THE UNIVERSITY *of York*

The Department of Computer Science

2010
THE AWARDS
UNIVERSITY OF THE YEAR

Postgraduate Programmes
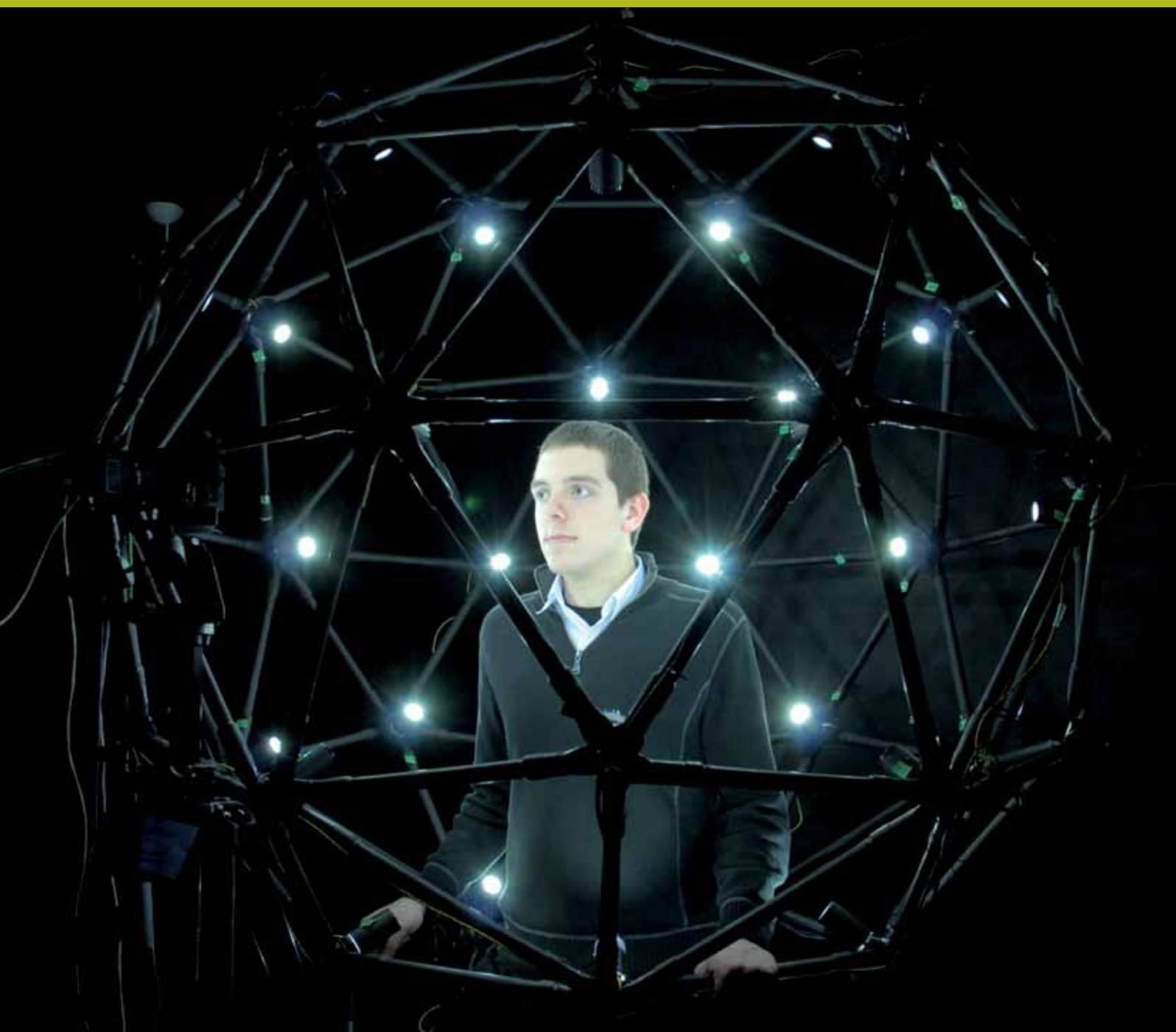
Contents

Postgraduate study in Computer Science at the University of York

Whilst computers are now commonplace, there are still significant challenges at the heart of computer science, including novel forms of computation, and the development and assurance of large-scale systems. The study of Computer Science involves you in the very infrastructure of the modern world – from desktop computers and programming to interactive technologies, aerospace, healthcare and beyond.

Here in the Department of Computer Science at York, we have developed a range of taught and research postgraduate degrees that build upon the excellent research done within the Department, and which address the challenges faced by industry and academia to equip you for a career within the discipline. Our research is very broad – including artificial intelligence, aerospace, computer vision and the interaction of humans with computers. See page 4 for more details.

Many of the challenges facing Computer Science are interdisciplinary, and in the interaction of computing with other technologies. In recognition of this, we offer unique interdisciplinary programmes, including links with Biology, Chemistry and Sociology.

About the Department of Computer Science at York

The University of York has established a national and international reputation for the quality of its teaching and research, and is consistently ranked amongst the top universities in the UK. Being a student at York is a special experience – the academic quality, campus community, supportive staff and the beautiful, well-connected city make it a popular choice with students.

We are one of the leading departments of Computer Science in the UK, being ranked in the top ten for the quality of our teaching and research. We are internationally recognised for our world class research, which is setting the agenda for some of the big challenges in Computer Science.

The Department has recently moved to brand-new, purpose-built, state-of-the-art accommodation on the University campus extension at Heslington East. This has allowed us to enhance and update our facilities, to ensure that we provide the very best for our students and further cement our reputation as a leading Computer Science department.

We have a very high calibre of academic staff, with the majority judged to be world-leading or internationally excellent, according to the 2008 Research Assessment Exercise (RAE). Our teaching is driven by our research, to ensure that what we teach is current and progressive – an important component of our 'excellent' rating, given to us by the Higher Education Funding Council for England (HEFCE).

We couple this high quality teaching with the practical research and training needs of industry and commerce at a level internationally regarded as world-class, and work closely with industry to ensure that our courses remain relevant and up-to-date in such a dynamic and rapidly changing field.

We offer a warm and friendly environment that supports and develops research and learning. We maintain a low staff: student ratio, run small tutorial and practical sessions and emphasise small group teaching so that you get the most out of your time here.

Studying at York

There are currently around 2,500 graduate students at York, who make up approximately 23% of the total student population. This includes over 700 part-time students and over 600 students from overseas.

York is one of the few universities to offer a collegiate system, with students benefiting from the close community feel that brings. Personal supervision in the Department combined with the support from your college and the University provides you with the best opportunity to achieve your potential.

York also boasts impressive technological, archival, computing and library resources, and these are constantly being updated.

All registered graduate students are automatically members of the Graduate Students' Association,

which provides academic and non-academic welfare support, advice and information on all aspects of postgraduate study, as well as organising a year-round calendar of social events.

In addition to the support and welfare services, the University provides a range of facilities, both academic and non-academic, to support its students. These include a careers service, varied sports facilities and a nursery and health centre on campus. York is a pioneer in innovative extra-curricular activities for students, and has over 90 campus clubs and societies.

International students

All new single international students are guaranteed University accommodation for at least the first year of their course. The University has a dedicated International Student Support Coordinator, who coordinates cross-campus services for international students. The University also offers free English language support for all international students in their first year.

Another resource is the Overseas Students' Association at York, a student run body that provides information, guidance and support for overseas students.

Our research

The Department of Computer Science at York is one of the leading research centres in Computer Science in the UK. We carry out fundamental research which is setting the agenda in the discipline; we also work extensively with industry, translating research results into usable solutions.

We have a major role in several important national and international research programmes and initiatives. Some of the programmes are highly interdisciplinary and many involve industrial and academic collaborations in the UK and internationally.

Research activity centres on our major research groups:

Advanced Computer Architectures

The Advanced Computer Architectures group's major aim is to undertake research into novel computer architectures. To date, the group's work has developed systems such as the Cortex II machine based on neural networks, novel search engines, new types of processors for computers and new ways to make computers recognise people.

www.cs.york.ac.uk/research/research-groups/aca

Artificial Intelligence

The focus of the Artificial Intelligence research group is constraint programming, natural language processing, machine learning and adaptive and learning agents. The group's research is strongly interdisciplinary with links into biology, Human-Computer Interaction (HCI), psychology and biochemistry.

www.cs.york.ac.uk/research/research-groups/ai

Computer Vision

The Computer Vision group's specific research areas include object recognition (including face analysis and recognition); 3D shape analysis from 2D images; brain image analysis (including tensor MRI and MEG); tracking; watermarking; quantum information processing; spectral graph theory; machine learning and reflectance modelling.

www.cs.york.ac.uk/research/research-groups/cvpr

Enterprise Systems

Enterprise systems are the large-scale, distributed, highly complex, and business-critical software systems that extend across and between organisations. The Enterprise Systems group studies the unique technical and socio-technical challenges involved in the analysis, design, implementation, deployment and management of these types of systems.

www.cs.york.ac.uk/research/research-groups/es

High Integrity Systems Engineering

The High Integrity Systems Engineering (HISE) group undertakes work on systems and software engineering, with a focus on critical applications, especially safety and security. Through its strong industrial links, the group can validate research ideas on real-world problems in domains as diverse as aerospace and healthcare. HISE has strong international links, working with universities and companies across the world including Rolls Royce plc, Goodrich Control Systems Ltd, BAE Systems, the Ministry of Defence and the Department of Trade and Industry.

www.cs.york.ac.uk/research/research-groups/hise

Human-Computer Interaction

Our HCI research group is one of the oldest in the UK. It is part of the University-wide HCI Group, which includes members in the Departments of Engineering, Psychology and Sociology. It undertakes research into the design and evaluation of interactive systems from both theoretical and applied perspectives. The group has a highly interdisciplinary approach drawing on methodologies from anthropology, computer science, mathematics, psychology and sociology.

www.cs.york.ac.uk/research/research-groups/hci

Non-Standard Computation

The Non-Standard Computation group researches reality-based computing approaches that seek their inspiration from the natural world (biology, chemistry, physics). Close work is undertaken with mathematicians and physicists on aspects of quantum computation and quantum cryptology. As part of the York Centre for Complex Systems Analysis, the group work with engineers and biologists on complex emergent systems and novel bio-inspired computational paradigms.

www.cs.york.ac.uk/research/research-groups/nsc

Programming Languages and Systems

The Programming Languages and Systems research group aims to advance programming languages, methods and tools, with particular interest in alternatives to main-stream programming systems. Using theoretical and applied research, the group investigates the principles underlying new kinds of programming languages as well as the practical challenges of implementing and using them effectively. Main areas of expertise include coordination and concurrency, functional programming, graph transformation, model checking, parallel computation, specifying and reasoning about algorithms.

www.cs.york.ac.uk/research/research-groups/ plasma

Real-Time Systems

Only 2% of CPUs are found in the desktop computers and servers with which we are all familiar. The remaining 98% are embedded in other systems such as washing machines, mobile phones, cars, aeroplanes and nuclear power plants. Many of these embedded applications are safety critical: a system failure endangers lives. Correct behaviour of real-time systems requires not only that correct results are produced, but also that these correct results are produced in a timely manner. The research of the Real-Time Systems group addresses all aspects of the design, construction, analysis and maintenance of real-time and embedded systems. Current work considers a range of topics including timing analysis, system design, programming languages, operating system kernels, distributed systems and reconfigurable hardware.

www.cs.york.ac.uk/research/research-groups/rts

Degrees by research

MSc/MPhil/PhD

MSc – 1 year full-time/2 years part-time
MPhil – 2 years full-time/4 years part-time
PhD – 3 years full-time/6 years part-time

Undertaking a degree by research in the Department of Computer Science allows you to choose to work closely with one of our internationally respected research groups and pursue your interests. You choose your supervisor and a second member of staff – an assessor – provides further support. By working with one of our established research groups, you will benefit from the accumulated knowledge and resources of your colleagues.

Whether your interest is in how users interact with technology or you want to work with world-leading researchers in quantum computing or artificial immune systems, our Department is the place for you to gain a degree in research.

You become part of the Department, including having access to our excellent facilities and having your own desk and fully networked computer. You are encouraged to work in collaboration with others and to present your ideas at some of the many informal research seminars held regularly in the Department.

Programme structure

You will follow a structured programme that includes a series of milestones carefully chosen to guide you, culminating in the submission of a successful thesis. In the first year, research skills seminars are provided, and relevant advanced taught modules may be attended if necessary. You are expected to give a literature review seminar in your field after three months.

MSc

The MSc is awarded following the successful completion of a period of research over one year full-time or two years part-time. You will submit your thesis, which is expected to display a particular knowledge of some aspect of your chosen field of study, and to make a contribution to knowledge or understanding.

The MSc by research degree involves three formally required pieces of work, which are assessed by your supervisor and assessor.

▸ Literature Review Seminar – after 3 months
▸ Thesis Proposal – after 4 months
▸ Thesis – after 12 months and no later than 15 months

Part-time students can take an MSc by research over a two-year period. If you choose to study part-time, your literature seminar is given at the Departmental Conference held in your first year, and your research proposal must be submitted within the first eight months of study. You should aim to submit a thesis at the end of the two-year registration period: the deadline falls six months later.

MPhil

You gain an MPhil following the successful completion of a period of research over two years full-time or four years part-time. Your thesis is expected to display a comprehensive particular knowledge of some aspect of your chosen field of study, and to make some original contribution to knowledge or understanding.

The MPhil research degree involves five formally required assessments which are timetabled as follows:

▸ Literature Review Seminar – after 3 months
▸ Qualifying Dissertation – after 9 months
▸ Thesis Proposal – after 18 months
▸ Thesis Seminar – after 22 months
▸ Thesis – after 24 months and no later than 36 months

The normal period of registration for part-time MPhil students is four years. If you choose to study part-time, your literature review seminar is preferably given after three months, and your qualifying dissertation is due after 18 months. The thesis proposal should be submitted after three years, and your thesis seminar is normally given in the fourth year.

PhD

A PhD is awarded following the successful completion of a period of research over three years full-time or six years part-time. Your thesis must contain an original element that makes a publishable contribution to knowledge or understanding in your chosen field of research.

The PhD degree involves five formally required assessments which are timetabled as follows:

▸ Literature Review Seminar – after 3 months
▸ Qualifying Dissertation – after 9 months
▸ Thesis Proposal – after 18 months
▸ Thesis Audit – after 27 months
▸ Thesis Seminar – by Year 3
▸ Thesis – after 36 months and no later than 48 months

The normal period of registration for part-time PhD students is six years. If you choose to study part-time, your literature review seminar is preferably still given after three months. Your qualifying dissertation is due after 18 months and the thesis proposal after three years. Your PhD thesis audit will take place after four and a half years. The thesis seminar is normally given in the sixth year.

Entry requirements

You should normally have (or expect to receive) at least an upper second class honours degree (or international equivalent). If you wish to study for a PhD, you are not required to have a Masters level degree for direct entry to the PhD programme.

Studentships

We have a number of studentships available every year to students wishing to undertake a PhD. Further details can be found at *www.cs.york.ac.uk/postgraduate/research-degrees/research-studentships/*

MRes Computational Biology

This one-year intensive programme is delivered by staff from the Departments of Biology, Chemistry and Computer Science, to provide interdisciplinary research-led training in data analysis, informatics and biosystem simulation.

About the programme

The Masters of Research (MRes) in Computational Biology will train you to meet the computational research demands of modern interdisciplinary bioscience in universities, research institutes and industry.

The programme develops computational scientists with:

▸ data analysis and computer programming skills;
▸ knowledge of the principles of bioinformatics and the simulation of biosystems;
▸ interdisciplinary research training through group and individual projects, as well as an external placement in industry, research institute or university;
▸ enhanced career prospects through an established and internationally regarded training programme.

The programme develops the core skills to support long-term research careers in computational and quantitative areas of modern interdisciplinary integrative bioscience.

Programme structure

The programme consists of modules (including lectures, workshops and projects) that are carefully tailored and delivered by an interdisciplinary team of staff across the Departments of Biology, Chemistry and Computer Science.

You will also undertake two research projects, one of which is an external placement.

Assessment

Assessment of students' performance in the course modules will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

The programme is principally aimed at graduates of the biological and molecular sciences, but also accepts graduates of computer science, mathematics and statistics.

Studentships

The programme is supported by studentships from BBSRC, which are awarded every year on a competitive basis to fund tuition and living expenses. Further information can be found at *www.york.ac.uk/depts/biol/gsp/prospective/masters/cb/funding.htm*
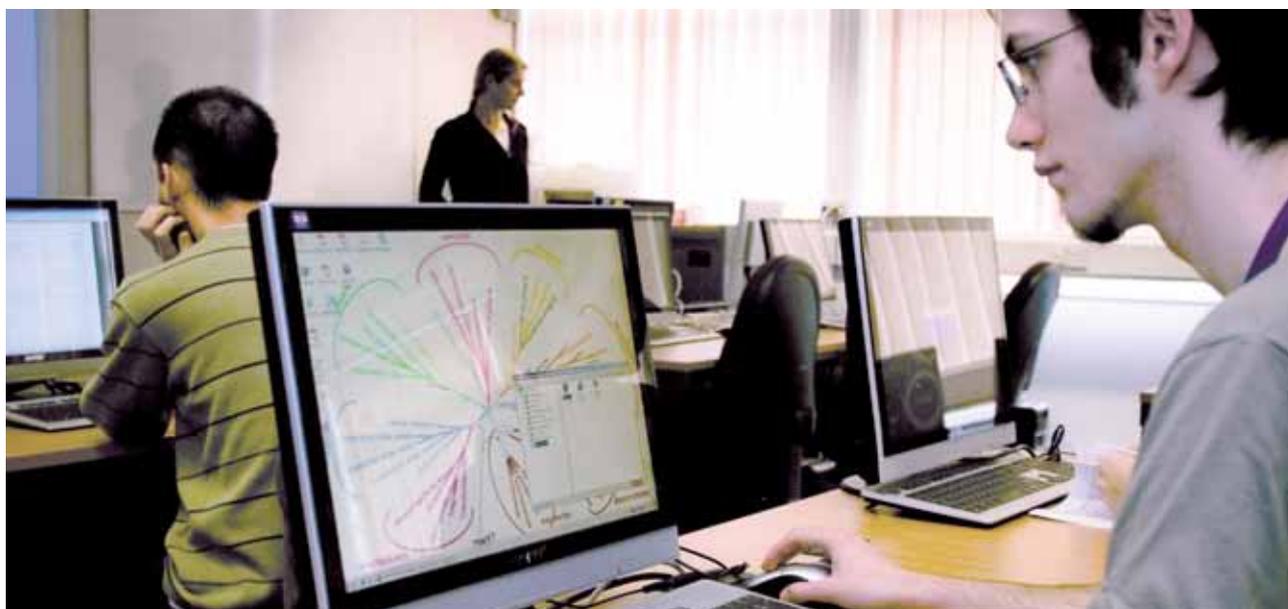
Engineering Doctorate in Large Scale Complex IT Systems

This programme is a unique opportunity to become part of a new generation of specialised engineers and scientists dedicated to meeting the challenges inherent in dealing with current and future large scale complex IT systems (LSCITS) and systems-of-systems. The on-going growth in the size and complexity of IT systems means that these skills will continue to be in demand.

About the programme

The Engineering Doctorate is a full-time, four-year doctoral level research degree with both a research and a taught component. The main aim is to significantly extend your abilities to address current and forthcoming challenges in the science and engineering of LSCITS, and to give you a detailed understanding of technology innovation, development and deployment in applied industrial and business contexts. This will enable you to understand how to analyse, design, deploy and manage LSCITS.

The Engineering Doctorate is specifically designed to equip you for a senior role in industry and commerce, or as a route into academic research.

Programme structure

Working with a sponsoring organisation or your current employer, you will conduct independent research based on a project identified by the organisation, which will lead to the submission of a doctoral thesis. You will also undertake a taught programme, with six core modules delivered at York and further optional modules offered by the Universities of Bristol, Oxford, St Andrews and York. There is a wide range of optional modules available, allowing you to tailor the course to suit you.

Skills training is also embedded throughout the programme, with an emphasis on transferable skills, to enable you to work effectively in an industrial environment.

Further details on the course can be found at *www.cs.york.ac.uk/EngD*

Assessment

Assessment of performance will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

The Engineering Doctorate is suitable for recent graduates in Computer Science or a related discipline, and has been designed to be of particular benefit to those who already have relevant industrial experience and may wish to work with their current employer as their sponsoring organisation.

Studentships

This programme is sponsored by the Engineering and Physical Sciences Research Council (EPSRC), and fees for Home/EU students will be paid in full. An overseas student will incur a fee supplement, which will be payable by the student.

For students not already in employment with their preferred sponsoring organisation, and who satisfy the funding eligibility requirements, we are able to offer an annual EPSRC studentship, awarded on a competitive basis. This award is an enhancement of approximately £3,000 p.a. over the standard EPSRC PhD studentships.

Further details can be found at *www.cs.york.ac.uk/engd/-Entry-Requirements-*

Taught postgraduate programmes

MSc in Computing

Computers are now ubiquitous with devices and systems being controlled by software. Building robust and reliable software systems requires deeper knowledge of software design principles and programming methodologies.

This is a one-year, full-time programme intended for those seeking to become experts in the IT industry. The programme has been specifically designed for those with a degree or experience in IT and who are keen to strengthen their knowledge. The course is suitable for those seeking employment as expert programmers, technical consultants and software engineers.

About the programme

The MSc in Computing covers a range of topics including advanced programming, concurrent programming, user-interface design, software engineering, testing and management. The programme concentrates on the following subject areas:

- **Programming:** A thorough grounding in advanced programming concepts using Java, including algorithm design and in-depth understanding of real-time concurrent programming.

- **Testing:** A methodological exposition of methods for systematic software performance measuring and testing.

- **User-Interfaces:** Theory and practice of human-computer interaction (HCI).

- **Formal Methods:** Practical and theoretical methods for verifying and specifying software using Z.

We receive regular advice from our Industrial Advisory Board, whose industrial representatives ensure we teach relevant material in such a dynamic and rapidly changing industry. On completion, you will be capable of becoming a team leader or skilled developer in the IT industry.

Programme structure

The programme is offered as a full-time MSc running for 12 months from October, and comprises eight taught modules as well as a dissertation project.

Each student is a member of a tutorial group, which meets regularly with a supervisor to discuss and review taught material.

More information about the programme can be found at *www.cs.york.ac.uk/postgraduate/taught-courses/msc-computing/*

Assessment

Assessment of performance will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

You should have an upper second-class degree (or international equivalent) in an IT or related subject, and already possess good programming skills. However, we are willing to consider applications from those who do not fit this profile.

You should also meet the following four essential criteria:

- Basic knowledge of programming in any programming language;
- Basic knowledge of databases including basic SQL programming;
- Basic knowledge of logic, set theory, relations, and functions;
- Basic knowledge of web design (HTML, CSS, PHP/Perl).

MSc in Information Technology

Information Technology is now fundamental in every aspect of our daily lives. IT systems are crucial for delivering every day services such as banking, web-based services and information systems.

This is a one-year full-time programme intended for those seeking a professional career in the IT industry, but who do not have a background in computing. It has been specifically designed to suit the requirements of the IT industry with graduates entering employment as computer programmers, technical consultants and media specialists.

About the programme

You will cover a range of topics including advanced programming, user-interface design, software engineering and management. The programme concentrates on the following subject areas:

▸ **Programming:** A thorough grounding in advanced programming concepts using Java, including efficient data structures and algorithms.

▸ **User-Interfaces:** Theory and practice of human-computer interaction (HCI) including web design and web programming using PHP / MySQL / CSS.

▸ **Management:** Understanding and appreciating the development and management of IT systems in a wider organisational context.

We receive regular advice from our Industrial Advisory Board, ensuring that the programme contains relevant material in such a dynamic and rapidly changing industry.

On completion, you are expected to be capable of taking up technical or management positions in the IT industry.

The course is accredited by the British Computer Society (BCS) allowing successful MSc graduates to obtain exemption (Certificate, Diploma and Diploma Project) from the BCS Professional Examination.

Programme structure

This is a full-time MSc running for 12 months from October, and comprises ten taught modules as well as a team project and an individual dissertation project. Some recent projects include 'Web Usage Mining; Development of Self Optimising Navigational Structures' and 'Context Aware Multi-Modal Weather Forecasting'.

Each student is a member of a tutorial group, which meets regularly with a supervisor to discuss and review taught material.

You can find out more about the programme at *www.cs.york.ac.uk/postgraduate/taught-courses/ msc-it/*

Assessment

Assessment of performance will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

The MSc IT programme is intended for students with minimal or no background in computing. However, we do require that you have studied a basic programming course or have relevant basic programming skills through work experience.

You should have an upper second class degree (or international equivalent) in any discipline other than a computing related subject and should possess a good knowledge of programming concepts. However, we are willing to consider applications from those who do not fit this profile.

MSc in Human–Centred Interactive Technologies

This is a one-year, full-time programme with a unique emphasis on developing an understanding of users' capabilities and requirements (including users with particular requirements, such as older and disabled users, or those in a diversity of cultural settings) and developing a range of techniques to work with these users to produce interactive technologies that best suit them.

About the programme

The MSc in Human–Centred Interactive Technologies aims to provide participants with a thorough grounding in the design and evaluation of interactive technologies of all kinds, from the perspective of the human user. It is aimed at graduates with a first degree in a computing discipline who wish to develop knowledge and skills in this area.

The programme concentrates on providing:

- a specialist education in the theories of, and methods for, designing and evaluating interactive technologies;
- a specialist education in the range of current research and practical topics of designing and evaluating interactive technologies;
- practical experience of designing and evaluating interactive technologies.

On completion, you will be equipped to play a leading and professional role related to the design and evaluation of interactive technologies in industry, commerce, academia and public service. This MSc is also intended to provide a route into a PhD or research in this rapidly expanding field.

Programme structure

This is a full-time MSc, running for 12 months from October each year.

The first half of the programme is taught modules. Each module comprises a mixture of lectures, problem classes and practical classes plus a significant amount of personal study time. Students then undertake an individual research project, under the supervision of a member of staff. In addition, each student is a member of a tutorial group which meets regularly with a supervisor.

The programme has two key aspects:

- emphasis on the sound theoretical basis for the design and evaluation of interactive technologies;
- research methods to provide a sound empirical basis for the design and evaluation of interactive technologies.

More information about the programme is available at *www.cs.york.ac.uk/postgraduate/taught-courses/msc-hcit/*

Assessment

Assessment of performance in modules will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

You should have an upper second class degree (or international equivalent) in a computing discipline. Appropriate recent work experience may also qualify you for the programme if you do not have an appropriate degree.

MSc in Social Media and Interactive Technologies

This unique one-year full-time programme combines the expertise of the Departments of Computer Science and Sociology so students benefit from the very latest research in socio-political and cultural interests in digital media and human-computer interaction.

About the programme

The programme is designed to respond to the increasing demands from business, academia and policy-makers worldwide for professionals and analysts who have an interdisciplinary understanding of the potential and requirements for the effective adoption of new media technologies. A rapid expansion of Web 2.0 interactive technologies, such as YouTube, Wikipedia, Flickr and Facebook, are profoundly changing the production, communication and consumption relationships between users and providers.

The programme combines theory, methods and practices intended to exploit these emerging relationships through a deep understanding of how good design facilitates interaction and convergence in a complex and dynamic social environment. It thereby provides you with the understanding and skills required to fully appreciate and respond to the dramatic changes in play.

The significant impact of information and communication technologies and the Internet upon the performance of organisations and their need to respond to new user demands will make you very appealing to employers. It will also give you the skills and competence needed for consultancy, self-employment or research.

Programme structure

The programme consists of eight taught modules, taught in the Departments of Computer Science and Sociology, plus a dissertation. The dissertation gives you the opportunity to apply the methodological, conceptual and analytic skills you have acquired throughout the taught components of the degree.

More information about the programme can be found at *www.york.ac.uk/sociology/postgraduate/masters/msc-media-technologies*

Assessment

Assessment of performance will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

You must have the minimum of an upper second class degree or equivalent suitable experience. This should be within a social science, business and management studies or a computer science related discipline with a particular emphasis on social informatics, information management or social aspects of computing.

We recognise that this programme is likely to attract highly capable students from other backgrounds who wish to undertake rigorous social science training. In this case, high calibre applicants from non-social science disciplines will be considered for admission.

MSc in Natural Computation

This is a one-year full-time programme designed to equip students with knowledge, understanding and experience of the practical application of a broad range of aspects of natural computation, to complement previously gained knowledge and skills in traditional Computer Science.

About the programme

This MSc aims to provide a thorough grounding and practical experience in the use of advanced techniques of natural computation – broadening ideas about computation to include ideas from mathematics, physics, electronics and biology. The emphasis of this course is on developing the computational view of natural processes.

The programme concentrates on the following subject areas:

▸ **Bio-inspired computation:** neural networks, genetic algorithms, particle swarm systems, swarm robotics, artificial immune systems – approaches to computation that have been inspired by observation of biological systems.

▸ **Embodied computation:** quantum computation, evolvable hardware, DNA computing – physical and bio-chemical systems that are examined from a computational perspective.

▸ **Complexity and emergence:** dynamical systems, adaptive and learning agents, emergent behaviour – the understanding of properties of natural systems and how these properties are related to the underlying structures.
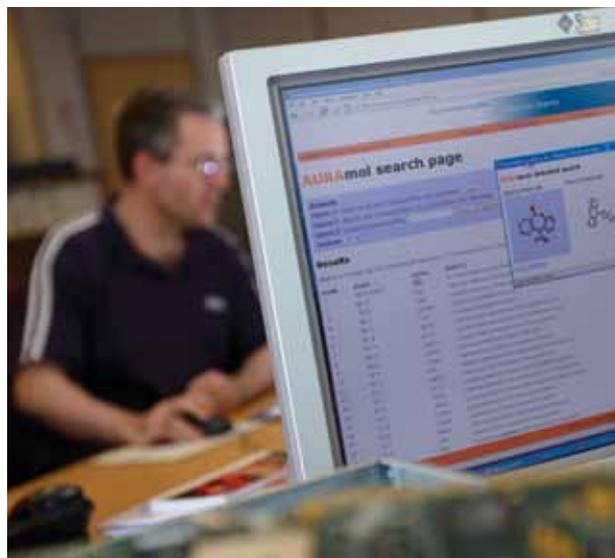
The unique emphasis of the MSc in Natural Computation is on developing the computational view of natural processes, rather than considering particular aspects of nature-inspired computation, or concentration on the application of techniques in a particular domain. You will be taught by world-leading experts in the field.

The programme is intended to provide a route into a PhD or research in this rapidly expanding area.

Programme structure

This is a full-time MSc running for 12 months from October.

The first half of the programme consists of taught modules. Each module comprises a mixture of lectures, problem classes and practical classes plus a significant amount of personal study. In the second half, students undertake an individual research project, under the supervision of a member of staff.

Each student is a member of a tutorial group, which meets regularly with a supervisor.

More information regarding the modules and projects can be found at *www.cs.york.ac.uk/postgraduate/taught-courses/msc-nc/*

Assessment

Assessment of performance in the modules will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

This is an advanced level programme built on research work at York. It is aimed at graduates with a degree in Computer Science or a related discipline with an appropriate mathematical basis who wish to develop knowledge and skills in this area before undertaking industrial work or further study. We will consider applicants who do not have an appropriate Computer Science qualification but have compensatory experience, for example appropriate industrial experience.

MSc in Software Engineering

Software Engineering has become a crucial discipline in the functioning of the modern world. Information systems, communications, transport, manufacturing and services all require well-engineered and reliable software. This programme focuses especially on software systems with a high requirement for dependability.

About the programme

The programme aims to provide a thorough grounding and practical experience in the use of state-of-the-art techniques for developing software-based systems. It will also provide an understanding of the principles behind these techniques, so students can make sound judgements during system and software design.

We regularly receive advice from our Industrial Advisory Board, whose industrial representatives help ensure that the programme content retains relevance in this rapidly changing environment.

The programme carries exemption from the British Computer Society's Professional Graduate Diploma and Diploma Project and is accredited to the fullest extent possible for Chartered Engineer status.

Programme structure

This is a full-time MSc running for 12 months from October and comprises eight taught modules. You must take six compulsory modules, one team project in software management and one of the two optional modules. You will also undertake an individual project.

The team project covers project management skills, which will be directly applied to a medium sized software project with topics suggested by our industrial partners. The programme concludes with the individual project; recent topics include 'Business Process Execution Architecture for Integrating Web Services' and 'Bioinformatics Sequence Manipulation'.

Each student is allocated a supervisor within the Department who meets regularly with you to discuss academic progress and is there to help and advise on all aspects of life at University.

More information regarding the modules and projects can be found at *www.cs.york.ac.uk/postgraduate/ taught-courses/msc-swe/*

Assessment

Assessment of performance in the programme will take place in a variety of ways: practical exercises, reports, closed examinations, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

You should have an upper second class degree (or international equivalent) in Computer Science, or a related discipline with an appropriate mathematical basis. It is assumed that your knowledge of Computer Science will include at least the following:

- Basic knowledge of Java, including practical programming. Knowledge of C++ would also be suitable.
- Basic knowledge of Operating Systems, including concurrent programming, busy waiting, semaphores and monitors.
- Basic knowledge of software engineering and its processes, including software processes, system models and object-oriented design and software testing.
- Basic knowledge of logic, set theory, relations, and functions.

We will consider applicants who do not have an appropriate Computer Science qualification but have compensatory experience, for example appropriate industrial experience.

MSc in Gas Turbine Control

The requirements for engine control systems are amongst the most challenging for aerospace products, and includes stringent safety, availability and reliability targets. To produce these products cost-effectively, companies need good processes and tools – but the most crucial factor is having a highly skilled workforce. The MSc in Gas Turbine Control is a key tool in developing the skills needed.

About the programme

This modular advanced MSc is designed to prepare you for work in the field of gas turbine control by introducing you to the latest advances. A key aim is to provide an understanding of the principles underlying good industrial practice, to enable you to work more effectively and efficiently.

The programme aims to provide a thorough grounding and practical experience in the use of state-of-the-art techniques for the development of gas turbine control systems; together with an understanding of the principles behind these techniques, you will be able to make sound engineering judgements during the design and deployment of such a system.

On completion, you will be equipped to play a leading and professional role in control systems engineering related aspects of industry and commerce. New areas of teaching are always being developed in response to new advances in the field and the requirements of the organisations that employ our graduates.

Programme structure

The modules are normally taken over four years, with the option to complete in three. Mandatory modules are normally taken in the first and second years and the optional modules are taken in the first, second and third years. Each module is taught full-time for one week and delivered at York. Optional modules give you the opportunity to specialise in other areas that are of interest.

The programme also includes a project which addresses a major technical problem concerned with real issues, and is a natural progression from the taught modules. It will typically have an industrial flavour, and those working within industry are encouraged, with the help of their managers and academic staff, to select a project which is relevant to their own work.

More information about the programme can be found at *www.cs.york.ac.uk/postgraduate/taught-courses/msc-gtc/*

Assessment

Assessment of performance will take place in a variety of ways: practical exercises, open assessments and a project dissertation.

Students are deliberately exposed to a variety of assessment methods so that they are not disadvantaged by background. Assessments will take place at various times during the year.

Entry requirements

You should have achieved at least a second class degree in an engineering or related discipline with an appropriate mathematical basis. This part-time programme is specifically directed at those with several years of industrial experience. An appropriate degree is desirable, but many applicants will have reached degree-level knowledge through their work experience.

Postgraduate Certificate and Postgraduate Diploma in Gas Turbine Control

This programme can also be completed as a Postgraduate Diploma or Postgraduate Certificate. These take place over a shorter length of time, and are made up of fewer modules than the MSc.

Further details can be found at *www.cs.york.ac.uk/postgraduate/taught-courses*

MSc Safety-Critical Systems Engineering

This modular MSc programme is designed to prepare students for work in the demanding field of systems safety engineering by exposing them to the latest developments. Classical hazard and safety analysis techniques deal poorly with complex systems, where the dominant failure causes are errors and oversights in requirements or design. These techniques are being extended and revised in order to deal effectively with modern systems. Investigation of issues with the safety of complex (including computer based) systems have given some useful insights into traditional system safety engineering, for example, into the meaning of important concepts such as the term hazard.

About the programme

We aim to provide you with a thorough grounding and practical experience in the use of state-of-the-art techniques for the development of safety-critical systems. You will also gain an understanding of the principles behind these techniques so that you can make sound engineering judgements during the design and deployment of such a system, particularly when software is involved.

On completion, you will be equipped to play a leading and professional role in safety-critical systems engineering related aspects of industry and commerce. New areas of teaching are always being developed in response to new advances in the field and the requirements of the organisations that employ our graduates.

The programmes may be used as part of a Continuing Professional Development programme for The Institution of Engineering & Technology (IET) or British Computer Society (BCS) members.

Programme structure

The MSc in Safety-Critical Systems Engineering can be taken over one year full-time, or as a part-time degree over two or three years. The programme is made up of:

▸ Nine assessed modules, six of which are core. The remaining three are chosen from the available optional specialist subject modules.
▸ An individual project (split into two parts for the part-time MSc) carried out either at York or on site in industry.

Each module is taught full-time in York for one week. The optional modules give students the opportunity to gain knowledge in other areas which are of interest, such as safety-critical software.

Each student is allocated a personal supervisor from within the Department who meets the student regularly to discuss progress during both the teaching and project phases. In addition, industrial supervisors will be responsible for the day to day supervision of projects that are undertaken in industry.

More information about the programme can be found at *www.cs.york.ac.uk/postgraduate/taught-courses/ msc-scse/*

Assessment

Each module has an associated assessed exercise, which may be completed on or off site. All assessed exercises are open, comprising a report or case study. There are no closed examinations. The project is examined by dissertation.

Entry requirements

This programme is specifically directed at those with several years of industrial experience. An appropriate degree is desirable, but many applicants will have reached degree-level knowledge through their work experience.

Postgraduate Certificate and Postgraduate Diploma in Systems Safety Engineering

We also offer flexible postgraduate programmes suitable for part-time students that result in a Postgraduate Certificate or Postgraduate Diploma award in Systems Safety Engineering. These programmes can be upgraded to the MSc award.

Further details can be found at *www.cs.york.ac.uk/ postgraduate/taught-courses/*

Continuing Professional Development (CPD)

Software Engineering

We offer an extensive range of CPD courses within the area of risk based systems safety, safety-critical systems engineering and gas turbine control. All of these courses are suitable for those who wish to refresh and further develop their understanding within their chosen field. Those teaching our CPD courses have extensive experience working with industry on their specialist topics.

Modules

Each module on our Gas Turbine Control and Safety-Critical Systems Engineering programmes is available individually, and may be used as part of a CPD programme for The Institution of Engineering & Technology (IET) or British Computer Society (BCS) members. Find out more at *www.cs.york.ac.uk/cpd/sse-gts*

For those who complete and pass the optional assessment, the module can be counted towards a relevant MSc award if you register within two years.

Human-Computer Interaction: web usability and accessibility

We also offer two-day courses on web accessibility and usability, which allow you to access the expertise of our Human-Computer Interaction research group. This will help you to give your users positive experiences that will have them coming back again and again.

You will:

▸ learn how to design modern websites that can be used by the broadest range of users;
▸ understand the needs of your users and what they want from your site;
▸ discover how to create positive user experiences;
▸ learn website design and development for accessibility.

Find out more at *www.cs.york.ac.uk/cpd/hci-courses*

Large Scale Complex IT Systems modules

The core modules from our Engineering Doctorate in Large Scale Complex IT Systems (LSCITS) are available to take individually as part of your CPD. These include:

▸ Systems Engineering for LSCITS;
▸ Empirical Methods for LSCITS;
▸ Socio-Technical Systems;
▸ Predictable Software Systems;
▸ High-Integrity Systems Engineering; and
▸ Technology Innovation.

Further information on all these modules is available at *www.cs.york.ac.uk/cpd/lscits*

How to apply

Once you have chosen the right postgraduate programme for you, it's easy to apply to study at York. We have an online system that allows you to save your application form at any point in the process, and then log back in to add more details at any time. You can also choose to use our paper application forms.

Details of how to apply both online and offline can be found at *www.york.ac.uk/graduatestudy/applying/*

For international students, you must have an IELTS (or equivalent) score of 6.5 for the taught programmes, with a minimum of 6.0 in each component. For the research degrees, you must have an IELTS score of 6.0. For further details and equivalent qualifications, please visit *www.york.ac.uk/graduatestudy/applying/englang.htm*

Applying for CPD courses

If you wish to apply for any of our CPD courses, please download a booking form from *www.cs.york.ac.uk/cpd.* You should also download and read the booking conditions available there.

Applying for the Engineering Doctorate

To apply for our Engineering Doctorate, you can either submit your application electronically using the online system (*www.york.ac.uk/univ/mis/cfm/opas/opas_courselist.cfm*) or you can download and complete an application form from *www.cs.york.ac.uk/engd/-How-to-Apply* which also contains further details on sponsoring organisations and references needed.

The University of York admissions policy

The University is committed to maintaining high standards in admissions through its policies and procedures and through the quality of students it admits. Our admissions policy aims to select students who have the ability and motivation to benefit from the academic opportunities offered and to contribute towards the research-led environment of the University. In applying its policies and procedures, the University undertakes to ensure that no prospective or existing student is treated less favourably on the grounds of age, race, colour, nationality, ethnic origin, creed, disability, HIV status, sexual orientation, gender, marital or parental status, political belief or social or economic class.

Funding

Where applicable, studentships for particular programmes have been outlined with the course description.

We also have a number of departmental studentships of £1,500 each. The number available is determined each year, and they are awarded competitively to eligible students to cover tuition and living costs.

To be eligible, you must have an upper second, or first class degree (or equivalent) in a relevant subject. Please indicate on your application if you would like to be considered for these studentships.

The University also offers a number of scholarships for students, and can advise on other sources of funding to help you pay for your postgraduate study. More information and details about individual scholarships can be found at *www.york.ac.uk/graduatestudy/finance/*

Admissions enquiries

All enquiries about our postgraduate programmes, your application
or the application process should be made to:

Research degree programmes

⊲aZˋ k Efa] aW
Research Administrator
Telephone: +44 (0)1904 325404
Fax: +44 (0)1904 325599
Email: postgraduate@cs.york.ac.uk

Full-time postgraduate taught degree programmes

⊲aZˋ k˙Sfa] aW
Postgraduate Programmes Administrator
Telephone: +44 (0)1904 325404
Fax: +44 (0)1904 325599
Email: postgraduate@cs.york.ac.uk

Part-time postgraduate taught degree programmes
(Gas Turbine Control and Safety Critical Systems Engineering) and CPD

Alex King
Part-Time Taught Postgraduate Administrator
Telephone: +44 (0)1904 325402
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Engineering Doctorate in Large Scale Complex IT Systems

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www.cs.york.ac.uk/postgraduate

Computer Science

THE UNIVERSITY *of York*