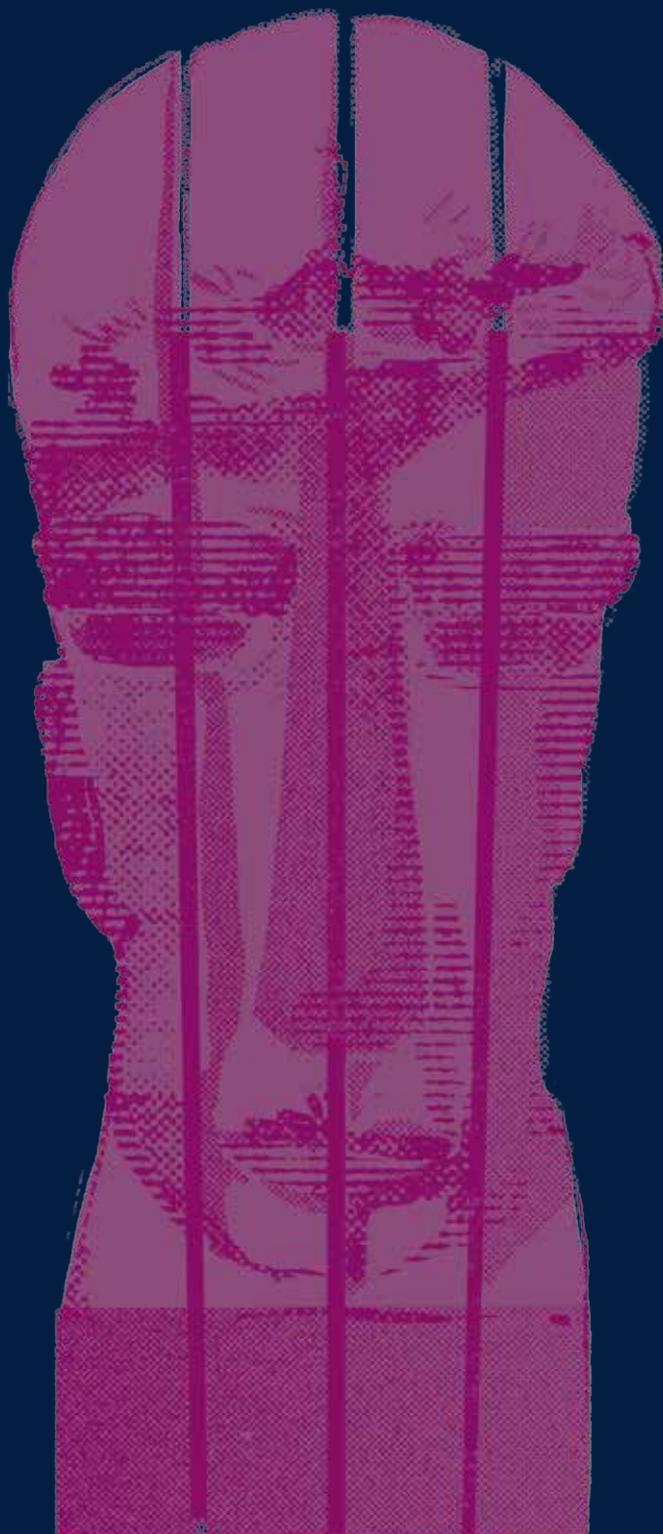




THE UNIVERSITY
of EDINBURGH

Mathematics

Postgraduate Opportunities 2018



Influencing the world since 1583

“Edinburgh isn’t so much a city, more a way of life . . . I doubt I’ll ever tire of exploring Edinburgh, on foot or in print.”

Ian Rankin

Best-selling author and alumnus

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Influencing the world since 1583

15 Nov 2017
Postgraduate Open Day

[www.ed.ac.uk/
postgraduate-open-day](http://www.ed.ac.uk/postgraduate-open-day)

For more than 400 years the University of Edinburgh has been changing the world. Our staff and students have explored space, won Nobel Prizes and revolutionised surgery. They've published era-defining books, run the country, made life-saving breakthroughs and laid the foundations to solve the mysteries of the universe.

Our distinguished alumni include NASA astronaut Piers Sellers, former MI5 Director-General Dame Stella Rimington, Olympians Sir Chris Hoy and Katherine Grainger and historical greats such as philosopher David Hume, suffragist Chrystal Macmillan, who founded the Women's International League for Peace and Freedom, and physicist and mathematician James Clerk Maxwell.

International collaboration

An internationally renowned centre for academic excellence, we forge world-class collaborations with partners such as the California Institute of Technology (Caltech), Stanford University, the University of Melbourne, Peking University, the University of Delhi and the University of KwaZulu-Natal. As a member of the League of European Research Universities and the Coimbra Group, we link up with leading institutions across Europe.

Linking research and commerce

We were one of the first UK universities to develop commercial links with industry, government and the professions. Edinburgh Innovations promotes and commercialises our research excellence and can assist you in taking the first step to market, through collaborative research, licensing technology or consultancy.

Enhancing your career

We are committed to embedding employability in your University experience and have one of the Russell Group's best track records for graduate employment. From volunteering schemes to our sector-leading careers service, we provide you with opportunities to develop your skills, knowledge and experience, giving you an edge in the competitive job market.

TOP 50

We're consistently ranked one of the top 50 universities in the world. We're 23rd in the 2018 QS World University Rankings.

4TH

We're ranked fourth in the UK for research power, based on research quality and breadth.*

83%

The majority of our research – 83 per cent – is considered world leading or internationally excellent.*

32ND

We're ranked 32nd in the world for the employability of our graduates.†

£268m

In 2015/16 we won £268 million in competitive research grants.

21

We're associated with 21 Nobel Prize winners, including physicists Peter Higgs, Charles Barkla and Max Born, medical researcher Peter Doherty and biologist Sir Paul Nurse.

13TH

We're ranked 13th in the world's most international universities.‡ Students from two-thirds of the world's countries study here.

* Research Excellence Framework (REF) 2014

† Latest Emerging Global Employability University Ranking

‡ Times Higher Education: The World's Most International Universities 2017

 twitter.com/appliedinburgh

 facebook.com/appliedinburgh

 youtube.com/edinburghuniversity

 instagram.com/appliedinburgh

Taught masters programmes

www.ed.ac.uk/pg/935

Computational Applied Mathematics

MSc 1 yr FT (2 yrs PT available for UK/EU students)
PgDip 9 mths FT (Exit only)

Programme description

Computational mathematics, in particular the physical applied areas and the theory and implementation of numerical methods and algorithms, have wide-ranging applications in both public and private sectors. In this era of ubiquitous, cheap, computing power, there has been an explosion in the number of problems that require us to understand processes by modelling them, and to use large data sets. Consequently there is high demand for computational modellers and data scientists. This programme concentrates on the overlap and synergy between these fields.

Programme structure

You will study two semesters of taught courses followed by a dissertation. The availability of courses each year may be subject to change as the curriculum develops. Your individual dissertation will be a supervised research-style project on a topic proposed by a staff member in the applied and computational mathematics group. The project will provide practical experience and skills for tackling scientific problems requiring both computational approaches and mathematical insight. This will include identifying and applying appropriate mathematical and numerical techniques, interpreting the results, and presenting the conclusions.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Applied Dynamical Systems; Mathematics of Data Assimilation; Numerical Partial Differential Equations with Applications; Object-Oriented Programming with Applications; Research Skills for Computational Applied Mathematics; Scientific Computing.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Applied Stochastic Differential Equations; Data Analytics with High Performance Computing; Fundamentals of Optimization; Large Scale Optimization for Data Science; Mathematics in Action A; Multi-Scale Methods in Mathematical Modelling; Numerical Linear Algebra and Applications; Numerical Ordinary Differential Equations and Applications; Optimization Methods in Finance; Python Programming; Statistical Programming.

Career opportunities

This programme will provide training in the tools and techniques of mathematical modelling and scientific computing, and provides you with skills for problem solving using modern applied mathematics techniques.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in a numerate discipline such as mathematics, engineering, computer or physical sciences. Previous study of applied mathematics, probability and differential equations at university level will be required.

Applicants should have studied a university-level course with a substantial programming element, or have an equivalent level of programming experience.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Konstantinos Zygalakis
Tel +44 (0)131 650 5975
Email cammsc@ed.ac.uk

www.ed.ac.uk/pg/894

Computational Mathematical Finance

MSc 1 yr FT (2 yrs PT available for UK/EU students)
PgDip 9 mths FT

Programme description

This dynamic programme delivers high-quality training in the theory of mathematical finance and emphasises computational methods. Graduates are expected to have a working knowledge of advanced computational finance (including construction of algorithms and programming skills) and a sound knowledge of the theory of probability and stochastic analysis. These are the core theories needed in the modern valuation of complex financial instruments. The programme delivers:

- a flexible programme of study relevant to the needs of employers such as: top investment banks, hedge funds and asset management firms;
- a solid knowledge in financial derivative pricing, risk management and portfolio management; and
- the transferable computational skills required by the modern quantitative finance world.

Placements

Adding depth to your learning, a work placement puts you at the heart of financial organisations such as Aberdeen Asset Management, Lloyds Banking Group, Moody's Analytics and the Royal Bank of Scotland.

Programme structure

There are two streams, each of two taught semesters and a dissertation.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Discrete-Time Finance; Finance, Risk and Uncertainty; Monte Carlo Methods; Numerical Methods for Stochastic Differential Equations; Object-Oriented Programming with Applications; Research-Linked Topics; Risk-Neutral Asset Pricing; Stochastic Analysis in Finance; Stochastic Control and Dynamic Asset Allocation.

Computational stream: *Numerical Partial Differential Equations; Time Series.* **Financial stream:** *Financial Risk Theory; Optimization Methods in Finance.*

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Applied Databases; Bayesian Theory; Credit Scoring; Numerical Partial Differential Equations with Applications; Financial Risk Theory; Integer and Combinatorial Optimization; Scientific Computing; Parallel Numerical Algorithms; Programming Skills; Optimization Methods in Finance; Python Programming; Time Series.

Career opportunities

You can expect to go on to work in major financial institutions or to continue your studies by joining a PhD programme.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in mathematics or a mathematical subject such as statistics, physics or engineering. You must also have relevant programming experience.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Sotirios Sabanis
Tel +44 (0)131 650 5084
Email cmfmsc@ed.ac.uk

www.ed.ac.uk/pg/118

Financial Mathematics

MSc 1 yr FT

Programme description

This masters is run jointly with Heriot-Watt University. It provides you with expertise in financial mathematics, including stochastic calculus, and a range of practical techniques for analysing financial markets. You will also learn quantitative skills for developing and managing risk that are in high demand since the recent financial crisis.

Placements

Adding depth to your learning, a work placement puts you at the heart of financial organisations such as Aberdeen Asset Management, Lloyds Banking Group, Moody's Analytics and Royal Bank of Scotland.

Programme structure

This programme involves two taught semesters of compulsory and option courses, followed by a dissertation project. Taught elements of the programme will be delivered by both Heriot-Watt University and the University of Edinburgh and you will attend each institution as appropriate. Your dissertation project will be supervised by staff from Heriot-Watt University.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Discrete-Time Finance; Stochastic Analysis in Finance (delivered by the University of Edinburgh).

Credit Risk Modelling; Derivatives Markets; Derivative Pricing and Financial Modelling; Financial Markets; Special Topics (delivered by Heriot-Watt University).

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Optimization Methods in Finance; Simulation; Stochastic Control and Dynamic Asset Allocation (delivered by the University of Edinburgh).

Financial Econometrics; Numerical Methods of Partial Differential Equations; Portfolio Theory; Statistical Inference; Statistical Methods; Time Series Analysis (delivered by Heriot-Watt University).

Career opportunities

Graduates typically work in major financial institutions or continue their studies by joining PhD programmes. Recent graduates are now working as bankers, financial consultants, tax administrators and as risk, portfolio, quantitative and credit analysts, for employers such as EY, Barclays Bank, Scottish Widows, Standard Life, Moody's Analytics and the People's Bank of China.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in mathematics or a mathematical subject such as statistics, physics or engineering.

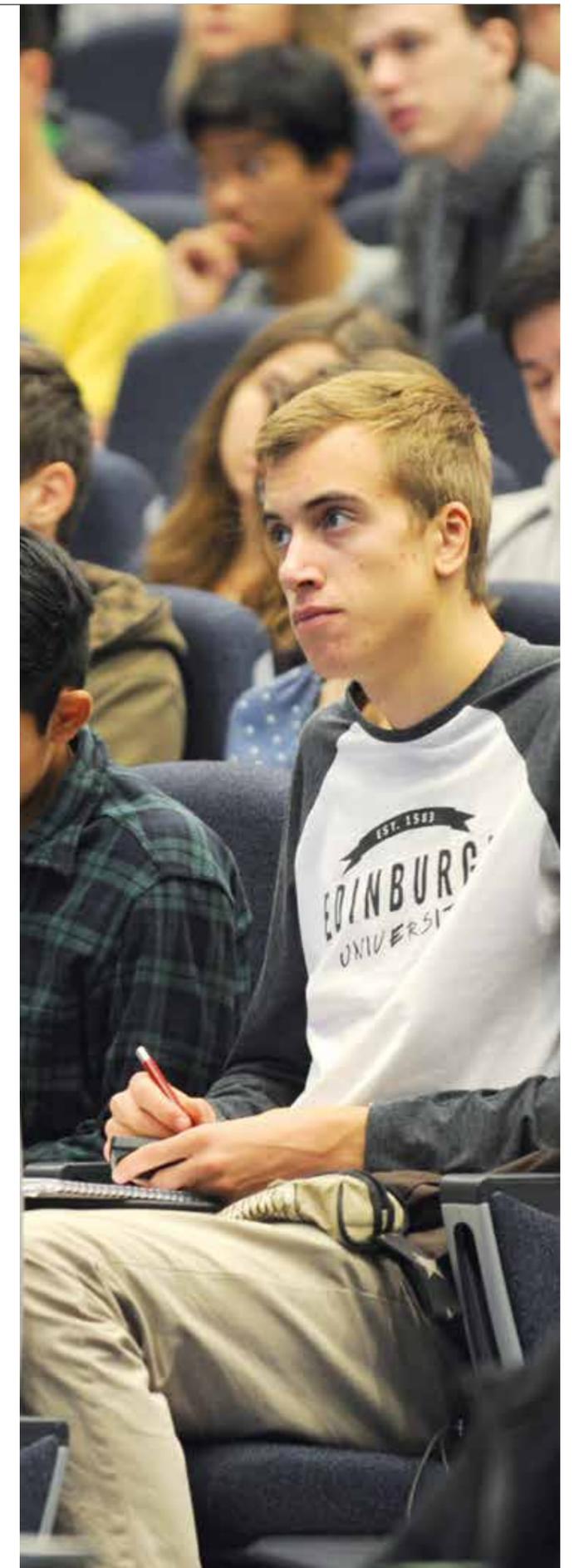
English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Contact MACS PG Enquiries
Tel +44 (0)131 451 4152
Email macspgenquiries@hw.ac.uk



www.ed.ac.uk/pg/640

Financial Modelling & Optimization

MSc 1 yr FT (2 yrs PT available for UK/EU students)
PgDip 9 mths FT

Programme description

This programme gives you a flexible syllabus to suit the demands of employers that use modern financial tools and optimization techniques in areas such as the financial sector and energy markets. We will give you sound knowledge in financial derivative pricing, portfolio optimization and financial risk management. We will also provide you with the skills to solve some of today's financial problems, which have themselves been caused by modern financial instruments. This expertise includes modern probability theory, applied statistics, stochastic analysis and optimization.

Placements

Adding depth to your learning, a work placement puts you at the heart of financial organisations such as Aberdeen Asset Management, Lloyds Banking Group, Moody's Analytics and the Royal Bank of Scotland.

Programme structure

This programme involves two taught semesters of compulsory and option courses, followed by a dissertation project.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Discrete-Time Finance; Finance, Risk and Uncertainty; Fundamentals of Optimization; Optimization Methods in Finance; Research-Linked Topics; Risk-Neutral Asset Pricing; Simulation; Stochastic Analysis in Finance.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Credit Scoring; Financial Risk Theory; Fundamentals of Operational Research; Integer and Combinatorial Optimization; Large Scale Optimization for Data Science; Multivariate Data Analysis; Numerical Partial Differential Equations with Applications; Object-Oriented Programming with Applications; Parallel Numerical Algorithms; Programming Skills; Python Programming; Scientific Computing; Stochastic Control and Dynamic Asset Allocation; Stochastic Modelling; Time Series.

Career opportunities

Graduates have gone on to work in major financial institutions or to continue their studies by joining PhD programmes. Recent graduates are now working as financial consultants, tax administrators and as risk, quantitative and credit analysts, for employers such as EY, Barclays Bank, Santander, Scottish Widows, Moody's Analytics and the People's Bank of China.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in mathematics or a mathematical subject such as statistics, physics or engineering.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Sotirios Sabanis

Tel +44 (0)131 650 5084

Email fmomsc@ed.ac.uk

See also...

Taught masters programmes in related fields are also offered by the University of Edinburgh Business School, the School of Economics, School of Informatics and the School of Physics & Astronomy.

www.ed.ac.uk/studying/prospectus-request

www.ed.ac.uk/pg/116 (Operational Research)
www.ed.ac.uk/pg/499 (OR with Computational Optimization)
www.ed.ac.uk/pg/498 (OR with Risk)

Operational Research/ OR with Computational Optimization/OR with Risk

MSc 1 yr FT (2 yrs PT available for UK/EU students)
PgDip 9 mths FT

Programme description

This programme will show you how to use mathematical techniques to tackle real-life problems ranging from scheduling flights and routing mobile phone calls to managing investments and minimising risks. Operational Research (OR) is an important skill that is in high demand.

Our intensive programme allows you to specialise in an area that best suits your career goals. In addition to the general MSc in Operational Research, we offer the programmes Operational Research with Risk and Operational Research with Computational Optimization.

Programme structure

These programmes involve two taught semesters of compulsory and option courses followed by your dissertation project. Many dissertation projects are carried out as part of an external placement in industry.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Fundamentals of Operational Research; Fundamentals of Optimization; Methodology, Modelling and Consulting Skills; Simulation; Stochastic Modelling.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Option courses are generally grouped into the following areas: finance, industry, optimization and statistics.

As part of your option course choices, Operational Research with Computational Optimization requires you to study a combination from *Integer and Combinatorial Optimization; Large Scale Optimization for Data Science; Object-Oriented Programming with Applications; Probability and Statistics; Python Programming; Scientific Computing; Statistical Methodology; Topics in Applied Optimization*. Operational Research with Risk requires you to study a combination from *Credit Scoring; Object-Oriented Programming with Applications; Probability and Statistics; Python Programming; Risk and Logistics; Scientific Computing; Statistical Methodology; Statistical Programming; Topics in Applied Operational Research; Topics in Applied Optimization*.

Career opportunities

The skills you will learn are in demand by a vast range of high-profile organisations including consultancy firms, companies with operational research departments such as airlines or telecommunications providers, financial firms and the public sector. Recent graduates have joined Deloitte, PricewaterhouseCoopers, GlaxoSmithKline, Proctor & Gamble, Lloyds, Royal Bank of Scotland and Scottish Widows.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in a numerate discipline such as mathematics, engineering, computer science, physical or biological sciences, economics or business.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Julian Hall

Tel +44 (0)131 650 5075

Email j.a.j.hall@ed.ac.uk

www.ed.ac.uk/pg/915

Operational Research with Data Science

MSc 1 yr FT (2-3 yrs PT available for UK/EU students)

Programme description

This programme will show you how to use mathematical techniques to tackle real-life problems ranging from scheduling flights and handling large data sets to managing investments and minimising risks. The skills of operational research and data science are in high demand.

This is a new, forward-looking programme that delivers high-quality training. You will develop strong technical skills in operational research, optimization and statistics, practical skills in programming and modelling for a wide range of applications and communications skills in writing and audio-visual presentation.

Programme structure

This MSc consists of two semesters of taught courses, assessed by coursework and examinations. You will undertake four compulsory courses in semester one and 60 credits of option courses in semester two, before starting work on a three-month dissertation project.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Fundamentals of Operational Research; Fundamentals of Optimization; Methodology, Modelling and Consulting Skills.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Algorithmic Game Theory and its Applications; Bioinformatics; Biomedical Data Science; Computational Cognitive Neuroscience; Credit Scoring; Data Mining and Exploration; Generalised Regression Models; Incomplete Data Analysis; Integer and Combinatorial Optimization; Introductory Applied Machine Learning; Large Scale Optimization for Data Science; Machine Learning and Pattern Recognition; Machine Learning Practical; Object-Oriented Programming with Applications; Operational Research in the Energy Industry; Optimization Methods in Finance; Probabilistic Modelling and Reasoning; Python Programming; Reinforcement Learning; Risk and Logistics; Scientific Computing; Statistical Methodology; Statistical Programming; Stochastic Modelling; The Analysis of Survival Data; Time Series; Topics in Applied Operational Research; Topics in Applied Optimization. You may also select options in the areas of finance, industry; optimization, statistics and data science.

Career opportunities

Graduates will gain the transferable skills required to pursue careers in a data-rich operational research environment, and will be in an ideal position to apply for work in a wide range of institutions in the public and private sector. The programme is also excellent preparation for further study in operational research, optimization or data science.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in a numerate discipline such as mathematics, engineering, computer science, physical or biological sciences, economics or business. You must also have studied probability and statistical theory at university level.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme contact Dr Julian Hall

Tel +44 (0)131 651 7761

Email ormsc@ed.ac.uk

www.ed.ac.uk/pg/660

Statistics & Operational Research

MSc 1 yr FT (2 yrs PT available for UK/EU students)

Programme description

This programme will help you develop professionally in the theory and practice of statistics and operational research (OR), providing the foundations for a successful career.

It will prepare you for work in areas such as the medical and health industry, government, the financial sector and any other area where modern statistical tools and OR techniques are used. You will also develop the wider skills required for solving problems, working in teams and time management.

You will be able to identify and apply appropriate statistical or operational techniques to practical problems. This will include specifying appropriate models and fitting these models using appropriate computer packages.

Programme structure

This MSc consists of two semesters of lecture-based courses and practical, lab-based courses assessed by a combination of exams, written reports and programming assignments. Following successful completion of the courses, you will undertake a dissertation, which may take the form of an industrial project.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Bayesian Theory; Fundamentals of Operational Research; Fundamentals of Optimization; Generalised Regression Models; Methodology, Modelling and Consulting Skills; Simulation; Statistical Programming; Statistical Research Skills.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Bayesian Data Analysis; Biomedical Data Science; Credit Scoring; Genetic Epidemiology; Incomplete Data Analysis; Integer and Combinatorial Optimization; Large Scale Optimization for Data Science; Machine Learning Practical; Multivariate Data Analysis; Nonparametric Regression Models; Operational Research in the Energy Industry; Python Programming; Risk and Logistics; Scientific Computing; Statistical Consultancy; Statistical Methodology; Stochastic Modelling; The Analysis of Survival Data; Theory of Statistical Inference; Time Series; Topics in Applied Operational Research; Topics in Applied Optimization.

Career opportunities

This programme is ideal for students who wish to apply their statistics and operational research knowledge within a wide range of sectors including the medical and health sector, government and finance. The advanced problem-solving skills you will develop will be highly prized by many employers.

Entry requirements

At least a UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in a numerate discipline such as mathematics, engineering, computer science, physical or biological sciences, economics or business. You must also have studied probability and statistical theory at university level.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Bruce Worton

Tel +44 (0)131 650 4884

Email statsmsc@ed.ac.uk

www.ed.ac.uk/pg/916

Statistics with Data Science

MSc 1 yr FT (2-3 yrs PT available for UK/EU students)

Programme description

In this digital and data-rich era, the demand for statistics graduates from industry, the public sector and academia is high, yet the pool of such graduates is small. The recent growth of data science has increased the awareness of the importance of statistics, with the analysis of data and interpretation of the results firmly embedded within this newly recognised field. This programme is designed to train the next generation of statisticians with a focus on the newly recognised field of data science. It combines rigorous statistical theory with wider hands-on practical experience of applying statistical techniques to data and correctly interpreting the associated results. You will be trained in both classical and Bayesian ideologies and associated computational software, including R, for fitting a range of different models to data. There will be significant practical experience applying different statistical techniques.

Programme structure

This MSc consists of two semesters of lecture-based courses and practical, lab-based courses assessed by a combination of exams, written reports and programming assignments. Upon successful completion of the courses you will complete a dissertation, usually taking the form of two consultancy-style projects or an externally supervised project.

COMPULSORY COURSES PREVIOUSLY OFFERED INCLUDE:

Bayesian Data Analysis; Bayesian Theory; Generalised Regression Models; Incomplete Data Analysis; Statistical Programming; Statistical Research Skills.

OPTION COURSES PREVIOUSLY OFFERED INCLUDE:

Biomedical Data Science; Credit Scoring; Data Mining and Exploration; Extreme Computing; Fundamentals of Operational Research; Fundamentals of Optimization; Genetic Epidemiology; Large Scale Optimization for Data Science; Machine Learning and Pattern Recognition; Machine Learning Practical; Multivariate Data Analysis; Nonparametric Regression Models; Object-Oriented Programming with Applications; Probabilistic Modelling and Reasoning; Python Programming; Scientific Computing; Simulation; Statistical Consultancy; Statistical Methodology; Stochastic Modelling; Text Technologies for Data Science; The Analysis of Survival Data; Theory of Statistical Inference; Time Series.

Career opportunities

Trained statisticians are in high demand due to an increasingly data aware society. We anticipate that the majority of graduates will be employed as statisticians within private and public institutions providing statistical advice/consultancy. The statistical, analysis/interpretation and communication skills you will develop and your knowledge of the underlying statistical principles coupled with practical experience of implementing statistical techniques using standard software across a range of applications, will ensure you are ideally placed for a range of job opportunities or for further study.

Entry requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in a numerate discipline such as mathematics, engineering, computer science, physical or biological sciences, economics or business. You must also have studied probability and statistical theory at university level.

English language requirements

See page 20.

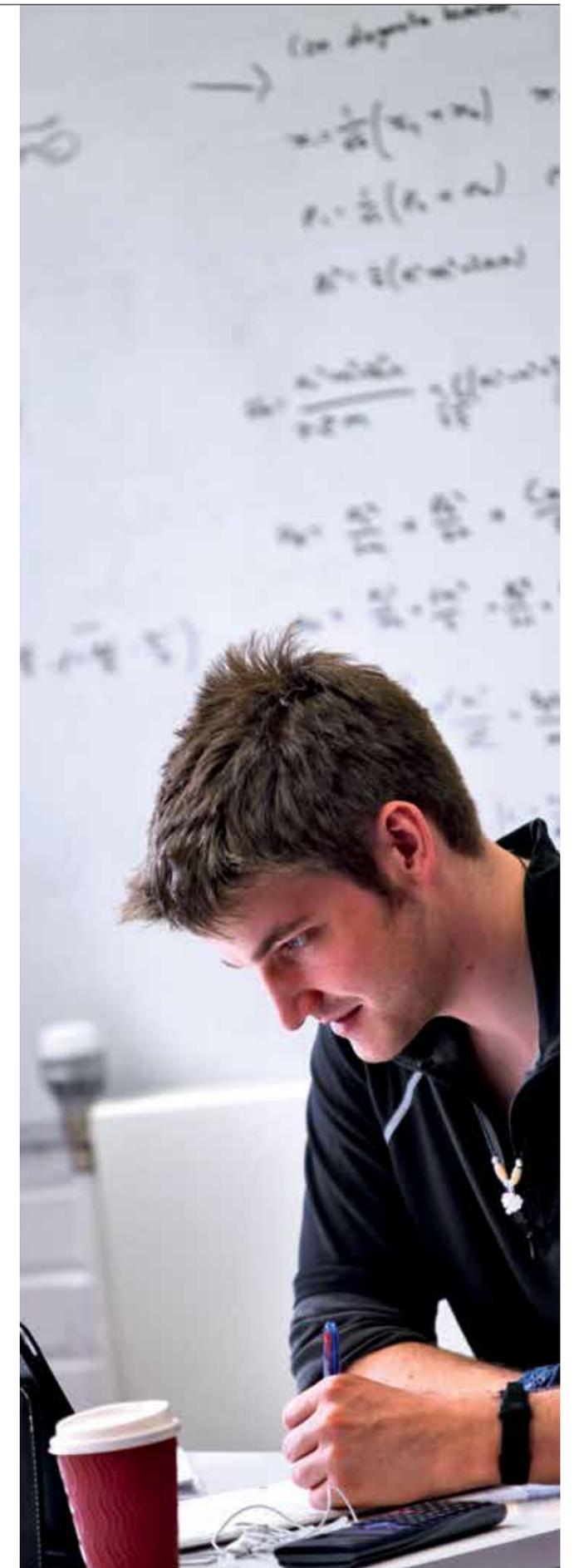
Fees and funding

For fees see page 20 and for funding information see page 22.

Programme Director Dr Bruce Worton

Tel +44 (0)131 650 4884

Email statsmsc@ed.ac.uk



Research at the School of Mathematics

As one of the best hubs in the UK for mathematics research, we can provide a truly stimulating and inspiring environment for developing your research career.

The Maxwell Institute for Mathematical Sciences (established in collaboration with Heriot-Watt University in 2005) represents a partnership of more than 70 staff members at both institutions. The Institute pools research from both universities to offer a research and postgraduate training environment that can attract the best mathematics talent from around the world. The rich environment includes a lively seminar programme, encompassing all areas of mathematics, operational research and statistics: www.maxwell.ac.uk

In 2018 we are offering a unique PhD experience under the umbrella of Maxwell Graduate School. PhD students from both institutions will share common space in their first year in a new building in the heart of Edinburgh. High quality academic training in the form of courses and seminar series, will be offered jointly. All our PhD students will also receive training in transferable skills in one of four streams, based on your preference – teaching, outreach, industry or programming. The application process for the Maxwell Graduate School is separate for each institution and you will be awarded your degree from the institution where you have applied. If you are interested in any of the University of Edinburgh's research areas, listed below, please apply online:

- algebra;
- computational mathematics;
- geometry and topology;
- mathematical analysis;
- mathematics education;
- mathematical physics;
- operational research and optimization;
- partial differential equations (PDEs);
- probability and stochastic analysis; and
- statistics.

ICMS

With Heriot-Watt University we also created the International Centre for Mathematical Sciences (ICMS). This research institute works to develop mathematical sciences in new directions, supports and develops mathematics that is relevant and in demand from other sciences, industry and commerce and fosters collaboration between mathematics departments across Scotland.

MIGSAA

In March 2014, the School of Mathematics became a Centre for Doctoral Training (CDT) and now hosts the Maxwell Institute Graduate School in Analysis and its Applications (MIGSAA). MIGSAA offers a unique, fully integrated, four-year PhD programme, which will train 60 students to the highest international standards.

Students receive broad training in theoretical analysis, stochastics, numerics and applications and will emerge with multiple skill-sets designed to deal with the sophisticated challenges arising in academia, industry and commerce. Our approach is founded on rigorous mathematical analysis in the context of collaboration with industry. The programme is jointly operated by the University of Edinburgh and Heriot-Watt University and students will receive PhDs awarded jointly by both institutions. MIGSAA differs from a standard PhD. During the first year, you will participate in a full programme of broad academic training in the specialist areas of the CDT, including a joint taster project in the autumn and a fuller project during the summer which may align with your

eventual research topic. The matching of a supervisor with your research topic is done during this first year. In subsequent years we offer high-level courses augmenting your primary research activity, as well as a number of other activities specially focused on the MIGSAA students, including the possibility of industrial placements and academic placements in other countries.

We offer up to 12 fully-funded places across the University of Edinburgh and Heriot-Watt University in each intake. If you are interested in our PhD programmes in Mathematical Analysis, Stochastic Analysis or Applied Mathematics then MIGSAA will be an opportunity that you do not wish to overlook.

For further information, contact MIGSAA:

Director Tony Carbery
Email a.carbery@ed.ac.uk

Deputy Director Dugald Duncan
Email d.b.duncan@hw.ac.uk

Postgraduate research programmes

Entry requirements

A UK first class honours degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in an appropriate subject; or a UK 2:1 honours degree plus a UK masters degree, or their international equivalents; or relevant qualifications and experience.

Please check the specific entry requirements for your programme online before applying.

Research opportunities

www.ed.ac.uk/pg/509

Algebra

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Our algebra research group is made up of international leaders in the field who have won between them the European Mathematical Society Prize, the Whitehead Prize of the London Mathematical Society, the Waclaw Sierpinski Prize of the Polish Academy of Sciences and the Berwick Prize of the London Mathematical Society.

Our members have given invited lectures at both the International Congress of Mathematicians and the European Congress of Mathematicians.

Our research focuses on several areas: non-commutative ring theory; non-commutative algebraic geometry; the geometry of algebraic numbers; Lie-theoretic representation theory; quantum algebra; and category theory.

Much of our research is related to the areas of geometry and topology, and mathematical physics, which has led to the formation of the Hodge Institute: <http://hodge.maths.ed.ac.uk>

Through the School's membership of the Maxwell Institute, we present regular seminars, and run our own informal seminars and colloquia. We also serve on editorial boards of various international journals. All of our PhD students take part in international conferences and symposia and, in part thanks to this global exposure, many have gone on to postdoctoral positions throughout the world.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator
Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/510

Analysis

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Our analysis research group is one of the UK's top centres for research in the field, especially in linear and nonlinear partial differential equations (PDEs) and harmonic analysis. Your passion for mathematical analysis will be rewarded by contact with, and supervision by, world leading academic staff, a rich seminar and working group programme and ultimately a qualification that boasts an internationally respected pedigree.

Research

We have a unique focus on the interplay of classical Euclidean harmonic analysis with the modern theory of PDEs. We study harmonic analytic ideas in number theory, geometric measure theory, combinatorics, and discrete geometry and geometrically invariant inequalities; and we investigate applications of harmonic analysis to elliptic and parabolic PDEs with rough coefficients and/or on rough domains. We also study: nonlinear hyperbolic, dispersive and kinetic equations and systems arising in the classical field theories of mathematical physics, mathematical biology and, in connection with black holes, mathematical general relativity; free-boundary problems, optimal mass transportation and Monge-Ampère equations in nonlinear elasticity and other continuum theories; and well-posedness for supercritical initial value problems with noisy initial data.

Additional resources

In addition to the School's excellent facilities, as part of the Analysis group you will have access to the activities of the Centre for Analysis and Nonlinear Partial Differential Equations (CANPDE) and the Maxwell Institute Graduate School in Analysis and its Applications (MIGSAA). Through seminars, mini-symposia and training courses, these stimulate and support development of research in analysis and theoretical nonlinear PDEs.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator
Email pgresearch@maths.ed.ac.uk



See also...

You may find your preferred research area in the prospectus of another School within the University, in particular the University of Edinburgh Business School or the Schools of GeoSciences, Informatics or Physics & Astronomy.

www.ed.ac.uk/studying/prospectus-request

www.ed.ac.uk/pg/511

Applied & Computational Mathematics

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

The Applied and Computational Mathematics research group combines expertise in dynamics, classical and statistical mechanics and advanced scientific computing techniques, to develop techniques for applications such as molecular dynamics, geophysical and astrophysical fluid dynamics and optoelectronics.

If you have a passion for applied mathematics, our facilities, people and environment will help you develop your research ideas to their full potential.

You'll have access to Edinburgh Parallel Computing Centre (EPCC), one of Europe's leading supercomputing centres, and membership of the Centre for Numerical Analysis and Intelligent Software (NAIS).

Research environment

Our research interests are varied and include astronomical fluid dynamics, multiscale modelling and analysis, molecular dynamics, mathematical meteorology, Hamiltonian dynamics, nonlinear waves in fluids and solids, optoelectronics, signal processing, mathematical biology, exponential asymptotics and homogenisation theory.

Valuable connections

Having access to a broad community of researchers means that your work will be well distributed and recognised. Through the NAIS collaboration, you'll create strong networks with researchers across Scotland and have access to substantial training as well as visitor and workshop programmes in numerical analysis, computer science and high-performance computing software development.

As part of the Applied & Computational Mathematics group you will have access to the training activities provided by the Maxwell Institute Graduate School in Analysis and its Applications (MIGSAA).

Strong links also exist with life scientists, chiefly through SynthSys (Synthetic and Systems Biology Edinburgh), a multidisciplinary Edinburgh-based centre whose mission is the analysis and design of biochemical systems using theoretical, computational, and biological techniques.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/512

Geometry & Topology

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Our Geometry and Topology research group has strong links with both the Algebra & Number Theory and the Mathematical Physics research groups, as you can find at our common home in the Hodge Institute: <http://hodge.maths.ed.ac.uk>

You'll find this invaluable, as opportunities to discuss your work and expand your thinking abound. Working within one of the largest mathematics groups in the UK, you'll be completing your programme in an environment that hums with a busy graduate school life, and you'll have the chance to make your mark in seminars, workshops, clubs and outings.

Our interests include algebraic geometry, derived categories, algebraic and geometric topology, twistor theory, category theory and integrable systems.

While we can offer a large community of researchers under one roof, we believe in encouraging you to gain as broad a perspective as possible. The best way to do this is to involve yourself in the international dialogue on your research area, through attending conferences and symposia, and visiting your peers in centres of research worldwide. Throughout your studies, you'll be given opportunities to travel to events and institutions that will allow you to gain this perspective, and open up new areas of investigation.

English language requirements

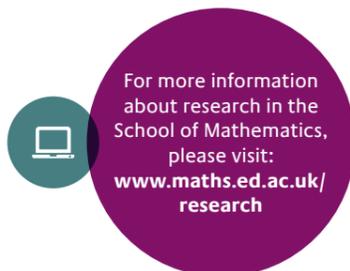
See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/895

Mathematical Analysis & its Applications

PhD 4 yrs FT

This programme is associated with the Maxwell Institute Graduate School in Analysis and its Applications (MIGSAA), a Centre for Doctoral Training that provides high quality instruction in analysis and the applications of analysis to a wide range of areas.

MIGSAA has been made possible by a grant from the UK's Engineering and Physical Sciences Research Council and the Scottish Funding Council. The programme is delivered in collaboration with Heriot-Watt University.

PhD study in MIGSAA may be undertaken with more than 40 supervisors and on topics ranging from pure analysis to applied mathematics relevant for scientific, engineering, environmental or social challenges. Most projects will relate to one of the following themes:

- Harmonic Analysis
- Partial Differential Equations (PDEs)
- Stochastic Processes
- Mathematical Modelling
- Atomic and Molecular Systems
- Fluid Dynamics
- Applied Probability.

Our intention is that all MIGSAA students gain awareness of the full intellectual spectrum of research in analysis and its applications, including familiarity with theoretical issues, stochastic techniques, numerical methods and examples of how analysis problems impact the sciences and engineering. Therefore we expect all students to take some training spanning these areas – even though your eventual PhD thesis may specialise in only one or two.

Research environment

As opposed to a standard PhD, you will be admitted to the programme (rather than with a specific supervisor) and take PhD training courses and projects, which help shape your perspective, leading to a match with a supervisor in Year 1. The research project directed by the supervisor is still the centrepiece of the PhD, but this is augmented by an ongoing training programme in Years 2-4.

Valuable connections

Mathematics is a discipline of high intellect with connections stretching across all the scientific disciplines and beyond, and in Edinburgh you can be certain of thriving in a rich academic setting. The collaboration between MIGSAA's partner institutions maximises the opportunities available for students to gain a breadth of knowledge from leading experts.

In your first year, you will be based at the International Centre for Mathematical Sciences in Edinburgh. This affords a number of opportunities to engage with the international mathematical community. You will be encouraged to travel and participate in conferences and seminars and will have opportunities to meet distinguished researchers from all over the world who are attracted to conferences held here. You'll find opportunities for networking that could have far-reaching effects on your career in mathematics.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

MIGSAA CDT Administrator

Tel +44 (0)131 650 5955

Email migsaa-info@maxwell.ac.uk

www.ed.ac.uk/pg/513

Mathematical Physics

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Mathematical Physics is a multidisciplinary research group with close connections with the Hodge Institute. You'll benefit from being not only in one of the largest mathematics research groups in the UK but also part of the Edinburgh Mathematical Physics Group – a joint research collective formed in 1999 with Heriot-Watt University and now part of the Maxwell Institute.

Research environment

Our group pursues wide-ranging interests spanning a number of disciplines. A central goal is to understand the principles behind quantum gravity, through the study of black holes, cosmologies and spacetime singularities, and via the use of holography and the interplay with quantum gauge field theory through the gauge/gravity correspondence. Particularly fruitful areas of research are the geometry of higher-dimensional black holes and their near-horizon geometries in the context of higher-dimensional generalisations of general relativity.

We're fascinated by the various manifestations of supersymmetry: in string theory, supergravity and gauge theory. This has led us to several classification results on supersymmetric supergravity backgrounds, including a recent proof of the homogeneity conjecture. In addition we study gauge theoretic moduli spaces using supersymmetry and via integrable systems techniques, displaying an interplay between the algebraic geometry of curves and their associated function theory. This research has led to computer implementations of various algebro-geometric constructions.

Recently we have made progress in some purely mathematical problems suggested by the gauge/gravity correspondence: namely, the classification of certain exotic algebraic structures related to superconformal field theories, as well as that of certain types of homogeneous supergravity backgrounds.

Valuable connections

As well as experiencing a vibrant research environment that brings you into contact with a broad group of your peers, your membership of the Edinburgh Mathematical Physics Group will give you access to a dynamic programme of seminars, lecture courses and conferences. There is a dedicated website and blog, and a comprehensive range of graduate activities. More information: <http://empg.maths.ed.ac.uk/>

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/postgraduate/degrees

Mathematics Education

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Our Mathematics Education research group undertakes evidence-based study into a wide range of aspects of university level learning of mathematics, statistics and operational research. Our aim is to develop and evaluate research-based instructional strategies, by gathering and analysing both quantitative and qualitative data, with a view to being able to improve student learning in the subject and related cognate areas.

Research environment

We are interested in undertaking research to develop an evidence-based expansion of the effective use of technology in teaching and learning mathematics, statistics and operational research at the university level. For example, we are a world leading centre for automatic online assessment of mathematics. We also have broader interests in assessment, including flipped-classroom and peer instruction. Current interests within the group related to education and educational technology include:

- Automatic online assessment of mathematics.
- Effective use of technology in teaching and learning mathematics more generally, including programming and online teaching.
- Design of assessments for learning, including evaluation of curricula sequences.
- Evaluation of teaching interventions such as flipped classroom.

Valuable connections

The University of Edinburgh is a world-leader in digital education, spanning the full range of activities including Massive Open Online Courses (MOOCs) and online learning of postgraduate programmes. By joining the School of Mathematics you will have opportunities to interact with educational research groups in cognate disciplines such as the Edinburgh Physics Education Group, and the interdisciplinary Centre for Research in Digital Education. As a research student you will be part of a vibrant and dynamic community of educators, with expertise in educational research and opportunities to develop and pursue your research goals. You can be certain of a rich academic setting with opportunities available for students to gain a breadth of knowledge from leading experts.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/514

Optimization & Operational Research

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

As a member of the Operational Research and Optimization research group you will also be part of the Edinburgh Research Group in Optimization (ERGO), a wider association, with our group as the focus, which includes academics at the University of Oxford as well as commercial organisations. Through its regular seminar series, this network provides interaction with an array of local and international institutions and industrial bodies interested in the development of operational research and optimization. As a result, you'll establish valuable relationships that will help you take your research to its optimum level.

Research environment

Our group has as its primary focus the mathematical and computing aspects of optimization. Core technology in optimization is the solution for large sparse linear and quadratic problems, and we're able to provide world-class expertise in the two main solution methods for these: the simplex method and the interior point method.

We have interests in global optimization, decomposition methods, parallel computing, industrial applications of optimization and stochastic optimization. Our current researchers are exploring the following areas: parameter uncertainty in queuing theory and revenue management; algorithms for linear and nonlinear nonconvex smooth optimization problems; optimization methods for linear, quadratic and nonlinear programming; decomposition methods for large-scale nonlinear nonconvex constrained optimization; bundle methods; warmstarts for interior point methods; pooling problems; computational techniques for solving large-scale linear programming problems; applications of optimization in the chemical, oil and electricity industries; and efficient gradient methods for large-scale convex and nonconvex optimization problems.

Valuable connections

Being part of the Operational Research and Optimization research group and ERGO will give you opportunities to meet and confer with academics worldwide – we're currently working with researchers in Italy, Norway, China, France, Spain and Turkey. Two of our visiting professors are world leaders in continuous optimization. In addition, researchers from our group are regularly invited to give addresses and organise workshops at major optimization conferences, join international conference committees and sit on assessment panels for European grants.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/515

Probability & Stochastic Analysis

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Our Probability and Stochastic Analysis research group operates in what is perhaps the most widely applied area of mathematics. The financial sector, in particular, is a major focus of our research, and graduates with the right research experience can make their way into highly rewarding roles in industry. As part of our small, specialised group, you'll enjoy a research environment that features a balance between theory and practice, access to one of the most powerful computing facilities in the UK and strong links with relevant industries.

Research

Our research focuses on the following themes: stochastic differential equations and stochastic partial differential equations (PDEs) and their applications in nonlinear filtering and stochastic control; applications of stochastic analysis of PDEs, stochastic PDEs and stochastic differential equations (accelerated numerical methods in particular).

We're also involved in the applications of probability theory, mainly to mathematical finance, particularly stochastic volatility models, equivalent martingale measures and incomplete markets. Other applications include engineering, signal procession and biological sciences.

Valuable connections

With the financial sector being the major commercial employer of our graduates, our involvement with the Scottish Financial Risk Academy, established in conjunction with Heriot-Watt University, offers valuable industry links and training. You can benefit from short project internships with leading financial institutions, visits from leading risk scholars, and a series of knowledge exchange courses and events.

As part of the Probability & Stochastic Analysis group you will have access to the training activities provided by MIGSAA.

Unparalleled computing

The Probability & Stochastic Analysis group also gives you access to the Edinburgh Parallel Computing Centre (EPCC), one of Europe's leading supercomputing facilities. EPCC enables high-level grid computing, data integration, and computer simulation and process optimization. We offer training in all the relevant programs required to achieve your research aims.

Rewarding career options

Many of our graduates take up lucrative positions with high-profile financial companies. A large number also pursue careers in academia, while others apply their skills in engineering or biological sciences.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

www.ed.ac.uk/pg/516

Statistics

PhD 3 yrs FT (6 yrs PT available for UK/EU students)

Statistics is the branch of mathematics that deals with uncertainty and the particular application of 'making sense of data'. It is a core element of the newly recognised area of data science, involving the development of new techniques for analysing data within a rigorous framework. The Statistics research group explores a wide range of statistical theory and practice, applying newly developed theories/techniques in collaboration with researchers in related fields, such as informatics, biostatistics, health, ecology and physics.

Research

Statistical research spans both the classical and Bayesian paradigms. Particular areas of interest include efficient computationally intensive techniques, hidden (semi-)Markov models, hierarchical models, multivariate models, time-series models, wavelets, non-parametric regression and extreme value theory. The group builds on a strong theoretical base, developing new statistical methodology applied to a wide range of different application areas including, astrophysics, biostatistics, ecology, epidemiology, health, law, environment, agriculture, geosciences, and functional genomics data, such as gene expression microarrays.

Valuable connections

As a research student, you will find a wealth of expertise available via our links with theorists and practitioners in related fields. For example, several members of the Statistics group are also Faculty Fellows of the recently formed Alan Turing Institute, of which the University of Edinburgh is a founding member. In addition, the Scottish Government-backed institute Biomathematics and Statistics Scotland (BioSS) is an associated research institute of the University. With its main base in our building, it provides access to other researchers with an interest in statistical methodology, bioinformatics, and process and systems modelling. The University of Edinburgh is also a member institute of the Academy of PhD Training in Statistics (APTS), providing additional residential training in advanced statistical techniques.

Rewarding career options

You will gain a qualification that is highly regarded and in high demand. This will lead to excellent career prospects in academia, industry and with government bodies.

English language requirements

See page 20.

Fees and funding

For fees see page 20 and for funding information see page 22.

Contact Graduate School Administrator

Email pgresearch@maths.ed.ac.uk

Our involvement with the Scottish Financial Risk Academy offers valuable links and training.

About the School of Mathematics

By joining the University of Edinburgh's School of Mathematics, you'll follow in the footsteps of mathematical pioneers and study alongside some of the most exciting minds working in the field today.

Whether you wish to follow a taught masters programme or pursue your own line of investigation, we offer a dynamic academic environment, supported by excellent facilities.

We have an outstanding reputation for mathematics teaching and research. We were judged 'excellent' in the most recent Teaching Quality Assessment. In the Research Excellence Framework (REF) 2014 we were ranked fifth in the UK with 83 per cent of our research rated world leading or internationally excellent.

Rich heritage

The School boasts a rich heritage in pioneering mathematics. Our base, the James Clerk Maxwell Building, is named after one of the most celebrated mathematicians to study at the University. The 19th-century scientist is most famous for developing classical electromagnetic theory.

Leaders in their fields

Our status as one of the most prestigious schools in the UK for mathematics attracts highly respected staff. Many of our 50 current academics are leaders in their fields and have been recognised with international awards.

The School is home to two Fellows of the Royal Society, 14 Fellows of the Royal Society of Edinburgh and seven Philip Leverhulme Prize or Fellowship holders. Abel Prize winner and Fields medallist Professor Sir Michael Atiyah is an Honorary Professor and Professor Agata Smoktunowicz is a recent recipient of the European Mathematical Society Prize.

Facilities and resources

You will enjoy excellent facilities, ranging from one of the world's major supercomputing hubs to generous library provision for research at the leading level, including the Noreen and Kenneth Murray Library at King's Buildings.

You will have access to more than 1,400 computers in suites distributed across the University's sites, many of which are open 24 hours a day. In addition, if you are a research student, you will be provided with your own workspace with desk and desktop computer.

Software support

We provide all our mathematics postgraduates with access to software packages such as Maple, Matlab and Mathematica. Research students are allocated parallel computing time on 'Eddie' – the Edinburgh Compute and Data Facility. It is also possible to arrange use of the BlueGene/Q supercomputer facility if your research requires it.

In good company

Mathematics is a discipline of high intellect with connections stretching across all the scientific disciplines and beyond, and in Edinburgh you can be certain of thriving in a rich academic setting. Our School is one of the country's largest mathematics research communities in its own right which includes around 60 active research students. You will also benefit from Edinburgh's high-level collaborations, both regional and international. These include the International Centre for Mathematical Sciences and our close collaboration with Heriot-Watt University through the Maxwell Institute, which was set up in 2005 following significant funding from the Scottish Funding Council.

Research students will have a primary and secondary supervisor and the opportunity to network with a large and varied peer group. You will be carrying out your research in the company of eminent figures and be exposed to a steady stream of distinguished researchers from all over the world.

Collections of the University

The University of Edinburgh has one of the world's great collections, which has been growing ever since its foundation in 1583. Our collections include rare books, archives and manuscripts, art, historical musical instruments and a wide range of museum objects from geological specimens to anatomical models. If laid out end to end, we would have almost 60 kilometres of shelving and storage space devoted to our heritage material, from 1st-century Greek papyrus fragments to new works of sculpture. This is curated by specialist staff across 45 sites and used for our teaching and research and by the wider public community.

The Centre for Research Collections in the Main Library is the hub for all our collections, where specialist curators make them available for study, research and pleasure. Postgraduate students are welcome to study original objects and have made many important research discoveries while working on the archives. You will find an incredible range of material in our collections that is available nowhere else in the world.

"I experienced an egalitarian professor-student relationship and felt that student feedback was considered carefully. A number of external guest lecturers from diverse backgrounds in industry and academia enriched the programme with their expertise."

Michel Zedler, MSc Operational Research

Community

We are a vibrant community of more than 50 academic and related staff supervising 60 research, and many more MSc, students. While you will be immersed in academic discourse at the highest level, we also offer plenty of opportunities to make new connections, through a full calendar of social events.

You'll have the chance to meet people through the daily bustle of the Maths Hub common room, subject-specific clubs, the weekly postgraduate colloquium – where students give talks and share cake – and at many annual events, including a residential excursion to Firth Point on the banks of Loch Tay in Perthshire, where everything from cycling to canoeing is on offer.

There are opportunities to get involved with our new magazine *Contours*, which is written for the School by our students. We also have a talented team of staff and students working on a busy calendar of outreach activities, including the annual Edinburgh International Science Festival. They demonstrate to the wider community that maths is a beautiful, elegant and creative subject, which underpins a huge amount of modern society.

Graduate School

For research students, our Graduate School offers a busy schedule of activities ranging from formal seminars to social events. The Graduate School runs its own website and YouTube channel, which features self-produced videos of lectures.

Share your work with the world

Researchers are encouraged to travel and participate in conferences and seminars. You'll also be in the right place in Edinburgh to meet distinguished researchers – from all over the world – who are attracted to conferences held at the School, and the various collaborative centres based here. You'll find opportunities for networking that could have far-reaching effects on your career in mathematics.

“The School is very supportive in organising social events to help networking. Edinburgh is an international university that attracts students from different countries. I've made useful contacts with academics within the University and with external experts in the field.”

Sarah Farid Khwaja, PhD Mathematics



Employability and graduate attributes

While your research will build your knowledge and skills in your chosen field, throughout your programme you'll also gain expertise and confidence in a number of related areas, such as public speaking, presentation and written communication.

This personal and professional development, supported by services offered by the School and the University, will give you an edge when applying for academic or commercial roles.

Institute for Academic Development

All postgraduate students can benefit from our Institute for Academic Development (IAD), which provides information, events and courses to develop the skills you will need throughout your studies and in the future. IAD events also offer the perfect opportunity to meet and network with other postgraduates from across the University.

Further information is available online:
www.ed.ac.uk/iad/postgraduates

For taught postgraduates, IAD provides a popular study-related and transferable skills support programme. It is designed to help you settle into postgraduate life, succeed during your studies and move confidently to the next stage of your career. We offer on-campus and online workshops and one-to-one study skills consultations, plus online advice and learning materials. Workshops and learning resources cover key topics tailored to different academic stages, including getting started with your studies; critical reading, writing and thinking; managing your exams; and planning for and writing up your dissertation.

IAD also provides a comprehensive programme of transferable skills training, resources and support for researchers completing a doctorate. The workshop programme is designed to help you successfully prepare for the various milestones of your PhD, from getting started with your research, to writing up and preparing for the viva. Workshops cover topics such as writing skills, reference management tools, statistics, preparing for conferences, delivering presentations, time and project management, and personal development. IAD also offers online resources and planning tools to help get your research started, plus support for tutoring and demonstrating, and research public engagement and communication.

Careers Service

Our Careers Service plays an essential part in your wider student experience at the University, offering a range of tailored careers and personal development guidance and support. We support you to recognise the wealth of possibilities ahead, while at university and after graduation, helping you explore new avenues, tap into your talents and build your employability with confidence and enthusiasm.

We provide specialist support for postgraduate students. From exploring career options to making decisions, from CV writing to interview practice, from Employ.ed internships to graduate posts and from careers fairs to postgraduate alumni events, we help you prepare for the future.

We sustain and continually develop links with employers from all industries and employment sectors, from the world's top recruiters to small enterprises based here in Edinburgh. Our employer team provides a programme of opportunities for you to meet employers on campus and virtually, and advertises a wide range of part-time and graduate jobs.

More information:
www.ed.ac.uk/careers/postgrad

Connect.ed

Edinburgh encourages its alumni to stay in touch with current students who share an academic background or are interested in a similar career path. Connect.ed is a networking system run by the Careers Service that provides an informal and confidential opportunity for alumni to share their occupational knowledge and experience with current students, who can contact them for advice and guidance on their future career.

More information:
www.ed.ac.uk/careers/connected

Backing bright ideas

LAUNCH.ed is the University's award-winning programme for student entrepreneurs. Each year, LAUNCH.ed works with hundreds of students to assess their ideas and develop their business skills and helps many start their businesses. We have helped Edinburgh students and alumni launch almost 100 new businesses in the last three years, ranging from language tuition to robotics companies.

More information:
www.LAUNCH.ed.ac.uk

Learn to teach

PhD students are given leadership roles within the School, and you'll have the opportunity to spend some of your time conducting undergraduate tutorials. We'll help you with this: the University offers courses in public speaking and other teaching skills, and you'll be able to draw on the support of your peers and supervisors in research group meetings.

A solid start

For research students, a strong foundation in the fundamentals of your chosen field is essential and in the early part of your studies you'll be offered taught courses through the Scottish Mathematical Sciences Training Centre, a consortium of seven mathematics departments. You'll take part in video-conferenced lectures, presented by staff from all participating universities.

Applications and fees

We have an online application process for all postgraduate programmes. It's a straightforward system with full instructions, including details of any supporting documentation you need to submit.

When applying, you will set up an account, which lets you save your application and continue at another time.

Full guidance on our application system is available at: www.ed.ac.uk/postgraduate/applying

General requirements

A UK 2:1 degree, or its international equivalent (www.ed.ac.uk/international/graduate-entry), in mathematics or another mathematical subject or numerate discipline.

You will also need to meet the University's language requirements (see below). Entry requirements for individual programmes can vary, so check the details for the specific programme you wish to apply for.

To apply for a research degree you will need a UK first class honours degree, or its international equivalent, in an appropriate subject; or a UK 2:1 honours degree plus a UK masters degree, or their international equivalents; or relevant qualifications and experience.

References

For applications to taught programmes, the normal requirement is one reference, although an additional reference may be requested in individual cases. For applications to research programmes, two references are required. You should check the entry online for exact requirements for your intended programme of study. For general guidance on references, visit: www.ed.ac.uk/postgraduate/references

Deadlines

Taught programmes

Some programmes have application deadlines. Please check the programme entry online for details. For all other programmes, you are encouraged to apply no later than one month prior to entry to ensure there is sufficient time to process your application. However, earlier application is recommended, particularly where there is a high demand for places or when a visa will be required. Should you wish to submit a late application, please contact us for guidance. If you are applying for funding, in most cases you will need an offer to study with us before you can make your funding application.

Research programmes

The early deadline for applications is 30th November 2017 and the regular deadline is 31st January 2018. This will enable you to be considered for all of our available funding opportunities.

Early applications are encouraged and a limited number of early offers may be made.

Late applications will be considered, but priority will be given to applications received by the deadline.

English language requirements

Students whose first language is not English must show evidence of one of the qualifications below:

- IELTS Academic: total 6.5 (at least 6.0 in each module).
- TOEFL-iBT: total 92 (at least 20 in each module).
- PTE(A): total 61 (at least 56 in each of the Communicative Skills sections).
- CAE and CPE: total 176 (at least 169 in each module).
- Trinity ISE: ISE II (with distinctions in all four components).

Please note:

- English language requirements can be affected by government policy so please ensure you visit our degree finder to check the latest requirements for your programme: www.ed.ac.uk/postgraduate/degrees
- Your English language certificate must be no more than two years old at the beginning of your programme.
- We also accept recent degree-level study that was taught and assessed in English in a majority English-speaking country (as defined by UK Visas & Immigration).

Please contact the Graduate School Administrator for specific details: pgresearch@maths.ed.ac.uk

Abbreviations: IELTS – International English Language Testing System; TOEFL-iBT – Test of English as a Foreign Language Internet-Based Test; PTE(A) – Pearson Test of English (Academic); CPE – Certificate of

Proficiency in English; CAE – Certificate in Advanced English; Trinity ISE – Integrated Skills in English.

www.ed.ac.uk/english-requirements/pg

Tuition fees

The following table provides an overview of indicative fee levels for programmes commencing in 2018.

Figures marked * show the fee level set for the 2017/18 academic year. All other figures are indicative of expected fee levels for your studies during the 2018/19 academic year. Because these figures are indicative, it is important you check online before you apply and check the up-to-date fee level that will apply to your specific programme: www.ed.ac.uk/student-funding/tuition-fees/postgraduate

Please note:

- International students starting full-time taught programmes of study lasting more than one year will be charged a fixed annual fee.
- All other students on full-time and part-time programmes of study lasting more than one year should be aware that annual tuition fees are subject to revision and are typically increased by approximately five per cent per annum. This annual increase should be taken into account when you are applying for a programme.
- In addition to tuition fees, your programme may be subject to an application fee and additional costs/programme costs may apply. Please check the latest programme information online.

Tuition fees for EU students

EU students enrolling in the 2018/19 academic year will be admitted as Scottish/EU fee status students. Taught masters students will be eligible for the same tuition support as Scottish domiciled students from the Student Awards Agency for Scotland (SAAS).

For UK/EU students

	Annual fee
Taught programmes 1-year FT	£11,500
Taught programmes 2-years PT	£5,750
Taught programmes 3-years PT	£3,835
Except:	
Computational Mathematical Finance, Financial Modelling & Optimization 1-year FT	£23,200
Computational Mathematical Finance, Financial Modelling & Optimization 2-years PT	£11,600
Financial Mathematics 1-year FT	£20,900
Computational Applied Mathematics 1-year FT	£9,600
PhD 3-years FT	£4,195*
Except:	
Mathematical Analysis & its Applications 4-years FT	£4,195*
PhD 6-years PT	£2,098*

For international students

	Annual fee
Taught programmes 1-year FT	£21,300
Except:	
Computational Mathematical Finance, Financial Modelling & Optimization 1-year FT	£27,100
Financial Mathematics 1-year FT	£23,410*
PhD 3-years FT	£18,000
Except:	
Mathematical Analysis & its Applications 4-years FT	£19,100*

* Figure shown is the 2017/18 fee level
All other fees quoted are indicative of 2018/19 fee levels. Because these figures are indicative, it is important you check online before you apply and check the up-to-date fee level that will apply to your specific programme: www.ed.ac.uk/student-funding/tuition-fees/postgraduate



Funding

A large number of scholarships, loans and other funding schemes are available for your postgraduate studies. It is only possible to show a small selection in print. To see the full range, please visit: www.ed.ac.uk/student-funding/postgraduate

Awards are offered by the School of Mathematics, the College of Science & Engineering, the University of Edinburgh, the Scottish, UK and international governments and many funding bodies. Some of these offer our PhD students financial support for three and a half years and MIGSAA does so for four years, to cover both the training and PhD writing periods.

Here we list a selection of potential sources of financial support for postgraduate students applying to the School of Mathematics. This list was correct at the time of printing but please check the full and up to date range online (see above). The School aims to help find scholarships covering tuition and living expenses for all our PhD students.

Tuition fee discounts

We offer a 10 per cent discount on postgraduate fees for all alumni who have graduated with an undergraduate degree from the University. We also offer a 10 per cent discount for international graduates who spent at least one semester at the University of Edinburgh as a visiting undergraduate: www.ed.ac.uk/student-funding/discounts

Key

- Taught masters programmes
- Masters by Research programmes
- Research programmes

Scholarships at the University of Edinburgh

- **Beit Trust** ●●
Beit Trust and the University of Edinburgh Scholarships jointly fund postgraduate students from Malawi, Zambia and Zimbabwe to undertake a masters: www.beittrust.org.uk
- **China Scholarships Council/University of Edinburgh Scholarships (China)** ●
A number of scholarships for PhD study to candidates who are citizens and residents of China: www.ed.ac.uk/student-funding/china-council
- **Edinburgh Global Masters Scholarships** ●●
A number of scholarships are available to international students for masters study: www.ed.ac.uk/student-funding/masters
- **Edinburgh Global Research Scholarships** ●
These scholarships are designed to attract high-quality international research students to the University: www.ed.ac.uk/student-funding/global-research
- **Edinburgh Principal's Career Development Scholarships** ●
A number of scholarships, open to UK, EU and international PhD students: www.ed.ac.uk/student-funding/development
- **Enlightenment Scholarships** ●
The University is currently developing a new style of PhD scholarship to attract the best PhD applicants from around the world. These scholarships will provide funding for up to four years. For the latest information, and for details on which Schools will be participating, please check: www.ed.ac.uk/student-funding/enlightenment

- **Edinburgh Syrian Postgraduate Scholarships** ●●
A number of scholarships are available to postgraduate students from Syria studying a full-time one-year masters: www.ed.ac.uk/student-funding/postgraduate/syria
- **EPSRC, MIGSAA and School of Mathematics Studentships** ●
All PhD applications will be considered automatically for School of Mathematics studentships. All UK PhD applicants will also be considered automatically for EPSRC DTG funding: www.maths.ed.ac.uk/school-of-mathematics/studying-here/pgf/funding-opportunities
All students, but especially UK students, applying to the Analysis, Applied and Computational Mathematics, and Probability & Stochastics research groups, are encouraged to also apply for MIGSAA scholarship funding: www.maxwell.ac.uk/migsaa/apply-now
- **Highly Skilled Workforce Scholarships** ●
A number of scholarships are available to UK nationals permanently domiciled in Scotland, and to EU nationals domiciled either on mainland EU or in Scotland, who have been accepted on an eligible full- or part-time masters programme. The scholarships, which are funded by the Scottish Funding Council and subject to annual confirmation, cover the UK/EU tuition fee. At the time of printing, we are awaiting confirmation of these scholarships from the Scottish Government: www.ed.ac.uk/student-funding/sfc-hsw
- **Julius Nyerere Masters Scholarship (Tanzania)** ●●
One scholarship is available to citizens of Tanzania who are normally resident in Tanzania who are accepted on a full-time masters programme: www.ed.ac.uk/student-funding/nyerere

- **Richard Davidson Postgraduate Scholarship in Operational Research** ●
One scholarship awarded to the most outstanding student in Operational Research. Available only to EU nationals: www.ed.ac.uk/student-funding/davidson
- **School of Mathematics MSc funding** ●
Full and partial School funding of tuition fees and contributions to living expenses is awarded on merit. Select programme from: <http://msc.maths.ed.ac.uk>

Research council awards

Research councils offer awards to masters, MPhil and PhD students in most of the Schools within the University of Edinburgh. All studentship applications to the research councils must be made through the University, through your School or College office. Awards can be made for both taught and research programmes.

Normally only those UK/EU students who have been resident in the UK for the preceding three years are eligible for a full award. For some awards, candidates who are EU nationals and are resident in the UK may be eligible for a fees-only award. The UK Government has confirmed that EU postgraduate research students commencing their studies in 2018/19 will retain their fee status and eligibility for research council support for the duration of their programme: www.ed.ac.uk/student-funding/research-councils

The University also offers a number of scholarships in partnership with the following overseas government agencies:

- **Chile** ●●●
National Commission for Scientific and Technological Research (CONICYT): www.conicyt.cl
- **Colombia** ●
Administrative Department of Science, Technology and Innovation (Colciencias): www.colciencias.gov.co
- **Ecuador** ●●●
Secretaria Nacional de Educacion Superior, Ciencia y Tecnologia (SENESCYT): www.educacionsuperior.gob.ec
- **Iraq** ●
Ministry of Higher Education and Scientific Research: www.iraqiculturalattache.org.uk

- **Mexico**
National Council of Science and Technology of the United Mexican States (CONACYT): ●●●
www.conacyt.mx
- Banco de Mexico and the Banco de Mexico's FIDERH trust (FIDERH): ●●●
www.fiderh.org.mx
- Fundacion Mexicana para la Educacion, la Tecnologia y la Ciencia (FUNED): ●●
www.funedx.org
- **Pakistan** ●
Higher Education Commission, Pakistan (HEC): www.hec.gov.pk

Loans available for study at the University of Edinburgh

The University of Edinburgh is a participating institution in the following loans programmes, meaning we certify your student status and can help with the application process.

- **The Canada Student Loans Program** ●●●
The University is eligible to certify Canadian student loan applications: www.ed.ac.uk/student-funding/canadian-loans
- **Erasmus+** ●
The Erasmus+ Master Loan helps masters students with their living and tuition costs when studying in an Erasmus+ country other than where they live or where they took their first degree. For more information: <https://erasmusplus.org.uk/master-loan>
- **Postgraduate Loans (PGL) England** ●●
Student Finance England offers postgraduate loans for taught and research masters programmes, payable to eligible students: www.gov.uk/postgraduate-loan
- **Postgraduate Loans (PGL) Northern Ireland** ●●
Student Finance Northern Ireland offers a tuition fee loan for taught and research programmes, at certificate-, diploma-, and masters-level, which will be paid directly to the University: www.studentfinancenai.co.uk

- **Postgraduate Loans (SAAS) Scotland and EU** ●●
The Student Awards Agency Scotland offers tuition fee loans for taught diploma and masters programmes which will be paid directly to the University. Full-time students resident in Scotland can also apply for a non-income assessed living cost loan: www.saas.gov.uk
- **Postgraduate Loans (PGL) Wales** ●●
Student Finance Wales offers eligible students postgraduate loans for taught and research masters programmes: www.studentfinancewales.co.uk
- **US Student Loans** ●●●
The University is eligible to certify loan applications for US loan students. Full details on eligibility and how to apply can be found online: www.ed.ac.uk/student-funding/us-loans

Other sources of funding

The following are examples of the many scholarships and support schemes available to students from particular countries who meet certain eligibility criteria.

- **Chevening Scholarships** ●●
A number of partial and full funding scholarships are available to one-year masters students: www.chevening.org
- **Commonwealth Scholarships** ●●●
Scholarships available to students who are resident in any Commonwealth country, other than the UK: www.dfid.gov.uk/cscuk
- **Marshall Scholarships (USA)** ●●●
Scholarships available to outstanding US students wishing to study at any UK university for at least two years: www.marshallscholarship.org
- **Scotland's Saltire Scholarships** ●●
A number of scholarships open to students who are citizens permanently and ordinarily resident in Canada, China, India, Pakistan and the USA for one year of masters study: www.ed.ac.uk/student-funding/saltire

“The Scottish Government’s initiative to attract international students through the Saltire Scholarship Scheme, as well as the University of Edinburgh’s help and support for international students, has helped provide me with an opportunity that I would never have conceived of prior to starting my studies at Edinburgh.”

Robert Starr, MSc High Performance Computing, Scotland’s Saltire Scholarship

Campus map

The School of Mathematics is situated in the James Clerk Maxwell Building at the University's King's Buildings campus, which is about two miles south of the city centre and well served by buses, including a free University shuttle service during semester time.



Detailed maps
can be found at:
www.ed.ac.uk/maps



Get in touch

Contact us

For more information on our taught MSc programmes, please email:

Computational Applied Mathematics
cammsc@ed.ac.uk

Computational Mathematical Finance
cmfmsc@ed.ac.uk

Financial Mathematics
macspgenquiries@hw.ac.uk

Financial Modelling & Optimization
fmsc@ed.ac.uk

Operational Research
ormsc@ed.ac.uk

Statistics & OR/with Data Science
statsmsc@ed.ac.uk

For more information on postgraduate research, email
pgrresearch@maths.ed.ac.uk

Alternatively, contact:

Graduate School Administrator
Tel +44 (0)131 650 5085

Email pgrresearch@maths.ed.ac.uk

MIGSAA CDT Administrator
Tel +44 (0)131 650 5955
Email migsaa-info@maxwell.ac.uk

Visit us

The University's Postgraduate Open Day is your opportunity to come and meet current staff and students. Our next campus-based Open Day takes place on 15 November 2017. For more information, visit: www.ed.ac.uk/postgraduate-open-day

If you are interested in visiting the School outside the Open Day system as an individual, you are encouraged to contact any relevant member of staff directly to arrange a meeting or an informative video chat. Larger groups should contact George Kinnear, the Teaching & Recruitment Development Officer, to arrange a visit: g.kinnear@ed.ac.uk.

Our visits to you

If you are unable to visit the University, we attend events throughout the year so you can meet and speak to us in person.

UK and Europe: www.ed.ac.uk/postgraduate/uk-eu-events

International: www.ed.ac.uk/international/our-visits-overseas

Chat online

We offer all postgraduate students monthly online information sessions. To find out more and see when the next session will be: www.ed.ac.uk/postgraduate/online-events

For international students, Edinburgh Global runs two online chat sessions each month. These are timed to give students in all timezones a chance to get involved. You can find out more and register online: www.ed.ac.uk/international/chat-to-us-online



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by our world-class university

You are in good company. More than 37,000 of the world's brightest minds study here. Learn more at www.ed.ac.uk



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Ailsa Johnson, MA Illustration

The front cover shows Eduardo Paolozzi's plaster maquette *Alan Turing II 2000*, which was bequeathed to the University in 2007. It is a stylized depiction of Turing, the pioneering mathematician, computer scientist and codebreaker.

The item in this illustration is part of the University's unique Centre for Research Collections, a rich resource for all our students, staff and the wider community.

#drawntoedinburgh

This publication is available online at www.ed.ac.uk/postgraduate and can be made available in alternative formats on request. Please contact communications.office@ed.ac.uk or call +44 (0)131 650 2252.

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We have made every effort to ensure the accuracy of the information in this prospectus before going to print. However please check online for the most up-to-date information: www.ed.ac.uk

On 23 June 2016 the UK electorate voted in a national referendum to leave the European Union. At the time of going to print, there was no immediate, material change known that would impact on applicants for 2018 entry. However we recommend that you check online for the latest information before you apply: www.ed.ac.uk/news/eu

The University's standard terms and conditions will form an essential part of any contract between the University of Edinburgh and any student offered a place here. Our full terms and conditions are available online: www.ed.ac.uk/student-recruitment/terms-conditions

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