

THE DOCTORAL SCHOOL

Images of Research

Welcome to the Images of Research Exhibition 2022.

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 postgraduate student who is undertaking research at the University can participate, with all entries showcased to the public at our special exhibition.





Robin Kramer School of Psychology

Measuring the ideal male body

Recently, my collaborators and I investigated men's ideal body sizes and shapes. To do this, we used a 3D modelling environment (Daz Studio) in order to allow participants to directly manipulate a male avatar along multiple dimensions. My image illustrates the high degree of variability in muscularity (increasing from bottom to top) and adiposity (increasing from left to right) that could be achieved using this method. Following data collection, we used principal component analysis to extract those shape components of our participants' ideal bodies that were predicted by the questionnaires we utilised, and reconstructed the body shapes that these questionnaires were capturing. We found that higher scores on the Drive for Muscularity Scale and the Sociocultural Attitudes Towards Appearance Questionnaire corresponded with increases in muscularity, particularly muscle mass and definition. Our approach allows for the identification of actual body features that are being captured by a particular questionnaire.





Laura Jane Hathway School of Chemistry

Digging Deeper

This image represents the search for natural ingredients as an approach to Green Chemistry in the realm of agriculture. Green Chemistry or sustainable chemistry is defined as the design of chemical products and processes to reduce or eliminate the use and generation of hazardous substances. The reflection indicates a requirement for digging deeper, and sourcing alternatives of renewable, biodegradable raw materials from natural sources as a focal point for each of us in our own area of expertise. Maintaining a healthy environment, while increasing plant yield and quality, is one of the key aspects of sustainable agriculture. Pictured is leonardite, a dark brown, natural organic compound ubiquitous in water, soil and sediments and shown to improve nutrient uptake and increase plant yield and quality. Leonardite is an example of organic plant biostimulants as a gradual and promising replacement of chemical products in fertiliser to secure a nature positive food future.





Lorena Jane Hall School of Health and Social Care

Through his eyes...

Young man wearing headphones sits on hospital bed fidgeting with a blood pressure cuff. Headphones connected to ipad. Room is darkened. Background shows medication and sports bottle. What can't be seen, is me, his mother. It was a turbulent hospital stay. He has very complex learning disabilities. We can communicate but his voice wasn't heard during his treatment. I am his mum and carer. This sparked a research journey into health inequalities in acute care for people with learning disabilities in Lincolnshire. Hundreds of times we are asked for experiences formally and informally. These educate. How many times are we asked for ideas of solutions to more problematic experiences – very few. However, my Phd which will bring these stories and solutions to life both from people with learning disabilities, their carers and from staff which will potentially and most importantly, and hopefully, make a difference for all.





Katherine James School of Computer Science

A digital twin

Phenotyping, the process of describing a plant in terms of its physical properties, is a necessary step in the selection of new varieties of crop. This is particularly pertinent as day-to-day agriculture changes with new farming styles and the introduction of robotics. In my research we are investigating automated methods of conducting automated phenotyping of strawberries to reduce the strain currently placed on breeders. In this image, we see a reconstructed strawberry leaf represented in three-dimensional space after a process called meshing. This is one of the first steps towards extracting these physical descriptors.





Matthew King-Parker School of Psychology

The path of least resistance

This is a reflection of the Psychological theory, Script Theory. Which posits that in a well-known situation our unconscious mind guides our behaviour, in a manner identical to that of a play script. A step by step interpretation of the scenario, the script involves multiple people, and each person has a role and goal they have to achieve. The image shows a forest representing the actions undertaken when an human acts automatically. Each fork in the road represents a behaviour which is guided by a person's, beliefs, attitudes, and the world around them. The forest is infinitely wide due to the vast possibility of behaviours, yet there is a strict entrance and exit of the forest and script. This theory is being applied to criminal offences, in order to expand our understanding of criminal behaviours and the associated factors.





Emilio Rossi School of Design

'Inclusive Signs' Toolkit

Social Inclusion is a relevant and complex concept, but hard to be tackled simply by using problem solving design skills and cause-effects patterns. Therefore, the design of inclusive artefacts requires new creative processes able to interpret the complexity of Social Inclusion by suggesting designers original design concepts and design strategies linking real human needs to societal instances.

'Inclusive Signs' is a multilanguage open access design toolkit composed by a handbook, a set of 180 cards (60 descriptive cards and 120 visual cards) and a worksheet.

The 'Inclusive Signs' toolkit employs semiotic patterns to produce meaningful inclusive meta-design concepts – 'inclusive signs' precisely. The creation of such inclusive signs is operated through instinctive combination of descriptive and visual concepts belonging to Social Inclusion and, therefore, no technical skills are needed. Thus, both designers and stakeholders can easily conceive original ideas to design the next generation of enabling and inclusive solutions. Website: https://inclusivesigns.lincoln.ac.uk/





Daisy Elizabeth Gray School of Chemistry

Nanostructured Platinum and Copper Alloys supported on Carbon

This poster shows Scanning Electron Microscope images of nanostructured platinum and copper alloys attached to the surface of carbon particles. These materials have been produced for use as electrocatalysts in fuel cells.

Fuel cells offer a clean alternative to combustion engines, but widespread use is hampered by the difficulty of producing relatively inexpensive electrocatalytic materials. In this research very small amounts of platinum were alloyed with less expensive copper to reduce costs, and a simple synthesis method was developed.

The chemical synthesis of these alloys used compounds that are nontoxic, cheap, and naturally occur in citrus fruits, such as Vitamin C. The resulting branched structures composed of connected nanosized particles have been classified as nanodendrites. They are visible as white sponge-like shapes on the surface of the darker carbon particles, which were obtained from lemon peels. The suitability of these materials for their application will now be tested.





Roseline Edide Archibong National Centre for Food Manufacturing

Ukwoho soup

Development and characterization of ready-to-eat soups from the leaves of less-known edible plants of African origin Gnetum africanum and Telfairia occidentalis: Impact of processing on nutritional, bioactive and phytochemical properties.

Gnetum africanum and Telfairia occidentalis are one of the most popular green leafy vegetables in Nigeria and are gaining equal popularity as delicious food leaves in other African countries such as Cameroon, Congo and Angola. They are both cultivated for their nutritious, nutraceutical and pharmaceutical properties.

The ready-to-eat (RTE) vegetable industry is a worldwide expanding sector. From 2000 to 2017, global production has increased by approximately 60% for vegetables. Consequently, in 2019 the global soup market size yielded USD 16.12 billion and is projected to reach USD 21.0 billion by 2027. This is due to the change in lifestyle patterns and growth of awareness regarding the positive relationship between human health and the intake of RTE vegetables.

This study intends to develop a packaged soup base that is both nutritious, affordable and accessible. Currently, several parameters are being thoroughly investigated including the physicochemical, bioactive and sensory properties of these leaves.

Image: © 2022 Roseline Edide Archibong





Janet Elizabeth Mehmet Lincoln International Business School

A Ray of Hope

Putting on a brave face to the world and looking good , despite having cancer . This image symbolises the courage , strength , and hope of the women interviewed. I decided to explore the experiences of women at work who have been treated for gynaecological cancer , acting as a conduit for diverse women to tell their stories . Perceptions and insights :-

" Underneath it all it has changed me but you wouldn't know that from meeting me ...it's like a mask I put on before I go out of the door. "

" I spoke at a conference... you don't know what's underneath ... If you saw me you wouldn't think there is anything wrong."

" Cancer can be so dark..... It has made me look for the tiny flickers in that darkness and move towards them, these are the things that make me feel good and glad to be alive..."





Holly Parker School of Arts

Presenting Virtually on Virtual Reality

This photos shows me presenting virtually at PAMLA's 118th Annual Conference in November. It felt especially apt to be presenting a paper on Ernest Cline's "Ready Player One", interrogating the ways in which virtual reality and haptic technology is shaping our relationships, virtually. For me, this image demonstrates the way conferences and academia have evolved in the wake of the pandemic, and how my research into how we are navigating life in an increasingly digital age is also informed by and shapes my personal PhD experiences.





Neetu Malik School of Psychology

Globalised ideals in modern Indian culture

This montage of images was taken during fieldwork in India. Due to globalization and increasing availability of mass media, Western 'idealised' standards of appearance are becoming commonplace in daily Indian life: light-skinned models portray certain body types – very slim women and men with muscular 'V' shaped bodies. Additionally, Indian culture has a history of valuing lighter skin, and almost all Indian celebrities have smooth fair skin, further reinforcing Western appearance standards. In the West, research has shown that constant exposure to these kinds of appearance standards can make people feel less good about ourselves and even engage in unhealthy behaviours to try and change their appearance. There is evidence that media are having a similar impact in other parts of the world, however very little research has been carried out in India. My doctoral research is investigating media influence on appearance ideals in diverse Indian populations.





Obafemi K Akinwotu National Centre for Food Manufacturing

Improving the swallowability of carrot puree for dysphagic patients

The study was conducted to investigate the effect of selected hydrocolloids on the texture of potential dysphagia foods. International Dysphagia Diet Standardization Initiative (IDDSI) tests (fork drip, fork pressure, and spoon tilt test) were performed to evaluate the suitability of carrot purees for dysphagia patients. Xanthan gum (XG), kappa carrageenan (KG), and guar gum (GG) were added to pureed carrots to develop IDDSI level 4 pureed food. Mrs Gills level 4 pureed carrots for dysphagia diets were used as a commercial sample. Rheological tests, texture profile analysis (TPA), and particle size tests were employed to characterise the texture of the purees. The viscosity, TPA, and particle size tests of the commercial sample were comparable to GX-containing puree, making it appropriate for dysphagia diets. As a result, carrots blended with 2.5 % XG and 2% GG were recommended as a recipe for improving the swallowability of carrot puree.





Dr Ramana Sundara Lincoln Institute for Agri-food Technology

Smart Skin Technology

The development of Smart Skin Technology has become a landmark innovation in the past few years. The nascent technology using smart skin drones has received accolades for its application in soft drinks and pharma industries. Smart skin drones are developed as pressure-sensitive "thin-skin" sensor technology that helps identify the issues in bottling, canning, and production lines and helps in minimising the damage and downtime. Smart skin technology provides a state-of-the-art system for measuring the pressure movement exerted on glass, cans, and PET bottles. The technology has been adopted by some of the world's largest pharmaceutical companies manufacturing and packaging vaccines against a host of viruses. While much of the COVID-19 pandemic focus has been on the efficacy of new vaccine candidates, Smart Skin's Technology is offering a solution to a critical step of the challenge—making sure that every drop that can be produced gets to the market.





Abigail Davis School of Psychology

Mother-infant interactions and child language development (digitally!)

Since the pandemic, researchers have had to significantly adapt research. Our three-year longitudinal study explores mother-infant interactions and wellbeing, and subsequent infant language development, using observational methods through video conferencing software. Around 140 mums were recruited during pregnancy, and we captured self report measures from them before and after birth, and video recorded them interacting with their babies at 5, 7, and 9 weeks postpartum, and at 9 months. We will continue to follow the children and their language development until they are at least two years old. This work is a collaborative PhD effort between student, PI, dedicated research assistants, and most importantly, the mothers in this project. Together, we hope to better understand the ways in which interactions in the formative weeks and months may shape cognitive outcomes much later, and throughout the children's lives.

Image: © 2022 Abigail Davis







Abubakar Sani Ali National Centre for Food Manufacturing

The Effect of Oven drying, Dehydrator Drying and Freeze-drying Process on Physicochemical Properties of Beetroot (Beta vulgaris L.)

Beetroot (Beta vulgaris L.) is a root vegetable with numerous nutritional and health benefits. However, processing such as drying can induce negative changes in some beneficial properties of beetroot. The aim of this study was to evaluate the effect different drying methods on physicochemical properties of beetroot. Fresh beet (FB) beetroot was sliced evenly and subjected to oven drying (OV) at 70°C for 6h, dehydrator (DH) at 70°C for 9h and freeze-drying (FD) at -59°C for 24h. Drying methods changed product physiochemical properties of beetroot. Colour change was calculated as 3.35±1.69 (OV), 5.02±2.02 (DH) and 3.60±1.97 (FD) from 7.66±3.06(FP). Further research is needed to optimise drying conditions and investigate the use of different pre-processing technologies and combinations of drying methodologies that will help to maintain product quality.





Peter Eaton School of Chemistry

Waiting Caiman

The spectacled caiman, Caiman crocodilus is endemic to South and Central America. This photo was taken in Northeastern Brazil on an expedition to sample the Caiman's blood. This project aims to identify natural antibiotic molecules present in the animal's blood plasma, which are responsible for its low levels of infection.





Martin Scheuregger School of Fine and Performing Arts

Score: Mechanical Asynchronicity

Score: Mechanical Asynchronicity is a collaboration between visual artist, Danica Maier (Nottingham Trent University) and composer and musicologist, Martin Scheuregger (University of Lincoln). The project takes a single historical lace draft from the Nottingham Lace Archive as the starting point for new live and installation-based visual-musical works which explore ideas of iteration, transcription, repetition, glitch, asynchronicity and mimesis.

in this image – taken by project producer Christopher Leedham – four musicians perform at the Sir Jack Lyons Concert Hall, University of York. Each musician operates a record player which plays a recorded version of the same music they are playing live. Different combinations of live musicians and vinyl are explored in the performance. The project has appeared in galleries and concert halls in Amsterdam, Cambridge Lincoln, London, Nottingham and York, and will feature in a forthcoming publication from Beam Editions and as a Research Catalogue exposition. Score: Mechanical Asynchronicity is funded by Arts Council England.

Image: © 2022 Martin Scheuregger





Melanie Randall-Evans School of Chemistry

In the future of electrical storage, we see the stars

Bearing a resemblance to the night sky, the material shown in this image holds the potential to usher in a new era of how we approach electricity and its storage. My research is focused around developing the design of rechargeable aqueous zinc ion batteries, using stable and environmentally benign materials and production methods, all with the aim of developing a mass producible product that can be utilised throughout society. The electrode featured, is one of the components that I am aiming to optimize in my PhD through varying the crystal structure of one of the crucial components, manganese oxide, ideally to resolve established issues identified in literature around the topic. The success of the development of these zinc batteries could open the door to widespread clean and safe energy storage and further. The stars are the limit.

Image: © 2022 Melanie Randall-Evans





Hollie Jordan Kendall School of Education

Who Am I? Teacher Identity and the Missing Pieces

This research explores the impact mentors have on early career teachers and their developing identities. Recently, the Department for Education launched a two-year mentoring programme for new teachers in response to the rising number of teachers leaving the profession. This image reveals the thoughts of new teachers and how their identity is questioned with great importance so early on in their career. To the left of the jigsaw puzzle, you will observe thoughts of doubt and uncertainty. To the right of the jigsaw puzzle, you will see signs of growth and empowerment. However, with missing pieces, identity remains a puzzle unsolved. The first missing jigsaw piece 'who am I?' highlights the need for new teachers to feel secure and a valued part of the educational field. The second missing jigsaw piece portrays how mentors are key to guiding new teachers through adversity, in a way that teachers can feel 'complete'.

Image: © 2022 Hollie Jordan Kendall





Zarin Chowdhury School of Psychology

'Emotion Positivity in Older Age

Emotions have been reported to show a positivity effect with age, where older adults, in comparison to younger adults, tend to remember and have greater focus on more positive than negative information. My image represents how a young man is witnessing the rain and can only focus on how the leaves are falling off the trees and the flowers are losing their petals. Whereas the older gentleman is able to notice the flowers he has planted are finally showing some growth and that he has the warmth and safety of his home when it rains. This can be shown in how the older adult feels more at ease and content with his surroundings, whereas the youngster seems at distress. Older adults tend to interpret, pay attention to and remember more positive information than negative, compared to younger adults, resulting in overall improved mood and well-being in older age (Orgeta, 2009).

Image: © 2022 Zarin Chowdhury





Joe Boyd School of History and Heritage

Living inside a painting - Scottish Highlands

My research is concerned with artists' representations of an ever-present element of the Scottish mindset, the seas and coasts that are never more than 45 miles away. It focusses on five painters who have lived for a significant period where they painted. Steeped in place, they developed a rich experience of being there. (Think Covid lockdown, when the place where you live was savoured on regular walks, explored in great detail, investigated for its neighbouring people and its 'local' history.)

One was American Jon Schueler (1916–1992) who lived and painted the sea at Mallaig on the West Coast of the Scottish Highlands. An important member of New York's Abstract Expressionists in the 1950s, he came to Scotland to 'live inside my paintings' and stayed for years. This photograph is from one of the beaches that he frequented. It is the place that inspired and anchored his Scottish paintings.

Image: © 2022 Joe Boyd





Joe Langabeer School Of Fine and Performing Arts

Exploring the 'Musikal'

This image explores the performance practices pertaining to British Musical Theatre, seeking to examine if such practices have been standardised in the mega-musical and post-mega-musicals. I am conducting this exploration by implementing a practice-as-research methodology and focusing primarily on a historical analysis of psychophysical actor training in Britain. By furthering the research on these conventional practices, I aim to advance the musical theatre canon's discourse. I have examined performance practices by selecting data from the period preceding the mega-musical, mega-musical, and post-mega-music timelines. First, performances were closely examined, and a series of gestures (fifteen) were identified as potential signs of standardised practices. Subsequently, performances of songs selected from each era mentioned above (ten per period) were analysed against the gestures, which have been codified in the symbolic language I devised 'Musikal'. These special characters have been developed and then added to the songs' sheet music to investigate the repeated presence of standardised performance practices. The characters on the stave are analysing the performers practice in the image. This image suggests a potential future trajectory of the research, such as testing on performers trained in using Musikal gestures. There is also the potential to develop guides for performance training.

Image: © 2022 Joe Langabeer





Eleanor Bryan School of English and Journalism

Take note

In today's digital age, the majority of our research is on a screen. A PhD thesis is a Word document; a conference paper is a PowerPoint; our collaborations are in email chains; and our computer folders organise our notes. My laptop is not altered by the amount of words I write, nor the amount of emails it receives. But the ink stains on my fingers and the ever-growing stack of notebooks that continue to pile up on my desk serve as a physical reminder that I've put in the leg work and I've articulated my thoughts. While my incessant scribblings don't come with the Ctrl+F function to help me sift through the content to find what I need, having something tangible upon which my PhD research is based helps me to switch off from the screen and think more clearly.





Caterina Scott Lincoln International Business School

Sign of the times?

Lincolnshire is often referred to as Bomber County because of its World War Two (1939 to 1945) aviation history. As time passes and living memory fades, remembering, what happened there and why may seem less important in the 21st Century. This image of a modern road sign sits on a contemporary industrial site that was once part of RAF Elsham Wolds in North Lincolnshire. Clues like this are around us but unless you understand what it represents, or you visit the small number of heritage and visitor centres that have emerged around the county on the site of some former airfields, you might not know its significance. Through analysing documentation and oral testimony, this research aims to find out why heritage venues have developed on some of these former wartime airfields and if this is sustainable as a means of remembering this slice of the county's past.

Image: © 2022 Caterina Scott





Nawel Hamane School of Education

Tamazight language teaching and learning

The image will show the main focus of a project looking at the attitudes of headteachers, teachers of Tamazight, pupils, and their parents, towards the implementation of Tamazight language and its teaching and learning process in Algerian schools. where Arabic is the main medium of instruction. The mixed methods data was collected through three methods: focus groups with 52 children (aged 6-12) (both learning Tamazight and not), questionnaires administered to 105 parents at the participating schools and 4 semi-structured interviews with two head teachers and two teachers of Tamazight at the same schools. Using Ruiz's (1984) language orientations, the findings show that participants considered the teaching of Tamazight to be a right (e.g., to exercise a linguistic right) and a resource (e.g., to combat racism), but also a problem (e.g., lack of funding opportunities). Such attitudes highlight considerations for language planning and policy in multilingual countries such as Algeria.

Image: © 2022 Nawel Hamane



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