## Contents

**Introduction** 1  
Funding your studies in the Faculty of Science 2  

**Taught Postgraduate Programmes** 3  
Applied Neuropsychology (PG Dip) 3  
Applied Neuropsychology (MSc) 4  
Climate Change Science and Policy 5  
Clinical Neuropsychology (PG Dip) 6  
Clinical Neuropsychology (MSc) 7  
Mathematical Sciences 8  
Nanoscience and Functional Nanomaterials 9  
Neuropsychology 10  
Nuclear Science and Engineering 11  
Palaeobiology 12  
Research Methods in Psychology 13  
Statistics 14  
Volcanology 15  

**Doctoral Training in Partnership** 16  

**Postgraduate Research Programmes** 17  
Biological Sciences 17  
Chemical Synthesis 19  
Chemistry 20  
Condensed Matter Physics NEW 21  
Communications Cross-faculty 22  
Complexity Sciences Cross-faculty 23  
Earth Sciences 24  
Functional Nanomaterials 26  
Geographical Sciences (Physical Geography) 27  
Great Western 4+ NERC DTP 28  
Mathematics 29  
Physics 30  
Psychology (Experimental) 33  
Quantum Engineering Cross-faculty 34  
Synthetic Biology 35  
South West Biosciences Cross-faculty 36  

## Contact

**General enquiries**  
Postgraduate Admissions  
Faculty of Science  
**Tel** +44 (0)117 928 8126  
**Email** science-pg-admissions@bristol.ac.uk  
[bristol.ac.uk/science](http://bristol.ac.uk/science)  

---

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

Acknowledged as internationally leading, the Faculty of Science provides an outstanding intellectual environment for over 700 postgraduate students.

We are among the top three universities in the UK in our concentration of nationally funded Centres for Doctoral Training and Doctoral Training Programmes in the basic sciences, where students undertake a four-year PhD programme which typically includes one year of masters-level training. Current centres include Bioscience and Food Security, Catalysis, Chemical Synthesis, Chemical Theory and Modelling, Condensed Matter Physics, Diamond Science and Technology, Environmental Science, Functional Nanomaterials, Quantum Engineering, and Synthetic Biology.

In addition, each school in the faculty offers traditional PhD programmes across a broad range of disciplines, supervised by internationally leading researchers.

The faculty hosts a range of taught Masters programmes, including Palaeobiology, Volcanology, Neuroscience, Research Methods in Psychology, Climate Change Science and Policy, Mathematical Sciences, Statistics, and Functional Nanomaterials. In addition, each school offers a one-year MSc by Research.

The integration of education and research in the faculty helps to take postgraduate studies to the cutting edge of modern science.

Professor Timothy Gallagher
Dean, Faculty of Science
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.

MSc Climate Change Science and Policy
Applicants to this 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 Science is proud to work with colleagues across the University and with partner institutions as part of the following funded doctoral training initiatives:

- Functional Nanomaterials – EPSRC Centre (see page 26)
- Chemical Synthesis Centre – EPSRC Centre for Doctoral Training (see page 19)
- Catalysis – EPSRC Centre for Doctoral Training (see page 16)
- Condensed Matter Physics – EPSRC Centre for Doctoral Training (see page 21)
- Diamond Science and Technology – EPSRC Centre for Doctoral Training (see page 16)
- Great Western Four+ – NERC Doctoral Training Partnership (see page 28)
- Quantum Engineering – EPSRC Centre for Doctoral Training (see page 34)
- Synthetic Biology – EPSRC and BBSRC Centre for Doctoral Training (see page 35)
- Theory and Modelling in Chemical Sciences – EPSRC Centre for Doctoral Training (see page 16)
- South West Biosciences – BBSRC Doctoral Training Partnership (see page 36)

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.
The Diploma in Applied Neuropsychology is designed for people aiming to become clinical psychologists, but who do not hold a British Psychological Society (BPS) accredited Doctorate in Clinical Psychology (DClin). The programme provides an excellent basis for those wishing to pursue a career involving work with patients with neuropsychological deficits (eg head injury, dementia, stroke, rehabilitation). Alternatively, the diploma can lead to further doctoral research.

The programme would also be of interest to international students who wish to obtain specialist training in clinical neuropsychology. Many of the programme units are provided in a block format (over a single week), designed for people with personal and/or professional commitments. All lectures are also broadcast online, and can be downloaded, so can be viewed without travelling to Bristol.

Please note that this programme is not accredited by the BPS. Please see our Diploma in Clinical Neuropsychology if you are interested in a BPS-accredited programme.

Programme structure
Programme content is primarily guided by the BPS syllabus and guidelines for training in Clinical Neuropsychology. The Diploma includes eight distinct units, each of which supply credit points leading to a total of 120 credits. Units are taught within the University of Bristol and North Bristol NHS Trust (NBT).

Core units

Functional Neuroanatomy, Neuroscience Methods and Issues in Neuropsychology (30 credits)
• Part A: Issues in Neuropsychology
• Part B: Functional Neuroanatomy and Neuroscience Methods

Applied Clinical Neuropsychology and Principles of Assessment (30 credits)
• Part A: Assessment in Clinical Neuropsychology
• Part B: Applied Neuropsychology

Development, Rehabilitation and Evidence-based Neuropsychology and Principles of Clinical Statistics (30 credits)
• Part A: Development and Rehabilitation
• Part B: Evidence-Based Neuropsychology

Theoretical and Clinical Neuropsychology (30 credits)
• Part A: Clinical Neuropsychology in Practice
• Part B: Theoretical Neuropsychology

Entry requirements
An upper second-class honours degree in Psychology or a closely related discipline (eg neuroscience, clinical psychology). Some clinical experience is preferable, though not essential.

Contact for further information
Charlotte Powell, Postgraduate Administrator
School of Experimental Psychology
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0)117 928 8452
Email: charlotte.powell@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Applied Neuropsychology (MSc)

This MSc is a collaboration between the University’s School of Experimental Psychology and the Department of Neuropsychology within North Bristol NHS Trust. The degree provides you with training in clinical neuropsychology; a substantial portion of taught content is provided by clinicians working in the NHS. In addition to taught content the degree also involves a research project component. Many of the programme units are provided in a block format, over a single week.

This MSc will equip students intending to become clinical psychologists, as well as those who wish to pursue a career involving contact with patients with neuropsychological deficits (e.g. head injury, dementia, stroke, rehabilitation). It also provides an excellent grounding for students wishing to move on to further academic research through a PhD.

Programme content includes principles of assessment within clinical and neuropsychology, coverage of a range of neuropsychological disorders and pathologies affecting the brain, techniques for studying the human brain, and principles of treatment and rehabilitation following brain damage. It also focuses on evidence-based practice within the clinical context. There is a comprehensive range of additional structured tutorials in which students can discuss clinical practice issues with a range of subject experts working within the NHS.

A novel feature of our clinical training is that all lectures are broadcast live online, so can be viewed without the requirement to travel to lecture theatres. In addition, all lectures are recorded and can be replayed at any time. Students will have access to a large range of recorded clinical case reviews that supplement the learning experience. Our commitment to online learning may be of particular interest to international students.

Programme structure

Core units

Functional Neuroanatomy, Neuroscience Methods and Issues in Neuropsychology (30 credits)
- Part A: Issues in Neuropsychology
- Part B: Functional Neuroanatomy and Neuroscience Methods

Applied Clinical Neuropsychology and Principles of Assessment (30 credits)
- Part A: Assessment in Clinical Neuropsychology
- Part B: Applied Neuropsychology

Development, Rehabilitation and Evidence-based Neuropsychology and Principles of Clinical Statistics (30 credits)
- Part A: Development and Rehabilitation
- Part B: Evidence-based Neuropsychology

Theoretical and Clinical Neuropsychology (30 credits)
- Part A: Clinical Neuropsychology in Practice
- Part B: Theoretical Neuropsychology

Dissertation (60 credits)

Entry requirements

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

Key facts

Why choose Bristol?
Students benefit from cross-disciplinary collaborations with colleagues in Bristol Neuroscience and North Bristol NHS Trust.

School of Experimental Psychology
Awards available: MSc
Duration of programme
One year full-time; two years part-time
Part-time study available? Yes
Open to international students? Yes; but seek advice on visa requirements from the University’s International Office Advice and Support Team (bristol.ac.uk/international-office/visas-immigration)

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

Number of places 40

Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £19,600
Part-time: UK/EU £5,050

Funding
Please see p2

Website: bristol.ac.uk/expsych

Possible start dates September 2016
Application deadline 31 July 2016

Contact for further information
Charlotte Powell, Postgraduate Administrator
School of Experimental Psychology
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0)117 928 8452
Email: charlotte.powell@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Concern about global environmental change has never been greater. The University of Bristol’s MSc in Climate Change Science and Policy trains highly skilled graduates for professional employment in the public and private sectors, academia, consultancies, and non-governmental/advocacy organisations.

The curriculum is aimed at talented graduates seeking to enter, or upgrade their expertise in, the fields of climate change science, policy and analysis. The programme is provided by Geographical Sciences, one of Bristol’s leading Science departments, with world-class research groups in four key areas of the science:

- Climate change science and its links to policy and policymakers
- Modelling of the Earth System, from simple box models to complex climate models
- Remote sensing of the environment and GIS
- Understanding past climate change and making predictions of future change

The programme is closely linked to the renowned Cabot Institute, which brings together all of the University’s research into the changing global environment across the sciences, social sciences and engineering.

## Programme structure

### Core units

- The Science and Impacts of Climate Change (including interactions between climate scientists and policy and the media)
- Environmental Policy and Politics
- Case Studies of Past Climate Change and Predicting the Future (including using complex models of the Earth System to predict future global change)
- Remote Sensing of the Environment (including science and practices behind remote sensing and geographical information systems (GIS))
- Research Project (January to September)

### Project Phase One

Researching background material and acquisition of basic practical skills, in preparation for the main phase of the project starting in May. You will choose your main project supervisor at the start of Phase One. The project is assessed through a literature review and a seminar that both outline the background to the project, implications for policy, and the work to be carried out in Phase Two. Feedback is given throughout this phase, developing the research skills of the student.

### Project Phase Two

An independent investigation of a chosen topic, supervised by one of the academic team. The project is to be submitted as a written thesis and the main findings to be presented in a Research Colloquium.

### Entry requirements

An upper second-class honours degree (or international equivalent) in a scientific discipline such as Chemistry, Physics, Engineering, Mathematics, Biology, Earth Sciences or Geographical Sciences. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

## Contact for further information

Postgraduate Admissions
School of Geographical Sciences
University of Bristol
University Road
Bristol BS8 1SS
Tel: +44 (0)117 928 9954
Email: geog-pgadmis@bristol.ac.uk

## Applications

Details of how to apply are available at bristol.ac.uk/pg-study.
Clinical Neuropsychology (PGDip)

This programme combines the academic excellence of the School of Experimental Psychology with the clinical experience, knowledge and skill of a large and well-established Clinical Neuropsychology Department within Frenchay Hospital (North Bristol Trust), a Regional Neurosciences Hospital which has an international reputation for excellence in neuroscience.

The programme has a strong focus on patient care, diagnosis, and management of a range of neurological conditions, and is delivered by academics and experienced clinicians based in the Clinical Neuropsychology Department. These clinicians offer neuropsychology services to a broad range of patient groups: both paediatric and adult; acute inpatient and outpatient; patients seen primarily for diagnostic assessment and patients seen for rehabilitation.

Services are offered to patients being referred from Neurosurgery, Neurology, Neuropsychiatry, and Rehabilitation Medicine as well as from physicians within the Stroke Services. Clinical services are also offered to specialist programmes of interventional neurosurgery, principally for epilepsy and movement disorders but also more recently for mood disorders. As well as working within the acute hospital trust, the department provides input to specialist inpatient and outpatient rehabilitation services for people with acquired brain injury.

Many of the programme units are provided in a block format (over a single week), designed for people with major personal and professional commitments. All lectures are also broadcast online, and can be downloaded, so can be viewed without travelling to Bristol.

Programme structure
The programme content is primarily guided by the British Psychological Society (BPS) syllabus and guidelines for training in Clinical Neuropsychology. The Diploma includes eight distinct units, each of which supply credit points leading to a total 120 credits. Units are taught within the University of Bristol and North Bristol NHS Trust (NBT).

Core units

Functional Neuroanatomy, Neuroscience Methods and Issues in Neuropsychology (30 credits)
- Part A: Issues in Neuropsychology
- Part B: Functional Neuroanatomy and Neuroscience Methods

Applied Clinical Neuropsychology and Principles of Assessment (30 credits)
- Part A: Assessment in Clinical Neuropsychology
- Part B: Applied Neuropsychology

Development, Rehabilitation and Evidence-based Neuropsychology and Principles of Clinical Statistics (30 credits)
- Part A: Development and Rehabilitation
- Part B: Evidence-Based Neuropsychology

Theoretical and Clinical Neuropsychology (30 credits)
- Part A: Clinical Neuropsychology in Practice
- Part B: Theoretical Neuropsychology

Entry requirements
A clinical doctorate (DClin) plus an undergraduate degree or equivalent qualification in psychology (or similar). You must also be registered as a Clinical Psychologist with the Health Professions Council (HPC).

Key facts

Why choose Bristol?
Links with Clinical Neuropsychology Department within Frenchay Hospital (North Bristol Trust)

School of Experimental Psychology
Awards available PG Diploma

Duration of programme
Two years part-time

Part-time study available?
Yes, part-time only

Open to international students? Yes; but this part-time programme does not meet Government requirements for student visas. International applicants holding non-student visas may be eligible for study.

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

Number of places 30

Fees (per year, subject to annual increase)
Part-time: UK/EU £4,050; overseas £7,850

Funding
Please see p2

Website bristol.ac.uk/exppsych

Possible start dates
September 2016; January 2017

Application deadline
20 August 2016 for September 2016 intake
20 December 2016 for January 2017 intake

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
Clinical Neuropsychology (MSc)

This programme combines the academic excellence of the School of Experimental Psychology with the clinical experience, knowledge and skill of a large and well-established Clinical Neuropsychology Department within North Bristol NHS Trust, which has an international reputation for excellence in neuroscience.

The programme has a strong focus on patient care, diagnosis, and management of a range of neurological conditions, and is delivered by academics and experienced clinicians based in the Clinical Neuropsychology Department. These clinicians offer neuropsychology services to a broad range of patient groups: both paediatric and adult; acute inpatient and outpatient; patients seen primarily for diagnostic assessment and patients seen for rehabilitation.

Services are offered to patients being referred from Neurosurgery, Neurology, Neuropsychiatry, and Rehabilitation Medicine as well as from physicians within the Stroke Services. Clinical services are also offered to specialist programmes of interventional neurosurgery, principally for epilepsy and movement disorders but also more recently for mood disorders. As well as working within the acute hospital trust, the department provides input to specialist inpatient and outpatient rehabilitation services for people with acquired brain injury.

Many of the programme units are provided in a block format (over a single week), designed for people with major personal and professional commitments. All lectures are also broadcast online and can be downloaded, so can be viewed without travelling to Bristol.

Programme structure
Core units

Functional Neuroanatomy, Neuroscience Methods and Issues in Neuropsychology (30 credits)
  • Part A: Issues in Neuropsychology
  • Part B: Functional Neuroanatomy and Neuroscience Methods

Applied Clinical Neuropsychology and Principles of Assessment (30 credits)
  • Part A: Assessment in Clinical Neuropsychology
  • Part B: Applied Neuropsychology

Development, Rehabilitation and Evidence-based Neuropsychology and Principles of Clinical Statistics (30 credits)
  • Part A: Development and Rehabilitation
  • Part B: Evidence-Based Neuropsychology

Theoretical and Clinical Neuropsychology (30 credits)
  • Part A: Clinical Neuropsychology in Practice
  • Part B: Theoretical Neuropsychology

Dissertation (60 credits)

Entry requirements
A clinical doctorate (DClin) plus an undergraduate degree or equivalent qualification in psychology (or similar). You must also be registered as a Clinical Psychologist with the Health Professions Council (HPC).

Contact for further information
Charlotte Powell, Postgraduate Administrator
School of Experimental Psychology
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0)117 928 8452
Email: charlotte.powell@bristol.ac.uk

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

Key facts

Why choose Bristol?
All lectures are also broadcast online and can be downloaded, so can be viewed without travelling to Bristol

School of Experimental Psychology

Awards available MSc

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

Part-time study available? Yes

Open to international students? Yes; but this part-time programme does not meet Government requirements for student visas. International applicants holding non-student visas may be eligible for study

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

Number of places 15

Fees (per year, subject to annual increase)
Full-time: UK/EU £10,100; overseas £19,600
Part-time: UK/EU £5,050

Funding Please see p2

Website bristol.ac.uk/expsych

Possible start dates September 2016

Application deadline 20 August 2016
Mathematical Sciences

This MSc programme will give you a solid grounding in an area at the forefront of mathematics from internationally renowned researchers. Specialised lectures cover both the basics and the latest developments, and your research project allows you to gain your own hands-on experience.

Programme structure

Units

There is a huge variety of possible combinations of units and themes depending on your background and interests. A list of units is available from our Academic Quality and Partnerships Office (AQPO) website (bristol.ac.uk/esu/unitprogcat).

An academic mentor will advise you on these units and meet regularly with you individually and/or in small groups throughout the taught component. You are also invited to participate in the wider academic life of the school including research seminars.

Research themes

- Algebra and Representation Theory
- Ergodic Theory and Dynamical systems
- Geometric Analysis
- Number Theory
- Logic and Set Theory
- Applied Probability in Biology and Communications
- Bayesian Modelling and Analysis
- Monte Carlo Methods
- Nonparametric Regression
- Probability: Scaling Limits and Statistical Physics
- Time Series and Finance
- Dynamical Systems and Statistical Mechanics
- Fluid Dynamics
- Material Science
- Quantum Information
- Quantum Chaos
- Random Matrix Theory

You might also be interested in our MSc in Statistics, or the MSc by Research in Mathematics.

Entry requirements

A first-class degree (or equivalent) in Mathematics or a related discipline.

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

Contact for further information

Fionnuala Hill, Postgraduate Student Administrator
School of Mathematics
University of Bristol
University Walk
Bristol BS8 1TW
Tel: +44 (0)117 928 8658
Email: pgsec-maths@bristol.ac.uk

Applications

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

This interdisciplinary MSc programme will provide you with the skills, knowledge and expertise to become practitioners in nanoscience, whether in industry or academia. The programme provides innovative and novel training, and will support you in the next phase of your career. To date all of our graduates have been successful in obtaining either a PhD place or full-time employment. Just over 50% have taken up PhD places in Bristol, other leading UK Universities or in top Universities around the world.

You will work alongside PhD students and postdoctoral researchers in world-leading research laboratories around the University. The structure of the programme, with two short training projects – the Skills and Training Assignments – and one research project – the Extended Project – means that you will have direct contact with many different academics and areas of research. Very importantly, you will choose your Extended Research Project after exploring the BCFN network of research.

Within the programme, the assessment of the units is linked to specific skills. The programme has been designed to provide feedback on both technical and professional skills, including research skills, presenting, writing, teamwork, creativity and entrepreneurship.

The Bristol Centre for Functional Nanomaterials (BCFN) represents more than 100 academics from 15 departments in the faculties of Science, Engineering, and Biomedical Sciences. This rich and diverse support network ensures your training and research is at the cutting edge and is truly interdisciplinary.

Programme structure
Core units

Autumn and Spring Terms
- Communication and Management Skills (includes training on time-management, decision-making, project-management, group-working)
- Lecture courses on nanoscience and functional nanomaterials (graduate level training on key concepts and topics in nanoscience)
- Training in Advanced Tools for Nanoscience (through bespoke online modules, lectures and a special programme of hands-on practical training)
- Two Training Projects (one per term in months 1-3 and 4-6)

Summer Term
- Extended Research Project (months 6-12)
You choose your Training and Research Projects from a large number of project proposals, across the whole spectrum of BCFN research. You may also be interested in our MSc by Research programmes in Physics or Chemistry.

Entry requirements
An upper second-class honours degree (or equivalent) in a Science or Engineering discipline, for example: Chemistry, Physics, Biology, Biochemistry, Materials Science, or Chemical Engineering. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Key facts

Why choose Bristol?
This interdisciplinary programme equips students with the skills to become practitioners in nanoscience

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
15
Fees (per year, subject to annual increase)
Full-time: UK/EU £14,700; overseas £23,700
Funding
Please see p2
Website
www.bcfn.bris.ac.uk
Possible start dates
September 2016
Application deadline
30 June 2016

Contact for further information
BCFN Manager
HH Wills Physics Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
Tel: +44 (0)117 394 0018
Email: bcfn-info@bristol.ac.uk

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

This programme provides an opportunity to specialise in theoretical and practical aspects of neuropsychology. It aims to provide an integrated understanding of brain function, clinical neuropsychology, and neuropsychological techniques. The emphasis of this course is on the theoretical basis of the link between brain and behaviour, and the basic research methods to study this link.

Clinical syndromes, assessment methods and considerations feature heavily in the MSc. However, students with a clear ambition to pursue a career in Clinical Psychology may wish to consider the MSc in Applied Neuropsychology that is run by the school in partnership with the Neurosciences Institute of North Bristol NHS Trust.

The MSc in Neuropsychology is particularly suited to those students who wish to boost their research skills, for example, with a view to undertaking a PhD and/or pursuing a career in experimental psychology, neuroscience or related disciplines. We also note that research skills are heavily weighted in the admission to the Clinical Psychology doctoral programme.

**Programme structure**

**Teaching Block One**

- Psychological Statistics and Research Tools
- Generic Research Skills
- Neuropsychological Approaches in Clinics and Research

**Teaching Block Two**

During the second teaching block you will gain a larger insight into magnetic resonance imaging. Moreover, it covers a range of theoretical issues in neuropsychology, including theories of vision, attention, human development, emotion, sleep, memory, consciousness and hemispheric specialisation. You will also have an opportunity to write a theoretical dissertation on a topic of interest to you.

**Key facts**

**Why choose Bristol?**

The solid research training we provide equips students to pursue a research career in psychology or neuroscience.

**School of Experimental Psychology**

**Awards available** MSc

**Duration of programme**

One year full-time

**Part-time study available?** No

**Open to international students?** Yes

**English Language Profile**

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

**Number of places** 30

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

UK/EU £10,100; overseas 19,600

**Funding** Please see p2

**Website** bristol.ac.uk/expsych

**Possible start dates** September 2016

**Application deadline** 31 July 2016

**Contact for further information**

Charlotte Powell, Postgraduate Administrator
School of Experimental Psychology
University of Bristol
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0)117 928 8452
Email: charlotte.powell@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, including industry focused workshops, form and 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.

Contact for further information
Dr Tom Scott, Programme Director
HH Wills Physics Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
Email: nuclear-msc@bristol.ac.uk
Palaeobiology

This research-oriented MSc offers advanced coverage of quantitative aspects of the fossil record and the history of life. The programme bridges the biology–geology divide, and provides you with a strong background for independent research to PhD level or for a career in museums, libraries, management or the media. This programme is for students who are passionate about early life, dinosaurs, mass extinctions, macroevolution, fossil preservation, and the palaeobiology of extinct organisms.

This interdisciplinary programme is taught mainly in the School of Earth Sciences with some Archaeology and Biology units. You will engage in current debates in evolutionary biology, systematics and palaeobiology. You will learn how to analyse problems quantitatively, and design experimental approaches to resolving questions in macroevolution and in the study of ancient organisms. First-hand training in research methods in palaeobiology involves laboratory techniques. You will also learn a range of advanced skills such as computer software use, numeracy, planning research, problem-solving and communication skills. You will learn multimedia techniques, including presentation of palaeontological data through talks, posters and formal written reports.

A key aspect of the programme is that you prepare your projects for publication; we provide support to ensure as many projects as possible are published in leading international journals.

Programme structure
The first half of the programme consists of lectures, practical classes, tutorials, and visiting speakers, designed to provide a firm foundation in the theory and methodology of the subject.

You will take five core units and four optional units. We recommend that biologists take some of the more geologically oriented optional units, and that geologists take some of the biological units.

Core units
- Current Controversies in Palaeobiology and Macroevolution
- Scientific Communication
- Phylogenetic Methods in Palaeobiology
- Literature Review
- Research Methods in Palaeobiology

Optional units
- Biomechanics and Functional Morphology
- Early Human Origins
- Evolutionary Biology**
- Evolution of the Biosphere
- Geology for Research Palaeobiologists*
- Micropalaeontology
- Vertebrate Palaeobiology and Evolution
  * Mandatory for non-geologists
  ** Mandatory for non-biologists

Research project
The final part of the programme consists of a research project.

Entry requirements
An upper second-class honours degree (or equivalent) in Geology, Biological Sciences, Environmental Sciences, Archaeology, Anthropology, or a related discipline. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.

Programme structure
The first half of the programme consists of lectures, practical classes, tutorials, and visiting speakers, designed to provide a firm foundation in the theory and methodology of the subject.

You will take five core units and four optional units. We recommend that biologists take some of the more geologically oriented optional units, and that geologists take some of the biological units.
Research Methods in Psychology

This programme will provide you with a theoretical and practical grounding in psychological research techniques, equipping you to go on to a PhD programme in Experimental Psychology or related disciplines. Completion of this programme can also lead to the application of psychological knowledge and research skills in other fields, such as industry or education.

The core of this programme comprises a set of units that teach the practicalities of carrying out research. The aim is to provide experience using a broad range of techniques. In particular, in the Autumn Term, valuable experience is obtained in the unit ‘Apprenticeship in Psychological Research’. You will be placed in an established research group or laboratory, and gain practical experience working on an ongoing research project, attending meetings, collecting data, and assisting with day-to-day activities in a research-intensive environment.

The programme also covers a broader set of research skills, including oral presentations, writing, and analysis. In the Spring Term, you complete an intensive unit in the latest imaging techniques.

Programme structure

**Teaching Block One**

Core units
- Psychological Statistics and Research Tools
- Generic Research Skills
- Apprenticeship in Psychological Research

**Teaching Block Two**

Core units
- Neuropsychological Analysis Tools
- Communicating Science

Optional units
- Theory and Practice in Neuropsychological Research
- Evolutionary Psychology
- Psychology of Language

**Summer**
- Dissertation

**Entry requirements**
An upper second-class honours degree in Psychology (or equivalent) or a degree or professional qualification in a relevant field (eg neuroscience).

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

**Contact for further information**
Charlotte Powell, Postgraduate Administrator
School of Experimental Psychology
University of Bristol
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0) 117 928 8452
Email: charlotte.powell@bristol.ac.uk

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

The MSc in Statistics aims to provide a bridge for academically able students between undergraduate and PhD study, allowing an increase in the depth and breadth of understanding in a range of topics in statistics and probability, and developing overall research perspective and vision before focusing on one area of research.

Through a range of core and optional taught units, the MSc will develop your understanding of appropriate mathematical and statistical theory and equip you with the fundamental skills for the modelling and analysis of statistical problems. The research project will provide you with an opportunity to tackle a genuine statistical problem using a variety of theoretical, analytical, methodological and computational techniques.

The MSc in Statistics can be taken as a stand-alone programme, as well as by students already committed to PhD study who will take the MSc as the first year of a 1+3 year MSc/PhD programme.

Programme structure
The programme consists of two terms of taught study on a range of core and optional units, followed by a substantial research project.

Unit choices
There is a wide range of optional units, and the taught component is built around the following core units:
- Advanced Time Series
- Graphical Modelling
- Monte Carlo Methods
- Nonparametric Regression
- Stochastic Processes
- Stochastic Optimisation
- Research Project (June to September)

As an integral part of the MSc programme, students are required to complete a project and submit a dissertation. The project gives students the opportunity to carry out a substantial investigation on a topic of their choice and counts for one third of the total assessment. For an indication of staff research interests, please see the prospectus entry for PhD in Mathematics.

Entry requirements
An upper second-class honours degree (or equivalent) in Mathematics, Statistics, or a subject with substantial statistical and/or mathematical content.

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

Contact for further information
Fionnuala Hill, Postgraduate Student Administrator
School of Mathematics
University of Bristol
University Walk
Bristol BS8 1TW
Tel: +44 (0) 117 928 8658
Email: pgsec-maths@bristol.ac.uk

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

Key facts
Why choose Bristol?
The school will move into a custom-designed new home in 2016, featuring new teaching, library and study spaces

School of Mathematics
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 10
Fees (per year, subject to annual increase)
Full-time: UK/EU £8,400; overseas £19,600
Funding
Please see p2
Website www.stats.bris.ac.uk
Possible start dates September 2016
Application deadline 1 August 2016
Volcanology

This MSc offers advanced coverage of the physical processes governing the behaviour of volcanoes. The programme is taught by leading scientists working at the cutting edge of research into volcanoes, and will provide you with a strong background for independent research to PhD level or for a career in industry, public sector or NGOs.

The programme provides: knowledge of the physical processes of volcanoes, including both sub-surface and surficial behaviour; insights into important historical eruptions; understanding of risk and risk mitigation; and instruction and experiential learning on data gathering, handling analysis and presentation to publishable standard.

You will develop a wide range of skills, including:

- quantitative and computational skills, including the use of statistical and data handling software;
- proficiency in critical analysis of scientific material from a variety of sources, including primary research documents and original data;
- ability to synthesise concise and informative material targeted for a variety of audiences.

Programme structure

The first half of the programme consists of lectures, practical classes, tutorials, and visiting speakers, designed to provide a firm foundation in the theory and methodology of the subject. The programme consists of five core units which all students take, and a number of optional units of which students choose three or four.

Core units

- Modelling Volcanic Hazards
- Physics of Volcanoes and Hazardous Flows
- Scientific Communication
- Literature Review
- Research Methods in Volcanology
- Optional units
- Natural Hazards in Central America

Research project

The final part of the programme consists of a research project. For further information on research projects, please see the school website.

Entry requirements

An upper second-class honours degree (or equivalent) in Earth Sciences, Geographical Sciences, Chemistry, Physics, Computer Science, Engineering, Mathematics or a related discipline.

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

Contact for further information

Postgraduate Admissions
School of Earth Sciences
University of Bristol
Wills Memorial Building
Queens Road
Bristol BS8 1RJ
Tel: +44 (0) 117 954 5400
Email: earth-postgrad@bristol.ac.uk
Science – 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 Science is also delighted to partner with three other Russell Group university-led centres.

The **EPSRC Catalysis Centre for Doctoral Training** is led by Cardiff University in partnership with the universities of Bristol and Bath. The centre offers fully-funded four-year PhD studentships based across the three institutions. The interdisciplinary programme allows you to develop an advanced knowledge of traditional and emerging catalysis disciplines; an understanding of industry and global contexts; plus research and professional skills.

Full details of the centre and information about entry requirements and making an application can be found at www.cardiff.ac.uk/research/cardiff-catalysis-institute.

The **EPSRC Centre for Doctoral Training in Diamond Science and Technology** is led by the University of Warwick in partnership with the universities of Oxford, Aberystwyth, Newcastle, Strathclyde, Cardiff, Bristol and Imperial College London.

The centre offers fully-funded four-year PhD studentships with all students spending their first year in Warwick undertaking an MSc purpose-designed to prepare you for PhD study. Years two to four will take place in one of the eight partner universities depending on the project and supervision.

The aim of the centre is to produce researchers with a skill set that matches the interdisciplinary nature of research required to establish the UK as a front runner in the development and exploitation of emerging Diamond Science and Technology.

Details of the centre and information about entry requirements and making an application can be found at www2.warwick.ac.uk/fac/sci/dst.

The **EPSRC Centre for Doctoral training in Theory and Modelling in Chemical Sciences** is led by the University of Oxford in partnership with the universities of Bristol and Southampton.

The centre offers up to 15 four-year fully-funded PhD places per year. The first year is based in Oxford where you will undertake a year-long training programme followed by three years of PhD research in one of the three universities (depending on the project and supervision).

The overall aim of the centre is to transform PhD training in theoretical and computational chemistry, and to deliver the research leaders of the future required by both academia and industry.

Details of the centre and information about entry requirements and making an application can be found at www.tmcs.ac.uk/home.aspx.
Researchers in the School of Biological Sciences conduct cutting-edge research across a uniquely broad range of biological disciplines, from genomics, biotechnology, and cell biology, through sensory biology, animal behaviour and evolution, to population biology, host-disease interactions and ecosystem services.

In 2014 the school relocated to a new, £54-million, state-of-the-art life sciences building. Our new laboratory facilities are among the best in the world, with critical ‘omics’ technologies and associated computing capacity (bioinformatics) a core facility. The new building is designed to foster our already strong collaborative and convivial environment, and includes a world-leading centre for evolutionary biology research in collaboration with key researchers from Earth Sciences, Biochemistry, Social Medicine, Chemistry and Computer Sciences.

The school has strong links with local industry including BBC Bristol, Bristol Zoo and the Botanic Gardens. We have a lively, international postgraduate community of about 150 research students. Our stimulating environment and excellent Graduate School training and support provide excellent opportunities to develop future careers.

**Research groups**
The underlying theme of our research is the search for an understanding of the function, evolution, development and regulation of complex systems, using the latest technologies, from ‘omics’ to nanoscience, and mathematical modelling tools.

In the 2014 REF, 99 per cent of the school’s research was recognised as having international impact and 84 per cent as being world-leading or internationally excellent.

My time at Bristol has given me greater insight into what is involved in science communication.

**Thomas**
PhD Biological Sciences

Our research is organised around four main themes that reflect our strengths and interests: Evolutionary Biology; Animal Behaviour and Sensory Biology; Plant and Agricultural Sciences; and Ecology and Environmental Change.

**Evolutionary Biology**
The theme of evolutionary biology runs through all our research in the School of Biological Sciences. Research in this theme seeks to understand organismal evolution and biodiversity using a range of approaches and study systems. We have particular strengths in evolutionary genomics, phylogenetics and phylogenomics, population genetics, and evolutionary theory and computer modelling.

**Animal Behaviour and Sensory Biology**
Research is aimed at understanding the adaptive significance of behaviour, from underlying neural mechanisms (‘how’, or proximate, questions) through to evolutionary explanations of function (‘why’, or ultimate, questions). The approach is strongly interdisciplinary, using diverse physiological and biomechanical techniques, behavioural experiments, computer modelling, and molecular biology to link from the genetic foundations through to the evolution of behaviour and sensory systems.

**Plant and Agricultural Sciences**
The global issue of Food Security unifies research in this theme, which ranges from molecular-based analysis of plant development, signal transduction and disease to ecological studies of agricultural and livestock production systems. We have particular strengths in functional genomics, bioinformatics, plant developmental biology, plant pathology and parasite biology, livestock parasitology and agricultural systems biology. Our research is helped by the LESARS endowment, which can fund research of agricultural relevance.

**Ecology and Environmental Change**
Research seeks to understand ecological relations between organisms (plant, animal or microbe) at individual, population and community levels, as well as between organisms and their environments. Assessing the effect of climate change on these fundamental ecological processes is also fundamental to our research. Key research areas within this theme include: community ecology, restoration ecology, conservation, evolutionary responses to climate change,
and freshwater ecology. Our research has many applied angles, such as ecosystem management, wildlife conservation, environmental and biological control, agricultural practice, and informing on policy.

**Entry requirements**
An upper second-class honours degree (or equivalent) in Biological Sciences or related discipline.

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

**Contact for further information**
Nicola Bushnell, Programme Administrator
School of Biological Sciences
University of Bristol
Life Sciences Building
24 Tyndall Avenue
Bristol, BS8 1TQ
Tel: +44 (0) 117 394 1215
Email: biol-postgrad@bristol.ac.uk

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

Bristol Chemical Synthesis (BCS) is a world-class Centre for Doctoral Training (CDT) in the UK for Synthetic Chemistry.

Our alternative to the traditional PhD – a doctoral level research programme – will:
- enhance your research skills through our unique initial training period
- enable you to choose your own PhD project
- encourage you to explore areas outside your comfort zone
- foster a teamwork ethos through cohort-driven research
- build personal confidence
- create links with industry while working on real-world problems
- allow you to interact with international renowned research groups
- increase your employability by building on your transferable skills.

The Royal Society of Chemistry (RSC) has recognised the quality of our training by allowing students in their final year to apply for partial accreditation of the Chartered Chemist qualification (CChem). We are the first PhD programme in the country to be awarded this.

Our research is organised into themes and we encourage applications from students whose interests lie within these:

- **Metal Catalysed Transformations**
  - Synthesis of new heterocyclic chemistry
  - Iron-based catalysis
  - Gold catalysis
  - Upgrading of alcohols for fuel
- **New Scaffolds for Medicines and Agrochemicals**
  - Medicinal chemistry
  - Synthetic analogues
  - Heterocyclic chemistry
- **Designer Ligands for Catalysis**
  - Synthesis of phosphorus-containing ligands
  - Carbohydrate-base ligands
  - Polypeptide and protein based ligand design
- **Design and Synthesis of New Bioactive and Functional Molecules**
  - Supramolecular chemistry for recognition and transport
  - Design of new peptide and protein structures
- **Main Group Chemistry: From Molecules to Materials**
  - Polymers
  - Phosphorus/carbon analogues
- **Development of Expedient New Synthetic Methodologies**
  - Glycosylation methods
  - Organo-boron and organo-sulphur chemistry
- **Natural Product Chemistry**
  - Compound extraction and characterisation
  - Biosynthetic pathways
  - Total synthesis
- **Cleaner Synthesis**
  - C-H activation
  - Photochemistry
  - Biocatalysis

We currently work closely with several chemical companies, including AstraZeneca, Lilly, Syngenta, GSK, Novartis and Pfizer.

**Programme structure**

During the first seven months, you will partake in a unique training programme, PACT (Postgraduate Advanced Chemical Techniques), designed to broaden and strengthen your research techniques before your PhD project. For details, see: synthesiscdt.chm.bris.ac.uk/programme/course-details

Once you have started your PhD project, you undertake a range of chemical and transferable skills courses to broaden your expertise.

**Entry requirements**

An upper second-class honours MSci/MChem degree, or international equivalent. For information on international equivalent qualifications, please see bristol.ac.uk/international/countries.
Chemistry

The School of Chemistry, one of the UK’s largest, is an internationally recognised centre of teaching and research. Currently there are over 250 postgraduate and postdoctoral researchers from many different countries, working with over 60 academic staff on a range of projects. Collaboration with science-based industries and institutions across the world ensures that research here remains at the frontier of science.

The school is housed in spacious, modern, well-equipped laboratories and hosts or participates in eight EPSRC Centres for Doctoral Training (CDTs). Training opportunities in these national flagship centres are available in these disciplines:
- Chemical Synthesis
- Functional Nanomaterials
- Catalysis
- Theory and Modelling in Chemical Sciences
- Science and Technology of Diamond
- Synthetic Biology
- Advanced Composites
- Quantum Engineering

Opportunities also exist with doctoral training partnerships (DTPs) in the areas of environmental sciences, and bioscience and food security.

Research groups

The School of Chemistry has three sections: Inorganic and Materials; Organic and Biological; and Physical and Theoretical. Collaborative research is often conducted by staff in two or more sections. There are also strong interactions with other departments including Biochemistry, Physics, Earth Sciences and the Medical School, and with scientists worldwide. Selected major themes are highlighted below; further details are available at bristol.ac.uk/chemistry.

Inorganic and Materials Section

Organometallic chemistry and homogeneous catalysis; main group element chemistry; organised matter and materials chemistry including functional nanomaterials; polymers; bio-inorganic chemistry.

Organic and Biological Section

Organic synthesis (methodology, total synthesis of natural products, organometallic chemistry, catalysis; bio-organic chemistry including biosynthesis, enzyme mechanisms, protein structure and function); supramolecular and physical organic chemistry (reaction mechanism and design of novel receptors, materials and polymers; biogeochemistry); analytical and environmental chemistry.

Physical and Theoretical Section

Computational and theoretical chemistry (developing new electronic structure methods and modelling inorganic and enzyme catalysed reactions); laser chemistry (photodissociation and bimolecular collisions in gas and condensed phases); atmospheric chemistry (analysis, monitoring, modelling, spectroscopy, photochemistry); growth and applications of diamonds and other thin film materials; colloids and interface science (gels, surfactants, polymers, electrochemistry); physical and chemical properties of liquid aerosol droplets.

Entry requirements

An upper second-class honours degree (eg MChem, MSci) or equivalent. Applicants with a lower second-class honours degree (eg MChem, MSci) or an upper second-class honours BSc degree may be admitted if they can demonstrate good potential for research.

Contact for further information

Dr Charl FJ Faul, Director of Graduate Recruitment
School of Chemistry
University of Bristol
Cantock’s Close
Bristol BS8 1TS
Tel: +44 (0) 117 954 6321
Email: charl.faul@bristol.ac.uk

Applications

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

Jointly based at the Universities of Bristol and Bath, the Centre for Doctoral Training in Condensed Matter Physics aims to train students across a broad range of disciplines in the field of hard condensed matter physics, encompassing experiment, theory, fundamental studies and device applications.

Our programme is designed to develop students’ knowledge and skills, particularly in the first year. It also allows students to learn more about different areas of condensed matter physics before choosing their research area. This is achieved through bespoke lectures, hands-on modules, projects and group tasks. The embedded training provides students with skills and knowledge which is useful during their PhD and future careers.

We have a ‘cohort’ approach to learning in the first year in which students work together in problem-solving and other activities. The centre’s researchers are world-leading scientists with a track record in passing on that knowledge and expertise to others. The complementary nature of the physics departments at Bristol and Bath allows the Centre to offer a broad range of research topics including: semiconductors, superconductors, 2D materials (eg graphene), magnetic materials, spintronics, theory, photonic and plasmonic materials.

The centre also works in partnership with facility and industry partners to enhance the student experience with additional courses, interaction, joint projects and research placements.

Programme structure
In the first year of the training programme there are a series of lecture courses, practical techniques training course, short exploratory training projects (ETP) and an extended research project or research placement.

In most cases the research project will extend into the full PhD project which will continue in Years Two to Four. For some students there will be the opportunity to collaborate with an industrial, academic or large facility partner (in the UK, Europe, Japan, or the USA) and perform the research project in an external laboratory or workplace.

For detailed information about the programme, including a diagram illustrating the structure, please see the CDT CMP website. This placement forms the basis of dissertation research to be completed during the summer.

Entry requirements
An upper second-class honours MSci or MPhys degree in Physics or a related subject (or international equivalent).

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

Contact for further information
Centre for Doctoral Training in Condensed Matter Physics
HH Wills Physics Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
Tel: +44 (0) 117 928 8735
Email: cdt-cmp@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
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 to your professional career. Our Entrepreneur in Residence provides a tailor-made course that runs across all four years which focuses on a small number of critical subject areas necessary to prepare graduating PhDs to be the next generation of entrepreneurial leaders in UK corporations, start-ups, or academia.

Entry requirements
An upper-second class honours degree in a relevant subject (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
Engineering Graduate Education Team
University of Bristol
Merchant Venturers Building
Woodland Road
Bristol BS8 1UB
Tel: +44 (0)117 954 5395
Email: cdt-communications@bristol.ac.uk
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

For more information about our current and completed research projects and a list of affiliated academic staff, please see bristol.ac.uk/bccs.

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.

Contact for further information
Matthew Guppy, Manager
Bristol Centre for Complexity Sciences
Graduate School of Engineering
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.
Earth Sciences

The School of Earth Sciences has strong international links, and the presence of researchers from all over the world makes for an exciting and stimulating environment. Research involves the full breadth of the earth sciences and has benefited from major investment in new laboratories and equipment in the past few years. Important initiatives include experimental and theoretical studies of physical, chemical and biological processes of the Earth.

NB: If you are applying for this programme, please select “Geology” when completing your online application form.

Research groups
An expanding range of exciting subject areas characterise the research programme at Bristol. Research in the school also encourages interdisciplinary collaboration between its six research groups, which in turn nurtures revolutionary research.

Environment
The Environment group blends fundamental and applied science including expertise in palaeoclimate, global changes, biogeochemistry and ecosystem change as well as science communication. Research interests in the group range from local observations to global biogeochemical cycles and include areas such as sea-level change past and future, chemical and physical weathering and methane, CO2 and organic carbon and particle reactive element cycling.

Geochemistry
The Geochemistry group uses fundamental chemical techniques to understand natural processes on a range of temporal and spatial scales. This can be from single atoms on mineral surfaces and the environmental geochemistry of the modern Earth to the large-scale chemical structure of planets and the birth of the solar system. The group has considerable expertise in isotopic measurements, spectroscopy and first-principles calculations.

Geophysics
Geophysics uses physical properties of the solid Earth to measure structure and processes on scales from the single crystal to the entire planet. Members of the Bristol Geophysics group use gravity, seismic and satellite data to image the Earth in a variety of different contexts. These include the Earth’s core, mantle and tectonic processes, volcanoes, oil and gas reservoirs and mines.

Palaeontology and Biodiversity
The Palaeontology and Biodiversity group (PBRG) uses the fossil record to study the history of life. Research focuses on major diversifications, mass extinctions, dating the tree of life, phylogenomics and molecular palaeobiology, morphological innovation, biomechanics, and links between evolution and development, and the organisms of interest range from foraminifera to dinosaurs.

Petrology
The Petrology group utilise a wide range of state-of-the-art experimental and analytical techniques to investigate a diverse set of topics ranging from degassing in volcanic systems to crystallisation of the Earth’s core.

Volcanology
The Volcanology group at Bristol aims to understand the physical processes underlying volcanic phenomena and develop methods of hazard assessment. We integrate observations from these different approaches to provide a broad perspective on volcanological and sedimentological problems, and provide research training in these disciplines. The research group is involved in research into the crisis at Montserrat, the hazards of sediment-laden flows and applied research related to diamond exploration and mining (with De Beers) and to nuclear waste disposal in regions of active volcanism (Japan and USA), and with regard to oil exploration with a consortium of companies.

Research centres
The School of Earth Sciences is involved in a number of collaborative research groups at an international level. Inter-faculty research centres such as the Biogeochemistry Research Centre and the Cabot Institute involve collaboration across several departments and faculties.

Centre for Environmental and Geophysical Flows
This interdisciplinary research centre brings together expertise from the Schools of Earth Sciences, Geographical Sciences, Mechanical Engineering and Mathematics. This creates diverse research activities and interests, from traffic flow to explosive volcanic flows, meteorology to oceanography.

Biogeochemistry Research Centre
The Biogeochemistry Research Centre involves staff from the Schools of Earth Sciences, Geographical Sciences and Chemistry. The research aims to develop our understanding of the biogeochemistry of modern-day and ancient environments and the way that it is affected by natural processes and the actions of mankind.
Bristol Isotope Group
The Bristol Isotope Group is a world-class research facility for isotope measurements directed at understanding natural processes, from the formation of the solar system, the origin of Earth and its deep structure and atmosphere, through to the evolution of the atmosphere and contemporary climate change.

Interface Analysis Centre
The Interface Analysis Centre specialises in the application of a wide range of analytical techniques and is used by the Schools of Chemistry, Earth Sciences and Physics.

Bristol Glaciology Centre
The School of Earth Sciences contributes, alongside the Schools of Geographical Sciences, Applied Mathematics and Physics, to increasing our understanding of glaciers and ice sheets and the links between the cryosphere, oceans and atmosphere under changing climatic conditions.

The Cabot Institute
The Cabot Institute carries out fundamental and responsive research on risks and uncertainty in a changing environment. Interests include climate change, natural hazards, food and energy security, resilience and governance, and human impacts on the environment.

Entry requirements
An upper second-class honours degree (or equivalent) in a discipline related to the PhD project for which you are applying, such as geology, biological sciences, environmental sciences, chemistry, or mathematics.

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

Key facts
Why choose Bristol?
The school boasts some of the best research laboratories in the UK, contributing to the dynamic, intellectually stimulating environment.

Awards available
PhD, MSc by research

Duration of programme
PhD: Three years full-time or part-time equivalent
MSc by research: One year full-time or part-time equivalent

Part-time study available? Yes
Open to international students? Yes

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

Number of places
Around 20 per year

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/earthsciences

Possible start dates Not fixed

Application deadline Self-funded applicants: Not fixed. Please check the school website for details of funding application deadlines

Contact for further information
Postgraduate Admissions
School of Earth Sciences
University of Bristol
Wills Memorial Building
Queens Road
Bristol BS8 1RJ
Tel: +44 (0)117 954 5400
Email: earth-postgrad@bristol.ac.uk

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

Bristol Centre for Functional Nanomaterials (BCFN) is a nationally funded EPSRC Centre for Doctoral Training. Our four-year integrated PhD programme begins with a year of training, giving you all the foundational skills necessary for you to prosper in your PhD research. There is a strong emphasis on exploration: you are encouraged to try different research themes before choosing your PhD topic.

Other features of the first year:
- Interdisciplinary research projects giving you practical training in all the key characterisation and fabrication techniques in a variety of labs
- Expert-led group-work, practical sessions and lecture courses in advanced topics
- Real training from scientists working in world-leading companies so you can see real-world applications of research
- An international visit to a leading centre overseas
- A six-month project on a topic of your choice, during which you will choose your PhD project
- Extensive skills training in leadership, creativity, writing, presenting, group work, discussion leading, etc.

After the first year, you usually move to an academic department in the faculties of Science, Engineering or Medical Sciences for your PhD project, but you remain a BCFN student and keep close ties to it through teaching, regular seminars and events.

Research groups
Functional Nanomaterials is an exciting area of nanoscience, bridging the traditional disciplines of Physics, Chemistry, Biology, Medicine and Engineering. It offers PhD opportunities including:
- Fundamental investigations of atoms and molecules and how they assemble and order
- Research into the fabrication of more complex structures and surfaces
- The possibilities of functional nanostructures in fields as diverse as computing, healthcare, communications, energy storage and production, and pharmaceuticals.

All research projects have supervisors in at least two departments. Academic departments involved with the BCFN include Aerospace Engineering, Biochemistry, Biological Sciences, Chemistry, Clinical Sciences, Dentistry, Electrical and Electronic Engineering, Engineering Mathematics, Mathematics, Physics, and Physiology and Pharmacology.

Programme structure
The first year provides you with all the skills needed for effective interdisciplinary research in functional nanomaterials. The first six months are weighted towards lecture courses and skills training; the second half focuses on the Extended Project, which may become a PhD project. There are also regular industrial training modules and transferable skills sessions.

After your first year you will start work on your PhD project. You will continue to take part in a wide range of BCFN activities including research seminars, transferable skills training, international travel opportunities and the annual BCFN Conference.

Entry requirements
At least an upper second-class honours degree (e.g. MSci, MPhys, MEng, MChem) or equivalent. Applicants with an upper second-class honours BSc degree may be considered if they can demonstrate very good potential for research.

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

Key facts

Why choose Bristol?
Vibration and acoustic levels in our Centre for Nanoscience and Quantum Information are among the lowest anywhere worldwide

Awards available PhD

Duration of programme Four years full-time
Part-time study available? No
Open to international students? Yes
English Language Profile F
(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
A bench fee may be charged depending on research project

Funding Please see p2

Website www.bcfn.bris.ac.uk

Possible start dates September 2016

Application deadline 31 December 2015 for EPSRC-funded places (UK/eligible EU students)

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

Contact for further information
BCFN Manager
HH Wills Physics Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
Tel: +44 (0)117 394 0018
Email: bcfn-info@bristol.ac.uk
Geographical Sciences (Physical Geography)

The School of Geographical Sciences is one of the world’s leading international centres for research. It has been ranked the top Geography department in the UK in every government assessment of research excellence, including the most recent REF 2014 assessment. The Graduate School is integral to this success. We have a large and vibrant graduate community, with students following PhD, MSc by research (MScR) and taught MSc programmes. The graduate community has a strong international and interdisciplinary flavour, and offers an exceptional academic environment for postgraduate research.

Research opportunities encompass a wide range of subjects at the cutting edge of geographical research. There are also many exciting possibilities for interdisciplinary research that span research groups and even departments.

We advise you to consult the websites of individual members of staff as well as websites that detail collective research interests.

For Human Geography postgraduate research programmes, please see the Human Geography entry in the Social Sciences and Law section of this prospectus.

Research groups
The school’s Physical Geography research is focused on a number of themes which are based on UK Research Council priority areas and the interests of industrial and other stakeholders. These themes are reflected in our three research groups:

Global Environmental Change
The Bristol Research Initiative for the Dynamic Global Environment (BRIDGE) group aims to improve the understanding of natural climate and environmental variability and the relationship between global carbon cycling and climate, and to use this knowledge to improve our predictions of future change and its impacts on all aspects of ecosystems and human society.

Glaciology
The Bristol Glaciology Centre leads world-class research into ice sheet processes, subglacial environments, and sea level change. The centre’s aim is to increase our understanding of the present, past and future behaviour of ice sheets and glaciers, and the links between the cryosphere, oceans and atmosphere under changing climatic conditions.

Hydrology
The research interests of the Hydrology Research Group focus on the modelling of hydrologic and hydraulic problems using advanced numerical methods. They specialise in modelling river flooding, water quality monitoring, uncertainty analysis techniques, soil-vegetation-atmosphere interactions and weather radar and probabilistic forecasting.

Entry requirements
An upper second-class honours degree (or equivalent) in a relevant subject or an equivalent qualification.

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

Contact for further information
Postgraduate Admissions
School of Geographical Sciences
University of Bristol
University Road
Bristol BS8 1SS
Tel: +44 (0)117 928 9954
Email: geog-pgadmis@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
The Great Western Four+ Doctoral Training Partnership (GW4+ DTP) is led by the University of Bristol, with the Universities of Exeter, Bath, Cardiff (“Great Western Four” formal alliance) plus six Research Organisation partners; British Antarctic Survey, British Geological Survey, Centre for Ecology and Hydrology, Meteorological Office, Natural History Museum and Plymouth Marine Laboratory. This alliance creates a multidisciplinary arena in NERC sciences and has a long-standing commitment to PhD training.

This NERC-funded DTP programme offers studentships of between forty-two to forty-eight months depending on the nature of the project and the level of fieldwork involved.

PhD projects available encompass eight interdisciplinary research themes that cover the breadth of NERC earth and environmental science: Atmospheres, Oceans and Ice; Biogeochemical Cycles; Climate Changes and Impacts; Ecology, Conservation and Biodiversity; Genomes and Evolution; Natural Hazards, Resources and Sustainability; Solid Earth and Planetary Geology; Water.

As part of their studentship, students will have the chance to participate in a number of training opportunities across the partnership. A main drive of the programme is to equip students with a range of generic and specialised skills, enabling them to become leaders in diverse areas of employment. Training activities include residential summer schools, skills-based training courses and workplace secondments with one of the twenty-four associate industry partners, representing the full range of earth and environmental science employers in the UK. Students will also attend an annual student congress and a range of other cohort activities across the institutions.

PhD projects are available in a range of earth and environmental science topics within the following schools:
- Biological Sciences
- Chemistry
- Earth Sciences
- Engineering
- Geography
- Mathematics
- Veterinary Science

New projects will be advertised annually on the GW4+ DTP website from October.

Entry requirements
Applicants for a studentship must have obtained, or be about to obtain, a 2.1 degree or higher. If you have a 2.2 degree, but have also obtained a masters qualification, you are also eligible.

Contact for further information
Dr Andrew Rodrigues, NERC GW4+ DTP Manager
School of Earth Sciences
Wills Memorial Building
Queen’s Road
Bristol BS8 1RJ
Tel: +44 (0)117 954 5644
Email: andrew.rodrigues@bristol.ac.uk

Applications
Details of how to apply are available at bristol.ac.uk/pg-study.
The School of Mathematics has about 60 members of academic staff, 45 research assistants and 70 postgraduate students. It undertakes research in a range of areas in Applied Mathematics, Pure Mathematics and Statistics, and its international reputation for excellence is confirmed by the presence of several Fellows of the Royal Society.

Postgraduate students enjoy a stimulating place to study; during your programme you will have opportunities to develop your mathematical skills, collaborate with internationally leading researchers, and apply your results across a range of academic disciplines including mathematical physics, fluid dynamics, probability theory, number theory, and ergodic theory.

The school has collaborative research programmes with a number of other schools including Biological Sciences, Earth Sciences, Computer Science, Physics, and Medical Sciences. It is involved with University Research Centres in Behavioural Biology and in Environmental and Geophysical Flows. It has close links with the research divisions of Hewlett-Packard, QinetiQ, Unilever, Barclays Bank, Government Communications Headquarters, Toshiba, and National Air Traffic Services.

Mathematics plays a central role in several research initiatives in partnership with:
- Heilbronn Institute for Mathematical Research
- Bristol Centre for Complexity Science
- Centre for Nanoscience and Quantum Information
- Advanced Computing Research Centre
- Centre for Doctoral Training in Communications
- Centre for Doctoral Training in Quantum Engineering

We recruit postgraduate students to PhD projects in subject areas spanning Mathematics and Statistics. For details of some of the subjects offered, please see bristol.ac.uk/maths.

You can also study for a one-year MSc Mathematics by Research, focusing on Applied Mathematics, Pure Mathematics, Probability Theory or Statistics.

### Research groups
The school’s wide range of research crosses many of the conventional boundaries between disciplines. Potential applicants are encouraged to consult the website for detailed accounts of the research themes, but broadly there are three subject groups:

**Pure Mathematics:** Number theory, ergodic theory and dynamical systems, analysis and partial differential equations, representation theory, logic and set theory, combinatorics, and group theory.

**Applied Mathematics:** Nonlinear dynamics, quantum chaos, classical and semi-classical asymptotics, random matrix theory, quantum computation and quantum information theory, fluid mechanics, geophysical fluid dynamics, wave propagation and numerical analysis.

**Statistics and Probability:** Applied probability, Bayesian modelling and analysis, behavioural biology, multiscale methods, Monte Carlo methods, nonparametric regression, optimisation under uncertainty, statistical bioinformatics, statistical signal processing and the analysis of time series.

### Entry requirements
An upper second-class honours degree (or equivalent) in a relevant subject. Funded places may be subject to higher entry requirements.

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

### Contact for further information
Fionnuala Hill, Postgraduate Student Administrator School of Mathematics

---

### Key facts

**Why choose Bristol?**
In the Research Excellence Framework 2014, Mathematics at Bristol was ranked fourth for impact in the UK

**Awards available** PhD, MSc by research

**Duration of programme**
PhD: Three-and-a-half years full-time, or part-time equivalent
MSc: One year full-time, or part-time equivalent

**Part-time study available?** Yes

**Open to international students?** Yes

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

**Number of places** Dependent on funding

**Fees (per year, subject to annual increase)**
Full-time: UK/EU £4,145; overseas £18,100
Part-time: UK/EU £2,073
A bench fee may be charged depending on research project

**Funding** Please see p2

**Website** maths.bris.ac.uk

**Possible start dates** Usually September 2016, but flexible if funding allows

**Application deadline** Not fixed but we encourage application before 31 January 2016

---

University of Bristol
University Walk
Bristol BS8 1TW
Tel: +44 (0)117 928 8658
Email: pgsec-maths@bristol.ac.uk

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

Physics, with its concern for understanding the universe at a fundamental level, lies at the heart of scientific discovery. The School of Physics at Bristol has made major contributions to the field including the discovery of the pi meson (Nobel Prize 1950) and fundamental advances in quantum mechanics; researchers within the school explore physics at all length scales from the cosmological to the sub-nuclear, including strong activities in nanoscience and condensed matter physics. The Graduate School is an integral part of the School of Physics and is responsible for overseeing all aspects of graduate training in both academic and more generic skills.

Prospective PhD and MSc by Research students are encouraged to contact prospective supervisors prior to making an application, though this is not compulsory: applications identifying the research group of greatest interest from those listed below will also be accepted.

Research groups

The School of Physics is one of the leading physics institutes in the United Kingdom, with a strong international reputation in a wide range of research areas, including:

- astrophysics and cosmology;
- correlated electron systems;
- interface analysis;
- micro- and nanostructural materials;
- nanophysics and soft matter;
- particle physics;
- quantum photonics;
- theoretical physics.

The school has around 90 teaching and research staff. It is housed within the H H Wills Physics Laboratory that has recently undergone a major investment programme designed to create a new, state-of-the-art research environment for both students and staff. The latest facility to be added is a new semiconductor processing laboratory (clean room) to support research in quantum photonics and electronic devices, for example. The School is well positioned to carry out cutting-edge research in most major fields of physics.

Some of our research areas:

**Astrophysics and Cosmology**

The Astrophysics Group studies a variety of interesting phenomena in the universe, including extra-solar planets, black holes, galaxies, relativistic jets, clusters of galaxies, plasma physics, and cosmology. Observations of these systems are made with the world's best ground and space-based telescopes across the entire electromagnetic spectrum from radio waves up to gamma rays. PhD students usually have the opportunity to visit a major observatory in Chile, Hawaii or the Canary Islands. Theoretical work is closely tied to the interpretation of these data, and numerical or computational studies make use of the University of Bristol's powerful supercomputing facilities. Students present their work to the wider scientific community at high-profile international conferences.

The group provides a friendly and dynamic research environment. Graduate level courses and training in observational, data reduction and numerical techniques are offered. A series of research seminars are run throughout the year for graduate students and staff, and many sub-groups have regular informal meetings to discuss their work and the latest research advances.

**Correlated Electron Systems**

Electrons in a material can order in a huge number of different ways, giving rise to phenomena as diverse as superconductivity, magnetism, and the fractional quantum Hall effect, to name just a few. These properties emerge from the complex interactions between the large numbers of electrons and ions present in condensed matter systems.

A central challenge of contemporary condensed matter research is to achieve a full understanding of these electronic states of matter. If we can explain why these new states appear, and how we can potentially control them, we hold the keys to unlocking future technologies. These goals run parallel to the development of modern electronics which followed our understanding of semiconductor physics in the mid-20th century.

In the Correlated Electron Systems Group we study the fundamental properties of these exotic materials with particular emphasis on high temperature superconductivity, novel forms of magnetism and other strongly correlated electron systems – particularly those tuned to a quantum critical point. We investigate their electronic structure and excitations to see how new states of matter emerge, compete and interact. Research is carried out in high magnetic fields, at low temperatures and high pressures. We use a diverse range of experimental probes including: neutrons, x-rays, and positrons, as well as electrical/thermal transport, specific heat and magnetisation measurements. These experiments are carried out in Bristol and at international facilities including ones in the Netherlands, France, Japan and the USA.

**Interface Analysis Centre**

The world is in the middle of a materials revolution. Materials science and engineering have transformed every aspect of modern living. Advances in engineered materials are crucial to the continued vitality of countless industries. Research at the Interface Analysis Centre (IAC) plays a key part in this revolution. For more than 25 years we have been actively involved in research on materials and material surfaces, including strong activities in nanoscience and nuclear materials.
The centre continues to provide a vibrant and stimulating environment for postgraduate study. We apply the basic principles of chemistry and physics to understand the structure and properties of materials. As a postgraduate in the IAC you will learn to bridge the gap between science and engineering, becoming an expert not only in your area of study but in materials analysis in general. At the same time you will experience a multidisciplinary research environment and gain valuable exposure to industry. Indeed, since the centre has attracted much additional funding from leading UK companies, there is often the opportunity for PhD studentships to be further augmented with industrial placements and bespoke education and training.

**Micro- and Nanostructural Materials**

Research in the Micro- and Nanostructural Materials group covers many different topics, but all are driven by innovation and technological relevance.

The main thrust of the Centre for Device Thermography and Reliability is advancing understanding the reliability and thermal performance of semiconductor devices such as GaN and other power electronic devices used in satellites, switches and radars, and developing new materials such as borides for neutron detectors.

The Surface Physics Group researches a wide variety of materials and phenomena, including magnetic nanoparticles, catalysis, protein-surface interactions, spin transport in organic molecules and electrodeposited ultrathin films.

The Electron Microscopy Group has an outstanding reputation in transmission electron microscopy, and has a special focus on nanomaterials for solar cells and light emitting devices.

The Diamond and New Energy Group focuses on the synthesis and characterisation of nanostructured, wide band gap materials for applications in energy harvesting, radiation detectors and electron sources.

All the members of the Micro- and Nanostructural Materials Group have extensive international research links.

**Nanophysics and Soft Matter**

The Nanophysics and Soft Matter Group has research interests spanning hard and soft materials, biological systems and clinical applications. The common goal of the group lies in characterising and understanding micro and nanoscale materials using complementary techniques to understand fundamental physical and biological processes. This emphasis means that the group engages in a wide range of interdisciplinary collaborations, from the biophysics of cells, membranes and molecules to structural studies of liquid crystals, surfaces and semiconducting glasses.

A particular strength of the group is its development and use of scientifically-enabling instrumentation for scanning probe microscopy, optical trapping and microscopy, and X-ray and neutron scattering. The group has a world-leading position in the development of ultrahigh speed, high-resolution atomic force microscopy, for example, capable of producing movies with nm-scale spatial and millisecond time resolution. Moreover, lateral force microscopy pioneered in Bristol, offers extreme force sensitivity and is applied widely to biomolecular force measurements from molecular motors to the growth of microtubules. Research is underpinned by computer simulations.

The group offers unique postgraduate opportunities to further develop and apply cutting-edge instrumentation, eg holographic tweezers, photonic force microscopy, stimulated emission depletion microscopy, interferometric cross-polarized microscopy and acoustic levitation for container-less neutron and X-ray scattering.

**Particle Physics**

The Particle Physics Group is at the forefront of the data analysis and upgrade of the Compact Muon Solenoid (CMS) and LHCb experiments at the CERN Large Hadron Collider. Within CMS the group focuses on SUSY and other exotic particle searches and studying properties of the top quark. Within LHCb the group focuses on pioneering new methods to measure CP violation, the asymmetry between matter and antimatter, and are studying Quantum Chromodynamics. Furthermore the group is involved in developing novel detector technologies and systems, including applications outside particle physics such as homeland security and medical imaging.

Bristol PhD students will usually join one of the experiments and undertake physics analysis as their main activity, and will also be involved in some aspect of the detector operation. There are also opportunities for you to focus more on the detector upgrade programme, including hardware R&D and software simulation studies. There are also opportunities to be involved in looking at fresh data from CERN’s Large Hadron Collider in October 2016. You could also work on: new particle detector techniques using CVD diamond; novel integrated detectors; or new experiments in the area of quark flavour physics.

**Quantum Photonics**

The goal of the Centre for Quantum Photonics (CQP) is to explore fundamental aspects of quantum mechanics, as well as work towards future photonic quantum technologies by generating, manipulating and measuring single photons, and investigating the quantum systems that emit these photons. When you join the group you will typically work in one of three key areas of research:

- Quantum Computing Technologies
- Quantum Communications
- Quantum Metrology, Measurement and Control
In principle, quantum technologies can perform certain tasks that are forever beyond the capabilities of classical machines, such as factoring large numbers or simulating the dynamics or quantum systems. In the multi-photon quantum applications section of CQP, we are interested in how ensembles of single photons, controlled with integrated optical circuits, can realise prototypes of these devices. You can explore a mix of theory and experiment to devise and demonstrate new protocols for quantum information processing, including quantum simulations, quantum computing and quantum key distribution.

**Theoretical Physics**

Theory is an essential complement to experimental physics, guiding and interpreting real-world results. Bristol has a very strong tradition in theoretical physics, including the discovery of the Aharanov-Bohm effect in 1959 and the geometric or Berry phase in 1983 by Professor Sir Michael Berry FRS.

In **Field Theory and Wave Geometry**, we investigate a range of diverse physical problems united by common mathematical techniques: geometry and topology; semiclassical asymptotics; special functions; and nonlinear methods. Our main subject of interest is structured light and topological optics (especially optical and electron vortex beams), as well as quantum chaos and topological solitons. We also have a broad interest in Applied Topology, and currently are home to a major project in Physical Applications of Knot Theory.

The **Theory of Condensed Matter** research in the group is concerned with the description of unconventional and novel phases in the spin, charge, and superconducting order of complex materials. Particularly, we focus on material dependent predictions of experimental observables induced by symmetry breaking transitions. This work allows for the microscopic understanding of complex phases including topologically protected states, magnetism, and superconductivity.

Our research in **Quantum Physics** focuses on fundamental aspects such as paradoxes and non-locality as well as understanding why quantum mechanics – which is so counterintuitive – works. This work has led to some of the central concepts of the area of quantum information and computation. We are also interested in the foundations of statistical mechanics and thermodynamics.

There is also significant interest in the group in statistical and soft matter physics, and we have strong links with experimental groups as well as with theoreticians in the Mathematics and Chemistry schools.

**Entry requirements**

A first degree in Physics or a related subject, normally at a level equivalent to at least UK Honours 2.1 level or a relevant Masters qualification.

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

**Contact for further information**

Professor Walther Schwarzacher, Director of the Graduate School

HH Wills Physics Laboratory
University of Bristol
Tyndall Avenue
Bristol BS8 1TL
Tel: +44 (0)117 928 8735
Email: physics-pg@bristol.ac.uk

**Applications**

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

Studying in the School of Experimental Psychology will give you the opportunity to be part of a vibrant postgraduate community and a world-class department. Our postgraduate students are a very important part of the departmental research culture and are a key component in our ability to maintain our international research reputation.

We recommend that potential applicants make informal contact with the member of academic staff whose research you are interested in before submitting an application.

Research groups
Research activity in the school is organised into three research themes: Cognitive Processes; Brain, Behaviour and Health; and Decision-Making and Rationality. Within each theme, there are a set of focused research groups.

An important feature of our research structure is the extent of collaboration across research groups and across the three themes. All groups address fundamental questions as well as looking at the impact of their work more broadly in industry, healthcare, education and society. Across these thematic research groups the school has particular and growing strengths in computational neuroscience and neuropsychology.

Cognitive Processes
Focused research groups in Cognitive Processes are:
- Developmental (includes the Bristol Cognitive Development Centre and Bristol Autism Research Group);
- Language (speech comprehension, speech production, reading and dyslexia, language and thought);
- Memory (short-term memory, modelling, dynamics, lifespan memory);
- Social (social cognition and evolutionary social psychology);
- Vision (fusing cognitive science and information technology to tackle research problems that cannot be comprehensively addressed by the single disciplines alone).

Brain, Behaviour and Health
Focused research groups in Brain, Behaviour, and Health are:
- Neuropsychology (neural basis of both typical and pathological cognition, using a range of methodologies including EEG and fMRI);
- Nutrition and Behaviour Unit (effects of substances on cognition and performance; appetite, weight control, and diet);
- Tobacco and Alcohol Research Group (social drugs and social cognition; plain packaging of tobacco products; carbon-dioxide inhalation model of anxiety).

Decision-Making and Rationality
Areas of current focus include: selecting the appropriate movement response; how properties of the environment shape decisions; structuring the world to facilitate good decisions; food choice and dietary decisions; the origins of supernatural beliefs.

Entry requirements
An upper second-class honours degree (or equivalent) in Psychology or a related discipline.

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

Contact for further information
Charlotte Powell, Postgraduate Administrator
Department of Experimental Psychology
University of Bristol
12a Priory Road
Bristol BS8 1TU
Tel: +44 (0)117 928 8452
Email: charlotte.powell@bristol.ac.uk

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

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 stimulating and empowering. You will develop your technical expertise, and 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, ‘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, eg 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
Lin Burden, Postgraduate Administrator
Quantum Engineering Centre for Doctoral Training
Nanoscience and Quantum Information Building
University of Bristol
Tyndall Avenue
Bristol BS8 1FD
Tel: +44 (0)117 954 0112
Email: quantum-engineering@bristol.ac.uk

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

Part-time study available? No

Open to international students? Yes

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 Please see our website for deadlines. Interviews for an October start are likely to occur in spring. International applicants are encouraged to apply as early as possible

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

Synthetic Biology

The Synthetic Biology Centre for Doctoral Training (CDT) is a collaboration between the universities of Oxford, Warwick and Bristol. This multidisciplinary programme is designed for students from a wide range of backgrounds in engineering, physical or life sciences. In the first six months you are introduced to a wide range of topics and skills from the many disciplines that underpin synthetic biology, including engineering, mathematics, computing, biochemistry and biology. Initial training is tailored to your needs: an engineer might be introduced to biology whilst a biologist might develop mathematical skills. You will then study current synthetic biology research and work with potential supervisors to develop project ideas. Two short research projects are carried out before a final PhD project is chosen.

Research groups

SynBio CDT students at Bristol conduct their PhD research in teams associated with the BBSRC- and EPSRC-funded synthetic biology research centre, BrisSynBio.

The overall objectives of BrisSynBio are to improve abilities to design and engineer biological systems by understanding them from the bottom up; and to apply this knowledge in applications relevant to health and UK industry. Currently funded BrisSynBio research areas include:

Enzyme cascades and cell factories

Synthetic biology offers a framework through which the purposeful manipulation of biosynthetic pathways and cellular systems can be readily achieved, offering significant potential for accessing new chemical entities and constructing optimised ‘cell’ factories for their production.

Self-assembled systems and minimal cells

Using bio-inspired modular approaches, in which stripped-down biological components and machinery are combined and re-engineered, BrisSynBio will design and construct synthetic micro-compartments containing functional biochemical components.

Programming complexity in natural systems

Synthetic biology offers the potential to modify natural and synthetic cell-based genetic programmes, either by reworking existing pathways or by introducing complete, designed, synthetic multi-component pathways.

Engineering and modelling across scales

To contribute to the development of proteins and systems for synthetic biology, BrisSynBio uses techniques including: molecular models of protein dynamics and ligand binding; quantum mechanical modelling of biochemical reactions; ‘coarse-grained’ models for modelling protein-protein and protein-DNA association; and mathematical models of biological systems.

Programme structure

The first two terms are devoted to acquiring the necessary theoretical and technical skills through a combination of intensive lecture courses, practicals, seminars, project work and research and communication skills training.

Over the third term and summer of the first year, students undertake two projects of around ten weeks’ duration each. These serve both as advanced training and to help students to choose their research topic for the final three years. Students then undertake their substantive PhD research projects in one of the participating universities.

The Synthetic Biology CDT will produce internationally excellent researchers with key skills desired by employers in synthetic biology. Its graduates will be ideally placed to progress into many different science-based jobs, including multidisciplinary research in both academia and industry. There are strong links to diverse industrial partners, some of whom sponsor PhD projects.

Entry requirements

A first-class or upper second-class undergraduate degree (or international equivalent) as a minimum in Physical Sciences (eg Engineering, Physics, Chemistry, Computer Science, Mathematics, Plant Sciences) or Life Sciences (eg Biology, Biochemistry).

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

Contact for further information
Professor Claire Grierson, Associate Director
Email: synbio-cdt@bristol.ac.uk

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

Key facts

Why choose Bristol?

Our training offers you a broad insight across a rapidly evolving experimental and theoretical landscape

Awards available PhD

Duration of programme Four years full-time

Part-time study available? No

Open to international students? Yes

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

Number of places 18 (6 at Bristol)

Fees (per year, subject to annual increase)
Full-time: UK/EU £4,145; overseas £18,100
A bench fee may be charged depending on research project

Funding Please see p2

Website www.synbio-cdt.ac.uk/

Possible start dates October 2016

Application deadline To be announced.
Early application is advised

(eg Engineering, Physics, Chemistry, Computer Science, Mathematics, Plant Sciences) or Life Sciences (eg Biology, Biochemistry).
The South West Biosciences Doctoral Training Partnership (SWBio DTP) is led by the University of Bristol, together with the Universities of Exeter, Bath and Cardiff, and Rothamsted Research. These institutions present a distinctive cadre of bioscience research staff and students, with established international, national and regional networks, and widely recognised research excellence. The South West Biosciences Doctoral Training Partnership is one of a limited number of doctoral training partnerships funded by the BBSRC to provide PhD training across the UK in areas of strategic relevance. We provide training in two key areas: agriculture and food security, and world-class underpinning bioscience. There are approximately 23 studentships available each year across the partnership.

The programme will provide you with excellent cross-disciplinary research training in line with the current BBSRC strategy. You will be exposed to the expertise of all the partners by visiting / using their facilities, taking part in joint conferences, workshops and taught modules. To further the collaboration between the partnership, cross-institutional PhD projects will be featured that build on the expertise of each partner.

**Research groups**

Each year we advertise a variety of bioscience research projects which can be hosted across a broad range of schools. Details of current and previous research projects can be found on our website.

**Programme structure**

**First year**

In the first year we aim to deliver a broad awareness of the fundamental research approaches in life sciences and how they could be applied to real-life situations through taught units and rotation projects. Students need to complete 3 common training units and also experience two laboratory-based rotation projects. These are in different disciplinary areas related to their field of research, and help them to refine their research interests and project at the end of the first year.

**Second to fourth years**

The remaining three years will be more like a conventional PhD, with progression based on year reports and vivas. You will be taking on full-time research and likely to be based in the research group of your primary/lead supervisor. You will also have the opportunity to attend a number of annual conferences (for example the South West Biosciences Doctoral Training Partnership conference), workshops, outreach events, innovation schemes (for example the BBSRC Young Entrepreneurs Scheme) and SWBio DTP cohort activities, where you will get the chance to meet and interact with other students from the partnership.

To help identify your ongoing skills development, you will be involved in generating individually tailored Professional Development Plans that will be incorporated into an interactive website.

**Professional Internships for Postgraduate Studies (PIPS)**

As part of your training you will undertake a three month full-time internship (or part-time equivalent) in a non-research environment. This will give you the opportunity to broaden the scope of your experience and boost your employability post-graduation.

**Entry requirements**

An upper second-class honours degree (or equivalent) in biosciences, or an appropriate area of science or technology. In addition, due to the mathematical component of the first year, a minimum of a grade B in A-level Maths (or an equivalent qualification) is required.

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

---

**Key facts**

**Why choose Bristol?**

The programme is designed to provide training in cutting-edge bioscience and food security research skills

**Awards available** PhD

**Duration of programme** Four years full-time

**Part-time study available?** No

**Open to international students?** Yes

**English Language Profile** C

(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

A bench fee may be charged depending on research project

**Funding** Please see p2

**Website** bristol.ac.uk/swbio

**Possible start dates** September 2016

**Application deadline** January 2016

---

**Contact for further information**

Dr Samantha Southern, SWBio DTP Hub Manager

D30c

School of Biochemistry

Medical Sciences Building

University of Bristol

University Walk

Bristol BS8 1TD

Tel: +44 (0)117 331 1612

Email: swbio-dtp@bristol.ac.uk

**Applications**

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