



Science and Technology

Lancaster
University



2016 Postgraduate Prospectus

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Key Facts

In the 2014 Research Excellence Framework, over 80% of our research was rated as world-leading and internationally excellent.

Over £45m has been invested to provide state-of-the-art facilities, including modern workshops and laboratories, and highly specialised, cutting edge equipment alongside dedicated computer rooms and social spaces.

Dean of Faculty: Professor Peter Atkinson

Associate Dean for Research: Professor Jamshed Anwar

Associate Dean for Postgraduate Studies: Dr Chris Edwards

PG research students: 448

PG taught students: 634

About the Faculty of Science and Technology



The Faculty of Science and Technology is home to a vibrant and active community of postgraduate students from around the world. Our researchers engage in projects that make a demonstrable difference to the economy and society. In 2014/2015, the Faculty attracted over £20m in research income from organisations including NATO, UK Government, DEFRA, and we offer a significant number of opportunities supported by UK research councils.

Underpinned by research, our masters programmes are taught by experts at the cutting-edge of their field and our research students benefit from working alongside academic staff with specialist knowledge and expertise in core scientific disciplines. We place emphasis on an interdisciplinary approach to teaching. It is common for our postgraduate students to cross subject boundaries enhancing the multidisciplinary nature of their studies.

We are committed to delivering a first-class experience for our students. Over £45m has been invested to provide state-of-the-art facilities, including modern workshops and laboratories, and highly specialised, cutting-edge equipment alongside dedicated computer rooms and social spaces. This not only helps us to attract the best academic staff, it allows us to provide a highly stimulating and innovative environment for our students.

Our masters programmes remain relevant and up to date with industry by working in partnership with organisations, such as Unilever and BP, who actively contribute to the design and delivery of our modules. Our established Business Partnerships and Enterprise team work with small and medium businesses, voluntary organisations, social enterprises, public sector institutes such as the NHS and UK Government, and global companies like Microsoft, Shell and Toshiba. These organisations provide valuable opportunities to gain work experience whilst studying.

Our Departments

Chemistry

Department facts



Head of Division:
Professor Peter Fielden



Postgraduate enquiries
Postgraduate Coordinator: Carol Cook
Tel: +44 (0)1524 593820
Email: chemistry@lancaster.ac.uk
www.lancaster.ac.uk/chemistry

The Department boasts an expanding team of research-active staff at the forefront of research in their respective fields. It benefits from a significant investment from the University, and an extensive array of new instrumentation and equipment to support our ambitious research activity.

We are a vibrant community, and our research transcends traditional discipline boundaries, for example linking with biology and medicine, engineering, energy, materials, the environment and physics. Our staff come from a variety of backgrounds and thus have interests spanning many areas of both fundamental and technological interest. Perhaps most importantly, we share common ground in research-excellence, an inclusive and collaborative spirit, and a dedication to passing on our knowledge to a new generation of researchers.

The Department provides a research environment that strongly supports the individual needs of each student, promoting a healthy work-life balance. We are committed to family-friendly policies, flexible working and the Athena Swan Charter, which recognises and celebrates good employment practice undertaken to address gender equality in higher education and research.

As a young department, we are extremely proud of our results in the 2014 Research Excellence Framework where we are ranked 10th in the UK for research output quality, and judged to have 94% of our research as world-leading or of international excellence.

The first stage of the chemistry building project is now complete, giving us access to custom-designed teaching and research laboratories and instrument suites, housing an array of new instrumentation, including all the amenities you would anticipate in a chemistry department: solution state NMR spectrometers, mass spectrometers and gas and liquid chromatography equipment, powder and single crystal XRD, time-resolved and X-ray fluorimeters, SEM, and TEM, together with more specialised instrumentation, including a 700 MHz wide bore solid state NMR spectrometer, a Raman microscope for biomaterial characterisation, a nanoscribe nanofabricator, and local facilities for computational chemistry.

Further research and teaching laboratories, and dedicated space for on-site industry engagement are due to open in 2016.

Research degrees:

- Chemistry PhD
- Natural Sciences PhD
- Chemistry MSc



Research areas:

Research in the Department is broadly structured into a series of sub-disciplines or themes, including:

- A wide range of synthetic chemistry
- Chemical theory and computation
- Analytical chemistry, energy and spectroscopy
- Chemical biology and materials

Due to the interdisciplinary nature of our research, topics may fall within several research themes. Prospective students may also suggest projects that are variations of our topics.



Business engagement:

Gaining experience and skills

Preparing for your future career is important. We provide all chemistry students with the opportunity to apply for work experience through the Faculty of Science and Technology Internship Programme. Internships allow you to apply your academic knowledge in real world situations - and get paid for it!

You can also develop transferable skills such as team working, time management, leadership, networking, and commercial awareness.

Many employers use interns to test out a new role and frequently offer them graduate level roles as a result. Previous internship roles have included experimental chemistry for a global polymer manufacturer, energy consultant for one of the largest energy companies in the UK, and materials analyst for a local business.

Working in partnership

We liaise with all areas of the chemical industry, ranging from multinational oil, chemical and pharmaceutical companies, to a host of smaller enterprises producing new and specialised products. We have relationships with the Nuclear Research Institute, The Lloyd's Register Educational Trust, DEFRA, the UK Centre for Ecology and Hydrology, and many other organisations.

We also have an award winning global supplier of chemical regulatory services to industry, The REACH Centre, based in office spaces for businesses on campus in the Lancaster Environment Centre, which works with the department.

£11.4m Collaborative Technology Access Programme (cTAP)

The new cTAP centre, based in the Department, will support both small and large advanced manufacturing companies to develop new products and services by providing direct access to our expertise, equipment and facilities for the testing and manufacture of new chemicals, materials, semiconductor devices and products.

“ I'm working in a supportive and engaging environment, where I feel I can contribute and develop as a researcher. My supervisor is approachable and supportive. Seeing early-career researchers give seminars, and working in communal labs alongside other PhD students in the Department has broadened my experience.”

Olivia Lynes

Chemistry

Research degrees

Chemistry PhD

Overview

We welcome applications from those seeking to perform leading fundamental and technologically relevant research across the areas of analytical chemistry, energy and spectroscopy; chemical biology and materials; chemical theory and chemical computation; and a broad range of synthetic chemistry.

Our research based PhDs are supported by taught courses providing skills in modern research techniques, including analytical chemistry, experimental design, advanced laboratory techniques, spectroscopy, computational and materials chemistry, together with courses to develop transferable skills. This ensures that our postgraduate students extend their knowledge of all areas of chemistry, and possess a wide range of skills to aid employability.

Duration:	36 months, full-time
Entry requirements:	Upper second class undergraduate or Masters degree in Chemistry, or an equivalent degree in a related discipline such as Physics or Chemical Engineering, appropriate to the proposed research project
Assessment:	Original research and thesis

Natural Sciences PhD

Overview

This PhD offers an academic training route for graduates seeking to perform leading fundamental and technologically relevant research that transcends the traditional discipline boundaries linking one or more other disciplines with chemistry. Options include Biology and Medicine, Computation, Engineering, Physics and subjects offered by the Lancaster Environment Centre.

A substantial amount of research addresses research questions that fall between the boundaries of traditional disciplines. Real-world problems require a multi-disciplinary approach, and research expertise at the interfaces of these disciplines is essential to delivering impactful solutions. A Natural Sciences PhD will capture and give expression to such research training.

Duration:	36 months, full-time
Entry requirements:	Upper second class undergraduate or Masters degree in Chemistry, or an equivalent degree in a related discipline such as Biochemistry, Biophysics, Physics, Computation or Chemical Engineering, appropriate to the proposed research project
Assessment:	Original research and thesis

Chemistry (by Research) MSc

Overview

Our Masters by research programme provides the opportunity to undertake a short, in depth independent research project in one of our research groups. It will equip you for more sustained and original work at the doctoral level or for advanced-level applied research positions. This degree will develop relevant analytical and technical skills, together with transferable skills related to research, communication, problem solving, and independent working.

For information on possible projects, and for further details of our specific research interests, please see our Departmental website.

Duration:	12 months, full-time
Entry requirements:	Upper second class undergraduate or Masters degree in Chemistry, or an equivalent degree in a related discipline such as Physics or Chemical Engineering, appropriate to the proposed research project
Assessment:	Original research and thesis

Computing and Communications

Department facts



Head of Division:
Professor Jon Whittle



Postgraduate enquiries
Tel: +44 (0)1524 510311
Email: scc-msc-enquiries@lancaster.ac.uk
www.lancaster.ac.uk/scc

The School of Computing and Communications, ranked 12th amongst the computer science departments in the UK (REF 2014), delivers postgraduate taught programmes in the disciplines of computer science, communication systems, data science and cyber security. Our ethos is to combine research excellence with practical, experimental approaches to equip you with the knowledge and skills to achieve your career aspirations.

Our students benefit from high quality teaching from globally recognised academics, and from state-of-the-art services and facilities including dedicated teaching laboratories, individual supervision, and mentoring by a member of academic staff. Access to our Knowledge Business Centre (KBC), which links with over 500 ICT related businesses provides an invaluable resource for finding employment or starting your own company.

Our partnerships with industry and commerce are exemplary and you can benefit from organised placement activities within our flagship MSc programmes. Additionally, internships and project/dissertation placements are available alongside opportunities for part-time employment.

A range of funding opportunities is typically available for a number of our postgraduate degrees. Please visit our website for up-to-date details www.lancaster.ac.uk/study/fees-and-funding

Research degrees:

- Communications Systems PhD
- Computer Science PhD
- HighWire MRes/PhD
- Computer Science (by Research) MSc
- Communication Systems (by Research) MSc

Taught programmes:

- Computer Science MSc
- Cyber Security MSc
- Data Science MSc
- International Innovation (Computer Science) MSc
- International Innovation (Telecommunications) MSc
- Wireless Communication Systems MSc

Computing and Communications

Research areas:

Our research spans eight major sub-fields:

- **Communication Systems**
- **Data Science**
- **Distributed Systems**
- **Interactive Systems**
- **Networking**
- **Pervasive Systems**
- **Security**
- **Software Engineering**

Our research shares a strong engineering ethos that emphasises an understanding of real-world challenges and focuses on the development and experimental evaluation of systems. We are actively engaged in interdisciplinary research in areas ranging from signal processing and wireless networking to innovative user interaction, software engineering, cyber security, natural language processing and data science.

Our research is supported by grants from the UK Research Councils, the European Commission and industrial sponsors and our grant portfolio reflects our commitment to collaborative research, including international research. We attract more funding per staff member for Computing and Communications research from Europe than any other university in the UK.

In addition to our focused academic research, we believe in conducting research in partnership with end users and industry. We have research projects in many areas including health transport; energy management; online security, crime fighting, counter terrorism; environmental informatics, emergency response and computing for energy conservation. This has led to the establishment of numerous test beds and long term deployed 'Living Laboratories' with real communities (e.g. Wray wireless-mesh, e-Campus interactive public displays). These serve as unique resources for conducting novel research and supporting teaching.

Business engagement:

Gaining experience and skills

Preparing for your future career is important. We provide all computing and communications students with the opportunity to apply for work experience through the Faculty of Science and Technology Internship Programme. Internships allow you to apply your academic knowledge in real world situations - and get paid for it!

You can also develop transferable skills such as team working, time management, leadership, networking, and commercial awareness.

Many employers use interns to test out a new role and frequently offer them graduate level roles as a result. Previous internship roles have included an IT consultant for one of the largest energy companies in the UK, BBC, and roles in software development, research, cloud platform development, data analysis, and mobile app developers.

Working in partnership

The School of Computing and Communications is housed in InfoLab21, an award winning facility which is also home to 20 digital businesses ranging from start-ups to teams from international companies, who work alongside our staff. We also have a network of over 900 North West small and medium sized enterprises and have generated strong relationships with global organisations such as Microsoft, IBM, BT Labs, BBC, Cisco, NEC, Panasonic, Nokia, Ford, BAE Systems, NDS, Simoc, ATG, Intel and Orange.

“ I was so impressed with our intern James that I decided to give him a part-time job while he finished his Computer Science degree. His extra skills were an asset to the business.”

Alvin Blewitt, Director, Next World Web, InfoLab21

Research degrees

Computer Science Communication Systems PhD

Overview

We welcome applications from well-qualified and motivated students for PhD study (three years full-time, four to six years part-time).

You'll work under individual supervision to become a leading expert in your area, while research training courses will support your learning and help you realise your maximum potential. Annual progress review panels keep your work on track and our seminar programmes and state-of-the-art facilities provide access to ideas and technologies that stimulate your development as a research scientist.

There will be numerous opportunities to collaborate and to present your research nationally and internationally via our extensive research and industrial partnerships. Also, you will have the opportunity to work as a teaching assistant on our taught programmes; a valuable source of experience and income.

We recommend that you visit our website to read the latest information about our research interests and projects. Here you will also find details on preparing PhD proposals, on contacting individual staff and on funding.

Director of Studies:	Dr Gerald Kotonya
Duration:	36 months, full-time or 48-72 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in an engineering or associated discipline
Assessment:	Original research and thesis



Computing and Communications

Research degrees

Computer Science (by Research) Communication Systems (by Research) MSc

Overview

The MSc by Research programme can be tailored to your individual research needs.

You will first take an induction course leading to the production of a learning contract with a research supervisor and subsequently develop a research proposal that forms the basis of the rest of your study.

You will then progress to a period of independent research project work and complete a project dissertation. Upon successful completion of the MSc, you will have clearly demonstrated your ability to meet the required high levels of technical professionalism.

Director of Studies:	Dr Gerald Kotonya
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or equivalent
Assessment:	Learning contract, literature review and dissertation

HighWire MRes/PhD

Overview

HighWire is a world-class, cross-disciplinary and user centric Centre for Doctoral Training which brings together Lancaster's extensive expertise in Computing, Design and Management.

We go beyond multidisciplinary approaches by seeking a creative fusion between three key disciplines, aiming to produce a new breed of innovative people who are able to drive exciting advances in technical, design and business innovation.

The programme's continuing relevance is ensured by our close alignment with the needs and goals of business and industry. We encourage technology exchange and early adoption of emerging technologies, processes and ideas. HighWire graduates can work in challenging roles in organisations, driving radical change in the digital economy.

The programme spans four years beginning with formal and practical training, leading to a Masters of Research (MRes) and then progressing to PhD study.

Director of Studies:	Professor Gordon Blair
Duration:	48 months, full-time
Entry requirements:	Upper second class honours degree or Masters degree, or equivalent, in one of the following disciplines; Computing, Design or Management
Assessment:	Original research and thesis

“It was exciting to get my first taste of a real working environment. The internship showed me the importance of time in business and has changed my outlook on programming for the web completely.”

James Garner, Research Assistant Intern, Next World Web

Taught programmes

Computer Science MSc

Overview

The Computer Science MSc has been designed to meet the needs of contemporary industrial and research practices.

Modern computing is characterised by its massive scale, highly interconnected nature and socially oriented user interaction techniques. Under the guidance of our internationally renowned academics, you will learn about the design and development of computer systems, with technology and users in mind, and gain expertise in subjects such as Cloud Computing, Big Data and Data Mining, Enterprise Architectures and Interaction Design.

The degree also provides a placement that allows you to gain practical experiences through interaction with innovative companies or within our internationally renowned research groups.

Director of Studies:	Dr Andreas Mauthe
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in Computer Science or a closely related discipline. Relevant industry experience may be considered
Assessment:	Coursework and dissertation

Modules

- Elements of Distributed Systems
- Advanced Human-Computer Interaction
- Data Mining
- Systems Architecture and Integration
- Advanced Human-Computer Interaction
- Applied Data Mining
- Professional and Research Methodology
- Research or Industrial Placement
- A Research or Industrially Focused Dissertation

Cyber Security MSc

Overview

The overall aim of this MSc is to equip you with the knowledge and skills necessary to work within the IT security profession. It takes advantage of Lancaster having recently been awarded the highly prestigious status of an EPSRC-GCHQ Academic Centre of Excellence in Cyber Security Research, and combines advanced technical skills with disciplines such as Economics, Risk Management, Psychology and Social Science. Its strength and uniqueness lies in its multidisciplinary nature, merging expertise from across Lancaster's faculties to educate the next generation of security specialists.

The technical modules within the degree offer the skills and knowledge required to enable students to obtain the industrially recognised professional qualifications of CISSP (Certified Information Systems Security Professional), CEH (Certified Ethical Hacker) and CHFI (Computer Hacking Forensic Investigator).

Director of Studies:	Dr Shishir Nagaraja
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in Computing or a closely related discipline. Relevant industry experience may be considered
Assessment:	Coursework and dissertation

Modules

- Information System Security Management
- Information System Penetration and Countermeasures
- Information System Forensic Investigation
- Information System Risk Management
- Cybercrime
- Introduction to Law for Cyber Security Specialists
- Network and System Security
- Security and Conflict in the Digital Age
- A Research or Industrially Focused Dissertation

Computing and Communications

Taught programmes

Data Science MSc

Overview

This MSc is aimed at those students who wish to develop skills in the emerging discipline of Data Science. A variety of routes through the MSc are provided, allowing students to choose from a range of elective modules based on their own interests. Example routes are:

- Data Science Systems – how to build large-scale systems for answering data science questions.
- Data Mining – how data mining can be performed at scale, and in a range of application areas.
- Statistical Inference – advanced techniques for model inference from data.
- Marketing, Sales and Finance

Director of Studies:	Dr Matthew Rowe
Duration:	12 months, full-time
Entry requirements:	An upper-second class honours degree, or its equivalent, in a subject relevant to Computer Science, Mathematics or Statistics
Assessment:	Coursework and examination

Modules

- Data Mining
- Data Science Fundamentals
- Programming for Data Scientists
- Likelihood Inference
- Generalised Linear Models
- Statistical Inference
- Statistical Methods and Modelling
- CS: Elements of Distributed Systems
- Systems Architecture and Integration
- Applied Data Mining

International Innovation (Computer Science) MSc

Overview

You'll study a range of general and specialist modules in contemporary computer science areas such as cloud computing, the semantic web, big data analysis, enterprise systems and interaction design. You'll also have Chinese language, cultural and business seminars allowing you to benefit from a rich and distinctive learning experience.

You'll also work on collaborative projects with SMEs in the UK and in Guangdong Province, China.

Our highly supportive learning environment will help you to acquire a deep understanding of advanced technical skills in Computer Science coupled with the processes and techniques needed to apply innovation globally.

Alternative pathways of Design, Engineering, Entrepreneurship, Environmental Science and Telecommunications are also available. Please see www.lancaster.ac.uk/china-catalyst/msc for more information.

Director of Studies:	Dr Andreas Mauthe and Helen Fogg
Duration:	24 months, full-time
Entry requirements:	An upper second class honours degree, or its equivalent in Computer Science, Electronic or Electrical Engineering, Physics or Mathematics from a recognised university or equivalent professional qualification. Work experience preferred, not essential
Assessment:	Combination of coursework and/or examination, project work and dissertation

Modules

Core modules:

- Data Mining
- Elements of Distributed Systems
- Advanced Human-Computer Interaction
- Applied Data Mining
- Systems Architecture and Integration
- Advanced Human-Computer Interaction
- Organised Industry Placement (UK)
- Organised Industry Placement (China)

Plus interdisciplinary modules:

- Corporate Entrepreneurship
- Design Driven Innovation
- Chinese Language and Culture (or equivalent for Chinese speakers)

International Innovation (Telecommunications) MSc

Overview

You'll study a range of general and specialist modules in telecommunications such as digital and advanced communications, digital signal processing, speech and image coding, wireless broadband, advanced filters and systems, enterprise systems and interaction design. You'll also have Chinese language, cultural and business seminars allowing you to benefit from a rich and distinctive learning experience.

You'll also work on collaborative projects with SMEs in the UK and in Guangdong Province, China.

Our highly supportive learning environment will help you to acquire a deep understanding of advanced technical skills in telecommunications coupled with the processes and techniques needed to apply innovation globally.

Alternative pathways of Computer Science, Design, Engineering, Entrepreneurship and Environmental Science are also available. Please see www.lancaster.ac.uk/china-catalyst/msc for more information.

Director of Studies:	Professor Zhiguo Ding
Duration:	24 months, full-time
Entry requirements:	Second class honours degree, or its equivalent, in Electronic/Electrical Engineering, Communications/Telecommunications, Control, Computer Science/Computer Engineering, Physics or Mathematics. Relevant industry experience may be considered
Assessment:	Coursework, exams and dissertation

Modules

Core modules:

- Digital Communications
- Digital Signal Processing
- Wireless Broadband
- Advanced Communications
- Speech and Image Coding
- Advanced Filters and Systems
- Organised Industry Placement (UK)
- Organised Industry Placement (China)

Plus interdisciplinary modules:

- Corporate Entrepreneurship
- Design Driven Innovation
- Chinese Language and Culture (or equivalent for Chinese speakers)

Wireless Communication Systems MSc

Overview

This course is designed to equip graduates with the specialist skills in modern wireless communication systems such as 3G, Wi-Fi, mobile WiMAX and LTE, space-time coding, software defined radio, and reconfigurable analogue and digital RF systems. It also provides knowledge in the use of wireless and DSP techniques in many application areas including IoT, medical, geophysical, aerospace, automotive and environmental systems.

The degree provides placement in either industry or research. Our dedicated Knowledge Business Centre maintains links to over 500 partner companies to ensure that students can apply their knowledge and skills in a real-world industry. Graduates from this course are actively sought after by employers in mobile and wireless industries.

Director of Studies:	Professor Zhiguo Ding
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in Electronic/Electrical Engineering, Control, Computer Science/Computer Engineering, Physics or Mathematics. Relevant industry experience may be considered
Assessment:	Coursework, exams and dissertation

Modules

- Digital Communications
- Advanced Communications
- Speech and Image Coding
- Digital Signal Processing
- Wireless Broadband
- Advanced Filters and Systems
- Professional and Research Methodology
- Research or Industrial Placement
- A Research or Industrially Focused Dissertation

Department facts



Head of Division:
Professor Claudio Paoloni



Postgraduate enquiries
Recruitment and Marketing Officer: Lucy Cornthwaite
Tel: +44 (0)1524 592275
Email: engineering@lancaster.ac.uk
www.lancaster.ac.uk/engineering



Number of postgraduate students:
141

The Engineering Department is a broad-based engineering centre with a record of innovative teaching, world-class research and integration with industry. The University has invested heavily in a flagship building that provides a world-class environment with specially designed workshops, teaching laboratories and office areas.

In the latest Research Excellence Framework (REF 2014), 100% of our research has been rated as world-leading and of international excellence for impact. We have also been recognised for the vibrancy of our research environment.

We offer taught courses at masters level, PhD training and short courses for continuing professional development. Our postgraduate students are taught by, and work alongside, world-class academics in a wide range of engineering disciplines, and our strong industrial connections have allowed us to develop courses to meet the needs of industry. This combined with our excellence in teaching and research, means that the Department is one of the top in the country for graduate employment success.

Research degrees:

- Engineering PhD
- Engineering (by Research) MSc

Taught programmes:

- Electronic Engineering MSc
- Engineering Project Management MSc
- International Innovation (Engineering) MSc
- Mechanical Engineering MSc/PgDip
- Mechanical Engineering with Project Management MSc
- Safety Engineering (part-time, Industry-based) PgCert /PgDip/MSc
- Aerospace Safety Engineering (part-time, Industry-based) PgCert
- Nuclear Science and Engineering (part-time, Industry-based) PgCert



Research areas:

The Department has a wide range of research interests with an average annual research income in excess of £2.25m, nearly two thirds of which is in collaboration with industry.

Research is split into four groups:

Micro and Nanosystems

The Micro and Nanosystems group focuses on the devices, underpinning technologies and system design methodologies required to realise autonomous heterogeneous systems capable of sensing, data processing and actuation.

E-MIT

The E-MIT (Engineering of Microwaves, Terahertz and Light) Group is a leading group in high frequency applications projected toward novel and fascinating frontiers of microwave, particle accelerators, terahertz electronics, photonics and novel artificial functional materials.

Energy

Our staff play a major role in Energy Lancaster, a cross-disciplinary centre that brings together the University's expertise in a wide range of energy related areas covering the demand and supply of energy.

Structures and Manufacturing

The Structures and Manufacturing Research Group is multidisciplinary and includes academics addressing a broad range of societal and engineering problems, fundamental and applied.



Business engagement:

Gaining experience and skills

Preparing for your future career is important. Our staff have established relationships with a range of large and small organisations in the North West and we link practical work and projects to these companies throughout the programme. We provide all engineering students with the opportunity to apply for work experience through the Faculty internship programme. Internships allow you to apply your academic knowledge in real world situations - and get paid for it!

You can also develop transferable skills such as team working, time management, leadership, networking, and commercial awareness.

Many employers use interns to test out a new role and frequently offer them graduate level roles as a result. Previous internship roles have included a researcher for Amey and United Utilities, product development for a filter manufacturer, design development for a nuclear safeguards manufacturer, and draftsman for a horticultural device manufacturer.

£11.4m Collaborative Technology Access Programme (cTAP)

The new cTAP centre will support both small and large advanced manufacturing companies to develop new products and services by providing direct access to our expertise, equipment and facilities for the testing and manufacture of new chemicals, materials, semiconductor devices and products.

Engineering student Christopher Hall completed a piece of research for Amey, a public services provider which works in alliance partnership with United Utilities to provide emergency responses to wastewater issues.

Recommendations from Christopher's research into jet hose failure rates were implemented by Amey and helped them win new business with larger companies.

Research degrees

Engineering
PhD

Overview

Applications for postgraduate study (full-time, part-time and industry based) by research, leading to a PhD are welcomed. Research in the department is grouped into four main areas, each drawing on a range of different fields. The areas are:

- Structures and Manufacturing
- Micro-Nano systems
- Energy
- Engineering of Microwaves, Terahertz and Light (E-MIT)

Duration:	3–4 years, full-time or 4–7 years, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in an engineering or associated discipline. Relevant industrial or related experience will also be considered
Assessment:	Original research and thesis

Engineering (by Research)
MSc

Overview

This programme is ideal for students with industrial experience who wish to work in a specific area, and prefer flexibility to the taught MSc programmes.

Flexibility is the key to this programme. It begins with an induction where you are allocated a supervisor and often an industry contact; this sets the direction of your research and identifies training needs. The Graduate School's research training programme offers a range of sessions to meet those needs. Regular supervision and access to seminar groups, together with interim research reports, ensures good progress towards a final dissertation.

There is an MSc by Research scholarship scheme supported by the Sir John Fisher Foundation and is open to students interested in nuclear or maritime engineering research.

Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or equivalent, with strong evidence of excellence in research and writing
Assessment:	Interim reports with a final dissertation based on the research

“It was a brilliant opportunity to work with Amey on this internship. I was given the chance to practically apply the skills gained in my degree on a real world challenge and the experience has made a real difference when applying for jobs after I graduate.”

Christopher Hall, Engineering

Taught programmes

Electronic Engineering
MSc

Overview

Taking electronic engineering to the next level by adding high frequency devices, micro sensors, micro actuators, biology and novel materials is one of the primary goals of engineers and scientists within the electronic community.

This course focuses on miniaturised systems which are able to describe and diagnose a situation, detect critical conditions, and identify and address each other. They may also be energy autonomous and networked. Students will also learn how to design advanced circuits for high frequency applications.

The course will also include methods of building control loops and associated software; the design of analogue and digital electronic interfaces; and the manufacture of novel packaging technologies.

The dissertation will be on a major industrial project.

Director of Studies:	Professor Andrew Richardson
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	A second class honours degree, or its equivalent, in a related engineering discipline which may include communications, electrical engineering, computer systems and physics. A HND together with appropriate practical experience may also be acceptable
Assessment:	Combination of coursework and/or examination and a major project/dissertation

Modules

- Smart Systems
- Intelligent Control
- Advanced Embedded Systems
- High Frequency Electronics
- Linking Group Project
- System on Chip Engineering

Engineering Project Management
MSc

Overview

The Engineering Project Management programme is aimed at engineers wishing to advance their engineering and organisational skills and enable the move from a technical to a technical-managerial position.

The management side of the programme provides a thorough grounding in strategic thinking and the commercial aspects of project planning and control, while the technical component of the course is flexible and can be customised to meet particular engineering interests. Modules can be taken from other Engineering MSc programmes, subject to timetable restrictions.

The programme has a strong practical element, drawing on case studies, workshops, projects with local industry and a substantial summer project.

Director of Studies:	Dr Andrew Pinkerton
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	A lower second class honours degree level or equivalent in an engineering or technical subject. Relevant further learning and experience is preferable but not essential
Assessment:	Coursework, examination, presentations, projects and dissertation

Modules

- Principles of Project Management
 - Project Leadership
 - Advanced Project and Programme Management
 - Commercial Aspects of Programme Management
 - Linking Group Project
- Plus three other modules from the MSc Electronic or Mechanical Engineering, including:**
- Intelligent Control
 - Mechanics and Actuators
 - Renewable Energy
 - Smart Systems

Taught degrees

International Innovation (Engineering)
MSc

Overview

This two year full-time MSc International Innovation (Engineering) encompasses selected modules in electronic engineering and/or mechanical engineering. It builds on the current use of electronic and embedded software in industry, and the systems and devices we use on a daily basis.

Mechanical Engineering is the basis of just about anything that has movable parts, which includes areas like transport (automotive, railway, aerospace), renewable energy, medicine and manufacturing.

The course will give you specialist skills in engineering and a solid foundation of knowledge, skills and expertise in the areas of technology, design and management, as you become part of a group of like-minded, multidisciplinary students, entrepreneurs and businesses.

Alternative pathways of Computer Science, Design, Entrepreneurship, Environmental Science and Telecommunications are also available. Please see www.lancaster.ac.uk/china-catalyst/msc for more information.

Director of Studies: Dr David Cheneler and Helen Fogg

Duration: 24 months, full-time

Entry requirements: An upper second class honours degree, or its equivalent in a related technological subject, depending on the exact modules to be taken. For electronic modules, a degree in Electronic and Electrical Engineering would be required. Work experience preferred, not essential

Assessment: Combination of coursework and/or examination, project work and dissertation

Modules

Core modules:

- System Design and Modelling
- Intelligent Systems Control
- Linking Group Project

Specialist modules in either Electronic Engineering including:

- Smart Systems
- Advanced Embedded Systems
- Electrical Power Systems Analysis and Modelling

Or Mechanical Engineering including:

- Mechanics and Actuators
- Advanced CAD/CAM
- Renewable Energy

Optional modules:

- Corporate Entrepreneurship
- Design Driven Innovation
- Chinese Language and Culture (or equivalent for Chinese speakers)

Mechanical Engineering
MSc/PgDip

Overview

Mechanical engineering is the basis of just about anything that has movable parts, which includes areas like transport (automotive, railway, aerospace), renewable energy, and manufacturing. These areas will continue to be important to the UK economy and to all developed economies.

The taught part of this course consists of six compulsory modules. An individual industrial project allows you to extend your knowledge by exploring an area that interests you, whilst giving experience of the way in which a complete product or process requirement would be addressed.

The PgDip covers a selection of taught modules, with no individual project. Students may progress to an MSc given good results.

Director of Studies: Dr Sarah Green

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: Second class honours degree, or its equivalent, in Mechanical Engineering or related disciplines, or Physics. HND or equivalent together with appropriate industrial experience may be considered

Assessment: Coursework and/or examination and a major project

Modules

- Intelligent System Control
- Mechanics and Actuators
- Advanced CAD/CAM
- Design and Modelling of Systems
- Renewable Energy
- Linking Group Project
- Individual Project

Mechanical Engineering with Project Management
MSc

Overview

The Mechanical Engineering with Project Management programme is aimed at engineers wishing to advance or update their engineering skills and knowledge base.

The taught modules cover a broad range of engineering design and evaluation skills and how they can be applied to mechanical products and systems. In addition you will learn the key concepts and issues associated with engineering project leadership and organisational behaviour together with the project management processes, tools and techniques required to handle them.

The programme is taught with a strong practical focus and includes projects with local companies, case studies, workshops, and a substantial summer project.

Director of Studies: Dr Andrew Pinkerton

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: A second class honours degree level or equivalent in an engineering or technical subject. Relevant further learning and experience is preferable, but not essential

Assessment: Coursework, examination, presentations, projects and dissertation

Modules

- Intelligent System Control
- Mechanics and Actuators
- Advanced CAD/CAM
- Renewable Energy
- Principles of Project Management
- Project Leadership
- Linking Group Project



Taught degrees

Safety Engineering (Industry-Based)
PgCert/PgDip/MSc

Overview

As engineering systems become more complex it is increasingly difficult to show that they will operate safely for their lifespan. The programme addresses this problem by exposing students to the knowledge and techniques of safety engineering.

It is suitable for those from a conventional engineering background, for engineers in the early part of their careers, and for those in senior management.

Many high level industrial experts contribute to the course, as visiting speakers, and an important aspect of the course is a critical consideration of real accident case studies.

There are a number of modules to select from depending on the level of study. PgDip students cover a selection of modules, but without an individual dissertation. MSc students must submit an individual dissertation consisting of a substantial piece of literature-based research work in the area of study.

In addition to the generic safety modules, two modules deal with specific industries – Nuclear Engineering and Aerospace.

Director of Studies:	Dr Richard Dawson
Duration:	24 months, part-time (industry-based)
Entry requirements:	A second class honours degree, or its equivalent, in an engineering discipline. HND or equivalent together with appropriate industrial experience may be considered. UK/EU students only
Assessment:	Coursework and examination and a dissertation

Modules

- Engineering Research Methods
- Human Factors in Safety
- Nuclear Engineering Systems or Aerospace Engineering Systems
- The Design of Safety Critical Systems
- Nuclear Safety Environment or Aerospace Safety Environment
- Risk Analysis
- Organisational Safety
- Control of High Hazard Processes (COMAH)

Aerospace Safety Engineering
PgCert

Overview

As for the MSc PgDip and PgCert in Safety Engineering this course is suitable for those from a conventional engineering background who find themselves operating in a safety related industry. However, this course is most suited to those who are aerospace safety engineering practitioners who may not require the larger qualifications but who want to concentrate on aerospace safety engineering topics.

The taught element of this course consists of four modules in total; two per academic year. Upgrading to the higher qualifications during the course of study is possible should students wish but this will extend the period of study.

Director of Studies:	Dr Richard Dawson
Duration:	24 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in an engineering discipline. HND or equivalent together with appropriate industrial experience may be considered. UK/EU students only
Assessment:	Coursework and examination

Modules

- Aerospace Engineering Systems
- Aerospace Safety Environment
- Systems Design and Modelling
- Intelligent Control

Nuclear Science and Engineering
PgCert

Overview

This is an academic training route for graduates working in the nuclear sector. It provides scientists and engineers from a general non-nuclear background with specialist study in nuclear science and engineering.

The course covers nuclear engineering systems; nuclear safety and the use of risk assessments; and nuclear decommissioning. There is a focus on the UK and global nuclear industry, including the reasons for particular technology trends and the nature of regulation and culture in the industry. Engineering science fundamentals are covered where appropriate.

Director of Studies:	Professor Malcolm Joyce
Duration:	24 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in a related technological subject
Assessment:	Written examinations and assignments

Modules

- Decommissioning Technology and Robotics
- Nuclear Engineering Systems
- Nuclear Safety Environment
- Risk Analysis

“With a state-of-the-art technological infrastructure our leading academics aim to tackle the big problems which our world faces today. We collaborate with other universities and companies, both locally and on a global scale, to open new frontiers in cutting-edge research. Our excellent teaching is kept current by this pioneering research, allowing us to offer up-to-date programmes which are also relevant for industry.”

Professor Claudio Paoloni, Head of Department

Lancaster Environment Centre

Department facts



Head of Division:
Professor Kevin Jones



Postgraduate enquiries
Research enquiries
Postgraduate Research Coordinator: Andy Harrod
Tel: +44 (0)1524 510477
Email: lec.pg@lancaster.ac.uk
www.lancaster.ac.uk/lec/postgraduate



Number of postgraduate students:
250

Taught enquiries
Postgraduate Coordinator: Stacey Read
Tel: +44 (0)1524 510257
Email: lec.pg@lancaster.ac.uk
www.lancaster.ac.uk/lec/postgraduate

Lancaster Environment Centre (LEC) is one of the largest centres for environmental research in Europe. The 2014 Research Excellence Framework (REF) placed us third in the UK for the real-world impact of our research.

We are committed to research and teaching which delivers academic excellence and real-world impact and addresses some of the most challenging issues of the 21st century.

Our postgraduate students are taught by leading research active scientists and benefit from our collaborative links to many businesses and other external organisations, such as the Centre for Ecology and Hydrology and the Environment Agency. We offer a range of masters in specialist disciplines, underpinned by world-leading research that combines taught modules with a substantial research project and field work. We are fortunate to have areas of outstanding natural beauty and scientific interest on our doorstep and we have access to sites further afield, such as Mount Etna and the Brazilian rainforest.

Research degrees:

- Biological Science PhD
- Environmental Science PhD
- Geography PhD
- Ecology (by Research) MSc
- Environmental Science (by Research) MSc
- Plant Sciences (by Research) MSc

Taught programmes:

- Contamination, Risk Assessment and Remediation MSc
- Data Science for the Environment MSc
- Ecology and Conservation MSc
- Energy and the Environment MSc
- Environmental and Biochemical Toxicology MSc
- Environment and Development MA/MSc
- Environment and Law LLM/MA
- Environmental Management and Consulting MA
- Environmental Science and Technology MSc
- Human Rights and the Environment LLM/MA
- International Innovation (Environmental Science) MSc
- Resource and Environmental Management MSc
- Sustainable Agriculture and Food Security MSc
- Sustainable Water Management MSc/PgCert
- Volcanology and Geological Hazards MSc
- Food Challenges for the 21st Century PgCert

Research areas:

Research is organised into seven interdisciplinary themes with many specialist research groups.

Atmospheric Sciences

Research focuses on atmospheric composition, air quality and climate, and involves using laboratory, field and modelling techniques to investigate atmospheric processes from plant leaf scale up to the global scale.

Earth Sciences

Our specific aims are to mitigate natural hazards through understanding the fundamental physical and chemical processes involved. We develop quantitative methods for characterising and monitoring geological environments and for palaeoclimate reconstruction.

Ecology and Conservation

Our research uses molecular, behavioural and ecological techniques to understand how ecosystems function, how they respond to global change, and how they can be managed to enhance biodiversity and its associated services.

Environmental Chemistry

Our research aims to improve the fundamental understanding of how chemicals behave in the environment. We work closely with policy makers to help them assess the risks and benefits of environmental chemicals, and with industry, helping to develop chemicals that do not cause harm to the environment or humans.

Plant and Crop Science

We combine cutting-edge research in plant science, from the molecular to the crop scale, with other disciplines in both the natural and social sciences. By working closely with end-users, our research has a clear, practical focus on sustainable agriculture and so can help address the ecological, economic and social challenges facing crop production in a rapidly changing global environment.

Society and Environment

We focus on the critical investigation of global socio-environmental challenges, engaging in cutting-edge research and excellent teaching in human and environmental geography. Combining empirical and theoretical approaches, we drive research on socio-environmental topics.

Water and Soil Sciences

Our water research takes the latest discoveries in water science and works with the world-wide water industry, policy makers and others to deliver innovative solutions for a sustainable supply of clean water for everyone.

Research degrees

Biological Science Environmental Science Geography PhD

Overview

A great strength of LEC is its ability to share expertise and ideas from many disciplines in order to provide a flexible approach, which is so important in the dynamic, rapidly developing discipline of environmental science. Although the work is often organised within themes and research groups, there is much collaborative activity transcending these boundaries.

Duration:	36-48 months, full-time or 48-84 months, part time
Entry requirements:	Upper second class honours degree, or its equivalent, in a relevant subject, or lower first degree supplemented by a Masters qualification, and a viable research topic
Assessment:	Original research and thesis/collection of published papers

Research degrees

Ecology (by Research)

Environmental Science (by Research)

Plant Sciences (by Research)

MSc

Overview

These programmes are suitable for those wishing to carry out a short, in depth research project, and not attend taught programmes. The MSc by research programmes consist of induction courses, an eight month research project and a period to write it up. These degrees are carefully tailored to your interests, and can be particularly suitable for people undertaking research in a work based context wishing to gain an academic qualification.

Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in a relevant subject. Industry based experience will be considered, with demonstration of appropriate skills
Assessment:	Original research and dissertation

Taught programmes

Contamination, Risk Assessment and Remediation

MSc

Overview

Chemical contamination is a worldwide problem and represents a significant threat to the environment, to the functioning of ecosystems, and to human health. This Masters programme covers the science, risk assessment and remediation and is supported by a cutting-edge research base, supported by case studies.

You will gain the scientific, analytical and communication skills required to prepare you for a career with local authorities, industry, regulation or consultancy.

Director of Studies:	Professor Kirk T Semple
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Behaviour of Pollutants in the Environment
- Chemical Risk Assessment
- Contaminated Land and Remediation
- Data Analysis and Interpretation
- Environmental Radioactivity
- Environmental Sampling and Analysis for Trace Organics
- Geoinformatics
- Numerical Skills
- Pollution Microbiology

Data Science for the Environment

MSc

Overview

This MSc programme is aimed at students with a background in environmental, earth or ecological sciences who want to develop strong quantitative, data handling and analytical skills for application within their field.

The production of data that are relevant to environmental issues is increasing at a phenomenal rate. Technological advances in fields such as remote sensing, imaging and forecasting are increasingly producing data from more sources and with higher resolution than we have been able to handle until recently. There is a need for data scientists who are able to organise, analyse and disseminate such data in order to answer questions which will help us manage a range of scenarios, from management of natural resources to predicting population change.

This programme will involve a mixture of taught modules and a research dissertation with a placement in industry or with a research organisation.

Director of Studies:	Dr Ian Hartley
Duration:	12 months, full-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject
Assessment:	Coursework and examination

Modules on offer include:

- Data Mining
- Data Science Fundamentals
- Food Security, Agriculture and Climate Change
- Geoinformatics
- Global Change and the Earth System
- Habitat Management
- Modelling Environmental Processes
- Programming for Data Scientists
- Statistical Inference
- Statistical Methods and Modelling

Ecology and Conservation

MSc

Overview

This scheme offers great flexibility of choice from a wide range of modules that meet the needs or interests of any student of ecological or conservation sciences. This vocational degree offers you the chance to blend ecological and environmental science topics with those from areas such as social science, geography, and statistics.

You will gain an understanding of the relationships between living organisms and their physical, chemical and biotic environment whilst learning important skills related to environmental monitoring and management.

Graduates have gone on to careers in the environmental and conservation sectors, as well as further study for a PhD.

Director of Studies:	Dr Ian Hartley
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Conservation Biology
- Data Analysis and Interpretation
- Environmental Management
- Food Security, Agriculture and Climate Change
- Geoinformatics
- Habitat Management
- Lake Ecology
- Sustainable Soil Management
- Using the National Vegetation Classification
- Wildlife Monitoring Techniques
- Wildlife Population Ecology

Other modules available can be found on page 35 or on our website.

Taught Programmes

Energy and the Environment
MSc

Overview

With the EU-wide acceptance of the need to transition to lower carbon energy regimes, very significant employment opportunities have opened up in both the public and private sector to foster the uptake of 'alternative' patterns of energy supply and demand. The MSc Energy and the Environment is a response to this need whilst recognising that energy provision and use is not simply an engineering issue. The taught component of the programme is interdisciplinary and encompasses environment, engineering and policy. The program is completed by an extended research project, working on an energy sector application, often developed in conjunction with an industrial partner.

Director of Studies:	Dr Andy Jarvis
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Environmental Management
- Low Carbon Energy Use
- Sustainable Systems
- Climate Change and Society
- Energy Conversion
- Environmental Auditing
- Environmental Radioactivity
- International Environmental Law
- Renewable Energy
- The Nuclear Engineering Environment

Environmental and Biochemical Toxicology
MSc

Overview

Environmental and biochemical toxicology underpins a vast array of services. There is a shortage of qualified scientists in these areas, a fact highlighted both by academic societies and industry.

This MSc provides you with an appreciation of the underlying principles of how chemicals adversely affect living organisms. This includes identifying mechanisms through to hazard assessment, and understanding effects on human health. We also emphasise practical experience through the use of cutting-edge techniques in research laboratories.

After finishing this course you will be ready to enter consultancy or industry or to progress to PhD study.

Director of Studies:	Professor Frank Martin
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Biological Effects of Air Pollution and Climate Change
- Chemical Risk Assessment
- Consequences of Toxic Effects
- Contaminated Land and Remediation
- Diseases of the Brain
- Environmental Sampling and Analysis for Trace Organics
- Molecular Basis of Cancer
- Safety and Environmental Impact Assessment: an Industrial Perspective
- Toxicological Mechanisms and Measurements

Environment and Development
MA/MSc

Overview

The need for sustainable development is a global concern. This scheme aims to prepare you to address the challenges faced in safeguarding the planet's ecosystems while improving the environments of impoverished communities. You can take either the MA or MSc, depending on your choice of dissertation. The scheme has a broad choice of optional modules, combined with the specialisation of the dissertation project, which includes the option of overseas fieldwork. This programme provides the ideal education for anyone interested in a career that will address environment and development issues, in the private, public, or not-for-profit sectors.

Director of Studies:	Dr Yani Najman
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations and dissertation

Modules on offer include:

- Behaviour of Pollutants in the Environment
- Biological Effects of Air Pollution and Climate Change
- Conservation Biology
- Data Analysis and Interpretation
- Ecology, Conservation and Culture
- Flood Forecasting and Flood Risk Management
- Globalisation and Democratisation
- Habitat Management
- Sustainable Soil Management
- Wildlife Population Ecology

Other modules available can be found on page 35 or on our website.

Environment and Law
LLM/MA

Overview

This joint programme with the Law School is intended to appeal to students who wish to study the environmental aspects of law or the legal regulation of the environment at Masters level.

This programme has a flexible pathway of study which will define the classification of the final award with either an LLM or MA. Students take three modules from the Law School and three modules from the Lancaster Environment Centre as well as a dissertation.

Director of Studies:	Dr Sohia Kopela
Duration:	12 months, full-time
Entry requirements:	A second class honours degree or equivalent
Assessment:	Coursework and dissertation

Modules on offer include:

- Chemical Risk Assessment
- Climate Change and Society
- Corporations in International Business Law
- Either Environmental Law or International Environmental Law
- Environmental Justice
- Environmental Law
- European Union Law
- Food Security, Agriculture and Climate
- Gender, Sexualities and Human Rights
- International Environmental Law
- Perspectives on Environment and Development

Taught programmes

Environmental Management and Consultancy
MA

Overview

In an increasingly complex and competitive business environment, managers need to understand the commercial opportunities that the environmental sector offers, as well as the standards of performance which customers, shareholders and regulatory agencies now expect.

The MA in Environmental Management and Consultancy prepares you for these challenges. It will develop your skills in decision making, specialist environmental knowledge, and the ability to solve problems in real-world situations.

The programme also includes a six month research placement where you will have the opportunity to put your knowledge and skills to the test by working for a small-medium sized company, a public sector body or voluntary sector organisation.

Director of Studies:	Dr Nigel Watson
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Climate Change and Society
- Contaminated Land and Remediation
- Environment and Culture
- Environmental Auditing
- Environmental Law
- Environmental Management
- Food Security, Agriculture and Climate Change
- Low Carbon Energy Use

Environmental Science and Technology
MSc

Overview

The MSc in Environmental Science and Technology is designed to provide training in the general field of environmental science and its associated technologies. The emphasis is on developing in depth understanding of environmental processes, how these processes are modified by humans, and how technology can be used to monitor and remediate particular 'problems'. The course aims to exploit LEC's considerable pedigree in environmental research and technology development/application to equip students for the specific and generic demands of proceeding directly into either employment or doctoral research in the environmental sector.

Director of Studies:	Dr Andrew Jarvis
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)
Assessment:	Coursework, presentations, examinations and dissertation

Modules on offer include:

- Air Quality and Climate
- Behaviour of Pollutants in the Environment
- Catchment Protection (field course)
- Chemical Risk Assessment
- Contaminated Land and Remediation
- Environmental Radioactivity
- Environmental Sampling and Analysis for Trace Organics
- Environmental Toxicology
- Flood Forecasting and Flood Risk Management
- Groundwater Resources and Protection

Other modules available can be found on page 35 or on our website.

Human Rights and the Environment
LLM/MA

Overview

This joint programme with the Law School is intended to appeal to students who wish to study the environmental aspects of law and human rights or the legal regulation of the environment through human rights at Masters level.

The programme has a flexible pathway of study, which will define the classification of the final award with either an LLM or MA. Students take three modules from Law and three modules from the Lancaster Environment Centre as well as a dissertation.

Director of Studies:	Dr Sophia Kopela
Duration:	12 months, full-time
Entry requirements:	A good second class honours degree, in an appropriate discipline
Assessment:	Coursework and dissertation

Modules on offer include:

- Chemical Risk Assessment
- Either Environmental Law or International Environmental Law
- Food security, Agriculture and Climate
- International Human Rights
- Perspectives on Environment and Development
- Rights of Peoples
- The Right to Adequate Food as a Human Right

International Innovation (Environmental Science)
MSc

Overview

This new two-year MSc offers a ground-breaking curriculum, blending academic studies, company projects and cultural experiences. This course draws on the strengths of the Lancaster Environment Centre (LEC). As one of the first universities to establish a department of Environmental Science, we have long been in the forefront of the field.

Students will gain a foundation in the areas of design and management, whilst specialising in environmental science. The course provides an excellent opportunity for ambitious students to work on high impact collaborative research, development and commercialisation projects between UK and Chinese businesses, whilst gaining an insight into Chinese business, language and culture.

Students will be able to use their practical, language and cultural proficiency as a launch pad for their future careers: establishing a global venture, joining an international organisation, government institution, or pursuing further academic studies.

Duration:	24 months, full-time
Entry requirements:	An upper second class honours degree, or its equivalent in a relevant subject. Work experience preferred, not essential
Assessment:	Coursework, presentations and collaborative projects

Modules on offer include:

- Chemical Risk Assessment
- Consequences of Toxic Effects
- Environmental Radioactivity
- Groundwater Resources and Protection
- Physical Volcanology
- Pollution Microbiology
- Toxicological Mechanisms and Measurements
- Wildlife Monitoring Technique

Alternative pathways are available:

- Computer Science
- Design
- Engineering
- Entrepreneurship
- Telecommunications

Taught programmes

Resource and Environmental Management MSc

Overview

The management of land, air, water and other resources for sustainable development is a major challenge for the twenty first century. This very popular and vocationally relevant scheme will provide you with an in-depth critical understanding of the key management issues and challenges, as well as developing your problem-solving skills and practical knowledge for future employment in the environmental field.

You will be able to customise your learning by selecting from a wide range of optional modules in the natural and social sciences.

You will also have the option of taking a six month research placement with a private sector company, government body or voluntary sector organisation as an alternative to a traditional dissertation.

Director of Studies: Dr Nigel Watson

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)

Assessment: Coursework, presentations and dissertation/research placement

Modules on offer include:

- Climate Change and Society
- Environment and Culture
- Environmental Auditing
- Environmental Law
- Environmental Management
- Geoinformatics
- International Environmental Law
- Perspectives on Environment and Development



Sustainable Agriculture and Food Security MSc

Overview

One of the main challenges facing the human race is how to feed its people. Food production needs to rise by 50% by 2030, yet society expects that this additional food be delivered with reduced environmental impact.

Food security is also about addressing the associated socio-economic factors to enable people to access sufficient, safe and nutritious food.

This scheme aims to train natural and social scientists to tackle these challenges, by providing interdisciplinary training and research with an international focus.

Director of Studies: Dr Ian Dodd

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)

Assessment: Coursework, presentations, examinations and dissertation

Modules on offer include:

- Conservation Biology
- Contaminated Land and Remediation
- Crop Protection
- Environmental Management
- Food Security, Agriculture and Climate Change
- Habitat Management
- Perspectives on Environment and Development
- Sustainable Soil Management
- Sustainable Systems

Sustainable Water Management MSc/PgCert

Overview

This scheme combines modules in hydrology, water quality and ecology with a research project tailored towards developing skills relevant to a career in the UK or international water sector. You will be taught by world experts in the field, including staff from the Centre for Ecology and Hydrology (within LEC) and industry leader JBA Consulting. Your specialised project (including placements) benefits from our strong research links with organisations such as Dŵr Cymru Welsh Water, United Utilities, JBA Consulting, Environment Agency, Defra and Government Research Councils. The award requires the successful completion of four 15 credit modules.

Director of Studies: Dr Nick Chappell

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)

Assessment: Coursework, presentations, examinations and dissertation

Modules on offer include:

- Catchment Hydrology and Assessment
- Catchment Protection (field course)
- Contaminated Land and Remediation
- Environmental Management
- Forecasting and Extreme Event Response
- Groundwater Resources and Protection
- Integrated Systems for Sustainable Urban Drainage
- Lake Ecology
- Modelling Environmental Processes

Taught programmes

Volcanology and Geological Hazards MSc

Overview

Volcanoes threaten millions worldwide and improved hazard mitigation is a high priority. Our MSc provides training in field, theoretical and laboratory volcanology, including a highly popular field course on Etna.

Alongside specialist taught modules on volcanic and other geological hazards, additional modules provide broader training in environmental science, management and data analysis.

You will join our active volcanology research group, conducting a research project alongside internationally recognised experts and participating in many seminars, workshops and discussions.

This MSc is ideal preparation for PhD research or work in the environment sector, and suitable for students with a wide range of first degrees.

Director of Studies: Dr Hugh Tuffen

Duration: 12 months, full-time or 24 months, part-time

Entry requirements: An upper second class honours degree, or its equivalent, in a relevant subject. We can also consider applicants with a lower second class (or equivalent) if they have relevant work experience (including voluntary work)

Assessment: Coursework, presentations, examinations and dissertation

Modules on offer include:

- Air Quality and Climate
- Data Assimilation and Integration
- Environmental Management
- Flood Forecasting and Flood Risk Management
- Geoinformatics
- Geological Hazards
- Modelling Environmental Processes
- Physical Volcanology
- Volcanic Process Field Course

Food Challenges for the 21st Century PgCert

Overview

One of the most significant challenges currently facing humankind is to make enough food, for an active healthy lifestyle, available to a population which will probably rise beyond nine billion within the next 30 to 40 years. There are many factors that combine to impact food availability and the access that people have to food. Food production is prominent among these factors but we can also feed more people if we distribute food more effectively and waste less food. In addition, other factors such as the state of the economy, climate change and the effects of the food production system on the environment need to be taken into account when considering the future sustainability of our food system.

This PgCert provides an opportunity for flexible and accessible postgraduate learning and professional development, for those who are unable to commit to full-time study. It is delivered by blended learning, which consists largely of online material to allow flexible working, together with short residential schools.

Director of Studies: Professor Bill Davies

Duration: 2 – 3 years, part-time

Entry requirements: Professional experience of working in the food chain. We recognise prior learning and experience, and you don't necessarily need a degree to apply

Assessment: Essays, online discussions and short answer worksheets

Modules on offer include:

- Consumers and Retailing
- Crop Production and Supply
- Economics and Logistics of the Food Chain
- Food Quality, Nutrition and Food Safety, Post-Harvest Management
- Food Security: The Impending Storm
- Food Waste, Supply Chain Management and Consumer Behaviour
- Pests and Diseases, Pest Management and Pesticides
- Soils, Natural Capital and Sustainable Resource Management

Optional taught LEC modules include:

Most schemes have a set of core modules and a choice of optional modules. Further details of these and can be found at www.lancaster.ac.uk/lec/postgraduate

- Air Quality and Climate
- Behaviour of Pollutants in the Environment
- Biological Effects of Air Pollution and Climate Change
- Catchment Protection (field course)
- Chemical Risk Assessment
- Climate Change and Society
- Consequences of Toxicological Effects
- Conservation Biology
- Contaminated Land and Remediation
- Crop Protection
- Data Analysis and Interpretation
- Data Analysis and Programming Skills
- Data Assimilation and Integration
- Ecology, Conservation and Culture
- Environment and Culture
- Environmental Auditing
- Environmental Justice
- Environmental Management
- Environmental Radioactivity
- Environmental Sampling and Analysis for Trace Organics
- Environmental Toxicology
- Flood Forecasting and Flood Risk Management
- Food Security and Environmental Issues in China
- Food Security, Agriculture and Climate Change
- Geoinformatics
- Geological Hazards
- Globalisation and Democratisation
- Groundwater Resources and Protection
- Habitat Management
- International Environmental Law
- Lake Ecology
- Low Carbon Energy Use
- Modelling Environmental Processes
- Numerical Skills
- Perspectives on Environment and Development
- Pollution Microbiology
- Research Methods (for MA stream only)
- Right to Adequate Food as a Human Right
- Sustainable Soil Management
- Sustainable Systems
- The Rights of Peoples
- Toxicological Mechanisms and Measurements
- Using the NVC
- Wildlife Monitoring Techniques
- Wildlife Population Ecology



Mathematics and Statistics

Department facts



Head of Division:
Professor Andrey Lazarev



Postgraduate enquiries
Postgraduate Admissions: Dr Pete Neal
Tel: +44 (0)1524 593063
Email: p.neal@lancaster.ac.uk
www.lancaster.ac.uk/maths

We are one of the UK's top departments for world-leading research, ranked joint 5th in Research Excellence Framework 2014. We offer a variety of opportunities for postgraduate study in pure mathematics and statistics, ranging from taught masters to PhDs, as well as research degrees in the interests of our staff members. We have a vibrant community of academics, support staff and students from around the world. Our excellent facilities include dedicated teaching, learning, computing and research spaces.

Our established research links with business, industry and government provide expertise in pure mathematics, statistics, medical statistics and social statistics. We are part of the North West Hub for Trial Methodology Research and a founder member of several national PhD training consortiums in statistics, social statistics, mathematics and operational research.

In 2010, we were awarded funding to develop a Centre for Doctoral Training (STOR-i) combining statistics, operational research and industrial applications. We are producing a new generation of researcher, capable of creating an impact in these areas. This Centre has fully funded 40 students since 2010 and is due to fully fund at least 60 further students entering the Centre for Doctoral Training in 2014 – 2019. We are also part of the North West Doctoral Training Centre (NWDTC) and offer a pathway of study in social statistics.

Research degrees:

- Statistics PhD
- Mathematics PhD
- Applied Social Statistics (NWDTC) PhD
- Statistics and Operational Research (in partnership with industry) (STOR-i) MRes/PhD

Taught programmes:

- Data Science MSc
- Quantitative Methods for Science, Social Science and Medicine PgCert
- Quantitative Methods for Science, Social Science and Medicine PgDip/MSc
- Statistics MSc/PgDip



Research areas:

Statistics

The Statistics Group is interested in the development of novel statistical models and methods motivated by applied problems, with particular emphasis on environmental, biomedical and social sciences. Methodological strengths include change point methods, computationally intensive methods, design and analysis of clinical trials, epidemic modelling, extreme value methods, locally stationary processes, longitudinal models, spatial statistics, spatial genetics, stochastic modelling, survival analysis and time series modelling.

There is a strong emphasis on the interface between theory and application, and the group has close research links with other university departments, government departments and research institutes, a wide range of industries including multinationals and SMEs, hospitals, and pharmaceutical companies within the UK and overseas.

Pure Mathematics

Research interests are broad and cover areas of algebra, geometry, analysis, probability and combinatorics. There is also research at interfaces between algebra, geometry and rigidity theory.

Specific topics include: Algebraic Topology, Banach Algebras, Discrete Geometry, Group Theory, Graph Theory, Homological Algebra, Lie Theory, Mathematical Physics, Operator Algebras, Probability Theory (including Noncommutative Probability), Quantum Algebra, Quantum Field Theory, Random Matrix Theory, Representation Theory, Spectral Theory and Stochastic Analysis.



Business engagement:

Gaining experience and skills

Gaining work experience while you are at university is crucial to achieving a good graduate job. Students and recent graduates can apply for relevant paid work experience through the Faculty of Science and Technology Internship Programme.

Internships offer you the opportunity to apply your academic knowledge in real world situations - and get paid for it! They will help you develop transferable skills such as team working, time management, leadership, networking, and commercial awareness.

Many employers use internships to test out a new role and frequently offer graduate roles to interns.

Research degrees

Statistics Mathematics PhD

Overview

Our research expertise is in algebra, analysis, probability, statistical methodology, and medical and social statistics.

Students will have a formal weekly meeting with their supervisor, supplemented by more frequent, informal contact. Our postgraduate instruction is through either intense lectures (on- or off-campus) under the APTS scheme (Statistics), or term-length courses delivered by video-link, under the MAGIC scheme (Pure Mathematics). Any remaining skills gaps will be covered through additional lectures or directed reading. Students are encouraged to participate in appropriate seminars which provide ideal opportunity to gain valuable experience of communicating ideas to an audience while also receiving feedback; they also help to set future research directions.

Students will have their own laptop, and are generously supported to attend and present work at conferences.

Duration:	3 years, full-time
Entry requirements:	Upper second class honours degree, or its equivalent, in Mathematics, Statistics, or a combination of the two
Assessment:	Original research and thesis

Research degrees

Applied Social Statistics (NWDTC) PhD

Overview

This scheme, with funding from the North West Doctoral Training Centre, draws upon the acknowledged strengths of social science and social statistics with the balance between the statistics and substantive components of the research tailored to your interests and background.

We encourage joint supervision by the Department and a social science or related department across the three North West universities (Lancaster, Liverpool and Manchester), thus increasing the scope and potential focus of your research.

The programme is suitable for a range of purposes, notably: social science graduates interested in quantitative empirical work and statistics graduates wishing to develop applicable expertise in social statistics.

There is an option of taking the MSc in Quantitative Methods for Science, Social Science and Medicine before progressing to the PhD.

Director of Studies:	Professor Brian Francis
Duration:	3 years, full-time (PhD) or 4 years, full-time (MSc and PhD). Part-time study is also possible
Entry requirements:	Upper second class honours degree, or its equivalent, in Statistics, Social Science or a relevant related discipline, or relevant professional qualification or experience
Assessment:	Original research and thesis
Further Information:	www.nwdtc.ac.uk

Statistics and Operational Research (in partnership with industry) (STOR-i) PhD/MRes

Overview

This programme offers a ground-breaking approach to statistics and operational research, developed in conjunction with leading industrial partners. There are typically over ten fully funded places annually.

Collaboration with our industrial partners, such as BT, IBM and AstraZeneca, ensures that we produce a generation of highly skilled researchers prepared for careers in academia or industry.

Commencing with an MRes which provides a robust grounding and the development of research skills, you will identify a topic and plan your PhD research. You will also develop a versatile skill set including: advanced problem solving, programming, and a broad range of presentation and dissemination skills.

The remaining three years will be spent working on the PhD project guided by appropriate supervisory teams, whilst taking a range of training programmes and experiencing visits to world-leading universities.

Director of Studies:	Professor Jonathan Tawn
Duration:	4 years, full-time
Entry requirements:	First class honours degree, or its equivalent, in an undergraduate course with a substantial mathematical content
Assessment:	MRes: coursework and exam; PhD: original research and thesis

Modules

Compulsory modules:

- Training for Research and Industry
- Probability and Stochastic Processes
- Optimisation
- Likelihood Inference
- Bayesian Inference
- Computational Intensive Methods

Optional modules:

- Leadership and Project Management Training
- Communication Training
- Research Integrity
- Continual Professional Development in Statistics and Operational Research
- Computational Horizons

Taught programmes

Data Science Msc

Please see the entry under Computing and Communications

Quantitative Methods for Science, Social Science and Medicine PgCert

Overview

This Postgraduate Certificate can be obtained by successfully completing an approved combination of taught modules or, alternatively, the stand alone distance learning module in Teaching Statistics.

Director of Studies:	Dr Gillian Lancaster
Duration:	12 – 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in Mathematics, a Social Science or other related discipline, or relevant professional qualification and experience
Assessment:	Coursework

Quantitative Methods for Science, Social Science and Medicine MSc/PgDip

Overview

We offer a range of pathways for this MSc/PgDip, designed to provide you with a solid foundation in the theory and application of statistical methods for the natural, social and health sciences.

You study substantive theory, research methods, data collection (including how to use data from large government social surveys) and statistical analysis (including software packages R, SPSS and STATA) and explore the application of this knowledge in a range of areas. Modules are taught in short intensive blocks, making this programme ideal for part-time study.

The specialist pathways offered are Scientific Research Methods, Crime and Social Statistics, Statistical Methods for Health Research and Teaching Statistics (based on your choice of optional modules).

Director of Studies:	Dr Gillian Lancaster
Duration:	MSc: 12 months, full-time or 36 months, part-time PgDip: nine months, full-time or 21 months, part-time
Entry requirements:	Second class honours degree, or its equivalent, in a related technological subject
Assessment:	Written examinations and assignments

Modules

Compulsory modules:

- Statistical Inference
- Sampling Design
- Questionnaire Design
- Secondary Data Analysis
- Statistical Inference
- Generalised Linear Models
- Secondary Data Analysis
- Multi-Level Models

Optional modules (may vary from year-to-year):

- Bayesian Methods
- Methods for Missing Data
- Data Mining Techniques
- Structural Equation Modelling

Taught programmes

Statistics MSc/PgDip

Overview

This MSc has a strong theoretical and methodological component to supplement a focus on applications of statistics to real life scientific problems. You can opt to follow pathways in medical, pharmaceutical or environmental statistics, depending on your field of interest. Graduates tend to enter careers as practising statisticians, university research assistants or go on to study for a PhD.

For each pathway you will follow a set of compulsory modules covering core theory and methods, applied statistical modelling and practical skills in topics such as statistical computing, scientific writing, presentation and consultancy. You will also study optional modules tailored to your research interests and career aspirations. Your studies are completed with a supervised in-depth dissertation aimed at solving a substantive research question.

Director of Studies:	Dr Deborah Costain
Duration:	MSc: 12 months, full-time or 24 months, part-time PgDip: nine months, full-time
Entry requirements:	Second class honours degree, or its equivalent, in a subject with a strong mathematics or statistics component
Assessment:	Coursework, examination and dissertation

Modules

Compulsory modules:

- Statistics in Practice
- Likelihood Inference
- Generalised Linear Models
- Bayesian Inference
- Computational Intensive Methods

Optional modules (choose five):

- Extreme Value Theory
- Clinical Trials
- Principles of Epidemiology
- Genomics: Technologies and Data Analysis
- Longitudinal Data Analysis
- Pharmacological Modelling
- Survival and Event History Analysis

“The distinctive feature of statistics research at Lancaster is that methodological innovations are motivated by, and fed back into, substantive applications in the natural, biomedical and social sciences. We have particular strengths in computational statistical methods; longitudinal data analysis and extreme value theory.”

Professor Paul Fearnhead

Department facts



Head of Division:
Professor Roger Jones



Postgraduate enquiries
Postgraduate Coordinator: Sandra Irving
Tel: +44 (0)1524 592067
Email: physics-postgrads@lancaster.ac.uk
www.lancaster.ac.uk/physics



Number of postgraduate students:
80-100

With over 150 staff and postgraduate students from across the world, we are one of the top departments for research, ranking 2nd in the UK (REF 2014) for the number of research outputs judged as internationally excellent (4 star). Our research is concentrated on the experimental and theoretical aspects of Cosmology, Astrophysics, Condensed Matter Physics, Particle Physics, Advanced Materials Nanoscience and Mathematical Physics. It's supported by 142 grants of over £22.2m. There are numerous funded collaborations with overseas laboratories, as well as major European networks.

We have a state-of-the-art Quantum Technology Centre with molecular beam epitaxy facilities, specially equipped laboratories for III-V semiconductor nanostructures and devices and micro and nanofabrication clean-room equipment with e-beam lithography. Characterisation facilities include a FEG SEM, picosecond lasers covering visible and mid-IR range, photo and electro-luminescence in magnetic fields and a unique nanomechanical and nanothermal scanning probe microscopy suite. The new ultra-isolation lab will enable most sensitive measurements in the absence of spurious electromagnetic field and mechanical vibrations.

Our computing facilities include Linux workstations, grid networking, and a £1.1m Beowulf class computer.

The Experimental Particle Physics group has access to accelerators at Fermilab (USA) and the Large Hadron Collider (LHC) at CERN (Geneva). Our Ultra-Low Temperature Laboratory (ULT) allows experiments to be performed over the millikelvin and microkelvin range through liquid 4He and 3He. Dilution refrigerators and nuclear demagnetisation to well below 100k are available as well as high magnetic fields from superconducting solenoids (up to eight Tesla).

Research degrees:

- Nanoscience PhD
- Physics PhD
- Physics MSc (Research)

Research areas:

Accelerator Physics

Creating technologies and mathematical models that lead to future generations of particle accelerators.

Centre for Nanoscale Dynamics

We study and model theoretical properties of condensed matter systems, such as graphene, cold atomic gases, and molecular electronics.

Cosmology and Astroparticle Physics

Our research asks fundamental questions about the nature of the universe.

Experimental Particle Physics

We study the forces and interactions that shaped our universe and search for new particles such as Higgs boson, using the highest energy particle colliders and long-baseline neutrino beams.

Low Temperature Physics

We perform experiments and develop cooling technology to study fundamental processes and material properties at temperatures approaching absolute zero.

Mathematical Physics

The development of new mathematical techniques for studying the classical and quantum behaviour of matter and light.

Nonlinear and Biomedical Physics

Understanding nonlinear, time-varying behaviour of biological systems has the potential to impact many areas of medicine.

Quantum Nanotechnology

We work on a range of devices, from the fundamental physics of nanofabricated structures to practical applications with industrial partners.

Space Science

Exploration of fundamental physics at work in the solar system's space-plasma environment. We investigate the mechanisms that control space weather.

Business engagement:

Working in partnership

We have collaborations with major international manufacturing and ICT corporations such as BP Exploration, IBM, Alcatel, Pilkington Glass, Varta, Fiat and a range of medium sized research intensive companies within the UK and across Europe.

Spin out companies

You'll learn from experts who have also started their own businesses. We actively commercialise our research, and have spun out several companies, Lancaster Material Analysis Limited, quantum technology company Quantum Base, and cryogenics consultancy Lancaster Cryogenic Limited.

Research degrees

Nanoscience PhD

Overview

This PhD offers research in nanoscience and nanotechnologies which is excelled by the experimentalists in the Quantum Technology Centre and theorists in the Centre for Nanoscale Dynamics at Lancaster.

In experimental nanoscience we offer projects in quantum technologies and development; studies of superconductor and semiconductor qubits and quantum circuits; quantum metrology; development of quantum dot systems for quantum key distribution; studies of atomic two-dimensional materials including graphene, boron nitride, hexagonal metal chalcogenides and their heterostructures; development and applications of new scanning mechanical and thermal microscopy techniques; development of novel nanostructured materials for telecommunications and for energy applications. We study nanostructures at the record-breaking low temperatures, in a sub-mK range.

In theoretical nanoscience, we offer projects in quantum transport and quantum Hall effect; mesoscopics and fundamentals of nanoelectronics; single-molecule electronics; quantum optics; quantum information processing. We develop theories of new atomic two-dimensional materials using the first principles density functional theory, quantum Monte Carlo modelling, and phenomenological theories. We develop theories of dynamics and kinetics in quantum systems in strongly non-equilibrium conditions using field theory methods. On the side of applied nanoscience, we model devices for electronics and optoelectronic applications.

We collaborate with world leading companies including Bruker, Fiat, and Oxford Instruments. The programme is supported by a selection of taught courses providing skills in modern research techniques, special scientific training and transferable skills courses.

Director of Studies:	Professor Oleg Kolosov
Duration:	36 months, full-time (or pro-rated part-time)
Entry requirements:	Upper second class BSc or MPhys degree in Physics, or its equivalent, in a relevant subject
Assessment:	Original research and thesis

Physics PhD

Overview

We welcome applications from those seeking to perform research for a PhD. Research opportunities are available within each of our research areas concentrated within the broad areas of Elementary Particle Physics, Cosmology, Space Science and Condensed Matter Physics. It covers both theoretical and experimental aspects, grouped under Elementary Particle Physics, Cosmology and Space Science, Condensed Matter Physics, and Theoretical Physics.

There is vigorous cross-divisional activity, which includes studies of new materials such as graphene and molecular nanowires, cosmological experiments in liquid helium, nonlinear dynamics of biological rhythm and IR spectroscopy and nanoscale probe microscopy of biological objects.

Director of Studies:	Professor Oleg Kolosov
Duration:	36 months, full-time (or pro-rated part-time)
Entry requirements:	Upper second class BSc or MPhys degree in Physics, or its equivalent, in a relevant subject
Assessment:	Original research and thesis

Physics

“The MSc by Research facilitates well focused, bespoke and novel research projects which are ideal for solving specific fundamental or applied physics problems, or for students who wish to gain independent research skills without a three year commitment.”

Oleg Kolosov, Professor of Experimental Condensed Matter Physics

Research degrees

Physics MSc (Research)

Overview

You can begin this programme at any time of the academic year, as agreed with your supervisor. You will define and manage an independent research project which will equip you for more sustained and original work at the doctoral level, or for advanced level applied research positions in a range of organisations.

The programme is flexible to support learning in a variety of educational and practical research contexts: either on campus or in industry.

There is a period of induction with a project supervisor where you will complete a learning plan and assess your research training development needs.

At the end of the third month (full-time) or sixth month (part-time) you will submit a report which will enable your supervisor to offer formative feedback on your writing skills, progress to date and ability to synthesise information.

Finally, you will complete a dissertation based on your research.

Director of Studies:	Professor Oleg Kolosov
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in a relevant subject
Assessment:	Original research and dissertation

“Studying physics at Lancaster is a complete experience: top-quality research environment including high-level facilities and dynamic researchers, a super-efficient department composed of sympathetic staff and overall a mixed atmosphere of excellence and cheerfulness. Working here is also about collaborations with national and international leading groups. In short, Lancaster is a very good choice both for the professional and personal experiences.”

Jean Spiece, 2nd Year PhD student

Psychology

Department facts



Head of Division:
Dr Kate Cain



Postgraduate enquiries

Postgraduate Coordinators: Clare Race and Nadine Wilson
Tel: +44 (0)1524 594975
Email: postgraduate.psychology@lancaster.ac.uk
www: www.lancaster.ac.uk/psychology

Our research is internationally recognised as being at the cutting-edge of developments in psychology. Our team of well-known researchers, who form our teaching staff, ensure that your studies are driven by the latest findings.

We are home to one of the largest developmental centres in the world, and boast a wide range of facilities to support and enhance your independent work.

Our expertise is strengthened by our relationships with key institutions such as The Leverhulme Trust and ESRC North West Doctoral Training Centre who invest time and money in research at Lancaster.

Research degrees:

- Psychology PhD

Taught programmes:

- Developmental Disorders MSc
- Developmental Psychology MSc
- Psychology of Advertising MSc
- Psychological Research Methods MSc
- Social Psychology MSc



Business engagement:

Working in partnership

Since 2009, we have completed projects with over 30 organisations from the public, private and charity sectors, which vary in size from FTSE100 international corporations to local SMEs.

Gaining experience and skills

Gaining work experience while you are at university is crucial to achieving a good graduate job. Students and recent graduates can apply for relevant paid work experience through the Faculty of Science and Technology Internship Programme.

Internships offer you the opportunity to apply your academic knowledge in real world situations - and get paid for it! They will help you develop transferable skills such as such as team working, time management, leadership, networking, and commercial awareness.

Many employers use internships to test out a new role and frequently offer graduate roles to interns.

Research areas:

Infancy and Early Development

We are one of the largest groups world-wide working on development in babies, from before birth through to toddlers, including the investigation of how language is learned and how early communication leads to understanding of words. We explore how infants learn about the permanence of the physical world around them, how they learn to categorise objects, and how these categories support early word learning. Another focus is early social development: how do babies develop an understanding of others as human beings; and how do they develop the ability to interact with others?

Language and Literacy

We explore language and literacy at multiple levels from phonemes to paragraphs, and beyond.

Our research aims to advance the understanding of a broad range of topics encompassing: mental representations of written and spoken language; language and literacy development across the lifespan from preschool through to older adults; the causes of reading and communication difficulties; the effects of different writing systems on reading development; and the cognitive resources that underpin language processing.

Perception and Action

Our research investigates human interactions with the world via sensory and motor processes.

We examine auditory neural coding, visual processing in complex environments, representation of time and space, sensorimotor grounding of concepts, and links between sensory systems and more central processes such as language, music, cognition, decision making, and emotion. We explore the role of sensory processes in deficits due to ageing and Alzheimer's Disease, and in the use of sensory and motor measures as biomarkers for disease progression.

Social Processes

Our research examines the social and cognitive factors that shape our everyday lives at the individual and group levels, and through this aim to address contemporary social issues and challenges. This includes examining how our individual actions are shaped by non-conscious processes such as goal striving and cognitive load, how social identities, attitudes and categories affect our perceptions of others, and how our values, beliefs and emotions affect our decision making and social interactions.

“The Psychology Department is not only outstanding because of its high academic standards, but also because of its friendly and supporting environment.”

Marina Kalashnikova, Psychology PhD

“Doing a masters degree is simultaneously one of the most demanding and rewarding experiences you can have, and Lancaster's Psychology Department provides a world-class teaching and research environment so our students can really make the most of their time here.”

Dr Dermot Lynott, Director of PG Studies and Senior Lecturer

Research degrees

Psychology PhD

Overview

A PhD consists of an extensive and coherent research programme, typically involving three to four years of full-time study. We welcome proposals for PhD research that offer programmatic ideas connected with staff research projects and interests. We think of PhDs as student-led yet collaborative research projects.

We provide extensive support and training to ensure that PhD students are well equipped to make their work productive, effective and influential, ultimately leading to a successful and timely submission of a PhD thesis.

Director of Studies:	Dr Dermot Lynott
Entry requirements:	An upper second class honours degree, or its equivalent, in a relevant subject. We often recommend that applicants have a Master's degree as foundational experience for a PhD programme, although this is considered on a case by case basis
Assessment:	Original research and thesis

Taught programmes

Developmental Disorders MSc

Overview

This MSc focuses on atypical development across the lifespan, and benefits from our developmental psychology research centre being one of the most prominent in the world.

Through taught modules you will acquire advanced knowledge of the theories and major findings in this field, and develop expertise in the methods and analytic techniques used in research. This course provides ESRC-accredited research training.

The course is aimed at graduates wishing to enter an applied or research career in developmental disabilities, and is beneficial for students who wish to progress to a PhD in clinical, educational, or experimental psychology. It is also suited to those who wish to boost their research skills en route to, or after, behavioural therapy or clinical or educational psychology training.

Director of Studies:	Dr Dina Lew
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Normally an upper second class honours degree, or its equivalent, in Psychology or a related discipline
Assessment:	Coursework and dissertation

Modules

Compulsory modules:

- Conducting and Presenting Psychological Research
- Developmental Disorders
- Developmental Psychology
- Research Dissertation
- Statistics for Psychological Research

Optional modules (choose from topics in the following areas, which vary year-to-year and are aligned with our expertise):

- Applied Aspects of Psychology
- Cognitive Psychology
- Developmental Psychology
- Neuroscience
- Social Psychology

Taught programmes

Developmental Psychology
MSc

Overview

Lancaster is one of the largest centres for developmental psychology research in the world. This programme provides students with knowledge of advanced methods, analytical techniques, theories and major findings across a range of areas.

The course is delivered through a variety of teaching methods, including lectures, interactive discussion sessions, direct practical experience of modelling developmental phenomena, plus the gathering, analysing and presentation developmental data.

This course provides ESRC accredited training and is aimed at graduates who wish to progress to a PhD in Developmental Psychology, or seek to boost their research skills en route to clinical or educational psychology training, or for graduates who require additional developmental knowledge to apply to their work environment.

Director of Studies:	Dr Dina Lew
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in Psychology or a related discipline
Assessment:	Coursework and dissertation

Modules

Compulsory modules:

- Conducting and Presenting Psychological Research
- Developmental Psychology
- Research Dissertation
- Statistics for Psychological Research (two modules)

Optional modules (choose from topics in the following areas, which vary year-to-year and are aligned with our expertise):

- Applied Aspects of Psychology
- Cognitive Psychology
- Developmental Psychology
- Neuroscience
- Social Psychology

Psychology of Advertising
MSc

Overview

This MSc links psychological research skills, and knowledge of human behaviour, with the domain of advertising. As well as developing an understanding of advertising research design, you will undertake dissertation research that applies psychological theory to leading-edge issues in advertising or real-time commercial needs. This is conducted within an unpaid internship during the summer with a communications organisation (giving invaluable commercial experience), or within the postgraduate department for more specialised 'lab-based' experiments. This course provides ESRC accredited training.

You will be well placed for client or agency opportunities in advertising planning, marketing communications, media planning, digital marketing, brand planning, and qualitative research on graduation.

Director of Studies:	Dr Leslie Hallam
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in Psychology or a related discipline
Assessment:	Coursework and dissertation

Modules

- Advanced Advertising Theory
- Analysing and Interpreting Data
- Analysing Talk and Text
- Dissertation
- Practical Advertising Research and Planning
- Psychological Aspects of Advertising

Psychological Research Methods
MSc

Overview

Psychological Research Methods focuses on developing the tools and skills used at the cutting edge of research in the psychological sciences. This course provides ESRC-accredited research training for graduates whose first degree contains a significant component of psychology.

The course consists of taught modules followed by an independent project supervised by a member of staff and resulting in an MSc dissertation.

It is especially suited to applicants who are considering doing a PhD, or wish to develop their research skills in preparation for further professional training (e.g. Clinical, Forensic, Educational, Health, Occupational Psychology), or who require additional training in psychological research methods to apply to their work environment.

Director of Studies:	Dr Rob Davies
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	An upper second class honours degree in Psychology, or its equivalent, including research design and statistical methods
Assessment:	Coursework and dissertation

Modules

Compulsory modules:

- Conducting and Presenting Psychological Research
- Statistics for Psychological Research (two modules)
- Research Dissertation

Optional modules (choose from topics in the following areas, which vary year-to-year and are aligned with our expertise):

- Applied Aspects of Psychology
- Cognitive Psychology
- Developmental Psychology
- Neuroscience
- Social Psychology

Social Psychology
MSc

Overview

Increase your understanding of key theories, methods and findings, and learn how to do your own social psychological research and to apply social psychology to solving social problems.

This course draws on our expertise in the study of social identity and ideology, social conflict and violence, and the processes by which bonds of social responsibility, tolerance and citizenship are established.

This course offers a number of options and methodological foci, which give students the flexibility to focus on the areas of social psychology they find most interesting.

Social Psychology is beneficial in a wide range of professions including Civil Service, non-governmental organisations (NGOs), public and voluntary sector agencies, and social science professions.

Director of Studies:	Dr Kathleen McCulloch
Duration:	12 months, full-time or 24 months, part-time
Entry requirements:	Upper second class honours degree, or its equivalent, in Psychology or a related discipline
Assessment:	Coursework and dissertation

Modules

Compulsory modules:

- Analysis for Psychological Research
- Conducting and Presenting Psychological Research
- Research Dissertation
- Social Psychology

Optional modules (choose from topics in the following areas, which vary year-to-year and are aligned with our expertise):

- Applied Aspects of Psychology
- Cognitive Psychology
- Developmental Disorders
- Developmental Psychology
- Neuroscience
- Social Psychology

Course index

We offer a range of other subjects including Arts, Humanities, Social Sciences, Health, Medicine and Management. To find out more please see our website.

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Disclaimer

The University makes all reasonable efforts to ensure that the information in this prospectus is correct at the time of printing (September 2015). Please see www.lancaster.ac.uk/compliance/legalnotice/ for further information.



Lancaster University, Lancaster, LA1 4YW
T: +44 (0)1524 65201
lancaster.ac.uk
