Cranfield University

Cranfield is a unique environment – exclusively postgraduate with access to world-class facilities, passionate experts and a like-minded global community.

Exclusively postgraduate
A research-focused professional community

81% of our research is world-leading or internationally excellent

Over £70 million of external investment in new facilities over the past three years

A professional network of 60,000+ alumni

We work with over 1,500 businesses and governments based in over 40 countries

The only university in the world to own and run an airport with full airline status on-campus

81% world-class facilities

We work with over 1,500 businesses and governments based in over 40 countries

800+ research students

The School of Management and our sector specialisms bring academic disciplines together to align with industry, business and government; so that your research can impact the real world.

Aerospace
Defence and Security
Energy and Power
Environment and Agrifood

Manufacturing
Transport Systems
Water
School of Management
Research councils

Funding councils have awarded Cranfield over £10m in research grants in the past year alone.

Doctoral Centres

Our funded doctoral centres are often an ideal way for students to achieve a fully-funded place.

We are the lead partner in three UK Research Council-funded doctoral centres and a collaborative partner in four more.
Your doctoral research experience

Why choose to do a research degree?

Research degrees offer you access to the facilities, expertise and time to pursue your ideas in your chosen specialist area of interest. At Cranfield, we provide the framework to apply your work to make a real difference to society.

“I chose Cranfield to do my PhD because of the interaction between industry and academia, and its recognition in both industrial and academic networks. I believe that doing a PhD linked with industry, or at least embedded in the industrial context, is essential for every engineering project.”

Dawid Hanak,
Lecturer in Combustion, Carbon Capture and Storage
Winner of the Cranfield University Lord Kings Norton Medal 2016
(Energy and Power PhD, 2016)
The Cranfield Doctoral Network

As a researcher at Cranfield you will become a member of the Cranfield Doctoral Network, providing you with opportunities to share ideas and collaborate in a multi-disciplinary environment.

Comprising eight doctoral communities, which are aligned with the University’s sector specialisms, these give you opportunities to participate in a programme of events and networking opportunities.

Transferable skills – Doctoral Researchers’ Core Development programme

In addition to your academic studies, we provide a framework for your ongoing professional development through workshops, webinars and other resources. This enriching experience encompasses four key areas, highly valued by employers:

- Knowledge and intellectual abilities,
- Personal effectiveness,
- Research governance and organisation,
- Engagement, influence and impact.

“I love Cranfield for many reasons, but most of all how inclusive the environment is. There might be a high level of diversity in many other universities; however, diversity does not equate to inclusion. I would sincerely encourage all students to join Cranfield if they are looking for not just international but diverse and dynamic peers and members of staff.”

Minjle Cai,
(Management – Organisation Studies – PhD, 2016)
An example research degree timeline

Review literature and develop hypothesis

Year 1
- Progress review
- Skills training

Year 2
- Progress review
- Skills training
- Submit papers to supervisor

Experimental programme: collection and data processing

The above diagram includes key elements involved in all research degrees, and is illustrated on an example full-time PhD timeline. Other research degrees follow a slightly different structure.

For more information on these qualifications visit www.cranfield.ac.uk/research
## Research degrees and durations

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Degree name</th>
<th>Duration</th>
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<tbody>
<tr>
<td></td>
<td><strong>Full-time</strong></td>
<td><strong>Part-time</strong></td>
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<tr>
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<td>3 years</td>
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<tr>
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<tr>
<td>MRes</td>
<td>Master of Science by Research</td>
<td>1 year</td>
</tr>
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### Year 3

- **Progress review**
- **Skills training**
- **Submit papers to supervisor**

### Viva voce exam

Review key findings and write thesis
What are the different research options?

There are several ways you can embark on a research programme at Cranfield, depending on your ambitions and circumstances.

### Employment-related research projects
If you or your employer have a challenge which you think could form your research project, we can support you to develop a solution while gaining a research qualification.

**Benefits**
- Opportunity to study in your own country while working.
- Career development.
- Topic tailored to your own company.

### Funded research opportunities – studentships
We offer a range of pre-defined research projects that you can become involved with. These are funded opportunities, known as studentships, often in collaboration with industry and research councils. They offer a paid route – similar to a job in research.

**Benefits**
- Projects come with fixed income (stipend).
- Pre-defined topic aligned with industry or government interests.
- Often involves multiple sponsors on a collaborative research project.

### Individual research projects
If you have an area of research that you would like to explore further we can help you develop your proposal.

**Benefits**
- Opportunity to explore and develop your own topic.
- Potential for funding.
- Structured programme with specialist support.

[www.cranfield.ac.uk/research](http://www.cranfield.ac.uk/research)
How to apply

Intake dates are generally February-March, June and September-October each year, which ensures you start with other research students and have a thorough induction programme (check your course for details).

There are different ways to apply, depending on the route you choose to do your research degree. Further details can be found online at: www.cranfield.ac.uk/researchapplication

Please email study@cranfield.ac.uk for more information.
Location

Cranfield University is located on two sites. Research students in the majority of our specialisms are based on our Cranfield campus, pictured.

Defence and Security research takes place at a secure Ministry of Defence site, Shrivenham in Oxfordshire.

Trains to London from Bedford, Milton Keynes and Swindon take about one hour.

Directions to both sites are available at www.cranfield.ac.uk/visit

Fees and funding

Many research opportunities can be funded or you may be eligible for a bursary. For more information visit www.cranfield.ac.uk/research/phd

Fees will be payable annually. The fees and costs for each research degree are unique, depending on the nature of the research.

There may be additional costs (known as bench fees, or additional fee elements – AFE) that cover laboratory charges and access to specialist knowledge, which will be explained during the application process. A guide to research fees can be found at: www.cranfield.ac.uk/fees
Our sector specialisms and our School of Management align your research with industry requirements and bring academic disciplines together.

The following pages highlight just some of the exciting work happening in each area, as well as examples of the opportunities available to our researchers to collaborate across these areas.
The future of flight is about increased efficiency across the sector. In order to meet challenging environmental targets, we need to consider not just the technology of the aircraft but the world in which the aircraft operates too.

Bladesense: combining photonics and aerospace expertise

Current maintenance processes for helicopters are extremely labour-intensive, costly and involve regular checks of rotor blades to help identify any potential problems.

Simone Weber, Technology Integration Manager at Airbus Helicopters, is on secondment to study her Aerospace PhD at Cranfield. The results of her research will improve Airbus Helicopter’s knowledge of helicopter rotor blades during flight. This could impact on maintenance, rotor blade design and could even be used to update flight control systems with real-life data from the fibre optic sensors.

“It’s really important to us to gain access to diversity of thought, but also to expertise that’s out in the University. A lot of the people who come through with master’s degrees or PhDs will wind up joining Rolls-Royce as one of our employees.”

Henner Wapenhans,
Director of Technology and Strategy, Rolls-Royce Plc
Defence and Security

Cranfield provides specialist knowledge to industry, security and emergency services, military, governments and NGOs, underpinning defence and security sector reform around the world.

As a postgraduate academic provider to the UK’s Ministry of Defence, we offer a unique gateway to delivering practical education and solutions that make a real difference to the lives of military, security and civilian personnel.

Improving the next generation of missile seekers

This Engineering and Physical Sciences Research Council funded project, in collaboration with the Defence Science and Technology Laboratory (Dstl), is investigating how we can protect missiles from attempts to jam their guidance sensor. This four-year project supports a PhD student who will work for three years at Cranfield with Dr Alessio Balleri and then spend the fourth year at Dstl. The results of this project will help inform Dstl’s requirements for future systems.

Guided weapons hall, Shrivenham

“Studying part-time has suited me; there’s the benefit that I’ve not lost sight of the ‘real world’ which has helped to ground my academic thinking. I chose the PhD as it provided an opportunity to direct my studies into a specific area that intrigues me, one where innovation isn’t constrained by convention.”

Lieutenant Commander Ed Oates,
(Defence and Security PhD, current student)
Our expertise and research covers offshore renewables, oil and gas engineering, the production and clean use of fossil fuels, combustion and power generation through to bioenergy and using waste as fuel.

Oil and gas running on green energy

During the extraction process, managing water that surfaces with oil and gas currently adds to operating costs and can cause premature field abandonment.

Professor Gioia Falcone, Head of Geo-Energy Engineering at Cranfield, has looked into harnessing the geothermal energy from this naturally heated water to generate electricity, which can be used to power field-operations equipment. Testing the roadmap to geothermal energy recovery at mature oil fields showed that the concept could make oil recovery more economically efficient, increase the lifespan of a mature oil reservoir, reduce fossil fuel consumption in the field, and decrease pollution. The roadmap can be used to identify and predict environmental and economic benefits of other oil and gas reservoirs that could work hand in hand with geothermal energy.

“I am excited about my research, because I can see it being useful for utility companies, not only for the UK but for other countries as well.”

Blessing Ekpe,
(Energy and Power PhD, current student)
Environment and Agrifood

For our expertise and research in soil data, applied soil science and strong links with agricultural and agrifood businesses, Cranfield has been recognised with the Queen's Anniversary Prize 2017.

Combining big data and technology in agrifood

With £10 million investment in two new integrated Centres for Agricultural Innovation, our research in the Crop Health and Protection Centre will enable real-time, pilot-scale, controllable simulations of crop-soil systems and underpin new ways to produce food sustainably. Cross-fertilising ideas with the new Agricultural Engineering Precision Innovation Centre – which will develop sensor systems that link to a data hub – your research could inform environmental policy and agribusiness in the horticulture, arable, and agrochemical sectors.

“"My research is to develop potential alternative compounds that can be used to control plant diseases. I hope my research will be a success and these compounds can be applied to reduce affected countries’ economic loss.”

Azlina Mohd Danial, (Agrifood PhD, current student)

Find out about studentships with the Data Risk and Environmental Analytical Methods (DREAM) and Soil Training and Research (STAR) doctoral training centres: www.cranfield.ac.uk/researchopportunities
Home to the national Through-life Engineering Services Centre, we bring together industry knowledge with academic expertise to work on disruptive technology in manufacturing, maintenance and intelligent systems.

Using augmented reality to create a maintenance information loop

With the fast rate of technological change, Babcock International recognised that training manuals are no longer intuitive or a timely enough way of updating maintenance information.

Augmented Reality (AR) is a way to very quickly, and realistically, convey messages, and Cranfield has experience of implementing it in other sectors for training purposes. To complete the loop, we are also looking into how data can be transmitted from the maintenance operator into the system, ensuring that when a problem arises once, it can be fixed for all maintenance operators with AR devices.

Find out about studentships available with Ultra Precision (UP), Composites Manufacture, and Sustainable Materials and Manufacturing doctoral training centres at: www.cranfield.ac.uk/researchopportunities

“One of the nice things about doing a PhD in Cranfield is that normally you have a direct connection with an industrial company, and from that point of view, the PhD can be seen as consultancy work. I think that I am going to learn a lot about this connection with clients.”

Iñigo Fernandez Del Amo Blanco,
(Manufacturing PhD, current student)
Transport Systems

With an active airfield, and access to many different forms of wreckage, we can quickly stage accident sites for research purposes. These research opportunities are often combined with ongoing investigator training courses, so the lessons identified can be applied in almost real time.

Using drones to assist in serious and complex accident investigations

We are aiming to perfect the applications of Commercial Off The Shelf (COTS) drone technology to design a reliable and accurate methodology which can be employed by investigators around the world.

UK Air Accidents Investigation Branch (AAIB) and the UK Rail Accident Investigation Branch (RAIB) are just two of the state-level investigation agencies currently using drones.

Imagery from the site can be used in real-time to assist with communicating the situation to other agencies, and 3D modelling techniques can provide accurate, measurable 3D models of accident sites for investigative analysis and as graphic representation in final accident reports.

“I derive so much satisfaction when our graduates find careers after such a demanding time at Cranfield. Their characters constantly remind me of the passion, drive and determination needed to survive in this fast-moving sport.”

Professor Adrian Reynard,
Founder Reynard Motorsport
Honorary Graduate and Visiting Professor

www.cranfield.ac.uk/transportsystems
“One thing that particularly drew me to the PhD project was that it was solving real problems within the industry. What is specifically unique to Cranfield University is the facilities: there’s an onsite sewage treatment works with pilot hall testing facilities.”

Sarah Fane,
Senior Advisor, Public Health and Standards,
Severn Trent Water
(Water PhD, 2016)
We are actively engaged in consultancy and business-relevant research, ensuring we are committed to the practical application of knowledge in business and government.

Changing boardroom culture: it takes three

Cranfield’s research into women on boards includes a review of board evaluations, which show that you need three women before the culture and behaviour of a board changes.

Women on FTSE 100 boards should reach 33% by 2020 and women currently on boards are deemed by board evaluation advisors to be good directors. The research also highlights that the percentage of women senior independent directors and chairs has barely changed over ten years (now just 8%).

To address the lack of diversity in senior board positions, Professor Susan Vinnicombe’s team recommend the board evaluation industry mutually agree minimum standards in the areas of diversity and dynamics, culture and behaviour, on feedback and induction and the talent pipeline.

“I link my career progression directly to this programme as it provided rigour, discipline, content and a new way of thinking and reasoning that allowed me to have the confidence to challenge the loud voice in the room.”

Gabriel Morelli,
Global Head of Commercial Excellence, Sandoz
(DBA, 2010)
Some of the organisations we work with:

- AIRBUS
- BAE SYSTEMS
- easyJet
- Ford
- innocent
- JCB
- John Lewis
- Kazuba
- LOCKHEED MARTIN
- M&S
- Procter & Gamble
- Tarmac
- Volkswagen Group UK Ltd
- WaterAid

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