Welcome

When you join the School of Engineering, you become part of a dynamic group of students, academics and researchers, working together to advance knowledge and make a difference to society.

Few academic disciplines make a more tangible impact on modern society than engineering. Its innovations have raised living standards across the world, from the power stations which light our homes to the aircraft that make global travel possible.

Lincoln’s School of Engineering offers courses in mechanical and electrical engineering. Students have the opportunity to specialise in control systems or in power and energy systems, and to work across disciplines with specialist modules and group design projects.

Whichever pathway you choose, you benefit from an industry-engaged education with access to state-of-the-art facilities.

Our lecturers and professors are research active and enjoy strong partnerships with leading companies. In this brochure, you will see examples of our three key areas of focus: intelligent systems and control, power and energy, and materials processing and manufacturing.

The School has received accolades for its industry engagement, including a Times Higher Education Award and a prestigious Lord Stafford Award for our partnership with Siemens. Our aim is to produce industry-ready graduates with the skills to succeed as the engineers of the future.

If you would like to know more about the School of Engineering, you can contact us using the details at the back of this brochure or visit us on an Open Day to experience our School and campus for yourself.

Professor Tim Gordon
Head of School
Undergraduate Study

The engineers of the future need to be highly skilled, creative professionals who can adapt to new challenges and deliver sustainable solutions in an international environment. At Lincoln, we aim to prepare our graduates for the challenges of employment in industry and for postgraduate study and research.

Throughout your studies, you will take part in hands-on projects and benefit from cutting-edge research conducted by our academic staff. You will also have access to industry-standard equipment for study and research in our custom-designed Engineering Hub.

We offer the following courses:

- BEng/MEng Electrical Engineering*
  (Control Systems pathway)
- BEng/MEng Electrical Engineering*
  (Power and Energy pathway)
- BEng/MEng Mechanical Engineering
- BEng/MEng Mechanical Engineering
  (Control Systems pathway)
- BEng/MEng Mechanical Engineering
  (Power and Energy pathway)

Electrical Engineering

Electrical engineering is essential for the modern world to function. It encompasses everything from energy and manufacturing to communications and transport. At Lincoln, you gain a solid foundation in electrical engineering theory and practice, including key topics such as manufacturing processes and electrical technology.

After the first year, you have the option to follow a specialist route in either control systems or power and energy, or you can continue with electrical engineering.

MEng students complete an additional year of study at Master’s level and undertake advanced modules in electrical engineering, as well as learning about project management, teamwork and leadership before completing an extended project in an area of particular interest.

Mechanical Engineering

Mechanical engineering is the study of the design, development, installation, operation and maintenance of anything with moving parts. Graduates have a wide range of transferrable skills and knowledge, as well as excellent problem-solving and critical-thinking abilities.

At Lincoln, a degree in Mechanical Engineering will develop your knowledge of general engineering principles and give you a strong understanding of ethics and environmental implications of work. Key topics include manufacturing processes, thermodynamics and numerical computation, and technical skills such as computer-aided design.

After the first year, you can start to follow a specialist route in either control systems or power and energy, or you can continue with mechanical engineering.

Students progressing to MEng level will study advanced modules including applied computational fluid mechanics and advanced finite element analysis, as well as an elective module. You learn about project management, teamwork and leadership, before completing an extended project.

Collaboration with Siemens

The University of Lincoln is one of just five universities in the country to hold ‘principal partner’ status with Siemens.

The relationship with Siemens helps ensure that Lincoln graduates are prepared to make an immediate contribution upon entering the workplace, by providing work experience opportunities and industry input on course content.

The collaboration has been recognised with a Times Higher Education Award for Outstanding Employer Engagement and a prestigious Lord Stafford Award.

Steve Middlesbrough, Director of Service Engineering at Siemens in Lincoln, says: “Our relationship with the University continues to go from strength to strength in pioneering new areas of research and the concept of industry-ready graduates.”

Nine graduates from the first engineering cohort recently went on to join Siemens’ renowned graduate scheme.

Bursaries

The School’s collaboration with Siemens delivers numerous benefits for students, including a generous package of bursaries for selected students on BEng or MEng programmes who make the University of Lincoln their first choice institution during the application process.

“subject to validation

The strong collaboration with Siemens and sharing the Engineering Hub with them really helps students to gain an insight into the industry. Teaching is research-led and the lectures present new and fresh material often relating to their own areas of research, which is extremely beneficial and interesting.

“I would highly recommend Lincoln. Studying a course like this will give you an edge in the jobs market, which is crucial in the current economic climate.”

Jarek Grebenik Mechanical Engineering graduate
Postgraduate Study and Research

The School of Engineering is a thriving centre of academic and research excellence. As a postgraduate student, you are exposed to cutting-edge research and expertise, and develop critical skills that are highly valued by employers in the industry.

MSc Sustainable Power and Energy Engineering

The aim of the MSc Sustainable Power and Energy programme is to equip engineers with the skills, knowledge and ability to tackle the 21st Century’s most pressing issue – the generation of power and energy on a sustainable basis.

The unique and timely nature of this programme, and the School’s superb links with relevant local and global industries, aim to ensure that graduates will be in demand in a wide spectrum of organisations.

The course combines a challenging programme of academic study with opportunities to develop the personal and professional skills that are required to become a successful engineer. Graduates will be critical thinkers, independent learners and industry ready.

MPhil/PhD Engineering

A doctorate is the pinnacle of academic achievement. It enables you to complete an original piece of research and gain specialist knowledge, and opens up opportunities for roles in industry and academia.

The School of Engineering is a Centre of Industrial Research and Development Excellence, staffed by academics and researchers with long-standing records in attracting funding for, and delivering, world-class research and development.

Opportunities for research exist in a range of areas within our core disciplines of:

- Mechanical Engineering
- Combustion Engineering
- Electrical and Electronic Engineering
- Control and Systems Engineering
- Aeronautical and Automotive Engineering
- Laser Materials Processing.

Fully funded PhD studentships within the School of Engineering are advertised at jobs.lincoln.ac.uk

Research Groups

Our research groups are responsible for much of our research outputs and performance. They are key sites of inquiry and expertise and at the forefront of the School’s objective to support leading research of the highest quality.

Energy Research Group

The Energy Research Group conducts fundamental and applied research in all aspects of power and energy production, distribution, industrial diagnostics and diagnostics, and control, with key application sectors currently including low carbon/emissions engines, gas turbines, energy storage and peak power buffer technologies, smart energy and renewables research.

Systems Research Group

This Group’s diverse activity encompasses fundamental and applied research in advanced control and signal processing, laser materials processing and imaging systems with specific application in the fields of automotive, aerospace, healthcare, life sciences, surface treatment and micro-machining.

Tackling the Technical Challenges of Truly Self-driving Cars

Professor Tim Gordon, Head of the School of Engineering, is part of a global scientific working group that aims to further research into self-driving vehicles.

Professor Gordon: “A major impetus for self-driving vehicles is to improve mobility for people who, for whatever reason, cannot drive a car; such as the elderly or disabled. A number of car companies are bringing out products that require the driver to keep their eyes on the road, in which case the benefits may be quite limited.

“Self-driving technology will definitely help to improve road safety, The traditional vehicle dynamics community has a very strong role to play. It is not just about electronics, but also about the basic vehicle technologies, from steering to brakes and sensors. This is an area where the limitations of what you can do are important.”

The international working group includes Chalmers University of Technology, Sweden; Vienna University of Technology, Austria; Politecnico Di Milano, Italy; Czech Technical University, Czech Republic; Daimler AG, Germany and the Technical University of Berlin, Germany.

Find out more about research groups in the School of Engineering, visit www.lincoln.ac.uk/engineering/research
Student Stories

Studying for an Engineering degree will help you develop the critical-thinking skills and professional knowledge that are essential for a successful career. We also aim to help you learn beyond the lecture theatre, providing opportunities to get involved in research and project work with real-world impact. This approach allows you to make the most of your time at Lincoln and graduate with a competitive edge for the job market.

An International Platform for Student Research

The Organisation for Computational Neurosciences (OCNS) is a leading international group whose aim is to create an educational forum to advance knowledge in the field of computational neurosciences. A key part of the OCNS’ activity is providing a platform to promote research where the application of engineering skills and methodologies is used in the pursuit of novel and groundbreaking developments in neuroscience.

Working under the School’s Dr Basabdatta Bhattacharya, two of the School’s students have recently had their research presented at international forums and conferences.

Engineering student Jordan Claxton carried out innovative research in his second year of study on the MEing programme. His poster, which focused on his work simulating brain oscillatory dynamics using a bio-inspired model, was presented at the annual meeting of OCNS in Paris, France last year.

Mechanical Engineering student Thomas Bond has been developing computational models that could help advance the understanding of the brain signals observed via electroencephalogram (EEG), in order to better understand and predict disease conditions such as migraine. His work was presented at the 2014 annual meeting of OCNS in Quebec City, Canada.

Thomas has worked very hard on the project and has produced some amazing results. His contribution to the research achievements of the University has set standards, which will undoubtedly motivate future students for their third year projects.

Dr Bhattacharya

Invitations to prestigious gatherings such as these highlight the level of excellence within which the University’s engineering students are working. To keep up-to-date with the latest developments, news and research undertaken by the School, visit our blog at http://engineering.blogs.lincoln.ac.uk/

The Recycling Bin of the Future

Second-year students were recently tasked with creating a recycling bin fit for the year 2020 by plastics solution provider, Luxus.

The aim was to encourage tomorrow’s engineers to think sustainably by creating designs to help the plastics and waste industries improve recycling rates.

Adam Evans was announced as the overall winner of the ‘Design4Recycling’ competition. He says: “It’s been great to work on a design to satisfy a real business need. It has definitely helped with my understanding of the entire design process, thanks to its clear focus on both ‘green’ and economic goals.”

Nearing the Finish Line with Kawasaki

The School of Engineering’s relationship with the Be Wiser Kawasaki race team resulted in an opportunity for students to base their final-year projects on problem solving for the team.

The Kawasaki team are currently upgrading their ZX10R and ZX6R motorbikes to racing specification ready for the racing season. Our students’ projects focus on several aspects of data logging and analysis, as well as minimisation of brake fluid temperatures, equipment design and the introduction of more sophisticated materials and processing technologies.

The Politics of Energy

Sometimes, the best way to understand theory is to see it in context. The Politics of Energy module in the School provides opportunities for students to go on study visits and learn from guest speakers to further explore the techniques they are working on, particularly around alternative energy.

Recent speakers have included Karl McCartney MP, who spoke about the issues associated with energy security and the likelihood of energy blackouts, and representatives from energy company RWE, who discussed wind farm energy.

Careers in Engineering

University of Lincoln graduates go on to have successful careers in organisations around the world, as well as starting their own businesses. The School of Engineering has an excellent track record for graduate employment, with 100% of our 2013 graduates in employment or further study within six months of completing their course.*

Skilled engineers are in high demand in the UK and overseas. Due to the innovative teaching methods and high levels of employer collaboration within the School of Engineering, a range of career opportunities in power, energy and mechanical engineering are open to graduates from our School. There is also the opportunity to continue your study to postgraduate level at Lincoln.

Graduation

The School of Engineering recently celebrated the success of its first cohort of graduates. The graduation ceremony was held in one of the most spectacular venues in the country – Lincoln Cathedral – and was followed by an exclusive reception.

The graduation is a testament to the dedication of all those who are and have been involved in the School. After three years of hard work and study, the first cohort Mechanical Engineering students are prepared for the world of industry.

*According to the latest Destination of Leavers from Higher Education survey

Tailored Services

A number of specialist services are available to ensure that you have access to relevant information about the many opportunities on offer to you upon graduation.

The School has a dedicated Careers and Employability Adviser who runs a drop-in clinic, providing personal guidance appointments. A programme of group workshops and course-specific presentations runs throughout the year, often involving national and international companies.

CAREERS AND EMPLOYABILITY GUIDANCE

You have access to careers information and guidance from our Careers & Employability Team, including advice and support on developing your CV, applying for jobs and obtaining paid and voluntary work experience while you study.

For graduates, the University’s award-winning business incubator, Sparkhouse, is on hand to help those who have ideas for new enterprises and wish to set up their own business.
The School of Engineering is housed in the custom-designed Engineering Hub, which is part of a £37 million development of Engineering at the University of Lincoln.

The engineers and academics who are based in the Hub had extensive input into the design of the building, ensuring that it is not only a highly functional learning environment, but that it also embodies a vision shared by the University of Lincoln and leading, global businesses to bring world-class engineering facilities to the city. An extension to the existing building is planned for 2016.

The Hub provides a modern environment for teaching and research, development and design projects.

Siemens Industrial Turbomachinery Ltd has co-located their training facilities in the building, further strengthening the partnership between the School and Siemens.

At Lincoln, we are constantly investing in our campus to provide the best facilities for our students. The award-winning Great Central Warehouse Library offers specialised electronic and print books, journals and resources. A dedicated Academic Subject Librarian is on hand to help you navigate and locate materials for your studies.

Facilities

As a student in the School of Engineering you will have access to:

- A laser laboratory, which facilitates research within a wide range of wavelength spectra and power levels
- A fully-equipped metrology laboratory, which houses equipment for the study and manipulation of surfaces
- A thermodynamics laboratory for the investigation of thermal energy systems, such as internal combustion engines
- A bespoke research rig for the testing of high-speed rotating machinery
- Industrial engine and gas turbine testing facilities
- Computer Aided Design and 3D prototyping capabilities, in a variety of materials including wood, plastic and aluminium
- A renewable energy laboratory for the investigation of biomass conversion, including a bespoke gasification rig and biofuels production
- Teaching spaces, including lecture theatres, seminar rooms and project workshops.
Renewable Energy from Biomass

Biomass is a material derived from living or recently living organisms. There are numerous sources of biomass, and in the context of energy generation, biomass often refers to woods, energy crops (such as miscanthus), agricultural and forestry residues and municipal solid waste.

Biomass is a renewable, low carbon fuel that can deliver considerable net carbon emissions savings. As such, it is an important component of the UK government's strategy to reduce greenhouse gas emissions and to increase the use of renewables in this country.

The School of Engineering is conducting innovative research into the thermal conversion of biomass and the development of biofuels, as well as studies of biomass pyrolysis and combustion.

Virtual Reality in the Real World

Engineers working in the School's Combustion Group have been utilising powerful computer technology and engineering simulation to conduct experiments and test the performance of designs.

Computer simulation of complex systems allows engineers the freedom to optimise the performance of designs by exploring a wide range of possible configurations. Recent research into the optimisation of fuel and air mixing, performed in collaboration with Siemens, has helped to inform and improve the optimal ignition conditions of the sub 15MW gas turbines produced in Lincoln.

Computer-based simulation is most reliable when the results can be verified by real-world experiments, so further testing into fuel mixing processes is taking place using the Siemens Atmospheric Combustion Facility.
Supply Chain and Operational Resilience in the Energy Sector

Dr Giorgio Locatelli and Dr Abby Saddawi are working to bring together some of the world’s finest minds on issues around energy supply. Alongside Professor Paolo Trucco of the Politecnico di Milano, Italy, they are editing a collection of papers that will appear in a special issue of the International Journal of Supply Chain and Operations Resilience. According to the International Energy Outlook 2013, world energy use will grow by 56 per cent between 2010 and 2040. Fossil fuels will continue to supply almost 80 per cent of world energy use. In the electricity sector, renewable energy and nuclear power are the world’s fastest growing energy sources, each increasing by 2.5 per cent per year.

However, traditional generation technologies including coal and nuclear power, as well as their distribution infrastructures, are vulnerable to a wide spectrum of issues, such as natural disasters and growing social unacceptability, particularly in developed countries. The mass deployment of renewable sources, such as wind, solar and biomass, could help to increase the operational and supply chain resilience of the energy sector. Although, the technical feasibility and the economics of possible solutions are largely uncertain.

Dr Locatelli and Dr Saddawi will bring together the contributions of scholars and practitioners, managers, policymakers and the wider academic community to support the sustainable development of energy systems in the future.

Engineering Stem Cells

Professor Jonathan Lawrence from the School of Engineering is working alongside Dr Issam Hussain, Senior Lecturer in the School of Life Sciences, to conduct research that has far-reaching implications in regenerative medicine.

The research uses laser technology to manipulate the surface finish and chemistry of surfaces and materials on which stem cells are grown. The findings have shown laser surface treatment to be a potential means for modulating stem cell response in order to grow different cell types. This has the potential to allow clinicians to grow tailored tissue and bone, rather than using an insufficient foreign object implant, increasing transplant effectiveness and efficiency.

Endeavours into this field will ultimately allow medical staff to apply the technology to treat regenerative disorders.

Meet the Academics

Professor Tim Gordon

Professor Tim Gordon joined the University of Lincoln after 10 years at the University of Michigan as Professor of Mechanical Engineering.

He brings with him extensive knowledge and research aligned with automotive engineering, specifically around vehicle dynamics, automotive safety and computer-based innovation. His vision for how engineering can improve society is far reaching.

Professor Gordon says: “I feel it is our responsibility to look at how society currently operates, such as in the transport sector, and respond to challenges using our expertise and imagination. At Lincoln, our research ultimately seeks to improve the way technology and society interact.”

Professor Gordon is part of a global scientific group of leaders from the automotive and engineering industries who are researching autonomous functions and self-driving vehicles.

Dr Jun Yao

Dr Jun Yao is a Senior Lecturer in Computational Engineering. Previously, she worked as a research engineer for Mitsubishi Electric R&D Centre Europe B.V. (MERCE – UK), where she was a key member of the Energy & Environment Division.

Dr w has broad research interests in both science and engineering, and has participated in the Engineering and Physical Sciences Research Council and a number of industry funded projects. Her primary research interest is computational fluid dynamics. She teaches this subject to our students, as well as fluid mechanics and heat transfer and fluid flow.
Understanding Brain Behaviour

Research conducted by Dr Basababatta Bhattacharya, lecturer in Electrical Engineering, has made significant contributions to understanding brain behaviour.

Dr Bhattacharya (right) has an international reputation in the field of computational neuroscience, which involves the study of brain function and engineering computer models of the brain. This interdisciplinary science links the diverse fields of neuroscience, cognitive science and psychology with electrical engineering, computer sciences, mathematics and physics.

Some of her latest research seeks to underpin neuro-transmission dynamics associated with the abnormal brain rhythms commonly observed in neurological and psychiatric disorders. The model she is investigating is making understanding of brain oscillations – the rhythmic activities observed in the nervous system – in sickness and health and the frameworks we use to understand them, known as neural mass modelling.

Dr Bhattacharya says: “I was attracted to Lincoln’s School of Engineering because of its strong reputation, as well as its innovative and proactive approach. Students are encouraged to get involved in live research and I thoroughly enjoy working with them to share and advance my research.”

Small Reactors Make a Big Impact

Academics from the University of Lincoln’s School of Engineering have published a detailed assessment of a new, smaller type of nuclear reactor to help policymakers decide on the best way to meet the growing demand for energy.

According to official estimates, world energy consumption in 2035 will be more than double that of 1995. A substantial challenge for engineers and scientists over the coming decades is to develop and deploy power plants with sufficient capacity and flexibility to meet this increasing need while simultaneously reducing emissions.

The research, led by Lincoln’s Dr Giorgio Locatelli, aims to show to what extent a new type of nuclear reactor, termed the Small Modular Reactor (SMR), might provide a solution to these energy needs.

Modern SMRs are a relatively new product in the nuclear industry. The simplification, standardisation and compactness of SMRs allows for certain improvements on reactor safety and physical protection, which is of particular concern following the Fukushima accident. These improvements are primarily due to SMRs being “passive systems” that dramatically reduce the effects of human error and perform well and predictably in extreme circumstances.

Their small size makes them ideal for locations that cannot accommodate large-scale plants and they also require limited upfront capital investment.

Dr Locatelli, says: “Considering non-financial factors, preliminary results indicate that SMRs perform as well as, if not better than, Large Reactors. The social aspects of SMRs, such as the creation of new jobs, is also positive. We expect that SMRs will play an important role in nuclear industry in the next decades.”

This research has been published in the journal Progress in Nuclear Energy.

Students from the School of Engineering were given a tour of Drax Power Station in Selby as part of The Politics of Energy module, which seeks to examine the political and social realities behind a range of energy related topics.

The group were given a tour of both the traditional power station and the new biomass-adapted facilities, along with a close up view of the control centre.

Three of the boilers at the power station have been converted to burn biomass instead of conventional fossil fuels. They burn both plant-based residues, such as peanut husks, rape straw and forestry toppings, and dedicated energy crops such as willow and miscanthus. Due to this conversion, and others like it, recent government energy statistics indicate that the UK now generates around six per cent of its electricity from biomass.

Visi organiser, Dr Grant, said: “Biomass has so much potential to offer us in terms of providing a sustainable and alternative energy source and Drax gave us a great insight into their work. Their commitment to reducing carbon emissions through burning biomass is a game-changer, although electricity produced from biomass is not without its controversy. It has been really useful for the students to understand fully the complexities involved.”

A Visit to the UK’s Largest Power Station
There are many ways for you to engage with the University of Lincoln and the School of Engineering. Whether you want to visit us and take a look around, join our online community or simply find out more about the opportunities available, we are here to help.

Open Days
We hold Open Days throughout the year, opening up the campus for any prospective student. This is an opportunity to take a look at the facilities, meet academic staff, view our on-campus accommodation and meet current students. Please visit www.lincoln.ac.uk/opendays for information on the next Open Day.

Social Media
To keep up-to-date with the latest news and information from the University, you can follow us on Twitter @uniLincoln or like us on Facebook. The School of Engineering blog has lots of information and updates on the innovative work and achievements of our students and lecturers. Visit engineering.blogs.lincoln.ac.uk

Postgraduate Masterclasses
A Postgraduate Masterclass Taster Day provides the perfect opportunity to take part in a workshop or lecture in a subject of your choice to experience the vibrant postgraduate learning environment at the University of Lincoln.

During your masterclass, you will have the chance to meet our academics, advance your subject-specific knowledge and find out more about teaching and research for your chosen course.

Keep an eye on our social media pages and website for the next available dates or email pgevents@lincoln.ac.uk for more information.

International Students
The University of Lincoln provides a vibrant and dynamic atmosphere for international students who are looking to study in the UK. Lincoln is one of the safest and friendliest university cities in the UK with great transport links to London and other major cities. A wealth of information is available at www.lincoln.ac.uk/international

Find Out More

“Education is the most powerful weapon which you can use to change the world” Nelson Mandela