UNDERGRADUATE STUDY
IN COMPUTER SCIENCE
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Come along to an Open Day:
www.birmingham.ac.uk/opendays
Welcome

The University of Birmingham is a world-class university in a vibrant city. Founded as England’s first ‘civic’ university over a century ago and set in a glorious campus close to the heart of the city, the University of Birmingham is now not only one of Britain’s leading universities, but is 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 Artificial Intelligence (including Machine Learning and Robotics), Cyber Security, Theoretical Computer Science and Human-Centred Computing. 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 guide 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 department 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 where you can visit and talk to us. University Open Days are scheduled throughout the year and as an applicant or offer holder, you will also be invited to visit us separately, 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 meantime, 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
What is Computer Science?

Computers are a core part of our lives: social networking, media streaming, security, gaming, applications and online shopping are all obvious examples of things that computer science has brought us that many people are very familiar with.

At its most basic level, computer science is about information: how to represent, store, communicate, manipulate, understand and make use of it. Computer science is also at the heart of 21st-century commerce and industry, with virtually every company either developing new technology or making use of it. Cutting-edge research from areas like cyber security and artificial intelligence are increasingly being put to practical use in businesses. We are at an exciting point in time for computer science.

**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. 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:

- Extract the crucial features from very large datasets such as those generated in the search for gravitational waves
- Develop new 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 computational theories 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 and fix security flaws in computational systems from travel cards to voting systems
- Detect cyber security threats and employ novel solutions

So, at its core, 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; identifying flaws in cyber security and 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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‘Computing technologies are embedded into virtually every part of our lives. We carry computers in our pockets. Athletes have computers stitched into their clothes. Computing technologies create new kinds of art and help to look for new treatments for cancer.

As computer scientists, we think of problems in terms of information.

How can our world be represented as information that computers can make use of?

How can information be transported and stored?

How can different kinds of information be processed?

Our graduates have both the intellectual and practical skills to make a real impact on an increasing variety of exciting real-world computing challenges.’

DR SANDY GOULD
Lecturer, Human Computer Interaction
School of 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 past, Peaky Blinders, having more canals than Venice, Cadbury, and being the childhood home of JRR Tolkien. It is now a centre of arts and culture, commerce and entertainment, with a vibrant and diverse community.

ENTERTAINMENT, ARTS AND CULTURE
Aside from its industrial past, Birmingham has also long been noted for its cultural heritage. The Hippodrome, Alexandra and Birmingham Repertory Theatres between them stage touring productions 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 coffee shops 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. Arena Birmingham and Resorts World Arena regularly showcase headlining music and comedy gigs and sport events. The world-famous City of Birmingham Symphony Orchestra (CBSO) has its home in Symphony Hall.

SPORT
Birmingham is home to football clubs Aston Villa and Birmingham City, with West Bromwich Albion just up the road and in recent years it has staged more sporting championships than any other UK city. The Edgbaston Cricket Ground, close to the University, regularly hosts test matches and international tournaments including the Cricket World Cup. The city also boasts 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. London can be reached in just under 90 minutes and we have excellent transport links.

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 modern facilities. These include:

- Dedicated exclusive computing labs for just our students, with ultrawide monitors, dual working spaces for PC and laptop use, and a new GPU lab, where each machine has a latest generation Nvidia GPU.
- Teaching labs for Robotics
- Research labs for Medical Imaging, Intelligent Robotics and Security
- Full wireless network
- Bookable seminar and meeting rooms with plasma screens
- Collaborative student/staff teaching space
- Student areas (with power access and presentation screens)

See more of our School: www.cs.bham.ac.uk/about/gallery/

RESEARCH
The School of Computer Science is home to academics working at the forefront of their area of expertise. Our Centre for Cyber Security and Privacy (https://sec.cs.bham.ac.uk/) is recognised as an EPSRC/GCHQ Academic Centre of Excellence in Cyber Security Research, and the School is also home to staff specialising in Artificial Intelligence, Computational Theory, and Human Centred Computing. We also collaborate with various departments across the University.
Why Computer Science at Birmingham?

Birmingham is a truly cosmopolitan 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 stimulating degrees, giving the opportunity for a challenging and rewarding academic experience.

Teaching and research excellence
Our academic community consists of people working at the forefront of their subject, and we have staff working with us from across the globe. This benefits you directly as their cutting-edge research feeds into our undergraduate teaching and gives you the chance to learn from innovative developments as they are being made.

We have the highest possible rating for our Computer Science teaching from the QAA (Quality Assurance Agency for Higher Education.) Our School also has a strong reputation for high quality research, and is currently home to four research themes; Artificial Intelligence, Security and Privacy, Human Centred Computing and Theory of Computation. Our staff specialisms span across these themes – find out more here: www.cs.bham.ac.uk/people

Rewarding excellence
Choosing the School of Computer Science at Birmingham means you will be selecting one of the top computer science departments in the UK. We recognise and reward excellence, with competitive school-specific academic scholarships. See page 26 for more details.

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. You will study a range of compulsory modules in the first and second year, which will give you a solid foundation in the fundamentals of computer science. In our BSc degrees, you will spend your final year undertaking a project and choosing from a range of optional modules.

MSci and MEng students will spend their third year choosing from a wide range of optional modules, and their final year taking a project and delving deeper into a range of optional Masters-level modules.

Our BSc in Artificial Intelligence and Computer Science allows you to study fundamental computer science subjects in your first two years, and then specialise in exclusive AI-specific modules and a project in your final year.

This curriculum is designed to allow you to really gain a solid understanding of computer science, and then specialise in modules of your choice, in effect tailoring your own education. 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 allocated an academic member of staff as a personal tutor for academic related matters. In addition, the Staff Student Forum provides a useful space for raising and addressing issues.

We also have a dedicated wellbeing officer just for our School, who provides specific sessions each day, where students can visit, talk through any concerns and receive support and guidance.

We place great importance on the wellbeing of our students, and have an extensive support network available. Find out more: https://intranet.birmingham.ac.uk/student/Your-Wellbeing/Index.aspx

Second and third year students also work as demonstrators in lab sessions, who can help you with any questions you have.

Birmingham offers a huge variety of study support options to complement your studies, and also operates the student-led ‘PASS’, where higher year students help first-year students with their study across a specific academic module.

Find out more: www.birmingham.ac.uk/undergraduate/support/study.aspx

https://intranet.birmingham.ac.uk/as/libraryservices/pass/index.aspx

Guild groups
There are over 250 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.

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 high profile car manufacturers 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 are proud to have developed a revolutionary, award-winning method for diagnosing skin cancer.
Business and industry links
In the School of Computer Science we organise events and have support services to help you refine and maximise your career opportunities. Support is tailored to your chosen subject area and draws on our excellent range of resources. You have access to an exclusive careers officer for computer science students, and a wide range of careers and employability support from our College Careers Team. We hold specialist careers fairs throughout the year just for our students and have strong local and national relationships with major industry players from the public and private sector. These companies range from major software houses such as IBM, Microsoft, Oracle, ARM, Logica to mainstream services, finance and consultancy firms such as Accenture, Goldman Sachs, Capgemini, PwC, UBS. We offer a wide network of links that can help you to secure a year in industry, a placement and eventually a graduate position. Find out more on page 22.

Employer opinion
A computer science degree from the University of Birmingham is an excellent qualification for securing an outstanding graduate job. Birmingham is one of the top universities often targeted by prestigious and established companies when looking for new employees. So, whilst the end of your degree may be a while off, it is worth considering that we will give you the specialist knowledge and transferable skills that will make you very attractive to potential employers in what is an increasingly competitive job market.

Find out more: www.birmingham.ac.uk/ug-comp-sci-employability

CASE STUDY
KYLE ALLEN-TAYLOR
MSci Computer Science with Year in Industry

Why did you decide to study Computer Science at Birmingham?
I chose computer science as my degree because at school I thoroughly enjoyed my Computer Science A Level. I found it intriguing to learn more and more about how computer systems operated. This interest, and my enjoyment of mathematics made me realise that I wanted a career that would be practical and would involve mathematics and creative problem-solving. Computer science combines both these aspects, and being a computer scientist is one of the most flexible and stimulating careers one can have.

I decided to study computer science at Birmingham for several reasons. Birmingham has a reputation for excellence regarding computer science. There was also the benefit of location, and the campus experience you get at Birmingham offers so much more than an inner-city university could. The campus has everything you could ever need, all within close proximity.

What is your experience of the School?
The School of Computer Science is fantastic; it provides everything a student could ever need. The School has its own private network, which allows only computer science students to log in to the PCs provided, and it’s one of the only buildings with 24-hour access. The lecturers are excellent, and the School really listens to the students’ feedback.

Where are you going for your Year in Industry, and how did you find it?
I will be working for IBM as a Software Developer. I applied for a variety of placements, and the Careers Fair that Computer Science organises definitely helped. I don’t believe I would have landed this placement without the experience I gained from two paid internships that I did with the University. They both helped to improve my CV and gave me additional skills that employers found attractive.

THE UNIVERSITY
Birmingham is an internationally recognised, research-led institution, and we are one of the few universities to have a large, central campus that is incredibly close to the city centre.

Our beautiful 243-acre parkland campus offers students a safe, friendly environment with all the facilities of a small town – including bars, cafes, shops, banks, an art gallery, a brand new music hall, museums, a doctors surgery and our very own railway station. Considerable investment has been made into brand new facilities, including a state-of-the-art sports centre and new library.
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. Re-designed in 2018 to allow our students to tailor their degree, our curriculum is currently undergoing standard reaccreditation with the British Computing 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 of our undergraduate programmes.

We also offer an EPS Foundation Year/Pathway for students that don’t have the standard entry qualifications that, if completed successfully, allows direct entry onto our undergraduate degrees. Find out more: www.birmingham.ac.uk/undergraduate/courses/ld/physical-sciences-foundation.aspx


### Standard UK requirements

<table>
<thead>
<tr>
<th>Programme Title</th>
<th>Computer Science</th>
<th>Computer Science and Software Engineering</th>
<th>Artificial Intelligence and Computer Science</th>
<th>Computer Science with Digital Technology Partnership</th>
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<tbody>
<tr>
<td>Award</td>
<td>BSc</td>
<td>MSci</td>
<td>MEng</td>
<td>BSc</td>
</tr>
<tr>
<td>UCAS code and duration</td>
<td>G400 – 3 years</td>
<td>G401 – 4 years (with Year in Industry)</td>
<td>GG46 – 4 years (with Year in Industry)</td>
<td>GG47 – 3 years (with Year in Industry)</td>
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<tr>
<td></td>
<td>I10A – 4 years (with Study Abroad)</td>
<td>I103 – 5 years (with Year in Industry)</td>
<td>GG6L – 5 years (with Year in Industry)</td>
<td>G402 – PwC</td>
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<tr>
<td></td>
<td></td>
<td>I101 – 4 years (with Study Abroad)</td>
<td>G403 – Vodafone 4 Years (with Year in Industry). See page 12 for details</td>
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Teaching quality: QAA: Excellent
New programme
QAA: Excellent
QAA: Excellent
New programme

### Entry requirements

<table>
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<tr>
<th>A level grades</th>
<th>Computer Science and Software Engineering</th>
<th>Artificial Intelligence and Computer Science</th>
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<tbody>
<tr>
<td>AAA</td>
<td>Grade A in A level Mathematics</td>
<td>Grade A in A level Mathematics</td>
</tr>
<tr>
<td>A*AA</td>
<td>Grade A in A level Mathematics</td>
<td>Grade A in A level Mathematics</td>
</tr>
<tr>
<td>A*AA</td>
<td>AAA</td>
<td>AAA</td>
</tr>
<tr>
<td>International Baccalaureate grades</td>
<td>Grade A in A level Mathematics</td>
<td>Grade A in A level Mathematics</td>
</tr>
<tr>
<td>666 at Higher Level (32 points overall)</td>
<td>766 at Higher Level (32 points overall)</td>
<td>766 at Higher Level (32 points overall)</td>
</tr>
<tr>
<td>6 in Higher Level Mathematics</td>
<td>6 in Higher Level Mathematics</td>
<td>6 in Higher Level Mathematics</td>
</tr>
<tr>
<td>GCSE/IB Standard Level grades</td>
<td>C/4 or 5@SL in English</td>
<td>C/4 or 5@SL in English</td>
</tr>
<tr>
<td>C/4 or 5@SL in English</td>
<td>C/4 or 5@SL in English</td>
<td>C/4 or 5@SL in English</td>
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We consider combinations of other UK qualifications (including BTEC) with an A in A level Maths. Please contact ug-admissions@cs.bham.ac.uk for further information. We also welcome a range of qualifications from across the world. Find out more: www.birmingham.ac.uk/International/students/country/index.aspx

CONTACT US
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

Webcompsci
uobcompsci

Contact us to join our ‘UG Comp Sci Facebook Group’ and talk to our Admissions Team, current students and alumni.
BSc Computer Science
This degree will provide you with a balance of general computer science, practical software engineering, and more specialised areas such as artificial intelligence and cyber security. It will focus on analytical methods and technical skills, and offer you the opportunity to combine knowledge and personal skills as you research and develop 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, AI, operating systems, nature-inspired computation, robotics and the theory of computation. Your first two years will be compulsory modules, and in your final year you will undertake a project, and have the chance to really tailor your learning based on your own interests, by choosing from a wide range of optional modules.

MSci Computer Science and MEng Computer Science and Software Engineering
Our MSci in Computer Science and MEng in Computer Science and Software Engineering are both four-year single honours degree programmes with integrated Masters-level study. You will be provided with a thorough coverage of core areas in computer science, giving you a systematic grounding in the theoretical underpinnings of the discipline. You will have the ability to go deeper into specialist areas in appropriate modules than is possible in the BSc degree.

The first two years of course content for these degrees are compulsory fundamental modules, whilst in the third year you have a wide variety of optional modules to choose from. In the fourth and final year you have the unique opportunity to select extended modules from the School’s portfolio of specialist Masters subjects, in addition to tackling a large project. You will be able to tailor your studies by choosing modules relevant to your chosen degree, and will graduate with either an MSci or an MEng.

BSc Artificial Intelligence and Computer Science
In the field of Artificial Intelligence (AI) you create machines and software that solve problems, and study the nature of intelligence. The engineering side of 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 and second year, you will study a range of compulsory modules, in order to give you a solid grounding in computer science. You will also undertake an AI-related team project.

In your final year, you will take more advanced modules in specific areas in AI, including Complex Adaptive Systems, Intelligent Robotics, Language and Cognition, and Machine Learning and Intelligent Data Analysis, alongside a 40 credit individual project.

BSc Computer Science with Digital Technology Partnerships (PwC/Vodafone)
Our degree apprenticeship programmes allow you to gain a deeper understanding of the fundamental aspects of computer science, alongside specialised business modules, and include placements, year in industry and eventual career with either PwC or Vodafone. For more information see pages 12 and 13.

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/year three and four of a four-year degree and if successful leads to your degree title including ‘with a Year in Industry’. See page 20 for more details.

Degrees with International Study Opportunities
All students enrolled on the BSc or MSci in Computer Science programmes are entitled to pursue the opportunity to undertake a Study Abroad year, in the penultimate year of their degree. To learn about the benefits of choosing to study abroad see page 21.

BSc/MSci Mathematics and Computer Science
Birmingham also offers a BSc and an MSci in Mathematics with Computer Science. These degrees are hosted by the School of Mathematics. For more information please visit: www.birmingham.ac.uk/maths
Do you have a passion for technology and digital development? Do you want to gain experience in a global company and have a guaranteed role* at the end of your studies? Do you want to earn a salary whilst studying for your degree?

If you answered yes to any of these questions then this exciting degree could be right for you.

Our four-year programmes, designed in partnership with PwC and Vodafone, will allow you to receive an outstanding education from a top computer science department, whilst gaining valuable work experience with your chosen employer within their digital teams.

You will spend your first and second year at University, undertaking placements with your employer outside of term-time, and your whole third year will be spent working for your chosen company, before you return to University for your fourth year.

Are these courses right for me?

Unique
Our programmes are one of a kind – be one of the first to take this opportunity to study and work at the same time, whilst specialising in digital technology.

Earn a salary while you learn
All your University tuition fees are fully funded by your employer, and you will also receive a competitive salary and all the usual employee benefits.

Support
You will be fully supported both at University and within your employment, with buddies, mentors, people managers and peer support.

PwC – UCAS Code G402
When you graduate, you could obtain a role working for PwC* in various areas of the company, which could include being a Cyber Security Advisory Associate, Technology Risk Associate or working in Data and Analytics.
www.birmingham.ac.uk/compsci-pwc

Vodafone – UCAS Code G403
At the end of your studies you could become a front/back end developer, data analyst, software engineer or a scrum master, the choice is yours. Upon successful completion of your studies Vodafone will guarantee you a role within one of their digital streams*.
www.birmingham.ac.uk/compsci-vodafone

ENTRY REQUIREMENTS
AAA with an A in Mathematics from three A levels or equivalent (excluding General Studies and Critical Thinking), and a C/4 or above in GCSE English.

As part of the recruitment process, academically suitable applicants will be invited to complete a range of assessment activities. These may include an additional application, video interview, and following successful completion of these activities, an assessment day attendance and UoB campus visit.

Attending an assessment day will give you the opportunity to find out more about the programme, placements and prospects with PwC or Vodafone. You will also be able to tour our campus, meet current students and talk to staff.

Applicants will be notified of the decision on their degree apprenticeship application after attending an assessment day. Those that are not successful in gaining a place on G402 or G403 will automatically be offered a place on one of our standard UG programmes, usually BSc Computer Science (G400).

Please note this programme is only available for UK/EU students.

*subject to academic achievement
I applied for the PwC Digital Technology Degree Apprenticeship at Birmingham because I mainly wanted to go to university to give myself access to work opportunities and I highly value the importance of work experience. When I found out that the programme offered two summer placements and a year in industry, I knew this would be immensely helpful to figure out what areas of technology I would like to work in and would be exposed to a great network of people. PwC is a top graduate recruiter in the UK and I knew it would be great company to kick start my career in technology.

My time on the degree apprenticeship so far has been fantastic. The School of Computer Science offers wonderful academic support and PwC has been great in maintaining frequent contact with us throughout the year, with talks from staff who work in tech, as well as fortnightly online meetings about the company. I learnt so much on my first placement too, and the people on my team were all lovely and very supportive so they were great to work with.

LAUREN ALIE
2nd Year, BSc Computer Science with Digital Technology Partnership, PwC

‘I wanted a degree that was somewhat practical and somewhat theory, letting me do my own research as well, but also having some interesting maths to look at. The computer science degree at Birmingham let me do this.

After researching the opportunity to study the degree apprenticeship with Vodafone, I applied and was glad! Vodafone is friendly and relaxed – I saw this when I got to the assessment centre day, and that made me sure that I’d be happy in a company like this.

My time in the department has been brilliant. The lecturers are so friendly and enthusiastic, and the lectures and modules are really interesting. The students in other years are great, and always willing to help out.

I have met so many people during my first placement, all who were willing to help me and teach me about the jobs they do, and being in London was brilliant! The work I did mainly revolved around researching competitors and learning about agile and scrum.

KATIE MIDGLEY
2nd Year, BSc Computer Science with Digital Technology Partnership, Vodafone

‘The degree apprenticeship is simply a fantastic opportunity. I already knew I wanted to do the BSc Computer Science course at Birmingham and the DA offers you that same course with the benefit of being employed by Vodafone throughout your degree, gaining some valuable real world experience and having already secured a job with a fantastic company after you graduate.

I have had a great experience at Birmingham so far! Everyone in The School of Computer Science is really friendly and it made settling into first year a breeze.

Since being employed by Vodafone last year I have felt like a real part of the company. We have had lots of communication with Vodafone, and during my placement I was able to make a real contribution to my team. I’m really looking forward to working there for my year in industry where I can explore more and gain more experience in the areas I want to work.

WILL MATSON
2nd Year, BSc Computer Science with Digital Technology Partnership, Vodafone

‘I applied to Birmingham for the degree apprenticeship with PwC because as soon as I stepped foot on campus I felt as though I belonged here. Working for PwC and studying at UoB was genuinely the best combination of outcomes for me. The staff and students are so approachable and friendly and there are plenty of smiling faces to help you out whenever you need it!

PwC has been an incredible company to work for, offering so many opportunities for us to genuinely make a difference in their organisation and for clients. Even the most senior directors and partners want to spend time with us to consider a new point of view when it comes to technology and the future of their business.

The placements have been a real eye opener into a large-scale firm and we settled in unexpectedly quickly into the PwC culture and family. I feel as though I will be working with the firm for a very long time, it is definitely the right environment for me!

JAMIE KING
2nd Year, BSc Computer Science with Digital Technology Partnership, PwC
Module information

Our curriculum is designed to allow us to provide a solid computer science education to our students, but also give you the chance to really delve deeper into subjects of interest in your final year. We have provided a wide range of options in the final year(s) for you to choose from, each supported by prerequisite subjects achieved in the first two years. In this new curriculum our students will study 120 credits of compulsory modules in each of the first two years and 80 credits of options and a 40-credit project in the final year. (For the MSci and MEng programmes, students will study 120 credits of options in the third year, and 60 credits of options and a 60 credit project in the final year.)

The BSc in Artificial Intelligence and Computer Science is dedicated to the study of AI, and allows you to go much deeper into AI-module content.

<table>
<thead>
<tr>
<th>Year 1 Modules (credit worth in bracket)</th>
<th>BSc Computer Science</th>
<th>BSc Computer Science with Digital Technology Partnership</th>
<th>BSc Artificial Intelligence with Computer Science</th>
<th>MEng Computer Science and Software Engineering</th>
<th>MSci Computer Science</th>
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<tbody>
<tr>
<td>Artificial Intelligence (20)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Data Structures and Algorithms (20)</td>
<td>✓</td>
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<tr>
<td>Full Stack Application Development (20)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Logic and Computation (20)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Mathematical Foundations of Computer Science (20)</td>
<td>✓</td>
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<tr>
<td>Object Oriented Programming (20)</td>
<td>✓</td>
<td>✓</td>
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Total credits for Year 1 – 120
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<tr>
<th>Year 2 Modules (credit worth in bracket)</th>
<th>BSc Computer Science</th>
<th>BSc Computer Science with Digital Technology Partnership</th>
<th>BSc Artificial Intelligence with Computer Science</th>
<th>MEng Computer Science and Software Engineering</th>
<th>MSci Computer Science</th>
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<tbody>
<tr>
<td>Functional Programming (20)</td>
<td>✓</td>
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<tr>
<td>Artificial Intelligence 2 (20)</td>
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<tr>
<td>Security and Networks (20)</td>
<td>✓</td>
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<tr>
<td>Software Engineering and Professional Practice (20)</td>
<td>✓</td>
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<tr>
<td>Systems Programming in C/C++ (20)</td>
<td>✓</td>
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<tr>
<td>Team Project (20)</td>
<td>✓</td>
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<td>Team Project (20) AI</td>
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Total credits for Year 2 – 120

Third-year modules – 120 credits
Students studying the BSc Computer Science, MSci Computer Science and MEng Computer Science with Software Engineering have a variety of 20-credit optional modules to choose from. BSc Computer Science students will also undertake a 40-credit final-year project. (Students studying the BSc Computer Science with Digital Technology Partnership degree will spend their third year working in industry. They will take a 40-credit project and choose subjects from a selection of optional modules listed below in their final year).

Examples of modules may include:
- Advanced Networking
- Computer Graphics
- Computer Vision and Imaging
- Computer-Aided Verification
- Human Computer Interaction
- Individual Study
- Intelligent Robotics
- Language and Cognition
- Machine Learning and Intelligent Data Analysis
- Mobile and Ubiquitous Computing
- Neural and Natural Computation
- Programme Language, Principles, Design and Implementation
- Security of Real World Systems
- Teaching Computing at Schools
- Theoretical Foundations for Security

** Students studying the BSc Artificial Intelligence with Computer Science with Year in Industry will spend their penultimate year working in industry, and study their project and optional modules as listed above in their final year.

Examples of modules may include:
- Advanced Networking (Extended)
- Advanced Robotics
- Complex Adaptive Systems (Extended)
- Computer-Aided Verification (Extended)
- Computer Graphics (Extended)
- Computer Vision and Imaging (Extended)
- Human-Computer Interaction (Extended)
- Individual Study (Extended)
- Intelligent Robotics (Extended)
- Language and Cognition (extended)
- Machine Learning and Intelligent Data Analysis (Extended)
- Programme Language, Principles, Design and Implementation (Extended)
- Robot Vision
- Security of Real World Systems (Extended)
- Teaching Computing at Schools (Extended)
- Theoretical Foundations for Security (Extended)

** Students studying the BSc Artificial Intelligence with Computer Science with Year in Industry/Study Abroad will spend their penultimate year working or studying abroad, before returning to take their project and modules from this list in their final year.

Fourth-year modules – 120 credits
Students studying the MSci Computer Science and MEng Computer Science with Software Engineering will undertake a 60-credit final-year project, and have a variety of extended optional 20-credit modules to choose from.

Examples of modules may include:
- Advanced Networking (Extended)
- Advanced Robotics
- Complex Adaptive Systems (Extended)
- Computer-Aided Verification (Extended)
- Computer Graphics (Extended)
- Computer Vision and Imaging (Extended)
- Human-Computer Interaction (Extended)
- Individual Study (Extended)
- Intelligent Robotics (Extended)
- Language and Cognition (extended)
- Machine Learning and Intelligent Data Analysis (Extended)
- Programme Language, Principles, Design and Implementation (Extended)
- Robot Vision
- Security of Real World Systems (Extended)
- Teaching Computing at Schools (Extended)
- Theoretical Foundations for Security (Extended)

** Students studying the MSci Computer Science with Year in Industry/Study Abroad and the MEng Computer Science with Software Engineering with Year in Industry will spend their penultimate year working or studying abroad, before returning to take their project and modules from this list in their final year.

Whilst every attempt is made to provide accurate information, changes to modules and descriptions may occur, as this brochure is written six months in advance.

For detailed, up-to-date information on modules and our curriculum please see: www.cs.bham.ac.uk/admissions/undergraduate/degrees/ug-curriculum
Artificial Intelligence explained

Artificial Intelligence is at the forefront of every day technology, and society more broadly. One of the core concepts of computer science, the need for computer scientists specialising in AI is growing at a rapid pace.

AI is the design and use of computer systems to understand and mimic human-level decision making. These systems represent, reason with, and learn from different descriptions of knowledge and uncertainty. It is also the design and use of such computer systems to solve practical problems in different domains. AI research at Birmingham covers theoretical and applied topics, including:

- **Computer Vision** – developing methods for scene understanding, motion tracking, and gaze and pose estimation of humans interacting with computer systems.

- **Cognitive systems** – developing computer systems inspired by theories of human and animal control and cognition, and using such systems to model and understand decisions, emotions, intention, and action capabilities – in humans or machines.

- **Machine Learning** – understanding the theoretical underpinning of learning methods, and developing and using methods that learn from data to solve problems in different applications. It also allows us to leverage the ready availability of large datasets and computing power in recent occurrences.

- **Natural Language Processing** – developing computer systems that can understand and communicate in human languages.

- **Nature-inspired Computing** – developing methods inspired by natural systems such as evolution, ant foraging, molecular computation, and cell signalling.

- **Neuroscience** – developing models inspired by the stimulation of neurons in the brain, and using models to understand and mimic human behaviour and brain function.

- **Robotics** – enabling robots to sense, speak, reason, navigate, understand the environment, manipulate objects, and collaborate with other robots or humans in different applications.

**Applications of AI**

AI is at the heart of everyday technology, and our work in AI at Birmingham is applied to a wide range of domains. Some specific recent applications and projects include:

- Predicting extreme weather events and regional weather under changing climates.
- Warehouse logistics and automation based on sensor networks and robots.
- Robots providing cognitive engagement and enhancing the physical well-being of older adults.
- Understanding fundamental phenomena in astrophysics.
- Fraud detection systems that model and analyse customer behaviour.
- Automated trading algorithms that evolve stock trading strategies to outperform the market.
- Automated collision avoidance and parking for self-driving vehicles.
- Rostering of staff and allocation of resources efficiently based on preferences and needs.
- Medical decision support systems that help clinicians make accurate decisions.
- Forensic analysis of CCTV images to help catch criminals.

**AI teaching**

Our degree programmes at Birmingham provide a strong theoretical grounding in AI and many opportunities to put this theory into practice. Our AI teaching offers modules that include:

- **Artificial Intelligence** – which allows you to learn methods related to some fundamental AI concepts such as search, reasoning, and learning. You will work in teams to implement some of these methods on small Lego robots in our labs.

- **Intelligent Robotics** – where you will learn the fundamental concepts related to robots that sense, reason about, and navigate through a complex domain. You will work in teams to implement the related methods on mobile robots, and complete a final project of your choice.

- **Machine Learning** – you will gain a solid understanding of the theoretical concepts and methods for analysing and learning from data, and apply these methods to solve practical problems.

- **Nature-inspired Computation** – you will study the basic concepts, theories and methods for designing and understanding complex adaptive systems, using techniques from fields such as evolutionary computation, swarm intelligence and artificial neural networks.

- **Computer Vision and Imaging** – you will learn methods to transform an image and understand its contents in the context of topics such as image segmentation, object recognition, stereo vision, motion analysis, and tracking.
UG students Goda and Tom working in the Robotics Lab
Cyber Security explained

Cyber security is an integral part of everything we do in a digital society. From messaging friends to making bank payments, from medical implants to the power network, it is becoming increasingly important to ensure that all connected devices are secure. Cyber security deals with the design and analysis of these systems, and our research feeds into our teaching.

Wherever there is a computer, there is a potential attacker. These attackers can be local to the computer or remote, launching attacks across wired or wireless networks. By sending specially crafted messages or packets, attackers can exploit vulnerabilities in software and gain privileged access. The approach we take to our research and teaching reflects the two broad categories of activity in cyber security:

- **Designing secure systems** – As more and more of our devices are linked together, not just computers but everything from phones to door locks to vehicles, it is increasingly important that security is considered at all stages, from design to implementation and deployment. We want to make sure that future systems will be secure, and teach useful skills for programmers, engineers and designers in any industry.

- **Analysing systems for security** – There are many systems currently in use that may not have been built with security as a top priority. It is important to identify, understand and fix devices or systems that have vulnerabilities.

Through formal analysis of code, automated techniques to check firmware, active penetration testing, or hardware side channel attacks, we analyse all manner of digital devices to find and fix vulnerabilities. Whether it is a drone, phone or car, we want to fix vulnerable systems to ensure they function securely and to protect user privacy.

Our Security and Privacy group is recognised by NCSC as an Academic Centre of Excellence in Cyber Security Research. We work on the following key issues:

- **Applied cryptography** – almost all cyber security is underpinned by cryptography. We research new forms of encryption and implementation for real-world applications.

- **Embedded devices** – from smart cards to IoT to trains, we work on all types of cyber physical systems.

- **Automotive security** – as cars become increasingly connected, we test and design ways to make them more secure.

- **Wireless security** – we work to make sure the ways information is carried are not vulnerable to attack.

- **Cloud security** – we want to make sure that user data is secure and private without compromising functionality.

- **Formal verification** – at the design stage we use mathematics to provide proof that systems are secure.

- **Electronic voting** – we are working on ways to make online voting secure, verifiable and usable.

- **Security and privacy for society** – we want to make sure that user data is protected from attackers, working on issues that are important to government, industry and society as a whole.

‘Everything we do in the future will involve digital technology, whether it’s driving a car or turning on a light switch. This will create new opportunities and new risks. Therefore it’s crucial to understand the fundamentals and implementations of cyber security.’

PROFESSOR MARK RYAN, Professor in Computer Security
Cyber Security teaching
We understand the importance of providing students with both a strong theoretical grounding and relevant practical experience in order to be able to respond to a variety of roles and threats. Our teaching in Cyber Security includes:

- **Systems and networks** – as computers are embedded in everyday life, protection against the criminal or unauthorised use of electronic data is essential. We introduce students to the core concepts of storing, using and transmitting data securely.

- **Real-world security** – it is important to understand how security works in real systems. We teach students how to find, analyse and defend security vulnerabilities using a range of practical methods and tools.

- **Security theory** – cyber security is very hard to achieve in practice. By understanding the theoretical foundations of security, such as cryptography, authentication and confidentiality, students are able to build systems that resist a broader range of attacks.

HIGHLIGHTS

- Since its inception in 2005 by Professor Mark Ryan, the Security and Privacy group has grown to 11 academics, making it one of the largest academic cyber security research centres in the UK.

- Secure chips – work by Professor Mark Ryan in discovering vulnerabilities in the Trusted Platform Module (TPM) led to revisions in the TPM 2.0 by the international Trusted Computing Group consortium, to make sure future hardware is secure – this probably includes your current laptop.

- Critical infrastructure – our researchers, led by Dr Tom Chothia, are making sure that critical national infrastructure such as rail and power networks, as well as other industrial control systems, are secure against cyber attacks.

- Hacking vehicles – Professor Flavio Garcia, working with Dr David Oswald, has improved the security of cars by exposing vulnerabilities in immobilisers and keyless entry systems in systems used by over 100 million drivers. They are now working on secure architectures for next generation connected vehicles.

- Fatal flaws – our lecturers, working with students, are constantly improving the security of essential devices. From glucose monitors to pacemakers, our researchers have found flaws that leave patients vulnerable to tracking and interference. Having found a possible attack, we work with manufacturers to design more secure implementations.

Find out more about our Centre for Cyber Security and Privacy: https://sec.cs.bham.ac.uk/
Year in Industry

The UK has a significant shortage of computer science skills, but there is an incredible demand for computer scientists, which is growing all the time. Gaining relevant work experience during your studies can often give you the edge, helping you to develop skills and experience that will enhance your university education and maximise your prospects after you graduate.

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/three* years of your degree at Birmingham, followed by a 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 our dedicated careers officer and College Careers Team for help.

What will I do?
You will 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 UBS, Goldman Sachs, BAE Systems, Microsoft Studios, RIM, Caterpillar, PwC, General Electric, IBM and Google, amongst others.

Find out more:
www.birmingham.ac.uk/university/colleges/eps/study/undergraduate/computer-science/year-in-industry.aspx

CASE STUDY
ELLA ROSS
BSc Computer Science with Year in Industry

How has your experience studying computer science at Birmingham been?
I love studying computer science at Birmingham. The variety in types of modules I can take was something that drew me to Birmingham in the first place. In one lecture I can be learning about the intricacies of deep neural networks and in another I can be working on an algorithm to decode messages for a security assignment. I think the best thing about studying here is the relationships you build with your peers and lecturers. I haven’t found anywhere else where people are so interested in me and my passions!

Where did you go to work for your Year in Industry?
I worked at GE Aviation in their Digital Business team as a Full Stack Developer. My job involved working in a team to create web applications in Java and Javascript. This allowed me to work on lots of real-life projects, learn new skills and apply the knowledge I’ve learnt at university. I cannot recommend this year enough!

CASE STUDY
HUNG HOANG
BSc Computer Science with Year in Industry

Why did you apply to Birmingham?
I applied to Birmingham as the computer science degrees offered provided the most applicable, fundamental and widely used foundational knowledge as well as giving the option to specialise in certain areas. But what really sold it for me was the department itself. The lecturers and staff are so welcoming and made me feel at home.

What are you doing now?
For my Year in Industry, I went to work as a software developer for Bloomberg LP. I really enjoyed being part of a team, and could clearly see the effect of the things that I worked on, which was really rewarding. Bloomberg offered me a graduate role, so I’m now working for them as a software engineer. My degree and year in industry definitely helped me obtain my position – a lot of my technical interview was about content I’d learnt during the course. Birmingham definitely prepared me well!

*BSc/MSci or MEng
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 – experience a different 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 traveller
- 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 course are eligible to take part in the Erasmus+ Exchange programme and International Exchange programme. This means that you will spend your penultimate year 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 that want to study at one of our partner universities in Europe. The programme is run by the Study Abroad and Exchanges Team within the University’s central International Relations Department, and students are able to spend up to a year with a partner institution.

For more information please visit: www.birmingham.ac.uk/studyabroad-outgoing

INTERNATIONAL EXCHANGE PROGRAMME
We have international partner universities all over the world that offer study opportunities for our students. Countries include: Argentina, Australia, Brazil, Canada, Chile, China, Ecuador, Ghana, Israel, Japan, Korea, Malaysia, Mexico, New Zealand, Singapore, Uruguay, USA and the West Indies.

LEARN MORE
Contact the Study Abroad Office:
Email: outgoingstudyabroad@contacts.bham.ac.uk
www.birmingham.ac.uk/studyabroad

CASE STUDY
ELLIOTT UPTON
BSc Computer Science
with Year Abroad

Why did you decide to study computer science at Birmingham?
I chose to study at Birmingham due to the atmosphere and welcoming spirit of everyone I was able to speak to when I visited – CS is like a giant family! Birmingham’s specialisations also piqued my interest as they are leading in multiple areas, giving me the chance to learn from the best. Whilst studying I also had the chance to get more involved with the School and student body, working as an ambassador and being a student rep. This really allowed me to grow as a person.

Where did you go for your Year Abroad?
As part of my degree I was given the chance to study full time at the University of Melbourne for a year. This was an incredible opportunity that allowed me to further expand my studies, experience different cultures and network globally. I would highly recommend this to anyone.

What are you doing now?
I am working for Cisco International Ltd as a Software Engineer. I achieved this graduate role by attending their University Challenge which we won, quickly prompting many application forms to be sent my way for a year in industry. However, I chose to go to the University of Melbourne to study, rather than take an industrial year. When I came home, I applied for a Cisco graduate role and was successful, with my previous relationships holding me in good stead.
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 targeted by prestigious companies when looking for new employees. So whilst graduation may seem a long time away, it is worth considering the enormous 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.

What skills will I develop?
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 skills offered by computer science graduates, and as such, you might find yourself in a variety of environments in academia, industry, start-up companies, research and commercial organisations.

Future employers will also 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.

You may wish to pursue postgraduate study before entering employment or embark on an academic career. We offer specialist MScs in Robotics, AI, Cyber Security, Advanced Computer Science and HCI. 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 specialist Careers Fairs throughout the year (which include our Software, Systems and Emerging Technology Fair and Financial Computing and Consultancy Fair), where global companies come onto campus to meet our students exclusively. We have a dedicated careers officer for our School, and a large University Careers Network, who have an Engineering and Physical Sciences team that you can visit for advice and guidance throughout your studies.

Find out more about our connections with industry, opportunities available and what our graduates are doing now: www.birmingham.ac.uk/ug-comp-sci-employability

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

WE HAVE EXCELLENT CAREERS AND EMPLOYABILITY LINKS, AND 93% OF OUR STUDENTS ARE IN GRADUATE EMPLOYMENT OR FURTHER STUDY, SIX MONTHS AFTER STUDYING WITH US (DLHE 2016/17)
WHAT TYPES OF JOB CAN I GET?

The following job titles and their definitions have been chosen to give you a flavour of the variety of opportunities that exist.

- **Applications Analyst**: Responsible for the administration, monitoring and maintenance of software infrastructures and applications, to ensure integrity, safety and availability of data.
- **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 Engineer**: 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.
- **Cyber Security Analyst**: Works to protect organisations by employing a range of technologies and processes to prevent, detect and manage cyber threats.
- **Data Analyst**: Works to understand large data sets and provide insight, analysis and guidance in sectors including business intelligence, finance, higher education, marketing, sales.
- **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 college after taking a Postgraduate Certificate in Education (PGCE).
- **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 text, sound, artwork, 2D/3D modelling, animation, video and virtual reality to create a multimedia product, (eg, 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 community 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 ones; 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 Engineer**: 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/Developer**: 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](http://www.prospects.ac.uk) – the UK’s official graduate careers website.

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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 an Open Day and then an Offer-holder 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 readied me for an exciting career in technology.
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: www.ucas.com/students/apply.

When to apply
The majority of applications to our School 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 Visit Days offered from November each year.

Computer Science Offer-holder Visit Days (OHVDs)
Invitations to attend a School of Computer Science Offer-holder Visit Day are sent to all applicants who have been made an offer, and it is strongly recommended that you try to attend. It is a great day and an excellent opportunity to meet and ask questions of our academic staff and current students, attend subject talks, demonstrations and experience our fantastic department and campus. It is different to an Open Day, and we also use the day to get to know our offer holders better, which can be very useful during Confirmation and Clearing.

UK/EU scholarships
UK applicants applying for our standard degrees are only considered for one of our Excellence Scholarships if they have attended an Offer-holder Visit Day, chosen Birmingham as their Firm Choice by 1 August, and have satisfied their offer conditions. EU and International applicants are warmly invited to attend an Offer-holder Visit Day, but we realise that this is most likely impractical. EU applicants are considered for the Excellence Scholarships using other means. The Scholarship Committee will meet in August and contact all successful applicants then.

Successful applicants for the BSc Computer Science with Digital Technology Partnership are not eligible for our School Scholarship.

International scholarships
International applicants are considered for our Achievement Bursary and Excellence Scholarships using different criteria. For further information regarding Computer Science Scholarships, please see page 26.

Virtual Events
We also run regular virtual events and Facebook Lives which you are invited to take part in, and ask us any questions you might have. Sign up here: www.ug.bham.ac.uk and follow us on Facebook (@uobcompsci).

Campus tours
If you are unable to attend one of our OHVDs, 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 more information or to book a place, please contact Student Recruitment and Outreach.
Tel: +44 (0)121 414 3374
Email: studentrecruitment@contacts.bham.ac.uk

FIND OUT MORE

About Offer-holder Visit Days:
www.cs.bham.ac.uk/admissions/undergraduate/offer-holder-visit-days

CONTACT

Please contact us if you have any questions:
Email: ug-admissions@cs.bham.ac.uk
Tel: +44 (0)121 415 8742

FACEBOOK GROUP

Contact us to join our ‘UG Comp Sci Facebook Group’:
Email: ug-admissions@cs.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 degrees, 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/ambassadors

Accommodation
At Birmingham we offer a fantastic choice of living, all of which provide a safe, secure and sociable start to your university experience. We have three main University accommodation ‘villages’, and there is plenty of privately owned student accommodation in the vicinity.

For more information on types of accommodation, applying and our Freshers Guarantee Scheme, please visit: www.birmingham.ac.uk/study/accommodation/ug-accommodation/index.aspx
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 to contribute towards your living costs.

- UK/EU students can take advantage of financial support for tuition fees offered by the Student Loans Company (www.slc.co.uk), the agency that administers grants and loans to UK/EU students in higher education in the UK.

- UK students can also apply for a Maintenance Loan to assist with living expenses provided by the UK government. The amount you can borrow is determined by your household income and where you are intending to study (www.gov.uk/student-finance/loans-and-grants).

EU students are not eligible for this and are advised to contact their home country with regards to financial support for living costs incurred whilst studying in the UK.

Please note successful applicants for the BSc Computer Science with Digital Technology Partnership are not eligible for the School Scholarship and should not be in receipt of any student loans.

Financial support for international students
If you are an international student, you will not be eligible for any financial assistance from the UK government. However, we recommend contacting your home country to determine if there is any financial support available for international students studying in the UK. You may also find it useful to visit: www.birmingham.ac.uk/International/students/finance/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

You can also visit our ‘Undergraduate Funding Database’ to view any funding opportunities available: www.birmingham.ac.uk/undergraduate/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:
- Excellence Scholarship: £3,000 award, conditional upon meeting certain criteria, which includes attending one of our Offer-holder Visit Days and choosing us as your Firm choice by 1 August.
- Alternative options will be made for EU applicants unable to attend an Offer-holder Visit Day.

International:
- An Achievement Bursary of £1,500 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 £1,500 will be awarded to international students who obtain exceptional academic results (A*AA or equivalent). This Scholarship will be awarded for the first year only.

Please visit: www.cs.bham.ac.uk/admissions/undergraduate/scholarships to learn more.

INFORMATION
Find out more about fees and funding by visiting: www.birmingham.ac.uk/undergraduate/fees/index.aspx

Visit www.facebook.com/SFEngland/ to keep up to date with Student Funding developments
What our students say

‘I picked Birmingham because every time I visited I felt welcomed – out of all the universities I’d 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
MSci 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!’

GWEN
BSc Artificial Intelligence with Year in Industry

‘The first thing that caught my eye when looking for places to study was the set of modules and the overall rank and prestige of the University. However what sealed the deal was the attention and care I received when I visited beforehand. I received lots of support during my studies, have made some of the best friends I have ever had and I have learnt all the things necessary to help me stand on my own two feet when going out into industry.’

TUDOR
BSc 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 the 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.’

LOUISA
BSc Computer Science

‘The School impressed me from the beginning. The atmosphere is very warm, staff and lecturers are always friendly and you get to know students from all years, which made me feel at home. Looking back at my time so far, I feel proud to be a student at such an amazing university, which proves that I made the right decision.’

ALEXANDRA
BSc Computer Science with Year in Industry

‘The School’s staff and my fellow coursemates were incredibly welcoming when I arrived! It really did make a difference for me especially as an international student starting my life in the UK. The facilities we have are continuously improved and developed in response to feedback that we give as students, which is great.’

TSANIMIR
BSc Computer Science
This leaflet 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 not all programmes or all courses are offered every year. Also, because our research is constantly exploring new areas and directions of study some courses may be discontinued and new ones offered in their place.

Please note the information in this brochure is correct at time of publication but may be subject to change (October 2019).