School of Electronic Engineering and Computer Science
Postgraduate Study

eecs.qmul.ac.uk
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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.

Queen Mary highlights

• Member of the Russell Group – the UK’s 24 leading universities
• World-class research and teaching by international leaders in their field
• In the top one per cent of the world’s universities
• Attractive residential campus in the heart of London
• Commitment to financial support – £6m in research studentships last year
• Distinguished history dating back to the foundation of St Bartholomew’s Hospital in 1123 and the start of teaching at the London Hospital Medical College, England’s first medical school in 1785
Do you want to contribute to an area of cutting-edge research? Explore your academic interests in depth? Develop new knowledge and skills? Advance your career, or embark on a completely new path? Whatever your motivation, a postgraduate degree from Queen Mary University of London (QMUL) can help you achieve your ambitions.

We are one of the world’s leading universities, with first-class academics, inspirational teaching, and a distinguished 229-year history of preparing men and women for rewarding careers. Our postgraduate degrees are informed by the latest academic research in everything from cancer therapeutics to business management, and from aquatic ecology to commercial law. Our doctoral and masters by research programmes emphasise original and independent scholarship, while our taught masters programmes prepare you for professional life or further study.

Postgraduate study with us has a number of distinctive features: a high level of engagement with our internationally recognised academics, a campus environment in east London that fosters a real community, a commitment to financial support – more than £6m last year in the form of research studentships and scholarships – and programmes with demonstrable success in preparing you for professional life.

We offer plenty of opportunity for research and collaboration between different disciplines, regularly attract inspiring and high-profile speakers, and work closely with a range of cultural organisations, social enterprises, businesses and industry. A postgraduate degree with us will be a challenging, stimulating, and often life-changing experience.

**Russell Group university**

We are a member of the Russell Group of leading UK universities, testament to our excellence in research and teaching. The Group attracts the brightest students from all over the world and almost two-thirds of research funding in the UK. Graduates from Russell Group universities are especially valued by employers.

**Visit us**

The best way to get a feel for Queen Mary life is to join us for one of our Postgraduate Open Evenings. You can explore our campus, meet our tutors and students, and get a taste of what studying here will be like. If you are unable to visit us in person we run virtual open days, where you can speak online to current staff and students. We also have representatives in 35 countries and staff who regularly travel overseas. For more information, see page 73 or qmul.ac.uk/visitus
From our location in the heart of east London – one of the capital’s most dynamic areas – to our stunning campus, world-leading research and inspiring teaching, there’s a host of reasons to make Queen Mary your first choice.

**World-class university**
Queen Mary is a world-class university (we are in the top one per cent of universities in the world, according to the *Times Higher Education* World University Rankings in 2013), helping us to attract some of the very brightest minds to study, teach and undertake research here.

**Innovative research**
We conduct world-leading research. In 2012, we won the *Times Higher Award* for Research Project of the Year for our work into the development of a self-screening kit for the human papilloma virus. In 2013, we were shortlisted for the same award for our research into a 1,500-year-old genetic mutation connected to extreme growth (gigantism).

**Career success**
We are focused on ensuring that you leave Queen Mary with the enhanced skills and knowledge necessary to develop your career. Our postgraduates have an average salary of £32,942 on completing their course.

**Friendly campus lifestyle**
We are the only university in London able to offer a completely self-contained residential campus at our Mile End home. You will be able to enjoy all the benefits of a campus lifestyle – safety, convenience and a friendly atmosphere – while being just minutes from central London.
High-quality teaching
Our teaching is inspired by our world-leading research and you will be taught by academics who are genuine leaders in their field. Our academics embrace innovative teaching methods and receive national awards for their teaching (see page 8).

Exceptional facilities
We have spent more than £250m on new facilities in the past 15 years. From some of the largest open-plan laboratories in Europe in the Blizard Building, to our recently opened £21m ArtsTwo Building, award-winning Lock-keeper’s Cottage Graduate Centre – housed in an historic building alongside the Regent’s Canal – and our acclaimed student village, we offer an exceptional learning environment.

Great location
We are a short walk from fashionable Brick Lane and Shoreditch, and close to London’s financial centres, the City and Canary Wharf. Set beside the Regent’s Canal in Mile End, our main campus is within walking distance from the Olympic Park (see pages 10 and 11), and minutes from the West End on the Underground.

University of London
Queen Mary is part of the internationally recognised University of London (UoL). You will be able to use UoL’s extensive facilities, including Senate House Library and the University’s many specialist institutes and archives.

International outlook
We welcome students and staff from more than 150 countries who play a vital part in the life of the university. Our staff also conduct collaborative international research, travel to international conferences and we have links with many leading universities overseas. We were recently described by *Times Higher Education* as “one of the world’s 20 most international universities”.

Generous support
We can help you to secure funding for your postgraduate degree. We also offer a generous package of bursaries and studentships to our most highly qualified applicants, ensuring the brightest students receive a first-class education, regardless of their background.
Our academics undertake world-leading research. Their work is original, informative and significant – both within specialist areas of knowledge and to wider society. It also directly informs the content of our postgraduate programmes.

Reputation for excellence
We recruit the best academics in their disciplines from around the world and have an impressive track-record of winning generous research funding. Following the most recent national assessment of research (RAE 2008), the Guardian placed us 11th in the UK.

What does this mean for you?
Our academics publish in leading journals, organise conferences, speak at public events, comment in the media, engage with our local community, and collaborate with international partners. As a postgraduate with us, you will be learning from experts in their field, who will involve you in their latest research, and share their wealth of knowledge and experience.

Teaching excellence
Our academics receive national recognition for their excellent teaching. Eight members of staff have been awarded National Teaching Fellowships – a highly prestigious national award recognising exceptional teaching – making us the most successful College in the University of London since we joined the Teaching Fellowships scheme in 2006.

Research that makes a difference
From our involvement in this century’s most exciting scientific breakthrough, the discovery of the Higgs boson, to our work exposing the problems of poverty among low-paid workers, to our award-winning cardiovascular and stroke research, we conduct research that genuinely makes a difference to society – improving health, social and living conditions, advancing our knowledge and understanding in specialist fields, and influencing public policy and debate.

We are now preparing to embark on our most ambitious project for a generation – an innovative new Life Sciences Institute. Life sciences is the interface between the natural, social and biomedical sciences and aims to provide innovations in healthcare. This initiative will bring together academics, industrial partners and the NHS to improve health and wellbeing for patients. Find out more: qmul.ac.uk/lifesciences

Research in numbers
• £100m – total research income per year
• 11th in the UK overall for research quality (Guardian analysis of RAE 2008)
• Top 10 in UK for: English, drama, geography, law, economics, materials, Hispanic studies, Russian, medicine, dentistry (Guardian analysis of RAE 2008)
• £6m per year in research council funding for PhD students
• 55 academy and society fellows
• 6 Nobel Prize-winning alumni
"I truly love our enthusiastic students who are not afraid to get involved, take risks and push boundaries in what they learn and do. I also love the people who go beyond their personal interests to grasp the bigger picture, and from there are able to guide and support others."

Hatice Gunes, Lecturer in Digital Media
We are based in east London, the hub of London’s creative community, and home to its financial centres, Canary Wharf and the City. The area is steeped in history, yet always looking to the future, and is uniquely British in its diverse character. The 2012 Olympics has sealed its status as “the place to be” in the capital. Here’s our guide to the best of the east.

**Mile End and surrounding area**
EAT… the area around Queen Mary has a range of good value cafés, restaurants and pubs.

VISIT… Mile End Park, an unusual 90-acre linear park in the heart of the East End with a ‘green bridge’, a terraced garden, and ecology, arts and sports parks; the independent Genesis Cinema (go on Wednesday night for a student discount).

**Stratford**
VISIT… the Olympic Park has undergone an amazing £300m transformation and re-opened as the Queen Elizabeth Olympic Park in the spring of 2014. There are five state-of-the-art sporting venues: the Stadium, the London Aquatics Centre, the Copper Box Arena (a leisure centre and venue for basketball, volleyball, etc), the Lee Valley VeloPark and the Lee Valley Hockey and Tennis Centre. There are also cafés, restaurants, cultural venues and lots of green space – around 4,000 trees are being planted as part of a plan to double the green space in the park. queenelizabetholympicpark.co.uk

SHOP… Westfield Stratford City – Europe’s largest urban shopping centre, with over 300 shops, from high-street staples such as Uniqlo to high-end designers such as Armani. There are also over 70 restaurants (including GBK, Busaba Eathai, and Pho), a 17-screen cinema and a 14-lane bowling alley.

**Old Street, Shoreditch and surrounding area**
EAT… Ginger Pig Café on Hoxton Street (great for a leisurely brunch); Big Apple Hot Dogs, a mobile cart selling amazing hot dogs; also in Hoxton – the Breakfast Club, the perfect spot for a slap-up breakfast after a night out; Cây Tre, a delicious, reasonably priced Vietnamese restaurant on Old Street.

VISIT… Ibid Projects gallery on Hoxton Street; Hales Gallery off Shoreditch High Street (this area is the epicentre of the East End’s art scene); The Geffrye Museum of English domestic interiors.

SHOP… the Columbia Road Flower Market on Sunday mornings; KK Outlet art and design book shop.

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Brick Lane, Spitalfields and Whitechapel

EAT... Brick Lane is London’s ‘Curry Capital’—an entire street lined with Indian and Bangladeshi restaurants; Brick Lane Beigel Bake, open 24-hours (great for beigel emergencies).

VISIT... the Old Truman Brewery, a converted brewery and home to numerous fashion designers, artists and trendy bars; All Star Lanes, a boutique bowling alley serving burgers and cocktails; the acclaimed Whitechapel Gallery.

SHOP... Spitalfields market, with arts and craft stalls, restaurants and high-street shops. Nearby is Urban Outfitters, a great spot for sourcing retro fashions.
Docklands and Canary Wharf

EAT… Jamie’s Italian (part of Jamie Oliver’s growing empire); Wagamama for noodles; Canteen for good-value British food in a stylish setting.

VISIT… Museum of London Docklands, which explores the story of the docks from Roman settlement through to its recent regeneration.

Bethnal Green and Victoria Park

EAT… E Pellicci, on Bethnal Green Road, an Italian café and local institution which has been around since 1900. Near Victoria Park, Lauriston Road has some great cafés and restaurants including: Su Sazzagoni (Sardinian), the Fish House (posh fish and chips) and The Empress (a gastropub).

VISIT… the art galleries on Vyner Street; The V&A Museum of Childhood on Cambridge Heath Road; Bethnal Green Market, a daily street market with fresh fruit and veg, clothes and other essentials.

Charterhouse Square and surrounding area

EAT… bars and restaurants abound in Farringdon and the historic Smithfield Market. Two affordable favourites for lunch are the old-school Quality Chop House and The Farm Collective café.

VISIT… the Barbican, London’s most stylish brutalist performing arts centre. With galleries, cinema, theatre and live music. barbican.org.uk

Lincoln’s Inn Fields and surrounding area

EAT… the restaurants, cafés and bars of Covent Garden and Soho are minutes away, as is the Southbank Centre at Waterloo, home to the Royal Festival Hall, the Hayward Gallery and the Queen Elizabeth Hall.

VISIT… relax in the beautiful grounds of Lincoln’s Inn, watch a trial in the public galleries at the Royal Courts of Justice, or get lost in time at the nearby British Museum.
We are close to the City and Canary Wharf yet only minutes from the West End
EECS student Kleomenis Katevas demonstrating his project – the Sign Language Glove – a wearable device that recognises American Sign Language (ASL) gestures and translates them into text.
School highlights
• Close links with Tech City and industry, including Intergence, Juniper, IBM, BT, BBC and Microsoft
• Numerous awards for teaching and research
• Excellent teaching and research facilities, including our state-of-the-art video and audio recording and post-production studios
• Staff draw on their research and commercial consultancy work to develop teaching materials
• Extensive range of commercial placements and projects with industry partners via our Industrial Experience programme
• Current research grant portfolio of £38m
• All relevant degrees are accredited by the Institute of Engineering and Technology (IET) or the British Computer Society (BCS)
As one of the top 20 computer science and electronic engineering departments in the UK, we are internationally recognised for our pioneering and ground-breaking research, award-winning teaching, and innovative public engagement. Our outstanding resources include state-of-the-art recording and post-production studios, antenna, EEG, and augmented human interaction laboratories. We have 150 members of academic and research staff and a community of around 3,100 students based in the UK and China.

Why study with us?
Studying with us is a challenging and invigorating experience that enables you to develop your career, while studying in a research-intensive environment. You will be taught by leading academics in the field and will benefit from our strong links with industrial partners. We have collaborations, partnerships, industrial placement schemes and public engagement programmes with a variety of organisations, including Vodafone, Google, IBM, BT, NASA, BBC and Microsoft. We have also been home to a number of original research ideas that have subsequently become successful spin-out companies. These include: QApps (provides smartphone and social networking apps); Chatterbox (provides natural language processing software to understand brand-related discussions); and Vision Semantics Ltd (develops software to manage facilities and enhance security).

Research strengths
Research in the School is at the cutting-edge; we work on core developments and novel technologies, making meaningful and long-lasting contributions that apply to real-world problems. Our research is focused in key areas led by internationally leading researchers. We engage with industry partners and academic colleagues around the world in a variety of sectors and disciplines. Our research has left indelible marks in areas as diverse as: the foundations of programming languages, digital signal processing, parallel computing, augmented human interaction, and intelligent systems. The benefit of studying for an MSc in a research-active School is that you are taught by research leaders.

Postgraduate resources
We offer our taught postgraduate students their own computing laboratory, and MSc students have access to our award-winning Informatics Teaching Laboratory (ITL). The ITL boasts state-of-the-art computer systems, providing over 250 fully networked multimedia workstations. The ITL provides wireless access to all the IT infrastructures offered by the university so that you can use your own laptops.
“We have logicians and theorists and people who do music and cognitive science all in one stretch of the corridor. It is so refreshing to go to seminars with lots of maths in them and seminars when an artist plays a piece of experimental music and then analyses it for you”

Dr Mehrnoosh Sadrzadeh, EPSRC Career Acceleration Fellow and Lecturer
You will also have access to our specialist laboratories for carrying out your own research. Our Augmented Human Interaction (AHI) Laboratory combines pioneering technologies including full-body and multi-person motion capture, virtual and augmented reality systems and advanced aural and visual display technologies. We also have specialist laboratories in multimedia, digital signal processing – including a sound laboratory, microwave antennas and an Electroencephalography (EEG) laboratory.

In addition to these spaces, PhD students have generous study space in our research laboratories. In early 2011 we completed the development of new experimental facilities in antennas (£1m) and digital music (£0.5m). We formed the Interdisciplinary Informatics Hub in collaboration with the Schools of Biological and Chemical Science and Mathematical Sciences. These laboratories and associated office spaces house around 40 researchers, providing a meeting place for postgraduates from all departments to interact and exchange ideas.

We have a regular distinguished lecturer series, in which major research figures from outside organisations and industry visit the School to speak to our students. In addition, each research group runs its own individual seminar series.

Our scholarships and studentships

MSc scholarships
Queen Mary provides Computer Science and Electronic Engineering studentships worth £3,000 to a limited number of high-quality applicants. These awards can be held in conjunction with other funding and are awarded on the basis of exceptional academic merit, on a first-come-first-served basis at the time of application to one of our programmes. For further information, please see qmul.ac.uk/postgraduate/studentships for further information.

A small number of Westfield Trust Bursaries (worth £2,000) are available to students on our MSc programmes. All applicants will be automatically considered for these awards and there is no separate application form. Successful candidates will be informed before the end of May.

MSc in Computer Vision Scholarship
The MSc in Computer Vision offers two MSc fee waivers on a competitive basis for September 2015 entry. In addition to this, we will award two PhD fee waivers for top-ranked students in this MSc who desire to continue onto our PhD programme. Moreover, International Science and Engineering Excellence Awards for the value of either £2,000 or £5,000 are available to reward academic achievement and help attract the brightest and best international students.

UK Government scholarships
The British Council administers the UK Government’s Chevening Scholarship programme. This is a special worldwide
scheme to fund masters-level study by international students and Queen Mary attracts about 20 Chevening Scholarship winners every year.

For further information please visit www.chevening.com or your local British Council office www.britishcouncil.org who will also be able to inform you of any other scholarship opportunities open to you.

For further information regarding these scholarships, please visit qmul.ac.uk/international/scholarships or contact our Postgraduate Administrator.

International Science and Engineering Excellence Awards
In recognition of the important investment that our international postgraduate students are making in their education, we are pleased to offer International Science and Engineering Excellence Awards. These awards will be deducted directly from your tuition fees.

The level of award that you may be eligible to receive will be based on your previous academic attainment.

• To be eligible to receive an award of £2,000 you must be on track to meet or exceed our minimum entry requirements for your chosen programme at the point of offer.
• To be eligible to receive an award of £5,000 per year, you must hold a UK first class bachelors degree or equivalent.

You will be considered for an award automatically on the basis of your online application to Queen Mary, so there is no need to complete a separate application form.

PhD studentships
The School has a number of EPSRC, Queen Mary, industrial and internationally funded research studentships available for PhD students beginning in the autumn of each year. These are available to UK, EU and international students and pay for tuition fees and/or provide a tax-free maintenance grant. There is always strong competition for these awards and interested students should apply as early as possible, preferably between January and March. There is no separate scholarship application form; however, please ensure that you indicate on the postgraduate application form that you wish to be considered for a scholarship. For further information regarding our scholarships, visit eecs.qmul.ac.uk/phd

Campus university
We are unique in that we are a campus university that is 15 minutes from central London, close to the Olympic Park, Stratford City, and Canary Wharf and less than a couple of miles from the area around Old Street known as Silicon Roundabout or Tech City, home to at least 400 digital start-ups, including Last.fm, SoundCloud and TweetDeck. We have links with many companies in the area and are very much part of the IT revolution. Our location enables you to have the best of both worlds – you can experience life in one of the greatest global cities and benefit from the convenience of a campus university experience.
Student Village
Our Student Village provides accommodation at our Mile End campus for more than 2,000 students. Living on campus is incredibly convenient. Not only are you just five minutes from your lecture theatre but all the facilities you need, including cafés, bars, the gym and squash courts, the Library and computer suites, are located within a short walk.

A short history of electronic engineering at Queen Mary
Electrical Engineering was first taught in Mile End in October 1888. Over the years, the Department’s research focus gradually shifted from High Voltage, Power and Electrical Materials to new groups including Antennas (1968), Telecoms (1985), ISAG (Intelligent Agents and Systems Group, 1990s), MMV (Multimedia and Vision, 2001) and C4DM (Centre for Digital Music, 2001). In 2008 the Electronic Engineering Department merged with the Computer Science Department and a whole new era began.

Today, the School of Electronic Engineering and Computer Science is home to nearly 90 academic staff, 65 post-doctoral researchers and over 240 research students. We have around 700 undergraduates and 120 masters students on our UK-based taught programmes. We also run a ground-breaking Joint Degree Programme with the Beijing University of Post and Telecommunications (BUPT), with close to 2,300 students on the Beijing campus.

The School has a research grant portfolio of £38m, with a research spend of about £10m per year and a significant EPSRC funding portfolio that has grown from £6m in 2002 to £25m today. This portfolio includes an EPSRC and AHRC Doctoral Training Centre for media and arts technology, with almost £6m of funding offering training to 12 PhD students per year, as well as very strong links to the UK media industry including the well-publicised Tech City, which is just a few miles from our campus.

Did you know?
• We helped set up the first internet node in the UK and were the first to provide the now popular Apple/Unix workstations for students.
• 81 per cent of our students were satisfied with the skills and personal development offered by their course and more than 83 per cent praised the level of access to IT resources in our most recent Postgraduate Taught Experience Survey
• We have our own app store, QApps, where apps developed in-house by our staff and students are available for download (qappsonline.com).
• We were the first university in the UK to establish a fully collaborative joint degree programme with a Chinese university.
• We were one of the first universities in Britain to have an Electrical and Electronic Engineering department.

School highlights
• Close links with Tech City and industry, •
Queen Mary is the best university in the UK for interactive media and maybe in Europe. And the lecturers, installations and workshops are amazing. The lecturers and lab managers are very friendly and helpful. Their knowledge is amazing and they encourage you to be creative and give you free rein to do whatever you want, even the craziest ideas!"  
Daniel Gabana, MSc Media and Arts Technology
Whether you are mid-career and looking to consolidate your professional experience or a recent graduate wanting to explore your subject in more depth, a postgraduate qualification from EECS can give you an edge in today's job market.

We are committed to being leaders in research, and training future leaders. The world of electronics, communications, media technologies and computing offers challenging, creative, and well-paid careers in a variety of industries and sectors. There is currently a shortage of highly qualified graduates in the fields of computer science and electronic engineering, meaning that there are lots of exciting career opportunities for graduates with the right skills. Recent research by e-skills UK estimates that the number of IT and telecoms professionals will grow at four times the average for the UK during 2010–2020. The Institute for Employment Research also predicts a need for 587,000 engineering jobs over the next decade.

Your future plans may involve working on the research and development of new technologies and applications – either in the laboratories of a large manufacturer or in a smaller contract research and development company, where you would be able to work with a variety of clients. For this type of work, career progression is through project leadership into positions of increasing technical challenge and responsibility.

Alternatively, you may prefer to work on large projects which require organisational skills and leadership. Initially this might involve working at a junior level in support of major projects, but with increased experience this career path opens into senior project and company management.

PhD graduates have even more career opportunities. Vodafone, Microsoft Research, IBM, Hewlett Packard and Philips are just a few of the major companies employing our graduates in research capacities. Recent PhD graduates who are pursuing careers in higher education have found post-doctoral positions at New York University, Stanford University, University of Amsterdam, University of Glasgow, and here at Queen Mary.

What skills and knowledge will you develop?
Programmes offered by the School develop a range of skills including:
- logic, critical thinking and problem-solving skills
- communication and presentation skills
- project management and implementation skills
- risk assessment skills
- leadership and professional skills
- high-level programming skills.
Our links with industry
Over the years we have worked to develop strong links with industry through collaborations, partnerships, student industrial placement schemes and public engagement programmes. Some of our current partners include Vodafone, IBM, BT, NASA and Microsoft Research.

In recent years, the School has been the home to a number of original ideas that have subsequently become successful spin-out companies. These include:

- **Actual Experience Ltd** ([actual-experience.com](http://actual-experience.com)) – a multiple award-winning software based service that quantifies and diagnoses perceived application experience.

- **QApps** ([qappsonline.com](http://qappsonline.com)) – provides smartphone and social networking apps developed by students and staff.

- **Chatterbox** ([chatterbox.co](http://chatterbox.co)) – provides natural language processing software to understand brand-related discussions.

- **Agena Ltd** ([agena.co.uk](http://agena.co.uk)) – provides risk management software for business systems and a range of major clients including Philips and Motorola.

- **Vision Semantics Ltd** ([visionsemantics.com](http://visionsemantics.com)) – develops software to manage facilities and enhance security.

- **MixGenius** ([mixgenius.com](http://mixgenius.com)) – develops automatic mixing tools for audio and music production

How we can help
Our strong links with industry can be of help when you are looking for work after graduation. For example, many of the organisations that we work with offer graduate opportunities in electronic engineering and computer science, in sectors including banking, media, telecommunications and technology. Help is also available from our careers team as well as our Industrial Placement Manager.

We offer a range of networking events including the IT and Technology Fair, where recruiters such as Barclays Capital, Logica, IBM, and Transport for London (TfL) seek new talent, and Meet a Mentor, where professionals from the QMUL graduate developer community return to speak to current students. We also host ‘Start Up, Stand Up’, an event that sees entrepreneurs from local start-ups share the spotlight with up-and-coming comedians – the aim being to provide light-hearted reflections on the road to entrepreneurial success, and to inspire the audience to pursue their business ideas.
Where do our graduates work?

**Computing and information systems**
Our graduates typically find roles in the development of: real-time embedded systems, web development, search engine development and evaluation, and database development and administration. Specific examples of roles our graduates have obtained include: security analyst, educational systems developer, web developer, database developer, systems analyst, and financial systems developer.

**Employers of our graduates include:**
Accenture, BT, Camelspace, Datang Microelectronics Technology, Hellagro, Kaplan Financial, KPMG, Lancaster University, Bank Melli Iran, and Pacific World Ltd (Thailand).

**Big data science**
A Data Scientist is a highly skilled professional, who is able to combine state-of-the-art computer science techniques for processing massive amounts of data with modern methods of statistical analysis to extract understanding from massive amounts of data and create new services that are based on mining the knowledge behind the data. The job market has a current shortage of trained professionals with this set of skills, and demand for data scientists is expected to increase significantly in future years.

**Computer science**
Our graduates typically find roles in the areas of advanced programming, software development and support, software engineering, product design and development, systems analysis, interface and interaction design, and database development.

**Sound and music computing**
This programme prepares you for a range of careers related to the music industry, the recording industry and the creative arts, including those in technical development. Recent graduate destinations include: Creative Labs, FXpansion, Sonnox, Sonalksis, Intrasonics, EMI, Calrec Audio, and Rockstar Games, among others.

**Digital signal processing (DSP)**
Rapid advancements in technology and dependence on DSP means that employment options are broad. Our graduates typically find opportunities in conventional electronics and telecommunications companies, the creative media, professional audio companies, healthcare, digital image processing, the automotive industry, biomedical industries, and in research and development.

**Software engineering**
Our graduates are qualified to work in software development or database technology in a wide variety of sectors, including computer games design in the entertainment sector, database design in the financial sector, or in any number of computing-based roles in the public and private sectors. Typical
jobs include: security analyst, social network analyst, software risk analyst, system designer, software engineer, programmer, usability consultant, and software architect.

**Telecommunication systems**
Graduates will develop an in-depth knowledge of converged, all-packet communications networking, an understanding of the mathematics and science that underpins communications networking, Java programming for network and services design, and the ability to apply probabilistic methods to evaluate the performance of networks.

Graduates roles typically include: network engineer, telecommunications system specialist, mobile control consultant, communications engineer. Employers of our graduates include: China Mobile, Nokia-Siemens China, OrangeLabs, Bank of America, Merrill Lynch, and Bell Labs Ireland and UK.

**Mobile and wireless networks**
Our graduates develop an in-depth knowledge of mobile and wireless communications; an understanding of the science that underpins wireless communications, including an understanding of the physical medium through which information flows; and exposure to the developing fields of sensor networks and the internet of things.

Examples of recent graduate destinations include: Airwide Solutions, King’s College London, Motorola (China) Technologies Ltd, Schlumberger and Wateen Telecom.

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**ALUMNI PROFILE: Shuvashis Dey**

**Studied:** MSc Wireless Networks (Physical Pathway)

**What have you been doing since you graduated?**
After graduating I started to work as a lecturer at American International University-Bangladesh. I worked there for three years and then I joined Monash University, Australia to pursue my PhD in 2013.

**Why did you choose Queen Mary?**
I chose Queen Mary because of its research excellence in my field. I was pretty aware of the exceptional infrastructure; quality teaching and world-class laboratory facilities. I had a firm belief that being a part of such a pioneering institute would bring out the best in me.

**How did your degree from Queen Mary help you with your career?**
My degree has helped me enormously. I got my first job as a lecturer in a renowned university in Bangladesh immediately after completing my masters. I continued to do my research that I started in Queen Mary and my research papers were published in international journals and conferences, which paved the way for me to get admitted into my current PhD role.
Our research

We are well known for our pioneering research and pride ourselves on our world-class research projects. Joining us as a PhD student gives you the chance to experience this buzz and be part of our efforts to shape the future of electronic engineering and computer science.

We have a dynamic community of approximately 240 PhD students and 80 research assistants in our labs working on leading-edge research. We offer well-integrated doctoral study programmes in our various areas of specialisation and each of our research groups is involved in internationally leading research funded by UK Research Councils, the European Union and industry around the world.

As one of the UK’s leading electronic engineering and computer science schools, we offer our postgraduate research students a comprehensive and supportive training environment. You will work as part of a friendly and vibrant research community under the supervision of experts in the field.

As a member of one of our research groups, you will be accommodated in a research laboratory alongside other PhD students and full-time post-doctoral researchers. Students often participate in funded group research projects. We provide a generous travel budget to enable our research students to present papers at international conferences. Budgets for expenditure on experiments, equipment and software are also available.

For more detailed information and funding opportunities for PhD students, visit: eecs.qmul.ac.uk/phd

Further information
Research Students Coordinator
Tel: +44 (0)20 7882 5820
email: eecs-phd-enquiries@qmul.ac.uk

Media and Arts Technology (MAT)

Our PhD in Media and Arts Technology is an innovative interdisciplinary training programme in the science and technologies that are transforming the creative sector. Our mission is to produce postgraduates who combine world-class technical and creative skills and who also have a unique vision of how digital technology transforms creative, technical and social possibilities.

This is a unique four-year PhD programme built around core modules in advanced research methods, interactive digital multimedia, arts documentary production and digital sound production techniques. There are also specialist option modules ranging from Digital Audio Effects through C++ and Java to Contemporary Performance. You will work under the supervision of internationally recognised experts in:

- Digital Music
- Digital Video
- Human Interaction
- Performance and Live Art
You will also develop a working partnership with one of our strategic collaborators, who include large companies such as BT, IBM, P&G as well as innovative digital-creative enterprises such as Lean Mean Fighting Machine, Cinimod and United Visual Artists. Our programme is jointly funded by the EPSRC and AHRC and is exceptionally well resourced. You will have access to our state-of-the-art Media and Arts Technology studios, which include the Listening Room, Control Room and Performance Laboratory, as well as other research and performance facilities including the Augmented Human Interaction Laboratory and the Pinter Studio Theatre.

For more detailed information and funding opportunities, see: mat.qmul.ac.uk

Further information
MAT Programme Manager
Tel: +44 (0)20 7882 7337
email: mat-enquiries@qmul.ac.uk

“My team is working on writing algorithms for robots to be creative, to explore the world like babies and scientists do. I argue that Darwinian natural selection takes place in the brain, with games and solutions being co-evolved in an open-ended fashion”
Dr Chrisantha Fernando, Lecturer
Our main areas of research are defined as follows. For more detailed information please visit each research group’s web pages: eecs.qmul.ac.uk/research

Antennas and Electromagnetics
Established in 1968, the group has comprehensive experimental facilities housed in the Antenna Measurement Laboratory, which has recently received £1m in infrastructure investment. The group has strong links with industry and a current active grant portfolio of over £6m, which includes a prestigious £1m EPSRC Platform Grant to fund post-doctoral researchers in the field of antennas for healthcare and imaging.

Our research on antennas for mobile communications includes multiband antennas, multiple antennas for MIMO applications, ultra wideband (UWB) antennas, semi-smart base station antennas and antennas and radio propagation for body-centric communications. In the area of metamaterials we study computational electromagnetic models for both active and passive structures. We study new nano-materials such as graphene and carbon nanotubes that offer possible advances in antennas and metamaterials.

We develop software techniques to exploit the concepts of transformation electromagnetics, offering such novel devices as flat multireflector antennas and cloaking devices. We recently received a major EPSRC programme grant valued at £4.4m called Quest (“The Quest for Ultimate Electromagnetics using Spatial Transformations”) where we work with colleagues from Oxford (Materials), St Andrews (Physics) and Exeter (Physics) to research and bring to practical applications the exciting new concept of controlling how electromagnetic waves propagate by controlling their material properties in 3D.

Our research on terahertz (THz) spectroscopy aims to help scientists visualise structures such as proteins and actively enhance chemical reactions. In the area of antennas and healthcare we study the interaction of electromagnetic waves with biological tissue, dosimetry, wireless implants and RF sensors, for example in blood glucose monitoring. We also apply CEM to microwave electron tube devices to understand design of magnetrons, with the aim of developing compact high-power millimetrewave sources. In the area of metrology we work on near-field measurement, millimetrewave imaging for security and compact antenna test range development.

Staff research interests
Akram Alomainy MEng PhD(Lond) SMIEEE MIET
Lecturer/Senior Tutor
Body-centric wireless communications, wearable antennas/sensors, bioengineering, computational electromagnetic, intelligent networking for low-power and efficient body area networks, cognitive radio
Prof Xiaodong Chen PhD SMIEEE MIET (UESTC, CHINA)
Professor of Microwave Engineering
Microwave devices, antennas, wireless communications and bio-electromagnetics

Rob Donnan PhD CPhys MInstP MIET (W’gong, Australia)
Senior Lecturer
Metrology of quasi-optical systems, dielectrometry, THz spectrometry for biochemical sciences

Prof Yang Hao FIET SMIEEE PhD(Bris)
Professor of Electromagnetics
Antennas and propagation for body-centric wireless communications, microwave metamaterials and their applications, computational electromagnetics, millimeterwave, THz and photonic antennas

Prof Clive Parini BSc PhD FIET MIEEE CEng(Lond) FREng
Professor of Antenna Engineering
Microwave, millimetrewave and THz antenna theory, design and measurement, antennas for mobile communications, metamaterials, bioelectromagnetic, ultrawideband antennas

Khalid Rajab BSc MA PhD(Penn State)
Lecturer
Antennas, active metamaterials, transformation electromagnetics structures, computational electromagnetics, THz systems

Rostyslav Dubrovka
CAD/CAM Engineer
Lagrangian dynamics analysis of THz/far i.r. spectra of amino acids

Tijana Timotijevic BEng (Hons) MSc (Surrey) PhD (Queen Mary University of London)
Lecturer in Electromagnetics and Bioelectromagnetics
Electromagnetic stimulation and control of neuronal structures, bioelectronics, ICT in healthcare, assistive technologies, motion capture and analysis, technology-assisted motor training and rehabilitation

Centre for Digital Music
The Centre for Digital Music (C4DM) is a world-leading multidisciplinary research group in the field of music and audio technology. In less than a decade, the Centre has grown to become the UK’s leading digital music research group. We hold several substantial EPSRC grants, including a platform grant, and a Doctoral Training Centre. Resources include our state-of-the-art listening room and performance lab as part of the new media and arts technology studios.

Our projects span many different disciplines, including digital signal processing (DSP), semantic web (musicontology.com), knowledge processing, live performance, musicology, software engineering, and interaction. We emphasise adventurous and trans-disciplinary research, pushing the boundaries of DSP, computer science, philosophy and psychology. We investigate topics such as music information retrieval (MIR), music scene analysis, semantic audio processing, object-based audio coding, machine listening, human machine interaction and digital performance.
Much of our research targets real users, seeking to build new algorithms into usable and useful software. We have developed systems for automatic play-listing from personal collections (isophonics.net/SoundBite), for looking inside the audio (sonicvisualiser.org) for automatically synchronising to a drummer (BKKeeper) and for collaborative composition (DaisyPhone for iPhone), and many others. We regularly release algorithms under open source licenses. See our interactive art installations at: c4dmpresents.org

Staff research interests

Simon Dixon AMusA LMusA BSc PhD(Sydney)
Reader
Music informatics, music signal processing, automatic transcription, synchronisation, analysis of rhythm and harmony, computational musicology, expressive performance, semantic web

Dawn Black MEng(King’s) PhD
Lecturer
Singing information retrieval, singing voice, modelling musical expression, the application of music signal processing to Asian music

Prof Elaine Chew BAS(Stanford) SM(MIT) PhD(MIT) FTCL LTCL
Professor of Digital Media
Mathematical and computational modelling of music performance and aspects of musicianship related to performance, including prosody, cognition, analysis, composition/improvisation, ensemble interaction, and performance rendering

Panos Kudumakis BSc MSc PhD (Lond) SMIEEE
Research Manager / qMedia
Standardisation related to music technologies and interoperable multimedia architectures and services

Andrew McPherson BSc Music BSc MEng/MIT, USA PhD(U.Penn, USA)
Lecturer in Digital Media
Augmented instruments, new performance interfaces, study of expressive performance, hardware systems for music signal processing

Prof Mark Plumbley MA PhD(Cantab)
Professor of Machine Learning and Signal Processing
Automatic analysis of music and other sounds, including automatic music transcription, beat tracking, and acoustic scene analysis, using methods such as source separation and sparse representations.

Joshua D Reiss BSc PhD(Georgia Tech, USA)
Senior Lecturer
Audio engineering, sound synthesis, digital audio effects, intelligent audio and music production, multitrack and live signal processing

Andrew Robertson MA(Oxon) MSc PhD(Lond)
Research Fellow
Real-time analysis of music signals and interactive performance systems

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Prof Mark Sandler BSc PhD(Essex)
SMIEEE FAES FIEE FBCS CEng
Professor of Signal Processing
Digital audio, digital music, music informatics, semantic and intelligent audio, semantic media, linked data and metadata for music and audio, big data for music and audio, human interaction with web scale audio

Computer Science Theory
Our Theoretical Computer Science group (Theory) specialises in the logical mathematical and statistical foundations of computer science with a breadth and depth of expertise almost unmatched in the UK. The group’s expertise is broad in range – from complexity, through automated reasoning, concurrent and distributed systems, formal methods in human-computer interaction to verification of systems software and logic. We tackle the hard problems inherent in discovering the power and limitations of computer systems and how principled design based on the right mathematical models might make them more robust and secure.

We collaborate with NASA, ARM, Intel, Microsoft and other companies and government agencies on using novel mathematical modelling techniques. Our group is known as a world-leading centre for research on logical methods for reasoning about computer systems. We have spearheaded novel theoretical developments and new applications in areas including separation logic, logic for continuous systems, information theory for security, and process types for web services. We have also made fundamental contributions in pure logic (model theory, proof theory, categorical semantics) and in complexity theory.

Our extensive research funding comes from a variety of sources and includes three personal fellowships, and standard research grants. In the past year our work has won a Royal Academy of Engineering Silver Medal and the inaugural ETAPS prize, as well as a number of other awards. Our Monoidics spinout company has recently been sold to Facebook.

Staff research interests
Prof Dino Distefano MSc(Pisa) PhD(Twente)
Professor of Software Verification
Logic, automated software verification, program analysis, model checking, concurrency

Matthew Huntbach BSc(Lond) MA DPhil(Sus)
Lecturer
Concurrent programming languages specifically in languages to describe systems that consist of multiple agents interacting with each other

Prof Pasquale Malacaria Laurea(Rome) DEA PhD(Paris)
Professor of Computer Science
Semantics of programming languages and their application to static analysis computer and software security
Research areas

Paulo Oliva BSc(UFPE Brazil) MSc PhD(Aarhus University, Denmark)
Reader, Royal Society Research Fellow
Mathematical logic, structural proof theory, higher-type computability, complexity theory, game theory, Hoare logic, and formal verification

Soren Riis MSc(Copenhagen) PhD(Oxon)
Reader
Algebraic proof complexity, mathematical logic, bounded arithmetic, complexity theory, nonstandard models, network coding, representation theory and algebra

Prof Edmund Robinson MA PhD(Cantab)
Professor of Computer Science
Logic category theory and the semantics of programming languages and type theories

Mehrnoosh Sadrzadeh PhD
Lecturer, EPSRC Career Acceleration Fellow
Logic, category theory, and vector space models for syntax and semantics of natural language and social situations

Michael Tautschnig PhD
Lecturer
Automatic verification of software verification, concurrency, decision procedures

Nikos Tzevelekos Diploma(Athens) MSc PhD(Oxford)
Lecturer, RAEng Research Fellow
Logic and semantics of computation, game semantics, program analysis and software verification, automata on infinite alphabets, category theory

Greta Yorsh BSc MSc PhD(Tel Aviv)
Lecturer
Program analysis, verification, and synthesis, shape analysis, compilers programming languages, parallel and concurrent, programming, software engineering, abstract interpretation

Cognitive Science
The Cognitive Science group is built around a shared interest in how technology makes new forms of human action and interaction possible. Combining ideas from the arts, engineering and science, we examine how technology changes what it is possible for people to do, how they collaborate with others (real, robotic or virtual) and the new social economies they create. Our primary research areas are: human interaction, public engagement, advanced multi-modal interaction and social and ubiquitous computing.

We have built up world-class research facilities, including ground-breaking new experimental platforms, the Augmented Human Interaction (AHI) Laboratory – which combines high-quality motion capture equipment with novel 3D auditory and visual displays – and our new performance laboratory for studying multiperson, multi-modal interaction.

Our current grant portfolio of over £11m includes key projects on human-human and human-computer dialogue (DynDial), robot-human interaction (LIREC), interaction design for medical devices (CHI+MED),
personalised live video streaming (My eDirector 2012), and social models to enable smarter mobility (SUNSET). We also host world-leading science outreach activity including cs4fn (cs4fn.org), qMedia and the Media and Arts Technology Programme (mat.qmul.ac.uk).

We publish our research in high-quality international journals and have a strong presence at international conferences in our subject areas (eg Cognitive Science and Human-Computer Interaction). We also chair important international conferences in our area (eg SIGDial, IWCS: “SIGDIAL, IWCS and Creativity & Cognition”). Our innovative arts-science collaborations have been shown at the National Portrait Gallery, the ICA, SHUNT, Eyebeam in NYC and festivals around the UK.

Commercial applications of our work include a spinout company, Chatterbox (http://chatterbox.co)

Staff research interests

Nick Bryan-Kinns
BSc MSc PhD(Lond), FBCS
Reader in Interaction Design
Mutual engagement and group creativity, especially interactional sound and music, ranging from installation art to sonification in the workplace

Prof Paul Curzon BA MA PhD(Cantab)
PGCertHE FBCS NTFS
Professor of Computer Science
Interaction design, human error, medical device design, formal specification and verification, public engagement in science (cs4fn.org), computer science education

Chrisantha Fernando MA(Oxon) BM BCh(Oxon) MSc(Sussex) PhD(Sussex)
Lecturer
Darwinian neurodynamics, cognitive science, theoretical biology, computational neuroscience, evolutionary computation, origin of life, Bayesian cognition, artificial life, machine learning, artificial intelligence

Hamed Haddadi BEng(Hons) MSc(UCL) PhD(UCL/Cantab)
Lecturer in Digital Media
Social networks, advertising, privacy, network economics and operations

Prof Patrick Healey BSc(Hons) Dip App Psych(Nottingham) MSc PhD(Edinburgh)
Professor of Human Interaction
Communication and miscommunication, development of technologies to enrich and transform human interactions

Athen Ma BEng PhD(Lond)
Senior Lecturer
Social network analysis, complex network modelling and analysis, graph partitioning, community detection, personalisation, recommendation and delay tolerant networks
Research areas

Marcus Pearce MA(Oxon) MSc(Edin) PhD(City)  
Lecturer in Sound and Music Processing  
Music perception and cognition, auditory perception, auditory neuroscience, music and emotion, empirical aesthetics, neuroaesthetics, expectation, predictive coding, computational psychology

Stefan Poslad BSc PhD (Newcastle), MIEEE  
Senior Lecturer  
Internet of things, ubiquitous computing, semantic web and software agents, systems management, including security, safety, trust, and privacy

Matthew Purver BA MPhil(Cantab) PhD(Lond)  
Senior Lecturer  
Computational linguistics, natural language processing, semantics and pragmatics, ranging from dialogue systems and social media analysis to understanding mental health therapy dialogue

Karen Shoop BA MSc PhD(Lond)  
Lecturer  
Collaborative interaction and decision-making, social networks

Tony Stockman BTech PhD(Bradford)  
Senior Lecturer  
Collaborative interaction, cross-modal systems, the use of audio and haptics in Interaction Design, interactive sonification

Laurissa Tokarchuk BA BSc(Saskatchewan Canada) PhD(Lond)  
Lecturer  
Recommendation, multi-agent and tagging applications, artificial intelligence (including machine learning and planning) particularly in social computing, social network analysis mining

Graham White BA(Oxon) SM(MIT) DPhil(Oxon)  
Lecturer  
Spatial and causal reasoning, the logic of explanation, and the application of category and type-theoretic techniques to reasoning about action

Prof Geraint A Wiggins MA(Cantab) PhD PhD(Edin) MIET MBCS FRSA  
Professor of Computational Creativity  
Computational creativity, music cognition, music informatics, artificial intelligence. The relationship between learning, information and creativity

Computer Vision
Our Computer Vision group is internationally renowned for its work on computational modelling of the perception of action and activity, visual analysis of behaviour, face recognition, articulated structure and deformable surface reconstruction from video, and biologically inspired perceptual models; and pioneered techniques for robust real-time object detection and tracking, mining behaviour and action in video, multi-view super-resolution, multi-camera object reidentification, and multi-camera scene analysis.
“The facilities are awesome. The library is brilliant and has a separate silent study floor and areas for group study. The lab facilities are good, with all the equipment needed and helpful lab technicians”

Daria Stefic, Computer Science
Our core expertise includes statistical machine learning, time series analysis, dynamic Bayesian graph models, multi-view geometry, multi-modal data fusion, and neurobiologically inspired vision. The group’s research attracts significant interest from industry and the Government, including a large amount of international funding. Since 1998, the group has had direct industrial funding from the US and Australia for an R&D project developing computer vision-based advanced incident monitoring systems. Since 2007, the group has received venture capital investment; and UK and US government seed funding for video analytics commercialisation. This work has also been the primary intellectual property for two start-up companies in the US, Australia and UK.

Current and recent projects include SmartPrevent, Smart Video-Surveillance System to Detect and Prevent Local Crimes in Urban Areas; SUNNY, Smart UNmanned aerial vehicle sensor Network for detection of border crossing and illegal entrY, SAMURAI, global behaviour inference over distributed multicamera networks; LIREC, emotion and body language recognition; BEWARE, multi-camera object tracking and abnormal event recognition in CCTV; HUMANIS, 3D models of deformable and articulated objects; APIDIS, autonomous production of images based on distributed and intelligent sensing; and INSIGHT, video analysis and selective zooming using semantic models of human presence and activity. These collaborative projects link the group with UK, EU, and US government and industrial partners, as well as end users.

Staff research interests

Prof Andrea Cavallaro MSc(Trieste, Italy) PhD(Lausanne, Switzerland)
Professor in Multimedia Signal Processing
Multimedia signal processing, object tracking, perpetual semantics and interactive media computing

Prof Shaogang Gong BSc(Electron Sci and Tech, China) DPhil(Oxon) FIEE FBCS
Professor of Visual Computation
Computer vision, machine learning, visual analysis of behaviour, biometrics, visually mediated interaction, semantic video analysis

Miles Hansard BSc MRes PhD(UCL)
Lecturer
Binocular vision, multi-view reconstruction and depth-cameras, geometric and statistical models of human perception

Prof Peter McOwan BSc(Edin) MSc(Aberd) PhD MSc(Lond) FBCS
CSci CITP FInstP
Professor of Computer Science
Visual perception, mathematical models for visual processing, cognitive science and biologically inspired hardware and software
Yi-Zhe Song BSc(Bath) MSc(Cantab) PhD(Bath)
Lecturer
Computer vision, computer graphics, segmentation and grouping, non-photorealistic rendering, object classification, mobile visualisation

Tao Xiang BSc(Xi’an Jiaotong, China) MSc(CUC, China) PhD(NUS, Singapore)
Senior Lecturer
Computer vision, machine learning, data mining, video analysis, abnormal video behaviour detection for visual surveillance

Multimedia and Vision (MMV)
Our Multimedia and Vision group’s expertise is broad, ranging from multimedia coding to visual information retrieval. Our work includes scalable source and channel video coding, surveillance centric coding, object segmentation, and tracking for surveillance, multimodal signal processing, interactive media computing, semantic inference for visual information retrieval, multi-view-based 3D modelling, pattern recognition, artificial intelligence and video processing for social networking.

Members of the group have published numerous technical papers, several of them in the highest ranked journals of the field, including IEEE Transactions. We are currently co-operating with top academic institutions and industrial players world-wide, including research centres in France, the Netherlands, USA and Germany.

We have developed practical applications for relevant multimedia systems including a complete framework for scalable video coding and are contributing to other standardisation activities as JPSearch and MPEG-4/7/21. We are a member of the European Networked Electronic Media Platform and participate in a selected group of international experts making up the Future Media and 3D Internet Task Force of the European Commission.

Our current research portfolio consists of a healthy mixture of academic and industrial-orientated research. We hold three EPSRC research projects and two substantial industry funded grants. Members of the group are currently co-ordinating the IST Network of Excellence, 3DLife and participate in several large co-operative European projects including ADVISE, VideoSense, Saracen, REVERIE, Cubrik.

Staff research interests

Pengwei Hao BSc MSc(NWPU, Xi’an, China) PhD(IRSA CAS Beijing, China)
Lecturer
Image coding, image retrieval, 3D modelling, mesh coding, colour imaging, on photorealistic rendering and computer animation

Prof Ebroul Izquierdo BSc MSc PhD (Humboldt, Berlin) MBMVA FIEE SMIEEE CEng
Professor of Multimedia and Computer Vision
Visual information retrieval, scalable video coding and networking, social networks and 3D media processing
Research areas

Ioannis Patras BSc MSc (Heraklion, Greece)
PhD (Delft, Netherlands)
Senior Lecturer
Computer vision, pattern recognition and artificial intelligence and their application in multimedia analysis

Hatice Gunes BSc PhD (Sydney, AU) MIEEE
Lecturer
Affective computing, social signal processing, computer vision, machine learning, multimodal behaviour analysis, human-computer/virtual agent/robot interaction.

Networks
The Networks group was founded in 1987, and has since expanded greatly. We have an international reputation for excellence in bringing intelligence and performance assessment techniques to fixed and mobile communication networks. The group has a long-standing interdisciplinary collaboration with the School of Mathematical Sciences, supported by a succession of funded projects. This collaboration encompasses non-linear dynamics and experimental design, particularly as applied to optimising network measurement.

We have been key players in many international collaborative projects, are active in joint teaching and research with Beijing University of Posts and Telecommunications, as well as a joint lab in Macao. The wireless research in the group is growing rapidly and current research now covers areas including cognitive radio, cooperative networks and MIMO, self-organising radio resource management, smart antennas, energy efficiency and capacity improvements, cross-layer design, vehicular communication technologies, sensor networks and network security.

The group is active in many key areas of the current and future internet, such as cloud content delivery, and online social networks. Another specialty of the group is the use of mathematical formalisms and methodologies to model network behaviour, with significant contributions to queuing theory, topology and traffic modelling, accelerated simulation and measurement. The group actively exploits its intellectual property, whether as patents (eg jointly with major equipment vendors), or in spinout activity, such as Actual Experience Ltd.

Spin-out company
Actual Experience plc has developed an innovative business information tool to enable corporations to analyse their digital supply chains and thereby improve the experience of their employees, customers and partners with regard to important digital products and services. Watch a three-minute documentary at actual-experience.com/video

Staff research interests
Eliane Bodanese BScEng MSc PhD (Lond)
MIET
Senior Lecturer
Intelligent mechanisms for control and management in wireless networks, QoS provisioning in communications, middleware development for distributed systems
Michael Chai BEng(Hons) MSc PhD MIEEE
Joint Programme Lecturer
Wireless networking and protocols on smart grid, vehicular networks, heterogeneous wireless networks, the internet of things, LTE/LTEA, Cloud radio access network

Yue Chen BS MS PhD MIET MIEEE
Director of Offshore Operations
Next-generation wireless networks, intelligent radio resource management, CoMP, cognitive radio, intelligent transport system, smart grid

Félix Cuadrado MEng PhD (Universidad Politécnica de Madrid) MIEEE
Lecturer
Autonomic computing, cloud computing, big data processing, software-defined networking, internet analytics

Maged Elkashlan BSc MSc PhD(UBC)
Lecturer
Co-operative wireless networks, MIMO, cognitive radio, physical layer security

Paula Fonseca BSc PhD(Lond) MIET
Lecturer
Previously worked for major telecoms companies as R&D engineer, modelling IP differentiated services’ control and implementing features for network switches

Yue Gao MSc PhD (Queen Mary University of London) SMIEEE MIET
Lecturer in Antennas and Signal Processing
Compact antennas from UHF to millimetre-wave, intelligent spectrum sensing and cognition algorithms for mobile and Machine-to-Machine (M2M) communications including compressive sensing

Ling Ma BEng MSc PhD(York)
Lecturer
Context-aware information systems, acoustic environment classification, software engineering for mobile applications and content information retrieval

Raul Mondragon MSc PhD(Bris)
Senior Lecturer
Application of non-linear dynamics to network traffic and the development of chaotic control techniques to reduce end-to-end delay in packet traffic

Chris Phillips BEng PhD(Lond) MIET
Reader
Internet technologies, next generation optical networking, energy-aware resource management, body area networking and wireless sensor networks

Prof Jonathan Pitts MEng PhD(Lond) MIEEE
Professor of Communications Engineering
Quality of service, perceptual quality, network performance, teletraffic analysis, accelerated simulation, traffic control, and resource management for converged network infrastructure

John Schormans BSc PhD(Lond) MIET CENG
Senior Lecturer
Modelling, probabilistic analysis, simulation and measurement of broadband packet networks, including wireless systems
Research areas

Yan Sun BEng MSc PhD(Lond)
Lecturer
Routing strategy in ad-hoc wireless networks, energy-saving solutions in the internet of things, cross-layer modelling design for the next generation of wireless network

Prof Steve Uhlig MSc PhD(Louv) MIEEE MACM
Professor of Networks
Internet measurements, traffic engineering, routing, software-defined networking, content delivery, network infrastructure virtualisation

Matthew Tang BEng MPhil PhD(CUHK) MIEEE
Lecturer
Electronic design automation, FPGA architectures, embedded systems, green electronics

Vindya Wijeratne BEng PhD(Lond)
Lecturer
Network performance specifically active queue management and differentiated services, accelerated simulation, virtual router platforms

Risk and Information Management
The RIM group takes an interdisciplinary approach to decision systems.

The group’s research focuses on problems of decision-support under uncertainty using methods from computer science, statistics, machine learning and psychology, to solve problems and challenges presented by scale, complexity and variability. The research of the group is world-leading in its unique combination of data-centric methods with hypothesis-driven approaches, in which the power of advanced computing is combined with the insights of human expert judgments. RIM group members work with practitioners to produce intelligent ‘unified models’ that use both data and expertise as inputs. These models are used to support inference and decision-making in a wide range of application domains, including medical, legal, systems engineering, bioinformatics, security, risk and safety.

The group was established in 2010 from the merger of the RADAR (Risk Assessment and Decision Analysis Research) and IR (Information Retrieval) groups. The group has attracted research funding worth over £4 million from organisations such as the EU, EPSRC, Royal Society, Yahoo, Library and Information Commission and the British Council. The group has a long-term association with Agena Ltd, and its work with Agena was chosen as a case study for the 2014 REF submission.
Staff research interests

Prof Norman Fenton BSc MSc(Lond) PhD(Sheff) FBCS MIEE AFIMA CEng CMath
Professor of Computer Science
Intelligent decision analysis and risk, using Bayesian networks, with applications in medicine, law, critical systems and media personalisation

Anne Hsu PhD(UCB, USA)
Lecturer
Machine learning, human decision-making, behaviour economics, human computer interaction, motivation, engagement and gamification

William Marsh MA(Cantab) MSc(Oxon) PhD(Soton)
Lecturer
Risk assessment and decision analysis with Bayesian networks, specialising in system safety and medical decision-making

Prof Martin Neil BSc(Glasgow Caledonian) PhD(South Bank and Strathclyde) MIEE CEng
Professor of Computer Science and Statistics
Systems risk and software project risk assessment, operational risk in finance, and decision analysis with Bayesian networks

Jane Reid MA(St Andrews) MSc(Glas)
Senior Lecturer
User-centred aspects of information seeking, information retrieval, structured document retrieval and human-computer interaction; pedagogical research

Timothy Hospedales MA(Cantab) MSc MRes PhD(Edin)
Lecturer
Transfer, cross-domain and active machine learning. Application to computer vision, multimedia indexing, security, web analytics, and medicine

Thomas Roelleke Diplom-Informatiker Dr rer nat
Senior Lecturer
Information management based on the integration of database and information retrieval technologies

Fabrizio Smeraldi MSc(Genoa) PhD(EPFL)
Lecturer
Pattern recognition, computer security, physical foundations of computing, computer vision, machine learning

Tassos Tombros DipEng(Patras, Greece) MSc PhD(Glas)
Lecturer
Document clustering as a tool for effective document retrieval, query-based similarity measures and user-based
All of our MSc degree programmes are available as one-year full-time study, and in some cases as part-time study over two years.

**Full-time study: one-year duration**
Full-time programmes are organised into three semesters. In the first and second semester you will study a set of core and option modules (where available) that cover the foundational techniques and tools employed in your area of specialism. The module selection allows you to focus on domain-specific research or industry applications for your subject area. In the third semester, you will carry out a large project full-time, after agreeing to a topic and supervisor in the first semester, and completing the preparation phase over the second semester.

Undertaking a masters programme is a serious commitment, with your weekly contact hours being in addition to the numerous hours of independent learning and research needed to progress at the required level. When coursework or examination deadlines are approaching, independent learning hours may need to increase significantly.

**Part-time study: two-year duration**
Part-time study options often mean that the number of modules taken is reduced per semester, with the full modules required to complete the programme spread over two academic years. Teaching is generally done during the day and part-time students should contact the course convenor to get an idea of when these teaching hours are likely to take place.

**Teaching and assessment**
The required study time for all full-time programs is 36 hours a week. Courses are delivered through a combination of lectures, seminars and practical labs, the balance of which is determined by the nature of the material being covered. There are eight taught modules, four per semester. From the end of the exam period, you will be fully engaged in your summer project which is equivalent to another four modules. All modules are examined through a combination of coursework and written examinations taken in May/June. To obtain an MSc, you must gain passes in six of the eight modules taken, with an overall average of 50 per cent.

**Individual Research Project (Dissertation)**
You will also be assessed on a substantial individual research project, taken at the end of the examination period, during June to September. We encourage you to develop research projects that involve collaborations with industry or that are commercially focused.
Students are currently researching a range of topics including:

• investigation into human errors in interactive systems
• automatic emotional tone detection of Twitter dialogue
• pedestrian detection in crowded surveillance scenes.

**Industrial Experience programmes**

We offer Industrial Experience options on all our full-time taught MSc programmes, which combine academic study with a one-year industrial placement between your taught modules and summer project. Taking the Industrial Experience option as part of your degree gives you a route to develop real-world, practical problem-solving skills gained through your programme of study in a professional context. This can give you an important edge in the graduate job market. As a leading research School, we have excellent links with industry. We also employ dedicated staff to help you arrange your year in industry. The Industrial Experience programmes are highly competitive and attract the best students, given the limited availability of placements. We are unable to guarantee that all students will secure an industrial placement, as our industrial partners conduct their own employment application and interview processes.

**Industrial projects scheme**

This scheme is open to all of our MSc students. It provides a mechanism for you to do your MSc project in collaboration with an industrial partner. Projects can either be based on-site or done remotely through collaborative supervision. Most projects are undertaken part-time (five months – January-June) or full-time (three months – June-August). Media and Arts Technology MSc projects are full-time for five months (April-August). We are unable to guarantee an industrial project, as our industrial partners always reserve the right to interview students for suitability for the project.

**Benefits to our industrial partners include:**

• a cost-effective way of getting a project done or an idea tested
• the ability to trial potential employees
• a creative, highly skilled and fresh approach
• involvement and access to high quality cutting-edge researchers
• IP: We offer flexible arrangements regarding any IP developed by the student while involved in an industry project.

**How the industrial projects work:**

• Firms submit project briefs to us by the beginning of November
• All briefs are subject to approval by the School
• You attend a number of classes in semester 1 to help you prepare applications for industrial projects and give you information about the process
• Approved briefs are circulated to you and you identify one or two projects in which you are interested and apply for those projects
• Your application is filtered both by the School and by the firm proposing the project
• Students passing this filtering process are interviewed by the firm proposing the project
• An academic supervisor for the project is assigned
• Offsite part-time work on the project begins in January
• Full-time work on the project (either off or on site) begins after the exams in early June and continues up to the end of the project period at the end of August, when you submit your final report
• The project viva takes place in the first two weeks of September.

Some of the organisations we have worked with include:-
• Alcatel-Lucent (alcatel-lucent.com)
• BBC (bbc.co.uk)
• BFI (bfi.org.uk)
• Big Dog Interactive (bigdoginteractive.com)
• BT (bt.com)
• Chatterbox (chatterbox.co)
• Codex (codexdigital.com)
• Corbas Consulting (corbas.co.uk)
• dstl (dstl.gov.uk)
• Engineered Art (engineeredarts.co.uk)
• fxpansion (fxpansion.com)
• Goodgym (goodgym.org)
• IBM (ibm.com)
• Illustrious (illustriouscompany.co.uk)
• LastFM (last.fm)
• Nearfield Systems (nearfield.com)
• 007 Daily Deals (007dailydeals.com)

ALUMNI PROFILE: Yannick Jacob

Studied: MSc Digital Music Processing

What have you been doing since you graduated?
I spent a couple of months in Spain for a research-oriented internship in human / computer interaction. I am now a Research Engineer at Mines ParisTech & PSA (Paris), pursuing a PhD in Mathematics and Systems.

Could you tell us about your current role?
I am working for a French car manufacturer and an automotive robotics lab to develop a completely new technology. My PhD is focused on the use of vision systems (and especially 3D cameras) to capture the driver’s gestures. This system enables the driver to activate secondary controls (radio, navigation) via natural and simple commands (gaze, finger gestures, voice). It encapsulates various areas from computer vision to signal processing, human computer interaction, machine learning and design.

How did your degree help you with your career?
My MSc degree at Queen Mary, along with the thesis I completed there, were very important in order to complement my French engineering degree. Its research focus in a very interesting and promising field enabled me to obtain several job offers, where both core scientific skills and creative and innovative thinking were required.

• Proboscis (proboscis.org.uk)
• Somethin Else (somethinelse.com)
• Sony (technology.scee.net)
• Space (spacestudios.org.uk)
• Tandemlaunch (tandemlaunch.com)
To help you choose the right career path, our postgraduate degree programmes are organised into three themes:

- Computer science
- Electronics, telecommunications and signal processing
- Media

**Computer science**

Sixty years since the introduction of the first commercial computers, they have transformed the way we live and work. Computers are used for communication, entertainment and commerce; controlling robots, monitor hospital patients, flying aeroplanes and helping us to drive cars. Devices are smaller, cheaper and yet more powerful, and change shows no sign of slowing: new industries are created, existing ones transformed. To stay ahead, it is vital to understand how computers work, new applications are created, and people and computers work together. This is analytical and logical, yet also innovative and creative. Our Computer Science programmes combine programming, the design of computers and networks, the theory of computers, as well as usability, media and creativity.

Information technology is vital in so many industries, giving you a wide range of career choices. You may choose to work in the finance industry, where there is complete reliance on computers and networks to provide the mechanisms for transactions across the world, or in one of London’s creative start-up companies clustered in the East End. Alternatively, you could join one of the large technology companies or consultancies. Studying Computer Science will give you the confidence to play a significant part in the greatest wave of technological innovation of all time.

**Electronics, telecommunications and signal processing**

What do the following all have in common: your smart-phone, video streams of important events anywhere in the world, surfing the internet, processing data from a crime scene, and a surgical procedure to remove a brain tumour? They all rely on electronics. Electronics allows us to make our thoughts and ideas a reality. Mankind has travelled from the deepest ocean to the moon, and has sent probes into deep space, and all this has been made possible by electronic systems. You might say that electronic engineers are the people who make the modern world function. Due to its power and wide applicability, studying electronics is both challenging and rewarding. Here at Queen Mary, you will learn the specialist skills that you need to prepare you for an exciting career in fields such as digital and analogue electronics, networking, audio systems engineering, and business information technology.
Globally, the internet is growing at an astounding rate, connecting people in ways never seen before. This has made possible much that the world now takes for granted, for example, Facebook and Google and mobile phones running a vast array of Apps. Underpinning the internet revolution is the science and technology of telecommunications systems, both fixed and mobile. This new world of networks requires a whole new generation of engineers educated to a high level in the fundamental science, mathematics and technologies that have made global networking possible. Our MSc programmes are ideal for such ambitious individuals. These are for students who want to pursue a career shaping and defining the new generation of converged networks, responding to rapid developments such as social networking, seamless mobility, mobile data and the proliferation of applications for mobile and handheld devices.

Media
In the digital creative industries, in both the UK and worldwide, there is a strong demand for new people with the necessary creative and technical knowledge and skills. Our Masters by Research in Media and Arts Technology (MAT) degree is aimed at students who are passionate about the visual arts or sound/music and want to develop creative technology to affect and change the way humans interact with each other and with technology. On this course you will learn the core skills for new media production – interactive media design, programming for arts applications, creating interactive objects – as well as understanding the theory that underpins computer and multimedia systems. To develop these technical and creative skills, MAT students have access to our computer and multimedia labs, our recording studios and our performance space. A competitive Placement Project covers topics ranging from developing advanced technical skills through human interaction to performance and live art. On this degree you will develop the range of artistic, design and technical skills to fulfil many posts in creative industries within Tech City and beyond.

Our MSc in Sound and Music is developed by the acclaimed Centre for Digital Music (C4DM). This programme offers a broad range of study options in methods of processing, analysis, synthesis and manipulation of musical signals and is designed for those who want to acquire an in-depth understanding of data analysis and signal processing techniques related to human speech and hearing, psychoacoustics and masking, and instrument and room acoustics. The MSc is intended for graduates in a related discipline, who wish to hone and enhance their skills, and for industrialists with experience of sound and music computing, seeking formal qualifications. The taught modules are fully supported with computing and laboratory work.

**Please note:** the availability of programme modes of study and the modules listed in the following sections are subject to change. Please contact us to confirm the availability of specific modules before you make your application.
MSc Big Data Science
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-big-data

This programme is designed for those who want to pursue a career as data scientists, deriving valuable insights and business-relevant information from large amounts of data. You will cover the fundamental statistical (e.g., machine learning) and technological tools (e.g., cloud platforms, Hadoop) for large-scale data analysis.

The course leverages the world-leading expertise in research at Queen Mary with our strategic partnership with IBM and other leading IT sector companies to offer a MSc in the field of Data Science. The Big Data science movement is transforming how internet companies and researchers over the world address traditional problems. Big Data refers to the ability to exploit the massive amounts of unstructured data that is generated continuously by companies, users, devices, and extract key understanding from it. The programme is taught by academics from the Networks, Centre for Intelligent Sensing, Risk and Information Management, Computer Vision and Cognitive Science research groups. This is a team of more than 100 researchers, performing world-leading research in the fields of Intelligent Sensing, Network Analytics, Big Data Processing platforms, Machine Learning for Multimedia Pattern Recognition, Social Network Analysis, and Multimedia Indexing.

Programme outline
Core modules:
• Big Data Processing
• Data Mining
• Applied Statistics
• MSc Project

Option modules include:
• Advanced Program Design
• Advanced Database System Technology
• Sensors and the Internet of Things
• Business Technology Strategy
• Techniques for Computer Vision
• The Semantic Web
• Information Retrieval
• Digital Media and Social Networks

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in electronic engineering, computer science, mathematics, or a related discipline.
• Applicants with unrelated degrees will be considered if there is evidence of equivalent industrial experience.
• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
“Big Data processing to me is a magic trick that we uncover during the module. A few lines of code in a familiar language trigger the orchestrated execution of potentially hundreds of machines, processing terabytes of information. The results from these computations are directly relevant to many application domains”

Dr Felix Cuadrado, Computer Science
MSc Computing and Information Systems
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-comp-info-sys

Graduates who are able to fully exploit the potential of computing and information systems within a range industries, including retail, manufacturing, health, and communications are highly sought after. If you are looking to enhance your employability and develop your skills in this area, but have little or no technical experience, then this programme is for you.

Overview
Guided by academics with a wealth of industrial experience, this is an intensive one-year MSc programme for highly motivated graduates with a good honours degree, but with little prior experience of computer science. You will develop your theoretical knowledge and practical technical development skills through extensive training in the subjects at the heart of computing, including object-oriented programming (using Java), database systems, and information systems (covering system design, networking and computer architecture). You will be able to extend your areas of technical expertise to specialist areas by choosing from a variety of option modules, such as Mobile Devices and Social Networks, Business Technology Strategy and Graphical User Interface Design.

You can personalise your programme to follow a technical or business focus, developing practical and theoretical skills which will be highly relevant in today's job market.

Programme outline
Core modules:
• Database Systems • IT Programming (double module) • Information Systems (double module) • MSc Project

Option modules:
• Artificial Intelligence
• Business Information Systems
• Business Technology Strategy
• Distributed Systems and Security
• Graphical User Interfaces
• Mobile Services
• Security and Authentication
• Software Risk Assessment

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in a subject not related to computer science, or a degree with less than 50 per cent of the modules in computer science subjects.

• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
MSc Computer Science
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-comp-sci

The demand for better products and commercial services drives the search for creative solutions using computing-based systems, and has established a critical dependence between computing and practically every industry and sector. This flexible programme offers a broad range of advanced study options, reflecting the emerging technologies in industry.

Overview
You will be able to shape your programme to match your interests and career ambitions, choosing modules from a range of areas, including the development of human-computer communications (dialogue systems), ubiquitous computing, applying interactive digital multimedia techniques, security and surveillance, and building decision-support tools for uncertain problems in various contexts (eg legal, medical, safety). This is a multidisciplinary programme and, in addition to pure computer science modules, you may choose options in which computer science intersects with other fields and builds on your first degree.

Programme outline
Core module:
MSc Project

Option modules:
• Advanced Database Systems and Technology
• Advanced Program Design
• Big Data Processing
• Business Technology Strategy
• C++ for Image Processing
• Design for Human Interaction
• Foundations of Intellectual Property Law and Management
• Functional Programming
• Information Retrieval
• Interactive System Design
• Introduction to Computer Vision
• Introduction to Law for Science and Engineering
• Machine Learning
• Mobile Services
• Program Specifications
• Real-Time and Critical Systems
• Security and Authentication
• Software Analysis and Verification
• Software Risk Assessment
• Techniques for Computer Vision
• The Semantic Web
• XML and Structured Documents

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in electronic engineering, computer science, mathematics, or a related discipline.
• Applicants with unrelated degrees will be considered if there is evidence of equivalent industrial experience. For international students whose first language is not English we require IELTS 6.5.
MSc in Computer Vision
One year full-time, two years
full-time with Industrial Experience,
two years part-time
eecs.qmul.ac.uk/msc-comp-vision

What if your smartphone could recognise that it was you before switching on, and could sense your mood by recognising your facial expressions? What if you could use a real thumbs-up for ‘liking’ things on Facebook? How can you play games on an Xbox using only your body gestures? How can you equip cars with in-vehicle technology that could automatically read road signs? These are just some of the fascinating questions that you will strive to answer on this programme.

Overview
This programme is intended to respond to a growing skills shortage in research and industry for engineers with a high level of training in the analysis and interpretation of images and video. It covers both low-level image processing and high-level interpretation using state-of-the-art machine learning methodologies. In addition, it offers high-level training in programming languages, tools and methods that are necessary for the design and implementation of practical computer vision systems. You will be taught by world-class researchers in the fields of multimedia analysis, vision-based surveillance, structure from motion and human motion analysis. Aside from your lectures, you will be working on cutting-edge, live research projects, gaining hands-on experience.

Programme outline
Core modules:
• Advanced Transform Methods
• Emerging Topics in Learning and Vision
• Introduction to Computer Vision
• Machine Learning
• MSc Project
• Techniques for Computer Vision

Option modules:
• Artificial Intelligence
• Big Data Processing
• C++ for Image Processing
• Computer Graphics
• Digital Media and Social Networks
• Real-Time and Critical Systems
• Real-Time DSP

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in computer science, electronic engineering, maths, physics or a related discipline. You should have good knowledge of computer programming, including programming using C/C++, Python, Matlab or Java.

• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
“Computer Science is a constantly evolving subject and so I enjoy being challenged with new problems and having the chance to learn about the latest developments in my studies. Students have the opportunity to carry out their own research in an area they are interested in for the final year project. This is my favourite part of the postgraduate degree, as I have the freedom to work independently and acquire knowledge in a subject I am enthusiastic about.”

Aminah Sayed, MSc Computer Science
MSc Software Engineering
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-soft-eng

Whether it’s the computers in our offices, the smartphones in our pockets, the electrics in our cars or the technology that enables us to monitor patients in critical care, software is at the heart of our society. This MSc programme focuses on advanced theoretical and practical techniques in program design, and the management of software project risk.

Overview
You will learn advanced techniques in programme design (including software patterns and component technologies) and information handling (structured information and databases). You will also cover vital areas such as security, specification, risk management, usability, and design integrity. You can study key issues of interactive system design, leading to the ability to identify issues and trade-offs in the design of human-computer interaction, and to invent and evaluate alternative solutions to design problems. You will study the mathematical foundations of software and their use in practice. You will develop skills to manage software project risks and learn about the development of tools to support decision-making.

Programme outline
Core modules (three from):
• Design for Human Interaction
• Functional Programming
• Program Specifications
• Real Time and Critical Systems
• Software Analysis and Verification
• Software Risk Assessment
• MSc Project

Option modules:
• Mobile Services
• Security and Authentication
• Business Technology Strategy
• Interactive Systems Design
• The Semantic Web
• High Performance Computing
• Machine Learning
• XML and Structured Documents
• Advanced Program Design
• Advanced Database Systems and Technology
• Distributed Systems and Security

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) with a substantial computer science component (at least half) or equivalent industrial experience. You should also have good programming skills for undertaking the practical elements of the programme. Unrelated degrees will be considered if there is evidence of significant industrial experience.
• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
MSc by Research in Computer Science
One year full-time, two years part-time
eeecs.qmul.ac.uk/msc-comp-sci-research

This MSc involves an extended individual research project carried out as part of one of our established research groups, combined with selected taught modules.

Overview
This programme offers you the chance to undertake an advanced masters programme through an extended research project. The programme is suitable for outstanding students who have an interest in advanced research-based study in one of our research specialisms: Computer Vision, Cognitive Science, Risk and Information Management, Computer Science Theory. The expectation is that every graduate from the degree will publish at least one conference paper as part of their research. The MSc by Research programme will give you solid theoretical and practical research competences in your chosen field of study and will enhance your employability. Successful completion of the programme may also provide a route to further study at doctoral level or for a research position in industry.

Please note module availability is subject to change.

Programme outline
• You will join one of our research groups, taking four selected taught modules and completing an extended research project.
• You can choose four taught modules from any of the modules offered in the School, in line with what is most appropriate for your chosen research project.

Teaching and assessment
• Teaching for all modules includes a combination of lectures, seminars and a virtual learning environment.
• Modules are assessed through a combination of coursework and written examinations. You will also be assessed through an individual project.
• The MSc Research Project will be conducted under close supervision throughout the academic year, and is evaluated by thesis, presentation and viva examination.

Entry requirements
• An upper-second class (2:1) honours degree or equivalent in a related discipline. For international students whose first language is not English, we require English language qualifications IELTS 6.5.
• In your application you should identify the research group relevant to your proposed study. Offers are subject to the agreement of a suitable research proposal.
This programme was designed in response to a growing skills shortage in industry of engineers with a high level of training in digital signal processing, a technology which is vital to the support of the internet, multimedia, broadcast, communications and consumer industries.

**Overview**
From facilitating the growth of digital communication systems to healthcare scanning applications, digital signal processing (DSP) underpins many of today's technologies. On this programme you will develop core knowledge of basic DSP theory and its implementation in hardware. You will also be able to specialise in areas including multimedia and intelligent signal processing. The taught modules are fully supported with computing and laboratory work. This MSc is designed for graduates in a related discipline, who wish to enhance their skills in this area, and also for those working in the IT sector with some experience of working with signal processing, who wish to consolidate their knowledge with a formal qualification.

**Programme outline**

**Core modules:**
- Communication Theory
- Advanced Transform Methods
- Fundamentals of DSP
- Real-time DSP
- MSc Project

**Option modules:**
- Mobile and WLAN Technologies
- Machine Learning
- Introduction to Computer Vision
- XML and Structured Documents
- Sensors and the Internet of Things
- Mobile Services
- Security and Authentication
- Real-time and Critical Systems
- Business Technology Strategy
- Music and Speech Processing
- Digital Audio Effects
- Music Analysis and Synthesis
- Interactive Systems Design
- Techniques for Computer Vision

Please note module availability is subject to change.

**Entry requirements**
- A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in electronic engineering, computer science, mathematics, physics or a related discipline, with some programming experience.
- Unrelated degrees will be considered if there is evidence of significant industrial experience.
- For international students whose first language is not English, we require English language qualifications IELTS 6.5.
“Queen Mary provides a relaxing and peaceful environment suitable for students who want to enjoy themselves by studying in the fully equipped labs or in the library. Mostly I enjoy interacting with other students from other parts of the world exchanging opinions and experiences”

Angeliki Bazigou, MSc Digital Signal Processing
MSc Telecommunications Systems
One year full-time, two years full-time with Industrial Experience, two years part-time
ecs.qmul.ac.uk/msc-telco-sys

This new MSc is designed to educate a generation of network engineers in the fundamental science, mathematics and technologies that have made global networking possible, and will continue to develop it into the future. It is for students who want to pursue a career shaping and defining the new generation of converged networks, responding to rapid developments such as social networking, seamless mobility, mobile data and the proliferation of applications for mobile and handheld devices.

Overview
The MSc programme teaches Java programming for network and services design, provides an in-depth treatment of the technological foundations of converged all-packet networks, and covers current mobile networks from WCDMA 3G to LTE and LTE-Advanced. It will enable you to develop an extensive understanding of 21st Century networks, current mobile and WLAN technologies, software for network and services design, network modelling, and the new realm of sensors and the Internet of Things.

Our staff are international experts in the fields of converged all-IP networks, modelling, measurements and quality of experience, and wireless technologies.

Programme outline
Core modules:
- 21st Century Networks
- Communication Theory
- Mobile and WLAN Technologies
- Mobile Services
- Network Modeling and Performance
- MSc Project
- Software and Network Services Design

Option modules include:
- Business Technology Strategy
- Digital Media and Social Networks
- Network Planning, Finance and Management
- Next Generation Mobile
- Security and Authentication
- Sensors and the Internet of Things

Please note module availability is subject to change.

Entry requirements
- A good second-class degree or above (good 2:1 minimum for Industrial Experience option) or equivalent in electrical engineering, computer science, mathematics, or a related discipline.
- Unrelated degrees will be considered if substantial relevant industrial experience is shown.
- For international students whose first language is not English, we require English language qualifications IELTS 6.5.

Electronics, telecommunications and signal processing
MSc Telecommunications Systems Management
One year full-time, two years full-time with Industrial Experience, two years part-time
ees.qmul.ac.uk/msc-telco-sys-mgt

This programme provides training in the principles of converged networking, network planning, network management and network performance through an integrated curriculum designed to respond to rapid developments and growing demand in the discipline.

Overview
The programme will provide a greater appreciation of the business context in which networked applications and underlying information and communications technologies are used by organisations. Increased exposure to, and understanding of, the benefits of technology, business and strategic knowledge and thinking will give you a thorough preparation for management roles within such organisations.

Programme outline
Core modules:
• Business Technology Strategy
• Network Planning, Finance and Management
• MSc Project
• Communication Theory
• Mobile and WLAN Technologies
• 21st Century Networks
• Software and Network Service Design

Option modules include:
• Next Generation Mobile
• Sensors and the Internet of Things
• Network Modeling and Performance
• Mobile Services
• Digital Media and Social Networks

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) or equivalent in electrical engineering, computer science, mathematics, or a related discipline.
• Unrelated degrees will be considered if substantial relevant industrial experience is shown.
• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
Electronics, telecommunications and signal processing

MSc Mobile and Wireless Networks
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-mwnet

Globally, the explosion of applications and data services has created huge growth in the mobile and wireless communications industries. Seamless mobility, mobile data, proliferating applications for mobile and handheld devices and social networking are all fast-moving areas driving growth in the rapidly expanding mobile telecommunications industry.

Overview
This programme has been specifically designed to educate a new generation of engineers in both the fundamental engineering science and the technology necessary to sustain the future of this industry. In it we cover communications theory, physical layer network communications and advanced electromagnetics, performance evaluation techniques, and an in-depth treatment of mobile networks from WCDMA 3G to LTE and LTE-Advanced. You will have access to our state-of-the-art Antennas Measurement laboratory, which specialises in high-quality measurements for the purposes of antenna design. It is one of the most comprehensive in a European university, and includes a Microwave CATR reflector, a general purpose anechoic chamber and a body-centric wireless sensor lab.

Programme outline
Core modules:
- 21st Century Networks
- Antennas for Mobile Applications
- Communication Theory
- Mobile and WLAN Technologies
- Next Generation Mobile
- MSc Project
- Radio Wave Propagation for Wireless Communications

Module options include:
- Business Technology Strategy
- Mobile Services
- Network Modeling and Performance
- Real-Time DSP
- Sensors and the Internet of Things

Please note module availability is subject to change.

Entry requirements
- A good second-class degree or above (good 2:1 minimum for Industrial Experience option) or equivalent in electrical engineering, computer science, mathematics, or a related discipline.
- Unrelated degrees will be considered if substantial relevant industrial experience is shown.
- For international students whose first language is not English, we require English language qualifications IELTS 6.5.
Our students working on propagation measurement for body-centric communications in the Microwave Anechoic Chamber
MSc by Research in Electronic Engineering
One year full-time, two years part-time
eecs.qmul.ac.uk/msc-comp-sci-research

On this programme you will use theoretical and experimental research techniques to explore and create innovative state-of-the-art technologies, enabling you to transfer your knowledge for practical application in the future.

Overview
An MSc by Research will provide you with the necessary skills to undertake research either in an academic or industrial environment. The expectation is that every graduate from the degree will publish at least one conference paper as part of their research. You will develop excellent technical skills, and will be able to demonstrate to employers your ability to undertake high-level independent research.

The programme is suitable for outstanding students who have an interest in advanced research-based study in one of our research specialisms: Antennas and Electromagnetics, Centre for Digital Music (C4DM), Multimedia and Vision (MMV), and Networks. This programme is a pathway to a PhD, providing the necessary training to prepare for a career in research and development.

Programme outline
- You will join one of our research groups, taking four selected taught modules and completing an extended research project.
- You can choose four taught modules from any of the modules offered in the School, in line with what is most appropriate for your chosen research project.

Teaching and assessment
- Teaching for all modules includes a combination of lectures, seminars and a virtual learning environment.
- Modules are assessed through a combination of coursework and written examinations. You will also be assessed through an individual project.

Entry requirements
- An upper-second class (2:1) honours degree or equivalent in a related discipline. For international students whose first language is not English, we require English language qualifications IELTS 6.5.
- In your application you should identify the research group relevant to your proposed study. Offers are subject to the agreement of a suitable research proposal.
Investigating the interaction of electromagnetic waves and biological tissue
MSc in Sound and Music Computing
One year full-time, two years full-time with Industrial Experience, two years part-time
eecs.qmul.ac.uk/msc-snd-msc-comp

This programme responds to a growing skills shortage in industry for engineers and computer scientists trained specifically in sound and music processing, as digital media become ever more advanced and ubiquitous.

Overview
You will develop core knowledge of advanced music and audio technologies, giving you the background and skills you need for careers in the technical aspects of audio production or engineering, broadcasting, intelligent signal processing, computational music analysis, music information retrieval and other areas of sound and music computing. You will graduate with the potential to become a pioneer in developing future generations of leading-edge music technologies. The taught modules are fully supported by computing and laboratory work. The MSc is intended for graduates in a related discipline, who wish to hone and enhance their skills, and for industrialists with experience of sound and music computing, seeking formal qualifications.

Programme outline
Core modules:
• Fundamentals of DSP • Music Perception and Cognition • MSc Project

Plus maximum one of:
• Sound Recording and Production Techniques • Interactive Digital Multimedia Techniques

At least two from:
• Music & Speech Processing • Digital Audio Effects • Music Analysis & Synthesis • Real-Time DSP

Module options include:
• Machine Learning • Advanced Transform Methods • XML and Structured Documents • Mobile and Wireless Technologies • Interactive System Design • The Semantic Web • Digital Media and Social Networks • Information Retrieval

Please note module availability is subject to change.

Entry requirements
• A good second-class degree or above (good 2:1 minimum for Industrial Experience option) in electronic engineering, computer science, mathematics, or a related discipline.
• You should have programming experience from your undergraduate degree.
• Unrelated degrees will be considered if there is evidence of significant industrial experience.
• You should also have completed an undergraduate programme in at least one of the following areas: signal processing, control, or analogue filters.
• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
MSc by Research in Media and Arts Technology
One year full-time
qmul.ac.uk/msc-matr

This new programme aims to produce graduates with excellent technical and creative skills, who have a unique vision of how digital technology transforms creative, technical and social possibilities. You will receive training in the full research cycle including identifying a problem, choosing suitable methods to address it and communicating results.

Overview
This innovative programme, unique in the UK, comprises four main components: a series of advanced taught modules completed during the first six months that include programming interactive digital media, production skills for audio and video, making creative installations and research methods; additional advanced option modules that cover topics ranging from advanced technical skills through human interaction to performance and live art; and specialist project work and a placement project with an external partner leading to a thesis (see www.mat.qmul.ac.uk for a full list of our partners). You may also undertake your placement project with a research partner in a different department or, where appropriate, collaborating departments in other universities.

Programme outline
Core modules:
• Digital Arts Documentary • Interactive Digital Multimedia Techniques • MSc Advanced Placement Project • Research Methods I • Sound Recording and Production Techniques • Plus two modules from any Level 7 EECS or Drama module

Please note module availability is subject to change.

Teaching and assessment
• The core modules are assessed through coursework alone.
• Option modules are examined through a combination of coursework and written examinations.
• The advanced placement project is examined by thesis and viva.

Entry requirements
• An upper-second class (2:1) honours degree or equivalent in a related science, engineering or design-oriented discipline and evidence of programming or mathematical ability.
• We seek applications from outstanding students with proven technical and creative abilities who wish to develop their skills and take advantage of the unique opportunities offered by this programme.
• For international students whose first language is not English, we require English language qualifications IELTS 6.5.
“My research interests focus on the perception and cognition of complex sensory signals. I am especially interested in music, which (along with dance) is a universal and quintessentially human mode of expression. Much of my work focuses on understanding the cognitive and neural processing involved during ongoing, dynamic listening to music”

Dr Marcus Pearce, Lecturer in Sound and Music Processing
How to apply
All applications should be made online (follow the link from the relevant programme description). Documents such as references and transcripts can be uploaded directly into the online application system.

Entry requirements
See individual programme entries.

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

Funding
All funding information for taught and research students is available at: qmul.ac.uk/postgraduate/funding

Accommodation
We are the only university in central London to offer a completely self-contained residential campus, with a 2,000-bed award-winning Student Village at Mile End. There is also a good range of private accommodation in the area around the Mile End campus, and we can provide advice and information to help you find a convenient place to stay.

For more information on your accommodation options:
Tel: +44 (0)20 7882 5522
e-mail: residences@qmul.ac.uk
residences.qmul.ac.uk

Contact us
School of Electronic Engineering and Computer Science
Tel: +44 (0)20 7882 7333
eecs-msc-enquiries@qmul.ac.uk
eecs.qmul.ac.uk
Queen Mary has a cosmopolitan postgraduate community, with students from over 150 countries making a valuable and active contribution to academic and social life. Wherever you are from, you will find a very warm welcome at the university.

**Entry requirements**
Each application received at Queen Mary is evaluated on a case-by-case basis, comparing international and UK qualifications. We look at your qualifications, the institution you have attended, and any relevant work experience. You can find detailed country-specific entry requirements here: qmul.ac.uk/international/countries

**Support for international students**
We offer a range of support services to help you feel at home:

**Airport collection**
New international students are offered a free airport collection service before the start of term in September 2015. This service will be advertised on our website, along with an online booking form: qmul.ac.uk/prearrival

**The welcome programme**
A welcome programme will be provided for all new international students before the start of term in September 2015. This is an opportunity to meet other international students studying a variety of programmes and gain practical advice about living and studying in London. Following the welcome programme, you can take part in a number of social events throughout the year. In 2014, these included trips to Amsterdam, Bruges, the Scottish Highlands, Wales, and the Wye Valley.

**Advice and counselling**
The Advice and Counselling Service offers professional advice and support to international students. We can advise you on finance and funding, Tier 4 Entry Clearance, Tier 4 extensions, immigration problems, UK work schemes after study, and offer counselling support for personal issues, such as homesickness. For further details, see: welfare.qmul.ac.uk

**International Student Society**
As a new International Student at Queen Mary the International Office pays your membership fee to the International Student Society (ISS). The ISS will organise a number of social and cultural events throughout the academic year to help you immerse yourself into student life at QMUL.

**Healthcare**
There is a Student Health Service on campus. You (and your spouse and children if they are in the UK with you as your dependants) are entitled to free medical treatment on the UK National Health Service (NHS) if you are registered on a programme lasting six months or longer (please note: from September 2015 this may change – International Students may face a small charge to access NHS services). If your programme lasts for less than six months, you should make sure you
have adequate medical insurance cover. If you are an EEA national, you should obtain a European Health Insurance Card (EHIC) before coming to the UK, which entitles you and your family to full NHS treatment. For more information, visit: studenthealth.qmul.ac.uk

Living costs
International students will need to show evidence of having at least £9,000 for living costs plus 100 per cent of your tuition fees in order to obtain Entry Clearance under Tier 4 of the UK Visas and Immigration’s points-based system of immigration. Additional amounts need to be shown for dependants. £9,000 is based on nine months of study and is an immigration requirement only – most students require more money than this for 12 months’ living costs – normally around £11,000. For further information, visit: welfare.qmul.ac.uk/international/money

Scholarships
We want to attract the best students to Queen Mary. In recognition of the important investment that international students are making in their education, we are pleased to offer a range of scholarships to reward outstanding academic achievement. For more information, visit: qmul.ac.uk/international/feesfinance

Representatives in your country
In many countries we have offices or representatives who you can visit to discuss applying to Queen Mary. Contact details can be found at: qmul.ac.uk/international/countries

QMUL International
Members of staff at Queen Mary regularly make visits overseas to meet students and their families.

To see when we will be visiting your region or for more information on any aspect of life at Queen Mary, see: qmul.ac.uk/international/events

Contact us
Tel: +44 (0)20 7882 6530
email: international-office@qmul.ac.uk
qmul.ac.uk/international

English language
All tuition and examinations at the university are in English, so a sound command of the language is essential for success. Queen Mary provides a number of programmes in English for academic purposes to help you get the most out of your study. You need to be able to cope with reading; note-taking from lectures, books, journals, and other materials; to speak well in seminars, discussion groups, and tutorials; and to present yourself effectively in written assignments and examinations.

English language requirements
If your first language is not English, you must provide evidence that your English skills are sufficient by including details of recognised language qualifications with your application. If you are an international applicant you are strongly advised to contact your local British Council Office, take the academic IELTS (International English Language Testing Service) test and submit the results with your application. Queen Mary’s minimum
requirement for postgraduates is an IELTS score of 6.5 or PTE Academic 62, however, some courses require a higher score. For detailed English language entry requirements for all of our programmes, including individual component scores, see: qmul.ac.uk/international

For many nationals, it is now also an immigration requirement that you sit a secure English language test and meet minimum component scores as set by the UK Visas and Immigration service.

If you have English language scores slightly below the required band you may be eligible to attend one of our pre-sessional English language summer programmes before the start of your course.

English language summer programmes (pre-sessional programmes)
From June to September, we arrange a series of English language programmes for students who wish to improve their proficiency in English before starting university. The programme aims to improve your listening, speaking, reading, and writing skills; teach study skills such as note-taking, academic writing, and seminar participation; develop skills essential to working independently; and to introduce you to life in Britain. We encourage independent work and use of English by setting individual projects. Queen Mary academic staff and other visiting lecturers will give a series of lectures. We provide some residential accommodation on summer programmes in our halls of residence. Find out more: http://language-centre.sllf.qmul.ac.uk/presessionals

In-sessional English language support
The Language Centre runs a series of insessional English programmes in academic writing, grammar and vocabulary, lecture comprehension and seminar skills, and general English during the main teaching periods of the academic year. These are free of charge. Find out more: http://language-centre.sllf.qmul.ac.uk/in-sessionals

Academic study support
To help you with the transition to higher degree study, the Library runs a programme of short courses, tutorials, and drop-in classes in skills such as organisation and time management, research and note-taking, oral communication and presentation, academic writing, personal development planning and revision, and examination skills. For more information, see: library.qmul.ac.uk/academic_study_tutorials

English Language and Study Skills Office
Tel: +44 (0)20 7882 2827
email: elss@qmul.ac.uk
http://language-centre.sllf.qmul.ac.uk
A postgraduate open evening in the Octagon at our Mile End campus, historically the university’s library and now an event space.
Campus tours
We organise campus tours throughout the year. Restricted to small groups so that everyone has the chance to ask questions, these informal events are a great way to find out about living and studying here. They normally last an hour and you will be shown around by a current student. To book your place, visit: qmul.ac.uk/visitus

Postgraduate open evening
Our postgraduate open evening is held at the Mile End campus. You will be able to meet academics, see subject-specific facilities, tour research and learning facilities and speak to our support services, including Careers staff.

To book your place, please visit: qmul.ac.uk/pgopenevening

Virtual events
We also hold virtual events during the year. For dates, virtual tours of the campus, videos and more, visit: qmul.ac.uk/postgraduate/virtualopenday

“My teachers encourage me to ask questions and dig into a subject topic. Some subjects like functional programming were really difficult, but with my teachers’ support I had no problem grasping the concepts”
Indrani Sen
MSc Software Engineering
How to find us

The easiest way to get to Queen Mary is to use public transport. There are two Underground stations and many bus stops within a few minutes’ walk of the Mile End campus.

**Underground**
Queen Mary’s Mile End campus is located between Mile End station (Central, District, Hammersmith and City lines) and Stepney Green station (District, Hammersmith and City lines). Both stations are in London Underground Zone 2.

Our Whitechapel campus is right behind the Royal London Hospital on Whitechapel Road. Whitechapel Underground station (Hammersmith and City, and District lines) is directly across the road from the Hospital.

Based in the City of London, close to the Barbican, Queen Mary’s Charterhouse Square campus is five minutes’ walk from Barts Hospital. The nearest Underground station is Barbican (Hammersmith and City, Metropolitan and Circle lines). Farringdon is also not far away.

The nearest Underground station to the Postgraduate Law Centre at Lincoln’s Inn Fields is Holborn (Central and Piccadilly lines).

**Buses**
All of our campuses are well served by London bus routes. To plan your journey, visit: tfl.gov.uk

**Docklands Light Railway (DLR)**
The nearest DLR station to Queen Mary is Bow Church.

**Travelcards and Oystercards**
The most cost-effective and convenient way to pay for public transport in London (buses, trains, tubes, boats, trams, and DLR) is to get an Oyster card. As a student at QMUL, you are eligible for an 18+ Student Photocard which gives you 30 per cent off the price of adult-rate Travelcards and Bus and Tram Passes.

A discounted Zone 1-2 Travelcard – which gives you unlimited travel on buses, trains, tubes, and the DLR within Zone 1 (Central London) and Zone 2 (which includes Mile End) – is approximately £84. For more information, please see: www.tfl.gov.uk/oyster

**Cars**
Traffic is heavy and parking difficult, making driving in London an unattractive option. There are no parking places for students on campus, with the exception of students displaying an authorised blue disabled sticker (who have applied for and received a Queen Mary parking permit). Contact the Disability and Dyslexia Service for advice on: +44 (0)20 7882 2756.
**Taxis**
Black cabs use a meter to calculate your fare and you can hail one in the street. They are safe to use, but can be expensive. Mini-cabs are normal cars and charge a fixed price. Only use registered mini-cab firms.

**Trains**
London is very well served by overground train stations, all within easy reach of Queen Mary’s campuses. The closest is Liverpool Street, just two stops from Mile End on the Underground (Central line). Trains from Liverpool Street run to Stansted Airport, as well as other destinations. King’s Cross and St Pancras International (for Eurostar services to mainland Europe) are both a short journey from Mile End on the Underground’s Hammersmith and City line. London Bridge and Fenchurch Street are also close by.

**Airports**
The closest airport is London City Airport – just five miles away – which offers regular flights to UK and other European cities.

Heathrow, Gatwick, Luton, Stansted and Southend are within easy reach of Queen Mary, and all can be reached in anything from one to two hours by train or Underground.

**Student travel in London**
For more information about discounted travel, safety information and how to use the travel planning tools on the tfl website, visit: tfl.gov.uk/campaign/student-guide-to-travel-in-london
Mile End campus

For more detailed campus information, see: qmul.ac.uk/about/howtofindus
We would like to thank the students who took part in these photographs. Student and departmental photography by Jorge Estevao (jdestevao.com) and Jonathan Cole (JonathanColePhotography.com)

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