



University of
Strathclyde
Glasgow

ELECTRIFICATION FOR YOUR BUSINESS

www.strath.ac.uk



Collaborating around electrification

At the University of Strathclyde, we recognise that collaboration leads to success both in academia and industry.

We believe in working collaboratively internally and externally. We work with each other and with partners from across the academic and industrial landscape, combining knowledge, expertise and capabilities to research and advance novel technologies to higher technology readiness levels, and to develop innovative solutions for key industrial challenges.

The UK is facing a rapidly shifting landscape around propulsion, energy generation, power distribution and storage technology that requires a step change in design methods, products, manufacture and skills to deliver.

The University's Advanced Forming Research Centre, Institute for Energy and Environment, and Power Networks Demonstration Centre have teamed up to tackle the biggest challenges around electrification.

This unique grouping brings with it world-renowned capability and expertise along with a long history of engineering excellence working together with industry, helping businesses to overcome present-day and future challenges around electrification.

Advanced Forming Research Centre

A globally-recognised centre of excellence in innovative manufacturing technologies, engineering research and development and metal forming and forging research. One of only seven High Value Manufacturing Catapult centres in the UK filling the gap between fundamental academic research and industry.

www.afrc.org.uk

Institute for Energy and Environment

Internationally recognised for research excellence and industrial engagement, the institute hosts over 200 specialists in electrical power engineering. Its academic teams work with industrial partners and international collaborators across a range of sectors including aerospace, energy, and marine, driving research programmes on power systems design, prototyping, testing and validation.

<https://www.strath.ac.uk/research/subjects/electricelectricalengineering/instituteenergyenvironment/>

Power Networks Demonstration Centre

An internationally recognised specialist centre for accelerating the innovation and adoption of new power technologies. Supported by an industrial membership programme and a unique kV and MW-scale power network, the centre is uniquely placed to support prototype technology development, testing, and systems validation.

www.pndc.co.uk

Driving innovation in:

Aerospace
Automotive
Energy
Industrial
Marine
Off highway
Rail

Our electrical future; your electrical future

The world is demanding that industry and academia work differently. The norms are no longer sufficient for a sustainable future.

Radical thinking will be required to achieve the UK Government's 2050 net carbon neutral target: we need to take a new approach with how we work and think. Barriers to collaboration need to be overcome, uniting expertise and capability across sectors, ensuring innovation can spread, increasing the impact across the globe.

For us, this new way of working is about taking an all-encompassing approach to the design and manufacture of electrical systems and mechanical components. We utilise the latest in innovative technologies to develop integrated solutions for the electrification of key industry sectors.

Together we are speeding up and de-risking innovation and are working with industry to find the solutions needed to meet the challenges of tomorrow's world while minimising waste and cost.

How we can help you

Together we offer technology and system-level capability for the development of new electrification solutions.

We're revolutionising the traditional approach to system development to support de-risking, from early design stage through to system validation including methods of manufacture.

We provide businesses with a means to explore innovative ideas and bring novel electrification technologies and systems to life. We help companies seize new opportunities to increase and maintain competitiveness while driving forward the electric revolution.

There are a number of routes available to companies that want to work with us as we recognise that a flexible approach is required when investing in research and development work. We will work with you to identify the most suitable way forward for your business.



Current work

Superconducting propulsion

Using superconducting technology in future aircraft propulsion will result in light and compact systems.

We are involved in a number of projects collaborating with key industry stakeholders in the following areas:

- Development of novel superconducting machine components for electrical propulsion systems. This aims to maximise power density and minimise losses.
- Identification of superconducting network solutions as propulsion transmission systems. We are working on reliable and efficient integration technologies for superconducting cables.
- Establishment of advanced testing platforms for superconducting propulsion technology. Our helium and nitrogen based cryogenic systems are able to provide the UK with testing platforms of unique temperature ranges and power levels.

Future Electrical Machines Manufacturing Hub

Through the EPSRC Future Electrical Machines Manufacturing (FEMM) Hub, we're bringing manufacture to the start of the design process, working with academic colleagues at the Universities of Sheffield and Newcastle, to combine world-leading expertise in electrical machines design and manufacturing.

The FEMM hub will put the UK at the forefront of the electrical revolution, unlocking design freedoms for electrical machines with improved performance and functionality.

Advanced forming and forging techniques will be combined with state-of-the-art machine design to develop high power electrical machines for high integrity applications.

Electrical steels

A key area of interest for the group is increasing efficiency of electrical steels through modifying the current manufacturing processes with the aim of producing electrical machines with increased power density.

There are three key areas of interest within this programme of work:

- Develop solutions to improve the formability of steels with a high silicon content. The aim is to increase their use in manufacturing processes and the wider supply chain
- Seek to enhance the magnetic performance of electrical steels through developing favourable texture and microstructure
- Identify alternative production routes for stator laminations with a focus on additive manufacturing

Hybrid electric aircraft

The Rolls-Royce University Technology Centre (UTC) within the Technology and Innovation Centre (TIC) at Strathclyde is focused on systems level design, protection and fault management, and optimisation for future electrical and hybrid electric propulsion. Researchers are addressing key emerging challenges that come from the novel interfaces between the electrical and mechanical systems.

The testing facilities hosted by the TIC support the development of electrified flight by demonstrating the key fault tolerance and integrated fault management required for safe and reliable flight operations. Enabled by unique hardware-in-the-loop rigs, the team is validating key protection and fault management solutions for electrical propulsion aircraft concepts and demonstrators.

Power electronics

The Strathclyde team provide a range of support to a diverse number of projects in the area of power electronics.

The Power Electronics Drives & Energy Conversion (PEDEC) group is an interdisciplinary research group with a broad portfolio encompassing power electronics devices, circuits and control for high performance energy conversion, renewable integration, HVDC systems and broad electrification applications.

Working alongside power systems specialists, and supported by an innovative real time simulation suite, the team is researching, prototyping and validating new power electronic technologies and functions. Integrating these with power management and protection schemes is creating new system optimisations that contribute to the electrification of propulsion.



Find out how we can help your business

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