UNIVERSITY OF LINCOLN

THE DOCTORAL SCHOOL

Images of Research

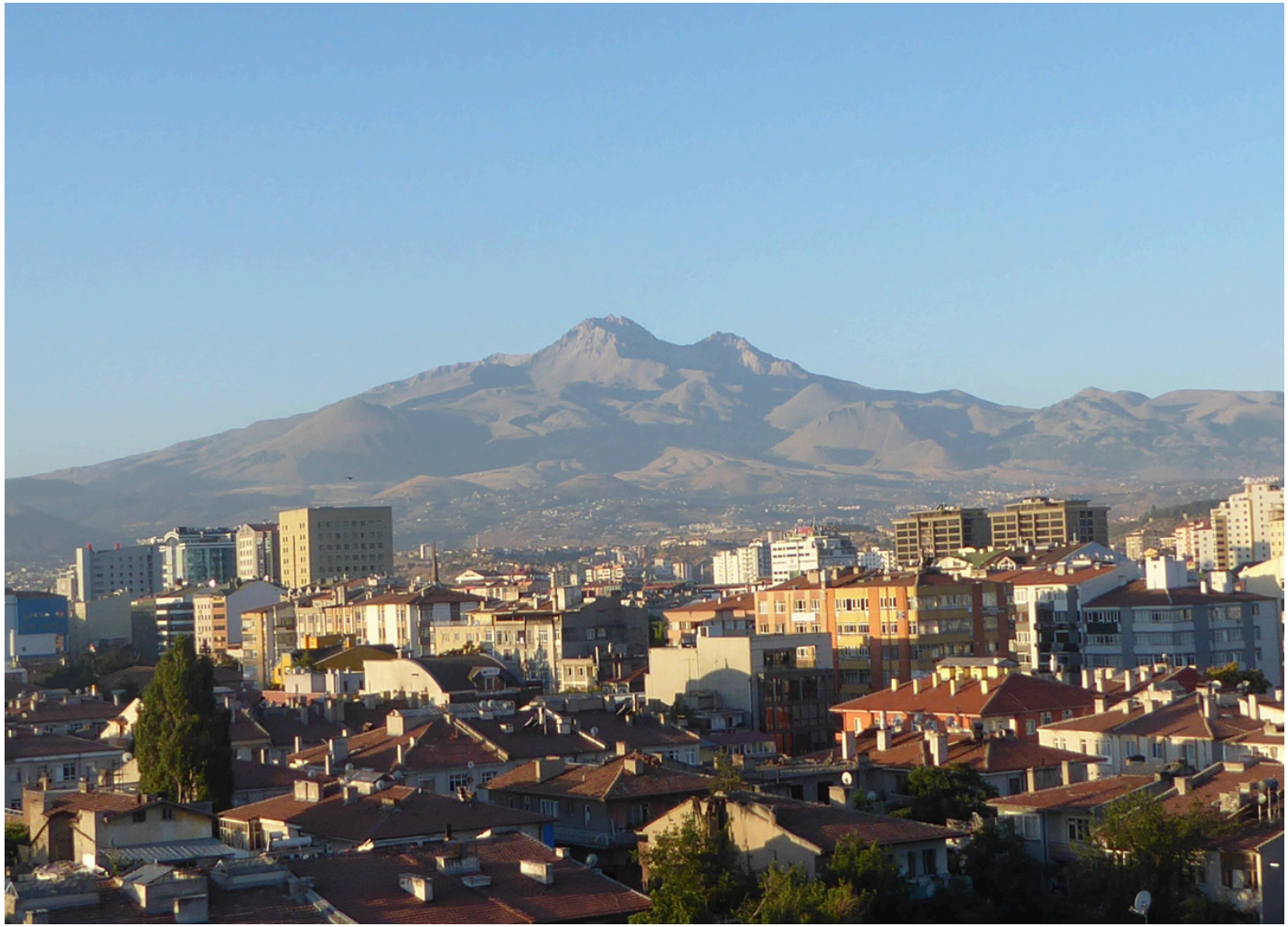
Welcome to the Images of Research Exhibition 2024.

The Images of Research competition showcases the research taking place at the University of Lincoln. Participants are asked to submit a unique image, along with a 150 word abstract describing how the image reflects their research. Any staff member or PGR student who is undertaking research at the University can participate, with all entries showcased to the public at our special exhibition.

Alessia Vacca
School of Law

Fashion and Microplastics

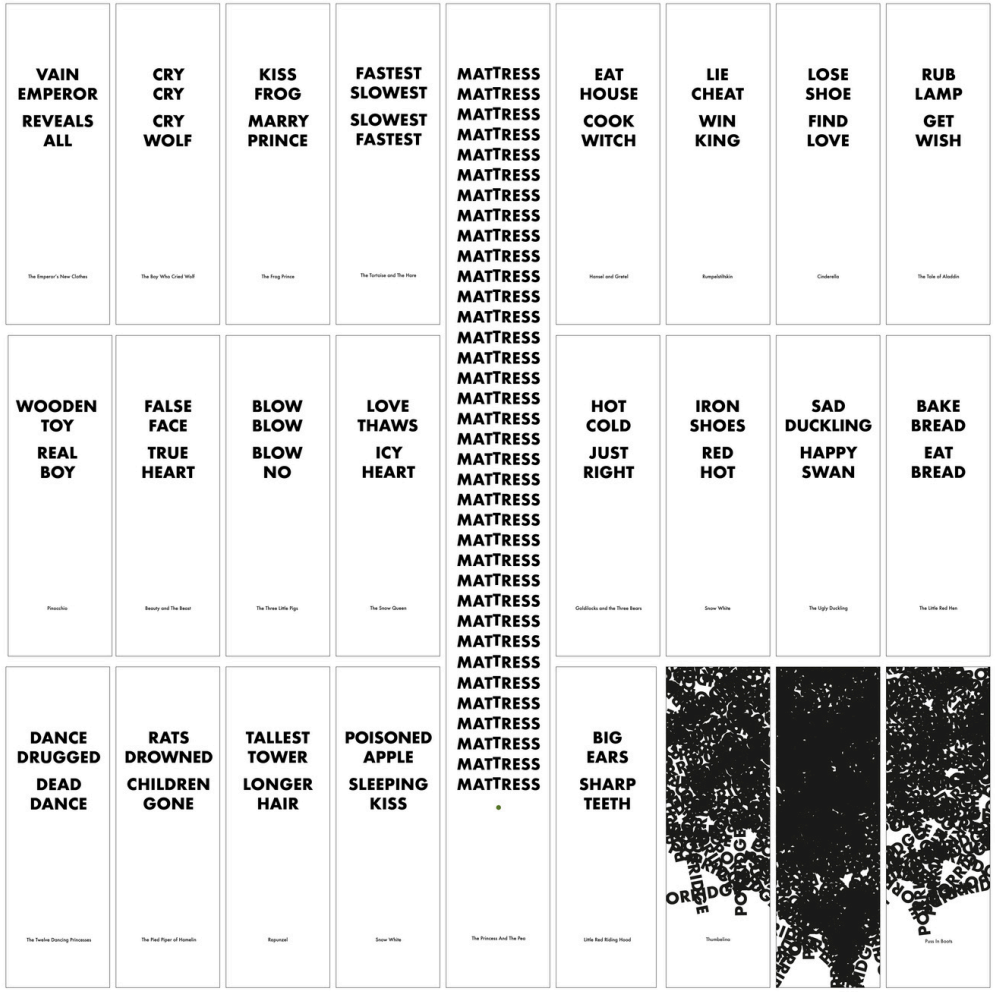
The global fashion industry is one of the largest and influential industries in the world. There is a plethora of applications of plastics in the fashion industry. Synthetic fabrics shed microplastics when washed and end up in the oceans posing risks to marine species and human health. Indeed, about 60% of textile fibres are synthetic. Most of our clothes contain plastics like polyester, nylon, rayon, acrylic and polyamide. This fact poses the question of both legal and social accountability of the fashion industry to reduce the production of plastics. This research needs to explore the efficacy of the current international and regional legal frameworks (EU) that regulate the use of plastics in the fashion industry. The relevant stake holders in the fashion industry should also have a pivotal role for climate action, for reducing the use of plastics, protecting the sea/ocean from microplastics and can convey an important message to support a sustainable world in an effective way.



Alyson Wharton
School of Humanities and Heritage

Erciyes Mountain, Kayseri/Gesaria

This image was taken in August 2023, when I travelled, along with husband and two daughters (aged 1 and 5) to Kayseri in Central Anatolia (Türkiye). It shows the volcano, Mt Erciyes, which provides the backdrop for the city. Kayseri was an important centre for Armenians in the Ottoman Empire, which was the reason for my visit. The city and its surrounding villages are still today filled with Armenian houses and churches, many of which are in a state of ruin as their original inhabitants were killed or fled in the turmoil of the end of the Ottoman Empire. We spent a few days visiting the villages that were the places of origin for several families of Armenian-Ottoman antiquities dealers that I am currently working on, who grew up under the shadow of Mt Erciyes, before moving to the Ottoman capital of Constantinople, and then going on to take the international art and museum world by storm. These dealers became some of the fore most suppliers of art objects to museums such as the Metropolitan Museum in New York. Some of them, through diversifying into other trades, like petroleum, became the world's richest men. Kayseri was the not-so-humble origins for these Armenians, who served as an unofficial noble class in this beautiful, and once intellectually and culturally thriving- as well as economically thriving,- region.



Barrie Tullett
School of Design

Four Second Fairy Tales

The 1960s saw a variety of text experiments, both in prose and poetry. This series of Minimalist Stories was inspired in part by the writing experiments of OuLiPo (Ouvroir de littérature potentielle), the One Word poems of poets such as jw curry, Ian Hamilton Finlay, and Stuart Mills, as well as Flash Fiction, which despite being considered a modern phenomenon, can actually trace its beginnings back to the19th century in works by authors such as Walt Whitman, Ambrose Bierce, and Kate Chopin.

One of the biggest inspirations was the six-word story: For sale: baby shoes, never worn.

The story is anecdotally attributed to Ernest Hemingway, supposedly as part of a $10 bet in the 1920s – in six words the story suggests a wider narrative of loss, or unfulfilled dreams.

IRON SHOES RED HOT for example only works as a reference to Snow White if you are familiar with the ending of the Grimm version of the fairy tale, where the evil Queen is punished by being made to dance to her death in a pair of red-hot iron shoes. Perhaps a better nod to the short story would have been IRON SHOES, WORN ONCE.

So, the tales here are not stories as such, but distillations of Fairy Stories, and the narratives only reveal themselves by suggestion and familiarity.

Caterina Scott
Lincoln International Business School

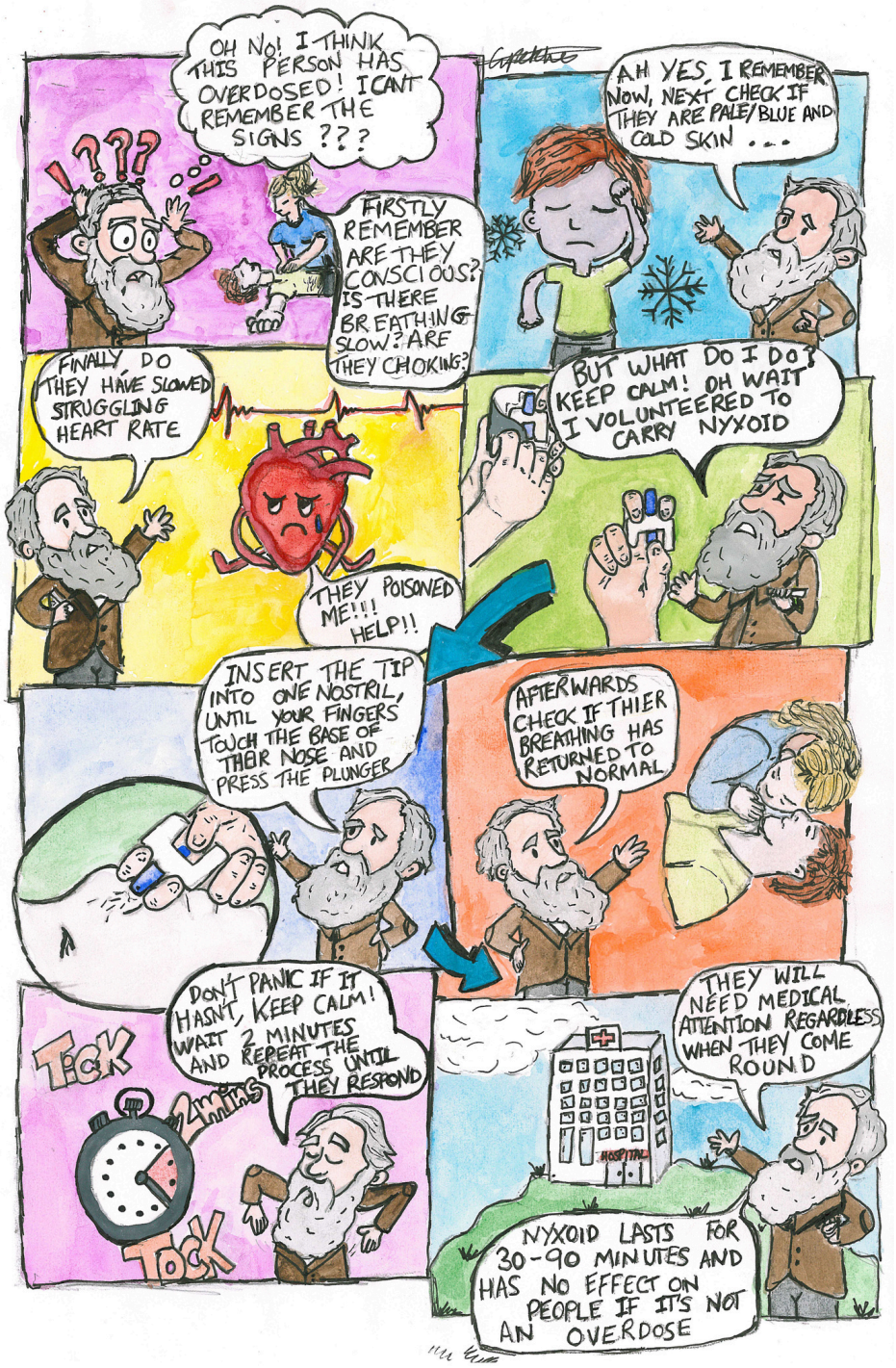
The ‘memorial’ garden at Metheringham Airfield Visitor Centre

A relatively small number of Lincolnshire’s Second World War RAF Bomber Command airfields have heritage centres based on them where the stories of what happened there are being told. The siting of a garden within some of these centres echoes the initial findings of my research reflecting aspects of how the centres developed over the years - needing a place to be, some people to manage it and objects to see. Like a heritage centre, the garden needs to be in a place, it has objects that have been donated such as memorial plaques and benches and needs people to tend and maintain it. Some of the participants of my research say the garden helps them to remember those who served. It was a place where veterans once gathered to remember their fellow crews but now it’s for quiet contemplation and latterly it is their families who now gather here.

Charles Fox
School of Computer Science

The game of chicken

Interacting with human pedestrians in negotiations for shared public space remains a hard problem for self-driving cars. The ƭreezing robot problem' is that if they are programmed to be completely safe by yielding to pedestrians, then pedestrians learn that it is optimal to take priority at every interaction and the vehicles make no progress. Our early game-theoretic models based on the ȝame of chicken' showed that, like human drivers, AVs can only resolve this problem for utility-maximising pedestrians by trading off very small risks of actual collision for the value of time lost due to yielding. Recently, we have proposed new, more socially and legally acceptable solutions in which these collisions can further be replaced by more frequent but less harmful inflictions of negative purely psychological utility onto pedestrians by invading their personal space. These models have been presented to the Department for Transport and cited by the UK Law Commission in their consultation which has changed UK law on autonomous vehicles. The photograph shows a human experiment testing our self-driving, open source hardware podcar negotiating for space with a pedestrian volunteer as they both speed up and slow down, using their positions and speeds to signal the intent to each other. We record their positions and analyse the data using the game theory model, to help create safer and more efficient self-driving cars.



Charlotte Petchey
School of Psychology

Spreading awareness for Nyxoid

Opioid addiction and overdose are a significant public health issue, with England and Wales experiencing a 6.2% increase in drug-related fatalities in 2021 (Office for National Statistics, 2022). Since 1971, the Food and Drug Administration (FDA) has authorised Nyxoid as an opioid antagonist in treating opioid overdoses (Skolnick, 2018). Nyxoid administration is straightforward, and the effects persist 45-90 minutes after an intranasal administration (Sporer 1999). Nonetheless, awareness surrounding Nyxoid, and other opioid-reversing medications is still lacking and is not routinely known by the public. Police officers are now being asked if they would voluntarily carry Nyxoid, which drove the creation of this comic strip to see if it can recruit officers to carry Nyxoid. If officers agree to carry Nyxoid it will ensure they are equipped with the right tools if they are sent to an overdose and potentially save lives.

Claire Harman
School of Psychology

Harmful Gambling

Gambling harms can be defined as ‘any initial or exacerbated adverse consequence due to an engagement with gambling that leads to a decrement to the health or wellbeing of an individual, family unit, community or population’ (Langham et al., 2015, p. 4). The likelihood of developing harmful gambling behaviour is influenced by a wide range of risk factors, some of which can be altered, and some of which cannot. My research is focused on whether there is a difference in the risk factors for and associated harms of gambling between three different cohorts: university students, those who are engaged with drug and alcohol treatment services and those who are engaged with gambling treatment services. I will also explore if there is a link between risk factors, the different levels of gambling and the resulting gambling related harms.

Frances Nicol
School of Education

Identity formation

The academic and professional identity of the nurse within a higher education setting is becoming increasingly recognised, whilst the delivery of nurse education within an academic setting as opposed to a clinical environment becomes established. The role of the nurse lecturer is multifaceted; however, it has an overarching aim of fostering a learning environment that is both supportive and inspiring to ensure safe and effective future practitioners. To do so, nurse lecturers must draw upon the distinct skill set they gained in the clinical environment and translate the theoretical elements into a contextualised and pedagogically sound scenario for the learners. This socialisation can feel complex with the potential for isolation, it requires a level of gumption, in which you can feel unique to your counterparts, but none the less, still flourish.

George Mason
School of Sport and Exercise Science

Science For Services

The emergency services, or as some of the members of the Trust would have me call them, the essential services, provide some of the most exceptional care to the nation. However, from my research so far, it appears that there is some care I may be able to provide to them. While the Trust, in this case the East Midlands Ambulance Service, follow the statutory regulations with regard to manual handling to the letter, literature indicates that multiple common movement tasks within the remit of an Ambulance Clinician often exceed spinal compression limits set out by NIOSH and also cause injury. While I cannot develop new equipment, I can certainly investigate using 3-D motion capture and electromyographic sensors to potentially recommend 'best practice' methods to reduce the injury rate of our acting and prospective Ambulance Clinicians - I hope!.

Holly Parker
School of Humanities and Heritage

PhDone!

This photo was taken on the morning I finally submitted my PhD! I submitted on the 29th February 2024 - this date doesn't come around very often, and it's always seen as a special day, so of course I had to submit then. Naturally, as a proud Yorkshire Woman, I also had to toast it with a good mug of tea! A PhD is a huge part of your life, and you can see from the smile on my face how proud I was to see the culmination of 6 years' worth of work all wrapped up in two binders! It had been a journey; life doesn't stop when you do a PhD, especially when you're a mature student. So, when you throw 3 house moves, multiple "lockdowns", a wedding, bereavements, and losing a lot of your research due to burglary (back up your work, kids!), as well as juggling the 9-5 work week and the rest of life, it's especially astounding to see the final product. Exactly 2 months after this photo, I passed my Viva with minor corrections, and here I am, so close to the end. If you're in the middle of your PhD project, and juggling everything else, I hope this photo can remind you that the end is in sight: you've got this.

Jacob Diameh
Lincoln International Business School

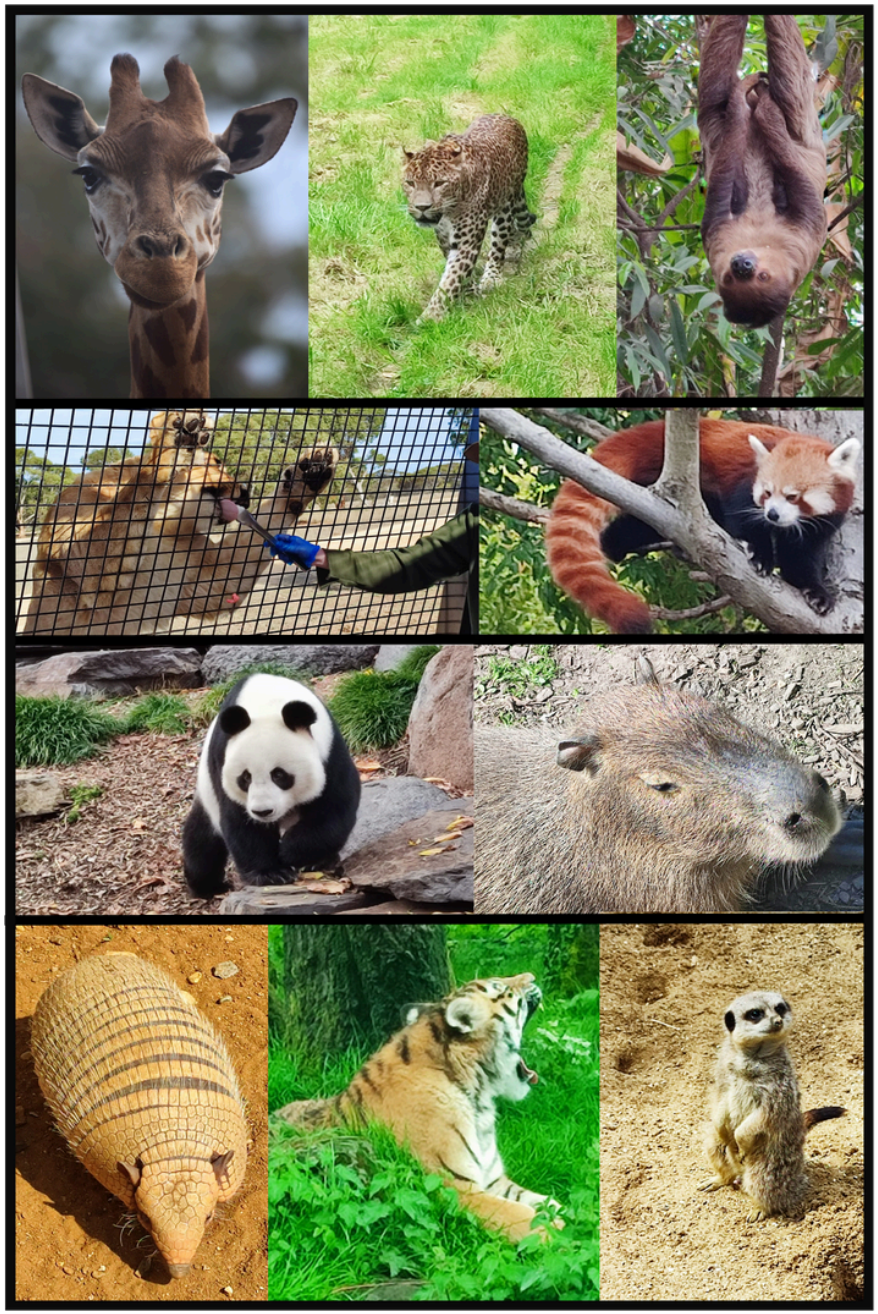
Internationalisation of immigrant- Owned small and medium enterprises (SMEs) in the United Kingdom: Drivers, barriers and impacts

This study explores the internationalisation of immigrant-owned small and medium enterprises (SMEs) in the United Kingdom, focusing on identifying the key drivers, barriers, and impacts of their expansion into global markets. The research aims to provide a comprehensive understanding of the internationalisation process among these businesses across United Kingdom. Specifically, it examines trends and patterns of internationalisation, investigates the main factors driving this expansion, explores the barriers hindering their efforts, and assesses the impacts on both the SMEs and the wider economy. The findings are expected to reveal trends and patterns in the international activities of immigrant-owned SMEs, identify critical factors driving their international market expansion, and highlight the barriers they face. The image shows a unique representation of African shop, Asian supermarket and Indian restaurant owned by immigrants along the High street of Lincoln and the white vans are about to offload imported goods from their foreign networks.

Jasper Kanomanyanga
Lincoln Institute for Agri-Food Technology

Weed surfing efficacy

Annual weeds often establish large soil seedbanks, leading to severe weed competition and unsustainable farming if seeds are allowed to return. Managing low weed seedbanks is crucial for efficient weed control and minimizing herbicide resistance. This research focuses on sustainable strategies to reduce weed seed return, particularly targeting black-grass (Alopecurus myosuroides), a significant grass weed in winter cereals in the UK. The study introduces 'weed surfing,' a novel technique that involves cutting weed heads before shedding and crop harvest to prevent seed return, thus reducing soil seedbanks. The image shows the progress of an ongoing field experiment, with the left plot having uncut black-grass seed heads and the right plot having cut heads. Implementing such techniques can lower weed pressure, support regenerative agriculture, and make weed control more manageable, contributing to sustainable cropping systems



Joanna Shelton
School of Psychology

Around the world with animals and wellness

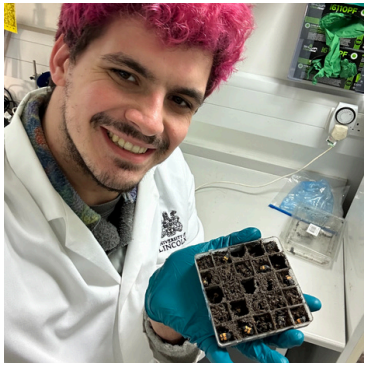
My research explores the effects of behind-the-scenes animal encounters in zoos on visitors' well-being. This research area often focuses on animals, but humans are often forgotten! My project tests two hypotheses that might explain how animal encounters at zoos might enhance visitors' well-being. In green well-being research, it is suggested that a connection to nature improves human well-being, whereas in animal-assisted intervention research, attachment to animals might increase human well-being. I proposed that these theories may be interconnected as animals are a part of nature. However, my findings indicated that people conceptualised animals differently to nature. It was also found that a relationship with animals matters most to human well-being outcomes. The images here are some photos of the animals involved in the encounters I have observed. These include animals from Banham Zoo, and Jimmy's Farm and Wildlife Park in the UK, and Adelaide Zoo and Monarto Safari Park in Australia.

John Dowling
School of Design

Window Display: Navigating deception, embracing uniformity and the historical imprint of window tax

The window tax was first introduced in England by William III in 1696 and eventually repealed in 1851. The goal was to tax the wealthy, under the assumption that the wealthier someone was, the more windows they had. Many found imaginative ways around avoiding the tax and as a result, government expanded the definition of a window – treating it as any hole in a wall. There were many unintended architectural changes, including bricked over windows, fewer windows, and false painted windows. Fake windows became so fashionable that new construction included them for stylistic purposes. 'Ghost windows' or 'blind windows' can still be found in new buildings today.

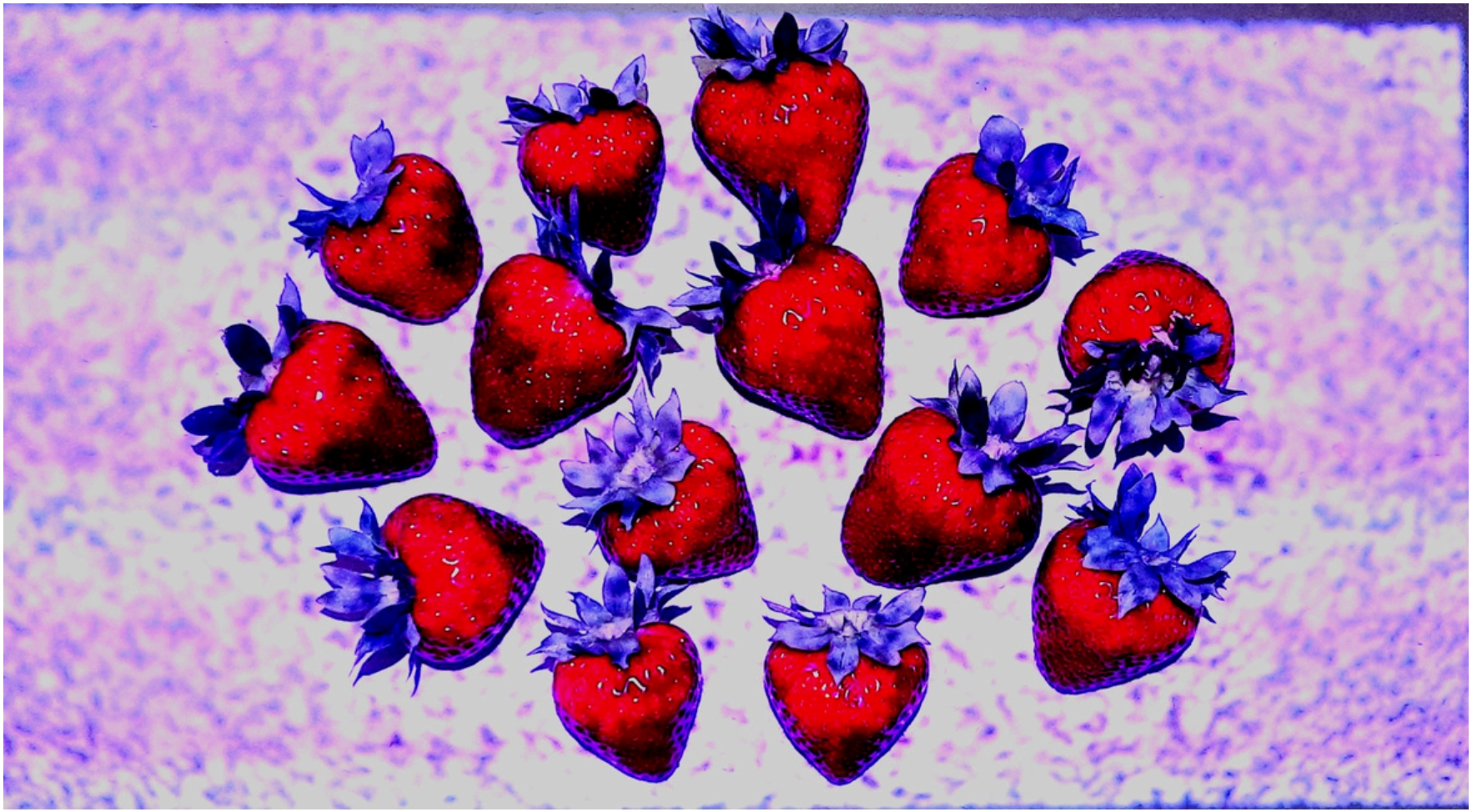
Blind windows, with their deceptive allure and role in architectural uniformity, stand as silent witnesses to the evolving narrative of the built environment. Whether driven by a desire for symmetry, historical homage, or strategic response to taxation, these non-functional features have left an indelible mark on the facades of buildings across different periods and styles. Window Display focuses on these silent, accidental, abstract works of art and how they represent a visual narrative of the historic market town of Newark in Nottinghamshire, serving as a canvas where deception and uniformity dance in harmony.



Joseph Rees
School of Life and Environmental Sciences

Dirty Work

My research is focused on the warning signal of the burying beetle (Nicrophorus vespilloides). However, the work required to maintain the beetle colony for experiments is rarely seen. Here I have shown the process of washing the mountain of dirty equipment, alongside my lab coat stained with soil and the stars of my research: a male and female burying beetle. This photo lifts the curtain to show the true day-to-day life of an evolutionary biologist, beyond the complex statistics and intricate graphs.



Katherine James
School of Computer Science

Fragaria digitalis

Automated plant phenotyping (measuring observable characteristics) has the potential to revolutionise the selection of new varieties that meet the ever changing requirements of both consumers and the environment. Pictured here are a collection of strawberries (scientific name: Fragaria ananassa) from our Riseholme farm undergoing 3D imaging. A pattern is projected onto the berries, which allows mapping of the berry features to create models in 3D space. The result can then be used to measure quality factors of the berries.

Lorena Hall
School of Health and Social care

Be a microphone, never a voice!

This research will critically examine the purpose and impact of day services for adults with learning disabilities, viewed from their own perspectives. The focus is specifically on the social relationships and friendships that these services foster, using emancipatory and inclusive research methods. The study has several key objectives. First, it seeks to delve into the lived experiences of adults with learning disabilities who attend day services, paying particular attention to social connections and friendships. Second, it aims to identify the perceived benefits and limitations of these services in facilitating meaningful social interactions. Third, the research will gather insights on how day services can be improved to better support the development and maintenance of social relationships and friendships. Additionally, the study aims to develop a framework for inclusive research where, importantly, people with learning disabilities are true co-researchers. Be a microphone, never a voice!

Lynda Skipper
School of Humanities and Heritage

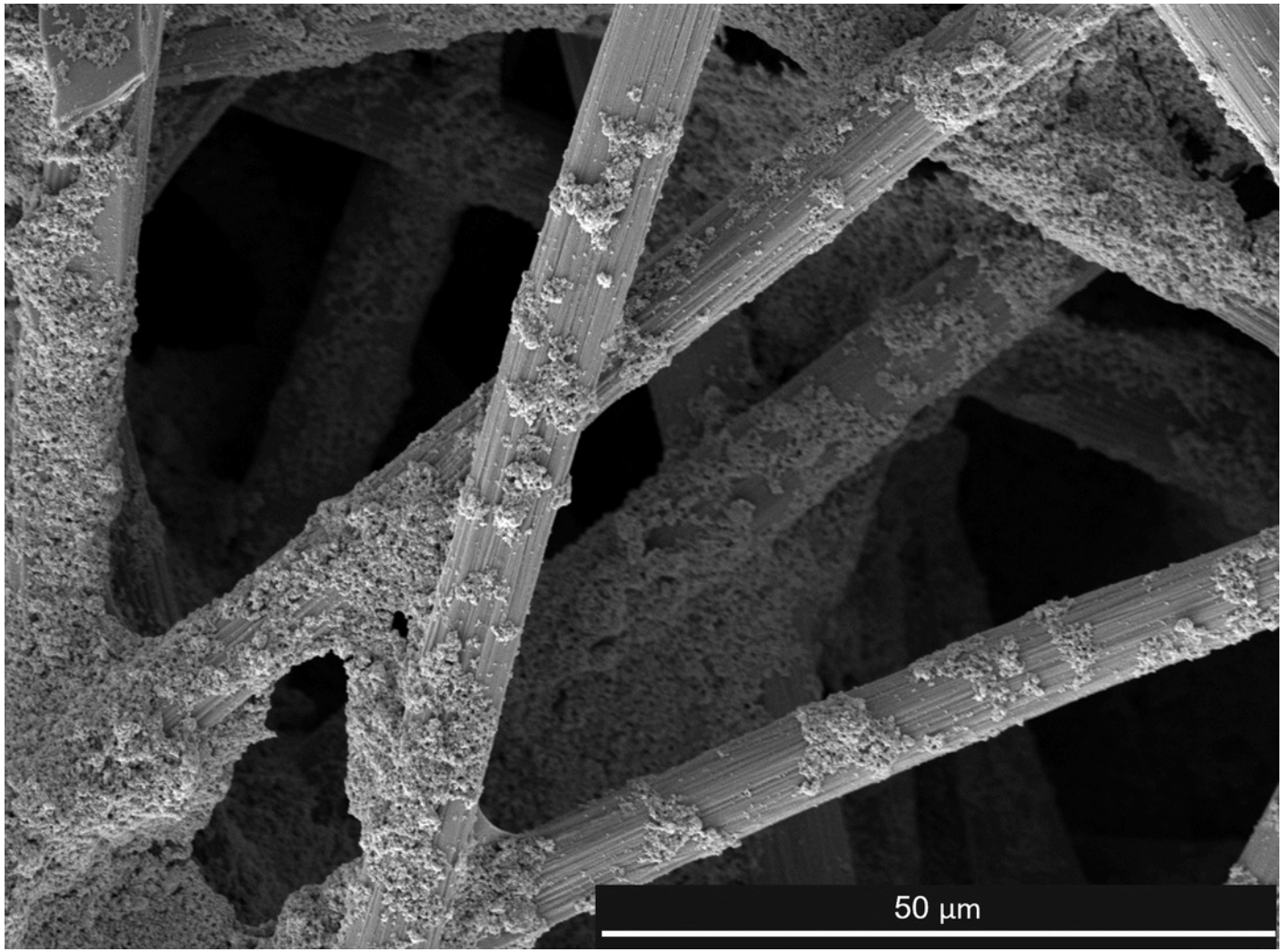
The playful side of research

TThis image is a draft front cover of a report for Historic England, describing the outcome of a study to develop a standardised way of measuring rates of biological growth on stone. When I was looking for a cover image, I initially chose one showing Philip Skipper measuring stone colour with a spectrophotometer. Philip did not want his face on the cover image, so I did a bit of editing, then took a photograph of my computer screen after I'd made the 'new' head. Outputs of research papers and reports are generally very factual, and can be hard to access by non-specialists due to the academic style and language. It's easy to forget that underlying our research is a process which involves fun, creativity, curiosity and play, and I chose this image because I wanted to bring that element of the research process to the fore.

Maria Xiouri
School of Law

The breach of a treaty

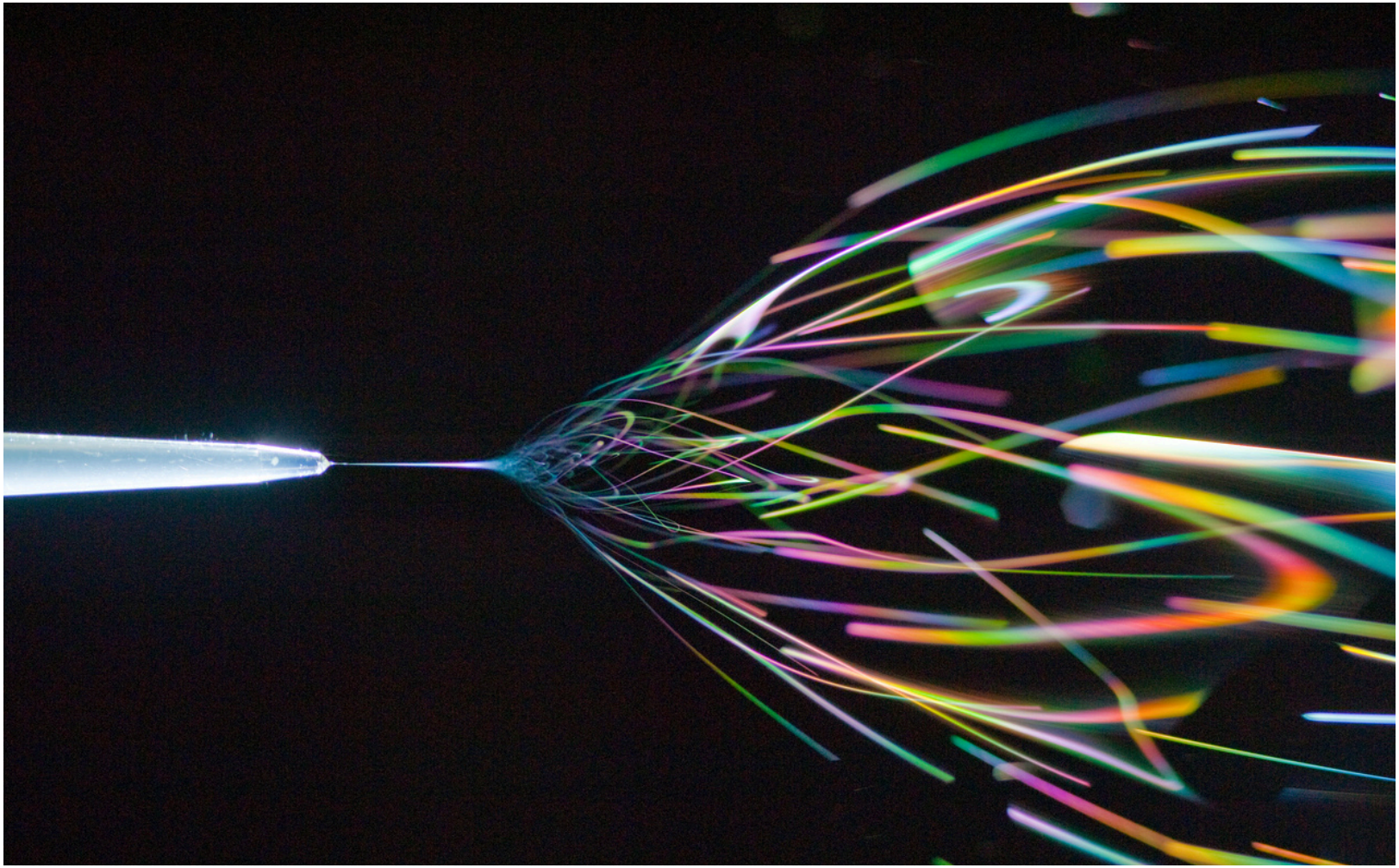
‘Treaties shall be complied with’. And what happens to a treaty when a party seriously violates it? One option is to terminate it, which means the end of the treaty. But if one of the States parties to the treaty does not want the treaty to end, it has two options. First, it may suspend the treaty: in such a case, the treaty does not apply to the parties during the period of suspension unless the breaching party ceases the breach, namely the treaty is ‘frozen’. Second, it may take countermeasures, namely it stops performing (with some exceptions) any of its obligations towards the party which has breached the treaty in order to put pressure on the latter to start complying with the treaty again. Which of the two solutions is more efficient? I argue the second: ‘freezing’ the treaty does not make the breaching party stop the violation.



Melanie Randall-Evan
School of Chemistry

Giving structure to the future of clean energy storage

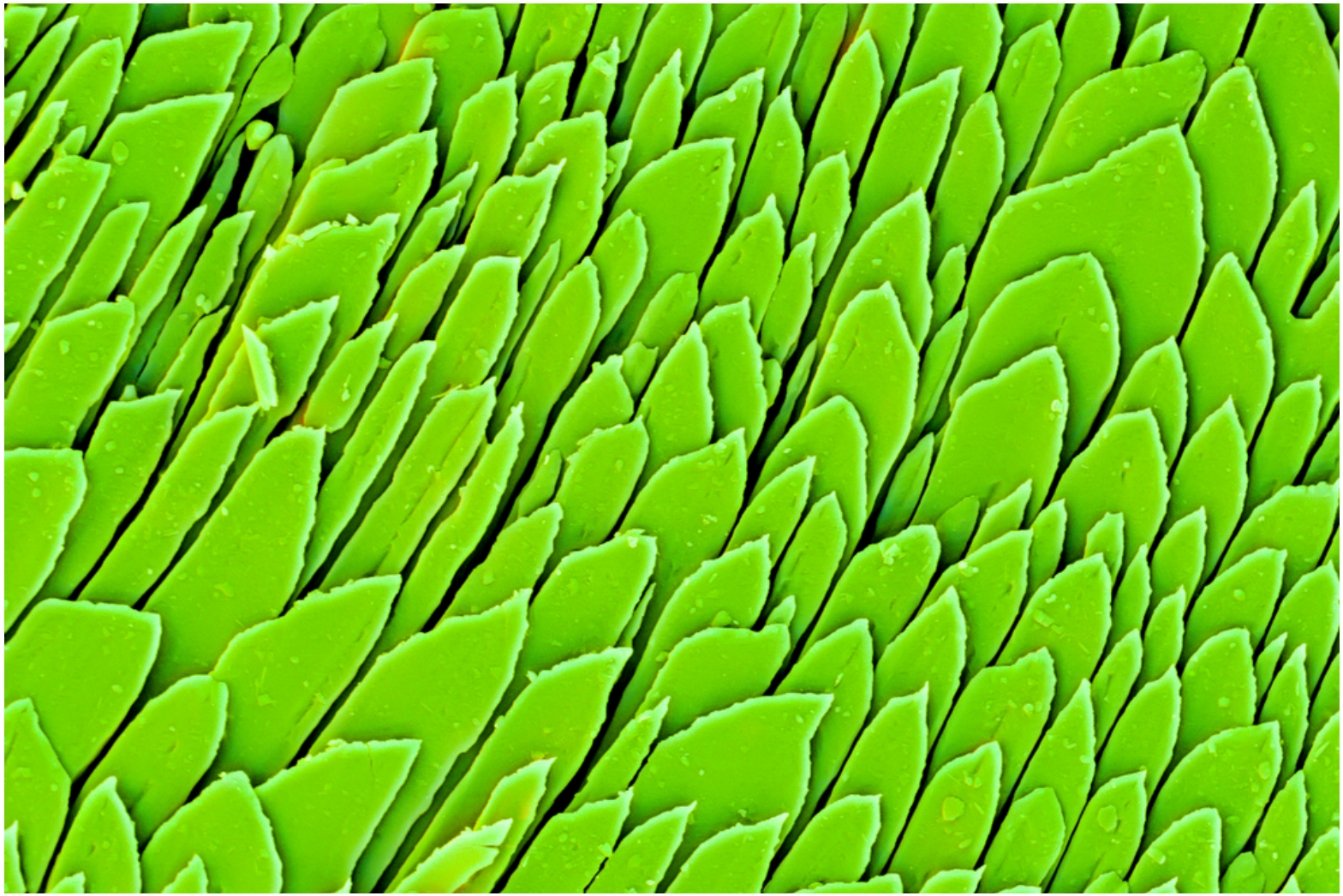
In the current climate of environmental preservation, producing green energy and finding sustainable methods of storing it is paramount. Lithium-ion batteries have historically dominated the market, however due to reaching the theoretical limit of their energy density capability and the soaring costs of required materials (e.g. cobalt), alternatives are more urgent than ever. My project aims to address this through working towards providing a viable alternative to lithium, in the form of zinc-ion batteries. Seen in this image is a manganese cathode used for these batteries, in which the carbon paper current collector acts as scaffolding for the active material seen clinging to the posts. This active material, comprised of manganese oxide synthesized using a sustainable method at low temperatures, produces a reproducible capacity of >140 mA g-1 and sustained cyclability.



Nick Tucker
School of Engineering

Electrospinning - a fibre in flight

Electrospinning uses electrostatic force to draw a strand of fibre from a polymer solution or melt, and rapidly stretches it out into a nanoscale fibre. The strand accelerates from 0 to 60-100m/s in 150mm of flight. A one square metre electrospun mat composed of a single fibre fibre (diameter 100nm) with a thickness of 10µm has a surface area of about forty square metres. This high surface area means that electrospun fibres make very good filters and cores for biochemical or chemical reactors. The time-lapse image shows the helical flight path of a single fibre in flight. The colours are produced by diffraction as the fibre diameter reduces to the size of the wavelength of light. Assoc. Prof. Nick Tucker and Dr. Saravana Jaganathan are working with colleagues from the schools of Pharmacy and Physics to gain control of the process and to produce biomedical materials such as wound dressings. Photo: Robert Lamberts (formerly of the NZ Institute for Plant and Food Research)



Peter Eaton
School of Chemistry

Oyster Shell

Scanning Electron Micrograph of an oyster shell (Magallana gigas, the Pacific Oyster). The feather-like structures that make up the oyster shell are responsible for it's incredible strength, and also the iridescence that characterises mother of pearl. The image has 28 microns horizontal field width, reproduced at approximately 20,000x.

Robert Dean
Lincoln School of Creative Arts

Power in Kindness

Our research project is dedicated to exploring the profound impact of creative arts in social prescribing, particularly focusing on how these activities can enhance mental health and wellbeing. As part of this project we are gathering evidence to demonstrate the efficacy of artistic engagement as a therapeutic tool. The image featured here was created at Art Ninja HQ, a Lincoln-based initiative where individuals can relax, express themselves creatively, and form connections. Through data collection and analysis, our research supports the growing recognition that the creative arts serve as a powerful mechanism in social prescribing. By promoting holistic health and wellbeing, the act of creation not only fosters individual expression but also facilitates human connection, thus reinforcing the therapeutic benefits of the arts. The evidence gathered through this project underscores the potential of artistic activities to be an integral part of healthcare.

Robin Kramer
School of Psychology

Can you spot a synthetic face?

In recent years, artificial intelligence (AI) has become a prominent part of our lives. One use of AI is in the creation of images that look like real people but are computer generated. Researchers have shown that these synthetic faces are highly realistic, and people can't distinguish between them and real face photographs. For this reason, we have been investigating ways to improve performance on this difficult task of spotting them. By taking advantage of the 'wisdom of crowds', we have found that aggregating the responses of multiple people (the more, the better!) increases accuracy in detecting these AI-synthesised faces. Importantly, we collected individuals' responses separately and these are combined later so there is no actual crowd or team working together. This approach may have applied uses, for example, in helping professionals to spot synthetic faces that are submitted as part of official documents (e.g., passports).

Roxy Kulengowska
School of Mathematics and Physics

Earth's Moon: A Portal to Understanding Exomoons

This image captures Earth's moon through a telescope, symbolising our closest celestial neighbour and a stepping stone in studying the exomoons. My research focuses on detecting exomoons by analysing transit depth variations of distant planets. Just as the moon provides insights into planetary formation and dynamics, studying these variations can reveal the presence and characteristics of moons orbiting exoplanets. This research advances our understanding of the diversity and complexity of planetary systems beyond our own, inspired by the familiar sight of our moon.

Yinrui Xie
School of Architecture and the Built Environment

Rethinking Orientalism: A British architect and his design for a Christian university in China

Founded in 1910, West China Union University (WCUU) was among the earliest Christian universities established by British and American missionaries in China. Designed by British architect Fred Rowntree, architecture of the campus carefully reconciled a sense of Chinese-ness and Christianity, in response to politico-cultural tensions between the missionaries and the local community. Beyond the Orientalist framework, however, the meanings embedded in the architecture were constantly interpreted and revised by various audiences, challenging the original intention of the architect. Incorporating postcolonial theory and architectural semiotics, my research explores the creation, transition, and interpretation of the WCUU architecture in terms of the communicative function of architecture and the interaction of multiple participants against the shifting contexts of modern China. Focusing on the intertwined relationship between the built form, history, and the interpretation/experience of architecture, a wider socio-cultural dialogue is illustrated between China and the UK in the twentieth century.

Zameel Hussain
School of Law

Establishing effective rules for the allocation of tuna resources at Indian Ocean Tuna Commission

From my desk; the water bottle that keeps me going, tunas are the main focus, books on the right representing subject and methodological approach of my research. The scattered papers signify ongoing research, the phone symbolizing the contribution my research is expected to make; achieving UN Sustainable Development Goals 14 (Life Below Water) and 16 (Peace Justice and Strong Institutions). Indian Ocean Tuna Commission (IOTC), a Regional Fisheries Management Organization established for conservation and management of tuna resources in the Indian Ocean. Negotiating since 2011, IOTC is struggling to reach an agreement on allocating tuna resources, hindering sustainable management. By utilizing Global Administrative Law (GAL) as a conceptual framework, I am examining the practices and legal framework of IOTC through lenses of transparency, participation, accountability and legality. The aim is to suggest ways to remove obstacles in allocation negotiations towards establishing effective allocation rules for sustainable management of tuna resources.

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