

The Centre for Doctoral Training Net Zero Aviation

Information Pack



Welcome from the Management Team

We are excited to introduce the **EPSRC Centre for Doctoral Training in Net Zero Aviation**.

The £15 million Centre that is co-funded by EPSRC is a collaboration between Cranfield University, Cardiff University, the University of Strathclyde, the National Centre for Atmospheric Science and more than 40 industrial and research partners that cover the wider aviation ecosystem.

We are looking for enthusiastic and inquisitive PhD researchers with diverse backgrounds, skills and experiences covering engineering, science, computing, social, business, AI and many more topics to work with us to transform the future of aviation.

If you are a student, researcher or professional, passionate about aviation and Net Zero and you want to make a difference then join our innovative, inclusive and highly rewarding, industry co-funded PhD programme and contribute towards the decarbonisation of aviation.

Working together we will develop the future leaders that will:

- drive the decarbonisation of aviation
- deliver innovative and disruptive technical solutions
- establish novel ways of working together across different disciplines and sectors
- adopt a new research mindset that accounts for social, environmental and commercial impact from the outset of the research.

In close collaboration with our industrial partners, we are offering 64 fully funded PhD studentships spread over 4 intakes/cohorts, with the first intake started in October 2025.

In addition to your individual research, you will have the opportunity to work closely with other CDT researchers, engage in group design and researcher led out-reach activities as well as attend a comprehensive and interactive development programme specifically tailored to the requirements of Net Zero Aviation.

The EPSRC CDT in Net Zero Aviation Team

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Introducing the Management Team Members

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1. EPSRC CDT in Net Zero Aviation Mission & Objectives

The EPSRC CDT in Net Zero Aviation is a direct response to the urgent need to decarbonise the wider aviation sector and secure industrial, research and academic leadership. Working with industry and authorities we will develop the innovators and researchers needed to find the novel solutions to decarbonise aviation and deliver the UK's Jet Zero and ATI's Destination Zero strategies.

The CDT in Net Zero Aviation combines innovation and impact driven research to develop skills fit for the future. Graduates will become a nucleus for Net Zero Aviation upskilling across the aviation ecosystem disseminating

knowledge and further promoting innovation and collaborative working. Training will focus on a systems engineering approach to integrate theoretical, computational and experimental methods while combining exploratory and applied science along with technology and engineering solutions to address environmental and socio-economic aspects. The CDT's research driven and aviation focused training programme will also cover development, commercialisation and route to market of Net Zero technologies, operations and required infrastructure.



CDT NZA 2025 co-Hort

Working together we will:

- Create future leaders that will lead the decarbonisation of aviation
- Develop future-proof technical, professional, leadership and personal skills
- Deliver technological innovation
- Create new ways of working together
- Apply a new research mindset that accounts for social and environmental aspects for the outset of the research
- Inform stakeholders & general public while also engaging with and inspiring the future generations



We are offering:

- An inclusive, diverse and accessible working/learning environment
- Fully funded 4 year full-time and 6 year part-time industrially co-sponsored PhDs & EngD's - £25,183.00 tax free annual stipend, full fees and additional funding for conferences and
- 3 month industrial placement
- Industrial supervision/mentorship
- Access to more than 40 industrial, government & research partners from the wider aviation sector
- Access to world class research and education facilities
- Attendance/presentations to international and national conferences with expenses fully covered
- Cohort and individual modular training covering technical, research, professional and personal development.
- Minimum of 3 months fully funded industrial placement
- Flexible/hybrid working arrangements and accessible facilities
- Research projects designed from the outset to meet and promote EDI and responsible research requirements while catering where possible for individual needs
- Opportunities to inform future research strategies and environmental policies
- Opportunities to engage, interact and inform the public and end users, promote STEAM and inspire the new generation of students and researchers
- Additional support for disabled and matured researchers and carers.



2. We are looking for

- Passionate, inquisitive and enthusiastic researchers, graduates and professionals
- Applicants with a strong interest in research covering engineering, science, technology, net zero, environmental, sustainability, social, economic and commercial aspects along with their interactions
- Applicants from a wide range of backgrounds, experiences and skills that want to make a difference and further develop their professional, research and personal skills
- Graduates, early career researchers and technologists as well as professionals with degrees or relevant work experience in mechanical, electrical, aerospace and general engineering, materials, manufacturing, transport, science, maths, computing, social sciences or environmental topics.



Eligibility Criteria: This opportunity is currently available for applicants that have UK student fee status. **Only a limited number of international places are available. Please contact us to learn more and find out if you are eligible to apply.** We are committed to invite to interviews all candidates that have a second lower degree in engineering, scientific, technology or relevant discipline and/or work experience. We encourage applications from candidates with diverse backgrounds skills and experience. We are also committed to skills-based selection of applicants. **Career Prospects:** Graduates of the CDT in Net Zero Aviation will be equipped with a unique combination of interdisciplinary technical and professional skills, appreciation of the wider aviation ecosystem and sustainability mindset to lead and accelerate the decarbonisation of aviation from various roles in industry, academia, government and policy.

3. Why a CDT and How is it Different from Conventional PhD Projects?

Centres for Doctoral Training are long-term partnerships between government, industry and academia. CDTs specialise in the development and delivery of cohort-based research and training programmes to address challenges of strategic significance that require new skills, new technical capabilities and development of novel technologies.

In comparison to conventional PhD projects, CDTs are designed to deliver strong cross-sector partnerships along with holistic and consolidated strategies for the development of future-proof skills and novel technologies. All researchers are co-funded by industry and EPSRC and are participating in a cohort based and structured training programme that promotes team working, peer to peer learning, networking as well as researcher led outreach activities. Our programme is designed to develop a wide range of future-proof skills that combine technical, professional, leadership and personal development.

The CDT in Net Zero Aviation is connecting people, knowledge, skills, tools, facilities, and research activities across academia, industry, government and public sectors to support the development of the next generation of Net Zero Aviation leaders and contribute to the acceleration, integration and implementation of disruptive and impact driven technologies.

In addition to the technical elements of the CDT, our aviation focused training programme offers a holistic approach that covers the wider aviation eco-system and considers commercialisation of research and route to market as well as synergies with other sectors along with the development of the required infrastructure and operations to support the decarbonisation of aviation by 2050. Our cohort and multi-centred approach promotes collaboration within an innovative, inclusive and interactive environment.



The CDT offers diverse training methods that cater for individual needs and learning styles and a modular training approach that enables our members to manage and plan their training activities according to their development needs and priorities. Student led activities further support the development of personal and professional skills. Working with the Aerospace Technology Institute, CAA and other partners offers exposure to strategy and policy making mechanisms that support our researchers in developing their strategic thinking skills and future vision.

As a member of our CDT you will learn to bridge disciplinary boundaries while developing innovative and collaborative solutions. Societal aspects including public and stakeholder engagement, awareness and acceptance are at the heart of all our activities, thus promoting long term and global thinking beyond local, discipline and application specific solutions.

Future Proof Skills & Career Prospects

The requirement to train Net Zero Aviation leaders stems from the need to develop disruptive technologies and integrate them into novel aircraft platforms.

Decarbonisation of aviation requires researchers to explore, create and implement new methods, tools and ways of working together that capture the synergies of the disruptive technologies as well as the benefits of new digital methods.

Our CDT will promote a culture of change and a new mindset that considers commercialisation and route to market, safety and certification, environmental, social and economic aspects from the outset of the research and development phases. Our researchers will engage with the various stakeholders including the general public and even more importantly the new and future generations.



Graduate profiles matching industry's and academia's requirements include technology leaders with strong research, computational, technical, leadership, team working, multidisciplinary, and strategic skills. Our researchers will contribute to all phases of the development of Net Zero Technologies for Aviation: from fundamental research to the design and analysis, manufacturing and assembly, operations and maintenance all the way to retirement-end of life phases.

They will also contribute to the development of the required infrastructure including research and test facilities as well as airport and vertiport infrastructure.

Some of our researchers will continue their development and career within the academic sector contributing to research and education, leading large projects and consortiums, initiating their own research and becoming internationally influencing thought leaders.

Others will join industry as project engineers and technologists progressing to project managers and senior technologists and further progressing to programme managers as well as principal/chief engineers and technologists.

A portion will also join Department for Transport, CAA, ATI and other national and international policy making organisations (ICAO, IATA, EU, etc) to work on future strategies, developing technology roadmaps and certification processes and monitoring the socio-economic and environmental impact of the new technologies

4. Why Net Zero Aviation and How the CDT Will contribute to It?

Aviation has a major social and economic role connecting people, places and cultures, driving commerce and economic development, contributing to sustainable growth and enabling access to and connections with remote places. Over the years it has been at the forefront of important technological developments and has been experiencing significant growth. With success comes responsibility and while aviation has done remarkable progress in drastically reducing emissions while improving efficiencies and promoting environmental and sustainable responsibility more needs to be done to secure the decarbonisation of the sector by 2050. The EPSRC Centre in Net Zero Aviation is a direct response to the urgent need to decarbonise aviation.



Due to the unique nature and challenges related to the decarbonisation of aviation it is imperative that a holistic approach is adopted to ensure maximum impact. While the CDT is covering a wide range of disciplines and topics its alignment with the UK's Jet Zero and ATI's Destination Zero strategies ensures that research and training activities remain focused with clear targets and a well-structured approach that is reflected in the 5 main research and training themes that include:

- **Zero Aerospace Emission Technologies:** covering electrification, production, storage, use of hydrogen, Sustainable Aviation Fuels (SAF) and novel energy vectors along with their integration on the aircraft
- **Ultra Efficient Aircraft & Propulsion Systems:** including methods and tools required for the design, integration, analysis and testing of novel aircraft configurations and synergistic integration of aerodynamics, propulsion and structures.
- **Aerospace Sustainable Materials & Manufacturing Technologies:** that comprise novel, sustainable aerospace grade materials and manufacturing processes with improved efficiency, reduced waste and energy consumption as well as aspects related to circular economy, availability of materials and life cycle aspects.
- **Green Aviation Operations and Infrastructure:** covering airborne, airside and airport operations, airspace management and development of infrastructures that include new airports as well as energy production, distribution, and storage facilities.
- **Aviation Environmental & Socio-Economic Aspects:** focusing on formation of emissions, impact on environment, climate change and society, commercialisation and route to market including legislative and certification frameworks, supply change, intellectual rights, progression through the TRLs will also be addressed.

Our researchers will become familiar with state of the art experimental, computational, and data analytics methods applied to the above topics and will learn how they can be used to add value to their research, promote collaboration and improve knowledge transfer. Our CDT is the world's first eco-system wide collaboration to train researchers and produce leaders in Net Zero Aviation, bringing together multiple world leading research and training communities and facilities.

Need to Consider the Wider Aviation Ecosystem

In the case of Net Zero Aviation one size does not fit all. As a result different aircraft, operations, infrastructures and technology pathways need to be considered over different horizons.



For example, development of hydrogen aircraft will revolutionise the engine's combustor and will have a major impact on the thermomechanical properties of materials affecting the life, integrity and durability of the propulsion system. Due to its unique properties, hydrogen will also have a radical impact on the size, shape and configuration of the aircraft, its aerodynamic performance and weight, the design, material selection and manufacturing of the internal structures, the fuel tanks and the fuel distribution system. The above aspects will also affect its flight dynamic characteristics as well as its operation and maintenance. Furthermore, the airport infrastructure needs to be completely re-designed and updated. As such individual advancements cannot be considered in isolation to each other.

Similarly, adoption of electrified technologies presents additional challenges for aviation compared to other industries and require major advancements including very high-power densities, use of sustainable materials, advanced thermal management solutions, addressing the impact of thermal runaway in batteries, novel topologies for embedded electric machines as well as novel control strategies of integrated hybrid systems.

The impact of electrified propulsion on the configuration and aerodynamic performance of the aircraft – including radical distributed propulsion configurations – also needs to be considered along with the re-design of the airports and energy systems. The overall environmental impact throughout the life cycle of the whole aircraft needs to be accounted for. Furthermore, the impact of alternative energy vectors including H₂, SAF, batteries, etc on atmospheric emissions, the environment and climate change is currently not understood and further research is required to address these aspects.



Through the consortium's unique capabilities our CDT is able to make major advancements in these fields. The expertise, skills, research capabilities and experience of the CDT partners cover the full extent of the above challenges. The consortium has an excellent track record of leading contributions to international research programmes with strong links to NASA, DLR, NLR, ONERA, EASA, ICAO, etc providing access to additional resources, networks and opportunities for collaboration while also ensuring that CDT outcomes can be benchmarked against other internationally leading activities.

Pathways to Impact

In addition to the graduates themselves, the skills, knowledge, technologies, methods and tools developed in the CDT are crucial for accelerating, integrating, testing and de-risking technologies needed to decarbonise aviation. Accounting for safety and certification with relevant project partners from the outset of the research will accelerate commercialisation and route to market while informing future regulations and safety protocols. Outcomes from research, group design and challenge week projects will shape national and industrial policies, research strategies, technology roadmaps and prioritisation of funding allocation. Through the industrial partnerships, the resulting technologies will lead to new product developments with competitive advantages.



Engaging with and informing the general public including air passengers on the principles of Net Zero and the influence of user choices will directly impact on the success of future policies. The CDT will promote STEAM (Science, Technology, Engineering, Art and Maths) and will support social mobility. It will inform the wider research community fostering technology and knowledge transfer across industries and disciplines. The CDT will also contribute to the adoption of standards by international and domestic agencies such as ICAO, IATA, etc.

The CDT is the worlds first centre of excellence for Net Zero Aviation Research, Education and Training offering access to world class experts and interconnected industrial-scale research facilities (including a fully operational Net Zero Airport) that will further promote national and international collaborations and support the development and testing of future flight demonstrators.



The CDT in Net Zero Aviation will deliver strong partnerships, future proof skills, innovative and impact driven research as well as thought leadership across the different sectors of aviation.

5. An Exciting, Highly Rewarding Research Journey & Experience

Working with our partners we have developed an inclusive, highly stimulating and modular research training programme. Emphasis is on innovation and impact, collaborative working and learning, continuous development, active engagement with partners and stakeholders and inclusion of student-led activities.

You will enrol to a 4-Year EngD or PhD programme as appropriate. EngD researchers can complete their individual research projects while being employed by their sponsors or by having extended industrial placement periods, more than 16 months.

During Y1 you will be mainly based at Cranfield spending a total of 9 weeks at Cardiff, Strathclyde and NCAS. In Y2-Y4 you will move to the University that hosts your research.

All our researchers have access to the consortium's facilities, modules and research staff. Training and development spans across the partners, over the 4 years and encompass 9 main elements: 1- Individual Research, 2- Technical, 3- Leadership, 4- Modelling & Experimental, 5- Atmospheric Science 6- Personal, Professional & Research Skills, 7- Student led out-reach activities, 8- Industrial and external training, 9- Group activities. The cohort approach will forge long lasting connections and networks of people, skills, capabilities and knowledge within and between the cohorts, promoting collaborative ways of working. In the first 3 months, with the support of your supervisors and industrial mentor you will develop an individual training and development plan that will be reviewed frequently.



Year 1	Year 2	Year 3	Year 4
Individual Research			
Project Definition Literature Review Paper Research Plan Dissemination Plan Individual Training Plan	Research Tools Development Data Generation/Collection Data Analysis Journal & Conference Papers		Data & Analysis Refinement Validation & Verification Environment Evaluation Impact & Conclusions Journal & Conference Papers
Cohort-Training Activities			
Core Technical Modules			
Leadership in Sustainability Training			
Modelling, Experimental & Data Analytics			
NCAS – Atmospheric Sciences			
Group Design	Challenge Week	Challenge Week	
Seminars – Workshops – Invited Lectures			
Individual and External Training Activities			
Industrial Placement			
Elective Technical Modules			
Enhanced Research, Personal, Professional Training			
External, Discipline Specific Training – Royce Institute, ERA, etc			
Student Led Outreach and Inter Cohort Activities			
CDT Conference Open Days School Visits	CDT Conference Open Days School Visits	CDT Conference Open Days School Visits	

Induction Week Y1: You will register at Cranfield University and will be introduced to the overall structure of the CDT, its scope, people, activities, partnerships and training programme. You will attend introductory courses on research integrity, ethics, EDI and data management as well as drivers and challenges of decarbonising aviation including potential technologies and targets related to Net Zero Aviation. A review of Destination Zero, Jet Zero, Clean Aviation and NASA's Sustainable Flight strategies will be covered. You will also participate in various networking events and activities.

Individual Research Project Y1-Y4: You will work on your individual research from the start of your studentship. At the end of Y1 you will submit a research portfolio with a literature review, specifications, and plan for the project. Working with your supervisors you will develop an impact, sustainability and environmental assessment portfolio that will be continually reviewed and updated as your research progresses. You will also develop and maintain a dissemination plan detailing conferences you will be attending, journal publications you will prepare and other relevant activities you will participate to.

Technical Training Y1-3: will combine Net Zero Aviation tailored and customised cohort based and individual training. Core modules will offer an insight into the interconnected aviation disciplines, topics and sectors, the relevant emerging and transformational decarbonisation strategies and technologies along with their associated challenges and impact on infrastructure, operations and processes of the wider aviation ecosystem.

The programme will support you in developing and applying, technical, multidisciplinary, systems engineering, life cycle analysis and systems analysis skills. It will also directly inform and enhance your research experience. Elective modules offered by academic partners will equip researchers with advanced, discipline specific skills. You will have access to 25+ specialist modules across the 4 partners covering all 5 themes of the CDT.

Credit Bearing Modules - CU
Hydrogen for Aviation
Aircraft Electrification
Aerospace System Development & Life Cycle
Air-transport Environmental Planning
Materials for Hydrogen
Sustainable Materials & Manufacturing
Non Credit Bearing Modules – CaU & UoS
Energy Studies - CaU
Fuels & Energy Systems - CaU
Electric Aerospace Power Systems – UoS
Certification Requirements & Experimental
Validation of Net Zero Aircraft Systems - UoS

Leadership in Sustainability Y1-Y3: will equip you with business and leadership attributes focusing on cultivating, managing and commercialising sustainable innovation. In collaboration with the Bettany Centre for Entrepreneurship at Cranfield, the training will support you in developing and applying people/project/supply chain/technology and change management skills that will be further complemented by entrepreneurial, technology commercialisation, business case development as well as strategic decision-making capabilities.



Modelling, Experimental & Data Analytics Y1-3: You will learn to design and execute physical, numerical and simulation experiments, develop digital twins and cyber-physical systems as well as make use of Hardware and Software in the loop methods. The programme will be delivered in Y1 and will spread across the partners making use of the National Flying Laboratory at Cranfield (you will have the opportunity to fly with the Saab 340B, take and analyse measurements for the aircraft and the propulsion system and discuss the performance of the aircraft during its mission), the DragonFly demonstrator at Cardiff and the software/hardware in the loop capabilities at Strathclyde.

Atmospheric Science Y1-Y2: delivered by NCAS, the training combines lectures and practical activities offering fundamental understanding of the theoretical, modelling and experimental aspects of atmospheric sciences, climate change, climate models and impact of emissions.



Group Design Project Y1: You will work together with other team-members on a 6-month group design project that will support peer to peer learning, sharing of expertise, skills and experiences and will promote the development of innovation and problem-solving skills. The activity will span across the academic partners to ensure that the expertise, facilities, and capabilities from all partners are captured.

Research, Professional and Personal Skills Y1-Y3: Aligned with the Vitae Research Development Framework, you will receive high quality training on Research Governance & Organisation, Impact and Translation, Diversity & EDI, Personal & Professional Development. This ensures that all our researchers develop transferable skills in response to personal needs.

Engagement with Partners and Stakeholders Y1-Y4: through a series of structured activities including visits to industrial sites as well as webinars, invited lectures and workshops.

Industrial Placements Y2-Y4: You will complete a minimum of 3 months industrial placement. Normally placements will be with the sponsor of your PhD. However, placements with multiple partners as well as international and extended placements can become available.

Student Led Outreach and Engagement Activities Y2-Y4: Working together with other CDT members you will plan, manage and run a number of outreach activities. These will include a rotating annual conference that will be open to the partners and the public, Open Days during the summer months to offer the opportunity to the public and other stakeholders, including future students to understand better the mission and vision of the CDT along with its activities, impact and contribution. STEAM and visits to schools will also be a key activity.

Stakeholder Challenge Week Y2&Y3: you will work along with other researchers from different cohorts to solve a challenge offered by our industrial partners. Industrial challenges simulate real working conditions and “industrial project sprints”. At the end of the challenge week researchers will present their findings and recommendation to industry representatives.

6. Making a Difference: Innovation and Change Through Equality, Diversity & Inclusion

At the Centre for Doctoral Training in Net Zero Aviation, we value our diverse staff and student community and maintain a culture where everyone can work and study together harmoniously with dignity and respect. This is reflected in our values, practices and working ethos. This encompasses the student recruitment team as well as both academic and non-academic staff engaged with CDT in Net Zero Aviation, all of whom will be supported through targeted and appropriate training initiatives. We welcome students and staff from all backgrounds and support our staff and students to realise their full potential, from academic achievement to mental and physical wellbeing.

Our Partner-Universities are committed to progressing the diversity and inclusion agenda through several initiatives and action plans:

Cranfield University holds an Athena SWAN Bronze award, is a member of the Women's Engineering Society (WES) and Working Families, and sponsor of International Women in Engineering Day. We are also Disability Confident Level 1 Employers and members of the Business Disability Forum and Stonewall University Champions Programme

Cardiff University holds an Athena SWAN Bronze award both at University and School level and is a member of the Women in Engineering Society, and we support our students' participation to their annual conference. The university recently received the Race Equality Bronze Award, and the School of Engineering is currently undertaking several projects to inspire the next generation of engineers, funded by the Royal Academy of Engineering and the Sutton Trust.

The University of Strathclyde holds an Athena SWAN Silver Award at institutional level, and a Bronze Award at the department of Electronic and Electrical Engineering and is a Disability Confident Employer.

7. Academic Partners

Cranfield University

Cranfield University is UK's leading postgraduate only university. Cranfield's world-class expertise, large-scale facilities and unrivalled industry partnerships is creating leaders in technology and management globally.

We aim to create and maintain a culture in which everyone can work and study together and realise their full potential.



We are a Disability Confident Employer and proud members of the Stonewall Diversity Champions Programme.

We are committed to actively exploring flexible working options for each role and have been ranked in the Top 30 family friendly employers in the UK by the charity Working Families.

We are the only university in Europe with our own airport and runway. Through the strong links with industry we have built over the past 70 years, we focus on defining and delivering sustainable and impact driven solutions covering a wide range of disciplines along with their interactions including aerospace, aviation, materials, manufacturing, energy, environment,

management, digitalisation, autonomous systems and many more. Cranfield's Global Research Airport, also funded as a Net Zero Research Airport by the UK Research Partnership Investment Fund, offers a unique environment for transformational research covering the decarbonisation of the whole aviation ecosystem.

We also operate a number of unique facilities including a SAAB 340B+ Flying Classroom and Laboratory, the Boeing 737 Ground Demonstrator, Wind and Icing Tunnels, Engine test cells and Accident Investigation Laboratory. Cranfield is also hosting the Rolls Royce University Technology Centre for Aero Systems Design, Integration and Performance, the Airbus and Rolls Royce Aerospace Integration Research Centre as well as the Digital Aviation Research and Technology Centre which in close collaboration with our industrial partners aims to get new digital systems within the aviation sector integrated and working together.



Cranfield has a leading role in multiple flagship international and national research projects funded by the UK government, the European Commission and our industrial partners.

Cardiff University

Cardiff University is a leading research-intensive institution, renowned for its significant contributions across diverse disciplines. A Russell Group University in the 2021 Research Excellence Framework, 90% of its research was rated as world-leading or internationally excellent, positioning it among the UK's top 20 universities for research quality.



The university's research strengths reflect its commitment to interdisciplinary excellence and its focus on achieving Net Zero targets. Cardiff's state-of-the-art facilities, such as the Hydrogen & Electric Propulsion Innovation Centre at St Athan, Advanced Research Computing at Cardiff, the PET scanner, and the Morgan-Botti Lightning Laboratory support cutting-edge research and innovation.

These resources are accessible to global partners, fostering collaborations that address real-world

challenges. As a member of the Russell Group, Cardiff University continues to attract leading researchers and substantial investment, reinforcing its role in driving economic growth and delivering societal impact both in Wales and internationally. Our researchers work closely together across disciplines, and in partnership with industry and government, to generate real-world impact with a legacy.

Cardiff works closely with industry, hosting the National Grid Research Centre of Excellence established in 2005, the Airbus Centre of Excellence in Cyber Security Analytics and Airbus Centre of Excellence in Human Centric Cyber Security.



University of Strathclyde

The University of Strathclyde is a leading research-intensive University with multiple educational awards and nearly 90% of its research classified as world leading or internationally excellent. The Institute for Energy and Environment is recognised as Europe's leading and largest power systems and energy technology university research groups. Our 200 staff and researchers engage in a diverse range of collaborative, multidisciplinary research programmes, addressing issues such as the creation of sustainable energy systems, to the development of condition monitoring technologies and asset investment planning for major electricity companies.



The Institute is a key partner in a broad range of multidisciplinary research projects funded by government, EU and industry. Our expertise spans four core areas and research in these is augmented by working closely with business, industry and policy partners through strategic Industry Engagement Research Centres. The Institute is equipped with state-of-the-art experimental facilities to support its research and

commercial activities. Capabilities include the design, testing and real time simulation of power electronic systems, development of protection relay algorithms, prototyping, intelligent networking, demand side management and associated modelling for future smart grid and micro-grids applications. These facilities are available for industrial use. The Institute hosts the Rolls Royce University Technology Centre in Electrical Power Systems, focusing on the development and validation of technologies for future electrical power systems for aircraft, marine and land-based systems and the development of protection and other power technologies that enable electrified architectures



National Centre for Atmospheric Science

The National Centre for Atmospheric Science is a world leading research centre, funded by the Natural Environment Research Council. Our research falls into three key areas. These are air pollution, climate and high-impact weather and long-term global changes in our atmosphere. We also provide the UK with state-of-the-art services for observing and modelling the atmosphere. These include a research aircraft, advanced ground-based observational facilities, computer modelling and support, and facilities for storing and analysing data. We play a significant and influential role in many international science programmes and provide advice, leadership and national capability in atmospheric science.





We are committed to providing the best training in atmospheric science in the UK. Our training programme is research-led and delivered by experts, allowing you to master the fundamentals and refine practical skills and techniques. NCAS will facilitate the training of CDT students in the underpinning science and offer access to world class research capabilities. The knowledge, skills and facilities offered will be invaluable in bridging the gap between a graduate's own core discipline and the science of the ongoing anthropogenic impact upon the environment.

8. Our Industrial & Research Partners

The CDT includes more than 40 partnerships that cover all sectors including UK, Scottish and Wales Government (DfT, Transport Scotland, Welsh Govt, Cardiff Capital Region), certification authorities (CAA), industry associations (Wales Aerospace Forum, ADS), policy makers (ATI), research institutes (Royce Institute and ERA) as well as industry.

The latter covers the wider ecosystem including energy (GE Power Conversion & SSE), airports across England, Scotland and Wales (Bristol Airport, AGS Airports, Cardiff, HIAL), airlines (Loganair) and aerospace partners including internationally leading airframers like Airbus and game changing SMEs like ZeroAvia, LYTE, DuoDrive, iNetic and others.

Partnerships span across the supply chain including international propulsion (Rolls-Royce and GE), systems/structures (GKN, Spirit AeroSystems, Safran, Saab, Marshall) and component manufacturers (Meggitt, Derregallera Toshiba, IHI), digital engineering organisations (CFMS) and research-intensive SMEs developing novel technologies (Sunborne, Blue Bear Systems Research).

Partnerships and activities cover the full spectrum of research topics across the 5 themes of the CDT including zero emission technologies, ultra efficient aircraft, propulsion and systems, materials and manufacturing, infrastructure and operations as well as cross cutting disciplines focusing on commercialisation, environmental, digitalisation and societal aspects



9. Contacts & Useful Information

In addition to the academic, research and training activities the CDT, Cranfield, Cardiff, Strathclyde Universities and NCAs offer additional student services and support including

- Inclusive, Accessible & Diverse Learning Environment
- Wellbeing and Mental Health Support and Counselling
- Academic and Industrial Mentorship
- Career Advice
- Disability & Learning Support
- Additional Support for Carers
- Accommodation
- Sports Activities/Facilities
- Personal & Professional Development



Contacts

General Enquiries: info@netzeroaviation-cdt.ac.uk

Cranfield Enquiries: cdtaviation@cranfield.ac.uk

Strathclyde Enquiries: graeme.burt@strath.ac.uk

Cardiff Enquiries: featherstonca@cardiff.ac.uk

Online

<https://www.netzeroaviation-cdt.ac.uk>

<https://www.cranfield.ac.uk/campaigns/cdt-net-zero-aviation>

10. Applicants Interview Information

Interview Schedule

The CDT in Net Zero Aviation is committed to offer all candidates that meet eligibility criteria and have a minimum of 2:2 degree in any engineering, scientific, computing or relevant discipline the opportunity to attend online or face to face interviews according to their preference.

Important Dates – All interviews will be held on the same day (please contact us to discuss any specific requirements or if you are not available). Our target is to make an offer within 2 weeks from the application deadline with 1st interview taking place within a week followed by a second interview in the second week.

Interview Process

- 1st Interview:
 - o Motivation for PhD and why you would like to join the CDT
 - o CV and background-based questions
 - o Technical Skills
- 2nd Interview:
 - o 15 minute presentation on why you would like to join the CDT in Net Zero Aviation and how your skills and experience can support your research
 - o Competence based interview
- For all interviews
 - o Introduction of panel members/roles and applicant
 - o Explain process
 - o Introduction to the CDT
 - o Introduction to the role/PhD opportunity
 - Topic, skills, sponsor, bursary, duration of PhD
 - o Offer candidate the opportunity to ask questions
 - o Candidate Presentation or ask candidate to present their background/CV
 - o Questions to the candidate
 - o Any other items that the candidate would like to emphasise or bring to the attention of the panel, including question to the panel
 - o Panel to explain next steps and timeline

Skills Based Criteria

We are committed to a skills-based selection process that focuses on applicant's competencies, skills and core attributes to determine if candidates are suitable for the roles available.

Candidates are not expected to demonstrate proficient levels of skills and experience and are not expected to cover all areas of the CDT. They will develop these skills during their training and research programmes. Instead they are expected to offer examples where they had the opportunity to practice and apply some of these skills and have developed relevant experience. Examples don't have to be based on large projects. Instead, they could refer to previous academic projects, group designs, theses, assignments or extra curriculum activities. Examples from previous or part time jobs are also very welcomed.

1. Topic specific and technical skills

Candidates could describe any previous experience using relevant software, modelling/numerical tools or their previous experience in planning and undertaking experimental work. They could give examples where they used these tools, how they found the overall experience and what they learned/what skills they developed. Candidates will have the opportunity to attend specific training during their PhD research and detailed understanding or previous experience is not always required as long as the candidates have a good engineering, technical or scientific background.

2. Motivation for carrying out a PhD and why they would like to join the EPSRC CDT in Net Zero Aviation

Candidates should clearly explain what is their motivation for doing a PhD and how the PhD research relates to and will help them with their future career aspirations.

Potential answers may include examples covering one or more of the following:

- a. Why and how they would like to develop specialised technical skills? on what field? How can their previous experience help them in their PhD and what specific technical or research skills they would like to develop?
- b. Work with other experts and contribute to the development of novel technologies –What previous experience they have that is relevant? How a PhD could support this ambition?
- c. Have a keen interest in innovation – offer examples of innovation and novel technologies that inspire them – they don't have to be on the topic they apply for. How their interest in novel technologies and innovation relates to their future career aspirations, how they believe they can have an impact and contribute to future technological, social and environmental developments?
- d. How the CDT will help with their career development? What skills they would like to develop in addition to the technical skills? These may include communication, leadership, team working, strategic skills, etc. Candidates are encouraged to offer examples not just mention the skills.
- e. Why they would like to join the CDT instead of a conventional PhD project- candidates could describe how they believe the CDT can help them develop a wider understanding of the requirements driving the decarbonisation of aviation, the potential technology pathways, the requirements for developing appropriate infrastructure and operations and the associated challenges. Candidates don't have to be familiar with all these aspects and technologies, they will develop this knowledge, skills and understanding during their studies. They can also explain how the CDT will offer them a wider understanding of the aviation eco-system and its different sectors.

3. Team working Skills & Experience

Candidates should be able to describe and give examples based on previous experiences from their academic, professional or social life including charity or community work, etc where they have been part of a team and how this helped them in the development and application of communication skills, what was their role, what was the outcome, how they contributed to the successful outcome, etc. They could also offer examples of how they supported and helped other team members, took initiatives, stayed motivated or how they overcame challenges and difficulties, resolved conflicts, what they learned and how they may have done things differently.

4. Organisational, Planning and Project Management Skills

Candidates could describe and offer examples of how they organised, planned and managed an activity or a project. This could be based on their academic, professional or social activities. They could give examples of setting up SMART aim and objectives, defined and agreed realistic targets, outcomes and deliverables, how they defined and allocated tasks, developed a timeline with expected outcomes and how they reviewed and monitored progress.

5. Research Planning Skills

Based on their previous experience candidates could offer examples and/or describe how they approached or would approach a research project. They could explain the different steps they will take in organising, planning and carrying their research including the definition of the overall challenge, identifying relevant stakeholders, setting up, selecting and agreeing requirements, constrains, priorities and success criteria. How they would review relevant previous work and become familiar with what others have done/attempted.

What is the state of the art and how these steps can help them develop new ideas and concepts, check their feasibility and down-select potential solutions. Candidates could describe how they would develop their methodology, select their tools and software or plan their experiments, and how they will validate and assess the outcomes of their work. Candidates don't need to refer to the specific project/area of research they apply for. They can base their answers on previous group designs or individual projects from their academic or professional background. Applicants should be familiar with NASA's Technology Readiness Level (TRL): how many levels and how they represent different phases – they don't need to memorise all 9 levels:

- Technology Feasibility & Development (TRL 1-4)
- Technology Demonstration (TRL 5-6)
- Technology Implementation (TRL 7-9)

6. Creativity & Innovation

Candidates could describe situations and offer examples from their academic, professional and social/personal life where they:

- a. developed a new idea, concept or a process (does not matter how simple or complex it was and how wide its application is. Simple examples will be sufficient and can be based on previous academic projects and exercises where they were required to design or build something)
- b. improved an existing process, idea, design or product – same as above. Is the approach that matters.
- c. solved a problem/challenge – same as above
- d. managed to think outside the box and have done things differently

Familiarity with Net Zero Aviation Strategies and Challenges

Candidates should be able to demonstrate some familiarity with the different Net Zero Aviation options and the relevant technology pathways. We don't expect candidates to be familiar with all topics but to be able to identify some key aspects related to some of the areas below and potential synergies between different sectors – i.e. electrification also requires decarbonisation of the energy sector, developing appropriate infrastructure and airports, etc. We don't look for specific expertise and detailed knowledge but for overall awareness and an overview of potential solutions and challenges as described in the CDT introduction pack and could include:

- **Electrification, SAF, Hydrogen and other alternative fuels and energy vectors.** They should also be able to discuss challenges related to their implementation especially compared with other industries. These could include mass and volume/size constraints. Certification and safety challenges, impact of infrastructure/airports. Impact on total energy generation/consumption and related emission/environmental impact required to charge batteries, produce green or blue hydrogen, produce SAF. Cost implications and scalability of SAF, hydrogen or other fuels, challenges associated with recyclability of batteries, etc. We are not looking for detailed knowledge but mainly awareness of the different technologies that are considered with a top level view of their challenges – for example batteries and electric equipment are heavy, hydrogen takes a lot of space and volume, SAF are difficult to produce and are expensive, all methods require additional energy which may produce emissions on their own. As a result a life cycle analysis is required to understand what the emissions and energy requirements are to produce these fuels/energy carriers or charge batteries.
- **Development of Ultra Efficient Aircraft and Propulsion Systems** along with their integration: these could include novel and highly integrated airframe and propulsion systems such as blended wing body aircraft, distributed propulsion systems, use of advanced computational and experimental methods including AI, machine learning, etc to better understand, model and analyse physics including aerodynamics, structural analysis, performance of systems and their integration. Detailed understanding of the above concepts and technologies is not required. What we are looking for is awareness that these aspects can reduce energy requirements and contribute to more efficient and green aircraft
- **Development of Sustainable Materials and Manufacturing Technologies** including new light weight metals, alloys and composites, new sustainable materials for electric components and batteries, new manufacturing techniques that could reduce energy consumption, accelerate production rates, reduce waste. We are not looking for detailed and expert knowledge but for awareness that new technologies (no need to know what are these specific technologies) could improve material properties and manufacturing techniques to contribute to reduced waste, reduced energy consumption and improved performance. Candidates can refer to relevant sections of the introductory pack.

Interview Preparation Questions

Technical Questions:

Technical questions will focus on the topic of your previous thesis and relevant experience

Net Zero Aviation Questions:

- What are potential Net Zero Aviation technology pathways, i.e. novel fuels, energy vectors/storage, etc.
- What are the challenges of decarbonising aviation and how are they different from other industries
- How can the introduction of ultra efficient aircraft and propulsion systems contribute to the decarbonisation of aviation?
- Why is it important to consider the overall life cycle aspect of new technologies and new aircraft?
- Why is it important to decarbonise aviation?
- Why is it important to consider the synergies between aviation and energy sectors to achieve Net Zero.
- Give an example of an innovative technology that inspires you

Questions related to the CDT:

- Why are you interested in doing a PhD
- How will a PhD help you with your future career?
- Why would you like to join the CDT in Net Zero Aviation and how does this compare to a “conventional” PhD?
- Why are you interested in this particular project?
- How do you think your research and the CDT will contribute to the decarbonisation of the aviation sector?
- How could you inform air-travellers and the general public about the importance of Net Zero Aviation and your research?

Competencies and Skills:

- Give examples where you had to work as a member of a team. What was your role, what was your contribution to the team effort what did you learn from the experience and how would you do things differently if you had the chance.
- Give an example where you had to communicate information to different audiences and how you adjusted your style or the form of the information to account for the different audiences? This could include examples of presenting data and results to other team members using technical presentations, provide updates to reviewers using more top level presentations, inform the general public or other interested parties that are not experts using less technical information and focusing more on why your work is important or try to inspire others.
- Give an example where you had to plan and organise an activity or a project. What steps did you take, how did you manage the whole process, what was the end result and what did you learn from the experience
- Give an example where you were successful in influencing a decision. That could be from a group design activity or a project. How did you approach your colleagues, how did you build your case and how did you manage to influence the final outcome
- Give an example where you had to develop (either on your own or as part of a team) a new idea or method, process, design etc.
- Based on your previous experience how would you organise and plan your research project? What are the different steps/phases of the PhD?