Key facts

- The University of Birmingham has run nuclear-related courses for the past 60 years
- A large portion of the UK Nuclear workforce has been trained at the University of Birmingham
- The University has world-leading research facilities including its own cyclotron
Welcome!

What may not have escaped your attention is that the University of Birmingham has one of the most attractive campuses of any UK University, and has ambitiously invested in nationally leading sporting facilities and library. This matches the desire to be amongst the best environments for students to develop and thrive. The University is a powerhouse in the local economy, generating over a billion pounds into the West Midlands economy per year, and supporting 10,000 jobs – equivalent to one job in every 50 in Birmingham. Its impact on the economy is more than double that of the eight regional football teams combined.

The College of Engineering and Physical Sciences (EPS) has been the engine that has powered the success of the University in recent times. It encompasses Physics and Astronomy, Chemistry, Mathematics, Computer Science, and the Engineering Schools associated with Electrical, Chemical, Civil, Mechanical and Metallurgy & Materials disciplines. Its research is motivated by the desire to discover, design and deliver and thematically is linked to Science Frontiers, Advanced Manufacturing and Resilience, Energy and Sustainability. The impact of the research of EPS has been major, from the development of the cavity magnetron, which revolutionised radar and gave birth to the microwave oven, to a leading role in the discovery of the Higgs Boson.

One of the liberating effects of the College structure is that it encourages cross-discipline research, and many of the great challenges reside at these interfaces. Nuclear power is a fine example of the need to bridge subjects. Combining Nuclear Physics and Materials opens up the ability to advance our understanding of the behaviour of materials in the extreme environment of reactors. Similarly, Computer Science with Mechanical Engineering is essential for the development of robotics systems for nuclear decommissioning and Chemistry combined with Earth and Environmental Sciences (and even Biosciences) has been key in understanding the migration of radionuclides in the geology and hydrological environment.

The Centre for Nuclear Education and Research takes advantage of the leading science and research we do across the University to solve the challenges associated with nuclear fission, fusion, nuclear waste management and decommissioning. Our heritage means that we have some unique facilities, which include our own particle accelerator – an MC40 cyclotron. This can accelerate high energy beams of particles such as protons.

Birmingham has one of the largest nuclear research and education programmes in the UK, which is embedded in a University that both celebrates excellence but is truly ambitious. This is a great place to both study and work and we would be delighted if you were part of that.

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Staff profile
Prof Martin Freer

Martin Freer is a Professor in the School of Physics and Astronomy, and acts as Head of the Nuclear Physics Research group and Director of the Centre for Nuclear Education and Research. Prof Freer’s main research area is the study of the structure of light nuclei using nuclear reactions. He has a strong interest in the UK’s energy policy and led the 2012 University of Birmingham Policy Commission, which examined the Future of Nuclear Energy in the UK. In 2010 he won the Rutherford Medal for his contribution to nuclear science.
Meeting the energy challenge

There are many challenges facing the UK, perhaps none greater than that associated with energy. Driven by the need to address climate change and energy security, the UK is reshaping its energy portfolio. In a bid to decarbonise energy production, renewable energy sources are taking centre stage - coupled with efforts to increase energy efficiency. Nevertheless, it is widely believed that such sources alone cannot meet the full UK demand. Other low carbon sources will be required.

Many countries are revolutionising the way they generate energy, but for the UK – with its large population density and the relatively high per capita use of electricity – the situation is more acute than for other countries. At a time when demand is predicted to increase, the UK’s current nuclear power stations will be approaching their design lifetimes – the last is due to close around 2035. In addition, many coal power stations are to be closed commencing in 2015, as controls on various emissions are tightened. Combined, these two sources account for nearly 50% of the current UK electricity production. This will create a significant gap between supply and demand that, unaddressed, will have dramatic consequences. Is enough being done, and done fast enough, to fill the gap in the UK’s energy portfolio? Herein lays the challenge for both Government and those who seek to influence policy alike.

The Kyoto Protocol agreed in 1997 commits nations to cut greenhouse gas emissions. The UK made a unilateral commitment to reduce its greenhouse gas emissions (focussing on CO₂) by 80% of 1990 levels by 2050 – a commitment now enshrined in the 2008 Climate Change Act. The UK’s electricity consumption is approximately 350 TWh per year and the lion’s share (approximately 70%) is produced by CO₂-generating coal and gas power stations. The solution then seems obvious: decommission coal and gas power stations and replace them with low-carbon alternatives.

Is this a plausible solution? The answer is not trivial. The UK road transport produces approximately 20% of CO₂ emissions and electrification of transport would increase electricity demand. History shows that it is unlikely that electricity demand in the UK will plateau or decrease – in the last 30 years there has been an approximately linear growth in demand of 3-5 TWh/year.

One drawback of renewable energy sources is that they need a lot of space; wind turbines have an energy density of 2-3W/m², so that a 25 MW wind farm would need ten square kilometres of land. To put this into context, the UK’s demand divided by its land area gives a figure in excess of 1 W/m², implying the coverage 1/3-1/2 of the UK landmass with wind turbines. Offshore wind turbines solve this problem, but create others not least of which being the increased cost, which is an important consideration not only for the domestic consumer and voter, but also for industry.

As part of the solution, the Government has a stated aim of encouraging the continued use of nuclear energy, a tried and tested technology...
shown to be one of the lowest emitters of greenhouse gases and that would contribute to the UK’s security of supply by providing a significant fraction of the country’s base load electricity. Importantly, at the political level, there is cross-party support for maintaining a significant proportion of nuclear in the UK’s future energy mix. In some scenarios the contribution to the UK’s electricity generation from nuclear power could be as high as 40%.

In terms of new construction, eight or more reactors are under consideration. The first to be constructed will be the AREA EPR reactor at both Hinkley Point C and Sizewell C. The EPR is a modern pressurised water reactor (PWR) with high levels of safety. Next, it is likely that the Hitachi-GE advanced boiling water reactor (ABWR) will be constructed, followed by others. With this level of investment there is a significant chance of the UK making progress towards its greenhouse gas emissions targets, and securing its electricity supply for future generations. What is abundantly clear is that nuclear energy is going to play a key role.
Nuclear engineering @ Birmingham

‘The Birmingham Centre for Nuclear Education and Research was launched in 2010 and provides the investment and infrastructure to grow the nuclear expertise and capacity that has existed at Birmingham for over 60 years.’

The University of Birmingham has a long and established track record in the areas of decommissioning, health monitoring, nuclear physics and residual life prediction of existing nuclear power stations. The Physics and Technology of Nuclear Reactors MSc course began in 1956, only weeks before the opening of the Calder Hall power station at Sellafield. Building upon our experience in this field, the University launched the MSc course in Radioactive Waste Management and Decommissioning, and undergraduate programmes in Nuclear Science and Materials (BSc) and Nuclear Engineering (MEng).

The teaching activities of the Centre for Nuclear Education and Research are supported by research programmes across all Schools in the College of Engineering and Physical Sciences.

In Metallurgy and Materials, the University of Birmingham has made significant contributions in the study of the extension of the lifetime of reactor materials, which led to Professor John Knott receiving an OBE for ‘services to Nuclear Safety’ in 2004. The research groups of Professor Alison Davenport and Doctor Brian Connolly also made important contributions towards understanding the effects of radiation and corrosive environments on materials making up critical components of nuclear power plants and spent fuel storage sites.

In the Geoscience area, the University has active research programmes in geosphere characterisation for nuclear waste disposal, in particular groundwater engineering, groundwater pollution and the modelling of contaminant transport in complex aquifer systems.

In Physics, the University also has an established record in research into radioactive waste assay, having supported PhD programmes in collaboration with industry on assay of waste drums containing uranium and plutonium using both gamma-ray and neutron detection techniques.

Thanks to the nuclear-related research activity spanning many Schools, strong links with industrial partners, and its 60-year-strong experience at teaching these subjects, the University of Birmingham is in a unique position to offer the undergraduate and postgraduate programmes described in this prospectus.
Our research

Nuclear Physics
The study of the structure of the nucleus and its constituents is fundamental to the key questions that underpin our understanding of the universe. These range from the nature of the universe an instant after the Big Bang, through to how best to harness the power of the atom. By studying the structure of atomic nuclei, researchers at the University of Birmingham hope to provide answers to these fundamental questions. Our work in this area takes us to an international stage: experiments using the ALICE detector at the LHC at CERN (for which our researchers constructed key components) are colliding heavy nuclei together to form the quark-gluon plasma.

Materials in extreme environments
The future of nuclear power is intimately linked to our ability to develop new materials capable of operating at higher temperatures and pressures, and reliably characterising their properties under these conditions. Additionally, one of the key issues facing the sector is a genuine understanding of how materials change when they are exposed to high levels of radiation; changes to their tensile strength could have dramatic consequences! Birmingham has an on-site materials irradiation facility consisting of the UK-unique MC40 cyclotron. The cyclotron is able to accelerate beams of protons and focus them onto samples of the size of a few mm. These samples can also be tested, in situ, to establish how their properties evolve with irradiation.

Robotics
One of the outstanding challenges in the nuclear industry is the decommissioning of the current generation of nuclear reactors and facilities. The associated costs are predicted to be in excess of £70 billion. This is a highly complex problem, which involves working in highly active environments normally inaccessible by humans. At the University of Birmingham, researchers have worked on developing robotic systems capable of learning and making intelligent decisions for many years. These researchers are now leading a research programme, sponsored by the Nuclear Decommissioning Authority, focussing on developing robotics for remote dismantling of contaminated environments.

Nuclear waste remediation
The importance of remediation of radio-nuclei within the environment and the prevention of radioactive material escaping into the environment has been highlighted by the post tsunami events surrounding Fukushima. New technologies are being developed at the University of Birmingham. Given the issues over cleaning up existing legacy waste sitting in storage ponds and dealing with the reactors due to be decommissioned, our work on developing new and improved ion-exchange materials continues to be an important topic. Additionally, we run exciting research programmes looking at the potential of using bio-molecules for nuclear waste remediation.

Human factors
An essential component of nuclear safety is realistic training. This is relevant to both the operation and decommissioning of nuclear reactors. In the age of gaming machines, one of the most portable and effective training environments is virtual. Researchers at the University of Birmingham have used gaming engines to generate a variety of realistic training environments. For example, our SubSafe project has been used to train submariners to operate UK’s nuclear submarines safely. In these simulations, trainees have access to all decks, comprising over 30 compartments and 500 objects, including major safety-critical items. The ability to develop realistic training scenarios has been recognised by the nuclear industry to be an important component of developing safe operation of future facilities and the University of Birmingham is currently engaged in discussions with partner companies regarding the development of such simulations.

Nuclear waste storage
Safe storage of radioactive materials from the nuclear industry remains a research challenge. Austenitic stainless steels are the most common materials used for intermediate level radioactive waste containers in the UK. However, the time for which the radioactive material must be stored significantly exceeds our working experience of these stainless steels. In order to be confident of the resilience of the material over the period of thousands of years the corrosion properties must be understood in detail. Research at Birmingham funded by the Nuclear Decommissioning Authority is characterising in detail the corrosion process. This involves both direct measurements of the corrosion process and corrosion modelling.
Our Undergraduate Programmes

BSc in Nuclear Science and Materials (H821)
MEng in Nuclear Engineering (H822)

These unique courses are designed to develop the skills and understanding required to prepare students for the Nuclear Sector. Our undergraduate courses provide a strong background in physics, mathematics and engineering, together with modules specifically designed to train students for the nuclear industry. Fundamentals and background modules are drawn from top ranked Schools across the University including the Schools of Physics and Astronomy, and the School of Metallurgy and Materials. These degree courses have been designed in response to demand from the nuclear industry to equip students with the fundamentals to provide non-fossil fuel alternatives for our future energy requirements.

In year 1 and 2, students spend 80% of their time covering some of the background physics relevant for nuclear engineering as well as developing basic skills essential for a career in the nuclear industry. The remaining time in year 1 and 2 is spent learning the fundamentals of materials science and engineering. In year 3, students start exploring some of the specific knowledge essential for the sector, through radiation detection laboratories and modules on the environmental degradation of materials, the physics of nuclear fusion and fission and radiation protection. Students on the MEng course spend year 4 covering masters-level courses on nuclear engineering, reactor control systems, radiation transport and advanced particle detectors.

Assessment methods include examinations, written assignments, oral and poster presentations, computer-based tests, class tests and laboratory reports. In the third year, students work on a 12-week nuclear-industry-related group project, presenting findings and results to our industrial partners. Students on the MEng course also do an individual research project during their fourth year. During this time, students are fully embedded in the research groups of academics in the School of Metallurgy and Materials, working on key issues concerning the materials that will be used in the nuclear power plants of the future.

Staff profile

Dr Brian Connolly

Dr Brian Connolly is a Senior Lecturer and director of undergraduate courses for the Centre for Nuclear Education and Research. Dr Connolly’s expertise is primarily in the area of corrosion engineering and electrochemical science. He has published over 30 papers in scientific journals as well as reviews and book chapters. He also has over ten years experience in undergraduate and graduate education/instruction with an emphasis on mechanical engineering and materials science.
Year 1 modules
- Fundamentals of Materials Science: Structure
- Fundamentals of Materials Science: Shaping
- Classical Mechanics and Relativity 1
- Electromagnetism, Temperature and Matter
- Fluid Flow, Thermodynamics and Heat Transfer
- Mathematics
- Physics Laboratories
- Communication and Presentation Skills

Year 2 modules
- Ferrous and Non-Ferrous Alloys
- Fracture, Fatigue and Corrosion
- Functional Ceramics
- Classical Mechanics and Relativity 2
- Nuclear Physics
- Mathematics
- Statistical Physics and Entropy
- Physics Laboratories
- Electrical Power
- Communication and Presentation Skills

Year 3 modules
- Control of Microstructure
- Design Against Structural Failure
- Environmental Degradation of Materials
- Design for Manufacture
- Thermal Hydraulics
- Essentials of Quantum Mechanics
- Nuclear Physics 2
- Physics of Nuclear Fusion and Fission
- Nuclear Radiation Laboratory
- Radiation Protection, Dosimetry and Shielding
- Industrial Group Project

Year 4 modules
- Nuclear Engineering
- Reactor Systems and Safety Analysis
- Reactor Control Systems
- Radiation Transport and Reactor Kinetics
- Particle Detectors and Electronics
- Optional Module Choices
- Individual Research Project

Scholarships
For home/EU students, we offer scholarships based on entry grades: £3,500 for A*A*A, £2,500 for A*AA. Note that the A* should be mathematics and/or a numerate science (Physics, Chemistry, Biology). For overseas students, we offer £3000 for students with A*AA or AAAA and £1,500 for students with AAA. These are renewed yearly at £1,500 subject to outstanding performance in the course. In addition, applicants can also apply for University-wide scholarships, such as those for music and sports.

How to apply
Applications are accepted via UCAS

Admission requirements
BSc Nuclear Science and Materials (H821):
- AAB (A in Physics and Mathematics)
MEng Nuclear Engineering (H822):
- AAA (A in Physics and Mathematics)

Accreditations
Our courses are accredited by the Nuclear Institute and the MEng degree is accredited by the Institute of Materials (IoM3).
Our Postgraduate Programmes

MSc Physics and Technology of Nuclear Reactors

The aim of this programme – which began in 1956 – is to provide the necessary background, both in breadth and in depth, for anyone wishing to enter the nuclear industry. The areas of study and degree of specialisation involved have changed considerably to reflect the increasing sophistication of the field, and yet the overall breadth of the course has been maintained. Studentships are sponsored by the nuclear industry in the UK, and these provide excellent and effective entry routes into careers in this stimulating field for physicists, mathematicians, metallurgists or engineers.

This degree course will provide students with the relevant skills, knowledge and understanding in nuclear sciences, reactor design and control, and materials science, preparing graduates for a career in the nuclear industry.

The course runs over a 12-month period from October to September. Taught modules are delivered in the autumn and spring terms and consist of lectures and practical sessions interspersed with field trips and industry seminars. Taught modules include: particle detectors; nuclear electronics; radiation dosimetry; radiological protection; radiation shielding; thermal hydraulics and nuclear engineering; metallurgy; reactor materials; safety analysis; non-destructive testing; reactor kinetics and control; nuclear fusion and principles of decommissioning.

From April to September, students undertake an independent research project, usually within the nuclear industry.

Assessment is done through a variety of methods, including laboratory exercises, written coursework, case study reports, oral presentations and standard examinations. The independent research project is assessed through a written report.

How to apply
Apply online by visiting www.birmingham.ac.uk/nuclear

Staff profile
Dr Paul Norman

Dr Paul Norman is a Senior Lecturer in the Nuclear Physics group and he is course director for the MSc in Physics and Technology of Nuclear Reactors MSc program. Dr Norman has also done pure nuclear physics research, including significant contributions at both CERN and Brookhaven national lab. On the applied nuclear physics side, Dr Norman has appeared several times on BBC’s “The Politics Show” speaking about nuclear power, and has had many radio appearances and publications in physics and engineering magazines.

Learn more
Dr Paul Norman
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MSc Nuclear Decommissioning and Waste Management

The nuclear weapons and nuclear energy programmes of the past 60 years have left an extensive legacy of waste and contamination around the world. This nuclear legacy is one of the most significant environmental and technical challenges facing society today and there is a recognized shortage of skilled graduates in the field. The Nuclear Decommissioning and Waste Management course will train graduates for careers in the Nuclear Industry and will provide them with the scientific understanding and practical skills needed to address this challenge.

This degree course will provide students with the relevant skills, knowledge and understanding in nuclear sciences (nuclear physics and radiochemistry), geosciences (including geochemistry, geophysics and hydrogeology) and materials science, to prepare graduates for a career in nuclear decommissioning, waste management and remediation.

The course runs over a 12-month period from October to September. Taught modules are delivered in the autumn and spring terms and consist of lectures and practical sessions interspersed with field trips and industry seminars. Taught modules offered include: nuclear radiation and dosimetry; nuclear fuel cycle and radiation shielding; site decommissioning and environmental management; processing, storage and disposal of nuclear wastes; policy, regulation and management; field, laboratory and computing studies. From April to September, students undertake an independent research project allowing them to further develop their skills and understanding in specific areas.

Assessment is done through a variety of methods, including laboratory exercises, written coursework, case study reports, oral presentations and standard examinations. The independent research project is assessed through a written report.

How to apply
Apply online by visiting www.birmingham.ac.uk/nuclear

Staff profile
Dr Alan Herbert

Dr Alan Herbert is a leading mathematical modeler and hydrogeologist specializing in the understanding of coupled processes and heterogeneous groundwater systems. Of particular interest are deep fractured rocks and the applications to nuclear waste disposal, geothermal energy and fracking for exploitation of shale gas resources. He is currently PI for a research collaboration involving NDA and NAGRA, studying numerical modelling of colloid migration experiments carried out in the Grimsel Underground Research Laboratory in Switzerland.

Learn more
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What the students think of us

‘My course is absolutely fascinating and I couldn’t imagine doing anything else! We get to cover such a broad range of subjects and disciplines, no other course can even come close. It’s jam-packed and a challenge but a very rewarding one at that, and the support from the University is second to none. There is not another degree that will push you and stretch you as much as this course, but there is no better degree offered to increase your employability! You’ll learn how to approach and solve almost any problem and this will carry through into the wide world of work.’

Chris Jones, MEng Nuclear Engineering

‘The energy industry will face some massive challenges in the future and I chose to study Nuclear Engineering at Birmingham because I was intrigued by this technology. I love how the course is industry-specific, which will provide an excellent foundation for a career in the growing nuclear sector. Our lecturers are very experienced and our laboratory activities are interesting and engaging, allowing us to explore the subject fully.’

Stacy Snook, MEng Nuclear Engineering

‘Choosing to study Nuclear Engineering at Birmingham was a great decision. The course and the student lifestyle have helped me to grow both academically and as a person. Nuclear Engineering covers such a great breadth of subjects compared with anything else on offer – anywhere! This diversity is unparalleled and employers love it. Nuclear engineers have formed a unique community: the year groups are small enough that everybody knows each other, and the older years are friendly, fun and always around to offer you support, both academically and personally. I do not regret my decision, and neither will you.’

William Thomas, MEng Nuclear Engineering
‘When someone finds out that I do Nuclear Engineering the typical response that I get is along the lines of ‘oh that sounds hard!’ However it’s a lot more than hard. It’s enjoyable and very different to other engineering courses. Due to our firm physics background (which we develop over the years), we are in a better place when it comes to employment than many other graduates. The students and staff around us provide a friendly atmosphere and it’s like a second home to us. So personally, I reckon doing nuclear engineering is the greatest decision I have ever made!’

Ruqia Bibi, MEng Nuclear Engineering

‘Having done an undergraduate degree in particle physics, I decided to go in more depth and do a masters in the Physics and Technology of Nuclear Reactors (PTNR). I have to say that was the best decision I took as this course helped me to develop the right skills a scientist/researcher should have and set the foundations for my PhD. Furthermore, it is one of the few courses in the UK that has excellent lab facilities training physicists and engineers for a successful career in the nuclear industry. I enjoyed it that much that the last four years I have been demonstrating in the labs, teaching the next generation of students about radiation and the different ways of detecting it. So, if someone is thinking of a great future in the nuclear industry I think it’s the best course to do.’

Georgia Adam, MSc in Physics and Technology of Nuclear Reactors
Careers - What the Industry experts say about us

'The nuclear power industry involves operating some of the largest and most complex machines in the world. With the Government determined that we need to build new reactors to secure our electricity supplies, there are fantastic opportunities for talented engineers and scientists in the sector. EDF Energy is leading the way, and Birmingham’s nuclear courses provide just the sort of training we require, so that graduates can hit the ground running and make a real contribution to our business.' Barbara Jones, HR Director for EDF Energy’s Nuclear New Build projects

'At Horizon we greatly appreciate the relationship that we have with the University and its PTNR programme, not least in the high calibre of the students who graduate from this programme and elect to join our Company. At a time of renewed, sustained and growing interest in nuclear power in the UK, having a close relationship with such a long-established nuclear engineering programme and centre-of-excellence is very valuable indeed.' Mark Tippett, Learning and Development Manager Horizon Nuclear Power

'Fusion power is a promising sustainable source of energy and potentially a vital component in a future low-carbon energy mix in the latter part of this century and beyond. Culham Centre for Fusion Energy (CCFE) in Oxfordshire is at the forefront of magnetic confinement fusion research. It hosts the world’s largest tokamak, the Joint European Torus (JET), which demonstrated in 1997 that significant controlled fusion energy production is possible by heating a deuterium-tritium plasma, contained via a magnetic field, to more than 100 million degrees. To take fusion forward to a practical and economic means of energy production significant technological challenges now need to be addressed. These include, for example, demonstrating the performance of materials under high energy neutron irradiation, and developing robust technologies to produce and manage the tritium fuel, which must be bred in a lithium blanket surrounding the plasma. Several former Birmingham graduates are employed at CCFE and are playing a strong role in exciting research activities that are ongoing, in UK domestic, European and international collaborations, notably in the key area of neutronics simulations and nuclear experiments. Given the challenges that need to be tackled to bring fusion power to fruition, there will be a strong need for highly skilled graduates from courses such as the well-established Physics and Technology of Nuclear Reactors and Nuclear Engineering courses at Birmingham.' Lee Parker, Applied Radiation Physics Section Leader, UK Atomic Energy Authority

'Birmingham has run nuclear-related courses uninterrupted for the past 60 years, delivering high-quality graduates to the nuclear industry. This means that a large portion of engineering and scientists in the nuclear industry started their career at Birmingham, and view Birmingham as the best place to get training for a career in Nuclear Engineering.' Professor Martin Freer, Director of the Centre for Nuclear Education and Research

'With reactor new build about to begin, life extension of the seven operating Advanced Gas Reactor stations and new contracts in place to decommission the ten Magnox and three major UK nuclear research sites there has never been a more exciting and challenging time for nuclear capable graduates working in Cavendish Nuclear. Cavendish Nuclear is working closely with the University to develop and sustain a pipeline of high calibre students who will make a growing contribution to meeting this nationally important challenge now and for decades to come.' Robert Page, Governance Director, Cavendish Nuclear
Over the summer, I was at the Princeton Plasma Physics Laboratory (PPPL), Princeton University, USA, working as a summer nuclear fusion research student. The PPPL is a world-class, world-respected US Department of Energy scientific laboratory operated by Princeton University for fusion energy research – mainly researching on plasma physics and experimental fusion with their two fusion reactors NSTX and LTX.

My research project was based on a new inductive current drive mechanism for nuclear fusion reactors (Tokamaks and/or spherical configuration). The project was to research the profile of electrical currents generated using ANSYS Maxwell 3D software package, investigate if the mechanism is feasible at the laboratory scale and perform a materials selection. I presented my results to physicists at Princeton University in the form of both a presentation and poster, and produced an academic paper. My paper is now pending peer-review in the Fusion Science & Technology journal.

Out of all the work experiences I have done, this placement has been the most rewarding and most valuable. I have gained knowledge within fusion engineering, how a large international scientific laboratory operates and, more importantly, conducted independent research. If anyone is interested in continuing on to a PhD (like me), a summer research placement will show you actually what the work involves.
The University

‘For over one hundred years, learning and research at the University of Birmingham has played a key role in the success of the city, the region and the world, contributing greatly to the advancement of knowledge and its application.’

Built on a foundation of science and engineering, the University of Birmingham offers one of the largest subject bases in the UK, spanning physical sciences and engineering, the life sciences, medicine and dentistry.

The green and leafy Edgbaston campus of the University, located two miles south of Birmingham city centre, has been ranked as one of the top campus environments in the country. It houses all the amenities that you would expect to find in a small town, including shops, banks, bars, libraries and sports facilities, all of which serve to make your time here a pleasant experience.

Research and Teaching
Birmingham is a research-rich university, with a strong belief in research-led teaching. Our groundbreaking research into the treatment of cancer, pioneering work on new energy technologies and exciting developments in nanotechnology illustrate how we are pushing forward the boundaries of knowledge and impacting on our lives and society. Our world-leading research informs the content of our degree courses, and in combination with continual investment and improvement in the latest teaching technologies and methodologies, keeps the campus teaching and learning environment fresh and up-to-date for both students and staff. Birmingham welcomes students who are keen to be challenged and develop original thinking. We stimulate natural curiosity and enable original ideas to flourish through dialogue between different disciplines.

Sport and the Arts
Sport and the Arts are central to life at Birmingham. Birmingham University has a very strong reputation for sporting excellence, being ranked consistently in the top three UK Universities for sport, and has nurtured several recent Olympic and internationally renowned sportmen and sportswomen. Even if your sporting prowess does not extend to competing at the highest levels, University Sport Birmingham brings together some of the highest quality indoor and outdoor sporting facilities in the country, including a swimming pool, gym, sports halls, athletics track, floodlit astroturf pitches and much more. With professional coaching and imaginative fitness and sports programmes, we offer sporting opportunities to suit all tastes and abilities. The University has its own art gallery, called the Barber Institute of Fine Arts. Admission is free and it boasts works by some of the greatest artists from across the globe. Music is also a distinctive part of Birmingham life. The University has two symphony orchestras, a Big Band, a number of choirs, a symphonic wind band, a Jazz orchestra and a brass ensemble. Public performances are regularly staged both on campus, in the concert hall at the Barber Institute, and further afield including Symphony Hall in Birmingham. The University has recently completed the renovation of its central, crescent-shaped Aston Webb building, with its new 450-seat Bramall Concert Hall.

Student Living
The student villages offer a range of accommodation, where you can choose from single-study bedrooms with shared facilities, or have your own en-suite bathroom. If you prefer to cook for yourself, you can opt for a self-catered flat with a communal living room and kitchen. Alternatively, you can choose the meal-plan, where your meals are provided. Around a ten-minute walk from the main campus, the main halls of residence site is the Vale Village, where the residences are located in landscaped parkland overlooking a lake. The Village provides a safe and secure environment and a focus for student life, as well as all the amenities that you will need, including laundrettes, shops, cafes and unlimited internet access in all rooms.

The Guild of Students
The hub of undergraduate student life is the Guild of Students, Birmingham’s students’ union. The Guild was one of the first students’ unions in the country and its mission is to ‘enhance the student experience’. More than 180 student groups and societies are supported by the Guild of Students, covering all areas of interest from Manga to Motor Racing, guaranteeing a packed calendar of social events to enhance your student experience. You can also get involved in our student radio station, BURN FM, or the student newspaper Redbrick.
Birmingham - the city

‘Come to study at Birmingham and enjoy living in one of Europe’s most exciting cities. Birmingham is changing fast. A massive regeneration scheme over the past twenty years has reinvented the city and this renaissance is set to continue.’

Over forty percent of our graduates choose to stay in the region following graduation, and for good reasons. Birmingham is a thriving, modern commercial centre and home to one of the largest financial districts outside London, offering Birmingham Graduates great opportunities. Birmingham has also been designated as one of six Science Cities in the UK, recognising its industrial heritage and importance in the further development of the UK science base.

Major attractions of Birmingham are its culture, cuisine and entertainment, the retail experience it offers, and its location at the heart of the some of the UK’s most beautiful countryside.

Entertainment, Arts and Culture
There is always something going on in Birmingham. In addition to a choice of cafes, restaurants and venues, bringing flavours from across the globe, there are theatres, museums, cinemas, nightclubs and 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. Near the city centre are the International Conference Centre and the National Indoor Arena, where many international sporting events take place, such as the World Indoor Athletics and All-England Badminton Championships. Birmingham also played host to the U.S. Athletics Team, while they were preparing for the 2012 London Olympics. Symphony Hall, home of the world-renowned City of Birmingham Symphony Orchestra, provides a magnificent setting for classical music, while the National Exhibition Centre is a prominent stop off for star names in rock and pop. Star City is Birmingham’s biggest cinema complex with 30 screens, six of which are devoted to Bollywood films, while the home of the Royal Shakespeare Company is just an hour away in Stratford-upon-Avon.

Cuisine
Birmingham has recently been placed in the top 20 visitor destinations by the New York Times for its culture and cuisine. Boasting more Michelin Star restaurants than anywhere in Britain outside London, and originating the famous Balti dishes, it is no wonder the New York Times dubbed Birmingham the UK’s ‘foodiest town’.

Shopping
In the heart of the city, Bullring Shopping Centre is Europe’s largest city retail development and includes the award-winning, iconic Selfridges building. The Mailbox development houses a wide range of high-end designer chains, including Harvey Nichols, and a range of canal-side restaurants. Birmingham hosts four major markets, as well as all the principal chain stores. There is also a wealth of smaller shops and retail centres, where you can find everything from fresh herbs and spices for authentic international dishes to hand-crafted jewellery made in Birmingham’s unique Jewellery Quarter, responsible for 40% of the UK’s jewellery production.

The Heart of England
Located in the heart of the country, Birmingham has 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 UK’s motorway and rail network, and with its own international airport, it is easy to get almost anywhere in the world starting from here. The University is served by its own train station, called University, giving easy access within minutes to the city centre and destinations beyond.