, and a choice of elective modules means students have the opportunity to explore areas of interest in more depth. Additionally, all students complete an individual research project which enables further specialisation.

## ENTRY REQUIREMENTS

Bioengineers use engineering skills to solve biological and medical problems. It is therefore essential that applicants can demonstrate excellence in engineering or physical science disciplines before entering the programme, to ensure they have the aptitude required to succeed. The minimum requirement for entry is an Upper Second Class Honours degree in engineering, physical science or mathematics, which must have included an element of mathematics. Additionally, applicants should have a Grade A in A-level Mathematics or equivalent. The Department also accepts a range of international qualifications. Please see our website for more details.

est.

# 2016

The MSc Human and Biological Robotics was established in 2016, and builds upon the unique strengths of the Department of Bioengineering and the wider College in this new field.

## INTERDISCIPLINARY COLLABORATION

The programme benefits from links with the Imperial Robotics Forum, which groups together robotics researchers at Imperial doing multidisciplinary research at the cutting edge of several disciplines. The programme is taught in the Department by Bioengineering, with additional input from Departments across the Faculty of Engineering.

## CAREERS

Graduates of this programme will have a deep understanding of robotics engineering, along with skills in entrepreneurship and interdisciplinary collaboration. Graduates will be well-placed for careers in academia and research, design and production of medical or assistive devices, and technical or commercial consulting.

# MRes PROGRAMMES

## MRes Medical Device Design and Entrepreneurship

The MRes in Medical Device Design and Entrepreneurship was the first programme of its kind in the UK, providing education and training that combines biomedical engineering with the entrepreneurial skills necessary to take medical devices to market.

The course aims to:

- produce postgraduates with a sound understanding and knowledge of the intricate and unique field of medical device development, from concept to business planning and market emergence
- provide management and communication skills training, including problem definition, project design, decision processes, teamwork, written and oral reports, proposals and publications
- develop research and analytical skills related to bioengineering using a multidisciplinary approach
- develop oral and written scientific and business presentation skills
- provide a solid foundation for those intending to go into industry or on to study for a PhD

**"I highly recommend this course due to the sheer amount of knowledge that you are able to gain from both the research and business perspectives of medical devices. It's been a busy year filled with work but the reward of a unique and valuable degree has made it completely worth it. The course leader, Professor Moore, was extremely supportive throughout the degree and it was a pleasure to have him as a supervisor."**

Paolo Angeles MEng

MRes Medical Device Design and Entrepreneurship graduate

## MRes Bioengineering

The MRes in Bioengineering prepares students for research careers in Bioengineering while aiming to:

- produce postgraduates equipped to pursue careers at the interface between the physical, biological and medical sciences in academia, industry, the public sector and non-governmental organisations
- develop the ability to undertake research in multidisciplinary teams at this interface
- develop research and analytical skills related to bioengineering
- develop oral and written scientific presentation skills
- provide an experience that is intellectually stimulating, enjoyable and meets students' needs
- provide a solid foundation for those intending to go on to study for a PhD

The course involves lectures and practical work in the first term, followed by full-time work on a research project. A variety of seminars and workshops are provided to deepen and broaden students' research skillbase. The course will prepares students to analyse and solve problems in bioengineering using an integrated, multidisciplinary approach.

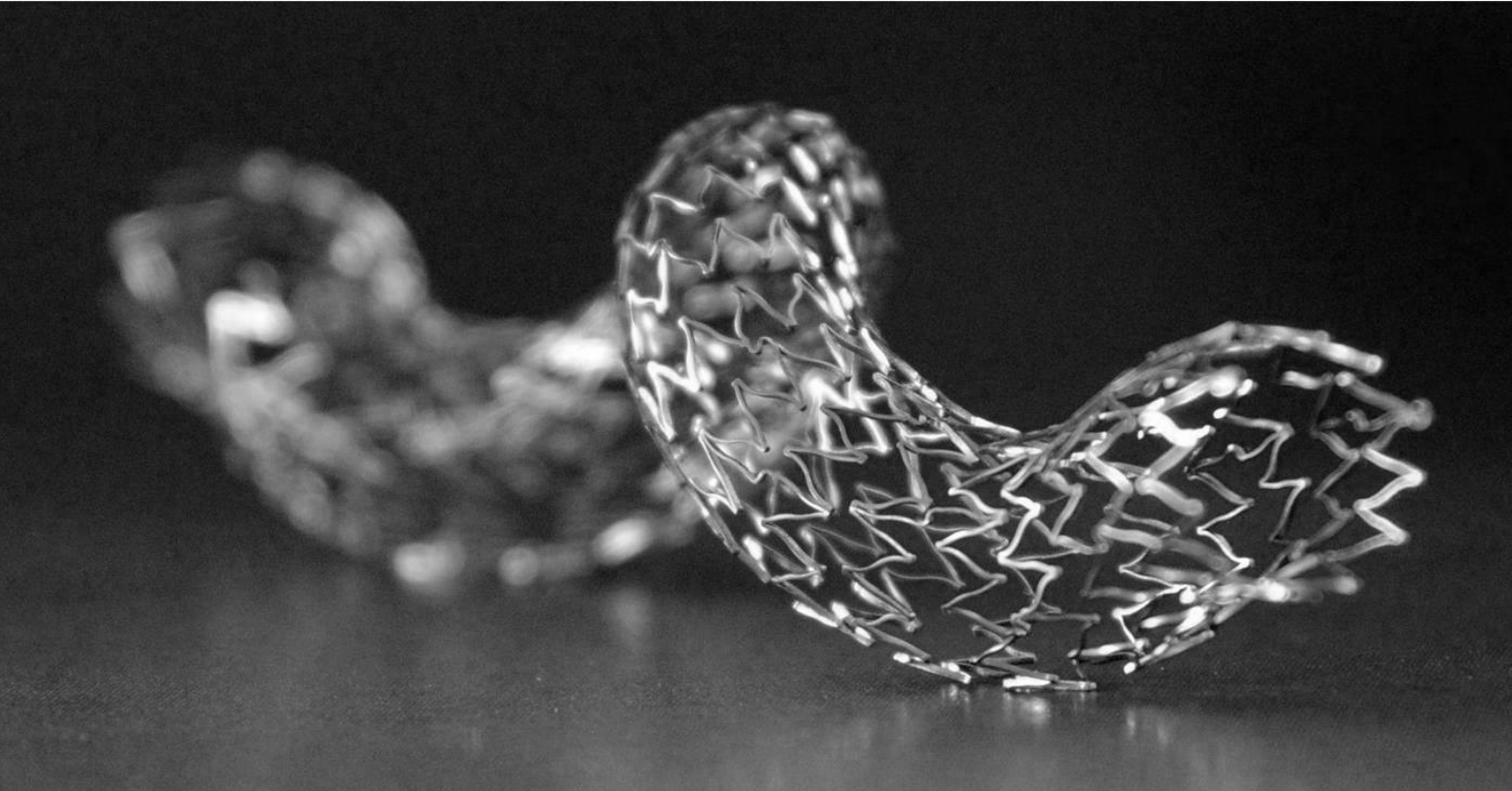
### How to apply

Before making an application, you need to contact potential research project supervisors to ensure that there is a suitable project available for you. Visit the MRes Projects page on the website for details of projects available for the upcoming year. Once you've found a suitable project and supervisor, you should then apply via Imperial College's online application system.

<http://www3.imperial.ac.uk/bioengineering/courses/mres/projects>







## PhD PROGRAMMES

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The Department provides a highly stimulating environment for student research and our PhD programme attracts outstanding students from a variety of academic backgrounds. Research in the Department covers a variety of areas and involves collaborations with several departments at Imperial, as well as leading national and international research institutions. Core research areas include biomechanics and mechanobiology, detection, devices & design, molecular and cellular bioengineering, implants and regenerative medicine, human and biological robotics, and neural engineering.

Our PhD students are encouraged to interact with researchers working in different areas and are commonly co-supervised by academics from other departments. Such interdisciplinary training fosters the intellectual capabilities and practical skills needed to cooperate with engineers and scientists from a variety of academic backgrounds.

### Entry Requirements

Graduates with a degree in engineering, any of the physical sciences, mathematics, biological sciences, physiology or medicine may be accepted for a PhD. We will normally only accept applicants with a good 2:1 or 1st class degree from a UK university, or non-UK equivalent.

[For further information on how to apply which go to our website](#)

## CDT PROGRAMMES

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The Centre for Neurotechnology at Imperial College London hosts the EPSRC Centre for Doctoral Training (CDT) in Neurotechnology for Life and Health, which offers a unique training programme, created by Imperial College in collaboration with partners in industry and the charity sector. Working in multidisciplinary teams, CDT students undertake 4 years of training which allows them to develop and harness new technologies for understanding and treating brain disorders.

The Department also has students from the Medical Imaging CDT co-run with Kings College London and the CDT in Fluid Dynamics across Scales, led by the Aeronautics Department at Imperial.

over **150**

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PhD students form an integral part of the Department's research life and numbers have risen from 12 in 2001 to over 150 PhD and MD(Res) students in 2016.

### Funding

Funding for PhDs varies the CDT programmes are supported by the EPSRC and industry partners, whereas other PhD programmes can be supported by research councils, charities, industry or other sources.

[For further information on how to obtain funding go to our website](#)





## CAREERS

The multidisciplinary nature, world-class research and enterprising environment of the Department of Bioengineering at Imperial prepares graduates for a range of professions, including academia, medtech industry, consultancy and finance.

Students develop a range of skills alongside building their academic knowledge of bioengineering. Bespoke careers support is available through the Department alongside a number of careers talks and events throughout the academic year.

Our graduates have gone into a range of careers such as in global medical technology companies like GE Medical, Siemens Healthcare, GSK, St Jude Medical and Phillips, and global healthcare consultancy firms like SG2 and PA Consulting. Others have begun their research careers by studying for a PhD in biomedical engineering or postdoctoral research positions all over the world.

## CONTACT US

For further details on the course or to apply, please contact:

Student Administrator, Department of Bioengineering  
Imperial College London, London, SW7 2AZ, UK

e: [be.mscadmissions@imperial.ac.uk](mailto:be.mscadmissions@imperial.ac.uk) (MSc)

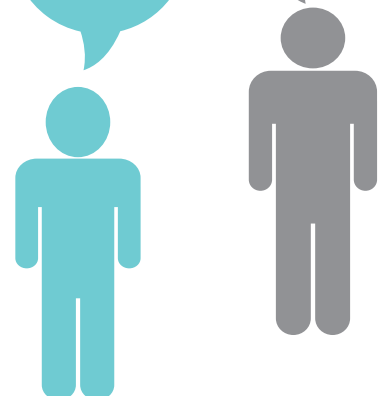
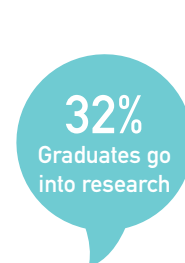
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<http://www3.imperial.ac.uk/careers/resources/destinations/postgraduates/bioengineering>