

## Joy Welch Post-Doctoral Grants Fund

2025-26

Report

In January 2026, Lancaster University proudly hosted the fifth round of the annual Joy Welch Post-Doctoral Grants Fund. This funding initiative was accessible to all researchers at Lancaster University, aiming to support research projects across various fields and disciplines. According to the agreement between the Joy Welch Educational Charitable Trust and Lancaster University, a total of £100,000 was allocated to award at least 12 research grants.

Researchers from Lancaster University's four Faculties were invited to submit a brief application form, including a research proposal of up to 1,000 words. The scheme received 40 eligible applications. A review panel, consisting of four research-active academics from each of Lancaster University's Faculties, was assembled to evaluate the applications. Panel members cast their votes for the most promising projects.

The panel comprised:

- Professor Jo Knight, Lancaster Medical School, Faculty of Health and Medicine (Chair)
- Professor Leon Cruickshank, School of Arts, Faculty of Humanities, Arts and Social Sciences
- Professor Grzegorz Pawlina, Department of Accounting and Finance, Management School
- Professor Corina Sas, School of Computing and Communications, Faculty of Science and Technology

After thorough consideration, the panel was able to distribute 13 awards, totalling £100,000, to researchers at different career stages and from various disciplines. The panel expressed the University's deep appreciation to the Trust for its generous support, which provides a unique and valuable resource for Lancaster University researchers. The panel members were highly impressed by the number and quality of applications received this year and are excited that 13 awards have

been granted to colleagues to pursue original research. We eagerly anticipate the outcomes of their projects in the coming year.

Breakdown of applications received by Faculty:

	<b>Eligible applications assessed by the panel (number)</b>	<b>% (to nearest whole number)</b>
FHASS	12	30%
FHM	2	5%
FST	20	50%
LUMS	5	13%
Lancaster University Leipzig	1	3%
<b>Total</b>	<b>40</b>	

Breakdown of awards made by Faculty:

	<b>Awards (number)</b>	<b>% (to nearest whole number)</b>
FHASS	3	23%
FHM	1	8%
FST	8	62%
LUMS	1	8%
<b>Total</b>	<b>13</b>	

## **Awarded Projects**

**Dr Gemma Fenwick**

**Lancaster Environment Centre**

**Amount requested and awarded £5,400**

***Nutrient baselines for changing tropical coral reefs***

Coral reefs around the world are changing rapidly due to climate change and human impacts. Many reefs are no longer dominated by hard corals, but instead by other organisms such as algae, sponges, and soft corals. These organisms play an important role in storing and recycling nutrients, such as nitrogen and phosphorus, which support reef life. However, we currently lack clear and comparable information on how much of these nutrients are held within different parts of the reef. This project focuses on coral reef systems in Mozambique, a region that supports important marine biodiversity but remains relatively understudied. It will measure the nutrient content of a range of reef organisms and components, including algae, sediments, sponges, and soft corals. By analysing all samples using the same methods, the project will produce a comprehensive dataset of nutrient levels across multiple reef components within these reef systems. The results will help scientists better understand how nutrients are distributed within reef ecosystems, and how this may change as reefs continue to shift away from coral dominance. This is important because changes in nutrient storage can influence how reefs function, how productive they are, and how well they can recover from environmental stress. By making the data openly available, this project will support future research, improve ecosystem monitoring, and contribute to more effective management of coral reefs in a changing world.

**Professor Carolyn Jackson**

**School of Social Sciences**

**Amount requested and awarded £4,527**

***Fears of academic and social failure in secondary schools: what are they and what can be done about them?***

Fear of failure is rife in schools. This is a serious problem as fear of academic failure is associated with reduced academic performance; missed opportunities for learning; poor time management; lower social and emotional wellbeing; higher levels of stress, anxiety, burnout and depression. Fears of social failure are also prevalent, these include fears about being unpopular, harassed and bullied.

This project will explore fears, and their impacts, among secondary school students in England, aged 13-14 years. It will focus in particular on fears of academic and social 'failure', their intersections, and changes since 2005. Change over time will be investigated through comparisons with the extensive interview dataset I generated 20 years ago (200 student, 30 teacher interviews).

The project will address the following key questions:

- What are the students' key fears?
- How do fears of academic failure impact students' lives in and out of school?
- How do fears of academic failure intersect with fears of social failure (e.g. fears about being unpopular, harassed or bullied)?
- How are these fears inflected by gender, sexuality, social class, race and other intersecting social categories?
- How do schools exacerbate or reduce these fears?
- In relation to all of the above, what has changed in 20 years?

Data will be generated through individual interviews in 2 schools that differ in student intakes and exam results. Interviews will be undertaken with 20 year 9 students (aged 13-14 years) and 3 staff in each school (40 student and 6 staff interviews in total).

**Dr Pramita Mondal**

**Physics**

**Amount requested and awarded £8,450**

***Ordered Molecular Architectures via Langmuir Blodgett Films for High-Performance Memristive Device***

Artificial intelligence (AI) is rapidly transforming our world, with its global economic impact estimated at \$3.5 - 5.8 trillion annually. However, this progress comes with a growing environmental cost. The computing power required to run AI systems consumes vast amounts of energy, with large-scale services using energy comparable to that of tens of thousands of households each day. This rising demand is becoming unsustainable, highlighting the urgent need for new, energy-efficient computing technologies. One major limitation of current computers is that they store and process information in separate units, meaning data must constantly move between them, slowing performance and wasting energy. A promising solution is a new type of electronic device called a memristor, which can store and process information in the same place, similar to how the human brain works.

Our research focuses on building memristors using specially designed organic molecules assembled into ultra-thin, highly ordered layers using the Langmuir–Blodgett method. This approach provides precise control over molecular arrangement, unlike existing techniques where materials are often disordered and unpredictable. Going beyond current designs, we introduce redox-active molecules with mobile counterions, allowing electrical switching to be controlled in a more reliable and tunable way rather than through random processes. This leads to improved stability, reproducibility, and device performance.

The Molecular Electronics group at Lancaster University has already demonstrated molecular level conductance using advanced microscopy techniques, supported by theoretical modelling. Building on this expertise, and in collaboration with researchers at the University of Cambridge, we will develop prototype memory devices. This project paves the way for faster, low-power, brain-inspired computing technologies, helping to reduce the energy demands of AI and support more sustainable digital infrastructure.

**Dr Laura White**

**Lancaster Medical School**

**Amount requested and awarded £450**

***What Matters Most in Motor Neurone Disease: Building a Patient-Focused Data Set***

Motor neurone disease (MND) is a serious condition that affects the brain and nerves, leading to muscle weakness, problems with speaking and swallowing, breathing difficulties, and eventually death. Although MND is rare, it has a major impact on individuals, families, and healthcare systems. One challenge for researchers is that information about people with MND is collected differently across studies and countries. This lack of consistency makes it difficult to compare results or combine data to improve understanding of the disease.

A useful way to address this problem is to create a 'Minimum Data Set'. This is a standard list of key information that should always be collected in both clinical care and research. While such datasets exist for some conditions, there is currently no agreed standard for MND. Importantly, most existing datasets have been designed mainly by clinicians, which means they may miss issues that matter most to people living with the disease.

People with MND often experience symptoms such as pain, fatigue, excess saliva, and difficulties with movement and communication. These can greatly affect quality of life, but are not consistently recorded in current databases. This project aims to develop a new Minimum Data Set for MND that reflects both clinical priorities and patient experiences.

To do this, we will work closely with people living with MND and their caregivers, alongside healthcare professionals. Participants will be recruited through the MND Association and invited to take part in small group discussions. These meetings will follow a structured method to ensure everyone can share their views and help prioritise the most important information to collect.

The final outcome will be a Minimum Data Set that represents what matters most to patients. This will support more consistent, meaningful research and could ultimately improve care, inform health policy, and guide future studies.

**Dr Christopher Taylor and Dr Patrick Mohl**

**Lancaster Environment Centre**

**Amount requested and awarded £11,768**

***Shrub encroachment into abandoned medieval grasslands: climate friend or foe?***

Soils store more carbon than the atmosphere and all land plants combined, with up to a third being held in grasslands. Temperate grasslands can also be incredibly biodiverse, particularly when managed using traditional and low-intensity practices. However, due to a range of socioeconomic factors, the consistent management required to maintain such high biodiversity is in decline across all of Europe. Little is known about how abandoning these management practices affects soil carbon storage in these grasslands.

Grassland abandonment often leads to encroachment by shrubs ('shrubification'), which leads to reduced abundances of specialist grassland plant and insect species. Recent analyses of soil carbon stocks suggest both the direction and magnitude of responses to shrubification can vary considerably—ranging from stark reductions (-50%) to more than tripling grassland soil carbon, depending on soil conditions and the species of shrubs that encroach. The primary aim of our research is to quantify changes to soil carbon stocks following abandonment and shrubification of some of the most biodiverse grasslands on Earth, with a goal of using these data to preserve management of the grasslands that remain.

We will sample shrub-encroached grasslands from the Târnava Mare valley of Southern Transylvania, Romania, which contain highly species-rich grasslands due to traditional management that has remained largely unchanged since the 12th Century. These grasslands are severely threatened and represent one of the last remaining medieval farmed landscapes in lowland Europe, and without conservation intervention, could disappear within the next 20 years. By comparing carbon stored in soil directly under encroached shrubs to the carbon content of adjacent grassland soils, we can estimate how shrubification is changing the ability of these grasslands to slow the rate of climate change—and use this knowledge to either fund their conservation or inform management.

**Professor Ian Gregory**

**School of Global Affairs**

**Amount requested and awarded £9,123**

***Using AI to help with museum acquisitions: An impact project with the US Holocaust Memorial Museum***

Under the ESRC/NSF funded Spatial Narratives project we have developed AI-based approaches to understanding space, time and events as described within narrative texts. The project has focussed on two datasets: a collection of around 1,000 Holocaust survivor testimonies, and a smaller collection of texts describing touristic journeys in the Lake District. Under Joy Welch funding we will work in partnership with the US Holocaust Memorial Museum (USHMM) in Washington DC to build on this research by developing a prototype system suitable that we hope to be able to include as part of an Impact Case Study for REF2029. We will then explore if the resulting system is suitable for other museums with oral history collections.

A major challenge for USHMM is that they are offered around 2,000 items per year for accession into the museum's collection. Museum staff have to evaluate each potential accession to see whether it fits the museum's policy of only accepting accessions that enhance its collection, particularly by helping to fill gaps identified in its 'gaps' document. This is prohibitive in terms of staff time, leading to a lengthy waiting list and valuable items potentially being lost or missed.

They already have developed methods of converting sound-based media such as cassette tapes to text. Our project starts with these textual transcripts. We will modify existing code developed under Spatial Narratives to enable museum staff to automatically tag key features such as locations, times, people, organisations, and events, within a testimony. These will be used to create a Large Language Model (LLM)-based precis of the testimony providing museum staff with a qualitative summary of its potential value. We will also investigate generating an originality score for the testimony to provide a quantitative measure of its worth derived from the goodness of fit between the testimony and a digital version of the museum's 'gaps' document.

**Matthew Ivory and Dr Sophie Nightingale**

**Psychology**

**Amount requested and awarded £9,270**

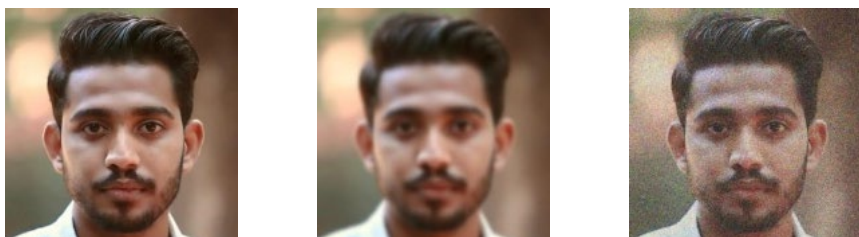
***Trust, Attraction, and Realism in Artificially-Generated Faces***

Artificial Intelligence (AI) can generate highly realistic faces that are often considered indistinguishable from, and more trustworthy than, real faces. One possible explanation for this is that AI-generated faces tend to be more average-looking than real faces. Yet different AI models produce varying patterns of results—for example diffusion-generated faces are often judged to be more trustworthy but less realistic than StyleGAN2-generated faces. Therefore, it seems unlikely that averageness alone is the underlying mechanism responsible for driving both the perceived realism and trustworthiness of AI-generated faces. Instead, we propose that at least two distinct mechanisms are responsible for these effects. This project aims to explore potential mechanisms through a two-part research programme. First, we will test two cues people reported using to detect AI-generated faces in prior research—symmetry and skin-smoothness. Second, findings will be applied in a risk/reward scenario where participants must trust other players to maximise personal profit.



*Image 1. Examples of experiment 1 stimuli. L-R: mirrored, original, right side.*

In Part One, two experiments will test the role of symmetry and skin-smoothness on human judgments of realism and trustworthiness in faces. Experiment 1 will manipulate face symmetry by using face halves and mirrored face halves. Experiment 2 will manipulate skin-smoothness by blurring or visually distorting faces.



*Image 2. Example of experiment 2 stimuli. L-R: normal, blurred, noised.*

In Part Two, people will engage in a game experiment where players must trust other players to return transferred money. Informed by Part One findings, an opponent's avatar will be altered for perceived trustworthiness to influence a player's willingness to transfer money as an indication of trustworthiness.

The project will contribute to understanding the mechanisms underlying AI realism and trustworthiness, which can be used to help identify and counteract deceptive use of AI-generated faces, such as in scams and fraud.

**Dr David Kang**

**Economics**

**Amount requested and awarded £8,850**

***The Price of Uncertainty: A Pilot Study on the Impact of Policy Volatility on EV Adoption***

The UK automobile market is currently navigating a period of significant uncertainty. While the drive toward zero-emission vehicles remains a priority, the timeline for banning new petrol and diesel cars has experienced multiple shifts in recent years. This shifting policy landscape risks confusing consumers and undermining the market confidence necessary to meet electric vehicle (EV) adoption targets. This project aims to investigate how volatility in environmental policy impacts consumer trust and their willingness to pay for EVs. Consumer hesitation can be driven not just by economic factors, but by a lack of clarity surrounding the future legality of hybrid vehicles and the resale value of traditional cars. To explore this, the study will survey a sample of UK residents, presenting them with hypothetical vehicle purchasing scenarios under different policy timelines. By analyzing how people make choices when faced with varying levels of policy stability, the project will quantify the 'discount' consumers apply to EVs when the rules are uncertain. Ultimately, this research seeks to uncover how policy consistency is a critical determinant of green technology adoption. The findings will provide practical insights for policymakers, helping them refine future vehicle mandates, strengthen market confidence, and support wider consumer behaviour shifts during the UK's broader transition to Net Zero.

**Dr Stephanie Wright**

**School of Global Affairs**

**Amount awarded £5,077**

***Thalidomide in Spain from dictatorship to democracy: doctors, disability, and state***

Spain was one of the countries worst affected by the thalidomide scandal, which devastated lives worldwide from the late 1950s. Thalidomide was a drug synthesized by the West German pharmaceutical company Chemie Grünenthal, marketed as a medicine for morning sickness. It was withdrawn in most countries between 1961-62 after it caused severe birth defects in infants whose mothers consumed it while pregnant. At the time, Spain remained under the Francoist dictatorship, which suppressed the news and was slow to act. Thalidomide was not officially withdrawn until 1969 and was used in an unregulated manner until the mid-1980s. The secrecy surrounding the scandal in Spain means that survivors fight to this day for adequate pensions and healthcare.

This project has three objectives: 1) to create an oral history archive of thalidomide in Spain following decades of erasure, 2) to write the first history of thalidomide through the lens of dictatorship, and 3) to lay the groundwork for policy impact and follow-on funding.

These aims will be driven by the following research questions:

1. How have Spanish 'thalidomider' experiences, disabled identity and activism been shaped by Spain's context of dictatorship and transition to democracy?
2. What role did Spanish doctors play in the thalidomide scandal? How did the episode shape their practice in its aftermath? What role have they played in the care of survivors, and in the official recognition of their victimhood?
3. What can the thalidomide episode reveal about relations between Spanish citizens, medical professionals, pharmaceutical industries, and the state between dictatorship and democracy?

Through these questions, the project will rethink the histories of thalidomide, modern Spain, medicine, and pharmaceuticals, while contributing to the broader interdisciplinary fields of disability studies, medical humanities, and toxicology studies.

**Dr Lefteris Danos**

**Chemistry**

**Amount requested and awarded £9,702**

***Proof of concept 3D-printed multi-dye LSC-PV module for indoor PV harvesting and greenhouse applications***

As buildings move towards net-zero energy, there is a growing need to capture energy not only from sunlight but also from indoor lighting and diffuse light. This project explores an innovative technology called luminescent solar concentrators (LSCs), transparent materials that absorb light and redirect it towards small solar cells to generate electricity. These devices can be integrated into windows, roofs, or greenhouse panels, offering a way to produce clean energy without blocking natural light.

While LSCs have shown promise, their use under indoor lighting conditions remains largely unexplored, and current designs are limited in efficiency. This project aims to develop a proof-of-concept LSC-PV module using advanced 3D printing and a combination of light-absorbing dyes. By carefully selecting and combining multiple dyes, the device will capture a broader range of visible light and improve overall performance.

The research will involve designing and 3D printing small transparent panels, testing how effectively they absorb and convert light into electricity, and assembling them into a working prototype module with integrated solar cells. The system will be evaluated under indoor lighting and greenhouse conditions, where it could support both energy generation and plant growth.

The outcome of this project will be a demonstrator module showing how this technology can be applied in real-world settings. In the longer term, this approach could contribute to more energy-efficient buildings, support sustainable food production in greenhouses, and reduce reliance on conventional energy sources. By combining advanced materials, 3D printing, and renewable energy technologies, this work opens new pathways for sustainable energy solutions in everyday environments.

**Dr Vilius Franckevicius**

**Chemistry**

**Amount requested and awarded £9,833**

***Unlocking Novel 3D Molecular Building Blocks for Drug Discovery***

The discovery of new medicines is a crucial priority in tackling global healthcare challenges, such as the world's growing and ageing population, antibiotic resistance and emerging infectious diseases. Given that the active ingredient of a therapeutic drug is a complex organic molecule with a unique structure, the discovery of wholly novel molecules is essential if we are to be successful in targeting known illnesses more effectively and treating emerging, hitherto-incurable diseases.

To accelerate the discovery of new pharmaceuticals, it has been shown that molecules with a complex 3D shape have superior potential as building blocks of new drugs compared to those that are structurally flat. Unfortunately, whilst 3D building blocks are extremely attractive in drug discovery projects, they remain severely underutilised as they are remarkably challenging to make in the laboratory.

The aim of this project is to develop a new, cost-effective and environmentally-friendly synthetic route to previously inaccessible 3D building blocks that are particularly sought-after by the pharmaceutical industry. Our strategy will exploit simple and readily available amino acids as starting materials, which will be transformed to the desired 3D products in a single chemical transformation. With sustainability at the forefront of our vision, we propose that this process will be driven by visible light – an abundant resource – and a simple, bench-stable and innocuous nickel catalyst, an inexpensive, earth-abundant metal.

In the first instance, this project will focus on the development of the proposed chemical transformation to ensure that it is efficient and high-yielding. Once optimised, this process will then be applied to the synthesis of a much broader array of novel 3D building blocks. In this way, this research will lend itself to exploitation in the pharmaceutical industry to rapidly prepare novel 3D building blocks for the discovery of new pharmaceuticals.

**Dr Laurence Nix**

**Engineering**

**Amount requested and awarded £7,600**

***Low-loss, Compact Coupling Structures for THz-driven Accelerating Waveguides***

Accelerated electron bunches have a range of applications from radiotherapy to high-energy physics research. Conventional acceleration methods are well-established, but to make the technology more accessible, there remains a large field of study towards the realisation of novel accelerating techniques that could provide high energy electrons in smaller, cheaper, and more energy-efficient systems. One such method is that of terahertz-driven acceleration, using travelling wave pulses with frequencies over 0.1THz. This method allows for picosecond-scale time control of interaction properties, allowing for highly tailored output bunches in interaction structures on the order of 10s of millimetres long. Several groups around the world are studying THz-driven acceleration to progress it to higher levels of technological readiness, including at the Cockcroft Institute in a collaboration between Lancaster University's School of Engineering and Department of Physics and the University of Manchester's Department of Physics.

The Terahertz Acceleration Group at the Cockcroft Institute has previously demonstrated experimental proof of THz-driven acceleration. One limiting factor in our experimental work has been the coupling between sources of THz-frequency radiation and the modes within the accelerating structures. As the initial THz pulse generation process is low efficiency, it is crucial not to then waste the pulse energy in transit and losses. In this project, a novel coupler shall be designed at the Cockcroft Institute using computer simulation, and a prototype shall then be manufactured by the TWT Fabrication Lab at Lancaster. This is expected to achieve improved coupling efficiency over previously used methods while also simplifying the optical set-up. Successful demonstration of this would allow for increased interaction energy in future experiments and a reduction in the complexity of the set-up of those experiments.

**Professor Carly Stevens**

**Lancaster Environment Centre**

**Amount requested and awarded £9,950**

***Are mycorrhizal fungi the key to missing trees in limestone pavements?***

Limestone pavements are a rare and highly protected natural habitat found mainly in the north-west of England. They are very important for biodiversity and are an important habitat for a number of rare plant and butterfly species. However, research has shown that many areas of limestone pavement are in poor condition and over the last 50 years this problem has become worse. One of the major challenges in limestone pavements is an absence of trees and shrubs. This is the result of many years of over-grazing in pavements and in the wider landscape. In fact, over half of limestone pavements have less than 1% tree cover.

In a number of pavements across the Yorkshire Dales efforts have been made to increase tree cover. This has included reducing grazing intensities, tree planting in surrounding areas and even planting trees and shrubs directly in pavements. So far success rates have been poor and many pavements remain open; this is exacerbated by ash dieback, a disease which is having a devastating impact on the survival of ash trees. One possible reason for the lack of tree colonisation is a lack of the right mycorrhizal fungal communities. Mycorrhizal fungi form relationships with most plant species where both the fungi and the plants benefit. Early colonist tree species including birch and hazel and later colonists such as oak need a specific type of mycorrhizal fungi called ectomycorrhizal fungi. This project will investigate whether ectomycorrhizal fungi are present in limestone pavements, contrasting pavements with no tree and shrub cover with those where trees and shrubs are found. This project will be conducted in collaboration with Dr Fay Voller from Edge Hill University.