UNDERGRADUATE STUDY IN COMPUTER SCIENCE
Welcome

The University of Birmingham is a great university in a vibrant city. Founded as England’s first truly ‘civic’ university over a century ago and set in a glorious campus close to the centre of England’s second city, the University of Birmingham is now not only one of Britain’s leading universities, but internationally acclaimed and globally recognised.

I am delighted that you are considering studying at the University of Birmingham. The School of Computer Science provides specialist teaching and conducts cutting-edge research in theoretical computer science, machine learning, artificial intelligence, optimisation, security, robotics and human-computer interaction. Led by academics at the forefront of their fields, we deliver outstanding education and offer comprehensive careers support to ensure an exciting range of opportunities for your future.

We are eager to receive applications from highly motivated and well-qualified students and hope that this brochure will provide you with what you need to know about the variety of Computer Science degrees offered and the opportunities available to you, whilst studying with us and after you graduate. It is important that you choose a degree programme to suit your future career aspirations and that you choose a University and School where you will be happy and able to fulfil your potential. One of the best ways to make this decision is to visit the University to explore, enquire and listen to what life is really like at Birmingham. We very much hope therefore, that you will be able to attend one of our admissions events. Our Computer Science Admissions Team are here to support you in your decision, and they help arrange a number of opportunities at which you can visit and to talk to us. University Open Days are scheduled throughout the year and as a Computer Science applicant, you will be invited to attend an ‘Applicant Visit Day’, where you can meet staff and students who will try and help you make a decision that’s right for you. If you have any questions in the mean time, please do not hesitate to get in touch and we will do all that we can to help. I wish you every success with your studies and hope to welcome you to Birmingham in the near future."

Professor Andrew Howes
Head of School
Computer Science
Computers are a core part of our lives: social networking, media streaming, security, computer games, office applications and online shopping are all obvious examples of things that computer science has brought us that many people are very familiar with.

It is a popular view that computer science is about developing and building new and improved consumer products and technologies, and of course it has a vital role to play in this area. Computer science is at the heart of 21st century commerce and industry, with almost every business using computers in some way. Large businesses will often devote a substantial proportion of their operating budget to the development of computer systems that aid in the management of the company; for example, by keeping track of stock levels or managing delivery schedules.

But computer science is about so much more than this. At its most fundamental level, it is about information and how to represent, securely store, communicate, manipulate, understand and make use of it. This can have a far more significant impact than the use of computers to perform comparatively simple housekeeping tasks.

### Computational Thinking

Information is a tremendously valuable commodity, and there is a vast industry dedicated to making sense of it: from generating adverts specific to your interests on social networking sites to identifying trends in financial markets. Computer science is at the heart of this industry. The role of the computer scientist in this process is not just about writing computer programs to perform a particular task (although this can be a significant part of what computer scientists do), it is about developing new ways of thinking about information, and what you can do with it.

This can have a profound impact on other areas of science and engineering, and also on humanities, social sciences and business.

Thinking about problems from a computational perspective is leading to fundamental new insights in other areas and allows us to:

- Use computer simulations to work out how the flocking behaviour of birds emerges from the actions of intelligent individuals.
- Develop new designer drugs for cancer.
- Understand how the brain works, through the analysis of artificial neural networks, and by drawing on our knowledge of information processing to formulate a ‘Computational Theory of Mind’.
- Analyse data from social networks and mobile systems in order to understand the movements and motivations of people.
- Model and analyse business processes to understand how to improve the efficiency of a company's operations.
- Identify areas of cyber security and store information safely.

So, at its most fundamental level computer science is about understanding, analysing, and designing information processing systems. This is a complex multi-faceted process that can involve mathematical analysis, engineering, human factors and ethical considerations.

A Computer Science degree could lead to a tremendous variety of careers: you could be helping to develop the next generation of social networks; writing a sophisticated motor racing game (or even a Formula 1 simulator); working out the structure of proteins; developing software for financial trading; predicting the weather; modelling the effect of brain injuries, amongst many other possibilities. The proliferation of information, and the pressing need and desire to understand it will only lead to an increase in the demand for skilled computer scientists to develop new ways of thinking.

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**What is Computer Science?**

Computer science is the study of computational systems and their applications. Fundamental to this is the study of information, and how to understand, represent, and manipulate information mechanically and automatically.

This broad definition admits a wide range of academically challenging and industrially relevant topics, including: the transmission of information; extracting and exploiting patterns in information; building systems to manipulate information; understanding what types of computational information-processing systems are possible; enabling people to interpret and interact with information; and encoding real-world problems as information then solving them algorithmically. We teach all of this at Birmingham.

**DR NICK HAWES**

Reader, School of Computer Science

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**CASE STUDY**

**SARAH KEMBER**

BSc Computer Science with Year in Industry

Why did you decide to study Computer Science at Birmingham? Computer Science is such a broad subject you can take it almost anywhere, with so many different new skills and interests that you can acquire. I chose Birmingham because of everything they had to offer, from the excellence of the teaching to the range of modules that you can pick from, all of which gave you the ability to really explore the different areas that there are.

What is your experience of the School? There is plenty of student support, which is provided through office hours, giving you an opportunity to speak to the lecturer, as well as demonstrator sessions where you get help from older students who have been through the module themselves.

There are also lots of opportunities to socialise and work with computer scientists from all years and backgrounds, which gives you the chance to learn new skills from many people; not just the standard knowledge you gain from attending the lectures.

What are you intending to do for your Year in Industry? I was just entering my second year, but I am really interested in the field of Forensic Psychology, so I’m intending to spend my Year in Industry discovering more about it.

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**CASE STUDY**

**OSSAMA EDBALI**

Degree: MSci Computer Science

Why did you decide to study Computer Science at Birmingham? I was searching for a Computer Science department where research, teaching and graduate employability prospects were high. I was also looking for a great campus and community where I could get involved in various societies. For these reasons Birmingham was my first choice.

Whilst studying at Birmingham, I have had the opportunity to improve my academic and employability skills through societies, events, career fairs, talks, one-to-one appointments and I’ve also been able to pursue my hobbies actively.

Birmingham has some of the best urban communities in the country with green spaces everywhere. Coming from a small village in Italy, this was incredibly appealing to me.
The City of Birmingham

THE CITY
Birmingham is a modern and exciting city, famous for its historic, industrial past; it is now a centre of arts and culture, commerce and entertainment, with a vibrant and diverse community.

ENTERTAINMENT, ARTS AND CULTURE
Famous for its industrial past, Birmingham has also long been noted for its cultural heritage. The Hippodrome, Alexandra and Birmingham Repertory Theatres between them stage touring dramas and West End shows, ballets, operas, pantomimes and stand-up comedy.

In addition to theatres, there is an excellent choice of cafés and restaurants providing culinary experiences from a variety of cultures, most notably in the Balti Triangle and the Chinese Quarter. There are museums, cinemas, nightclubs, pubs and wine bars in abundance.

If you like live entertainment, then take your pick from comedy clubs, local music gigs and top shows at Birmingham’s principal theatres. The National Exhibition Centre and the Barclaycard Arena regularly showcase star names from the worlds of Rock, Pop and Sport. The world famous City of Birmingham Symphony Orchestra (CBSO) has its home in Symphony Hall.

SPORT
Birmingham is home to football clubs Aston Villa, West Bromwich Albion and Birmingham City and in recent years it has staged more sporting championships than any other UK city. The Warwickshire County Cricket ground, close to the University in Edgbaston, regularly hosts test matches and international tournaments including the Cricket World Cup. The city also hosts many golf courses, including The Belfry, which has hosted the Ryder Cup four times.

THE HEART OF ENGLAND
Located in the heart of the country, Birmingham has so much to offer visitors. With Warwickshire, the Malvern Hills and the Ironbridge Gorge all nearby, you are never more than a short drive from some of the UK’s most scenic countryside.

Birmingham is at the centre of the motorway, rail and canal network, with its own international airport — you can get almost anywhere in the world from here.

RETAIL THERAPY
The city centre offers a first-class retail experience; from famous brands to independent stores, Birmingham has every shop you could ever need. You’ll find a wealth of choices, including the Bullring and Grand Central for your big brands and high street needs, and diverse vintage clothing stores in the historic industrial district of Digbeth. Make sure you venture further and explore the hidden gems of Birmingham.

School of Computer Science

SCHOOL FACILITIES
As a student in the School of Computer Science you will be based within a purpose built multi-million pound building, which offers 24-hour swipe card access to an impressive range of state-of-the-art facilities. These include:
- Dedicated exclusive computing labs for Computer Science students only
- Teaching labs for Robotics
- Research labs for Medical Imaging, Intelligent Robotics, HCI and Security
- Full wireless network
- Bookable seminar and meeting rooms
- Student areas (with power access)
- New Computer Science reference library
- New collaborative student/staff teaching space
- New student areas (with power access and presentation screens)

RESEARCH CENTRES
We are home to the Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), The Human-Computer Interaction Centre (HCI), and the Centre for Computational Neuroscience and Cognitive Robotics (CNCR). Our Security and Privacy Group is also recognised as an EPSRC/GCHQ Academic Centre of Excellence in Cybersecurity Research and we have a strong collaboration with the Centre for Computational Biology (CCB).
Why Computer Science at Birmingham?

Birmingham is a vibrant city and is one of the top universities for studying computer science in the UK, with a strong international reputation for excellence in teaching and research. We offer a broad range of flexible degrees, giving the opportunity for a challenging and rewarding academic experience.

Course flexibility
At this point in time, the most important thing is for you to choose a programme that meets your future career aspirations. Once you have selected an undergraduate degree programme, you will find that it is carefully structured to allow you as much choice as possible, while making sure you take core modules to achieve a solid base in the subject. There is considerable flexibility built into the system with the core modules of the first year being shared between the BSc Computer Science, BSc Computer Science, MEng Computer Science and Software Engineering, and the BSc Artificial Intelligence and Computer Science. This flexibility allows you decide which programme best suits you before making a final choice. You will also have the chance to mould your career direction as your ideas and interests evolve.

Student support
To help you settle into your first year, all students are paired with an existing student on a mentor-scheme and a member of staff is also allocated as your personal tutor for academic-related matters. In addition, the Student/Staff committee provides a useful forum for raising and addressing issues. We also have a dedicated welfare team who provide specific sessions each day, where students can drop in and have a chat.

There are over 200 different clubs and societies to get involved with through our Guild of Students. The University has its own internal student recruitment agency, Worklink, and many of our students also act as ambassadors at Computer Science events and activities.

Computer Science Society
We also have a student-led Computer Science Society (CSS), who offer support and organise various social and professional events. These range from hackathons, industry presentations, conferences and workshops to the CSS BBQ, Summer Ball, and various other social activities. Find out more: www.facebook.com/CSSham

Award-winning development
At the School of Computer Science we are not just renowned for teaching and research excellence. We also produce novel solutions for real-world applications. We work with Jaguar Land Rover to make their vehicles more secure, and have contributed to the development of the Trusted Platform Module which makes many of our computers capable of secure cryptographic operations. We have deployed autonomous, intelligent robots in security and health support facilities, and work closely with the nuclear industry to use similar systems to help speed up nuclear decommissioning. We are also proud to have developed a revolutionary, award-winning method for diagnosing skin cancer.

Business and industry links
At the School of Computer Science we organise events and have support services to help you refine your career options. Support is tailored to your chosen subject area and draws on our excellent range of resources. We hold specialist careers fairs throughout the year and have strong local and national relationships with major industry players from the public and private sector. We range from Accenture, Goldman Sachs to IBM and Logica. We offer a wide network of links that can help you to secure a job in industry, a placement or even a graduate position. Plus, senior speakers from these organisations give specialist lectures throughout the year. We also have research partnerships with many blue-chip companies including BT Exact, Honda, HP, Marconi, OxinQ, Rolls Royce, Steven Trent and Sony. Find out more on page 16.

Why did you choose to study Computer Science at Birmingham?

When I was searching for universities, Birmingham was one of the top departments for studying Computer Science. I was invited to an Applicant Visit Day and that day made such an impression on me that I knew, as I flew on the plane home, that this was the place I wanted to study at. Everyone was very friendly and the atmosphere was so welcoming. As I spoke to the current students I got a sense that studying here would be very interesting because of the various modules provided and new concepts to learn.

What is your experience of our School?
I was surprised that university was going to be formal, but the atmosphere here is not what I expected at all. It’s like a home away from home. Everyone is super friendly and you really get to know everyone in our department from the beginning. The support is great as well, tutors are approachable and always have time to give insight into academic issues you could be facing.

Where are you going in your Year in Industry?
I applied for the Asda Scholarship Programme, which is now run by Citrus. I had already worked for them during a summer internship last year and had just started my Year in Industry placement with them. It’s going really well so far already and I look forward to learning much more in real-world applications throughout my time here, before returning to Birmingham.
Studying Computer Science at Birmingham

Computer Science at Birmingham dates back to the late 1950s. The School of Computer Science was one of the first academic departments in the UK to undertake research and teaching in this field.

Some 60 years later, we now provide specialist teaching and conduct world-leading research in theoretical computer science, machine learning, artificial intelligence, optimisation, security, robotics and human computer interaction.

As an undergraduate student within the School of Computer Science you will be taught by academics at the forefront of their fields and will benefit from an industry-informed curriculum that is appropriately accredited by the British Computer Society (BCS).

You will develop a high level of practical skills and will have the opportunity to build significant specialist knowledge in applied computer science, whilst maintaining the flexibility to follow your interests through the optional modules on offer.

Below you will find an overview of the programme and application details for all five of our undergraduate programmes. Please do not hesitate to contact our Undergraduate Admissions Team should you require any further information.

Society (BCS).

In Computer Science at Birmingham, students have full access to the School of Computing’s five computer clusters, as part of the School’s commitment to ensuring that every student has access to the latest technologies and software for their studies.

Computer Science, artificial intelligence and practical software engineering. It will focus on analytical methods and technical skills and offer you the opportunity to combine knowledge and personal skills to undertake the research and development of software solutions to problems. You will learn about all kinds of computational systems, their theory, design, development and application. This includes programming languages, software engineering, artificial intelligence, operating systems, databases, nature-inspired computation, concurrent computing, robotics and the theory of computation.

BSc Computer Science (G400)

This degree will provide you with a balance of computer science, artificial intelligence and practical software engineering. It will focus on analytical methods and technical skills and offer you the opportunity to combine knowledge and personal skills to undertake the research and development of software solutions to problems. You will learn about all kinds of computational systems, their theory, design, development and application. This includes programming languages, software engineering, artificial intelligence, operating systems, databases, nature-inspired computation, concurrent computing, robotics and the theory of computation.

In this degree, you learn all the fundamentals of computer science, with an emphasis on the skills required for successful software engineers. You begin with the fundamentals of computing and progress to comprehensive courses in software engineering, computer architecture, logic and the mathematical theory of computation.

BSc Artificial Intelligence and Computer Science (GG47)

Artificial Intelligence (AI) is a fascinating subject in which you build intelligent machines and study the nature of the mind. On the engineering side this field is especially relevant in today’s world because of the benefits of making computers perform tasks that normally require human intelligence. From a scientific viewpoint, artificial intelligence is a multidisciplinary field that connects with computing, psychology, neuroscience, philosophy, mathematics and linguistics. This degree programme will give you all the computing skills you need to enter industry, whilst also allowing you to acquire scientific skills in order to pursue research.

We are one of the leading centres for AI teaching and research in Europe, which enables us to offer an unusually rich and innovative programme for undergraduate study. In your first year, you will learn about theories of mind and techniques for generating intelligent behaviour, and implement them as computer programs. In your second year, you take more advanced modules in specific areas of AI, including an Introduction to Natural Computation, Machine Learning, Computer Vision and Natural Language Processing.

In the Computer Science half of your degree you learn to program in a language called Java and will learn how to apply these skills. For more information on AI see page 14.

In the final year of the MEng programme you will have the unique opportunity to select modules from the School’s portfolio of Masters programmes and even specialise in a particular field at Masters level. Additionally, you will undertake an in-depth software project in the final year.

This brochure was written several months in advance of the start of the academic year. It is intended to provide prospective students with a general picture of the programmes and courses offered by the School. Please note that because our research is constantly exploring new areas and directions of study, some modules may be withdrawn and new ones offered in their place.

Studying Computer Science

Entry requirements

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</tr>
<tr>
<td>UCAS Code and duration</td>
<td>G400 – 3 years</td>
<td>M11G</td>
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<td>G4N1 – 3 years</td>
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<tr>
<td>Grade C required in GCSE English</td>
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You require a minimum of 5 A Levels at Grade C standard in Mathematics or an equivalent qualification.

BSc/MSc Mathematics and Computer Science

Birmingham also offers a BSc and an MSc in Mathematics with Computer Science. These degrees are hosted by the School of Mathematics. For more information please visit: www.birmingham.ac.uk/mathematics-ug.

BSc Computer Science with Business Management (G4N1)

There is a real demand for managers who have a thorough grasp of computer science as well as a clear understanding of management principles. This programme is designed to give you both.

This degree is taught jointly by the School of Computer Science and the Birmingham Business School. It will prepare you not only for the technical side of computing but also for a career in management, sales or marketing, especially related to computing. In each year, you will spend one-third of your time in the Business School and two-thirds in the School of Computer Science.

Degrees with a Year in Industry

All programmes can be combined with a Year in Industry. This extra year is typically taken between years two and three of a three-year degree, and years three and four of a four-year degree and if successful leads to your degree title including ‘with a Year in Industry’. See page 18 for more details.

Degrees with International Study Opportunities

All students enrolled on the BSc or MSc in Computer Science programmes are entitled to pursue the opportunity to undertake a Study Abroad year, between years two and three of their degree. To learn about the benefits of choosing to study abroad see page 19.

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Degree modules

We understand the pressures that you can feel when faced with the prospect of deciding upon one specific route of study. Therefore all of our programmes have been carefully constructed to allow you as much flexibility as possible.

Year one syllabus

Year 1 Modules

<table>
<thead>
<tr>
<th>C = Compulsory</th>
<th>O = Optional</th>
<th>BSc Computer Science</th>
<th>MSci Computer Science</th>
<th>BSc Artificial Intelligence and Computer Science</th>
<th>BSc Computer Science with Business Management</th>
<th>MEng Computer Science and Software Engineering</th>
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<tr>
<td>Elements of Functional Computing</td>
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<tr>
<td>Introduction to Software Engineering</td>
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<td>Introduction to Economics</td>
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<td>Introduction to Financial Analysis</td>
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<td>Business Organisation and Management</td>
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<td>Language and Logic</td>
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<td>Robot Programming</td>
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<td>Software Workshop 1</td>
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Year two syllabus

Year 2 Modules

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<th>C = Compulsory</th>
<th>O = Optional</th>
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<tr>
<td>C/C++</td>
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<tr>
<td>Computer Systems and Architecture</td>
<td>C</td>
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Year three syllabus

Year 3 Modules

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*These are modules taken outside of the School

Year four syllabus

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*Modules currently offered in our degree programmes are listed on our website. For further information and a full description of each module, please visit: www.cs.bham.ac.uk/internal/programmes
Artificial Intelligence explained

As an A level or equivalent student, artificial intelligence is probably one of the areas of computer science that you may know least about. That’s perfectly understandable given that it is surrounded by so much Hollywood hype.

Artificial Intelligence (AI) is the study of the nature of intelligence by building computer systems, and the application of these insights to solving real-world problems. New AI technologies are being developed constantly but a few areas where Birmingham is active include:

- **Neural Networks** – simulating the work of neurons in the brain. At Birmingham, we run a world-leading Centre for Computational Neuroscience where such models are compared to human behaviour and brain function.

- **Machine learning** techniques are causing a revolution in computing, being behind almost all recent headline-grabbing company launches and acquisitions. At Birmingham, the AI group have machine learning experts working in robotics, computer vision, and analysing brain signals, galaxy formation, web browsing behaviour and much more.

- **Natural Language Processing** – this means producing computer systems that can communicate in human languages. A team of NLP researchers at Birmingham are finding fast new ways for computers to understand human utterances.

- **Nature Inspired Computing** – in this area, students and researchers write software and algorithms to create solutions to hard engineering problems. Ideas from Darwinian evolution, ant foraging, molecular computation, and cell signalling are used to inspire new types of computing. Birmingham is home to CERCIA, one of Europe’s largest centres for the applications of Evolutionary Computing, and many Birmingham graduates have gone on to work in the centre.

- **Robotics** – the new wave of robots changing our world are smarter than factory robots. Birmingham has one of Europe’s leading robotics labs, where undergraduates and researchers work to make robots that navigate, speak, see, learn, build maps, and manipulate new objects. The Birmingham Robotic Club meets regularly to develop and play with new robot software.

- **Computer Vision** – this includes all aspects of understanding images, including tracking people in video, object recognition, face detection, and understanding medical images (MRI, X-rays, ultrasound). The School is home to the UK centre for doctoral training in medical image understanding.

The applications of AI

There are a huge number of uses for AI technology, including:

- **Fraud detection systems** which use neural networks and machine learning to detect stolen credit cards by learning customer behaviour.

- **Automated trading algorithms** that outperform the market by evolving their stock trading strategies.

- **Self-driving cars**, including collision avoidance, self-parking, navigation by vision, and complete autonomous driving are now entering the car market.

- **Genetic algorithms** are used in scheduling to find the most efficient way to roster staff or allocate resources.

- **Medical decision support systems** which are now increasingly used by clinicians to support clinical decision making.

- **Call centres and help desks** which often use case-based reasoning to provide instructions on how to deal with common problems.

- **Forensic analysis** of CCTV images using AI vision technology which is being developed to catch criminals.

AI in games – Birmingham graduates Stuart Reynolds and Ian Wright are leading figures in the AI for games industry, working at AI Live, the games company in San Francisco that is famous for developing human motion control for the Wii and PlayStation.

- **Brain gain** – Birmingham lecturers Professor Peter Tino and Dr Hamid Deghani are developing ground breaking new ways of understanding the brain through images. This includes new machine learning algorithms to better understand brain imaging, and new brain imaging methods based on shining harmless infrared light onto your head.

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BIRMINGHAM AI FIRSTS

Birmingham has one of the biggest AI centres in Europe. Here are some Birmingham achievements:

- **BiAcscopy** – Birmingham student Symon Cotton invented BiAcscopy, a new way of diagnosing skin cancer using medical image understanding to detect cancerous cells.

- **Dora and Bob** – Birmingham AICS graduate, Nick Hawes developed our mobile robot Dora, that explores and maps its world. Dora first appeared at the Science Museum in 2012 and was seen by 12,000 people. Nick is now leading development of Bob, being used as a security guard at G4S headquarters.

- **CERCIA** – Established in 2003 by Professor Xin Yao, CERCIA is the UK’s leading centre for the application of nature-inspired computing in industry.

- **Boris the robot** – The UK’s most advanced robot manipulator, and is used by Professors Jeremy Wyatt and Alex Leonards to develop the next generation of advanced manipulation robots.

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What can you do with a degree in Computer Science?

There is so much potential in the real world for Birmingham’s computing graduates. Birmingham is one of the top universities often targeted by prestigious companies when looking for new employees. So whilst graduation may seem a long time away, it is worth considering the competitive advantage you will gain with a Birmingham degree.

Studying an undergraduate degree in Computer Science will develop management skills such as communication, teamwork, time management and report writing. It will give you a disciplined approach to analysing problems, with the ability to design creative solutions and critically evaluate the results. Employers are impressed by the combination of technical and transferable skills offered by computing graduates, and as such, you might find yourself in a variety of environments in academia, industry, research and commercial organisations, in such areas as:

- Artificial Intelligence – developing computers that simulate human learning and reasoning ability.
- Computer Design and Engineering – designing new computer circuits, microchips, and other electronic components.
- Computer Architecture – designing new computer instruction sets, and combining electronic or optical components to provide powerful but cost-effective computing.
- Information Technology – developing and managing information systems that support a business or organisation.
- Software Engineering – developing methods for the production of software systems on time, within budget, and with few or no defects.
- Computer Theory – investigating the fundamental theories of how computers solve problems, and apply the results to other areas of computer science.
- Operating Systems and Networks – developing the basic software computers use to supervise themselves or to communicate with other computers.
- Software Applications – applying computing and technology to solving problems outside the computer field – in education or medicine, for example.

What skills will I develop?

You will gain a disciplined approach to analysing problems, and the ability to design creative solutions and critically evaluate the results. Future employers will be interested in your technical skills, in particular your ability to program in multiple languages, and the transferable skills you’ve developed, such as innovation and the adaptability to cope with rapid change in technology.

Where can I work?

There are many different career paths to explore with a degree in Computer Science. You might choose to work for a technology consultancy like Accenture, Logica CMG or PA consulting, or one of the global IT giants such as Microsoft, Oracle, Hewlett Packard and IBM.

You may also decide to pursue opportunities in investment and retail banking and businesses, telecommunications companies and public sector organisations.

Other companies that are of interest to our graduates are: Apple, BUPA, European Space Agency, Experian, IBM, James Watt, JPMorgan, Morgan Stanley, Oracle, QinetiQ, Siemens, Google, Deloitte, Sony, Citi, UBS, PwC, GCHQ, Credit Suisse, HP, Rolls Royce, QinetiQ, Siemens, Google, Deloitte, Sony, Citi, UBS, PwC, GCHQ, Credit Suisse, JP Morgan, Morgan Stanley and Bank of England, to name but a few.

You may also wish to pursue postgraduate study before entering employment or embark on an academic career. Our School is home to a wide range of research areas, including AI/Robotics, Natural Computation, Medical Imaging, HCI, Security and Theory of Computation. For more information on postgraduate study, visit: www.cs.bham.ac.uk/admissions/postgraduate-taught.

Birmingham graduates go on to secure many different roles within industry, as well as pursuing postgraduate study and doctoral research worldwide.

Support

Our School organises department-specific Careers Fairs throughout the year (which include our Software, Systems and Emerging Technology Fair and Financial Computing and Consultancy Fairs), where global companies come onto campus to meet our students exclusively. We have a central Unisub Careers Network, who have a dedicated Engineering and Physical Sciences team that you can visit for advice and guidance throughout your studies.

Learn more:

https://intranet.birmingham.ac.uk/as/careers/college/cps/index.aspx

WHAT TYPES OF JOB CAN I GET?

The following job titles and their definitions are not standardised within the industry, but they have been chosen to give you a flavour of the variety of opportunities that exist.

- Applications Developer: Writes programs for technical, commercial and business users; usually works in a team to create a program to agreed specifications and produce detailed supporting documentation.
- Artificial Intelligence Developer: Develops computers that simulate human learning and reasoning ability.
- Cloud Computing Engineer: Applies computing and software development to design ways for sharing information and resources over the internet.
- Database Administrator: Responsible for the usage, accuracy, efficiency, security, maintenance, administration and development of an organisation’s computerised databases.
- Financial Computing Analyst: Accurately determines the financial risk that certain financial instruments create using various computational and mathematical methods.
- Information Systems Manager: Works with a staff of technical specialists to provide and maintain an organisation’s hardware and software technology infrastructures.
- IT Consultant: Gives objective advice on the best use of IT to solve business problems; clarifies client requirements, defines and presents the solutions.
- Lecturer/Teacher: Could teach computer science in secondary schools or colleges after taking a Postgraduate Certificate in Education (PGCE). Around 10% of graduates go on to further study, usually studying in greater depth through an MSc or PhD. This is essential for an academic career in higher education.
- Mobile Computing and Software App Developer: Develops internet applications that run on smartphones and other mobile devices.
- Multimedia Programmer/Computer Games Developer: Works in a team to write programs that bring together test, sound, artwork, 3D/2D modelling, animation, video and virtual reality to create a multimedia product, (e.g. for websites and computer games).
- Network Engineer: Ensures the server and network infrastructure is maintained to maximise efficiency, involving installing and supporting new servers, hardware and software, allocating resources and providing technical support to end users.
- Robotics Engineer: Design, construction and application of robots and computer systems for their control, sensory feedback, and information processing.
- Security Software Engineer: Using programming and cryptography to design security systems.
- Social Computing Engineer: Develops new technologies to form and extend communities and networks.
- Software Engineer: Researches, designs, tests, implements and maintains software systems to meet client or employer needs; uses a variety of computer programming languages and applications, working in teams with other IT professionals, or alone.
- Systems/Business Analyst: Works with a client to improve their information systems or recommend new systems; defines the problem, finds a solution, costs it – produces a project brief and outlines design for a systems designer to develop.
- Systems Designer: Designs new IT systems from a technical specification, and is responsible for installation, testing and maintenance. The job can incorporate a systems analyst or consultant role.
- Technical Support Officers: Monitors and maintains the computer systems and networks of an organisation, installs and configures computer systems, diagnoses hardware/software faults and solves technical problems, either over the phone or face-to-face.
- Web Designer: Designs and codes web pages, liaises with and advises clients, creates web pages, adds content and tests the finished site.

Source: Adapted from www.prospects.ac.uk – the UK’s official graduate careers website.

Want to chat to our current students and graduates?
Email: ug-admissions@cs.bham.ac.uk
for details of our new ‘Applicant Facebook Group’

CASE STUDY

HONG HOANG

BSc Computer Science

Why did you decide to study Computer Science?

What interested me about Computer Science was how applicable it is to modern day problems in many industries, from uses like predicting trends in stock with machine learning to developing software for rendering and post-processing 3D graphics in games and movies. There is also an exciting and diverse technology industry to explore.

What do you like about Birmingham?

I decided to study at Birmingham because after a lot of comparison and consideration, I believe that out of all the universities I was looking at, Birmingham’s Computer Science course provides the most applicable, fundamental and widely used foundational knowledge as well as giving the option to specialise in certain areas, and they do it very well. On top of all that, what really sold it for me was the department itself. The lecturers and staff are very welcoming and make me feel at home at Birmingham.

My time in Birmingham so far has been incredibly enjoyable and worthwhile, and I have been able to develop myself as an individual through participating and organising student society activities as well as working as a student ambassador. Birmingham provides a lot of good opportunities for anyone to develop in their own way.
**Year in Industry**

Competition for graduate jobs is tough so you need to do what you can to stay ahead in your career. Gaining relevant work experience can often give you that point of difference, helping you to develop skills and experience that will enhance your university education and maximise your prospects.

School of Computer Science students all have an excellent opportunity to supplement their studies with a year working in industry. In fact, many of our students go on to work for their year-out employers after graduating.

How does it work?
If you choose this option, you will spend the first two years of your degree at Birmingham, followed by the placement year on a salary, then back to the University for your final year. During your year in industry you will be able to put taught theory into practice, as well as gain valuable experience and skills.

Who will my placement be with?
We have strong local and national relationships with major industry players, from both the public and private sector. The School of Computer Science runs specialist Careers Fairs, where different companies come to meet our students to showcase opportunities for Year in Industry and graduate employment.

You should find an opportunity that suits your career goals, and whilst it is your responsibility to choose and apply for a Year in Industry placement, you will be supported by the School throughout, and can access the Engineering and Physical Sciences (EPS) Careers Network Team for help.

What will I do?
You'll learn how different organisations operate, gain valuable interpersonal skills and knowledge, apply theory to practice, and experience a real working environment, which will all help towards your future career choices. At the end of your studies you will be awarded your degree with a ‘Year in Industry’.

**Year in Industry placements**
Companies who have hosted our students include IBM, Goldman Sachs, BAE Systems, Microsoft Studios, RM, Caterpillar, General Electric, IBM and Google, amongst others.

CASE STUDY

**LUKE CROSS**

**BSc Computer Science with Year in Industry**

What interests you about Computer Science and why did you decide to study at Birmingham?
My original interest in the subject sprouted when I took A Level Computing. The challenges that are associated with the subject and problem solving skills needed are always something that has interested me. I came to Birmingham and then an Applicant Visit Day, and my decision was made when I saw how friendly and helpful staff and students were.

Where did you go in your Year in Industry?
I was lucky enough to secure a placement with Microsoft, and worked in a Microsoft Game Studio in London as a Software Developer Engineer in Test. I attended careers fairs in the department, and accessed the Careers Network Service for assistance with my application and interview.

How do you think your placement will benefit your future career?
I was welcomed into different teams treated as a full time employee and experienced new challenges day by day. I have thoroughly enjoyed my time on placement, and believe it has readiness for an exciting career in technology.

**CASE STUDY**

**AVINVA PATEL**

**BSc Computer Science with Year in Industry**

Why did you decide to study Computer Science at Birmingham?
I decided to study Computer Science because now more than ever the opportunities for women in the technology industry are exponentially rising. Birmingham provides networking opportunities with well known companies and by getting students involved in many events, as well as teaching the vital skills needed for our future.

Having come from London, I knew being close to a big city was something that was important to me. Once I visited Birmingham I started how amazing the campus and department was and I could only see myself studying here. What also drew me to Birmingham were the extra-curricular activities that were available. I was very keen to get involved and meet new people, and have been able to do so much.

Where are you going on your Year in Industry?
I am going to be working in London for EY as an eDiscovery Analyst before returning for my final year.

**International study opportunities**

Experience new cultures, meet new people, see more of the world – all while continuing your studies. That’s what a year of study abroad can offer you – enhancing your learning, expanding your horizons and offering you an experience to be remembered throughout your university and professional life.

**The Benefits**

Students who have studied abroad say that it is the best year of their lives. The benefits from participating in a year abroad include:
- Developing relevant, marketable skills – problem solving, communication, patience and perseverance, determination, self motivation, analytical and study skills
- Academic or subject related reasons – separation from academic environment and way of teaching
- Enhanced career prospects – employers more likely to choose you with additional offerings other than just your degree
- Language and culture – opportunity to be genuinely immersed into another culture rather than just being a tourist
- Personal development – increased confidence and ability to deal with difficult situations and unfamiliar surroundings
- Contacts – build worldwide relationships that can last a lifetime and benefit you in years to come

Am I eligible?
All students enrolled on the BSc or MSci Computer Science course are eligible to take part in the Erasmus+ Exchange programme and International Exchange programme. This means that you will only be eligible if you are at an approved institution in another country, returning to Birmingham for your final year.

What are my options?
The University of Birmingham has an excellent international reputation and we are proud of the growing opportunities for our Computer Science students to study overseas at one of our partner institutions.

**ERASMUS+ EXCHANGE**

This exchange programme is for students who want to study at one of our partner universities in Europe. The programme is run by the Study Abroad and Exchange Team within the University’s central International Relations Department, and students are able to spend up to a year with a partner institution.

**INTERNATIONAL PARTNER UNIVERSITIES**

We have international partner universities all over the world that offer study opportunities for our students.

Countries include: Argentina, Australia, Brazil, Canada, China, Chile, Ecuador, Ghana, Israel, Japan, Korea, Malaysia, Mexico, New Zealand, Singapore, Uruguay, USA and the West Indies.

**CASE STUDY**

**ELLIOTT UPTON**

**BSc Computer Science with Year Abroad**

How has your experience at Birmingham been?
Birmingham has provided me with an environment where I can not only develop my knowledge but flourish as a person as there are constantly things going on to help me build skills for my future. Throughout my ongoing study I have met and befriended people from all over the world in the friendly department I have ever been in – it’s like a big family.

Furthermore, being able to meet and work with so many different people allows me to understand and learn different perspectives and approaches to challenges that I face.

Where have you gone for your Year Abroad?
I always wanted to study abroad, and Birmingham facilitated and supported me in this opportunity to study for a year at the University of Melbourne. Australia not only fulfils an ambition but I am learning many valuable life skills through adapting to working and living in a new environment.

Both institutions are phenomenal places featuring world class academics and teaching, from which I am learning more than I could have ever imagined. The different specialisations are allowing me to study different areas of Computer Science in depth, diversifying my skill set and broadening my career options.

I am thoroughly enjoying my current year out and would urge anyone to consider doing a Year of Study Abroad.

**LEARN MORE**

Contact the Study Abroad Office:
Tel: +44 (0)121 415 8423
Email: outgoingstudyabroad@contacts.bham.ac.uk
www.birmingham.ac.uk/studyabroad
Useful information

We welcome applications from highly motivated and well-qualified students. We understand that this is most likely an unfamiliar experience for you, therefore if you have any questions about your application please do not hesitate to contact our Computer Science Admissions Team, who will do all they can to help.

Application and admissions

How to apply
All applications for undergraduate degree programmes must be made through the Universities and Colleges Admissions Service (UCAS) using their secure online application system at www.ucas.com/students/apply.

When to apply
The majority of applications are received during the months of September to December each year. There is the opportunity to apply up until the middle of January, however an early application is recommended so that you can take full advantage of the Applicant Visit Days offered from November each year.

Computer Science Applicant Visit Days (AVD)
Invitations to attend a School of Computer Science Applicant Visit Day are sent to all applicants who have been made an offer, and contact all successful applicants then. International applicants are considered for our Achievement Bursary and Excellence Scholarships using different criteria. Please contact us at: ug-admissions@cs.bham.ac.uk

Campus tours
If you are unable to attend one of our AVDs, the University also offers guided tours every Tuesday and Thursday, where you will be shown around by a current Birmingham student. Places are strictly limited and need to be booked at least one week in advance. To receive an information pack or book a place, please contact Student Recruitment and Outreach.

Tel: +44 (0)121 414 3374
Email: schools-liaison@bham.ac.uk

English Language requirements
If English isn’t your first language you will need to offer an acceptable English language qualification. Visit: www.birmingham.ac.uk/undergraduate/requirements/international/index.aspx for a list of acceptable English language qualifications for our degree and the latest required grades.

Coming to study with us from outside the UK?
We look forward to welcoming you if you are coming to study with us from outside the UK. Our School is a really friendly mix of people from different countries and backgrounds and is a very welcoming place. However we know that coming to a new country to study can be a little daunting, and you might have all sorts of questions you want to ask beforehand. We’ve got a great team of International ambassadors ready to talk to you and answer anything you’d like to ask. Visit: www.cs.bham.ac.uk/admissions/undergraduate/international-faq

LEARN MORE
Undergraduate Admissions Team
School of Computer Science
Tel: +44 (0)121 415 8742
Email: ug-admissions@cs.bham.ac.uk
www.cs.bham.ac.uk

Our students and alumni are happy to answer any questions you might have about life and study in Computer Science at Birmingham.

Please contact us: ug-admissions@cs.bham.ac.uk for details of our ‘New Applicant Facebook Group’
Money matters: scholarships, fees and funding

Our School is proud to offer a range of scholarships for both UK/EU and international students wishing to study for an undergraduate degree in a Computer Science subject. Scholarships are awarded to students who have, or expect to achieve, excellent academic results.

At Birmingham and in the UK, we ensure that financial barriers to entry are removed wherever possible, by offering a wide range of additional financial support packages in the form of loans, grants and scholarships.

Two of the main costs associated with undergraduate study are tuition fees and living expenses. Options are available in different forms, depending on your individual circumstances.

Financial support for UK/EU students

There are two types of student loan available: one to cover your tuition fees and the other for additional financial support packages in order to remove financial barriers to entry. Two of the main costs associated with higher education in the UK. You may also find it useful to visit: www.birmingham.ac.uk/undergraduate/fees/index.aspx

University scholarships, grants and bursaries

The University offers a range of additional financial support for students studying at Birmingham in the form of bursaries, grants and scholarships. For more information please visit: www.birmingham.ac.uk/undergraduate/fees/funding/index.aspx

Paying your tuition fees

We recognise that our students have different requirements for paying their tuition fees. This is why we are committed to providing a range of payment options to suit everyone. These will allow you to pay your fees in full before or after registration, or to spread the cost over manageable instalments by direct debit. Please visit: www.birmingham.ac.uk/student-fees-to-find-out-more.

School of Computer Science Scholarships

We offer a number of UK/EU and international Scholarships:

UK/EU:
- Outstanding Achievement Scholarship: £3000 award, conditional upon meeting certain criteria, which includes attending one of our Applicant Visit Days.
- An Achievement Bursary of £1500 will be awarded to all students who are categorised as overseas for fee purposes and who obtain AAA or equivalent.
- An additional ‘Excellence Scholarship’ of £3000 will be awarded to international students who obtain exceptional academic results (A*AA or equivalent). This Scholarship will be awarded for first year only.

Please visit: www.cs.bham.ac.uk/international/undergraduate/undergraduate/scholarships/index.aspx

Use the Student Finance Calculator

www.gov.uk/student-finance-calculator

INFORMATION

Visit: www.facebook.com/SFEngland to keep up to date with local developments.

Use the Student Finance Calculator

www.gov.uk/student-finance-calculator

What our students say

I picked Birmingham because every time I visited I felt welcomed – out of all the universities I visited I could see myself happily enjoying my time here. The School has some of the friendliest staff I’ve ever met! Whether it’s coursework, programme content or just something that’s interested you – they’re always happy to talk.

Sam Holdcroft
MSc Computer Science

I applied to Birmingham and was then invited to chat via Skype with a lecturer, who was really friendly and helpful. He asked if there was anything I needed to know and afterwards sent me four emails in a couple of hours highlighting what I asked for, with helpful links. That really helped me decide to choose Birmingham, as it is nice to know that even though you’re moving away from everything that you know, there would be someone who would go out of their way to help!

Grazyno Wong
BSc Artificial Intelligence with Year in Industry

The School of Computer Science goes above and beyond in order to make the students happy and that really makes you feel appreciated. The lecturers excel at teaching their subject areas, and all of them want the students to succeed to the best of their ability.

Kate Allen-Taylor
MSc Computer Science with Year in Industry

‘Computer Science has always felt like a friendly academic community, and what I liked about Birmingham is that when you start you are given a tutor who is able to offer advice on university life and give you academic guidance. In doing this School is taking an active interest in you to try to ensure that your experience is as good as possible, which made me feel really comfortable.

Laura Golden
BSc Computer Science

On arrival, I was struck by how close-knit and friendly the School felt. Students from all years made me feel welcome, and I was surprised by the enthusiasm of lecturers – who are always happy to stop for a chat.

George Brighter
MSc Computer Science and Software Engineering

I really love the School’s welcoming environment. I’ve met a lot of friendly, like-minded people that share the same interests and come from different backgrounds. The course is very engaging and challenging, and I am really enjoying it.

Amy Hristova
BSc Computer Science

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