A Brief Guide For Graduate Studies Applicants

Issued by the Mathematical Institute
University of Oxford

November 2011

Contents

1 Foreword

The Mathematical Institute at Oxford enjoys a high reputation, both nationally and internationally, for the excellence of its teaching and research, and is among the largest in the country. Mathematical research at Oxford covers a very wide range in both pure and applied mathematics. It attracts generous research funding and draws students and visiting faculty from all parts of the world.

Students working for higher degrees in mathematics at Oxford (numbering over 160 at present) are an important and valued part of the mathematical life of the Mathematical Institute http://www.maths.ox.ac.uk/, and are provided with excellent facilities for the pursuit of their advanced study or research.

Much of this information has been taken from official University and the EPSRC web site from which further details can be obtained. These are:

- University Central Administration http://www.admin.ox.ac.uk/, Wellington Square, Oxford OX1 2JD
  - Statutes, Decrees and Regulations
  - Examination Decrees
  - Graduate Studies Prospectus
  - Overseas Students Admission
- Engineering and Physical Sciences Research Council http://www.epsrc.ac.uk

Those wishing to be admitted to postgraduate work for a higher degrees should note that they will need to do the following:

1. obtain formal acceptance by the Mathematical Institute (see Section 3);
2. arrange adequate finance (see Section 4);
3. be accepted as a member of a college (see Section 5);
4. meet the department's English Language requirements.

Those who want to work here as postgraduate students not registered for any Oxford degree should consult sections 2.7 and 2.8.

Your attention is drawn to the University's Equal Opportunities Statement http://www.admin.ox.ac.uk/eop/statements.htm.

2 Possible Course Categories

Students are accepted in the following categories:

- for the degree of DPhil (see section 2.1)
- for the degree of MSc by research (see section 2.2)
- for the degree of MSc in Mathematics and the Foundations of Computer Science (see section 2.3)
- for the degree of MSc in Mathematical Modelling and Scientific Computing (see section 2.4)
- for the degree of MSc in Mathematical and Computational Finance (see section 2.5)

  We do not accept part time students for the above courses.
- for the part-time degree of MSc, or Diploma, in Mathematical Finance (see section 2.6)
- as a Recognized Student (see section 2.7)
- as a Visiting Student (see section 2.8)

2.1 DPhil

This is a higher research degree suitable only for able candidates. A first class degree or equivalent is a minimum requirement. The DPhil requires a significant and substantial contribution to knowledge. Students are normally admitted initially to a probationary status and approved for transfer to DPhil only when the Mathematical Institute is satisfied of their ability to attempt such a contribution; this transfer involves the submission of written work and an oral examination. It is also possible for students registered for other degrees to transfer to DPhil student status. The minimum period of registration for the DPhil is six terms (including any time registered for the MSc or as a probationary research student), but in practice most students need nine terms at least. Please contact Margaret Sloper (graduate.studies@maths.ox.ac.uk) at the Mathematical Institute for further information.

2.2 MSc by Research

The MSc by research is exactly like a doctorate, but with a research project designed to take less time (normally two years, though it is possible to complete the requirements in a single year). It is not intended as a first step towards a DPhil, but rather as an alternative to a DPhil. There are no associated lectures, classes or written examinations. It can be in any of the subject areas for which supervision is available. Those hoping to do an MSc by research are admitted as "Probationer Research Students" in exactly the same way as those intending to do a DPhil. Thus it is quite possible to switch between the two. The same standards are applied for admission for the two degrees. Relatively few students opt for the MSc by research, and in most cases the decision is due to limitations on the period for which they have funding. Please contact Margaret Sloper (graduate.studies@maths.ox.ac.uk) at the Mathematical Institute for further information.

2.3 MSc in Mathematics and the Foundations of Computer Science

Over the last 20 years or so, there has been an explosion in the use of computers in helping to solve mathematical problems. Such problems range from the extremes of pure number theory across the spectrum of mathematics to solving differential equations originating in biology and engineering. In this 12 month course, the emphasis is on combining those parts of mathematics which both gain from, and contribute to, the theoretical aspects of computer science. The mathematical schedules in this MSc concentrate on Algebra, Combinatorics, Logic, Number Theory and Topology. Every student will be required to pay regard to, and show proficiency in, the applicable parts of the course. This MSc will be of great benefit to those graduate students hoping to do research on the frontiers of mathematics and computer science. It aims to produce students well equipped either to start work on a doctorate or to enter the research side of industry.

Students take courses from two sections: Section A (Mathematical Foundations) and Section B (Applicable Theories). The course is suitable for those who wish to pursue research in pure mathematics (especially algebra, number theory, combinatorics, topology and their computational aspects), mathematical logic, or theoretical computer science. It is also suitable for students wishing to enter industry with an understanding of the mathematical and logical basis to many modern techniques in information technology (for example, machine learning, programming language design and concurrency). Applicants should have a strong mathematical background, that is, a good honours degree in Mathematics or a good honours degree in Computer Science containing a significant mathematical component. Please contact Margaret Sloper (graduate.studies@maths.ox.ac.uk) at the Mathematical Institute for further information.

2.4 MSc in Mathematical Modelling and Scientific Computing

This 12-month course aims to train graduates with a strong mathematical background to develop and apply their skills to the solution of real problems. Emphasis is placed both on the formulation of problems and on the analytical and numerical techniques for their solution and the computation of useful results. All students study core courses in mathematical modelling and numerical analysis which are assessed by written examination. In addition students complete coursework including three mini-projects chosen from a variety of lecture courses in the two areas and a dissertation. A typical dissertation will be concerned with a real problem with an industrial, physical, or biological background and will involve both mathematical and numerical analysis. The course provides good training for research in applied mathematics either in industry or in academia. There are some industrial bursaries available to support students on this course as well as a small number of studentships funded by OCCAM. Further information can be obtained by contacting Lotti Ekert(Lotti.Ekert@maths.ox.ac.uk)

2.5 MSc in Mathematical and Computational Finance

The finance sector is a leading employer of mathematics graduates. This MSc is a 10 month course training graduates with a strong mathematical background to apply their expertise to the solution of real finance problems. Students take core courses in mathematical methods

and numerical analysis, which are assessed by four two-hour written examinations. They take two optional courses which are assessed by short projects, and a compulsory course in Financial Computing with C++ which is assessed by practical examination. Students must also complete a dissertation of between 25 and 40 pages on a topic approved by the examiners. Training will be given in research techniques and methods, and presentational skills. Further information can be obtained by contacting the Mathematical Finance Administrative Office (mathfin.admissions@maths.ox.ac.uk).

2.6 Part-time MSc in Mathematical Finance

This MSc covers the most important technical and quantitative aspects of finance in regular use in financial institutions. It is structured to be accessible to those in full-time employment, and for those not resident in the UK. Students travel to Oxford to attend week-long taught "modules".

The MSc is intended for students who have a degree in mathematics, a mathematical science or an equivalent training, as well as some practical experience in finance, usually via employment in a financial institution. For further information contact the Mathematical Finance Administrative Office (mathfin.admissions@maths.ox.ac.uk).

2.7 Recognized Student Status

This status is intended primarily for graduates of some years' standing engaged in research elsewhere who wish to work in Oxford on a specific topic under the guidance of a person familiar with the relevant area of study. It is not a status generally granted to young graduates who merely wish to spend a year in Oxford. Recognized Students do not follow any formal course of study. Admission is at the discretion of the Mathematical Institute, which is also responsible for appointing the student's academic adviser. Recognized Students may use University libraries and attend lectures in the University but they have no formal association with an Oxford college and are responsible for finding their own accommodation in Oxford. The status may be held for a maximum of three terms. Further details and applications forms are available from Margaret Sloper (graduate.studies@maths.ox.ac.uk)

2.8 Visiting Student Status

This attachment is arranged through a college. The College accepting a Visiting Student arranges for the student's tuition and supervision. The status may be held for a maximum of three terms. Further details and application forms are available from individual colleges or from the Oxford Colleges Admissions Office.
(http://www.admissions.ox.ac.uk/int/visiting/)

3 Admission by the Department

Applicants must obtain formal admission by the department. The first step is to obtain an application form. Applicants should if at all possible use the online for,m but a paper version is available for anyone who cannot do this. In both cases, details are at http://www.ox.ac.uk/admissions/postgraduate_courses/index.html. Applications follow two routes. Those eligible for an EPSRC award are considered in gathered fields every 4 weeks. Other applications go to the University Graduate Admissions Office, and will be considered following three deadlines, which are 18th November 2011, 20th January 2012 and 9th March 2012. If there are still places available, applications can be considered after these deadlines, until 10th August 2012. For each round, decisions will be reached within about 8 weeks, and often less. Successful candidates will receive a formal offer of a place, which may be conditional on academic results, English Language requirements, or financial guarantees. In such cases final acceptance letters cannot be issued until these conditions are met. Successful candidates will automatically receive a college place. Applicants who are not successful will be informed either that they have been put on a waiting list for further rounds, or that they have been rejected. Decisions on scholarships and awards are taken by an entirely separate process, with different timetables (see 4.1).

4 Finance

The Mathematical Institute has at its disposal some support funding for various categories of graduate students (some of these are subject to certain eligibility restrictions); there are also sources of funding from elsewhere. Both are detailed below. The allocation of funds within the Mathematical Institute's gift will be carried out by the Graduate Admissions and Awards Committee. In making its allocation, the committee will take into account the strength of the individual case, the balance of awards across the range of mathematics, the research priorities expressed by the Research Committee (including the need to support the research of younger faculty members as well as those with more experience), and the availability of supervision from the permanent faculty members of the Institute.

4.1 British Subjects and EU students with 3 years' residence

Suitably qualified applicants ordinarily resident in Great Britain may wish to apply for an Engineering and Physical Sciences Research Council (EPSRC) Research Studentship. The Research Studentships are tenable for three and a half years, subject to satisfactory progress, and are designed for students ultimately wishing to proceed to the DPhil degree. These applications will be considered in gathered fields with deadlines 2nd December 2011, 6th January 2012, 3rd February 2012, 2 March 2012 and 30th March 2012. Students taking the MSc in Mathematics and the Foundations of Computer Science or the MSc in Mathematical Modelling and Scientific Computing may be wholly or partially supported by funding from the EPSRC or by industrial sponsorship.

4.2 Other EU Subjects

Suitably qualified applicants normally resident in the EU may wish to apply for an Engineering and Physical Sciences Research Council (EPSRC) Research Studentship which pays fees only. For the MSc in Mathematical Modelling and Scientific Computing courses they may be wholly or partially supported by funding from the EPSRC or by industrial sponsorship.

4.3 Other British Students and EU Students

EU and British students who do not gain EPSRC awards will have to find finance from other sources, but their university fees will be charged at the home students' rate. EU students are normally funded by their home countries.

4.4 Overseas Students (non EU)

Much useful information about funding possibilities for overseas students is available on the University website at http://www.ox.ac.uk/feesandfunding/.

The University of Oxford offers a variety of scholarships for international students wishing to undertake postgraduate study. Students should begin, however, by contacting the Ministry

of Education or Education Department and the British Council Office in their own country for advice and information on national aid and loan schemes for studying in the UK.

Three major scholarships tenable at Oxford are listed below and details of these and other schemes can be found in the Graduate and Undergraduate Prospectuses, as well as on the International Office website (http://www.ox.ac.uk/admissions/international_students/index.html). Applicants for Clarendon and other University awards should submit their application for a University place by the second round deadline of 20th January 2012.

- The Clarendon Fund Bursaries will provide around 100 awards for international students who are accepted onto a new course of postgraduate study in October 2011, and who are liable to pay fees at the overseas rate. The objective of the scheme is to enable outstanding candidates to take up their places at Oxford. Financial circumstances of candidates will be taken into account in determining the level of awards. Details of this and other University wide scholarships are available at

  http://www.ox.ac.uk/feesandfunding/prospectivegrad/scholarships/university/.

- The Commonwealth Scholarship and Fellowship Plan (CSFP) is a pan-Commonwealth scholarships programme administered by the Association of Commonwealth Universities, which enables postgraduate students to study or train in Commonwealth countries other than their own, under awards provided by the host country. CSFP General Scholarships are intended for scholars of high intellectual promise who may be expected to make a significant contribution to their own countries on their return from study abroad. Details and application procedures can be found on the ACU website at http://www.acu.ac.uk/ or in a pamphlet entitled Awards for Postgraduate Study at Commonwealth Universities which should be obtainable from the Registrar of any University in the Commonwealth.

The Grants Register published by Macmillan includes information on a variety of scholarships, fellowships and research grants, professional and vocational grants. Available from Macmillan Reference Limited, 25 Eccleston Place, London SW1W 9NF.
(http://www.palgrave.com/reference/) The International Office keeps one copy and the British Council Office in your city/country may also keep a copy for reference.

For more information on other scholarships available at the University of Oxford and advice on searching for funding, please go to the Graduate Funding website at
http://www.admin.ox.ac.uk/feesandfunding/prospectivegrad/ or refer to the Graduate Studies Prospectus, which can be downloaded from
http://www.ox.ac.uk/admissions/postgraduate_courses/index.html

For the academic year 2011-12, it is estimated that a single student spending 12 months in Oxford, and living in college accommodation, would need at least £12,300 to cover living expenses, excluding the cost of travel to and from Oxford. It must also be borne in mind that these costs are liable to rise in line with inflation. Students from other countries should also allow, as regards their whole budget, for the possibility of fluctuations in exchange rates.

4.5 College Scholarships

A list of full and partial College Scholarships is available on the University webpages using the funding search at http://www.ox.ac.uk/feesandfunding/fundingsearch/. Further information can be obtained from the college officer indicated. Prospective applicants for these awards should contact colleges as early as possible in the year preceding that for which they are seeking admission. Home and EU students are largely funded by the EPSRC.

5 College Admission

Everyone reading for a degree in mathematics at Oxford must be a member of one or other of the colleges. (For a Recognized Student this is not necessary, though there are often social advantages in being attached to a college.) It is not necessary to apply separately for college admission since the university application form is automatically passed on to colleges.

6 The Mathematical Institute

The Mathematical Institute is located at *24-29 St Giles', Oxford OX1 3LB*. See its web pages at http://www.maths.ox.ac.uk/

The Mathematical Institute is the centre for mathematical activity at the University of Oxford. It is one of ten departments under the Mathematical, Physical and life Sciences Divisional Board.

The history of mathematics at Oxford is described in Oxford Mathematics and Mathematicians, the text of a lecture by the late I. W. Busbridge and the Oxford Figures book by John Fauvel, Raymond Flood and Robin Wilson.

Whilst it is usual for mathematics departments in Britain to be split into departments of Pure and Applied Mathematics, the unitary Oxford structure, which encourages numerous strong interactions between the different groups, is regarded as a major factor in the continued high reputation enjoyed by Oxford Mathematics.

The members of the Institute include more than 160 graduate students, professors, readers, other members of staff and academic visitors. The head of the department is Prof N Woodhouse.

The Professors are

- Whitehead Professorship of Pure Mathematics held by Professor M. R. Bridson,
- Waynflete Professorship of Pure Mathematics held by Professor R Rouquier,
- Wallis Professorship held by Professor T J Lyons FRS,
- Savillian Professorship held by Professor N J Hitchin FRS,
- Professorship of Mathematical Logic held by Professor B Zilber,
- Sedleian chair of Natural Philosophy held by Professor J M Ball FRS,
- Rouse Ball chair held by Professor P Candelas,
- Chair of Applied Mathematics held by Professor S J Chapman,
- Chair of Pure Mathematics held by Professor R Heath-Brown FRS,

Members of the department who are Fellows of the Royal Society include J Ball, B Birch, P Candelas, R Heath-Brown, N Hitchin, F Kirwan, I James, T J Lyons, J R Ockendon, R Penrose, G Segal, U Tillmann.

Research is carried out in a wide variety of fields including algebraic, differential and general topology, group theory and representation theory, number theory, mathematical logic, functional analysis, harmonic analysis, algebraic and differential geometry, differential equations, probability theory and its applications, combinatorial theory, global analysis, mathematical modelling, mathematical biology, ecology and epidemiology, continuum mechanics, elasticity, applied and fluid mechanics, magnetohydrodynamics and plasmas, quantum theory, atomic and molecular structure, quantum theory and field theory, string theory, relativity and mathematical physics, applied analysis and materials science.

There are about 70 students studying taught MSc courses, in Mathematical Modelling and Scientific Computing, in Mathematical and Computational Finance and in Mathematics and the Foundations of Computer Science. Teaching for these is shared between the Mathematical Institute and the Computing Laboratory.

The Institute's reputation continues to attract graduate students of the highest calibre from overseas as well as from the UK. It admits approximately 40 research students to read for the D.Phil. in Mathematics each year. Research groups organise graduate lectures in their own areas, and the arrangement of supervision of their research students is co-ordinated by the Institute's Director of Graduate Studies.

The presence of many of the Institute's post-doctoral research workers and senior visitors is made possible by outside funding. This is regularly obtained for individual short-term projects, but there are in addition four major centres which deserve special mention:

1. **The Centre for Industrial and Applied Mathematics** (OCIAM Director, **Prof J Chapman**) aims to develop relations between mathematicians and industry, leading to high quality research with a practical basis. Ongoing fields of research include superconductivity, thin film flows, financial mathematics, complex ray theory, acoustics, glaciology, time series, nonlinear dynamics, exponential asymptotics and many more.

2. **The Centre for Mathematical Biology** (**Prof P Maini**). The CMB is part of the Mathematical Institute. Its interests are in the rapidly growing area of mathematical modelling in the Life Sciences. It consists of a number of graduate students, postdocs and visitors working in diverse areas of research, such as pattern formation, developmental biology, cancer modelling, and cardiology, ecology and epidemiology. The CMB has collaborations with a number of other university departments as well as several international collaborations.

3. **The Oxford Centre for Nonlinear PDE (OxPDE)**(**Prof Sir John Ball**). The Oxford Centre for Nonlinear PDE, led by Professor Sir John Ball FRS, aims to create a vibrant and stimulating research environment and provide leadership in the area of non-linear PDEs within the UK. The Centre focuses on the fundamental analysis of PDEs, and numerical algorithms for their solution, together with specific PDEs arising in areas as wide-ranging as geometry, relativity, finance, image analysis, learning processes and fluid mechanics, including geophysical, biological and polymeric flows. Amongst other initiatives the Centre runs an active visitor programme, an international exchange programme, an events programme and a dedicated technical report series. The Centre also hosts national event and visitor calendars for the UK PDE community.

4. **The Oxford Centre for Collaborative Applied Mathematics (OCCAM)**(**Prof Alain Goriely**) The Oxford Centre for Collaborative Applied Mathematics (OCCAM) has been established with substantial funding from the King Abdullah University of Science and Technology Global Research Partnership. Aiming to meet the ever-increasing global demand for quantitative understanding of complex scientific phenomena, OCCAM has been built on the strength of four pre-existing groups of applied and computational mathematicians working in Oxford: the Oxford Centre for

Industrial and Applied Mathematics, the Centre for Mathematical Biology, the Numerical Analysis Group and the Computational Biology Group. The centre is allied to a global network of mathematicians. OCCAMs mission is to use focused teamwork and innovative mathematical and computational methods to help understand pressing unsolved problems. The main thrust of OCCAM is to carry out quantitative collaborative research in a wide array of scientific fields, with priority given to an evolving set of focus areas. There areas include: (i) Methodologies, (ii) Resources, Energy and the Environment, (iii) Biosciences and Bioengineering and (iv) Materials Science and Engineering.

The Institute has an annexe at Dartington House, Little Clarendon Street, Oxford which at present houses the Centre for Industrial and Applied Mathematics, the mathematical Finance Group and the Centre for Mathematical Biology, and another one in the Gibson Building on the Radcliffe Infirmary site, which houses the Stochastic Analysis, Mathematical Physics and Combinatorics Groups, the Centre for Nonlinear PDE and the Centre for Collaborative Applied Mathematics.

There are plans for a new integrated Mathematical Institute on the Radcliffe Observatory site. Details can be viewed at http://www.ox.ac.uk/roq/maths.html.

Regular advanced courses and research colloquia are held in many branches of mathematics.

7 Other Departments

- The Computing Laboratory, Wolfson Building, Parks Road, Oxford, OX1 3QD
- Statistics Department, 1 South Parks Road, Oxford, OX1 3TG.

8 Appendix – Research Interests

8.1 Within the Mathematical Institute 2010/2011

Note: *This list does not include all members of the Mathematical Institute. It consists primarily of those who hold established posts or who are regularly engaged in supervision or teaching. Certain other names are included for information.*

Dr L F Alday	Hertford	String Theory
Dr D J Allwright		Industrial and Applied Mathematics, especially waves, acoustics and vibration
Dr R E Baker	St Hugh's	Mathematical modelling applied to biology, physiology and medicine. In particular, partial differential equation models for pattern formation in development.
Prof J M Ball, FRS	Queen's	Applied analysis and materials science
Prof C J K Batty	St John's	Analysis, especially one-parameter semigroups of operators and evolution equations, differential operators, operator theory and operator algebras.
Prof P Bressloff		Mathematical Neuroscience, Biophysics, Differential Equations, Stochastic Processes, Dynamical Systems
Dr C Breward	Christ Church	Fluid Mechanics and Modelling Industrial and Biological Processes.
Prof M Bridson	Magdalen	Interaction of geometry/topology and group theory. Much of his work explores the fact that shades of non-positive curvature underlie a wide range of basic phenomena in both topology and group theory.
Prof H Byrne	Keble	Her research focusses on building and analysing mathematical models that describe problems in biology and medicine. Areas of particular interest include the growth and treatment of solid tumours, tissue engineering and stem cell biology. The mathematical tools that she uses include nonlinear dynamics, asymptotic analysis, continuum mechanics and multiscale-hybrid modelling.
Prof P Candelas	Wadham	String Theory
Dr Y Capdeboscq	Queen's	Applied analysis : inverse problems for partial differential equations and homogenisation.

Prof S J Chapman	Mansfield	Differential equations, asymptotic methods, superconductivity, vortices, dislocations, exponential asymptotics, geometrical optics and the geometrical theory of diffraction, industrial applications of mathematics, Mathematical Biology and Medicine.
Prof T Chou	Keble	Nonequilibrium models in statistical physics, Mechanisms of viral entry, Membrane biophysics, Stochastic models of molecular motors, Electrostatics and electrokinetics, Nucleosome structure and dynamics, Cornea mechanics and fluid-solid interactions in the eye.
Prof M J Collins	University	Finite group theory and representation theory
Dr P J Collins	St Edmund Hall	General topology, in particular metric and generalized metric spaces, function spaces, many-valued mappings, and properties of continua. Topology and measure. Solution spaces of differential equations
Dr A Dancer	Jesus	Differential geometry, integrable systems, some related areas of mathematical physics.
Dr X de la Ossa	Oriel	String Theory
Dr P Dellar	Corpus Christi	Lattice Boltzman methods, kinetic theory, scientific computation in fluid dynamics. Variational approaches to atmosphere/ocean fluid dynamics and magnetohydrodynamics
Dr C Douglas	Keble	Algebraic and geometric topology. Geometric aspects of elliptic cohomology and the structure of three- and four-dimensional topological field theories.
Dr C Drutu	Exeter	Geometric group theory, topology and ergodic theory with applications in number theory
Prof M du Sautoy	All Souls	Number theory and group theory, especially the theory of zeta functions of groups.
Dr J Dyson	Mansfield	Analysis and differential equations. Cell population problems. Non-linear evolution operators and functional differential equations
Dr C M Edwards	Queen's	C*-algebras, JB*-algebras and triples and their applications
Prof A Ekert	Merton	Quantum physics, quantum computation and cryptography
Dr R Erban	Somerville	Mathematical biology; including gene regulatory networks, stochastic simulation algorithms, multiscale modelling, partial differential equations and pattern formation.

Dr K Erdmann	Somerville	Representations of groups, finite-dimensional algebras. Cohomology of algebras. Free Lie algebras.
Dr C Farmer		Flow through porous media, grid generation, numerical simulation of elliptic pde with tensor coefficients, inverse problems from a Bayesian viewpoint (particularly the connections between Tikhonov regularisation and Gaussian random fields), data assimilation and particle filters, construction of spatial priors using various types of spde, decision and control problems in the presence of uncertainty, optimisation of expensive functions.
Prof V Flynn	New	Number Theory; Arithmetic Geometry; Jacobians of Curves
Dr A Fowler		Differential-delay equations, enviromental and industrial applications. Medical and biological applications. Time series analysis
Dr E Gaffney	Brasenose	Microbiological fluid dynamics including muco-ciliary dynamics and spermatozoa dynamics; modelling tumours and chemotherapy scheduling; Mathematical and Biological aspects of reaction diffusion systems; modelling oxygen transport phenomena on biologically realistic domains, captured by imaging; models of cell movement, signalling and interaction; pattern formation mechanisms especially on growing domains and, more recently, involving time delays.
Prof M Giles	St Hugh's	Computational finance, numerical analysis, scientific computing, finite difference methods, Monte Carlo methods, parallel computing.
Dr K Gillow		Electrochemical sensors, which have a wide range of applications in a variety of fields including clinical medicine, environmental monitoring and pollution monitoring
Prof A Goriely	St Catherine's	Physical applied mathematics, Mechanics, Mathematical Biology, Dynamical systems
Dr B Hambly	St Anne's	Probability and stochastic processes, with applications to financial mathematics, analysis on fractals, random matrices, growth models and branching processes.

Dr K C Hannabuss	Balliol	Applications of operator algebras and non-commutative geometry to quantum field theory
Dr T Hausel	Wadham	Study of the topology, geometry, global analysis and arithmetic of hyperkahler manifolds with applications in various fields in mathematics and physics
Dr R A Hauser	Pembroke	Numerical Optimisation, Applied Probability, Operations Research
Prof R G Haydon	Brasenose	Functional analysis; geometry of Banach spaces
Prof R Heath-Brown, FRS	Worcester	Classical analytic number theory: Sieve methods, Riemann zeta-function, distribution of primes, Diophantine problems.
Dr A Henke	Pembroke	Representation theory, algebraic combinatorics, computational algebra
Prof N J Hitchin, FRS	New	Differential and algebraic geometry and its relation to the equations of mathematical physics
Dr A Hodges	Wadham	Developing the twistor programme for fundamental physics initiated by Roger Penrose. Large-dimensional complex contour integrals, which give a completely new description of the scattering amplitudes arising in quantum field theory
Prof S D Howison	Christ Church	Mathematics and finance, derivatives pricing, market models. Free and moving boundary problems in heat and fluid flows, applications of differential equations to industrial problems.
Dr P Howell	University	Industrial and applied mathematics, particularly fluid dynamics, differential equations and asymptotic analysis.
Dr H Jin	St Peter's	Mathematical Finance, applied stochastic analysis and optimization
Prof D Joyce	Lincoln	Holonomy groups and calibrated geometry (areas of differential geometry, on manifolds, and their submanifolds). Mirror symmetry, and connections with String Theory. Some aspects of symplectic geometry (Floer homology) and algebraic geometry (moduli problems).

Prof M Kim	Merton	Arithmetical algebraic geometry, with emphasis on the application of ideas from topology to the study of Diophantine equations. Recent research focuses on the technology of non-abelian constructions, especially non-abelian fundamental groups and non-abelian cohomology.
Dr B Kirchheim	Trinity	Calculus of variations (nonconvex problems like nonlinear elasticity or mass transport), Geometric measure theory (fractals and minimal surfaces) and the theory of real functions.
Prof F C Kirwan, FRS	Balliol	Algebraic and symplectic geometry.
Dr R Knight		The common boundaries of logic, set theory, and topology
Dr J Koenigsmann	LMH	Arithmetic and model theory of fields, using methods from Galois cohomology, valuation theory, number theory, algebraic and arithmetic geometry, profinite group theory and representation theory
Dr Y Kremnitzer		Geometric representation theory
Dr Jan Kristensen	Magdalen	Calculus of variations, in particular existence and regularity theory in the multi-dimensional case. Geometric function theory and real analysis, in particular pointwise properties of weakly differentiable maps and extensions of the Morse-Sard theorem.
Prof M Lackenby	St Catherine's	Topology (particularly in dimension three), geometry and geometric group theory.
Dr A Lauder	Hertford	Computational number theory, especially problems on zeta and L-functions.
Dr R Leese	St Catherine's	Performance modelling, especially in telecommunications; radio channel assignment; combinatorial auctions
Dr J Lotay	University	Calibrated submanifolds in 7 and 8-dimensional Riemannian manifolds with exceptional holonomy, and related geometries
Prof T J Lyons, FRS, FRSE.	St Anne's	Stochastic analysis, probability theory, the control of complex systems and rough paths, stochastic differential equations, diffusion equations, numerical aspects. Applications to finance, signal processing (filtering and vision) and engineering.

Dr C Macdonald	Oriel	Scientific computing, numerical analysis, and applied mathematics. Numerical computation on general surfaces, the Closest Point Method, Level Set Methods, ENO/WENO and other high-order discretizations, Runge–Kutta methods, strong-stability-preserving time stepping for hyperbolic problems.
Dr K McGerty	Christchurch	Representation Theory
Prof P K Maini	St John's	Mathematical biology, medicine and physiology; partial differential equation models for pattern formation in development; cancer; systems biology; wound healing.
Dr A Majumdar	Keble	Calculus of variations and partial differential equations in materials science with special emphasis on liquid crystalline systems. Aplications in the liquid crystal display industry
Prof L J Mason	St Peter's	Mathematical Physics with a focus on Twistor Theory and its applications to General relativity, gauge theory, integrable systems and differential geometry.
Dr C Melcher	Lincoln	Partial differential equations and multiscale problems that arise from questions in magnetism and materials science
Dr M Monoyios	LMH	Financial Mathematics; Optimal Hedging in Incomplete Markets; Stochastic Control applied to Financial Optimization.
Dr I M Moroz	St Hilda's	Bifurcation theory; geophysical fluid dynamics; voice morphing; nonlinear differential equations applied to industry. Wavelets; dynamical systems; dynamo theory.
Dr A Muench	St Catherine's	Nano- and Microfluidics, capillary interfaces, asymptotics and scientific computation
Prof B Niethammer	SEH	Applied analysis, partial differential equations, free boundary problems, kinetic equations, coagulation models.
Dr J Norbury	Lincoln	Nonlinear partial differential equations, in large-scale atmospheric dynamics, mathematical biology and pattern formation; free boundary and asymptotic problems from science and engineering.
Dr J Obloj		Mathematical Finance and its interplay with Probability Theory
Prof J R Ockendon, FRS.	St Catherine's	Differential equations in physical applied mathematics. Mathematics in Industry.

Dr J Oliver		The mathematical modelling of fundemental free boundary problems in engineering and biology, primarily the violent surface motion caused by high-velocity solid-liquid impact and self propelled locomotion of eukaryotic cells
Dr C Ortner	Merton	Application of mathematical methods to material science, especially to atomistic models of solids and to the mechanics fracture
Dr P Papazoglou	Queeen's	Geometric group theory, large scale geometry and isoperimetric inequalities, splitting theory for groups
Dr J Pila	Wolfson	Model theory and number theory, especially diophantine aspects"
Dr S Peppin		Nonequilibrium thermodynamics, colloid physics, solidification, pattern formation, geophysical and technological applications.
Dr M Porter	Somerville	Nonlinear dynamics; nonlinear waves and applications to granular materials, optics, and atomic physics; network science, social network analysis, classical and quantum chaos.
Prof H A Priestley	St Anne's	Lattice theory, ordered sets, and related areas. Specifically, duality and canonical extensions, and their applications in logic and computer science; in particular, relational semantics and correspondence theory for non-classical logics.
Dr C R Prior	Trinity	Mathematical modelling of charged particle accelerators. Theoretical design of advanced neutron sources and the Neutrino Factory
Prof Z Qian	Exeter	Stochastic Analysis, Brownian motion and diffusions, stochastic (backwards, partial) differential equations, statistics of stochastic processes and finance, theory of rough paths. Geometric analysis. Ricci curvature, geometric PDE, Ricci flow.
Dr C Reisinger	St Catherine's	Mathematical and computational finance. Asymptotic expansions. Financial model calibration. Numerical analysis of PDEs, particularly in high dimensions.
Prof O Riordan	SEH	Random graphs, and in particular scale-free random graphs or web graphs
Dr T Roose		Mathematical modelling of biological branching structures Plant soil modelling Cancer modelling Angiogenesis and lymphangiogenesis modelling

Prof R Rouquier	Magdalen	Representation theory, homological algebra and algebraic geometry.
Prof A Scott	Merton	Combinatorics, random structures and phase transitions, combinatorial algorithms.
Prof G B Segal, FRS	All Souls	Topology; string theory and related mathematical topics.
Prof D Segal	All Souls	Algebra
Prof G Seregin	St Hilda	Partial differential equations, recent work includes the analysis of the Navier-Stokes equations of incompressible fluid flow
Dr I Sobey	St John's	Modelling and numerical methods for laminar fluid mechanics, particularly unsteady flows which separate and form vortices. Mathematical Medicine - the movement of cerebrospinal fluid through the brain, Vortex waves - prediction of fast transients in steady and unsteady channel flow, Mixing Devices - adaptation of unsteady flows for mass transfer.
Dr J Sparks		Geometric aspects of string theory
Dr J Stedall	Queen's	History of mathematics; especially 16th to 18th centuries, development of algebra
Dr B F Steer	Hertford	Differential topology and geometry
Prof E Süli	Worcester	Partial differential equations and their numerical analysis; the mathematical theory of finite element methods for nonlinear partial differential equations.
Dr B Szendroi	St Peter's	Algebraic geometry, especially higher dimensional geometry and geometry of string theory
Dr P Tarres	St Hugh's	Self-interacting random processes, in particular reinforced random walks. Stochastic Algorithms. Applications to game theory and statistical learning.
Prof U Tillmann FRS	Merton	Algebraic topology and its applications
Prof K P Tod	St John's	General relativity; twistor theory; differential geometry
Prof N Trefethan	Balliol	Numerical analysis/scientific computing, including spectral methods for PDE, numerical linear algebra, eigenvalue problems, and fast algorithms based on "Chebyshev technology".
Dr S T Tsou	Jesus	Mathematical physics; gauge theory; fermion masses and mixing, neutrino oscillations; structure of the Standard Model.
Prof M R Vaughan-Lee	Christ Church	Computational Algebra, finite p-groups, Burnside groups. Lie algebra techniques in group theory.
Prof A Vasseur	Lincoln	Analysis of Non-linear PDEs

Dr D Vella	Lincoln	Surface Tension Phenomena, Continuum Mechanics, Adhesion, Flow in Porous Media.
Dr S Waters	St Anne's	Physiological fluid mechanics and the application of mathematics to medicine
Dr A Wathen	New	Numerical Analysis, Numerical Linear Algebra
Prof H Wendland	Exeter	Numerical Analysis, Numerical Linear Algebra, Data Approximation
Prof J SWilson	University	Finite and infinite group theory.
Prof N M J Woodhouse	Wadham	Applications of geometry, particularly to relativity and quantization; twistor theory and integrable systems
Prof T Zariphopoulou	Christchurch	Investment theory and optimal asset allocation
Dr Z Xu	St Hugh's	Free boundary problem in PDE, optimal stopping problem, and behavioral finance problem
Prof X Y Zhou	St Hugh's	Mathematical finance, stochastic control and stochastic processes
Prof B Zilber	Merton	Mathematical logic; especially model theory and its applications in number theory, algebra and complex geometry.

8.2 Other Departments

Prof A M Etheridge	Magdalen	Infinite dimensional stochastic processes and their applications, especially in the analysis of partial differential equations and in population genetics
Prof C J H McDiarmid	Corpus Christi Statistics	Discrete mathematics and the mathematics of operational research, in particular random structures and algorithms.
Dr D R Isaacson	Wolfson Philosophy Centre	Foundations and philosophy of mathematics.