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bristol.ac.uk/engineering

If you need all or part of this publication in accessible format, please contact the Public Relations Office, Communications and Marketing:
Tel +44 (0)117 928 8895
Welcome

Studying engineering at Bristol will immerse you in a vibrant postgraduate community that is at the heart of a faculty closely linked to world-class engineering industry. Bristol is known internationally for sustained engineering achievement, from Brunel’s iconic Clifton Suspension Bridge through to Concorde and now as one of the UK’s largest centres for the microelectronics industry. Our teaching and research is in close collaboration with world-leading industrial companies, many of which are located in the south west of England including AgustaWestland, GE Aviation, Rolls-Royce, BAE Systems, Airbus, Arup, Toshiba, Hewlett-Packard, Jaguar Land Rover, GKN, Thales and EDF Energy. These companies provide many jobs for our graduates.

The faculty comprises two academic schools which cover the core disciplines of Aerospace; Civil; Mechanical; Electrical and Electronic Engineering; Computer Science; and Engineering Mathematics.

Our taught and research postgraduate programmes evolve continuously to stay at the cutting edge of research and industrial advances.

The faculty has attracted over £20 million in funding to its six Centres for Doctoral Training: Advanced Composites; Composites Manufacture; Robotics; Quantum Engineering; Water Informatics; and Communications. This is one of the largest awards to a single university in the UK.

The faculty also hosts major research centres including The Bristol Laboratory for Advanced Dynamics Engineering (BLADE), a £15-million investment that was opened by HM The Queen in 2005; the cutting-edge Communications Research Group; and The Advanced Composites Centre for Innovation and Science, housed in a new £5.8 million facility. Bristol was also selected to lead the National Composites Centre, a government-funded project with investment in excess of £45 million. In 2013, the faculty was awarded a prestigious £12-million Interdisciplinary Research Collaboration fund for the SPHERE project with the aim to develop sensor systems to address the challenges in healthcare.

Outstanding industrial links enrich all of our postgraduate programmes. We are committed to producing leaders and entrepreneurs of the future and to advancing the knowledge required to address major societal challenges.

Professor Andrew Nix
Dean, Faculty of Engineering
Funding your studies in the Faculty of Engineering

Funding for postgraduate study can come from a variety of sources. Our students are funded by governments, research councils, families, charities and employers from across the globe.

You will need to secure the majority of your funding before commencing your postgraduate studies. The University subscribes to the Alternative Guide to Postgraduate Funding (www.postgraduate-funding.com), which provides contact information for charities and organisations who offer grants for postgraduate study.

Don’t forget to use our Funding Search facility (bristol.ac.uk/fees-funding/search) to see whether there are any additional grants or awards which are relevant to your chosen studies.

You may wish to consider self-funding your programme by opting to take out a bank loan (eg a Professional and Career Development Loan) and/or use savings.

**Postgraduate taught programmes**

At the time of going to print, details of the UK government’s proposed postgraduate loan scheme have not been confirmed. Our understanding is that the scheme will be available to UK students pursuing a taught master’s degree and will be income dependent. When details are confirmed, guidance will be available at bristol.ac.uk/fees-funding/postgraduate.

Applicants to the **MSc Water and Environmental Management** programme from specific Commonwealth countries may be eligible for a Commonwealth Shared Scholarship, covering fees and other expenses. For details please see bristol.ac.uk/fees-funding/awards.

**Postgraduate research programmes**

The University of Bristol has one of the largest concentrations of funded Doctoral Training Partnerships and Centres in the UK, many of which offer full studentships. The Faculty of Engineering is proud to work with colleagues across the University and with numerous partner institutions as part of the following funded doctoral training initiatives:

- **Advanced Composites for Innovation and Science – EPSRC Centre for Doctoral Training** (see page 19)
- **Composites Manufacture – EPSRC Industrial Doctorate Centre** (see page 25)
- **Future Autonomous and Robotic Systems (FARSCOPE) – EPSRC Centre for Doctoral Training** (see page 31)
- **Future Communications: People, Power and Performance – EPSRC Centre for Doctoral Training** (see page 23)
- **Neural Dynamics – Wellcome Trust PhD (see page 34)**
- **Quantitative Nondestructive Evaluation – EPSRC Centre for Doctoral Training** (see page 18)
- **Quantum Engineering – EPSRC Centre for Doctoral Training** (see page 35)
- **Water Informatics: Science and Engineering – EPSRC Centre for Doctoral Training** (see page 18)

Information and links to a variety of additional funding opportunities across the faculties can be found on the Bristol Doctoral College web pages at bristol.ac.uk/bdc.
Advanced Composites

Composite materials are increasingly replacing traditional metallic components in several industrial applications such as aerospace, wind turbine blades and the automotive industry. This MSc provides you with an in-depth theoretical understanding and practical knowledge of advanced composite materials.

The programme is based in the Advanced Composites Centre for Innovation and Science (ACCIS), one of the world’s leading centres in composite materials, which houses a number of state-of-the-art composites manufacturing facilities.

ACCIS has strong industrial and research links with companies like Rolls Royce, Airbus, BAE Systems, and GE Aviation, as well as government research labs such as Defence Science and Technology Laboratory (UK Government research lab), European Space Agency, and US Army International Technology Centre.

Programme structure

Core units
- Composite Design and Manufacture
- Smart Materials
- Research Skills
- Nanocomposites and Nanoengineering
- Elements of Polymer Composites

and either
- Advanced Composites Analysis
- Structures and Materials
  (after discussion with the Programme Director)

Optional units
You will select from the following:
- Engineering Design for Wind and Marine Power
- Nonlinear Structural Dynamics
- Ultrasonic Non-Destructive Testing
- Structural Engineering 4
- Advanced Techniques in Multi-Disciplinary Design
- Nonlinear Behaviour of Materials
- Nature’s Materials

Project
To complete the programme, you will carry out a research project, which can be either academically or industrially led.

Entry requirements
An upper second-class honours degree (or equivalent) in an Engineering discipline or in a closely related field. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
Postgraduate Admissions Team
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
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Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.

Key facts

Why choose Bristol?
We have strong industrial research links with companies like Rolls-Royce, Airbus, BAE Systems and GE Aviation

Queens School of Engineering
Awards available MSc
Duration of programme
One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)
Advanced Computing

This MSc is for students who already have a first degree in Computer Science or a related subject. It allows you to gain expertise with more advanced material in a range of specialist areas and covers both theory and practical application. It is suitable preparation for either a career in industry or a PhD.

The MSc is taught by active researchers. The Computer Science department is very active in research and, for example, has the largest cryptography group in the world and one of the largest Intelligent Systems groups in the UK. Staff have good links with leading researchers and industrial partners internationally.

Skilled professionals and researchers who are able to apply these technologies to current problems, and thereby push the limits of what computers can effectively do, are in high demand in today’s job market.

Programme structure
This MSc has units based around specialist themes such as:
- Intelligent Systems
- Robotics
- High-Performance Computing
- Creative Technologies
- Security
- Computer Architecture

This flexible programme structure allows you to shape the programme to suit your interests and career aspirations. The units you can follow will be determined by the school in consultation with you, based on your previous experience of the unit prerequisites and in consultation with your programme director. Please note that some unit combinations may not be possible owing to timetabling constraints.

You will study your units between October and mid-June. After completing the taught units, you will work on a project between mid-June and late September. The project consists of researching, planning and implementing a major piece of work. It must contain a significant scientific or technical component and will usually involve software development.

Entry requirements
An upper second-class honours degree (or international equivalent) in Computer Science or a related discipline such as Mathematics, Statistics, Physics or Electrical Engineering. Good programming skills, including familiarity with data structures, in at least one mainstream programming language (eg C, C++, or Java) are essential.

For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
MSc in Advanced Computing
Postgraduate Admissions
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Applications
Details of how to apply are available at bristol.ac.uk/pg-study.

Key facts

Why choose Bristol?
You have a wide choice of specialisms, including animation, interaction, security, machine learning and robotics

Merchant Venturers School of Engineering
Awards available MSc
Duration of programme One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £8,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)
Advanced Computing – Creative Technology

Games consoles and mobile devices are now ubiquitous, and computer graphics production has developed so rapidly that the best visual effects are those that you don’t realise are there.

This Creative Technology programme is designed to introduce you to the rapidly emerging areas of computer science where technology impacts the creative design process. With a focus on industry-relevant content production, the programme introduces the theory behind animation and special effects production, interaction design and robotics. You will learn to program proficiently in C, explore a wide range of topics, experience the entire creative design process and develop key skills in independent research.

This programme is designed to give you a significant advantage in the fast-paced world of emerging creative technology industries. The programme will also give you the knowledge and experience to continue studying for a PhD, or to enter a career in research. With strong links to industry through the faculty’s academic staff and the University of Bristol Careers Service, we are well placed to support you in your career aspirations in industry or furthering your academic career.

Programme structure

Core units

In the introductory week you will take a programming proficiency test and will be placed in either an ‘experienced’ stream or a ‘foundation’ stream.

You will take core units in creative technology, including Character and Set Design, Animation Production, Computer Graphics, Image Processing, and Web Technologies.

You will be able to choose from a variety of units as part of your option choice. If, however, you are studying on the foundation stream you must also include Programming in C (20 credit points) as part of your optional units.

Project

You will complete a project that involves researching, planning and implementing a major piece of work. The project must contain a significant scientific or technical component and will usually involve a software development component. It is usually submitted in September.

Entry requirements

An upper second-class honours degree (or equivalent) in a Computer Science or related discipline. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information

MSc in Advanced Computing (CT)
Postgraduate Admissions Team
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications

Details of how to apply are available at bristol.ac.uk/pg-study.

Key facts

Why choose Bristol?
The programme focuses on industry-relevant content production

Merchant Venturers School of Engineering
Awards available MSc
Duration of programme
One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £8,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)
Advanced Computing – Machine Learning, Data Mining and High-Performance Computing

This programme is aimed at giving you a solid grounding in Machine Learning, Data Mining and High-Performance Computing technology, and will equip you with the skills necessary to construct and apply these tools and techniques to the solution of complex scientific and business problems.

Machine Learning, Data Mining and High-Performance Computing are concerned with the automated analysis of large-scale data by computer, in order to extract the useful knowledge hidden in it. Using state-of-the-art artificial intelligence, this technology builds computer systems capable of learning from past experience, allowing them to adapt to new tasks, predict future developments, and provide decision support. Bristol’s recent investment in the BlueCrystal supercomputer – and our Exabyte University research theme – show our commitment to research at the cutting edge in this area.

Skilled professionals and researchers who are able to apply these technologies to current problems, and thereby push the limits of what computers can effectively do, are in high demand in today’s job market.

Programme structure
In the introductory week you will take a programming proficiency test and will be placed in either an ‘experienced’ stream or a ‘foundation’ stream.

This programme is updated on an ongoing basis to keep it at the forefront of the discipline. Please refer to the University’s programme catalogue for the latest information on the most up-to-date programme structure.

Core units
You will take the following core units:
- Introduction to Machine Learning
- Research Skills
- Statistical Pattern Recognition
- Uncertainty Modelling for Intelligent Systems

Optional units
Depending on previous experience or preference, you are then able to take optional units which include:
- Artificial Intelligence and Computer Vision
- Cloud Computing
- Computational Bioinformatics
- Computational Neuroscience
- High-Performance Computing
- Image Processing and Computer Vision
- Robotics Systems
- Server Software
- Web Technologies

Project
You will then complete a project that involves researching, planning and implementing a major piece of work. The project must contain a significant scientific or technical component and will usually involve a software development component. It is usually submitted in September.

Entry requirements
An upper second-class honours degree (or equivalent) in Computer Science or related discipline. Applicants with a mathematics or statistics background may also be considered.

Reasonable knowledge of programming is a prerequisite. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts
Why choose Bristol?
Teaching is informed by links to cutting-edge research by one of the largest AI groups in the UK

Merchant Venturers School of Engineering
Awards available MSc
Duration of programme One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase) Full-time: UK/EU £8,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)

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Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Advanced Mechanical Engineering

The main objective of this programme is to produce graduates with the ability to plan, execute and report technical projects for industry and academia.

The programme is composed of taught units, assessed by examination and coursework submission, and a major research project supervised by academic staff in the department.

The facilities and expertise in the Department of Mechanical Engineering have earned us consistent top rankings in the prestigious Times University League Tables and an internationally excellent rating for research.

Programme structure

Core units

These mandatory units are intended to develop your skills of investigation, system analysis, and project planning. Each is worth 10 credits.

- Finite Element Analysis (assessed by examination)
- Literature Review (assessed through marked report)
- Power Generation for the 22nd Century (assessed by examination)
- Research Project Proposal (assessed through marked reports)

Optional units

You will be able to choose eight optional 10-credit units from the list below at the start of the programme. The current options list is as follows:

Design and Manufacture
- Virtual Product Development
- Robotic Systems
- Biomechanics

Engineering and the Environment
- Environmental Thermalhydraulics

Materials
- Ultrasonic Non-Destructive Testing
- Nonlinear Behaviour of Materials
- Residual Stress – Impact on Materials Performance

Dynamics
- Advanced Dynamics
- Systems and Control Engineering 4
- Nonlinear Structural Dynamics

Project

Each student is allocated an individual project, worth 60 credits, which is supported from within the department through the three main research groups:
- Dynamics and Control
- Design and Process Engineering
- Solid Mechanics

Provided that the content is academically rigorous, industrially-related projects are possible, through either your own contacts or the department’s strong links with major companies such as Airbus UK, BAE Systems, Bechtel, British Energy, Nestlé, Qinetiq Ltd, Renishaw, Renold Chain, and Rolls Royce.

Entry requirements

An upper second-class honours degree (or equivalent) in an Engineering-based subject. Holders of non-UK degrees or other qualifications can obtain advice at bristol.ac.uk/international/countries.

Contact for further information

MSc in Advanced Mechanical Engineering
Postgraduate Admissions
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Email: fen-pgadmissions@bristol.ac.uk

Key facts

Why choose Bristol?
The department has a highly rated research profile which ranges across a wide spectrum of engineering subjects.

Queens School of Engineering

Awards available MSc

Duration of programme
One year full-time

Part-time study available? No

Open to international students? Yes

English Language Profile E
(see Introduction, ‘How to apply’, p15)

Number of places 20

Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600

Funding Please see p2

Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html

Possible start dates September 2016

Application deadline 21 August 2016
(Early application recommended; the programme will close once full)

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Advanced Microelectronic Systems Engineering

The Bristol region has traditionally hosted a world-leading semiconductor design industry that still thrives today. The MSc in Advanced Microelectronic Systems Engineering is designed to meet the needs arising from the UK’s strength in this industry. Internationally, there is a shortfall of graduates with the qualifications and skills expected from professional semiconductor design engineers.

The programme is run jointly by the Department of Electrical and Electronic Engineering and the Department of Computer Science, and spans the topics required for rapid advancement in the microelectronics design industry. A range of taught subjects cover core topics such as Advanced Computer Architecture, Design Verification, and Digital and Analogue VLSI Circuit Design, before progressing into more specialised areas, including System Design using FPGA and ASIC Platforms, Hardware/Software Co-Design and Verification, Integrated Sensors, and Mixed Signal Design.

Special emphasis is put on providing you with not only theoretical knowledge but also a range of contemporary design flow skills. Lectures are supplemented by lab exercises run on industrial-standard EDA software to give you experience of working in a professional environment.

Programme structure
The programme comprises 120 credits’ worth of taught units and a major individual project worth 60 credits. The following core taught units, each worth 10 credit points (100 learning hours), are taken over autumn and spring:
- Design Verification
- Analogue Integrated Circuit Design
- Integrated Circuit Electronics
- Digital Filters and Spectral Analysis (M)
- Advanced DSP and FPGA Implementation
- VLSI Design M
- Embedded and Real-Time Systems
- Bio Sensors

You can also choose any two of the following 10-credit units (some combinations may not be possible due to timetabling constraints):
- Device Interconnect – Principles and Practice
- Advanced Computer Architecture
- Sustainability, Technology and Business
- Computational Neuroscience

In the spring term, you also take a unit designed to introduce the fundamental skills necessary to carry out the MSc project.

You then complete a final project that involves researching, planning and implementing a major piece of work relating to microelectronics systems design. The project must have a significant scientific or technical component and may involve on-site collaboration with an industrial partner. The thesis is normally submitted by the end of September.

The programme content is under continual discussion with the National Microelectronics Institute and our industrial advisory board so that it remains at the cutting edge of the semiconductor industry. It is therefore subject to small ongoing changes.

Entry requirements
An upper second-class honours degree (or equivalent) in Electrical and Electronic Engineering, Computer Systems Engineering, or a related discipline in engineering or the physical sciences, with foundational knowledge in digital logic, computer architecture, digital and analogue transistor-level circuits, programming, and signals and systems. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts

Why choose Bristol?
Covers advanced topics in hardware and software that are relevant in the semiconductor industry worldwide

Merchant Venturers School of Engineering
Awards available MSc

Duration of programme
One year full-time; two years part-time

Part-time study available? Yes

Open to international students? Yes

English Language Profile E
(see Introduction, ‘How to apply’, p15)

Number of places Not fixed

Fees (per year, subject to annual increase)
Full-time: UK/EU £8,100; overseas £18,600
Part-time: UK/EU £4,050

Funding Please see p2

Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html

Possible start dates September 2016
Application deadline 21 August 2016
(early application recommended; the programme will close once full)

Contact for further information
MSc in Advanced Microelectronic Systems Engineering
Postgraduate Admissions Team
Faculty of Engineering
University of Bristol

Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Biomedical Engineering

Biomedical Engineering is an emerging field in the UK that involves the application of physical, chemical, mathematical and computer science and engineering principles, to the analysis of biological, medical, behavioural and health-related problems. Biomedical engineers develop innovative devices and procedures for the prevention, diagnosis and treatment of disease, by relying on an in-depth understanding of science and engineering fundamentals combined with a broad knowledge of physiological and anatomical systems.

This programme allows you to gain expertise in the exciting field of biomedical engineering and covers both theory and practical applications. You will acquire the analytical tools and broad physical knowledge of modern engineering and science, will develop a fundamental understanding of the anatomical and physiological systems, and will become familiar with recent technological breakthroughs.

**Programme structure**

**Core units**

**Teaching Block One (70 credits)**
- Physiology for Biomedical Engineering
- Mathematical Modelling in Physiology and Medicine
- Biomechanics
- Biosensors
- Digital Filters and Spectral Analysis
- Computational Genomics and Bioinformatics Algorithms

**Teaching Block Two (50 credits)**
- Anatomical Science for Engineering
- Computational Neuroscience
- Biomedical Imaging
- Research Skills

**Project**

A substantial research project is initiated during Teaching Block Two and completed during the summer.

**Entry requirements**

An upper second-class honours degree (or international equivalent) in Engineering (preferably Electrical, Mechanical or Computer Science) or a subject related to Biomedical Engineering. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**

MSc in Biomedical Engineering
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

**Applications**

Details of how to apply are available at bristol.ac.uk/pg-study.

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**Key facts**

**Why choose Bristol?**

The programme is run by the Faculty of Engineering in close collaboration with the Faculty of Biomedical Sciences

**Merchant Venturers School of Engineering**

**Awards available** MSc

**Duration of programme**

One year full-time

**Part-time study available? No**

**Open to international students? Yes**

**English Language Profile** E (see Introduction, ‘How to apply’, p15)

**Number of places** Not fixed

**Fees (per year, subject to annual increase)**

Full-time: UK/EU £9,500; overseas £17,400

**Funding** Please see p2

**Website** bristol.ac.uk/engineering/graduate-school/pg-open/index.html

**Possible start dates** September 2016

**Application deadline** 21 August 2016

(Early application recommended; the programme will close once full)
Communication Networks and Signal Processing

This is a challenging, one-year, taught Masters degree programme that provides you with a range of advanced topics drawn from communication networks (fixed and wireless) and related signal-processing (including associated enabling technologies). It provides an excellent opportunity to acquire the necessary skills to enter careers in some of the most dynamic fields in communication networks.

This programme builds on the internationally recognised research strengths of the Communications Systems and Networks (CSN) group within the Centre for Communications Research. The group conducts pioneering research in a number of key areas including Network Architectures, Cross Layer Interaction and Advanced Wireless Access. Recently the group has developed optimised scheduling solutions that exploit the features of the 3G Long Term Evolution (LTE) draft standard.

Dimitra Simeonidou, Professor in High-Performance Networks, and her team (Dr Reza Nejabati and Dr Georgios Zervas) will deliver two taught units related to Optical Communications: Optical Networks and Data Centre Networks. Optical Networks will focus on wavelength-division multiplexed (WDM) networks, time-division multiplexed (TDM) networks including SDH/SONET and OTN, optical frequency division multiplexed networks, and optical sub-wavelength switched networks. Data Centre Networks will focus on networks for cloud computing, cloud-based networking, grid computing and e-science. There is a further networking unit, Networked Systems and Applications, which provides a top-down study of networking system support for distributed applications, from classical web and email to telemetry for the Internet of Things.

The programme is accredited by the Institution of Engineering and Technology until 2018, one of only a handful of accredited programmes in this field in the UK.

Programme structure

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<tbody>
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<td>Communication Systems</td>
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<td>Digital Filters and Spectral Analysis</td>
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<td>Mobile Communications</td>
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<td>Networking Protocol Principles</td>
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<tr>
<th>Semester Two (80 credits)</th>
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<tbody>
<tr>
<td>Data Centre Networking</td>
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<td>Advanced Networks</td>
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<td>Optical Communications Systems and Data Networks</td>
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<td>Optical Networks</td>
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</tbody>
</table>

Project

A substantial research project is initiated during Semester Two and completed during the summer. This may be based at the University or with industrial partners.

Entry requirements

An upper second-class degree from a UK university (or an international equivalent) in a numerate physical science or engineering discipline. Candidates with a lower class of degree, equivalent qualifications or relevant work experience may be admitted if they can demonstrate their potential for higher degree work. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts

Why choose Bristol?
This is one of only a handful of programmes in this field to be accredited by the Institution of Engineering and Technology

Merchant Venturers School of Engineering
Awards available MSc
Duration of programme
One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, 'How to apply', p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)

Contact for further information
MSc Communication Networks and Signal Processing
Postgraduate Admissions Team
Faculty of Engineering
University of Bristol
Queen’s Building
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Bristol BS8 1TR

Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Computer Science (conversion)

The aim of this MSc is to provide students coming from any discipline (other than Computer Science) with a wide understanding of Computer Science.

The programme is sufficiently general to give you an excellent background for a professional career in industrial or commercial organisations, and the required background in computer science to enable you to undertake further study leading to the specialisations needed for a research career.

This MSc is a conversion programme for people with little or no previous academic computing experience and is designed for students coming from a wide range of academic backgrounds. The aims of this programme are to provide:

- an understanding of the theoretical basis of computer science, and its importance in software development;
- an understanding of the underlying principles of computer systems and the applications;
- a foundation in professional standards of analysis, design, implementation, testing and documentation in software development;
- an appreciation of the current state and future directions of technological advances in computer science.

Programme structure
At the end of the first part of the programme, you will be able to approach large-scale software engineering design in a professional manner. The main thread is the design of large software systems, starting from the initial problem and proceeding through specification to a finished product. The main programming language used in the course is C.

In the second part of the course, you study a selection of key topics in Computer Science to equip yourself with the background for working on your final projects. Furthermore, you will be capable of managing all levels of computer systems in your future career.

Core units
- Databases
- Object-Oriented Programming with Java
- Overview of Computer Architecture
- Programming in C
- Research Skills
- Software Engineering and Group Project
- Web Technologies

Project
You will complete a project that involves researching, planning and implementing a major piece of work. The project must contain a significant scientific or technical component and/or a software development component. It is usually submitted in September.

Entry requirements
An upper second-class honours degree (or international equivalent) in any subject other than Computer Science. Competence in mathematics must be demonstrated, with at least a good grade in GCSE Mathematics or preferably with A-level Mathematics or equivalent university-level experience.

For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
MSc in Computer Science (conv)
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Image and Video Communications and Signal Processing

Audiovisual experiences are key drivers, not just for entertainment but also for business, security and technology development. Video accounts for around 80 per cent of all internet traffic, and some mobile network operators have predicted a doubling of wireless traffic every year for the next 10 years – driven primarily by video. Visual information processing also plays a major role underpinning other industries such as healthcare, security, robotics and autonomous systems.

This challenging, one-year taught Masters degree programme covers a range of advanced topics drawn from the field of multimedia signal processing and communications. The programme covers the properties and limitations of modern communication channels and networks, alongside the coding and compression methods required for efficient and reliable wired and wireless audiovisual transmission. It provides students with an excellent opportunity to acquire the necessary skills to enter careers in one of the most dynamic and exciting fields in ICT (Information and Communications Technologies).

The programme builds on the internationally leading research strengths of the Visual Information Laboratory (VI-Lab) and the Communication Systems and Networks Group (CSN) within the Faculty of Engineering at Bristol. Both groups are highly regarded for combining fundamental research with strong industrial collaboration, and their innovative research has resulted in world-beating technology in the areas of image and video analysis, coding and communications. Both groups offer extensive, state-of-the-art research facilities.

This MSc also provides in-depth training in design, analysis and management skills relevant to the theory and practice of the communication networks industry. The programme is accredited by the Institution of Engineering and Technology until 2018 and is one of only a handful of accredited programmes in this field in the UK.

Programme structure

Semester One (50 credits)
- Coding Theory
- Communication Systems
- Digital Filters and Spectral Analysis
- Mobile Communications
- Networking Protocol Principles

Semester Two (70 credits)
- Digital Signal Processing Systems
- Speech and Audio Processing
- Optimum Signal Processing
- Biomedical Imaging*
- Image and Video Coding
- Engineering Research Skills

* Subject to approval

Project (60 credits)
A substantial research project is initiated during Semester Two and completed during the summer. This may be based at the University or with industrial partners.

Entry requirements
An upper second-class degree (or international equivalent) in a numerate physical science or engineering discipline. Candidates with a lower class of degree, equivalent qualifications or relevant work experience may be admitted if they can demonstrate their potential for higher degree work. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
Postgraduate Admissions
Graduate Education Team
Faculty of Engineering

Key facts

Why choose Bristol?
Prepare for a range of careers including visual analytics, audiovisual streaming methods or new broadcast technologies

Merchant Venturers School of Engineering
Awards available MSc

Duration of programme
One year full-time

Part-time study available? No
Open to international students? Yes

English Language Profile E
(see Introduction, ‘How to apply’, p15)

Number of places Not fixed

Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600

Funding Please see p2

Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html

Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)

Queens Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Nuclear Science and Engineering

This MSc delivers a solid grounding in the Science and Engineering principles underpinning the global nuclear industry. Throughout the programme you will benefit from an innovative connection, via the South West Nuclear Hub, to the University of Bristol’s nationally leading industrial research. This environment of collaboration with key industrial partners enriches the learning experience and exposes you to the scientific and engineering challenges facing nuclear energy today.

Programme structure
The programme addresses five key themes; the nuclear cycle, nuclear reactor materials and design, nuclear structural integrity, nuclear professionalism and nuclear systems, infrastructure, hazards and risk.

Teaching consists of core lecture-based units in Science and Engineering:
- Fundamentals of Nuclear Science
- Nuclear Reactor Engineering
- Nuclear Material Behaviour
- Nuclear Reactor Physics
- Nuclear Fuel Cycle

Research Skills and Group Project units develop the skills necessary for work in this area and include industry-focused workshops. These units lead to a major Individual Research Project which takes place over the summer.

Entry requirements
An upper second-class honours degree (or equivalent) in Engineering, Physics or a related subject. Alternative relevant professional experience or qualifications may also be considered on a case-by-case basis.

For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts
Why choose Bristol?
Students will benefit from our connection to the South West Nuclear Hub, which has strong links with the nuclear power industry

School of Physics
Awards available MSc
Duration of programme One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase) Full-time: UK/EU £10,100; overseas £20,800
Funding Please see p2
Website bristol.ac.uk/physics
Possible start dates September 2016
Application deadline 31 August 2016
Optical Communications and Signal Processing

This programme provides students with a challenging range of advanced topics drawn from optical communications systems and devices, and optics-related signal processing (including associated enabling technologies). It provides an excellent opportunity to acquire the necessary skills to enter careers in some of the most dynamic fields in optical communications.

This programme builds on the internationally recognised research strengths of the Photonics Group within the Centre for Communications Research. Optical fibre communications form the backbone of all land-based communications and are the only viable means to support today’s global information system. Research at Bristol is contributing to the ever-increasing requirement for bandwidth and flexibility through research into optical switching technology, wavelength conversion, high speed modulation, data regeneration and novel semiconductor lasers.

Dimitra Simeonidou, Professor in High-Performance Networks, and her team (Dr Reza Nejabati and Dr Georgios Zervas) will deliver two taught units related to Optical Communications: Optical Networks and Data Centre Networks. Optical Networks will focus on wavelength-division multiplexed (WDM) networks, time-division multiplexed (TDM) networks including SDH/SONET and OTN, optical frequency division multiplexed networks, and optical sub-wavelength switched networks. Data Centre Networks will focus on networks for cloud computing, cloud-based networking, grid computing and e-science.

The group at Bristol is a world leader in the new field of Quantum Photonics, with key successes in developing photonic crystal fibre light sources, quantum secured optical communications and novel quantum gate technologies.

The programme is accredited by the Institute of Engineering and Technology until 2018, one of only a handful of accredited programmes in the UK.

Programme structure

**Semester One (50 credits)**
- Communication Systems
- Digital Filters and Spectral Analysis
- Mobile Communications
- Networking Protocol Principles
- Optoelectronic Devices and Systems

**Semester Two (70 credits)**
- Advanced Optoelectronic Devices
- Data Centre Networking
- Advanced Networks
- Engineering Research Skills
- Optical Communications Systems and Data Networks
- Optical Networks

**Project (60 credits)**
A substantial research project is initiated during Semester Two and completed during the summer. This may be based at the University or with industrial partners.

Entry requirements

An upper second-class honours degree from a UK university (or an international equivalent) in a numerate physical science or engineering discipline. Candidates with a lower class of degree, equivalent qualifications or relevant work experience may be admitted if they can demonstrate their potential for higher degree work. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information

MSc in Optical Communications and Signal Processing
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Robotics

The MSc in Robotics will provide you with the ability to understand, design and implement modern robotic systems. Robotics is increasingly prominent in a variety of sectors from manufacturing to health, to remote exploration of hostile environments (such as space and deep sea), and as autonomous and semi-autonomous systems that can physically and socially interact with people.

The programme exposes you to a wide range of advanced engineering and computer science concepts with the opportunity to carry out a practical robot project at the Bristol Robotics Laboratory. This collaborative research partnership between the University of Bristol and the University of the West of England has a vision to transform robotics by pioneering advances in autonomous robot systems that can behave intelligently with minimal human supervision.

Programme structure

Core units

- Robotic Systems
- Robot Mechanics, Intelligence and Programming
- Robotics Research Preparation
- Image Processing and Computer Vision
- Technology and Context of Robotics and Autonomous Systems
- Bio-inspired Artificial Intelligence

Optional units (list subject to approval)

You will select from the following:

- Computational Neuroscience
- Uncertainty Modelling
- Artificial Intelligence and Logic Programming
- Design Verification
- Advanced Computer Architecture
- Animation Production
- Communication Systems
- Digital Signal Processing Systems
- Advanced DSP and FPGA Implementation
- Statistical Pattern Recognition
- Control Theory
- Advanced Techniques in Multidisciplinary Design
- Advanced Dynamics
- Virtual Product Development
- Biomechanics
- Innovation, Entrepreneurship and Enterprise
- Sensory Ecology
- Transport Modelling*
- Electromechanical Systems Integration
- Advanced Control and Dynamics

*Subject to approval

NB: Your choice of optional units will be dependent upon your academic background, agreement with the Programme Director, and timetable availability.

Dissertation

During your second semester, you will start working on a substantial piece of research work that will make up one third of the overall MSc. It is possible to work on your dissertation at the Bristol Robotics Laboratory or in conjunction with one of our many industrial partners.

NB: Teaching for this programme is delivered at both the University of Bristol and the University of the West of England campuses. Students attending the programme will be given free transport passes to travel between these two universities in Bristol.

Entry requirements

An upper second-class honours degree in an Engineering, Physics, Mathematics or related subject. Other disciplines will be considered on a case-by-case basis. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information

MSc in Robotics
Postgraduate Admissions
Faculty of Engineering
Water and Environmental Management

This programme provides the skills and knowledge required for a career in water and environmental management. You will acquire academic and practical skills, as well as developing a detailed knowledge of fundamental environmental processes, and the ways in which these need to be managed sustainably. A considerable part of the programme is taught by leading practitioners including personnel from the Met Office, the Environment Agency of England and Wales, and Defra (UK Department of Food and Rural Affairs).

Programme structure

Core units

This stage provides a common platform for underpinning skills and knowledge in the basics of water and environmental management. The units aim to provide you with research, mathematics and computing skills, together with a firm understanding of fundamental processes that govern water movement through the atmosphere, atmosphere-biosphere interactions, and water flows through river catchments. The stage concludes by exploring how this fundamental understanding leads to environmental management, policy and legislation at local, national and international levels.

Core units include:
- Research Skills
- Environmental Management, Policy and Regulation
- Terrestrial Hydrometeorology
- Surface and Groundwater Hydrology
- Introduction to Environmental Statistics using MATLAB
- Numerical Analysis using MATLAB

Optional units

This stage provides specialist knowledge in a range of carefully chosen options. You choose two units from three options, including:
- Environmental Systems and Ecosystem Services
- Integrated Catchment Management
- Water Resource Engineering

Please note: Availability of optional units is subject to sufficient demand.

Dissertation

The programme is completed with the submission of a research-based dissertation. Further information is available on our website.

Entry requirements

An upper-second class honours degree in a relevant subject (or equivalent qualification). For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information

MSc in Water and Environmental Management
Postgraduate Admissions Team
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130

Key facts

Why choose Bristol?
Candidates may become members of the Chartered Institution of Water and Environmental Management (CIWEM)

Queens School of Engineering
Awards available MSc
Duration of programme
One year full-time (modular); two years part-time (modular)
Part-time study available? Yes
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600
Part-time: UK/EU £5,050
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)

Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Wireless Communications and Signal Processing

This MSc is a challenging, one-year, taught Masters degree programme that provides students with a range of advanced topics drawn from wireless communications and communications-related signal processing (including associated enabling technologies). It provides an excellent opportunity to acquire the necessary skills to enter careers in some of the most dynamic fields in wireless communications.

This programme builds on the internationally recognised research strengths of the Communications Systems and Networks (CSN) Group within the Centre for Communications Research. This group conducts pioneering research in a number of key fundamental and experimental work areas including Spatial Channel Measurements and Predictions, Information Theory, Advanced Wireless Access (Cellular and WLAN) and RF Technologies. The group has well-equipped laboratories with state-of-the-art test and measurement equipment and first-class computational facilities.

The MSc provides in-depth training in design, analysis and management skills relevant to the theory and practice of the wireless communications industry. It is accredited by the Institute of Engineering and Technology (IET) until 2018 and is one of only a handful of accredited programmes in this field in the UK.

Programme structure

Core units

Semester One (60 credits)
- Coding Theory
- Radio Frequency Engineering
- Communication Systems
- Mobile Communications
- Networks and Protocols
- Digital Filters and Spectral Analysis

Semester Two (60 credits)
- Advanced Mobile Radio Techniques
- Antennas and Electromagnetic Compatibility
- Broadband Wireless Communications
- Digital Signal Processing Systems
- Engineering Research Skills

Project (60 credits)
A substantial research project is initiated during Semester Two and completed during the summer. This may be based at the University or with industrial partners.

Entry requirements
An upper second-class honours degree (or an international equivalent) in a numerate physical science or engineering discipline. Candidates with a lower class of degree, equivalent qualifications or relevant work experience may be admitted if they can demonstrate their potential for higher degree work. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
MSc in Wireless Communications and Signal Processing
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.

Key facts

Why choose Bristol?
Accredited by the Institution of Engineering and Technology, one of only a handful of accredited programmes in this field in the UK.

Merchant Venturers School of Engineering
Awards available MSc
Duration of programme One year full-time
Part-time study available? No
Open to international students? Yes
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £18,600
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline 21 August 2016
(Early application recommended; the programme will close once full)
Engineering – Doctoral Training in Partnership

As well as the numerous doctoral training initiatives of which the University of Bristol is the lead higher education institution, the Faculty of Engineering is also delighted to partner with two other Russell Group university-led centres.

The EPSRC Centre for Doctoral Training in Quantitative Nondestructive Evaluation (NDE) is led by Imperial College London in partnership with the universities of Bristol, Manchester, Nottingham, Strathclyde and Warwick.

Quantitative NDE is a multi-disciplinary field that uses many physical phenomena to detect anomalies in structures and materials. This requires its research base to encompass a wide range of scientific and engineering skills, which is why the centre is based on a consortium of academic institutions with complementary capabilities.

Opportunities are available in the centre for either a PhD or EngD research degree. PhD projects tend to be more fundamental research while EngD projects tend to be more applied.

Students will have access to a range of training and development opportunities through technical and specialist modules.

Past industrial sponsors of the Centre’s students have included Airbus, EDF, Rolls Royce and Sonomatic.

Full details of the centre and information about making an application can be found at www.rcnde.ac.uk/home-cdt.

The EPSRC Centre for Doctoral Training in Water Informatics: Science and Engineering (WISE) is led by the University of Exeter in partnership with the universities of Bristol, Bath and Cardiff.

The centre offers four-year, fully-funded PhD studentships in the research areas of water informatics and water science and engineering.

The overall aim of the WISE CDT is to offer a programme that fosters new levels of innovation and collaboration to train a cohort of engineers and scientists at the boundaries of these research areas. The centre is seeking to establish a vibrant research and learning community which is uniquely placed to train the highest calibre of students.

Students of the CDT are given the opportunity to spend 3 months overseas at a partner academic institution. Such partners include Stanford University, Tsinghua University and the National University of Singapore.

Full details of the Centre and information about entry requirements and making an application can be found at www.wisecdt.org.
Increasing demand from industry for new materials with superior properties is giving a new urgency to the design and development of high-performance composites. The EPSRC Centre for Doctoral Training in Advanced Composites for Innovation and Science (ACCIS CDT) offers the opportunity for students in engineering, science and mathematics to receive training in composite materials and structures technologies and to conduct cutting-edge research.

The Centre fosters a collaborative work environment, strengthened by the cohort-driven activities in the first year, which encourages knowledge-sharing and joint problem-solving.

The Centre has exceptional, multi-sectorial links: industry partners offer a number of six-month and PhD projects providing opportunities to gain valuable experience. International secondments are also available; previous placements include NASA Langley Research Center, Caltech, Sandia National Laboratories and Eindhoven University of Technology.

The Centre covers a wide range of composites research, with possible projects being related to morphing structures for aircraft, cars and marine craft; multifunctional materials; and innovative manufacturing solutions.

On completing the programme you will leave with far more than a PhD: you will have the skills, knowledge and acumen to become one of the future leaders in advanced composites, be it in academia or industry.

**Research groups**
All CDT students are based in the ACCIS research group, which is a world-leading centre for composites research, combining cutting-edge fundamental science with strong industrial links for exploitation and technology transfer.

**Programme structure**

**Year One**
- A range of mandatory and optional taught units (see the programme catalogue for details)
- Group design, build and test project
- Individual six-month research project
- Transferable skills training and public engagement activities

**Years Two to Four**
- PhD research project
- International placement opportunity
- Transferable skills training and public engagement activities

**Entry requirements**
An upper-second class degree in a relevant subject (or equivalent qualification). For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**
Centre for Doctoral Training in Advanced Composites for Innovation and Science Graduate Education Team
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 331 5309
Email: composites-cdt@bristol.ac.uk

**Applications**
Details of how to apply are available at bristol.ac.uk/pg-study.
Aerospace Engineering

The University of Bristol benefits from the concentration of aerospace industry in the south-west of England, and a key feature of our research is our close links with business. We have also seen burgeoning links with the renewable energy industry.

We have established formal technology partnerships, e.g., the Rolls-Royce University Technology Centre (UTC) in Composites, the AgustaWestland UTC in Vibration, and a composites technology partnership with Vestas Wind Systems. We have strong collaborative links with organisations such as Airbus, GKN, Airbus Innovations and DSTL (Defence Science and Technology Laboratory). We are also founding members of the UK Applied Aerodynamics Consortium, and partners in the Centre for Fluid Mechanics Simulation (CFMS). We have numerous research collaborations with industry via the UK Aerospace Technology Institute and Innovate UK. We have strong international links with numerous European partners via previous and current EU grants, and with non-academic centres including NASA Langley, Los Alamos National Laboratories, JAXA and the US Air Force.

These close relationships with industry, associated with substantial research funding from other UK and EU sources, ensure our research is industrially relevant and at the leading edge of technology, as reflected by the high proportion of research found to exhibit world leading impact in the 2014 Research Excellence Framework (REF) exercise.

The department holds over £20 million in research funding in the fields of aerodynamics, dynamics and control, and composite materials.

As well as contracted research, we undertake a large amount of general research and consultancy from a variety of internal and external funding sources. An uninhibited approach to ideas encourages collaborative projects with others across the University.

An indication of our reputation for research is the selection by UK Government of our Advanced Composites Centre for Innovation and Science (ACCIS) to lead the establishment of the UK National Composites Centre (NCC), a £25-million investment supported by the UK Department for Business, Innovation and Skills and the EU. A further £28-million Phase II development has recently been completed (October 2014) to increase the capacity of the NCC still further and to facilitate the inclusion of additional academic input to deliver world-class innovation in the development of composite materials.

Research groups
Our research is organised via cross-faculty research groups; see bristol.ac.uk/engineering/research. People within the department vigorously pursue their research interests via three major interest groups: Fluid Flow and Aerodynamics; ACCIS; and Dynamics and Control. This work is supported by 60+ academic and research staff, and 100+ postgraduates, plus a highly experienced administrative and technical support team.

Entry requirements
An upper second-class honours degree (or international equivalent) in Science, Mathematics or Engineering. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

Key facts

Why choose Bristol?
Strong links and located close to major national and international aerospace companies

Awards available
MSc by research, PhD

Duration of programme
MSc: One year full-time; two years part-time
PhD: Three years full-time; six years part-time

English Language Profile
E (see Introduction, “How to apply”, p15)

Number of places
Not fixed

Fees (per year, subject to annual increase)
Full-time: UK/EU £4,145; overseas £18,100
Part-time: UK/EU £2,073

Funding
Please see p2

Website
bristol.ac.uk/engineering/graduate-school/pg-open/index.html

Application deadline
Not fixed

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
RESEARCH PROGRAMME

Civil Engineering

Our multidisciplinary research addresses the global need for delivering long-term, sustainable performance of existing and new infrastructure systems. We are leaders in modelling and managing the impacts of extreme natural and human hazards, such as earthquakes, climate change, flooding, industrial processes, traffic and crowds. Our application studies range in scale from complete national and regional systems such as national hydrological models, water systems, electricity and transport networks, through individual artefacts such as nuclear facilities, dams, long-span bridges and buildings, down to local scale buckling models of reinforcing bars in concrete. Much of the research includes monitoring of prototypes or modelling at large scale, for example, the dynamics of cable-stayed bridges such as the Second Severn Crossing, analysis of deep excavations, and flood prediction based on real-time radar detection of rainfall.

Our three groups collaborate widely with academic and industrial partners from across the engineering, science and social science disciplines, and from around the world.

Research groups

Earthquake and Geotechnical Engineering

This area encompasses structural engineering, advanced composite materials and geomechanics. Based around BLADE (the £20-million Bristol Laboratories for Advanced Dynamics Engineering) and the Earthquake Engineering Research Centre (EERC), the group focuses on the nonlinear performance and reliability of civil engineering infrastructure, with an emphasis on dynamic loading. It develops techniques for numerical analysis, physical testing of infrastructure in the field and laboratory structural and geotechnical material behaviour characterisation and modelling, structural vulnerability and overall nonlinear dynamic performance assessment. This group is the largest in the UK with an interest in earthquake engineering. The EERC hosts one of Europe’s leading academic experimental research facilities in earthquake engineering and structural dynamics. The centre has made notable advances in several areas including the mechanisms of wind and pedestrian-induced vibrations, the nonlinear dynamics of masonry and other buildings (including strengthening and using advanced composites), and the seismic response of large dams.

Research in advanced composites links with the faculty’s Advanced Composites Centre for Innovation and Science (ACCIS) and focuses on large-scale testing and advanced theoretical analysis of hybrid structures comprising any combination of conventional construction materials and novel materials, such as limecrete and fibre-reinforced polymers, which have significant sustainability benefits for use in buildings and bridges. The group has an active interest in solving geotechnical problems using a multiscale approach which combines laboratory testing, constitutive modelling, physical modelling, field observation and numerical simulation. Recent research focuses on measurements of deformation properties of soils using novel techniques of laboratory geophysics at very small strains for stiffness, dynamic soil-structure interaction for various types of structures including bridges, retaining systems, dams, and foundations of offshore wind turbines. The group also has a strong interest in the characterisation of treated geomaterials: mixtures of soil with various inclusions like fibres, cement, fly ash and soft tire chips. The Soil Mechanics Laboratory possesses a series of triaxial and a unique set of multiaxial soil test apparatus: True Triaxial Apparatus (independent variation of three principal stresses, rigid boundaries), Cubical Cell (independent variation of three principal stresses, flexible boundaries), and Hollow Cylindrical Torsional Apparatus (independent control of four stress variables).

Water and Environment

The Water and Environmental Engineering Research Group is concerned with characterising and simulating the water environment in a changing world. We advance the sustainable use of water resources, provide design variables for infrastructure, and enhance the security of society regarding floods and other environmental hazards. Focus areas include: hydrology; water and health; climate change impacts; water quality; risk from natural hazards and new observational methods. Water and environmental security are crucial for the sustainable and safe existence of both people and nature. Ensuring water security requires protection from floods and water scarcity, and the sufficient supply of freshwater of appropriate quality to ensure environmental and human health. The future of our society is less likely to be threatened by armed conflict, than by population growth, climate change, water shortages and pollution, as well as poverty and rising food prices. The water and environment research group focuses on developing the theory and tools needed to address the complex issue of water security in a changing world.
The group consists of an interdisciplinary team of engineers and scientists who combine process understanding, mathematical modelling, novel monitoring approaches and engineering principles to solve societal water problems.

**Systems and Safety**
The Systems research group develops novel, holistic approaches for characterising and managing the safe and sustainable performance of complex systems, including human factors. Key areas of work include sustainable systems, problem structuring methods, the vulnerability and resilience of infrastructures, and safety and vulnerability of embedded software systems. Within the Systems group, the Safety Systems Research Centre (SSRC) performs novel research into the safe and resilient performance of complex systems, including computational and organisational factors. The SSRC is also part of the Bristol-Oxford Nuclear Research Centre, and Bristol’s strategic relationship with EDF.

**Entry requirements**
MSc and/or upper second-class honours degree or international equivalent. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**
PhD in Civil Engineering
Postgraduate Admissions
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5130
Email: fen-pgadmissions@bristol.ac.uk

**Awards available**
MSc by research, PhD

**Duration of programme**
MSc: One year full-time; two years part-time
PhD: Three years full-time; six years part-time

**English Language Profile**
E (see Introduction, ‘How to apply’, p15)

**Number of places**
Not fixed

**Fees (per year, subject to annual increase)**
Full-time: UK/EU £4,145; overseas £18,100
Part-time: UK/EU £2,073

**Funding**
Please see p2

**Website**
bristol.ac.uk/engineering/graduate-school/pg-open/index.html

**Application deadline**
Not fixed
Communications

The UK’s only interdisciplinary EPSRC Centre for Doctoral Training in Communications offers graduates in engineering, mathematics and science a stimulating environment in which to undertake research. The Centre, funded by EPSRC and industry, addresses the shortage of highly skilled communications engineers by training postgraduates and exposing them to groundbreaking research.

The Centre brings together world-leading experts in their fields, many of whom also have extensive industrial links. Bristol benefits from a high concentration of communication-related industries in the region. Many of these organisations work closely with the centre and will provide you with industrial training and support, allowing you to obtain skills which will maximise your employability.

The programme will equip you with the necessary skills to work in a wide variety of roles to lead innovative research and future product development.

PhD topics might include:
• blind source separation;
• alternative methods for frequency duplexing;
• adaptive broadcast transmission with end-user metrics;
• a more cognitive approach to wireless access;
• target designation and surveillance presentation for live aerial imagery;
• optically reconfigurable microwave components for communication systems;
• sense and avoid for UAVs;
• ultra-broadband PA linearisation;
• next-generation conformal antenna arrays for sensors and communications;
• spectrum sensing for cognitive radio;
• true 3D display using acoustic levitation;
• integrated, user-centered health sensing;
• millimetre wave communications;
• intelligent systems;
• network analytics for security.

Programme structure
The four-year programme consists of a one-year taught component designed to extend and broaden key skills, followed by a three-year solo PhD research project. Training is provided in the form of lectures, bespoke transferable skills courses and workshops together with a diverse seminar programme given by leaders in their field, as well as individual and group research projects.

Successful applicants will be members of a close-knit team of students. The programme has been designed to allow flexibility in assumed previous knowledge, with advanced units building on a common core.

The centre is committed to providing additional training in skills that will help your personal development in your academic studies and through on to your professional career. Our Entrepreneur in Residence provides a tailor-made course that runs across all four years of study which focuses on a small number of critical subject areas necessary to prepare graduates to be the next generation of entrepreneurial leaders in UK corporations, start-ups, or academia.

Entry requirements
MSc and/or upper second-class honours degree or international equivalent. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
EPSRC Centre for Doctoral Training in Communications
Graduate Education Team
Merchant Venturers Building
Woodland Road
Bristol BS8 1UB
Tel: +44 (0)117 954 5395
Email: cdt-communications@bristol.ac.uk

Key facts

Why choose Bristol?
The UK’s only interdisciplinary Centre for Doctoral Training in Communications

Awards available
PhD

Duration of programme
Four years full-time

English Language Profile
E
(see Introduction, ‘How to apply’, p15)

Number of places
10-12

Fees (per year, subject to annual increase)
Full-time: UK/EU £4,145; overseas £18,100

Funding
Please see p2

Website
bristol.ac.uk/cdt-communications/

Possible start dates
September 2016
Application deadline
19 August 2016
(Early application recommended; the programme will close once full)

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Complexity Sciences  Cross-faculty

Have you ever wondered how animals move collectively in flocks, swarms and shoals? Or how the brain learns and remembers information? Or how different plants, species or even transport systems evolve and adapt according to their environments?

These are just a few examples of the numerous strands of research undertaken at the Bristol Centre for Complexity Sciences (BCCS).

The BCCS cultivates interdisciplinary research across a range of modern engineering, social, life and molecular science subjects. Combining new and traditional methods from a variety of disciplines, our research focuses on the development of innovative mathematical methodology, tools and concepts which can be applied and tested on important real-world problems.

Research groups
The BCCS brings together expertise from across the university with highly esteemed potential supervisors in a wide variety of areas such as:
- Biological Sciences
- Synthetic Biology
- Social Medicine
- Transportation
- Civil Engineering
- Computer Science
- Engineering Mathematics
- Chemistry
- Mathematics
- Neuroscience
- Social Sciences
- Physics

Please visit our website for more information about our current and completed research projects and a list of affiliated academic staff.

Programme structure
The BCCS is highly interdisciplinary with links to departments in all faculties. Each PhD project is supervised by at least two members of staff, to provide both a theoretical and an applied perspective. There are also links with potential supervisors at other institutions or in industry.

You will be supervised within an academic department which is usually defined by the main supervisor of your research project. You retain close ties with the BCCS community through regular seminars and events throughout the academic year.

You are encouraged to participate in a programme of activities including transferable skills workshops, public engagement, and attending the complexity sciences seminar series and other social events. As a result there is a strong sense of community between all years and with staff.

Entry requirements
An upper second-class honours degree (or international equivalent) in Mathematics, Physics, Computer Science or similar. Other degrees are considered but evidence of a strong mathematical background is essential.

For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts
Why choose Bristol?
Supervision from at least two experts drawn from different departments or schools across the University

Awards available PhD
Duration of programme Three years full-time
English Language Profile E
(see Introduction, ‘How to apply’, p15)
Number of places Not fixed
Fees (per year, subject to annual increase) Full-time: UK/EU £4,145; overseas £18,100
Funding Please see p2
Website bristol.ac.uk/bccs
Possible start dates Not fixed
Application deadline We welcome applications at any time of year but please note that actual start dates may be subject to host faculty procedures

Contact for further information
BCCS Manager
Bristol Centre for Complexity Sciences
Queens Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5663
Email: bccs-enquiries@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Composites Manufacture

The Engineering Doctorate (EngD) in Composites Manufacture is a four-year postgraduate research programme, which integrates an industry-based research project with research training in technical subjects, as well as business skills and transferable skills training. Each EngD research project is designed around the sponsoring company's research priorities.

The EngD programme is run by the Industrial Doctorate Centre (IDC) in Composites Manufacture, which is firmly embedded within the EPSRC Centre for Innovative Manufacturing in Composites (CIMComp). The IDC is a collaboration between the University of Bristol (lead university), Cranfield University, the University of Manchester and the University of Nottingham. EngD students benefit from the use of cutting-edge equipment and expertise at the universities and at the National Composites Centre (NCC), which provides a world-class facility to bridge the gap between research and industrial application.

The IDC aims to provide the UK composites manufacturing industry with EngD graduates equipped with the necessary advanced technical and leadership skills required for effective adoption of new knowledge and technologies in composites manufacture. The relevant industry areas include aerospace, automotive, marine, wind energy and construction.

Programme structure
EngD students spend 75 per cent of their time at their sponsoring company carrying out an industrially focused research project, while their remaining time is dedicated to the taught component of the EngD programme. This specialist training, which is delivered at the NCC in Bristol, involves attending a number of week-long, Masters-level units during the first two years of the programme.

Units
- Constituents of Composites
- Manufacturing of Composite Structures
- Laminate Analysis, Modelling and Design of Composites
- CAD for Composites Design and Manufacture
- Mechanical Performance of Composites
- Process Modelling and Control in Composites Manufacture
- Design for Manufacture of Composites
- Business Skills 1
- Business Skills 2
- Composites Manufacturing Study Tour

EngD students are supervised by an academic and an industrial supervisor and are registered at the university of the academic supervisor.

Entry requirements
An upper second-class degree (or equivalent qualification) in Engineering, Physical Science or Applied Mathematics. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
Industrial Doctorate Centre Manager
Industrial Doctorate Centre in Composites Manufacture
Faculty of Engineering
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 331 5315
Email: idc@epsrc-cimc.ac.uk

Applications
Please contact the IDC directly before making an application online.

Key facts

Why choose Bristol?
Access cutting-edge equipment and expertise at the universities and at the National Composites Centre

Awards available
EngD

Duration of programme
Four years full-time (75% in industry)

English Language Profile
E (see Introduction, ‘How to apply’, p15)

Number of places
10

Fees (per year, subject to annual increase)
Full-time: UK/EU £4,145; overseas £18,100

Funding
Please see p2

Website
epsrc-cimc.ac.uk/IDC

Possible start dates
Not fixed

Application deadline
We welcome applications at any time of year but please note that actual start dates may be subject to host faculty procedures.
Computer Science

The Department of Computer Science is an international centre of excellence and is located in the Merchant Venturers Building in the centre of Bristol along with the Department of Electrical and Electronic Engineering, bringing together the research in computing, communications, electronics and photonics within the University.

The Bristol region has one of Europe’s largest concentrations of high-technology industry. Computers, communications and microelectronics are well represented, alongside digital media, computer games and electronic commerce. The department has close relationships with many of these organisations via collaborative projects, staff secondments and visiting industrial staff.

Research groups
The Department of Computer Science has a large programme of research supported by industry, the European Union, and UK Government research establishments and public corporations. The academic research programme is organised into the following groups:

The **Microelectronics** group is a collective of researchers who are all interested in the challenges of increasing the scale and the speed of computer systems. Some researchers are tackling the problem of designing microchips with millions of transistors on them, and then ensuring that they will work as expected. They are particularly interested in systems handling sound, graphics and images, in which data needs to be transferred and processed at greater and greater speeds in order to meet the demands of new applications and appliances; other researchers are working on issues in ultra-largescale networked IT systems, involving hundreds of thousands of computers (and users). This area is also home to the Bristol Algorithms Group, who look at various aspects of the theory and practice of algorithms. The goal of their research is both to provide scalable solutions to existing problems and to understand the limits of what is possible; the quantity of data available in digital form continues to increase at an exponential rate, so the need for faster and more accurate algorithms is now more important than ever before.

The **Visual Information Laboratory** undertakes innovative, collaborative and interdisciplinary research resulting in world-leading technology in the areas of computer vision, image and video communications, content analysis and distributed sensor systems. Current research includes: images and video search and retrieval; video tracking; visual SLAM; medical and bio-imaging; machine vision; 3D and multi-view processing; colour science; high dynamic-range imaging, vision and graphics.

Our **Cryptography and Information Security** group conducts research into cryptography, the underlying hard problems on which it is based, and the hardware and software needed to implement secure systems. The group has particular interest in techniques for proving security of cryptographic systems, the efficient implementation of such systems on small computing devices, and the verification of those implementations, including testing their security against physical attacks. We also have an interest in security auditing and computer forensics.

Members of the **Intelligent Systems** group explore general principles underlying learning and intelligence in artificial and natural systems. An important focus is on machine learning and data mining techniques for systems and software that improve with experience. Other work is on the interface between computer science and the biological sciences, exploiting connections which not only help to make computers more intelligent but also provide a deeper understanding of aspects of human intelligence. We are also working on computational methods for automating significant parts of the scientific method. Our research enables the development of sophisticated systems allowing us to manage and make full use of the vast amounts of digital data that are now available.

Our **Interaction and Graphics** group explores creative interdisciplinary research topics spanning human-computer interaction, visual and tactile perception, imaging, visualisation and computer-supported collaboration.
We design and evaluate novel interfaces to computer systems, including hardware and software components. We are interested in new forms of practical application and devices that you can wear or carry with you incorporating sensing mechanisms and imaging techniques. This work will enable us to take advantage of the continuing miniaturisation and increased portability of computing devices. In addition to our experimental work, we conduct a number of projects to investigate novel uses of intelligent devices in the real world.

The newly formed Robotics group leads the faculty’s theoretical and practical robotics research, some of which is based at the Bristol Robotics Laboratory at Frenchay. Researchers are involved in projects studying human-robot interaction, collective robotics, aerial robotics, neuro-inspired control, haptics, control systems, rehabilitation robotics, soft robotics and biomedical systems.

We are also involved in a number of research centres spanning across different parts of the University. For example, the pioneering Centre for IT and Law looks at the new legal challenges presented by the rapid changes in information technology. It is a cross-disciplinary venture between the University of Bristol Law School and the Department of Computer Science and is supported by a group of international business and legal experts.

**Entry requirements**

An upper second-class honours degree (or international equivalent) in Computer Science or a related subject. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**

PhD in Computer Science  
Postgraduate Admissions Team  
University of Bristol  
Queen’s Building  
University Walk  
Bristol BS8 1TR  
Tel: +44 (0)117 331 5520  
Email: fen-pgrmadmissionsmvse@bristol.ac.uk

**Applications**

Details of how to apply are available at bristol.ac.uk/pg-study.

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**Key facts**

**Why choose Bristol?**

An international centre of excellence that is consistently ranked as one of the leading computer science departments in the UK

**Awards available** PhD

**Duration of programme**  
Three years full-time; six years part-time

**English Language Profile**  
E (see Introduction, ‘How to apply’, p15)

**Number of places** Not fixed

**Fees (per year, subject to annual increase)**  
Full-time: UK/EU £4,145; overseas £18,100  
Part-time: UK/EU £2,073

**Funding** Please see p2

**Website** bristol.ac.uk/engineering/graduate-school/pg-open/index.html

**Possible start dates** Not fixed

**Application deadline** Not fixed
The Department of Electrical and Electronic Engineering has an international reputation for world-leading research in areas such as mobile and wireless communication systems, microelectronics, electrical energy management, photonics and optical communications, artificial vision and image analysis, and high-performance networks. It collaborates with over 30 industrial organisations and has been exceedingly successful in attracting substantial research funding from diverse sources in the UK, Europe and overseas.

The department has a strong research profile, with 30 academic staff, more than 60 postgraduate research students and 30 full-time research assistants contributing to numerous research projects. The quality of our research is recognised nationally and internationally.

**Research groups**

**Communication Systems and Networks**

Modern communication systems and networks play a vitally important role in nearly every aspect of our society. The CSN group has been at the forefront of world research for more than 25 years and its pioneering work impacts the energy, healthcare, transport, semiconductor and telecommunications sectors. The group specialises in end-to-end wireless connectivity while focusing on the following activities:

- Antenna design and fabrication
- Channel measurement and prediction
- Information theory and advanced wireless access
- Broadband wireless (including 4G cellular)
- Network architectures and cross-layer interaction
- Gigabit wireless local/personal area networks
- Computational electromagnetics
- RF technologies

**Electrical Energy Management**

The Electrical Energy Management group researches, designs, builds and tests advanced energy conversion systems containing renewable energy, power electronic and electro-mechanical conversion systems and energy storage elements, in order to optimise efficiency or power/energy density.

The group places a growing emphasis on the efficient management of electrical energy and focuses its research in two main areas:

- Low-Power Systems: design and system-level modelling of vibration energy-harvesting devices and power electronic devices and circuits.

**Visual Information Laboratory**

Vision science research at Bristol is at the forefront of the study of human and animal vision, artificial vision systems and image analysis. The group is embodied by the Visual Information Laboratory, which stimulates interdisciplinary research in order to promote future development of this field. The group’s core research areas of coding and transport also include new parametric coding and analysis methods, distributed video coding and image fusion. The group’s activities fall into three main areas:

- Efficient Algorithms and Architectures
- Error Resilience and Transport
- Image and Video Content Analysis

**Photonics**

Photonics, the science of light, is underpinning many recent developments in communications, solar power, lighting, data storage, and displays, and it could even lead to a quantum revolution in computing. Optical fibre communications forms the backbone of all land-based communications. The Photonics group is pursuing world-leading research topics leading to cheaper, faster information and communication technologies, inexpensive sensors to revolutionise healthcare and new methods of harvesting renewable energy.

Cutting-edge research focuses on three key areas:

- Photonic Quantum Information: secure quantum key distribution, photon sources, quantum gates and integrated quantum circuits.
- Optical Communications: optical
transmission and optical switching technologies.

- Photonic Materials and Devices: low dimensional semiconductor quantum structures, photonic device fabrication and characterisation, nanophotonics, solar cells and sensors.

**Microelectronics**

The Microelectronics Research Group is a team of world-leading academic experts in computer architecture, design verification, fault tolerance, reconfigurable technologies and high-performance computing. The group brings together researchers from a range of academic disciplines in order to address its primary research theme of ‘Energy-Aware Computing’ (EACO), with expertise across the entire system stack, from transistors up to software applications.

**High-Performance Networks**

The High-Performance Networks group (HPNG) specialises in the application of advanced technologies to future communication network infrastructures together with the study of control, node architectures, and technologies best suited for future requirements. The group has a very strong collaborative profile and interacts with researchers and users in the UK, EU, US, Japan and China. Research areas include:

- Optical packet, burst and circuit switched networks
- High-speed (e.g. 1 Tbps) optical systems and networks
- Architecture on demand node
- Cloud computing
- Active optical network architectures and technologies
- Programmable and flexible network protocols/algorithms/functionalities

**Entry requirements**

An upper second-class degree (or international equivalent) in a relevant subject. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**

PhD in Electrical and Electronic Engineering Postgraduate Admissions Team
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 954 5200
Email: fen-pgradmissionsmvse@bristol.ac.uk

**Applications**

Details of how to apply are available at bristol.ac.uk/pg-study.

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**Key facts**

**Why choose Bristol?**

The department has an international reputation for world-leading research

**Awards available**

MSc by research, PhD

**Duration of programme**

MSc: One year full-time
PhD: Three years full-time; six years part-time, considered on a case-by-case basis

**English Language Profile**

E (see Introduction, ‘How to apply’, p15)

**Number of places**

Not fixed

**Fees (per year, subject to annual increase)**

Full-time: UK/EU £4,145; overseas £18,100
Part-time: UK/EU £2,073

**Funding**

Please see p2

**Website**

bristol.ac.uk/engineering/graduate-school/pg-open/index.html

**Application deadline**

Not fixed
Members of the Department of Engineering Mathematics carry out leading-edge research in areas where mathematics is applied to future challenges in engineering, industry and the life sciences. The department also makes fundamental theoretical and computational advances. There is a strong tradition of interdisciplinary work, international collaboration and publication in the leading research journals.

The research is supported by grants from public bodies such as the Engineering and Physical Sciences Research Council, the Biotechnology and Biological Sciences Research Council, the Medical Research Council and the European Union, as well as from industry, and local and national government.

Research groups
Members of the department participate in three official faculty research groups, which are in Applied Nonlinear Mathematics (ANM), Robotics and Autonomous Systems (RAS), and the Intelligent Systems Laboratory (ISL). However, increasingly research projects span across these groups. Throughout the department, we have a very strong culture of combining foundational work in Mathematics and Computer Science and using it to solve real-world problems across a wide range of applications.

For example, current and recent applications include: traffic flow and human mobility; novel materials; rotating machinery; aircraft dynamics; electrical and communication networks; social dynamics and structure; disease epidemics; nanorobots to cure cancer; finding genes linked with cancer; web intelligence; computer vision; climate change and flooding; energy harvesting; neuroscience; stem cells; social psychology; and music.

Fundamental research in the ANM group involves topics such as local and global bifurcation theory, partial differential equations, multiscale analysis, nonsmooth systems, delay differential equations, control theory, statistical physics, and network science. Fundamental research in the ISL group involves topics in machine learning (in particular big data analytics, bioinformatics, etc) and artificial intelligence (including machine translation, uncertainty modelling and fuzzy systems, as well as natural intelligent systems). Both groups interact with RAS which has expertise in topics such as soft robotics, tactile sensing, and swarm robotics.

More about possible research projects can be found on the department’s web pages.

Entry requirements
An upper second-class honours degree (or international equivalent) in a relevant discipline. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
PhD in Engineering Mathematics
Postgraduate Admissions Team
University of Bristol
Queen’s Building
University Walk
Bristol BS8 1TR
Tel: +44 (0)117 331 5520
Email: fen-pgradmissionsmvse@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
RESEARCH PROGRAMME

Future Autonomous Robotic Systems – FARSCOPE

FARSCOPE aims to train the next generation of innovators in the growing field of Robotics and Autonomous Systems (RAS), identified as one of the UK’s Eight Great Technologies for future growth. Our four-year programme leads to the award of a joint PhD degree from both the University of Bristol and the University of the West of England. A PhD is a uniquely challenging and rewarding endeavour, especially in a cutting edge field like RAS.

We have enhanced the standard individual PhD in various ways to give you the best possible start on your RAS research and innovation career:

- Specialist taught modules in a wide variety of RAS technologies to equip you for research
- Exposure to a diverse range of industry and academic RAS topics to give you a broad view of the potential and context of RAS
- Cohort-based skills training including enterprise, public engagement, communication and research methods
- Group projects and industry study workshops to foster creativity, practical skills and integration

You’ll have your choice of specialist topics from over 50 academic supervisors. The centre is based at the Bristol Robotics Laboratory, the largest specialist robotics lab in the UK, plus you’ll have access to all the combined facilities of both partner universities.

Research themes
The Bristol Robotics Laboratory is involved in a wide range of robotics research projects both nationally and internationally. Our research portfolio spans over a number of different themes as follows:

Aerial Robots: Research into intelligent aircraft, including autonomous Micro Air Vehicles, specialising in their guidance and control.

Assisted Living: Research into interactive assistive robots and smart sensor systems to realise person-focussed innovative assistive care solutions for supporting independent living.

Bioenergy and Self-Sustainable Systems: Research into overcoming the energy barrier to deployment of autonomous robots in remote areas utilising microbial fuel cells.

Biomimetic and Neuro-robotics: Developing robots that can operate in challenging environments, beyond the limitations of conventional sensory devices.

Medical Robotics: Robotic technology is able to provide precise and accurate sensing and movement capabilities, thus improving patient and surgeon experience.

Non-linear Robotics: Research towards bringing future generations of humans and humanoid robots together, which requires safe interaction of humans with robots.

Robot Vision: Developing Robots that are able to view, analyse what they see and make decisions in response to instructions by humans.

Safe Human-Robot Interaction: Investigating the aspect of physical and behavioural safety, to enable safe Human Robot Interaction, thus ensuring a robot is capable of performing cooperative tasks with humans.


Smart Automation: Research into the next generation of advanced robotics engineering systems. Robots that can make human like decisions while carrying out manufacturing process.

Soft Robotics: Soft robotics seeks to make robots that are soft, flexible and compliant, just like biological organisms.

Swarm Robotics: A combination of environmental, social and internal cues could result at the group level in components believed to be important in the emergence of self-organised behaviour.

Unconventional Computation in Robots: Drawing inspiration from nature to address the issues of distributed manipulation in the micro-scale.

Verification and Validation for Safety in Robots: Investigating all aspects of safety for verification and validation purposes and to enable safe human-robot interaction in co-operative tasks.

Programme structure
Year One

- Research methods training
- Seminars in modern robotics methods
- Robotics, mechanics and programming
- Robotics context and applications (industry delivered)
- Robot intelligence and systems
- Specialist robotics topics (chosen from list of options)
• Group robot project (e.g. IMAV contest, robot soccer or Mars rover field test)
• Initial research project
• Communications training and research presentation

Year Two
• PhD research
• Industry study workshop
• Innovation and entrepreneurship
• Complementary skills training

Year Three
• PhD research
• Industry study workshop
• Partner placement (optional: opportunities at partner universities in Europe, Asia, North America or partner companies in the UK and Japan)
• Public engagement training and group activity

Year Four
• PhD research
• Complementary skills training (including thesis preparation)
• FARSCOPE conference presentation
• Dissertation

You will start working on your initial research project in your second semester, leading to a dissertation completed at the end of your first year. You then progress to your major PhD research project, for which you may choose to continue your initial project or to pursue a new topic.

Entry requirements
An upper second-class honours degree in an Engineering, Physics, Mathematics or related subject. Other disciplines will be considered on a case-by-case basis.

Students who have completed our MSc in Robotics may be considered, on a case-by-case basis, for direct entry into Year Two of the

FARSCOPE programme. This will be subject to interview including a qualifying presentation on research.

Contact for further information
Diane Benoit, Co-ordinator
FARSCOPE Centre for Doctoral Training
Bristol Robotics Laboratory
University of the West of England
T Block, Frenchay Campus
Coldharbour Lane
Bristol, BS16 1QY
Email: farscope-cdt@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.

Key facts
Why choose Bristol?
Delivered with the University of the West of England through our partnership, the Bristol Robotics Laboratory

Awards available PhD
Duration of programme Four years full-time
English Language Profile E (see Introduction, ‘How to apply’, p15)
Number of places 12
Fees (per year, subject to annual increase)
Full-time: UK/EU £4,145; overseas £18,100
Funding Please see p2
Website bristol.ac.uk/engineering/graduate-school/pg-open/index.html
Possible start dates September 2016
Application deadline The first round of applications will be considered in December 2015. Shortlisted applicants will be invited for interviews in February 2016. Any applications received after February will still be considered.
The Department of Mechanical Engineering has a highly rated research profile which ranges across a wide spectrum of engineering subjects. We also have strong links with most of the UK’s top engineering companies as well as others worldwide.

**Research groups**

The department has three research groups representing the research interests of staff.

**Design and Process Engineering**

The research is focused on bioengineering, design methods and industrial applications. The group collaborates with the Bristol Dental Hospital, the United Bristol Hospital Trust (UBHT) and the Bristol Robotics Laboratory. The group is developing and testing several proof-of-concept technologies for industrial applications such as patented duct cleaning technology (known as ‘ice-pigging’). The group is pioneering new mechanical drive technology for a wide range of industrial applications including micro-air vehicles, spacecraft, dentistry, electro-mechanical valves and roller chains.

**Dynamics and Control**

Dynamics and control research is currently focused on the key themes of:

- Dynamic Substructuring
- Adaptive Control
- Nonlinear Vibration
- Control of Fluidised Beds

As a result we are interested in aspects of nonlinear dynamics, adaptive control, intelligent structures and fluid dynamics.

**Solid Mechanics**

Solid mechanics is about understanding the way engineering materials respond to loading to improve the efficiency and safety of structures. Within the broad area of solid mechanics, the main interests of the group are residual stress, non-destructive testing, structural health monitoring, composite materials, fracture, fatigue and tribology.

**Entry requirements**

An upper second-class honours degree (or international equivalent) in a relevant discipline. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

**Contact for further information**

PhD in Mechanical Engineering Graduate Education Team University of Bristol Queen’s Building University Walk Bristol BS8 1TR Tel: +44 (0)117 331 5953 Email: fen-pgradmissionsqse@bristol.ac.uk
Neural Dynamics

This programme will run in 2016 subject to confirmation of funding.

Neural dynamics is the study of the nervous system’s remarkable capacity to change, and, at a systems level, of the dynamic interplay between integration and segregation of brain regions that enables all aspects of behaviour, including learning, memory, homeostasis and sensorimotor control.

The Wellcome Trust PhD programme is different to a traditional PhD route: it provides you with a year of taught units and two extensive research projects before you embark on your primary research focus. This innovative structure enables you to explore several areas of neural dynamics research, giving you a broad understanding of the foundations that underpin your core interests. This equips you to make a fully informed decision on your major research focus for the remaining three years of your PhD.

Research groups

Bristol has one of the largest concentrations of neuroscientists in Europe and is a major centre for basic and clinical neuroscience. We are an acknowledged world leader in many key areas of neural dynamics research, from both an experimental and theoretical perspective, spanning molecular, cellular and systems levels of neuroscience. Together with experts in systems dynamics, based in the departments of Engineering Mathematics and Computer Science, the School of Mathematics, and the Bristol Robotics Lab, we can provide considerable scope for ground-breaking, integrative research projects.

Programme structure

Year One

Your first year comprises five taught units with related seminars, as well as two research projects lasting four months each, with a student conference concluding the year.

Taught units

• Foundations in Neuroscience
• Mathematical Modelling
• Computational Neuroscience
• An optional unit

These units will equip you with the necessary understanding and skills to engage with the major research that will be the focus of your remaining three years, regardless of your academic background. A tailored training plan will be drawn up for you by the programme directors and yourself.

Years Two to Four

One of the two research projects you undertook in your first year will be developed into your full PhD project, co-supervised by at least one experimentalist and one theoretician.

During this period you will have the option to:
• make an international lab visit for one to three months;
or, in the final year:
• make an industrial lab visit for three to six months.

Entry requirements

A first or upper second-class undergraduate degree or Masters degree in a biomedical science discipline or a relevant theoretical discipline (mathematics, computer science or physics). You should also have some background in mathematics or computer science, eg A-levels or application of mathematical modelling/computational methods in undergraduate research. Crucially, we are looking for talented and motivated students willing to take up the many varied challenges in neural dynamics and who are open to learning about new disciplines and working across different fields.
Quantum Engineering

Bristol’s Centre for Doctoral Training in Quantum Engineering offers a unique training and research experience for those wishing to help shape the emerging field of quantum technology. The core themes of quantum information science – communication, cryptography, simulation, and computation – are all studied at both the level of the fundamental theory, as well as practical implementation. The goal is to enable this exciting young field of academic study to transition into the development of viable technologies, and as such there are great opportunities both for cutting-edge research and for industrial engagement.

Our cohort approach to learning, utilising a balance of lectures, peer learning, group lab activities and individual research projects, creates an environment that is both stimulating and empowering. You will develop your technical expertise, and also receive leadership and transferable skills training through in-house activities and engagement with the Bristol Doctoral College.

This is supplemented by access to Bristol’s world-class local resources as well as a network of academic and industrial partners around the world – people with whom you can actively collaborate by way of visits, secondments, workshops and conferences.

Programme structure
The aim of the first-year training programme is to furnish you with expertise in the underpinning theory and engineering approaches needed in your research.

Year One
The core elements in Year One are:

• Foundations of quantum information theory
• Quantum optics and photonics
• Quantum device engineering: concepts, design and fabrication
• Advanced quantum information theory
• Quantum platforms: from ion traps to superconducting qubits

Years Two to Four
The main outcome from Years Two to Four will be the completion of your chosen PhD research project. You will also be exposed to a wide range of learning experiences including:

• A core module on ‘Enterprise, exploitation and entrepreneurship’ delivered by our academic and industrial partners.
• Cohort learning modules using peer-to-peer teaching to further your understanding of key topics, e.g.: quantum architectures; topological quantum error correction; and quantum chemistry.
• A public outreach activity to support students in promoting awareness of science to a wider audience, offering invaluable experience in public engagement.
• Industrial secondment at one of our partner organisations to develop an understanding of business practices and processes.
• Academic visits and secondments to support students in building collaborations with academic groups, both in the UK and internationally.

Entry requirements
We are seeking candidates with backgrounds in physical science, engineering, computer science and mathematics. Applicants should have an upper-second class degree in a relevant subject (or equivalent qualification).

For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Contact for further information
Postgraduate Administrator
Quantum Engineering Centre for Doctoral Training
Nanoscience and Quantum Information Building

Key facts
Why choose Bristol?
Students have access to an international network of world-class academic and industrial collaborators

Awards available PhD
Duration of programme Four years full-time
English Language Profile E (see Introduction, ‘How to apply’, p15)
Number of places 10
Fees (per year, subject to annual increase) Full-time: UK/EU £4,145; overseas £18,100
Funding Please see p2
Website bristol.ac.uk/physics
Possible start dates October 2016
Application deadline Not fixed, but interviews for an October start are likely to occur in late spring. International applicants are encouraged to apply as early as possible

University of Bristol
Tyndall Avenue
Bristol BS8 1FD
Tel: +44 (0)117 954 0112
Email: quantum-engineering@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Postgraduates at the University-run National Composites Centre
The information in this prospectus relates primarily to the session 2016/17 and every effort has been made to ensure it is correct at the time of going to press in August 2015. The University will use its reasonable efforts to deliver the programmes as described.

However, the University reserves the right for any reason without notice to withdraw or change any of the programmes included in this prospectus, to alter tuition fees, entry requirements, the facilities and/or services available from or provided by or on behalf of the University. You should also note that the choice of subjects may be limited by considerations of timetable, staffing and/or available places on a programme.

If you accept an offer of a place on a programme, the relationship between you and the University will be governed by the applicable Rules and Regulations for Students, which includes the Student Agreement.

Please see:
bristol.ac.uk/secretary/studentrulesregs
bristol.ac.uk/studentagreement

The University values its students and works to provide a set of support structures and a range of opportunities that will enable you to excel in every aspect of your life and make your university career a genuinely transformational experience. To help create a positive environment for learning and academic achievement, the University has established various rules and regulations that all students must follow if they accept an offer of a place to study with us. These rules and regulations include a Student Agreement, which sets out the relationship between the University of Bristol and its students. A copy of the agreement is available at bristol.ac.uk/studentagreement.

Prospective students should take into account when selecting a programme of study the inherent risks of their chosen career. For more information, see bristol.ac.uk/prospectus/postgraduate/health-safety.html.

For details of any changes made since publication, please refer to our online prospectus at bristol.ac.uk/pg-study.