



Queen Mary
University of London

School of Engineering and Materials Science Postgraduate Study 2018

**RUSSELL
GROUP**


sems.qmul.ac.uk

Both staff and students take part in world-leading research across all of the School's laboratories



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The Queens' Building, Mile End, has a proud association with not one, but four queens: Queen Victoria; Queen Mary (wife of King George V); Queen Elizabeth The Queen Mother; and our Patron, Queen Elizabeth II

QMUL highlights

- 9th in the UK among multi-faculty universities (Research Excellence Framework 2014)
- 162 nationalities among students and staff making us one of the world's most diverse universities (December 2016)
- Brand new £39m Graduate Centre with dedicated space for postgraduates
- £137m research income (2015/16)
- More than 550 masters students benefited from scholarships in 2016/17
- 130 years of education, support and success in the capital (est. 1887)
- One of the largest residential campuses in London at Mile End
- Member of the Russell Group of leading UK universities.

Welcome to Queen Mary University of London (QMUL)

Queen Mary has been at home in the East End since 1887. Starting out as a Victorian ideal, our founders aspired to create a place where everyone would have access to the same opportunities in education, recreation and culture – regardless of background.

We've continued to grow throughout our 130 years, opening centres across the city and bringing students and staff together to study from all over the world. One of the first colleges to provide higher education to women, Westfield College, joined us in 1989, and the internationally distinguished medical colleges of St Bartholomew's and the Royal London Hospitals combined to form our own medical school in 1995.

Today, we are one of the UK's top research universities and our postgraduate programmes offer a chance to explore subjects as diverse as the world in which we live. We would love for you to become a part of our story.

Come and share our knowledge

We know our postgraduate students are passionate about their subjects. In the tradition of our early expansion, we've continued to develop degrees across our world-leading expertise, from humanities and social sciences to medicine, dentistry, science, and engineering. Our programmes are directly informed by our academics' latest research. As professionals, they work side-by-side with industry, government, business,

communities and charities. In doing so, they understand the demands of modern-day society and can, in turn, share their insights with you.

Become a part of the capital

We retain close links with our local communities across London and remain dedicated to public good. We are an intrinsic part of east London, and have five campuses across the capital. Set beside the beautiful and historic Regent's Canal, our main site at Mile End is one of the largest residential campuses in the city and is home to our new £39m Graduate Centre. With the City of London to our west, the Queen Elizabeth II Olympic Park to our east, Canary Wharf and Docklands to our south and beautiful Victoria Park to our north, you'll be in the perfect position to explore the capital.

Meet us – in person or online

Our Postgraduate Open Evenings offer you the chance to explore our campus and meet our tutors and students. If you can't visit in person, don't worry; we also run Postgraduate Virtual Open Days online. We also have representatives in 51 countries and staff who regularly travel overseas. For more information and a list of open events, see page 46 or qmul.ac.uk/postgraduate/meet-us

Join Queen Mary and become a part of our story

Love London

Immerse yourself in a capital city

Explore your passion

Work side-by-side with top academics

Join a global community

Meet people from across the world

Empower others

Contribute to society

Advance your career

Stand out in a competitive jobs market



View from our Mile End campus

Why choose us?

Welcome to the School of Engineering and Materials Science (SEMS). We have a distinguished tradition in both teaching and research dating back to the beginning of the 1900s.

Today, we continue to push the boundaries of engineering and materials science, and are committed to internationally competitive research. The School brings together specialisms in:

- bioengineering and biomaterials
- materials science
- engineering science.

This combination creates robust degrees and will enable you to benefit from shared facilities and teaching staff, along with our research strengths.

We are proud of the quality of our research. In the latest measure of UK research quality (Research Excellence Framework 2014), 91 per cent of our general engineering research was rated as either 'world-leading' (4*) or 'internationally excellent' (3*). This means that we rank seventh out of the 62 institutions that conduct research in this area, and we are fourth in the UK for the quality of our research outputs.

Research that changes society

Our researchers have played a key role in recent breakthroughs across engineering and materials, including:

- the development of silk-based materials for cartilage and meniscal repair
- the development of new computational modelling techniques for the investigation of effective jet noise sources
- the design of the world's first solar-powered helicopter.

Our academics also publish in leading journals – including *Nature*, *Science* and *Proceedings of the National Academy of Sciences (PNAS)* – write books, lead international conferences and comment in the media.

Our ground-breaking research informs our teaching by inspiring the content of our modules and the subject areas of our students' research projects.

Your place with us

As a postgraduate student in the School, you will learn about the very latest developments in your field. You will also benefit from our specialist degrees, which are designed to equip you with the knowledge and skills you will need to pursue a career in industry or research after you graduate.

Student using equipment in our newly developed Human Performance Lab. The lab can support projects in the biomechanics area, which is of particular interest to biomedical engineering students.



Why choose us?

Our student community

We organise a varied events programme and will encourage you to take part. This includes regular research seminars from QMUL and visits from external academics in order to offer you the chance to hear about the latest research taking place in the School and at other institutions.

Dedicated space for postgraduates

QMUL's new Graduate Centre opened in early 2017, and provides excellent teaching and learning space for all postgraduate students, including a 200-seat lecture theatre, study spaces, seminar rooms, an open-plan group study area and a café. The seven-storey building also provides work areas and social spaces tailored specifically to the needs and working patterns of postgraduates.

Shaping your own research

All of our postgraduate students undertake a research project or dissertation. You will organise your own research, define your project title, and compare and appraise the viability of your project, all with the guidance of your supervisor. Most projects will include computational and/or experimental elements and will be linked to a research group.

Due to the multidisciplinary nature of the School, you will be able to undertake projects that encompass a wide area of engineering and materials. You will learn how to plan a research project and develop a range of other skills that are essential in any career as an engineer within an industrial or academic environment.

How our programmes are structured and assessed

All of our MSc programmes are made up of eight taught modules and one research project, while the MRes includes five taught modules and a more advanced research project. The modules are taught between September and April, and exams take place in May.

You can start your research project at any point after September, but will spend most of the following summer working in the appropriate lab on your research. The MSc programmes are assessed by coursework and formal exams.

Engineering conversion MSc programmes

Our engineering conversion programmes have been developed to address the demand for engineers, with a view to encouraging science and maths graduates to consider the subject. During the first term, you will take the compulsory 'Engineering Methods' module, which exposes you to essential engineering techniques and philosophy.

You can see detailed structures of each programme at: sems.qmul.ac.uk/pgadmissions

A portrait of Professor Wen Wang, a middle-aged man with short dark hair and glasses, wearing a dark pinstripe suit, a light blue striped shirt, and a dark blue patterned tie. He is standing in front of a stone building with large columns.

School highlights

- A reputation for excellence in advanced functional materials, biomaterials, experimental and computational aerospace, and mechanical engineering and bioengineering
- Research findings incorporated into our teaching
- We develop new technologies that have a lasting effect on society
- Exceptional laboratory facilities
- Links to industry
- Nanotechnology research supported by the facilities and expertise of Nanoforce, a company directly associated with the School.

“The School benefits from a wide range of excellent facilities and resources – recently updated with a £30m investment – which you will be able to use when you undertake your research project”

Professor Wen Wang, Head of School

Careers and alumni

Our graduates work in research, development and consultancy positions within the engineering and materials industries for companies such as BAE Systems, Atkins and JRI Orthopaedics. Many graduates apply their degree knowledge directly, working as engineers and/or scientists in sectors relevant to those they have studied.

Some graduates use their MSc to secure positions within the wider fields of mechanical and general engineering. Others work in areas beyond those directly related to their degree, including regulatory bodies, teaching, finance and the NHS. The range of skills developed through our programmes, coupled with opportunities for extracurricular activities and work experience, has enabled our graduates to move into careers across many successful companies both in the UK and worldwide.

A significant proportion of our graduates also go on to undertake PhDs in engineering and materials science.

Links to industry

We have strong links with many industrial partners in terms of both research collaboration and funding. We host a bi-annual engineering Industrial Liaison Forum with potential employers, industry representatives and alumni working in industry. These strong industrial links, combined with the skills and training you will acquire during your studies, are highly valued by potential employers.

Professional accreditation

Our MSc programmes are continually developed and updated to ensure that they are relevant to industry, and are accredited by the relevant professional bodies. This accreditation serves as a mark of quality that enhances your career prospects. It can also form the major component of an application for Chartered Engineer status.

The Institution of Mechanical Engineers (IMEchE) accredits:

- Sustainable Energy Systems MSc
- Biomedical Engineering MSc
- Aerospace Engineering MSc
- Computer Aided Engineering MSc

The Institute of Materials, Minerals and Mining (IOM3) has previously accredited*:

- Materials Research MRes
- Materials Research MSc
- Biomaterials MSc

The Royal Aeronautical Society (RAeS) has previously accredited*:

- Aerospace Engineering MSc.

**Reaccreditation, a normal process for accreditation agreements, is pending for these MSc programmes starting in 2018. Please check our website for further information.*



“Industrial partnership is a core part of our activities. We have an industrial advisory board who number more than 40 members from companies such as Airbus, BAE Systems, Jaguar Land Rover, Rolls-Royce, Ford, Schlumberger, GSK and DePuy. They deliver guest lectures, support projects, and provide work experience and graduate employment opportunities”

**Professor James Busfield,
Professor of Materials**

Careers and alumni

Careers support

SEMS has a dedicated Senior Careers Consultant who works directly with students through individual coaching sessions and the Engineering Employability Workshop programme.

A bespoke induction lecture is held exclusively for masters students showing them how to make the most of their year at QMUL and how to maximise their success with future employers or through further study.

QMUL's Careers team will also work with you to support your career planning and to connect you to employers through their fairs and events. Services include:

- one-to-one appointments to help with career direction, to review your skills and experience to-date, to give advice on job applications, to offer insight into the job market and to give mock interview preparation
- tailored workshops for career preparation and job hunting
- employer-led events focusing on sectors relevant to your knowledge or area of interest
- recruitment support for internships, part-time jobs and work placements.

Enterprise support

Many students and graduates across Queen Mary start new or grow existing business and social ventures each year. QMUL's Enterprise team can help you with support through:

- funding
- one-to-one advice and workshops
- workspace
- access to experts and entrepreneurial networks.

Visit: careers.qmul.ac.uk

Alumni profile: Theresa Wegert



Studied: Advanced Mechanical Engineering MSc 2016


Currently: Graduate Trainee, Jaguar Land Rover Ltd

What did you enjoy about your time at QMUL?

I enjoyed the fact that the other students came from so many different countries and backgrounds. The small courses allowed a relatively close relationship to our lecturers. Also, moving to London was a big step for me because I had never lived in a big city. I really enjoyed the variety of things you could do, whether that was a walk through Victoria Park or along the Thames, or going out in Shoreditch.

How has your degree from QMUL helped your current career?

Having a masters degree from Queen Mary meant I was considered by a lot more companies for jobs than with my bachelor's degree.

A photograph showing three male students in white lab coats and safety glasses working in a laboratory. The student in the foreground is using a handheld probe on a sample on a table. The student in the middle is writing in a notebook. The student in the background is looking at a computer monitor. The lab bench has various equipment, including a computer, a probe, and a sample holder. A recycling symbol is visible on a shelf in the background.

Students working in our materials characterisation laboratories

Our masters programmes

Advanced Mechanical Engineering MSc

One year full-time

qmul.ac.uk/msc-adv-mech-eng

This programme will teach you advanced skills in computational modelling, numerical and experimental techniques in one of the following areas of mechanical engineering: solid mechanics, robotics and automation, or thermofluids and combustion. At the end of the MSc, you will be able to perform design and analysis of mechanical engineering systems in your chosen area and develop novel computational and technology products for the mechanical engineering industries.

This MSc includes a substantial research project in advanced mechanical engineering, supervised by staff working in a wide range of research areas and working in our excellent facilities. These include high performance computing clusters owned by QMUL, a wide range of internal combustion engines, heat transfer facilities, wind tunnels, an anechoic chamber, a UK cueSim Flight Simulator, a France-Price Induction jet engine test bench, and materials synthesis and characterisation labs. Whenever possible and desired, we try to link up project students with one of our industrial partners. For example, last year, two of our students worked on a project in collaboration with Jaguar Land Rover.

The taught modules are all options, meaning that you have the choice to study modules that align with your background, your choice of specialisation area and your project topic.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Advanced Mechanical Engineering Research Project

Option modules

- Computational Engineering
- Materials Selection in Design
- Vehicular Crashworthiness
- Modelling and Control of Mechanical Systems
- Advanced Heat Transfer and Fluid Mechanics
- Renewable Energy Sources
- Numerical Optimisation in Engineering Design
- Composites
- Failure of Solids
- Aeroelasticity
- Computational Fluid Dynamics
- Robotics
- Manufacturing Processes
- Advanced Combustion in Reciprocating Engines
- Advanced Gas Turbines
- Advanced High Speed Aerodynamics
- Whole System Design in Sustainable Engineering
- Modelling and Control of Mechanical Systems
- Grad, Div and Curl: Vector Calculus for Engineering

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in a mechanically-based engineering subject.

Aerospace Engineering MSc

One year full-time

qmul.ac.uk/msc-aero-eng

Aerospace engineering has come a long way since the Wright brothers first achieved powered flight in 1903. The subject has evolved and diversified, ranging in topics from aerodynamics to flight control, and from space engineering to simulation and design. Engineers need to have the ability to operate and develop advanced devices based on complex theoretical and computational models. The aim of this programme is to allow those with a strong engineering background to develop advanced, yet broad, knowledge in aerospace engineering, while encouraging specialisation through a research project and flexibility in the programme.

The degree is designed to appeal to students with a science and engineering background. It includes modules such as 'Mechanics of Continua', where fluid dynamics and structural mechanics are studied in great depth, along with 'Research Methods and Experimental Techniques in Engineering', where novel experimental fields in aerodynamics and control are demonstrated. A further six specialised modules will enable you to achieve proficiency in highly advanced fields such as space engineering, flight control and simulation, aeroelasticity, computational fluid dynamics, advanced aerodynamics, combustion, computational mechanics and vehicular crashworthiness.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Aerospace Research Project

Option modules

- Advanced Flight Control and Simulation of Aerospace Vehicles
- Computational Engineering
- Mechanics of Continua
- Vehicular Crashworthiness
- Advanced Spacecraft Design: Manoeuvring and Orbital Mechanics
- Introduction to Law for Science and Engineering
- Computational Fluid Dynamics
- Aeroelasticity
- Robotics
- Advanced High Speed Aerodynamics
- Advanced Aircraft Design
- Grad, Div and Curl: Vector Calculus for Engineering

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in aerospace engineering or another mechanically based engineering subject. This MSc is suitable for students with a high 2:2 (or international equivalent) in a mechanically-based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering or physical sciences subjects.

Our masters programmes

Biomaterials MSc

One year full-time

qmul.ac.uk/msc-biomat

By the turn of the 21st century, there was an explosion in the development of new biomedical materials. This was enabled by the use of absorbable biomaterials for both the fabrication of scaffolds for the synthesis of tissue in vitro, and as implants to facilitate the regeneration of tissue in vivo (known as regenerative medicine). QMUL has led the field in biomaterials teaching and research for more than 20 years, and this programme is designed to provide a good level of understanding and an appreciation of the principles and applications of biomaterials and medical devices.

Biomaterials involves tailor-making materials for medical applications and examples include artificial skin, vascular and cardiovascular implants and devices, bone graft substitutes, new prosthetic devices, dental materials, biosensors, and controlled drug delivery. We focus on biocompatibility, ethical issues, nanomaterials, and materials science function in biological systems.

Technological advances, as well as methodological issues, have contributed to the transformation of biomaterials and their functions. The programme is therefore interdisciplinary in nature and involves a combination of theoretical and practical approaches from the following modules:

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Chemical and Biological Sensors
- Biomaterials Research Project

Option modules

- Nanotechnology and Nanomedicine
- Materials Selection in Design
- Advanced Structure-Property Relationships in Materials
- Advanced Tissue Engineering and Regenerative Medicine
- Introduction to Law for Science and Engineering
- Advanced Materials Characterization Techniques
- Science of Biocompatibility
- Tissue Mechanics
- Implant Design and Technology
- Foundations of Intellectual Property Law and Management
- Advanced Polymer Synthesis
- Advanced Biomaterials

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in materials science and engineering, biomaterials or physical sciences. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering subjects.

Biomedical Engineering MSc

One year full-time

qmul.ac.uk/msc-biomed-eng

Biomedical engineering is a rapidly developing field of engineering that relies on inter- and multidisciplinary approaches to research and development. Specialists in this area face problems that differ significantly from the more traditional branches of engineering. However, biomedical engineering also relies on methodologies and techniques developed in the more traditional engineering fields that are further developed and adapted to the particular specifications of biomedical applications.

This programme aims to prepare you with advanced skills in computational modelling and numerical techniques, while offering an in-depth understanding of engineering approaches to biological problems. You will graduate with the ability to develop novel computational and technological products for the biomedical industries. It is also designed to be flexible, enabling you to make module choices that will allow you to specialise in the area of biomedical engineering that interests you most.

You will acquire extensive knowledge in computational solid and fluid mechanics with a focus on biomedical applications such as biomechanics, bio-fluids and tissue engineering. You will also achieve in-depth understanding of the underlying theoretical issues and the technology developments in biomedical areas.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Biomedical Research Project
- Physiology for Medical Engineers
- Medical Ethics and Regulatory Affairs

Option modules

There are a wide range of option modules to choose from on this programme. For an up-to-date list, please visit: qmul.ac.uk/msc-biomed-eng

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in biomedical engineering or another mechanically-based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering or physical sciences subjects.

Our masters programmes

Biomedical Engineering with Biomaterials and Tissue Engineering MSc

One year full-time

qmul.ac.uk/msc-biomed-eng-bio

Biomedical engineering is a wide-ranging subject area and this MSc programme allows you to specialise in biomaterials and tissue engineering while developing valuable biomedical engineering skills and knowledge.

The MSc is designed to provide you with the skills to produce solutions to clinically relevant problems. These clinical solutions may be in the form of novel biomaterials or encompass tissue engineering strategies. You will study normal and disordered cell and tissue structure and function, biomechanics and biomaterials, alongside the engineering needed to provide the future of biomedical engineering. Any work in this field must be supported by the correct legal framework, and our modules provide this industry awareness.

Compulsory modules

- Physiology for Medical Engineers
- Medical Ethics and Regulatory Affairs
- Research Methods and Experimental Techniques in Engineering
- Biomedical Research Project
- Advanced Tissue Engineering and Regenerative Medicine
- Nanotechnology and Nanomedicine

Option modules

- Tissue Mechanics
- Mechanobiology
- Advanced Biomaterials
- Introduction to Law for Science and Engineering
- Materials Selection in Design
- Surgical Techniques and Safety

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in medical engineering or another mechanically-based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering or physical sciences subjects.



One of our students working in
the Human Performance Lab

Our masters programmes

Biomedical Engineering with Imaging and Instrumentation MSc

One year full-time

qmul.ac.uk/msc-biomed-eng-imag

This programme has been developed to meet the need within the biomedical engineering industry for graduates with specialist electronic skills and knowledge related to the medical field. As a graduate of this programme, you will be able to pursue a career either in the NHS, private research laboratories, or continue in education to a PhD.

The electrical safety requirements for medical equipment connected to patients are stringent and these aspects of design are thoroughly emphasised in the programme. This equipment is used in monitoring patients, life support and for surgical purposes. The human body produces signals which are crucial for clinicians to monitor and record in order to diagnose patients, and you will study how to process these signals by computer as well as learn the appropriate clinical techniques to measure them. These skills are relevant to the industry and a key part of our MSc.

This MSc is a joint programme delivered by the School of Engineering and Materials Science and the School of Electronic Engineering and Computer Science. You will be taught by well-recognised academics who have international standing in the latest imaging and instrumentation research. You will also benefit from access to excellent facilities and instrumentation while undertaking your research project.

Compulsory modules

- Medical Ethics and Regulatory Affairs
- Fundamentals of Digital Signal Processing
- Clinical Measurements
- Principles and Application of Medical Imaging
- Research Methods and Experimental Techniques in Engineering
- Biomedical Research Project
- Surgical Techniques and Safety

Option modules

- C++ for Image Processing
- Electronics
- Real-time and Critical Systems
- Principles and Applications of Bioelectricity
- Physiology for Medical Engineers

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in biomedical engineering or another mechanically based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering or physical sciences subjects.

Computer Aided Engineering MSc

One year full-time

qmul.ac.uk/msc-comp-aided-eng

Computer aided engineering (CAE) is one of the strongest growing fields within engineering. Today, computer simulations of engineering systems underpin all engineering design and analysis. This MSc will enhance your career prospects by providing you with a solid background in computational and numerical methods, such as finite element methods in structures or computational fluid dynamics (CFD). You will be introduced to programming and algorithms at a suitable level for engineers.

A distinctive feature of this MSc is a module on numerical optimisation, an area of strong industrial interest as demonstrated by the many industrial research projects in this field at the School. In numerical optimisation, computer algorithms systematically explore the full range of possible design variations to produce innovative and ground-breaking designs.

You will specialise in an engineering discipline chosen from aeronautical, mechanical, biomedical or sustainable energy engineering, and will follow advanced modules in that specialisation. The numerical analytical skills you have developed are then applied to engineering problems in your final project.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Computational Engineering
- Computational Fluid Dynamics

- Numerical Optimisation in Engineering Design
- Research Project in Computational Aided Engineering

Option modules

- Mechanics of Continua
- Topics in Scientific Computing
- Computer Aided Engineering for Solids and Fluids
- Advanced Flight Control and Simulation of Aerospace Vehicles
- Advanced Environmental Engineering
- Biomedical Engineering in Urology
- Advanced Heat Transfer and Fluid Mechanics
- Renewable Energy Sources
- Advanced High Speed Aerodynamics
- Aeroelasticity
- Topics in Scientific Computing (Programming and Algorithms)
- Robotics
- Advanced Combustion in Reciprocating Engines
- Advanced Gas Turbines
- Vehicular Crashworthiness

Entry requirements

This MSc is suitable for students with a high 2:2 (or international equivalent) in a mechanically-based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering, computer sciences or physical sciences subjects, but we will look closely at your grades in maths and physics-related modules.

Our masters programmes

Dental Materials MSc

One year full-time

qmul.ac.uk/msc-dental-materials

This programme is taught jointly by QMUL's Barts and The London School of Medicine and Dentistry and the School of Engineering and Materials Science. We aim to integrate the resources available in both schools to offer students a well-rounded experience of the available opportunities in the field of dental materials.

This MSc is designed to develop a significantly broad knowledge of the principles underlying the mechanical, physical and chemical properties of dental materials. You will also study the structural properties of materials at both micro and macro levels. A special emphasis is placed on materials and their structure/function relationships in the context of both clinical and non-clinical aspects. The theoretical modules are reinforced by the practical research experience that can take place in both schools.

You will explore the necessary tools and principles of dental materials used in clinical dentistry, and will cover the underlying principles of bioactivity and biocompatibility. Taught modules are complemented by research projects that are based on both the programme curriculum and your research interests.

This degree is aimed at dental surgeons, materials scientists and engineers wishing to work in the dental support industries, as well as the materials health sector generally. On completion of the programme, you will have a good knowledge of topics related to dental materials and will be competent in justifying selection criteria and manipulation instructions for all classes of materials relevant to the practice of dentistry.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Surfaces and Interfaces in Dental Materials
- Science of Biocompatibility
- Medical Ethics and Regulatory Affairs
- Properties of Dental Materials I
- Properties of Dental Materials/ Processing Methods II
- Introduction to Oral Biology
- Biomineralisation and Biomimetics
- Materials Research Project

Entry requirements

This MSc is suitable for students with an upper second-class honours degree (or international equivalent) in dentistry. We will also consider applicants with a 2:1 (or international equivalent) in a materials science or medical engineering subject.



Strong links with QMUL's Institute of Dentistry ensure that our Dental Materials MSc programme is clinically relevant as well as technologically up-to-date

Our masters programmes

Materials Research MSc/MRes

One year full-time

qmul.ac.uk/msc-mat-res

qmul.ac.uk/mres-mat-res

A number of challenges lie ahead as manufacturing supply chains become global, involving companies in strategic alliances and partnerships. Materials research is of great use because competition can only be achieved through the development of innovative approaches to the design, development and manufacture of novel materials and their characterisation.

Technological advances, as well as methodological issues, have contributed to the transformation of materials and their functions. They provide an insight into areas of manufacturing, planning and control systems, knowledge-based systems, and measurements and manufacturing systems.

Both the MSc and MRes programmes provide rigorous training in both theoretical and applied research for those who wish to pursue a career as a professional materials scientist. The design of the research masters (MRes) programme is based on guidelines provided by the Engineering and Physical Sciences Research Council (EPSRC). The programme will provide you with the foundations for a research career in industry, the service sector, public sector or academia, or as an enhanced route to a PhD through further research.

The research project is substantial and undertaken alongside taught modules throughout the academic year. It will be based within one of our materials research groups.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Advanced Structure-Property Relationships in Materials
- Advanced Materials Characterization Techniques
- Materials Research Project

Option modules

- Materials Selection in Design
- Nanotechnology and Nanomedicine
- Environmental Properties of Materials
- Polymer Physics
- Ceramics
- Introduction to Law for Science and Engineering
- Failure of Solids
- Composites
- Manufacturing Processes
- Chemical and Biological Sensors
- Advanced Polymer Synthesis
- Foundations of Intellectual Property Law and Management

Entry requirements

The MSc and MRes programmes are suitable for students with a minimum of a high 2:2 (or international equivalent) in materials science and engineering or physical sciences.



“There is a wide range of facilities in our School and, along with my project and lectures, they’ve enabled me to design my own materials and experiments. It’s great to be a student in London, and the gym (Qmotion) and the Students’ Union events are really enjoyable too”

Xiyao Liu, Materials Research MSc 2017

Our masters programmes

Polymer Science and Nanotechnology MSc

One year full-time

qmul.ac.uk/msc-poly-sci-nano

Polymer Science and Nanotechnology (PSnT) are rapidly growing fields in advanced materials and engineering. New techniques to produce nanometer-sized particles and new functional polymers are being discovered every day. There is a huge need from companies for well-trained engineers or scientists with a good knowledge of polymer science and nanotechnology. Taking both this and the direction of the leading scientific achievements into account, we have designed our Polymer Science and Nanotechnology MSc.

Polymers are unique materials used in composites, biomaterials and electronics. Our research groups have been developing new synthetic strategies to invent advanced materials. The programme therefore draws on this research strength and focuses on polymers synthesis and polymer composites, and concludes with an independent research project relating to these areas.

Our modules prepare you for an independent research project while also increasing your knowledge of the structure and behaviours of different polymer materials. Using our excellent facilities, you will learn how to decide the most suitable materials for the design of different products, taking into consideration their environmental impact. As well as emphasising the various types of materials processes that are currently used in the field, we will introduce you to the latest, innovative techniques that are still in development.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Polymer Science Research Project
- Advanced Polymer Synthesis
- Advanced Materials Characterization Techniques
- Advanced Structure-Property Relationships in Materials

Option modules

- Polymer Physics
- Composites
- Manufacturing Processes
- Environmental Properties of Materials
- Introduction to Law for Science and Engineering
- Foundations of Intellectual Property Law and Management

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in materials science or chemistry. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering subjects.

Visit: becergroup.com and nanoforce.co.uk to find out more about our research activities.

Our fully equipped Polymer Chemistry Laboratory is used to prepare molecularly designed polymers for various nanotechnological applications



Our masters programmes

Regenerative Medicine MSc

One year full-time

qmul.ac.uk/msc-regenerative-medicine

Regenerative medicine is a rapidly growing area of biomedical research that encompasses stem cell biology, tissue engineering, drug delivery, and nanotechnology. This MSc, delivered together with QMUL's Barts and The London School of Medicine and Dentistry, aims to provide the next generation of scientists and medical professionals with the skills and knowledge required for successful careers in this field.

Compulsory modules

- Cellular and Molecular Basis of Regeneration
- Stem Cell and Developmental Biology
- Tissue Engineering
- Research Skills and Methodology
- Biomaterials in Regenerative Medicine
- Tissue-Specific Stem Cells
- Induced Pluripotent Stem Cells and Genome Engineering
- Medical Ethics and Regulatory Affairs
- Research Project in Regenerative Medicine

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) related to biological science, medicine, or a physical science.

Contact

Dr John Connelly

Email: j.connelly@qmul.ac.uk

Our Regenerative Medicine MSc programme is taught jointly with QMUL's internationally respected Barts and The London School of Medicine and Dentistry



Our masters programmes

Sustainable Energy Systems MSc **One year full-time**

qmul.ac.uk/msc-sus-energy-sys

Renewable energy is of great significance to the future of our planet. Given the environmental issues related to the ways we generate most of our energy and the central place that energy occupies in our society, careful choices need to be made in order to avoid an environmental disaster, severe energy shortages and social chaos. These choices are not simple; making such decisions should consider the implications of our energy choices as well as their economic, environmental, technical and political aspects. Policymakers need to compare relative costs, benefits and impacts for all possible technologies.

The programme's structure is designed to appeal to students with engineering or science backgrounds. It contains a total of eight taught modules, as well as a research project, which is prepared over the first two semesters and carried out over the third (summer) semester.

For your research project, you will have the option to choose one of our renowned sustainable energy academics as your project supervisor, and work closely under their supervision on a wide range of technologies. These range from renewable energy generation (solar, wind, geothermal, wave) to energy storage (electrical, chemical, thermal), energy economics and politics and the environmental aspects of sustainable energy technologies.

Compulsory modules

- Research Methods and Experimental Techniques in Engineering
- Research Project in Sustainable Energy

Option modules

- Grad, Div, Curl: Vector Calculus for Engineering
- Renewable Energy Sources
- Advanced Heat Transfer and Fluid Mechanics
- Computational Engineering
- Advanced Environmental Engineering
- Energy Economics and Management of Sustainable Energy
- Advanced Combustion in Reciprocating Engines
- Advanced Gas Turbines
- Computational Fluid Dynamics
- Energy Storage Engineering
- Introduction to Solar Energy

Entry requirements

This MSc is suitable for students with a minimum of a high 2:2 (or international equivalent) in a mechanically based engineering subject. We will also consider applicants with a high 2:2 (or international equivalent) in other engineering or physical sciences subjects.



“Postgraduate students have played a major role in what I have achieved to date and there is no way I would have done this without them. They move on to secure important jobs either in academia or industry, but remain part of the QMUL family”

**Professor Madga Titrici,
Professor in Sustainable Materials Chemistry**

Our conversion programmes

Biomedical Engineering (Conversion) MSc

One year full-time

qmul.ac.uk/msc-biomed-eng-conv

As people live longer, there is an increasing demand for specialists in biomedical engineering. As a field, it relies on multidisciplinary approaches to research and development in order to address biological and medical problems. Specialists in this area are trained to face scientific and technological challenges that differ significantly from those relating to more traditional branches of engineering. Biomedical engineering makes use of more traditional engineering methodologies and techniques, which are adapted and further developed to meet the specifications of biomedical applications.

This programme is aimed at students who already have a science background and aims to turn them into engineers with unique expertise in the fundamentals of biomedical engineering, as well as a specialisation in imaging and instrumentation, tissue engineering and biomaterials, or biofluids.

You will undertake a 60-credit research project using our research expertise and innovative facilities. Several high-performance computing clusters owned by QMUL support a full spectrum of computational research. Our well-equipped laboratories include a wide range of tissue engineering, human performance, mechanical testing, and materials synthesis and characterisation labs.

Compulsory modules

- Medical Ethics and Regulatory Affairs
- Engineering Methods
- Essential Mathematics Skills for Engineers
- Biomedical Research Project

Option modules

- Principles and Applications of Medical Imaging
- Advanced Biomaterials
- Biofluids and Solute Transport
- Mechanobiology
- Tissue Mechanics
- Principles and Applications of Bioelectricity
- Clinical Measurements
- Physiology for Medical Engineers
- Biomedical Engineering in Urology
- Advanced Tissue Engineering and Regenerative Medicine
- Nanotechnology and Nanomedicine
- Surgical Techniques and Safety
- Engineering Instrumentation
- Grad, Div and Curl: Vector Calculus for Engineering
- Computer Aided Engineering for Solids and Fluids
- Materials Selection in Design
- Electronics
- Computational Fluid Dynamics

Entry requirements

This MSc is suitable for students with a 2:1 bachelor's degree (or international equivalent) in a science subject (eg biology, mathematics, chemistry, physics).

The Cell and Tissue Engineering Suite includes a separate stem cell laboratory funded by a Wolfson grant



Our conversion programmes

Mechanical Engineering (Conversion) MSc

One year full-time

qmul.ac.uk/msc-mech-eng

Mechanical engineering is the application of physical science to practical problem solving. As a mechanical engineer, you could work on anything from a simple component, such as a switch, to more complex machines like an internal combustion engine, or an entire system, such as an automobile or a factory production line.

Depending on your background, you will take three conversion modules (marked*). You will then have the choice to specialise in one of the main areas of solid mechanics, robotics and automation, and thermofluids and combustion.

You will undertake a 60-credit research project using our research expertise and innovative facilities. Several high performance computing clusters owned by QMUL support a full spectrum of computational research. Our well-equipped laboratories include a wide range of internal combustion engines, heat transfer facilities, wind tunnels, an anechoic chamber, a UK cueSim Flight Simulator, a France-Price Induction jet engine test bench, and materials synthesis and characterisation labs.

Compulsory modules

- Engineering Methods
- Essential Mathematics Skills for Engineers
- Computer Aided Engineering for Solids and Fluids*
- Materials Selection in Design*
- Research project in Mechanical Engineering

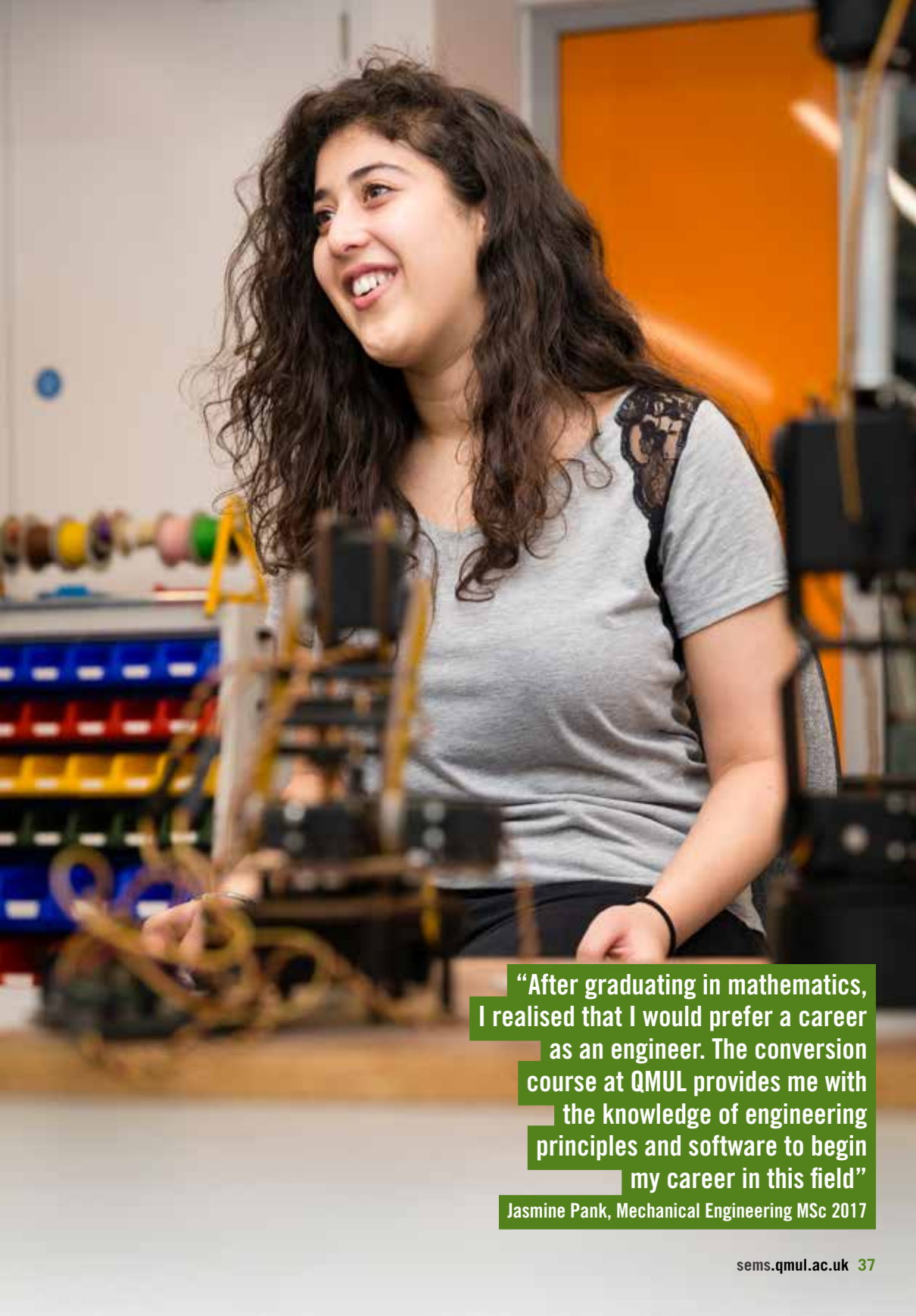
Option modules

- Energy Conversion Analysis*
- Grad, Div and Curl: Vector Calculus for Engineering*
- Numerical Optimisation in Engineering Design
- Composites
- Failure of Solids
- Aeroelasticity
- Robotics
- Manufacturing Processes
- Modelling and Control of Mechanical Systems
- Advanced Combustion in Automotive Engines
- Advanced Gas Turbines
- Computational Fluid Dynamics
- Whole System Design in Sustainable Engineering

Entry requirements

This MSc is suitable for students with a 2:1 bachelor's degree (or international equivalent) in a science subject (eg mathematics, chemistry, physics).

* indicates a conversion module.



“After graduating in mathematics, I realised that I would prefer a career as an engineer. The conversion course at QMUL provides me with the knowledge of engineering principles and software to begin my career in this field”

Jasmine Pank, Mechanical Engineering MSc 2017

Our conversion programmes

Sustainable Energy Engineering (Conversion) MSc

One year full-time

qmul.ac.uk/msc-sus-energy-eng

This programme aims to turn students into engineers with unique expertise in the fundamentals of energy and the environment, and their applications for the benefit of humankind. The content of the programme includes the compulsory 'Engineering Methods' and 'Renewable Energy Sources' modules. Besides this, you will choose three modules from the conversion options (marked*). The selection of these conversion modules depend on your background, and they serve to ensure you will have the appropriate engineering background to undertake specialist modules in the latter half of your programme.

In the second semester, you will take the compulsory modules 'Energy Storage Engineering' and 'Introduction to Solar Energy', as well as two option modules.

Compulsory modules

- Engineering Methods
- Essential Mathematics Skills for Engineers
- Renewable Energy Sources
- Energy Storage Engineering
- Introduction to Solar Energy
- Research Project in Sustainable Energy


Option modules

- Whole System Design in Sustainable Engineering
- Energy Economics and Management of Sustainable Energy
- Computational Fluid Dynamics
- Advanced Gas Turbines
- Advanced Environmental Engineering
- Environmental Properties of Materials*
- Advanced Fluid Mechanics and Heat Transfer*
- Computer Aided Engineering for Solids and Fluids*
- Energy Conversion Analysis*
- Grad, Div and Curl: Vector Calculus for Engineering*

Entry requirements

This MSc is suitable for students with a 2:1 bachelor's degree (or international equivalent) in a science subject (eg mathematics, chemistry, physics).

* indicates conversion module

A woman with dark hair in braids, wearing glasses and a grey blazer, is smiling and looking at a mechanical device. She is holding a silver metal rod that is part of a larger assembly with yellow rectangular components. The background is a large window with a grid pattern, showing a view of a city skyline.

Specialist modules on Sustainable
Energy Engineering (Conversion)
MSc provide you with the knowledge
to progress in this industry

Our research

We conduct our research across three divisions which are fully collaborative and often overlap. We welcome applications from postgraduate students who would like to undertake research that falls into our activities:

- Division of Bioengineering and Biomaterials
- Division of Materials Science
- Division of Engineering Science.

Division of Bioengineering and Biomaterials

The Division of Bioengineering and Biomaterials covers multidisciplinary research in bioengineering. The specific strategy of the group is to produce solutions to clinically relevant problems. These clinical solutions may be in the form of novel biomaterials, medical devices, implants or diagnostic systems.

They may also encompass regenerative medicine or tissue engineering strategies for future pharmaceuticals. Fundamental research involves the study of normal and disordered cell and tissue structure and function, biomechanics and biomaterials. There is also a focus on lifelong health and healthy ageing in cells and tissues. An integrated multiscale approach is taken from the nano- to the macro-scale, with researchers investigating a range of disease conditions including arthritis and other musculoskeletal disorders, cancer, inflammation, and cardiovascular disease.

Our work is supported by pioneering nanoscale techniques to visualise, quantify and manipulate biological processes, as well as computation biophysical modelling through collaboration with the Division of Engineering Science.

Division of Materials Science

The Division of Materials Science offers multidisciplinary education and innovations in the field. The development and understanding of nanostructured materials is currently a major research theme at Queen Mary. These nanomaterials have a range of unique physical and chemical characteristics, and have the potential to be used in a multitude of novel applications including new functional materials, sensors and actuators; materials for energy conversion and storage; and biomaterials. It is because of this diversity that our work overlaps with others at Queen Mary.

We provide a wide range of expertise and facilities, from polymer synthesis and processing to advanced polymer composites, ceramics, a hydrothermal synthesis lab and a chemical vapour deposition lab for thin film production. We also support manufacturing and testing of various renewable energy devices from solar cells, to fuel cells and batteries up to thermoelectric and ferroelectric materials. The Division also includes the1 NanoVision Centre (for advanced microscopy), combining high-resolution imaging with structural, chemical and mechanical analysis.

Biomedical Engineering MSc student
Hermamalini Raghu examining the
mechanics of a human knee and
how a prosthetic knee implant works



Our research

Application of our research was significantly enhanced by the creation of Nanoforce Technology Ltd, a wholly-owned QMUL subsidiary devoted to nanomaterials research for exploitation by industry. Nanoforce provides access to a broad range of unique world-class processing facilities, such as spark-plasma sintering for the development of nanoceramics and dedicated equipment for production of polymer nanocomposites.

Division of Engineering Science

The Division of Engineering Science develops computational models to investigate physical phenomena across different length scales (from large scale fluid motions to the dynamics of molecules) and to apply complex mathematical models to optimisation problems, robotics and control systems. We develop new generation robots, unmanned aerial systems (UAVs), and propulsion systems for the aerospace industry. Simulations are often complemented by experiments on model systems.

Our research is used to tackle industrial and societal problems including predicting the mechanical response of nanocomposites and biological tissues, understanding transport in cardiovascular systems, predicting loading by wind and water in renewable energy systems and the aerodynamic performance of Formula One cars.

Collaborations with the Division of Bioengineering and Biomaterials and the Division of Materials Science within the School are very active, as well as with other Schools (for example, the School of Electronic Engineering and Computer Science, and Barts and The London School of Medicine and Dentistry).

Our research activities are focused on the following areas:

- Computational engineering of thermo-fluids and solids
- Micro and nanomechanics
- Robotics
- Experimental methods applied to fluid mechanics and heat transfer
- Control theory
- Optimisation
- Aerospace and aeronautical structures
- Aerospace propulsion
- Control theory
- Energy research

Projects, funding, research grants and awards

The School's research areas are supported by external grants from UK research councils and government agencies, including the Engineering and Physical Sciences Research Council (EPSRC), the Technology Strategy Board (TSB), the European Union, and a multitude of industrial sponsors which fund postdoctoral research studentships.

A general-purpose laboratory, which incorporates advanced mechanical test machines and standard biochemical/ cell biology analysis equipment



Funding your masters

Tuition fees

You can find a full list of both UK/EU and international tuition fees at: qmul.ac.uk/tuitionfees

Funding

We want to attract the best students to QMUL, regardless of their financial situation. Every year we offer a range of scholarships for academically excellent students.

For the latest information, visit: qmul.ac.uk/postgraduate/taught/funding_masters

As a guide, in 2017 we were able to offer the following:

Commonwealth Scholarships (international students only)

QMUL worked in partnership with the Commonwealth Scholarship Commission in the UK to offer a wide range of scholarships for postgraduate study at masters and PhD level. Scholars from developing and developed Commonwealth countries were eligible to apply for these awards.

Chevening scholarships (international students only)

This is a worldwide scheme to fund masters-level study for international students, administered by the UK's Foreign and Commonwealth Office. QMUL attracted more than 80 Chevening Scholars in 2016/17.

Visit: chevening.org or your local British Council office: britishcouncil.org

International Science and Engineering Excellence Awards (international students only)

This extensive scheme provided awards of up to £5,000 for students, based on their academic achievement. To achieve the highest award, students had to hold a first-class bachelors degree or international equivalent.

QMUL Alumni Loyalty Awards

If you are a Queen Mary graduate, you may be eligible for our Alumni Loyalty Award for masters study (£1,000).

Science and Engineering Taught Scholarships (Home/EU students only)

We award £1,500 to every Home/EU student accepted on to a science and engineering programme with a UK first-class bachelors degree or equivalent.



Postgraduate Loan (Home/EU students only)

The government's Postgraduate Loan offers up to £10,280 per course for 2017 entrants. The Loan is available for any taught masters programme as well as Master of Research (MRes), including part-time study.

You must be aged under 60 on 1 August of the year in which you start your programme, and other eligibility criteria will also apply (see the government's website below). If you already hold a masters degree or higher level qualification, you won't normally be eligible for this Loan.

For further information on how to apply, eligibility criteria, payment information, and loan repayments, including salary scales and interest rates, visit:

- The UK government's website: **www.gov.uk/postgraduate-loan**
- QMUL's Postgraduate Funding advice guide: **welfare.qmul.ac.uk/guides/postgraduate-funding**
- QMUL's Funding a Masters webpages: **qmul.ac.uk/postgraduate/taught/funding_masters**

QMUL's new Graduate Centre opened at our Mile End campus in 2017 and provides a dedicated space for postgraduate study

Essential information

School of Engineering and Materials Science

Tel: +44 (0)20 7882 8736

Email: sems-pgadmissions@qmul.ac.uk

How to apply

You can apply for all our postgraduate programmes online. While there are no set deadlines for degree applications, we advise you to apply as early as possible to make sure your application is considered and to take advantage of any funding opportunities which may have early deadlines.

Visit: qmul.ac.uk/postgraduate/howtoapply

Accommodation

We offer approximately 500 spaces specifically to our postgraduate students and the majority of these are at our Mile End campus. We can also provide advice on a range of alternative housing, such as renting, private halls or homestay.

Tel: +44 (0)20 7882 6474

Email: residences@qmul.ac.uk

residences.qmul.ac.uk

International students

We offer a range of support services to students joining us from around the world, including in-country meetings, pre-departure briefings, an airport collection service, and the International Welcome Programme. We also offer advice about accommodation, scholarships, funding, summer school, study support, visas and English language requirements.

Tel: +44 (0)20 7882 6530

Email: internationaloffice@qmul.ac.uk

qmul.ac.uk/international

Entry requirements

Please see individual programme entries.

English language requirements

All applicants must show they meet a minimum English language standard. The English language levels vary between programmes, and you can read full details online at: qmul.ac.uk/eng-lang-reqs

If you have not achieved the required English language level yet, you may be eligible to take a Pre-sessional English course, or continue to take English language tests in your country to reach the level needed. Visit: slf.qmul.ac.uk/language-centre/presessionals

Postgraduate open events for 2018

- 17 January 2018, Virtual Open Day
- 7 February 2018, Open Evening
- 9 May 2018, Virtual Open Day
- 18 July 2018, Virtual Open Day
- 5 September 2018, Open Afternoon

Visit: qmul.ac.uk/postgraduate/meet-us

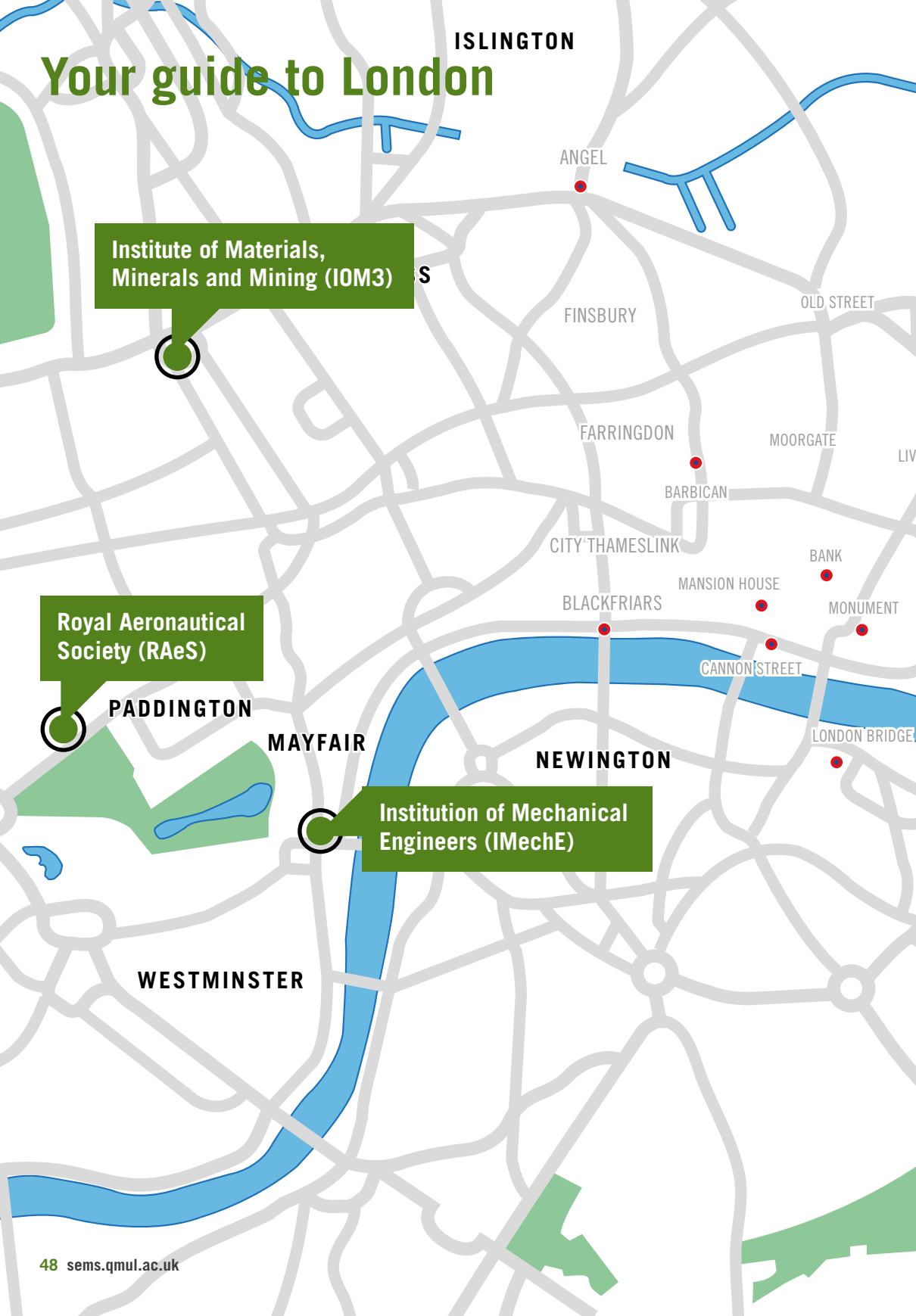
QMUL Doctoral College

Many of our masters students go on to undertake PhD research. If you would like to find out more about becoming a researcher, visit: doctoralcollege.qmul.ac.uk and qmul.ac.uk/postgraduate/research

The newly developed Human Performance Lab can support projects in the biomechanics area, which is of particular interest to biomedical engineering students



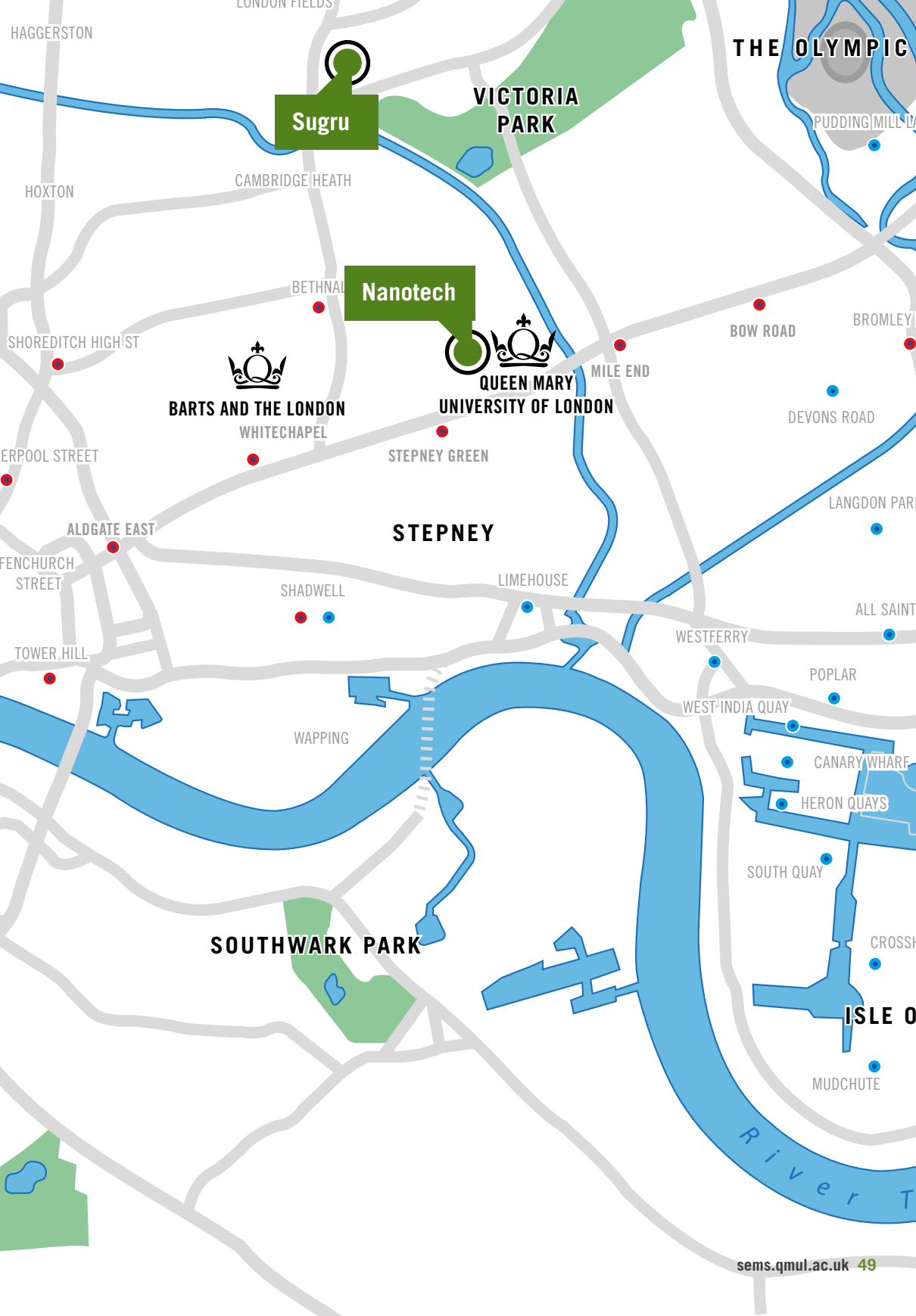
Your guide to London



**Institute of Materials,
Minerals and Mining (IOM3)**

**Royal Aeronautical
Society (RAeS)**

**Institution of Mechanical
Engineers (IMechE)**



Sugru

Nanotech

THE OLYMPIC

VICTORIA PARK

PUDDING MILL LANE

CAMBRIDGE HEATH

HOXTON

BETHNAL

SHOREDITCH HIGH ST

BOW ROAD

BROMLEY



BARTS AND THE LONDON
WHITECHAPEL



QUEEN MARY
UNIVERSITY OF LONDON

MILE END

DEVONS ROAD

ERPOOL STREET

STEPNEY GREEN

LANGDON PARK

ALDGATE EAST

STEPNEY

FENCHURCH STREET

LIMEHOUSE

ALL SAINT

TOWER HILL

SHADWELL

WESTFERRY

POPLAR

WEST INDIA QUAY

WAPPING

CANARY WHARF

HERON QUAYS

SOUTH QUAY

SOUTHWARK PARK

CROSS

ISLE OF

MUDCHUTE

River Thames

RUSSELL GROUP



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Terms and conditions

We have endeavoured to ensure that the information contained in this prospectus is both helpful and accurate at the time of going to press. There are circumstances in which we may still make changes to the programmes and services that we provide. For this reason, it is important that you check our website (qmul.ac.uk) for the most up-to-date information, or contact us, using the details contained within this document, before you apply.

We regularly update our programmes so that students can learn from the latest academic research and to make improvements in dialogue with current students and employers. Other circumstances that can lead to changes include:

- changes of academic staff, which can lead to new modules being offered and existing modules being withdrawn
- new requirements from professional or statutory bodies or
- changes to the way in which universities and services are funded.

If you apply to us and we offer you a place to study at QMUL, we will endeavour to deliver your chosen programme as is advertised when we make our offer of admission. For this reason, it is important that you check our website for the most up-to-date information, or contact us using the details contained within this document, before you accept an offer. We will only suspend or withdraw

your chosen programme in exceptional circumstances, such as if a key member of academic staff or essential teaching facilities become unavailable without warning. Programmes may also be suspended where the demand from applicants makes them unviable. If we have to suspend or withdraw your chosen programme after you accept an offer, we will inform you at the earliest opportunity and make every effort to provide a suitable alternative.

For up-to-date descriptions of our programmes, visit: qmul.ac.uk/postgraduate/coursefinder

Contact

Queen Mary University of London, Mile End Road,
London E1 4NS qmul.ac.uk

We would like to thank the staff and students who took part in these photographs. Student and departmental photography by Jorge Estevao (jdestevao.com) and Jonathan Cole (JonathanColePhotography.com) and Layton Thompson (LaytonThompson.com)

Produced by Marketing and Communications
Queen Mary University of London.



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sems.qmul.ac.uk

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Contact us

For general admissions enquiries about the admissions process for taught masters programmes:

Tel: +44 (0)20 7882 5533

Email: pgtadmissions@qmul.ac.uk

For general admissions enquiries about the admissions process for research degree programmes:

Tel: +44 (0)20 7882 2207/5860

Email: researchadmissions@qmul.ac.uk