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# Book of Abstracts

## **Ecocide as a Core International Crime: The Path to Recognition**

**Sasha Gadani**

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Despite early negotiations during the drafting of the Rome Statute - the treaty that established the International Criminal Court (ICC) and defines its core international crimes - ecocide, defined as severe and widespread environmental damage, was ultimately not included. The absence of accountability has been exacerbated by the restricted response to the environmental destruction (comparable to ecocide) caused by Russia in its ongoing war against Ukraine. This research focuses on the possibility for ecocide to be incorporated into the Rome Statute - becoming the fifth core international crime - and the possible implications this may impose on states and corporations if enforced. Using the ArcGis software I created an interactive, user-friendly website mapping the growing international momentum in support for criminalising ecocide at the ICC. By identifying states who lack the political will for such an initiative, the project aims to raise awareness and meaningfully inform advocacy in the push for ecocide to be internationally recognised. This project is the first step to wider research into strategies to address the impunity for the most serious environmental crimes. It suggests that, with many perpetrators of ecocide being nationals of non-ICC members or elite corporations who are more difficult to persecute at the ICC this strategy of criminalising ecocide may not be the most suitable solution.

Therefore, an alternative strategy - a universal ecocide prevention treaty - could be more appropriate as it has greater potential to spark more national reform. This would create state responsibility alongside individual responsibility and see greater state participation globally through its universality.

## **Research into Levels of Academic Staff Confidence in Supporting Students Provisionally and Formally Diagnosed with Autism Spectrum Condition**

**Jacob Lewis**

*University of Sheffield*

This research aimed to understand levels of staff knowledge of Autism Spectrum Condition (ASC) and potential impacts for supporting students.. Moreover, academic literature has identified limited Higher Education (HE) staff knowledge on ASC as a barrier for autistic students in HE. Qualitative (non-numerical data) semi-structured interviews were chosen which enabled detailed responses and impromptu questions and took place online or in person, roughly 45 minutes long, Furthermore, five academic staff members at University of Sheffield were purposively sampled from lecture/seminar, lab and placement based subjects. This enabled the data to be cross-sectional of teaching methods. After which, thematic analysis, the process of coding (categorising) data to develop overarching themes, was used. As a result three key themes were identified: desire for training on ASC, adoption of inclusive practices, and responding to learning support plans (LSP: a document detailing students accessibility requirements for staff). Participants reported variable levels of understanding of ASC and a strong desire for ASC training. In addition, there was a single participant outlier who preferred training to be practical and streamlined not broad and in-depth. This is consistent with the understanding of neurodiversity (all brains are unique and process information differently) amongst staff and students. Therefore, reflecting existing academic literature which calls for training and support for HE staff on ASC.

Furthermore, it is hoped that this research has evidenced the variable understanding of ASC amongst HE staff, albeit a small sample, and the need and desire for ASC training to improve accessibility.

# Investigating the Specificity of CRISPR Cas9 Gene Editing System

**Frances Booth**

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Gene therapy aims to treat or prevent disease by altering genetic information within cells, a goal increasingly achievable through gene editing technologies such as CRISPR-Cas9. As a genome editing tool, CRISPR-Cas9 enables precise modification of DNA sequences, offering transformative potential for future genetic therapies. However, its clinical translation is hindered by unintended “off-target” DNA interactions that can introduce harmful mutations. Understanding and mitigating these effects is therefore crucial for developing safe and effective treatments for genetic disease.

In this study, we investigated how mechanical forces acting on DNA influence the accuracy of CRISPR-Cas9 binding. To do so, repetitive DNA arrays were constructed using two different ligation approaches: plasmid ligation and PCR product ligation. Comparing these approaches allowed us to identify which method yields the most reliable DNA substrates for high-resolution measurements of Cas9-DNA interactions using optical tweezers. We then examined how mechanical tension affects Cas9 binding accuracy and stability. Plasmid ligation produced consistent, evenly spaced DNA arrays well suited for capturing binding events, while PCR product ligation, though less reproducible, offered greater flexibility and cost efficiency.

Using these arrays, we observed that Cas9 binding to its correct (on-target) sites remained stable under tension, whereas binding to incorrect (off-target) sites increased as DNA was stretched. These findings reveal a mechanical dependence in off-target recognition, increasing our understanding of how CRISPR-Cas9 interacts with the genome under physiological conditions. Overall, the study provides insight into the biophysical factors underlying off-target effects and advances efforts to improve the precision of CRISPR-based genetic therapies.

# **The Impact of Colonialism on British Military Doctrine at the Start of the First World War**

**Megan BeEVERS**

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Academic research and public debate has recently been rife with controversy over the legacies of British colonialism. Military histories of the First World War so far have analysed military strategies in narrow British contexts. Recent works have alluded to the involvement of colonial soldiers and resources during the war, yet these have not studied the strategic intentions of British leaders in utilising these soldiers. Thus, this project combines military and colonial history to provide new answers on British military doctrine at the start of the First World War to explain not how but why colonial soldiers were utilised in specific ways. This project reviewed secondary literature on the colonial context and initial colonial involvement in 1914, and British military planning from 1900 to 1914. It utilised The National Archives' maps, telegrams and despatches from the British military and colonial officials to highlight the significance of racial theories and imperial hierarchies had on guiding colonial involvement. When Indian soldiers were deployed, colour bar and martial race theories explain why they were deployed in colonial conflict and in more savage, 'ungentlemanly' battles. Indians were used with disregard to avoid sacrificing the 'superior' but limited number of British soldiers, who were overstretched on the Western Front. This project has thus shown that racial attitudes significantly guided military strategy. This is useful when compared to Canada and Australia. This methodology can be applied to other conflicts as it provides an insightful lens to analyse the British colonial experience of warfare from c.1790 to 1945.

## **How to Facilitate Access to Higher Education for Sanctuary Students?**

**Angel Nakhle**

*University of Warwick*

This research's main aim is to investigate how universities can facilitate access to higher education for asylum seekers, often referred to as sanctuary students.

First, it starts by exploring the current systemic barriers these students face through examining the international and UK legal frameworks underpinning their exclusion. Then, using important secondary research, such as Dr Rebecca Murray's "(Re)imagining the Higher Education Border" which explores three key pillars, "Access, Welcome, Protection." Each pillar has its own different barriers which sanctuary students face. This study only explores the barriers and solutions to the 'Access' pillar, which is the pre-university stage, which includes the application process, requirements etc.

Second, the research analyses four in depth interviews with sanctuary students, whose lived experiences reveal both challenges and recommendations to combat the systemic barriers. Participants Highlighted inconsistent scholarship provision, difficulties navigating admission systems, and a lack of recognition and flexibility of their unique circumstances.

The key overall finding is that methods to facilitate access to Higher Education can be relatively simple and cost effective. Universities can, for example, provide targeted staff training to raise awareness of asylum seekers's rights and the barriers they face; offer clearer and more accessible information about scholarships; make proactive referrals to charities for practical support; and develop inclusive pre-entry programs that combine academic preparation with social integration.

This research demonstrates that access means more than just outreach, it means making space for asylum seekers within the wider campus community, to explore their full potential and pursue their dreams.

## **Assessing the Accuracy of Dynamical Seasonal Forecast Models Developed by the Global North for Forecasting Drought Conditions in South America**

**Alex Pearson**

The weather and climate are complex and chaotic systems, notorious for being difficult to model/forecast. Development of increasingly accurate forecast models is particularly important when facing the challenges to agriculture, energy production and wider society posed by climate change. These challenges are poignantly seen in the record-breaking drought conditions experienced by the Amazon basin, South America in 2023.

This project aims to assess the accuracy of select current dynamical seasonal forecast models produced by Global North countries/organisations in forecasting the Amazonia 2023 drought conditions, highlighting strengths of current forecasts and areas for improvement. Dynamical Seasonal forecast models refer to systems that attempt to model the physical processes at play in the atmosphere and forecast any potential deviations from a weekly or monthly average, 1-6 months ahead of the forecast event.

This project employed the coding language Python to manipulate forecast data (downloaded from Copernicus Climate Data Store, an online store of observational and forecast climate data) into useable form, produce helpful plots and statistically test how these forecasts compare with ERA5 Reanalysis data (a climate model that uses both observational and forecast data to produce a record of past conditions). The UK MetOffice model produced the most consistently accurate forecasts of the variables under study with each model showing varying forecasting accuracy for specific variables.

This project shows the current strengths of the models assessed as well as highlighting areas for improvement in both the specific models studied and seasonal forecasting in the Global South as a whole.

## **Wearing Gender: An Exploration of Gender and Gender Nonconformity Between Actor and Character**

**Kaje McBride Hunter**

How is gender represented between actor and character? 'Wearing Gender: An Exploration of Gender and Gender Nonconformity between Actor and Character' aims to answer this through exploring gendered actors and gendered characters working in tandem with each other. Looking at both Shakespeare and modern musicals, which play with gender, I explore the semiotics and mimesis of gender-making on the stage and the trans-ing of said gender through this actor/role relationship. Primarily, the cycle of representation for the body as gendered and the gendered body on stage. Using case studies: Hedwig and the Angry Inch, The Rocky Horror Show, Romeo & Juliet, MacBeth, in tandem with relevant theory on gender, queerness, and the body, I aim to add to ongoing research in the field of gender and performance theory. By exploring this space of gender between the performed and the performing, we can open a wider scope for the associated gender of characters and actors. This space between costume and body: is it separate from the politics that define gender, or is it an intersex/non-binary space? This line of research has been touched on before, such as in the works of Judith Butler, yet I do not intend to conclude that gender is performative. Rather, I argue that this line between the actor's gender and the character's gender is a transgender one, and one that opens the stage for further exploration in performing a gender in tandem with the semiotics of the actors' genders, whether non-binary, transgender, or cisgender.

## **Contrast Agent Free Regional Ventilation Imaging in CT and MRI**

**Soniya Soniya, William Clark, Bilal Tahir, Seunghyun Im**

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Lung diseases put a large burden on healthcare, causing 20% of all deaths in the UK. Medically, lungs can be imaged using computed tomography (CT) using a contrast agent, xenon-133. This research explored whether changes in lung ventilation occur in patients with chronic obstructive lung disease (COPD) and asthma, and whether deep learning, such as artificial intelligence (AI), can develop functional CT scans for diagnosis without contrast agents. This study used a database of CT scans from 298 COPD, asthma, and healthy volunteers compiled by the University of Leicester. This database was provided to me after an AI model had identified the regions of interest

(masks), areas where gas exchange occurs. However, the masks frequently missed key areas of the lungs and extended into the bronchioles, bronchi, and other structures. Therefore, to aid machine learning, my role was to amend and analyse the dataset and its masks using the programme, SNAP-ITK. These reviewed masks were then modified to fit a Python script, from which values for inspiration, expiration, and total lung volume were derived to determine lung ventilation and, therefore, lung function in COPD, asthma, and healthy volunteers. The functional CT scans showed reduced lung function in COPD and asthma patients compared to healthy volunteers. This work is important as adopting non-contrast CTs will prevent the reliance on contrast agents on both the patient and the healthcare system, as analysing lung function using computational modelling and AI would make it more widely available to clinics and hospitals and improve diagnosis.

## **Land-Based Fiscal Governance, Housing Inequality, and Converging Outcomes under “One Country, Two Systems”: Evidence from Hong Kong and China**

**Jianlin Liang**

*University of Glasgow*

This paper investigates why income inequality and housing inequality in Mainland China and Hong Kong have become more similar in recent years, despite operating under different institutions under “One Country, Two Systems” since 1997. Instead of mainly reviewing housing-market fundamentals, the paper focuses on the political economy behind high land and housing prices and unequal access to housing.

Many studies emphasise state control of land supply and land scarcity. This paper explores an alternative mechanism: fiscal governance and land finance. It asks how fiscal rules, incentives, and budget constraints shape local governments’ reliance on land-related revenues and land-backed financing, and how this reliance affects land release for development, housing supply, housing prices, and distributional outcomes.

Empirically, the paper compares three key cities in the Pearl River Delta region, including Hong Kong, Shenzhen, and Guangzhou, to trace the link between taxation/fiscal dependence, land use, housing demand, and the distribution of housing price gains. Singapore is briefly referenced as an illustrative benchmark of how public housing and land policy can weaken the transmission from land scarcity to housing inequality.

Finally, the paper notes that demographic change and slower demand growth in China may put pressure on the current model, while land-based urban investment and local government debt can accumulate fiscal and financial risks even when demand cools. Overall, the paper offers a simple framework for evaluating how different land-based fiscal regimes can shape housing affordability and fiscal stability.

## **Networks from Puzzle Pieces: Partial Symmetries, Pseudo-similarity, and the Reconstruction Conjecture**

**Frankie Gillis**

*University of St Andrews*

A graph is a collection of vertices, connected by edges. Graphs are fundamental structures in mathematics, computer science, machine learning (and AI) which model the connections between data, objects, or ideas. Of key interest to mathematicians are symmetries of graphs, as these provide systematic ways to understand and classify graphs. The Reconstruction Conjecture is a long-standing problem in the study of graph symmetries, asserting that graphs can be uniquely recovered from incomplete information about their subgraphs - like piecing a jigsaw together, or building a map of the UK from many local maps. Many incorrect 'proofs' have emerged since the problem's origin in the 1940s. The error in one such proof was revealed by the existence of so-called pseudo-similar vertices - those that possess an 'almost symmetry'.

Our research considered extending the idea of symmetries to partial symmetries of graphs, which allow one to better capture the properties of pseudo-similar vertices, as partial symmetries allow for a much richer description of the algebraic properties of

graphs than full symmetries. A key result we proved gives a correspondence between sets of mutually pseudo-similar vertices in graphs and the algebraic structure of the graph's collection of partial symmetries. We used this result to improve the best upper bound on the size of a set of mutually pseudo-similar vertices in a graph. We expect that our techniques can be further extended to derive more detailed descriptions of pseudo-similarity, and that our results may contribute towards open problems such as the Reconstruction Conjecture in the future.

## **Machine Learning Based Electronic Scarecrow for Protecting Agricultural Yields from Predator Damage**

**Noah Adasi, Hyder Ali Segu Mohamed**

*Ashesi University*

Agricultural production in Africa is severely impacted by bird predators, especially on small-scale farms, causing economic losses and threatening food security. Traditional static scarecrows quickly lose effectiveness as birds adapt.

Inspired by my uncle, a rice farmer in Ghana whose children miss school to scare birds from crops, this project developed an intelligent electronic scarecrow using machine learning for dynamic, adaptive bird deterrence.

Built on a Raspberry Pi 4, the system employs a YOLO-based model for real-time bird detection with 98% accuracy across varied conditions. Upon detection, it triggers deterrents: a servo motor simulating human movement or speakers emitting distress calls and predator sounds.

Testing in some small environment confirmed reliable performance, though minor delays occurred in servo response. Future improvements include refined mechanics, broader detection capabilities, testing in an actual rice farm, and additional deterrents.

This affordable, automated solution significantly reduces crop losses, boosts productivity, and supports food security. It aligns with the FAO's Zero Hunger goal by 2030 and the African Development Bank's continental initiatives.

Most importantly, by freeing children from farm protection duties, it enables them - like my cousins - to attend school, fostering education and sustainable rural development.

## **Signal Processing for AI Privacy in Machine Learning: Input-First Quantization-Based Training Technique**

**Noah Adasi, Hyder Ali Segu Mohamed, Stanley Edem Lennox Agudu**

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Machine learning models used in healthcare, biometrics, and smart-home systems often process sensitive personal data. Although techniques such as homomorphic encryption and differentially private stochastic-gradient descent (DP-SGD) provide formal privacy guarantees, they typically introduce substantial computational overhead and may degrade model performance (Abadi et al., 2016). This work investigates a lightweight alternative based on low-precision training-data quantization applied prior to model updates. The proposed “input-first” approach reduces the resolution of input data through uniform quantization with additive dithering. By constraining input resolution at the source, the method reduces fine-grained signal information that may contribute to membership inference and model inversion vulnerabilities. An ablation study was conducted on CIFAR-10 dataset across five-independent runs to examine the impact of different bit-depth configurations. Based on these experiments, 8-bit and 4-bit quantization were selected for further evaluation. The main experiments were performed on CelebA dataset using four binary facial attributes (Smiling, Male, Young, Eyeglasses). We compare full-precision training with 8-bit and 4-bit quantized inputs. Privacy is evaluated empirically using confidence-gap analysis, a confidence-based membership inference attack measured via ROC-AUC (Shokri et al., 2017), and gradient-based model inversion attack assessed using PSNR and SSIM metrics. Results show that low-bit input quantization preserves comparable classification accuracy while reducing membership inference effectiveness for several attributes. While the method doesn’t provide formal differential privacy guarantees, the findings indicate that training-data quantization can serve as a lightweight, hardware-friendly privacy

mechanism for edge and cloud workloads where moderate accuracy loss is acceptable in exchange for substantial privacy gains.

## **Evaluation of Change in Surface Roughness of Dental Resin Composite when Exposed to Erosive and Erosive-Abrasive Environment**

**Mohamad Mohd Ariff, Flavia Rodrigues**

*University of Leeds*

**Objective:** To evaluate and compare the effects of simulated toothbrushing, mouth washing and combined treatment on surface roughness of dental resin composite.

**Materials and Methods:** Twenty-two EN-shade Transcend Universal Composite discs (2 mm x 10 mm) were assigned to two groups: (a) abrasive–erosive and (b) erosive. The abrasion group underwent a five-year toothbrushing simulation (18,100 cycles). Chemical degradation was assessed using a new capsule-mixing method to simulate turbulent rinsing with Listerine Total Care Milder Taste Smooth Mint Zero Alcohol, followed by a five-year mouthwash simulation (500 cycles; 30 s twice daily). Surface roughness parameters (Ra, Rp, Rq) were measured at baseline and after each treatment using non-contact profilometry (PROSCAN 2200). Surface profiles and microhardness were evaluated with optical microscopy (Struers Duramin-40, 20x) and Vickers indentation.

**Results:** Ra, Rp, and Rq increased significantly after toothbrushing simulation. During turbulent mouthwash exposure, the post-toothbrush group showed greater increases in these values than the non-toothbrush group. After mouthwash simulation, Ra and Rq in the post-toothbrush group decreased slightly, while Rp showed a small increase.

**Conclusion:** Mouthwash use combined with brushing increases chemical degradation and mechanical wear compared to brushing alone. Therefore, this study recommends reconsidering how often Listerine Total Care Milder Taste Smooth Mint Zero Alcohol is used, ideally limiting it to once daily or less, depending on clinical needs and the resin material used. Future studies should also examine how the new capsule mixing

technique affects different resin composites with various mouthwashes to guide safer clinical protocols.

## **Rub, Don't Scrub: A Sustainability Audit in Adult and Paediatric Theatres**

**Manas Agrawal**

*University of Glasgow*

**Introduction:** Operating theatres are responsible for a significant proportion of healthcare-related carbon emissions, with water wastage during surgical scrubbing being a major contributor. Transitioning from traditional water-based scrubbing to alcohol-based hand rubs (ABHR) can reduce water consumption and carbon footprint, while maintaining the same level of clinical effectiveness.

**Objective:** To assess the current scrubbing practices in adult and paediatric theatres and explore barriers to compliance with sustainability guidance set by the National Green Theatre Programme (NGTP).

**Methods:** Over a two-week period, scrubbing practices were covertly observed in adult and paediatric theatres at two hospitals in Glasgow. A total of 110 scrub events were recorded. In addition, informal discussions with theatre staff were undertaken to explore awareness, attitudes, and perceived barriers to ABHR use.

**Results:** In adult theatres, 47% of scrubs used ABHR compared to 20% in paediatric theatres. Wash-based methods were more popular in both settings, with greater variability in paediatric theatres. Discussions showed a lack of awareness, concerns about skin irritation, and ingrained cultural practices as barriers to ABHR use.

**Intervention:** Based on these findings, educational posters were introduced in theatres to promote sustainable scrubbing practices and address knowledge gaps.

**Conclusion:** Current scrubbing practices are not meeting sustainability targets, and there are significant opportunities to reduce water use through ABHR. Cultural perceptions and lack of awareness are key barriers. These findings highlight how small

behavioural changes can generate meaningful environmental benefits, making the work relevant beyond healthcare. Targeted interventions and education are essential to improve compliance with the NGTP.

## **Scalable Hybrid Control for Autonomous Production Lines A Modular Approach Using Decentralised and Limited Localised Coordination**

**Ali Al-Lami**

*University of Sheffield*

This work presents a modular hybrid control framework for autonomous production lines that integrates centralized supervision with decentralized autonomy. The approach is motivated by the need for scalable, Modular manufacturing systems capable of coordinating both stationary machinery and mobile multi-agent subsystems, with minimum human intervention, an essential characteristic of emerging smart-factory environments.

The proposed architecture divides the line into modular stations: centrally controlled single-machine modules and decentralized mobile-robot transport modules, each modelled as a linear time-invariant system regulated using integral-augmented Linear Quadratic control (LQI), an optimal state-feedback method enhanced with integral action to eliminate steady-state timing errors.

At a supervisory level, a proportional–integral (PI) control loop adjusts a global throttle factor to synchronize station cycle times, compensate for disturbances, and maintain consistent product flow across the line.

The control structure is evaluated through MATLAB simulations under noise, disturbances, and actuator constraints. Results show rapid convergence of station output times toward reference values, with total line performance stabilizing within approximately  $\pm 1.6\%$  of the global target. Visualized trajectories demonstrate effective interaction between local regulators and supervisory control, coordinated throttle

adjustments, and cooperative behaviour among transport agents, including collision-avoidance.

Robustness analysis highlights limitations such as throttle saturation under high noise and sensitivity to reference variations, indicating potential integral windup and dynamic constraints.

Overall, the results highlight the potential of hybrid centralized–decentralized control architectures to improve flexibility and modularity in autonomous production systems. Remaining challenges, including anti-windup integration and fault tolerance, indicate important directions for future development toward fully realized smart-factory systems.

## **How Mentally Well and Unwell International Students in the UK Use Musiclistening for Emotional Regulation**

**Summi Ng**

*Durham University*

This study uses the episode model (Eerola et al., 2024) to analyse which key functional musical-emotional episodes international students experience in different situations, and primarily whether there are significant differences in mean ratings for each episode under different situations between mentally well and unwell international students in the UK. 77 students were assessed on the level of mental well-being with the World Health Organisation-Five Well-being Index (WHO-5) and rated the emotional episodes they experience according to three hypothetical situations, with the Dynamic Emotional Episodes to Music (DEEM) instrument (Kirts et al., 2025). Results suggest that well and unwell individuals may share similar context-specific emotion regulation goals; however, they may differ in depth and nature of emotional engagement in areas involving aesthetic interest, awe, motivation, and sense of belonging. Nevertheless, the findings highlight that perceived emotional experiences alone may not determine whether music emotion regulation is healthy or unhealthy. Instead, according to previous literature, the effectiveness of regulation may depend on the outcome—whether emotional relief or stability is achieved.

# **The Political Economy of Climate Finance in Ghana**

**Christian Narh Fiergbor**

*Ashesi University*

The Political Economy of Climate Finance in Ghana: Governance, Power, and Resource Allocation Climate finance has emerged as a critical subject in the global fight against climate change. This study provides insights into the political economy of climate finance in Ghana and how political factors impact the mobilization and allocation of climate finance resources. It highlights key political drivers such as policy measures, international conventions like the Paris Agreement, intergovernmental organizations, and funding bodies. While climate finance is a critical tool for developing countries to combat climate change, the intersection of governance, international commitments, and local politics often complicates its mobilization and allocation. This research contributes new insights into these dynamics within the Ghanaian context. Some identified challenges include inadequate domestic resources, weak institutional capacity, corruption, and a lack of collaboration among all stakeholders.

This study adopts a qualitative research approach, using primary data collected through semi-structured interviews of participants within the categories of mid-level officials in the Ministries of Finance (MoF) and Environmental, Science, Technology, and Innovation (MESTI), local government environmental officers, NGO, academics and researchers, private sector, international development organizations, and journalists. It employs thematic analysis, which involves the identification, analysis, and reporting of patterns or themes to analyze data. The study emphasizes that governance structures and coordination play a significant role in enhancing the climate finance mobilization and allocation system. The study also offers recommendations such as enhanced domestic resource mobilization, enhanced institutional capacity, and strengthened transparency and accountability.

## **The "No Bed Syndrome" in Ghanaian Tertiary Hospitals**

## **Christian Narh Fiergbor, Jochebed Basil, Samantha Reindorf, Elvira Agbatsi, Disraeli Asante-Darko, Sena Agbodjah**

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The No "Bed Syndrome" in Ghanaian Tertiary Hospitals: Health System Constraints, Resource Allocation, and Implications for Access to Quality Healthcare.

The current global scarcity of hospital beds, especially in the developing world, is a major concern to human health. This paper explores Ghana's No Bed Syndrome, a phenomenon that describes the shortage of hospital beds. The hospital bed-to-1000 population in Ghana is 0.9 in 2021, extremely lower than the World Health Organization's (WHO) recommended minimum of 5 beds per thousand population. The research examines how the lack of adequate hospital beds in Ghana affects access to quality healthcare and the interventions to address this problem, focusing on tertiary hospitals. It enhances the study of public health by offering insights into the challenges faced in healthcare delivery in Ghana. It studies system contributors, including resource allocation, systemic issues, and patient behavior, which promotes hospital overcrowding and delayed treatment. The study adopts a sequential mixed-method approach, with qualitative key informant interviews with selected healthcare providers and quantitative data analysis to quantify the findings. Key findings reveal that "bed capacity" involves physical beds and the necessary resources to make them functional. Furthermore, the hierarchical healthcare structure in Ghana encourages decentralization, but inadequate resource distribution causes patients to bypass lower-level facilities and overburden tertiary hospitals. Effective interventions, such as increasing bed numbers and establishing Bed Bureau Offices, are already showing promise. The study concludes with recommendations for systemic reforms, including collaborations with key government ministries, public education, and resource allocation to lower-level healthcare facilities.

## **Mixed Biomass Feedstock Screening of IonoSolv Fractionation Using Low Cost Protic Ionic Liquid**

**Rashed Jastaniah, Suhaib Nisar, Jason Hallett, Agnieszka Brandt-Talbot**

Efficient lignocellulosic biomass fractionation to access high-value biopolymers (cellulose, hemicellulose and lignin) is critical for production of sustainable fuels and materials in a circular economy. The IonoSolv process, using protic ionic liquids like triethylammonium hydrogensulfate ([TEA][HSO<sub>4</sub>]), is a promising pretreatment technology for fractionation. However, while single feedstock processing is well-documented, the co-processing of mixed feedstocks, which is vital for biorefinery flexibility, remains largely unexplored. This study investigates the IonoSolv pretreatment of mixed *Miscanthus giganteus* (grass) and *Pinus sylvestris* (softwood) feedstocks at various mixing ratios and processing conditions. Fractionation performance was quantified using Near-Infrared (NIR) spectroscopy, and the extracted lignin structure was analysed by Heteronuclear Single Quantum Coherence (HSQC) spectroscopy. We found that glucan recovery and hemicellulose removal exhibited a predictable, additive effect, closely matching a weighted average of the single-feedstock controls. In contrast, delignification (lignin removal from feedstock) was non-additive and optimized in 1:1 (w/w) blends, likely due to balanced mass transfer and ionic liquid solvating capacity. Mechanistically, HSQC analysis revealed no evidence of chemical cross-condensation between the two lignin populations. Notably, syringyl (S) units, characteristic lignin moieties in *Miscanthus*, were completely absent from the precipitated lignin of mixed systems. This suggests that co-processing is governed by sequential extraction kinetics (driven by different lignin glass transition temperatures) with selective precipitation of the guaiacyl (G)-rich pine lignin. These findings demonstrate the technical feasibility of co-processing and open new strategies for staged lignin fractionation in flexible biorefineries.

## **Statistical Analysis of Formation of CaCO<sub>3</sub> in Micro Reactor Gel Droplets**

**Ruby Macklin, Maxime Durelle, Johanna Galloway, Jonathon O'Connor, Fiona Meldrum**

Calcium carbonate is the most common biomineral on Earth; with superior mechanical properties when compared to abiotic crystals such as toughness and low brittleness. It is necessary to control nucleation rates and crystal growth to understand biomineral structures for a range of industrial applications. This includes pharmaceuticals, material refinement, and chemical production. Controlling nucleation rates means we can optimise the material properties for these applications. We used hydrogels to control nucleation rates because their networks restrict the mobility of ionic species.

We made microfluidic 70µm droplets which were used to observe crystallisation events in hydrogels containing calcium and a fluorescent pH indicator doped with additives (magnesium, poly aspartic acid, and poly lysine). Fluorescence and brightfield microscopy captured the formation of amorphous and crystal phases, which were calcite or vaterite. Python and ImageJ software were used to create movies out of the still images taken of the droplets and these movies were loaded onto Jupyter Notebook. Using Python coding, the movies were analysed and this data was used to monitor the crystallisation kinetics of hundreds of droplets for each condition.

Large jumps in brightfield and fluorescent intensity values were pinpointed as crystallisation events and smaller jumps were determined to indicate the formation of the amorphous phase. It was found that using poly aspartic acid as an additive resulted in the highest number of crystals formed and calcite was more abundant overall across all additives. This shows we can use bio-inspired methods to better understand industrial, pharmaceutical and natural mineralisation processes.

## **From Modernity to Common Sense: 5 Fictional Assumptions in Contractual Interpretation**

**Ewan Lazenby**

*University of Warwick*

This paper takes a novel interdisciplinary approach to the issue of contractual interpretation. It uses linguistic philosophy to assess the unreality of five assumptions judges make in order to (objectively) interpret a contract:

- that the contextualist approach to contractual interpretation is 'modern' or new;
- an assumption that the parties to a contract are rational;
- an assumption that the parties intend, through the contract, to communicate in common;
- a rebuttable presumption that all contracts are optimally designed to communicate; and
- an assumption that the parties use language in accordance with its ordinary English usage.

I expect to find that the assumption of modernity is partially incorrect. I anticipate that the assumption of modernity will turn out to be correct only when understood as second-order modernity. We are not the first to take a contextualist approach, but we are among the first to be aware that that is what we are doing.

The result of this is that academics have been eager to formulate contractual interpretation in the terms of the four other assumptions. Each of these will likely prove artificial in their own ways, save for the last (the assumption of conventional language usage) which seems to be unique. That last assumption, so far as I can tell, is the 'mythmaker' in that it legitimates the other four. To say that a particular reading of a contract is simply 'common sense' shuts down all further discussion.

Relevance to wider public includes: interpretation of non-legal documents, linguistic philosophy in general.

## **Could AI be Considered an Employee Under UK Law?**

### **Umay Yıldırım**

*University of Leeds*

Artificial intelligence has been a topic of debate in the 21st century as the technology has advanced and new forms of artificial intelligence and technological systems have appeared. The efforts to integrate artificial intelligence into areas of our lives are becoming more prominent. Regarding this information, it is essential to study whether AI can be considered an employee under UK law and whether it is sensible to grant AI labour rights. Therefore, this research will examine arguments and ideas in AI and ethics, labour law and human rights concepts. AI has become more widespread, able to perform tasks which impact businesses and society. It is essential to answer the

research question since AI creates new ethical, legal and social issues and thus, the response and the outcome should be considered. The study will use conceptual analysis of existing literature on AI, labour law and human resource management to determine whether artificial intelligence can be given labour rights and considered an employee under UK law, and whether it would be beneficial. The anticipated findings are expected to concern the legal, ethical, and human rights frameworks surrounding the concept of AI being granted labour rights. The study is expected to identify the problems, consequences that may occur and highlight that artificial intelligence is more beneficial when used as a tool. The findings can assist in future research and related practices, highlighting how AI should be used in the business world in relation to topics such as labour rights, ethics, and human rights.

## **Male Speech and Language Therapists in The UK: Experiences From Inside The Profession**

**Oliver Dunne**

*University of Central Lancashire*

Speech and Language Therapy is characterised by a lack of male representation worldwide with only 3% of registrants identifying as male in the UK. This has implications for gender equality, lack of client representation and a diminished diversity of role models. Previous research has explored the gender-related perspectives of speech and language therapy students while insights into the experiences of qualified male speech and language therapists (SLTs) remains limited.

This study investigated how gender shaped the professional experience of qualified male SLTs and how their experience varied over the course of their career. The study employed a convergent mixed-methods questionnaire to collect the data of 23 qualified male speech and language therapists with varying experience. Data was analysed using descriptive statistics, a spearman's correlation and reflexive thematic analysis.

Quantitative analysis revealed 86.95% of participants perceived their gender as impacting their professional experience. Thematic analysis identified three superordinate themes: 'The Silver Edge of Sexism', 'Gendered Expectations' and

‘Client Engagement and Role Model Effects’. Insights afforded by the mixed-methods design revealed an overall heterogeneity of experiences for males in the profession.

Male SLTs’ experience is paradoxical and consists of microaggressions and assumptions around male gender contrasted with unconscious privilege and improved career opportunities. This study highlights the need for reflective supervision, greater representation and targeted recruitment to improve gender equality and foster diversity in the profession. Further research would benefit from longitudinal and intersectional approaches to highlight the holistic experiences of SLTs in the field.

## **High-Resolution Air Quality Monitoring Using Distributed Low-Cost Sensors: Early Findings from Real-Environment Pilot Deployments**

**Atanas Burmov**

*Bournemouth University*

Traditional environmental monitoring relies on sparse, high-cost reference stations that cannot capture the highly localised, short-duration pollution events affecting indoor, industrial, and peri-urban environments. This research presents the early-stage development and evaluation of a compact, low-cost, multi-parameter environmental sensing node designed for high-resolution monitoring through dense, distributed networks. While the complete envisioned architecture integrates over twenty measurements, this presentation focuses on our primary Phase 1 prototype, successfully engineered with a robust, weather-resistant, airflow-optimised casing and precisely calibrated sensors for particulate matter (PM1.0, PM2.5, PM4.0, PM10), CO<sub>2</sub>, VOCs, NO<sub>x</sub>, and high-resolution meteorology (temperature, humidity, and pressure). Supporting WiFi, Bluetooth, mobile network, and LoRa connectivity alongside versatile power options (battery, 6V external, solar), the node is highly adaptable for diverse indoor, outdoor, and industrial deployments. Pilot deployments and active calibration trials are currently underway to assess sensor stability, noise behaviour, and responsiveness to everyday pollution sources. Early findings from these controlled experiments indicate that this multi-parameter sensing approach will

substantially enhance the detection of transient, spatially localised pollution events, contributing to the development of accessible systems for large-scale sensor networks, local risk assessment, and evidence-based environmental management.

## **Feasibility of Cardiac Regeneration using Stem Cell Therapy for Cardiomyopathy Literature Review by Aayush Joshi and Shakthi Nandagopal**

**Aayush Joshi, Shakthi Nandagopal**

*University of Lancashire*

Cardiomyopathies are globally one of the leading causes of heart failure, primarily due to the limited intrinsic regenerative capacity of cardiomyocytes. Conventional therapies slow disease progression but do not restore lost myocardium. Therefore, stem cell therapy has emerged as a promising regenerative strategy. Assessing their clinical therapeutic potential such as myocardial re-muscularisation, synchronized contraction, vascularization, and mechanical compatibility with host tissue. This review critically examines current clinical evidence regarding the safety and therapeutic efficacy of stem cell therapy in cardiomyopathies.

All articles were sourced from PubMed, following the PRISMA checklist using the **keywords**: Stem cells, Pluripotent Stem cells, Cardiovascular disease, Cardiac regeneration, Cardiomyopathy, Ischemia, Heart Failure, Myocardial Infarction (n=37). Inclusion criteria were English language, human studies, published within the last five years(n=20). Upon title and abstract screening (n=8).

Major trials and meta-analyses demonstrate modest improvements in non-ischemic cardiomyopathy's left ventricular ejection fraction, with some studies reporting reductions in left ventricular end-diastolic diameter. Improving cardiac function by 3–5% with a favourable safety profile. However, the efficacy is variable, and it is not yet a standard treatment due to inconsistencies in outcome, high costs, and ongoing research into optimal cell types and delivery methods.

Stem cell therapy remains investigational rather than the golden standard of care, requiring large scale randomized controlled trials to establish consistent clinical benefit and optimise therapeutic protocols.

## **The DisabLED Project: Exploring the Temporal-Affective Labour of Disabled Doctors Transitioning to Clinical Practice**

**Oliver Hope, Megan E.L. Brown, Anna Harvey Bluemel, Neera Jain**

*University of Sunderland*

Disabled medical students transitioning to become Foundation Year 1 (FY1) doctors must navigate access, professional identity and risk of burnout within an NHS culture that demands productivity. The DisabLED project explored these experiences. Seven disabled doctors were recruited, and over twelve months from May 2024, twenty in-depth semi-structured phenomenological interviews were conducted across four time-points. Longitudinal reflexive thematic analysis and a novel co-produced poetic enquiry methodology revealed how their experiences changed over time. Four common stages of transition were found: anticipation (preparation for practice), translation (transferring identities and access needs to unfamiliar clinical environments), performing (proving competency under scrutiny), and consolidation (gradually establishing authorship of their professional identity).

Following this, four longitudinal themes were constructed. The Work of Access- developing competence in navigating access through burdensome personal responsibility. Reclaiming Legitimacy and Belonging- modifying expectations of one's self within the system and using personal experiences with healthcare to strengthen practice. 'Crip' Time and the Politics of Pacing- transitioning from straining to fit into rigid, ableist temporal expectations, to recalibrating pace as a form of resistance ('crip' is a reclaimed term used within disability studies). Lastly, 'Crip' Sustainability- redefining professionalism through advocacy, protected wellbeing and careful disclosure. Poetry gave voices to these themes, conjuring intense affectivity through emotional and temporal textures that demand systemic change and cultural competency.

At a time of immense workforce pressures in the NHS, this project elucidates the need for transitional support for this under-recognised group of students, to maximise equity, retention and workforce sustainability.

## **"Men Cannot Leap the Great Gaps, But Ideas Can": Failures of Communication Technology in Science-Fiction to Address Cultural Differences**

### **Liberty Holmes**

University of Glasgow

A development on an essay originally written for Glasgow's Student Learning and Development journal, (X)position, elaborating on the ethical implications of the 'ansible', an instantaneous interstellar communication device created by Ursula K. Le Guin and used by various characters across her collective science fiction works (the 'Hainish Cycle'). Communication and colonial critics show how technology can be exploited as more than fifty years after the publication of *Left Hand of Darkness*, *The Word for World is Forest*, and *Rocannon's World*, Le Guin's novels argues that communication technology is not solely a scientific innovation but must be integrated with ethics and human experience.

This research observes instantaneous communication using the ansible device does not solve cultural and societal misunderstandings between civilisations in Le Guin's novels. The close proximity of communities through the manipulation and removal of space and time as barriers by the fictional technology exposes many flaws in communication between individuals. The invention of instant communication technology to unify nations, fails to address many problems within the Hainish Cycle canon and leaves individuals vulnerable to isolation and prejudice.

These novels are a reminder that within an increasingly digital age, care must be taken to consider the implications of misunderstandings concerning mass communication and international diplomacy. Communication technology is not only scientific but deeply cultural, particularly evident by the use of global communication today. As

much as communication technology can resolve conflict, it can worsen tensions if careful consideration of humanitarian impact and communication ethics are not implemented.

## **Using Machine learning to predict MDM2 Amplification in Lipomatous Tumours**

**Akanksha Desai, Hanna Varughese**

*University of Leeds*

Lipomatous tumours range from benign lipomas to malignant liposarcomas. The malignant neoplasms include atypical lipomatous tumours, well-differentiated liposarcomas and dedifferentiated liposarcomas. Distinguishing them is important as the malignant types have more potential for metastasis, recurrence and a poorer prognosis. They are challenging to diagnose on morphology alone so Murine double minute 2 (MDM2) testing via fluorescent in situ hybridisation (FISH) is the gold standard. This is a time and resource intensive technique. This study aims to determine whether machine learning models can predict MDM2 amplification in lipomatous tumours using clinical data on age, gender, tumour size and location.

A retrospective study analysed lipomatous tumours diagnosed in Leeds Teaching Hospital from 2009 to present. 1,398 cases with complete data were included. A random forest model was trained with 80% of the data and tested using the remainder. Metrics of the model were reviewed, and repeated numerous times with different sets of data to improve sensitivity and specificity.

MDM2 amplification was identified in 145 (10.4%) patients. Greater MDM2 amplifications was noted in older patients and deeply located tumours, particularly in lower limbs. Tumour size did not show significant association. The model had a sensitivity of 92% and a specificity of 48%.

A machine learning model using clinical information can effectively estimate the probability of MDM2 amplification and so could be used to guide diagnosis and

treatment in clinical practice. Such tools can ensure prompt management of aggressive tumours and reduce over investigation of benign tumours, improving patient care.

## **A Historical Analysis of Concussion and CTE in Football and Rugby: How Have Major Leagues Neglected Athlete Safety Despite Science?**

**Chlöe Irvine**

*University of Lancashire*

American football and rugby rank among the world's most-watched and most violent sports, with some of the highest injury rates reported today. Although spectators often view big tackles as the most thrilling moments, these collisions pose the greatest danger to athletes. Close-contact situations carry the highest risk of concussion—a mild traumatic brain injury affecting brain function—which becomes more harmful when trauma is repetitive. Concussion is the most common injury in both sports, and chronic traumatic encephalopathy (CTE), a progressive neurodegenerative disorder caused by repeated head impacts, has become increasingly prevalent among athletes.

This thesis examines how scientific understanding of concussion, its sequelae, and CTE has evolved over the past century. It considers the transition from amateur to professional play, changes in athlete physique, and shifts in the incidence and severity of head injuries. Although the medical community long understood the dangers of concussion and its lasting effects, these insights were slow to influence safety standards. With numerous players now suing governing bodies and the NFL, it is crucial to review the neurological issues at the center of these cases.

Given the severe cognitive decline observed in many retired athletes, this thesis investigates how gameplay decisions contributed to long-term harm and whether athlete welfare was adequately protected. The NFL's denial of early twenty-first-century research heightened concussion risks. Rugby, professionalized later, had less time to apply emerging science but ultimately introduced more effective prevention

measures. Still, the widespread neurological damage in former players shows that protective actions came too late.

## **Mental Health in the UK Construction Industry and its Relationship with Safety Incidents**

**Colin Whiteley**

*University of Sunderland*

The UK construction industry faces persistent challenges related to workforce mental health, with emerging evidence suggesting a consequential link between psychological well being and safety performance. This study critically examines the prevalence of mental health disorders among construction personnel and investigates their association with minor to moderate safety incidents. The research aims to advance understanding of how cognitive and emotional stressors influence operational risk within complex, high-pressure environments.

Employing a mixed-methods design, the study integrates quantitative analysis of survey datasets with qualitative insights derived from semi-structured interviews and focus groups interviews. Correlational and regression analyses were conducted to determine the strength and nature of relationships between mental health indicators, such as anxiety, depression, and fatigue, and recorded safety events. Thematic coding of qualitative data further elucidated psychosocial factors contributing to lapses in situational awareness and procedural adherence.

Preliminary findings reveal a statistically significant association between poor mental health and increased frequency of low-severity incidents, particularly those involving human error and rule deviations. Anticipated outcomes include a conceptual risk model delineating pathways through which psychological impairment exacerbates safety vulnerabilities.

The implications of this research extend beyond occupational health, underscoring the necessity for integrated mental health interventions within safety management frameworks. By evidencing the bidirectional relationship between well being and

safety, this study contributes to theoretical discourse on human factors in construction and offers actionable insights for policy development, organisational resilience, and the reduction of preventable harm.

## **Discourses on Militarism in European Security Research**

**Martha Creaser-Ogden, Barış Çelik**

*University of Sheffield*

By critically analysing the research discourses on militarism within a corpus of the most prominent scholarship and funded research projects in the multidisciplinary arena of European Security Studies, our research exposes the field's narrow and limited engagement with the subject of militarism which we argue risks sidelining within the discipline ethical debates about coercive capabilities and tools of organised violence. We present four thematic categories of discourse - militarism as ontological security, militarism as research puzzle, functional critiques of current militarism, militarism as oppression - which highlight the pervasive silences surrounding existential critiques of militarism as a means of practicing and performing security. Our research reveals that the vast majority of critiques across the spectrum of debate address questions of functionality concerning the improvement of militarism's efficacy, efficiency or legitimacy: constructing a research agenda that privileges the development of militarism as the normative means of security (e.g. Ringmose, 2010). Our research thus presents the need for existential critiques of militarism, examining an observable academia-policy nexus in the field that essentialises militarism in the practice of European security (Berling, 2012). We identify an emerging research agenda offering this line of more fundamental inquiry and, through our research, encourage a turn towards these sustained, ethical and meaningful research agendas. Our research responds to recent calls for a greater awareness of privileged discourses and marginalised debates within European Security Studies, with the aim of enhancing the reflexivity and robustness of the discipline as a whole (Guerrina and Sloomaeckers, 2024, p. 37).

# **Community-Based Interventions Addressing Health Inequalities Among Minority Women in the UK: A Scoping Review of Mechanisms and Outcomes**

**Beverlyn Owusu Agyemang**

*University of Leicester*

Health inequalities among minority women in the UK remain persistent and are shaped by intersecting social, economic and cultural disadvantages. Community-based interventions are increasingly recognised as important for addressing these inequities, yet evidence on how they operate and what outcomes they produce remains fragmented. This scoping review aimed to map the mechanisms through which community-based interventions support minority women in the UK and to identify associated health and social outcomes.

The review was conducted in accordance with Joanna Briggs Institute guidance. A structured search strategy was applied across academic databases and grey literature sources, including PubMed, Google Scholar and UK policy and third-sector publications. Evidence published from 2015 onwards was examined alongside key earlier studies to capture the development of community-centred approaches. Data were systematically charted and synthesised to describe intervention characteristics, target populations, mechanisms of change and reported outcomes.

The synthesis identified several recurring mechanisms underpinning community-based interventions, particularly cultural tailoring of services, delivery through trusted community members and partnerships with local organisations. These mechanisms were associated with improved health knowledge, greater engagement with preventive and primary care services, enhanced wellbeing and stronger social support networks. Gaps in the evidence were also identified, including limited long-term evaluation, inconsistent reporting of how intersecting identities shape intervention effects, and insufficient attention to sustainability and local context.

This review clarifies how community-based interventions may contribute to reducing health inequalities affecting minority women in the UK and identifies priorities for future research and policy development.

## **Adaptive Drift Detection and Response Framework for Financial Machine Learning**

**Elisabeth Cooke**

*Durham University*

Commercially sourced wildflower plantings are increasingly promoted as tools for biodiversity enhancement, yet their genetic and ecological implications for wild populations remain underexplored. This study develops a multi-criteria framework to assess species-level risk of reduced local adaptation and introgression between commercially sourced and naturally occurring wildflower populations in Britain. Seven decision criteria: planting frequency, rarity, proximity to natural populations, intraspecific variation, dispersal ability, outcrossing rate, and pollinator specificity, were integrated using weighted sum aggregation and sensitivity testing across 28 shortlisted species, drawing on data from public planting schemes, plant trait databases, and literature reviews. The analysis identified seven species most vulnerable to genetic homogenisation and maladaptive gene flow: *Daucus carota*, *Geranium pratense*, *Origanum vulgare*, *Rhinanthus minor*, *Anthyllis vulneraria*, *Centaurea scabiosa*, and *Silene flos-cuculi*. Literature review confirmed high variability, documented introgression, and local adaptation in these taxa, underscoring their susceptibility under current restoration practices. Results also highlight the limited use of provenance-traceable seed by local councils and the risks posed by reliance on commercial suppliers with minimal genetic safeguards. By demonstrating robust species rankings across normalisation and weighting methods, this framework provides a defensible tool for prioritising conservation attention and informing more ecologically responsible seed sourcing and restoration strategies. Importantly, the findings indicate that commercial seed mixes containing these high-risk species should be used with caution near existing wild populations, as such planting may compromise genetic integrity. These species may also be prioritised for future studies or simulations

examining genetic differences and exchange between wild and commercially sourced populations.

## **The Legacy of the One-Child Policy**

**LiZhi Potts**

*University of Glasgow*

This reflective piece explores personal and political interconnectedness through the lens of international adoption in the wake of China's One-Child Policy (OCP). The One-Child Policy was officially terminated in 2016 and subsequently replaced by a two-child policy, which ended in 2021 (Reuters, 2021). Despite this, the topic tends to be presented in Western educational settings as a distant historical phenomenon, with the contemporary legacy being overlooked. The OCP's legacy cannot solely be quantitatively analysed. Therefore, this piece is a reflective writing piece investigating how different policies have impacted my life and lived experiences. Born during a time of strict population control and later adopted by a family in the UK, I examine how policies made at a governmental level rippled through generations: shaping identity, belonging, and emotional inheritance. Through reflection on my own experiences of abandonment, cultural displacement, and the deep bonds formed across distance and difference, I consider how the consequences of state decisions extend far beyond borders and lifetimes.

## **Educational Support for Autistic Children and their Families in Iraq and the Kurdistan Region**

**Shahang Jamil**

*University of Leeds*

Autism diagnoses are increasing globally, yet many regions-including Iraq and the Kurdistan Region-remain under-prepared to support autistic children and their families. In these contexts, limited awareness, cultural stigma, and lack of qualified training continue to delay early intervention, placing autistic children at risk of educational and

developmental obstacles (World Health Organization, 2023; Alkhateeb et al., 2022). This research seeks to investigate the resources available to Iraqi and Kurdish Region autistic children and their families. It answers five main study questions: the average age of diagnosis; the availability of educational help; educator confidence; training access; and the consequences of inadequate support. A qualitative case study approach was used, involving semi-structured interviews with ten educators from government-run autism centers in Baghdad and Erbil, alongside a bilingual survey with 22 educators. Findings revealed that autism is commonly diagnosed after the age of five, with many educators reporting a lack of early screening, specialist training, and structured intervention. Cultural stigma was generally recognized as a barrier for both families and institutions. Educators reported feeling underprepared and emotionally burdened. A notable growing concern was the near-complete lack of services for autistic people above the age of 12 (Rudaw, 2025). This study demonstrates that, while educators are dedicated, the system does not educate them to provide necessary support. It advocates for national investment in autism-specific training, early screening, and inclusive educational planning to address critical gaps and enhance long-term results for autistic students.

## **Curriculum Decolonisation and Improving Sustainability in Undergraduate Chemistry Teaching Laboratories**

**James Stokes-Tunney**

*University of Leeds*

The discipline of chemistry has a crucial role in ensuring a sustainable global future across a breadth of industries. These principles should also be integrated from undergraduate level. In this research, a more environmentally friendly hydrazone synthesis was adapted and optimised for use in undergraduate teaching laboratories to replace a previous tin iodide synthesis that involved refluxing in large volumes of environmentally harmful and toxic chloroform. A script, COSHH form and demonstrator notes were developed for the new synthesis to allow implementation in the upcoming academic year. This has led to a reduction in the consumption of chloroform by our undergraduate labs of over 1.5 L per year. The environmental

sustainability of an introductory column chromatography practical was also improved. The original experiment used a 1.5 g mixture of ferrocene and acetylferrocene, separated using 500 mL of 9:1 petroleum ether/ethyl acetate in a 600 mL silica column. The practical was redesigned using ‘microscale’ columns constructed from 10 mL plastic syringes, reducing both sample and eluent quantities. Analytical techniques (NMR and IR spectroscopies) were used to ensure the microscale separation provided comparable qualitative outcomes, and an instructional for the updated practical was developed. This is expected to reduce reagent and solvent consumption from this experiment by approximately threefold and silica use by more than tenfold. Contacts from leading pharmaceutical and manufacturing organisations were consulted throughout to ensure that the revised experiments continue to align with industry practice. These approaches are transferable and could be applied to other chemistry courses globally.

## **“Obroni Wawu” and the Politics of Waste: Neocolonialism and Inequality in Ghana’s Kantamanto Market**

**Erin Tyler**

*University of Leeds*

The export of second hand clothing (SHC) from the Global North to Ghana raises urgent questions about sustainability, inequality and the ethics of global fashion waste. Accra's Kantamanto Market receives 15 million SHC items a week, of which up to 40 percent becomes waste within days. While the market supports around 30,000 livelihoods, the volume of imported textiles exceeds local capacity. This overflow contributes to environmental degradation, particularly along Ghana’s coastline, where discarded textiles obstruct fishing activities, damage boat motors and reduce income for coastal communities. Accra’s beaches now accumulate more than 18 tonnes of textile and plastic waste each week, reinforcing neocolonial dynamics that position Ghana as a disposal site for the Global North. This study uses desk based secondary research and a case study of Kantamanto Market, framed through neocolonial theory. It analyses academic literature and NGO reports, including work by the Ghana based OR Foundation, to examine how power imbalances shape the SHC trade. The research

aims to identify the environmental impacts of SHC imports on Ghanaian communities, to evaluate how donation and recycling practices contribute to these impacts and to examine the neocolonial structures embedded in global clothing waste flows. Anticipated findings suggest that practices in the Global North that are often presented as sustainable instead intensify landfill overflow, coastal erosion and social inequality in Ghana. By situating Kantamanto within wider debates on sustainability and global inequality, this research contributes to discussions on responsible consumption, climate action and reducing inequalities in line with the UN SDGs.

## **From Outreach to Action: Laying the Groundwork for DC Drug Take-Back Programs**

**Fathia Fasasi**

*Georgetown University*

Washington, D.C. continues to face an urgent opioid crisis, with overdose deaths rising and Black residents in Wards 7 and 8 disproportionately affected. Many households have unused prescription medications but lack trusted, accessible disposal options. Existing drop boxes are often located in police stations, which some community members avoid, increasing risks of misuse and overdose. In summer 2024, I launched the DC Drug Take-Back Initiative in partnership with the Office of Representative Oye Owolewa to address this gap by promoting safe disposal and laying the groundwork for community-driven mail-back and future bin programs.

I developed the initiative's first public-facing materials, including a one-page overview, flyers, a "Share Your Story" form, and a partnership interest form. I launched an email account and Instagram page (@dcdrugtakeback) to increase visibility. Outreach combined digital engagement with in-person efforts, including speaking at the ONE DC Juneteenth Celebration and the Annual Peace Jam, hosting a public event in Ward 7, and meeting with the Department of Behavioral Health, prevention centers across Wards 7, 8, and 3, and local organizations such as East River Family Strengthening Collaborative, Marshall Heights Community Development, and BHG Recovery.

By summer's end, four community sites committed to hosting mail-back drug disposal programs. Challenges included limited responses to outreach, reduced youth programming availability, and regulatory barriers to naloxone distribution, which were addressed through relationship-building and expanded partnerships.

This project demonstrated that persistent, trust-based leadership can support scalable, low-cost, community-centered strategies to reduce overdose risk and advance health equity.

## **Transgender and Gender Diverse Identity in Dementia Care: An Integrative Review of Implications for Nursing Practice**

**Aisling Thomas**

*Queen Margaret University*

Transgender and gender diverse (TGD) people are increasingly reaching older age, yet dementia care has often been organised around cisgender, heteronormative assumptions. The literature indicates risks of misgendering, deadnaming and erosion of personhood, particularly when cognitive decline reduces a person's ability to self-advocate. My dissertation asks: how do nursing practices and care processes influence the preservation of affirmed gender identity and personhood for TGD people living with dementia?

I conducted an integrative literature review of multi-design empirical studies and case reports on TGD ageing, dementia and care, identified through systematic searches of seven health and social care databases. Studies were critically appraised and synthesised using reflexive thematic analysis, guided by critical and person-centred care frameworks.

The synthesis generated four interlinked themes: recognition and misrecognition; protective planning and identity anchoring; navigating institutional mistrust; and caregiver preparedness and relational advocacy. Together, these themes suggest that gender affirmation in dementia care is fragile and often dependent on individual planning, documentation and advocacy, within the context of limited trans-specific

training, inconsistent documentation systems and policies that assume cisgender identities as the norm.

The review suggests that current dementia services and nursing education are not yet fully equipped to meet the needs of TGD people. It outlines implications for nursing practice, including identity-inclusive assessment and care planning, enhanced training in gender-affirming dementia care, and stronger organisational and regulatory standards. More broadly, the project contributes to wider debates on inclusion, health and wellbeing, ethics and human flourishing in later-life care.

## **From Disposable to Durable: Redesigning High-Voltage Switches for Sustainable Science**

**Farhan Tanvir, Dr. Benjamin Chong**

*University of Leeds*

Major scientific facilities—from fusion energy reactors to cancer radiotherapy machines—rely on systems that deliver massive bursts of energy. Currently, the switches controlling these bursts act like contained lightning bolts. They function by blasting electricity across a gas gap, a violent process that physically erodes the metal components with every shot. Consequently, these switches are disposable, creating a constant stream of electronic waste and demanding complex, energy-intensive maintenance.

My research aims to replace this self-destructive technology with Silicon Carbide microchips—the same durable, efficient semiconductors driving the electric vehicle revolution. Previously, industry wisdom assumed these chips lacked the raw voltage capacity to replace the old switches. However, by revisiting the fundamental physics of how electricity jumps across a gap, I demonstrated that the speed of activation is more critical than raw voltage.

This insight enabled the design of a streamlined system that removes the need for bulky, wasteful energy-boosting components. Currently, facilities like the UK's Orion laser rely on multiple banks of these consumable switches, effectively multiplying the

maintenance burden. By swapping eroding metal for durable microchips, my design transforms a consumable, throwaway component into a permanent, maintenance-free asset. This shift eliminates a recurring source of hazardous waste and reduces the lifetime operational costs of these systems by over 50%, offering a concrete engineering step toward sustainable science.

## **From Classroom to Society: How Gender Inequality in Economics Education Shapes Policy, Institutions, and AI Bias in the Modern Economy**

**Satveer Kaur**

*Manchester Metropolitan University*

This research examines how gender and racial disparities within economics education shape student participation, progression, and the perspectives that inform economic institutions and policy making, and explores how artificial intelligence (AI) may reinforce these inequalities. Participation in economics education remains uneven across gender and ethnicity in the United Kingdom. Rather than assuming that minority status directly causes discrimination, this study investigates how pedagogical practices, assessment structures, and disciplinary culture interact with students' social identities to influence engagement, confidence, and perceived belonging.

The primary aim is to identify educational mechanisms associated with differential inclusion in economics and to assess how these patterns extend into labour market and technological contexts. Primary data are collected through an online survey of economics students at a single UK university. The survey captures demographic characteristics alongside measures of classroom experience, participation, confidence, perceived relevance of course content, and attitudes towards inclusivity and progression. Quantitative responses are analysed using descriptive statistics and group comparisons across gender and ethnicity, while qualitative open ended responses are analysed using thematic analysis to identify recurring patterns in students' lived experiences.

The study further examines mechanisms through which AI systems can reproduce inequality. Empirical research shows that algorithms trained on biased data can reinforce disparities through biased ranking, differential prediction accuracy, and optimisation criteria reflecting past exclusion, particularly in education and recruitment. When combined with unequal skill development and signalling within economics education, these systems may scale existing inequalities rather than mitigate them, reinforcing disparities from the classroom into policy influencing institutions.

## **Co-Producing a Faith-Based Intervention to Address Cancer Screening Uptake Barriers Among Black Individuals: Reflections from a Black Medical Student**

**Amarachi Inyama, Floor Christie-de-jong, Priya Ahmed, Judith Eberhardt**

*University of Sunderland*

**Background:** Screening uptake for abdominal aortic aneurysm (AAA), breast, bowel and cervical cancer remains disproportionately low within ethnic populations, contributing to later cancer detection and preventing access to life-saving treatment. Research highlights religious spaces and rhetoric as useful health promotion tools within ethnic communities.

**Aim:** To collaborate with a Public Involvement and Community Engagement (PICE) group to identify barriers and facilitators towards screening and co-produce an intervention to improve uptake of AAA, breast, bowel and cervical cancer screening among Black Individuals.

**Participants:** 11 Black individuals (males aged 50-74, females aged 25-74) from Glasgow, North-East England and Leeds.

**Methods:** Six focus groups were conducted: three exploring barriers and facilitators and three adapting an existing intervention. I co-facilitated discussions and documented key points for group debriefing. I independently coded the data using the Integrated Screening Action Model and compared findings with the research team to identify behavioural targets for change.

Results: Key barriers included mistrust of healthcare, experiences of racism and discrimination and faith-related health beliefs, whilst facilitators were centred around family influence and gender roles. PICE members shaped the content and format of a two-hour faith-based workshop.

Conclusion: We developed a co-produced faith-based intervention that may address barriers. By evaluating the intervention in church settings, we will assess effectiveness, feasibility and scalability. Future research should aim to assess long-term impacts and consider adapting this approach for other underrepresented communities. My perspective as a Black student deepened the understanding of community concerns, highlighting the need for diverse representation in co-produced health research.

## **Modelling Instability and Complexity in Chess Using Variational Dynamics and Fractal Geometry**

**Kshiraj Thummar**

*University of Warwick*

Chess is often described as a game of logic and calculation, yet small decisions can produce dramatic and seemingly disproportionate consequences. This project investigates how and why such instability arises by modelling chess positions as evolving mathematical systems. Central research question: Can tools from continuous mathematics meaningfully capture the complexity and sensitivity of discrete decision-making in chess?

To address this, I represent chess positions as points in a high-dimensional space and model their evolution using variational principles. By constructing a chess-specific Lagrangian and deriving Euler-Lagrange differential equations, I analyse how positional “tension” evolves over time and how small perturbations, such as a single suboptimal move, can lead to rapid divergence. I complement this with methods from dynamical systems and fractal geometry, including Lyapunov exponents and fractal dimensions, to quantify sensitivity to initial conditions and the structural complexity of position spaces across different phases of the game.

Applying the model to real engine-evaluated positions from high-level games, I show that critical moments exhibit sharp increases in instability and fractal complexity, providing a mathematical explanation for sudden collapses in evaluation following blunders. These findings suggest that chess positions occupy a low-dimensional but highly unstable subset of a much larger configuration space.

Beyond chess, this work demonstrates how ideas from calculus of variations and dynamical systems can be applied to complex decision-making processes, with potential relevance to economics, game theory, and artificial intelligence. It also offers an intuitive way to visualise why even expert-level decision-making can fail in highly sensitive strategic environment.

## **Understanding Suicide Risk and Eating Disorders amongst Autistic Women in the UK: A Cross-sectional Secondary Data Analysis**

**Ellie Fraser**

*University of Glasgow*

Autistic women are significantly more likely to experience suicidal ideation and death by suicide compared to autistic men and non-autistic women. Previous research suggests that suicide risk increases amongst autistic people with at least one psychiatric comorbidity, however, the impact of specific mental health conditions on suicidal thoughts and behaviours remains unclear. Approximately 29% of women with an eating disorder meet the diagnostic criteria for autism or self-report higher levels of autistic traits. Eating disorders are reported amongst the psychiatric conditions with the highest mortality and suicide rates worldwide, however, research has yet to explore their impact on suicidal ideation amongst autistic women. Through secondary analysis, this study compared the prevalence and severity of theoretical risk factors for suicide between autistic women with and without an eating disorder diagnosis. The relationship between suicide risk factors and symptoms of anxiety and depression was also explored. Autistic women (N=191) from the UK completed self-report measures of autistic traits, anxiety, depression, thwarted belonging, perceived burden, and

suicidal capability. Autistic women with an eating disorder reported significantly stronger feelings of perceived burdensomeness, thwarted belonging, and depression than autistic women without an eating disorder. In the total sample, perceived burdensomeness, thwarted belonging, and suicidal capability significantly predicted the severity of anxiety and depression symptoms. These findings suggest that autistic women with an eating disorder experience elevated feelings of loneliness and depression, increasing their vulnerability to suicide. Ultimately, future research investigating the impact of eating disorders is required to inform suicide prevention strategies for autistic women.

## **Design of Microstrip Patch Antenna for Sub-6G Applications at 73 GHz**

**Xiuneng Luo**

*University of Sheffield*

With the demand for mobile data traffic increasing rapidly, higher frequency bands are required to support the network. However, the current 5G frequency bands are unable to meet gradually. Therefore, the next network generation, 6G, is expected to support the higher demand, including 70 to 80 GHz sub-6G range.

This project designed a microstrip patch antenna operating at 73 GHz. The model was simulated by Ansys HFSS with the dimensions of 3.09 mm x 4.41 mm x 0.51 mm. The 73 GHz frequency was selected because it is one of the standardized candidate frequency bands for early 6G research, offering a reasonable trade-off between bandwidth, propagation, and fabrication compared to THz frequencies. The design was based on the Rogers RO4350 substrate, which is a microwave material widely used because its stable dielectric properties lead to stable bandwidth performance. Through performance results including return loss, voltage standing wave ratio(VSWR), and radiation patterns, this antenna demonstrated well impedance matching and wideband performance. A slight asymmetry between the electric field plane (E-plane) and magnetic field plane (H-plane) radiation patterns was observed, which indicates the potential area for improvement in future array design.

This sub-6G antenna can be used in future 6G networks not only because it meets the frequency requirement but also its small size compactness. Existing research on antennas largely focuses on 5G, with limited studies on 6G. This work also represents a pioneering exploration of antenna design at 73 GHz and provides a foundation for future research in THz 6G frequency bands.

## **Cross-Dressing for Power, Shedding Disguise for Love: Negotiating Feminism and Hetero-Patriarchy in Ashes of the Kingdom**

**Linxi Wang**

*University of Leeds*

Within China's patriarchal social context, female-oriented games offer vital cultural channels for feminist expression. *Ashes of the Kingdom* (2023) is China's first historical female-oriented game where the heroine cross-dresses as a prince to inherit the throne in Eastern Han Dynasty and develops romantic relationships with five male characters. Drawing on Butler's gender performativity theory, which understands gender as enacted through repeated stylised acts rather than innate identity, this study analyses how the heroine performs masculinity in political contexts while switching to feminine performance in romantic narratives. Existing research on female cross-dressing representations has primarily examined narrative in novels and comics. This study addresses this gap by using multimodal discourse analysis to interpret visual symbols and narrative within Chinese cultural contexts in game studies.

This study examines all the heroine's cross-dressing designs, including military uniforms and ceremonial robes, and analyses her initial romantic scenes with five male characters. Analysis reveals the game's "dual-coding" strategy: (1) the heroine must appear sufficiently masculine to legitimise political authority while retaining feminine traits to maintain romantic appeal; (2) costume symbolism grants access to patriarchal hierarchies yet reinforces power as inherently masculine; (3) romantic scenes employ the female gaze by displaying male bodies as objects of desire but narratively invoke the "damsel-in-distress" cliché.

This “dual coding” strategy reveals cross-dressing as pseudo-empowerment, concealing structural patriarchal constraints reaffirmed in romantic narratives. This reflects how Chinese female-oriented products balance empowerment promises against patriarchal traditions, calling for critical examination of persistent gender norms to expand possibilities for genuine female empowerment.

## **Behavioural and Neural Measures of Response Inhibition in University Students: The Impact of ADHD Traits Across Inhibitory Control Tasks**

**Hannah Riley**

*Southampton Solent University*

Difficulties with response inhibition, defined as the ability to suppress inappropriate or unwanted actions, are commonly associated with Attention Deficit Hyperactivity Disorder (ADHD). Although previous research has primarily focused on clinical populations, less is known about how ADHD traits influence inhibitory control in university students, where such difficulties may affect academic performance and wellbeing.

This study investigates the relationship between individual differences in ADHD traits and both behavioural performance and brain activity during tasks requiring response inhibition in a non-clinical university sample. Participants complete two cognitive tasks: a Go/No-Go task assessing proactive inhibition and a Stop Signal Task assessing reactive inhibition. Behavioural performance is measured using reaction times and accuracy, alongside brain activity recorded using electroencephalography (EEG), which provides indicators of how efficiently participants detect conflicts and control or inhibit their responses.

ADHD traits are assessed using the Adult ADHD Self-Report Scale and treated as continuous measures of inattention and hyperactivity/impulsivity. It is anticipated that higher levels of these traits will be associated with poorer inhibitory performance and

weaker neural responses related to response control, with potential differences in the strength of these effects across task types.

By integrating behavioural and neural measures within the same participants, this study seeks to clarify whether inhibitory difficulties associated with ADHD traits are task-specific or reflect broader differences in inhibitory control. The findings may inform strategies to support attention and self-regulation in higher education, particularly for students experiencing persistent challenges with concentration and impulse control.

## **Exploring Motivations Behind Lack of Adherence to Concussion Protocols in Rugby Players**

**Cara McNae**

*University of Glasgow*

Over recent years there has been an increased awareness as to the number of rugby players being diagnosed with neurodegenerative conditions such as Chronic Traumatic Encephalopathy (CTE). Research has suggested that rugby players are about 2.5 times more likely to develop these conditions than the general public (Russel et al., 2022), and that this is often attributed to the rate of concussions they have received (Chen, 2018). Although there are concussion protocols in place to mitigate this risk, studies have revealed that rugby players often do not follow these protocols, actively try to mask symptoms, and in some cases try to influence medical exams (O'Connell & Molloy, 2015). Whilst limited research shows that rugby players actively try to hide potential concussions, there is currently little evidence to understand why they behave in this manner.

This is a qualitative study, using a phenomenological method with a reflexive thematic analysis. It follows the Health Belief Model, a framework which analyses the players' perceptions of the risk, as well as the perceived potential barriers, and benefits, to following protocols. To conduct the study, a modification of the World Café is used; a structured, collaborative, dialogue method. This is carried out on the online chat platform, Discord, facilitating anonymous, open discussions, to understand the deeper motivations behind their lack of adherence.

It is hoped that this study will be useful in informing concussion protocols going forward to protect the health and safety of the players, and reduce the risks of developing conditions such as CTE.

## **Wicked Problems, Integrated Solutions: An Agent-Based Model of Interdisciplinary COVID-19 Policy**

**George Maycock**

*University of Warwick*

This paper argues for the necessity of interdisciplinary research (IDR) in political science, grounding its analysis in Karl Popper's problem-oriented philosophy that inquiry must be guided by the nature of the problem rather than the rigid boundaries of academic subjects. 'Wicked problems,' such as the global COVID-19 pandemic, present complex challenges that defy the analytical limits of single-discipline approaches. To empirically illustrate the limitations of siloed research, this study employs an agent-based model (ABM), a computational method that simulates the actions and interactions of autonomous individuals ('agents') to observe system-wide effects of COVID-19 policy. Unlike traditional models that often isolate a single domain, this simulation integrates epidemiological, economic, and political variables to model the complex trade-offs inherent in crisis management. The findings reveal that while strategies restricted to a single disciplinary focus may appear optimal within their own domain, they often produce suboptimal outcomes for society as a whole. Conversely, integrated strategies that balance competing demands yield public policy outcomes that are both effective and politically viable. The paper concludes that for political science to effectively address wicked problems, a deliberate shift towards interdisciplinary collaboration is not merely beneficial, but essential.

## **Mapping Decolonization: Curriculum Analysis in Undergraduate Sociology**

**Maryanne Ko**

*Durham University*

This curriculum mapping exercise aims to critically analyze the current curriculum by examining the integration of decolonial perspectives and the internationalization of content in Durham University's Sociology programmes (2024–2025).

This exercise utilized a mixed methods approach that included a systematic review of lecture and workshop materials, as well as structured dialogues with module convenors. Key themes such as race, intersectionality, and methodological nationalism were identified and analyzed.

The findings indicate significant progress, particularly in the engagement with historical and intersectional analyses in intermediate modules. However, the curriculum primarily reflects UK and Global North contexts, revealing gaps in the representation of Indigenous knowledge and non-Western epistemologies.

Recommendations include enhancing the visibility of international contexts, aligning lecture content with visual materials, and prioritizing the revalidation of Indigenous knowledge. This initiative helps foster an inclusive educational environment, paving the way for ongoing curriculum development discussions.

## **Visible and Invisible Homicides: Classification Practices, Homicide Patterns, and Intelligence-Led Policing Implications in Outer Paris Gendarmerie Areas (2019–2024)**

**Théa Mosewicz**

*Durham University*

Homicide represents the most extreme form of interpersonal violence, yet its social dynamics and true scope remain obscured by institutional and forensic constraints. This study examines detected and potentially undetected homicides in four Gendarmerie-policed départements bordering Paris, France, between 2019 and 2024, combining official police data with sociologically informed analytical frameworks. Using anonymized case files from Gendarmerie databases obtained during the

researcher's year in placement as data analyst, the research applies standardized coding inspired by the European Homicide Monitor to analyze structural, spatial, and temporal patterns of homicides.

Empirical findings indicate that homicides predominantly occur in private settings, particularly domestic and familial contexts, with strong concentrations during evenings and weekends. Victims and perpetrators are often socially proximate and motives are largely rooted in interpersonal conflict, separation, jealousy, or financial disputes. Children represent a substantial proportion of victims, with infants disproportionately affected, often in connection with shaken baby syndrome. While clearance rates are high, the small subset of unresolved cases shares recurring features, including delayed discovery of bodies and advanced decomposition. Beyond solved and unsolved cases, findings highlight systemic blind spots in the detection of homicide, notably linked to France's low autopsy rate and medico-legal classification practices, which disproportionately affect infants and other vulnerable populations.

By integrating criminological, institutional, and sociological perspectives, this research advances understanding of how lethal violence is both produced and rendered invisible. The findings carry implications for intelligence-led prevention, inter-agency coordination, and the refinement of forensic and investigative protocols aimed at reducing both homicide and its undercounting.

## **Comparing the Initial Fixation of Spherical Versus Conical Cups for Total Thumb Replacement: A Biomechanical Investigation**

**Emma Lowey, Mackenzie Smeeton, Sophie Williams, Joris Duerinckx, Sumedh Talwalkar**

*University of Leeds*

Thumb arthritis affects 11% of men and 33% of women aged 50-60, driving NHS demand for total thumb replacements (TTRs). These implants replace the damaged basal thumb joint to relieve pain and restore function. Early mechanical loosening of the cup component may compromise long-term outcomes, yet guidance on implant

selection is limited. This study compared the initial mechanical stability of two common TTR cup geometries—spherical and conical—under realistic surgical conditions.

Cups from a single manufacturer were impacted into artificial bone and axially pushed out to assess fixation. Forty cups were evaluated across two geometries, two diameters (9mm and 10mm), and implantation conditions (well-seated and fully/partially suspended). Maximum push-out force was recorded.

Across all matched conditions, conical cups demonstrated superior stability, requiring approximately twice the dislodgement force compared to spherical cups. Upsizing increased push-out force by 8% (spherical) and 16% (conical). Cup suspension reduced fixation, with spherical cups showing reductions of 27% (partial) and 40% (full), while conical cups showed smaller decreases of 6% and 15%. Statistical analysis showed significant effects of cup shape ( $F=1019.39$ ,  $p<0.001$ ) and implantation condition ( $F=55.51$ ,  $p<0.001$ ).

This study provides the first direct mechanical comparison of modern TTR cup designs. Conical cups demonstrated superior stability and greater tolerance to suboptimal implantation, due to their geometry and increased surface area. Upsizing to a 10mm cup improved fixation but is limited by patient anatomy. These findings inform implant selection and surgical decision-making, with potential to reduce early loosening and improve long-term outcomes.

## **A Statistical Analysis of Factors Influencing Mental Health Trends During the COVID-19 Pandemic**

**Molly O'Brien**

*University of Glasgow*

The World Health Organisation declared COVID-19 a pandemic on March 11th, 2020, marking the start of an unprecedented global crisis, that disrupted everyday life across societies. Beyond its physical health impacts, the pandemic had significant

consequences on mental health and wellbeing, an area that remains underexplored relative to other effects.

This project aims to investigate the groups of society who were at a higher risk of poor mental health, looking into factors such as age, gender and income. Many of these factors lie outside an individual's control, yet they may have played a critical role in shaping personal experiences and mental health outcomes throughout the pandemic. In addition, the study examines how mental health changed across different stages of the pandemic. By identifying periods of heightened vulnerability and the groups most affected, the research provides insight into how policy responses and social conditions influenced mental wellbeing.

Using statistical methods on the UCL COVID-19 Social Study dataset, we found that there were different trends in mental health at different time points during the pandemic, as well as higher and lower trends depending on age, gender and income. Furthermore, factors associated with the likelihood of experiencing depression were examined, with findings indicating that certain factors exerted a stronger influence than others on mental health outcomes.

These findings contribute to a clearer understanding of mental health inequalities during public health crises and highlight the importance of targeted mental health support in future emergency planning.

## **How Consulting Firms Signal Career Progression, Growth, and Work-Life Balance in Graduate Job Advertisements**

**Gwoon Lee**

*University of Sheffield*

Job advertisements act as important signals through which organisations communicate their priorities and expectations to potential applicants. Drawing on signalling theory, this study examines how consulting firms of different sizes frame career progression, growth opportunities, and work-life balance (WLB) in graduate recruitment advertisements.

The research analyses a dataset of 20 consulting job advertisements, comparing large consulting firms and boutique firms. Using a deductive coding framework informed by Connelly et al. (2011), job advertisements were systematically coded across three key themes: Career Progression, Growth Opportunities, and Work–Life Balance. The relative frequency and framing of these signals were then compared by firm size.

The findings reveal a clear imbalance between growth and progression signals. Large firms strongly emphasise growth opportunities such as training, global exposure, and skill development, while making relatively limited reference to explicit career progression pathways. Boutique firms, although still growth-focused, devote a higher proportion of their messaging to career progression, suggesting clearer promotion narratives. With regard to WLB, large firms reference it more frequently overall, but predominantly through formal policies and occasionally with risk-oriented language related to workload. Boutique firms mention WLB less often, but frame it more positively through cultural and practice-based signals.

These findings highlight how firm size shapes employer branding strategies and the messages received by graduate applicants. The study contributes to understanding how graduates may interpret recruitment signals and underscores the importance of critically evaluating advertised claims about growth, progression, and work–life balance in early career decision-making.

## **The Zombie Tax: Why Your Local Council Can't Benefit from a Booming Economy**

**Tamim Islam, Thanaphon Promjivit, Oliver McCabe, Chinyere Ossy-Okoye, Gomesh Raju, Jack Foster, Ruijun Zhou, Max Zuev**

*University of Leeds*

In a healthy fiscal system, local tax revenue should grow automatically alongside the economy. However, the UK's Council Tax remains anchored in 1991 property valuations, creating a "fiscal leash" on regional growth. While literature (Creedy & Gemmell, 2001; Lagravinese et al., 2020) has mapped the high elasticity of UK income

and consumption taxes, a significant empirical gap exists regarding sub-regional property tax responsiveness, particularly amidst "Levelling Up" challenges in Northern England.

This research investigates this "Responsiveness Gap" in Yorkshire and the Humber (2011–2019). Employing Two-Way Fixed Effects (TWFE) panel data regression, we measure how tax receipts respond to changes in local earnings and property market vibrancy. We contrast “High-Growth” authorities like Leeds and York against laggard areas to test for geographic heterogeneity in fiscal health.

Crucially, we introduce a novel comparative control: Business Rates. Unlike Council Tax, Business Rates are periodically revalued, providing a quasi-experimental benchmark for a "responsive" property tax within identical jurisdictions. By isolating the 1991 valuation freeze, we distinguish between "Natural Elasticity" (automatic growth) and "Tax Buoyancy" (discretionary rate hikes).

Anticipated findings suggest Council Tax is almost entirely inelastic, forcing councils into a "buoyancy trap" where funding relies on politically sensitive rate hikes. This study provides a vital evidence base for regional tax reform, arguing that the structural rigidity of the 1991 base is a primary driver of fiscal inequality in the North.

## **Tracking the Water Microbiome of Crayfish at Marwell Zoo**

**Laura Flint, Sandra Wilks, Catherine Bryant**

*University of Southampton*

A microbiome is the collection of all microbes, including bacteria, fungi, and viruses, along with their associated factors, in a specific niche. Within this, bacteria often form protective communities known as biofilms, which aid in survival and growth.

Environmental microbiomes and biofilms play a large role in the overall health and stability of community inhabitants.

White-clawed crayfish are endangered freshwater crustaceans native to the UK and mainland Europe. Their population in Hampshire has decreased by approximately 95%

in recent years due to the introduction of invasive crayfish. To counter this, Marwell Zoo created a captive breeding programme using a clay-based water filtration system, rather than chemical-based methods.

This initial observational study aimed to assess the bacterial portion of the microbiome within this clay filtration system by looking at the overall population number and their biofilm-forming capabilities. Very little research has been conducted on how biofilms impact crayfish health and breeding success. This study used water samples and tank swabs to quantify bacterial populations and show changes over time and across tank locations. Microscopy was used to visualise biofilm formation on the clay pellets. Initial results showed that changes in weather conditions between sampling dates altered bacterial counts across crayfish tanks. Additionally, qualitative analysis on the clay pellets showed biofilms could successfully form.

Further research will analyse the bacterial DNA collected, allowing identification of bacterial species found within the biofilms and provide insight into the effects of a circular clay filtration system on bacterial composition and numbers.

## **The Latency Cliff: Quantifying the Operational Resilience of NVMe/TCP and iSCSI**

**Tyler Mealing**

*Southampton Solent*

Fast, reliable access to remote data is essential for modern organisations, yet network delays often severely limit the performance of storage protocols. While existing literature widely acknowledges that NVMe-over-Fabrics (NVMe-oF) outperforms iSCSI in ideal conditions, the performance of these protocols under degraded network conditions, such as in Wide Area Networks (WANs), remains under-researched. This study characterises the performance envelope of both protocols experimentally to define the operational limits of iSCSI and NVMe/TCP.

The experimental design established a virtualised Linux environment (Proxmox VE/TrueNAS) using Traffic Control (tc-netem) to increase round-trip time (RTT) over

baseline, ranging from 0ms to 40ms of additional latency. Benchmarks evaluated sequential (1MB block) write and random (4K block) read-write throughput under identical conditions to isolate protocol overhead from virtualisation bottlenecks.

The results successfully quantify the divergence in protocol resilience. iSCSI proved to be highly sensitive to increases in RTT, with sequential write performance dropping over 80% at 2ms additional latency due to TCP windowing limitations. Conversely, NVMe/TCP was highly resilient to increases in RTT, maintaining sequential write performance of over 700 MB/s at a latency of +9ms, ~16 times faster than iSCSI at the same latency increase.

These findings quantify the protocol gap, confirming that NVMe/TCP's multi-queue parallelism effectively mitigates the Bandwidth-Delay Product (BDP) limitations that severely degrade the performance of iSCSI. By defining this performance envelope, the study confirms NVMe/TCP as the cost-effective enabler for high-speed Metro clusters and Disaster Recovery over standard Ethernet.

## **When Strength Falters: Could Sports Hold the Clues to Motor Neurone Disease?**

**Gregory Kosisochukwu Anyaegbunam, Paul McNamara**

*University of Glasgow*

**Aim:** To examine the evolving evidence on the relationship between sporting exposures and MND; to explore how this may influence early patient presentation, recognition, assessment, and referral decisions by clinicians.

**Methods:** A narrative systematic review was undertaken using recent cohort studies, UK Government Industrial Injuries Advisory Council reports, and UK Biobank analyses. Findings were reviewed in the context of typical patient presentations of early MND, including patterns of limb weakness, bulbar symptoms, fasciculations, and symptom progression. Consideration was given to how patients with extensive sporting backgrounds may interpret or explain early symptoms.

Results: Evidence to date supports an association between some high-intensity or contact sports and increased MND incidence in selected groups, but no causal link has been established. Hypothesised mechanisms include cumulative microtrauma, oxidative stress and glutamatergic dysfunction, although none are proven. Early symptoms of MND often masquerade as musculoskeletal injuries—particularly in physically active individuals who attribute weakness to previous sporting activity. Heightened awareness of symptoms such as asymmetric progression, spreading weakness, which are inconsistent with mechanical causes should prompt early presentation and timely intervention.

Conclusion: While the relationship between sport and MND remains unresolved, the emerging evidence warrants heightened social awareness. Primary care clinicians should maintain a low threshold for reconsidering neurological disease when persistent or progressive weakness does not follow a typical musculoskeletal trajectory, particularly in patients with significant sporting histories. The question of how sporting exposure interacts with genetic susceptibility remains open, but early presentation and clinician recognition remain essential for timely diagnosis and support.

## **Quantifying the Relationship Between Exposure Duration of Prism Adaptation Treatment and Its Aftereffect Longevity in Healthy Adults**

**Madison Sproule**

*University of Glasgow*

Prism Adaptation Treatment (PAT) is a candidate intervention that may reduce spatial neglect symptoms following a stroke. PAT works by temporarily shifting a person's visual field using prism glasses, forcing the brain to recalibrate how vision and movement are coordinated. This recalibration produces measurable aftereffects. However, despite its clinical importance, evidence on how long these aftereffects persist remains poorly studied. Previous research has shown that visuospatial aftereffects can last for at least 35 minutes following a typical 10-minute prism exposure, yet findings are inconsistent, as most studies rely on a single, fixed exposure

duration. As a result, a fundamental gap remains in understanding how the duration of PAT exposure influences the longevity of aftereffects in healthy participants. The present study addresses this gap using a between-subjects experimental design with healthy, right-handed adults. Participants will undergo prism adaptation for either 5, 10, or 20 minutes using leftward shifting, 25 dioptre prisms. Visuospatial aftereffects will be assessed using the landmark task and line bisection task immediately after adaptation and at multiple time points up to 40 minutes post-exposure. This design allows the temporal decay of aftereffects to be directly compared across exposure durations. This study hypothesises that longer adaptation sessions will produce longer-lasting aftereffects, indicating a proportional dose–response relationship. By establishing how exposure duration shapes aftereffect persistence in healthy adults, this research will provide foundational evidence to inform more efficient, evidence-based PAT protocols. Ultimately, these findings may contribute to informing clinical practice, optimising treatment strategies for individuals with post-stroke spatial neglect.

## **Bodies on Display: Embodied Shame from The Bell Jar to the Age of Digital Visibility**

**Mishika Gupta**

*University of Leeds*

This research will investigate that embodied shame remains a powerful cultural force for regulating who is permitted to belong. Through a comparative analysis of Sylvia Plath's *The Bell Jar* and contemporary digital media, it examines how bodies are represented as sites where social acceptance is negotiated, granted, or withdrawn. In Plath's novel Esther Greenwood's body becomes a battleground for mid-century expectations of femininity; shame is felt somatically, surfacing physical withdrawal, disordered perception, and a compulsive awareness of being seen. These moments reveal a cultural logic in which bodily acceptability is treated as prerequisite for legitimacy and inclusion.

The project will combine close textual analysis of *The Bell Jar* with qualitative analysis of contemporary digital media examples, including influencer aesthetics and trolling

practices on certain social media platforms. These digital spaces relocate shame from privately endured body to the publicly curated one, where belonging is measured through visibility, aesthetic conformity, and the threat of ridicule. The analysis does not claim causality between eras; instead, it identifies a shift in enforcement. Where Plath's world disciplines through interpersonal and institutional pressure, today's digital cultures mobilise algorithmic scrutiny and participatory policing to produce similar outcomes.

Overall, the project claims that across contexts, embodied shame functions as a mechanism of cultural regulation. Recognising this continuity invites reflection on how bodies are made to matter, and who is permitted to belong, in the shifting terrain of contemporary society.

## **Old Dilemmas in New Distributions of Global Reserve Currency Liquidity: Do Stablecoins Change the Underlying Logic?**

**Taiki Maruyama, Yui Morikawa, Tomoya Chiaki, Ryota Kojima**

*The University of Tokyo*

The Triffin dilemma remains a fundamental contradiction in the global financial system. To meet worldwide demand for a reserve currency such as the US dollar, the issuing nation must constantly supply liquidity through persistent deficits; yet doing so inevitably risks undermining international confidence in the stability of the very currency. Traditionally, it has been assessed using state-centred macroeconomic indicators such as current account balances and reserve-currency shares.

Recent debates, however, suggest that dollar-pegged stablecoins—digital assets designed to maintain a steady value—may alter this dynamic by enabling private individuals and firms to supply globally usable dollar liquidity via digital channels. Some argue that this decentralisation could advance economic justice by sharing the burden of providing global liquidity and by widening financial access to underserved populations.

This paper reassesses these claims. Using an exploratory analysis of macroeconomic data, it tests to what extent the expansion of stablecoins has begun to weaken the traditional link between a currency's global use and a nation's deficit. The results provide limited explanatory power, reflecting both severe data constraints and the difficulty of tracking private digital flows with conventional tools.

Accordingly, the paper adopts a cautious interpretation: whilst stablecoins offer new infrastructure, they may simply shift financial risks from state balance sheets to less regulated private markets. Rather than resolving the Triffin dilemma, stablecoins may reconfigure how it manifests, raising new and less visible questions of economic justice in the digital age.

## **Investigating Stress-Induced Activation of Mobile Genetic Elements Driving Antimicrobial Resistance in Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) Strain USA300**

**Ishani Badala**

*University of St Andrews*

Mobile genetic elements (MGEs) such as prophages and phage-inducible chromosomal islands (PICIs) play a key role in bacterial evolution by facilitating horizontal gene transfer and mobilising virulence and antimicrobial resistance genes. In the pathogen *Staphylococcus aureus*, particularly community-associated methicillin-resistant strains (CA-MRSA), activation of these elements directly influence disease severity, treatment failure, and spread of resistance within communities, and understanding their induction patterns is therefore crucial.

This study investigates induction dynamics of two resident prophages ( $\phi$ Sa2 and  $\phi$ Sa3) and PICI SaPI5 in the clinically important CA-MRSA strain USA300 following activation of bacterial SOS stress response. Triggered by DNA damage and activated during antibiotic exposure, the SOS response unintentionally promotes mobilisation of

MGEs. The study hypothesised that SaPI5 would activate earlier and or more strongly than helper prophages due to differences in regulatory control.

To quantify induction, sensitive beta-lactamase plasmid reporter systems were engineered to measure promoter activity of each element following treatment with DNA-damaging agent mitomycin C.

Mitomycin C treatment resulted in a measurable increase in promoter activity for  $\phi$ Sa2,  $\phi$ Sa3, and SaPI5, confirming SOS-dependent induction. Notably, SaPI5, the PICI, exhibited earlier and stronger promoter activation compared to its helper prophages in USA300. Comparison with a laboratory strain demonstrated that promoter activation was strain-dependent, indicating that genetic background modulates mobile element regulation.

By clarifying how genetic background influences mobile genetic element induction, this research demonstrates how stress responses in pathogenic bacteria accelerate the dissemination of virulence and antimicrobial resistance genes, with important implications for antibiotic stewardship and MRSA disease control.

## **What Exploding Stars Can (and Can't) Tell Us About the Universe: Using Bayesian Methods to Compare Cosmological Models**

**Nikoloz Gigiberia**

*University of Warwick*

The force driving the accelerating expansion of the Universe is a central open question in cosmology. This phenomenon is attributed to dark energy, an unknown component introduced to reconcile theory with observation. However, there is no universally accepted description of dark energy, raising the question of how researchers decide between competing models that fit the data almost equally well.

We address this problem by applying Bayesian inference, a statistical framework comparing how well different models explain observed data while accounting for uncertainty, to Type Ia supernova (exploding star) observations from the Dark Energy

Survey (DES-SN5YR). Using Hamiltonian Monte Carlo simulations, we estimated key parameters for the standard cosmological model ( $\Lambda$ CDM) and compared it with alternatives that assume either constant (wCDM) or time-varying (CPL) dark energy. Models were evaluated using two complementary criteria: predictive accuracy, measured by the Widely Applicable Information Criterion (WAIC), and statistical evidence, quantified by Bayes factors.

Our results reveal a striking contrast between these approaches. While WAIC suggests that all models predict supernova distances with nearly identical accuracy, Bayes factors favour the wCDM model over the other two models for this dataset. This highlights how different evaluation frameworks can lead to contrasting conclusions about which theory is best supported.

More broadly, this work reflects on how scientific consensus evolves over time, illustrating how methodological choices shape which theories are accepted as evidence accumulates. Future work will combine supernova data with other cosmological observations and newer simulation methods to refine our understanding of cosmic expansion history.

## **How Can Artificial Intelligence Help Surgeons in Theatre?**

**Ethan Higgins, Anni King, George Fowler, Rhiannon Macefield, Hamish Walker, Charlie Thomas, Sheraz Markar, Jane Blazeby, Natalie Blencowe**

*University of Sunderland*

Artificial intelligence (AI) is increasingly integrated into surgical practice, with potential to streamline workflows, enhance intraoperative visualisation, and support real-time interpretation. A rapidly expanding area is the use of AI to analyse intraoperative video - a resource-intensive process requiring specialist expertise. However, little is known about the quality and transparency of data used to train these systems and how reliably they can support clinical decision-making. This scoping review examined AI use in analysing intraoperative videos from invasive procedures and identified key gaps in the current evidence.

Systematic searches of Ovid MEDLINE and Embase identified studies using terms 'artificial intelligence', 'video' and 'surgery'. Extracted data included study characteristics, AI objectives, dataset descriptions, training methods, and accuracy measures.

A total of 122 studies were included. Gastrointestinal procedures accounted for the majority (61.5%). Surgical phase recognition was the most common AI objective (32.8%), followed by instrument recognition (23.0%) and enhanced intraoperative visualisation (18.9%). Most studies relied on small, single-centre datasets and predominantly used supervised learning. Papers often did not specify the number or expertise of annotators, making results difficult to interpret or replicate.

This review reveals substantial omissions in essential aspects of AI model development, training, and validation. It highlights the need for larger, more diverse, multi-centre surgical video datasets to represent real-world surgery. As well as clearer reporting standards to facilitate trial replicability and transparency. Addressing these gaps is critical for creating reliable, generalisable AI tools that can support surgical training, improve clinical performance, and enhance patient outcomes.

## **The Discrepancy Between Transiting Brown Dwarfs and the Brown Dwarf Desert**

**Callum Hodge**

*University of Warwick*

Brown dwarfs are celestial objects that bridge the mass gap between planets and stars in our Universe. Although discovered just 30 years ago, these objects are extremely common, with 1-4% of stars in our Galaxy harbouring a brown dwarf companion. The Brown Dwarf Desert characterises the scarcity of brown dwarfs orbiting stars at close separations, meaning transiting brown dwarfs (brown dwarfs that eclipse their host star) should be rare. My research investigated this claim by simulating a population of all the transiting brown dwarfs in the Solar neighbourhood using Python and empirical distributions of brown dwarf properties. Initial results of the simulation found a significant underestimate of transiting brown dwarfs (0-4) compared to the current

numbers that have been observed (~53). Further investigation into this discrepancy suggested that brown dwarfs should be more common and, on average, closer to their host stars than what current models imply. This mismatch between simulation and observation highlights the alarming contradiction between our current understanding of the Brown Dwarf Desert and the number of transiting brown dwarfs that have been discovered, meaning a refinement of our current models is necessary. My research also proposes new models for the separation, with the free parameters of these models constrained to fit the available data. It is hoped that new satellite surveys over the next 5-10 years will gather more data that can be used to further constrain these separation models and bring a resolution to the contradiction between transiting brown dwarfs and the Brown Dwarf Desert.

## **Macroeconomic Policy and Income Inequality : Evidence from Panel Data in Developed and Developing Economies**

**Miza Nasuha Mohamed Tamizi**

*University of Glasgow*

Income inequality has emerged as a central global challenge, raising concerns not only about economic efficiency but also about social justice and equitable distribution of wealth. From an interest-free perspective, the principle that “Wealth should not circulate only among the rich” (Holmes, 1893) underscores the normative importance of policies that prevent excessive income concentration. Motivated by both contemporary policy debates and this ethical framework, this study examines whether macroeconomic and fiscal policies contribute to widening or narrowing income inequality, and whether their effects differ between developed and developing economies.

The study estimates fixed-effects models that compare each country to itself over time, thereby isolating how changes in policy variables are associated with changes in the Gini Index using cross-country panel data from 2000 - 2024. Unobserved country characteristics and global shocks are controlled by this approach, while country-

clustered robust standard errors improve statistical reliability. Delayed policy effects are captured by additional models incorporating lagged variables.

Macroeconomic policies are not distributionally neutral such as in developed economies, higher interest rates are associated with increases in inequality, whereas higher tax revenues particularly from taxes on goods and services are linked to reductions in inequality, including in lagged specifications. In developing economies, inequality positively associates greater trade openness, suggesting an uneven distribution of trade gains.

In conclusion, the distributional consequences of policy depend strongly on a country's stage of development. Policymakers should therefore integrate inequality considerations into monetary, fiscal, and trade strategies to promote inclusive and socially balanced economic growth.

## **Manufacturing Neighbours into Enemies: How Egyptian Media Legitimated the Rabaa Massacre**

**Jannah Elgamal**

*Georgetown University*

This project asks how news reporting can make violence against fellow citizens appear morally acceptable. Focusing on Egypt in 2013, it examines how major newspapers framed supporters of the Muslim Brotherhood before and during the Rabaa and Al-Nahda dispersals, among the deadliest episodes of state violence in modern Egyptian history.

Using Critical Discourse Analysis, I analysed around 300 articles from outlets including Al-Ahram and Al-Youm 7, published between June 30 and August 17, 2013, tracing language from pre-dispersal incitement through the day of the massacre and its aftermath. Rather than portraying protesters as people with families and political grievances, newspapers repeatedly described them as “occupiers,” “terrorist elements,” or foreign infiltrators. War and impurity metaphors—such as calling the sit-ins an “occupation” or celebrating the slaughter of “sheep,” a slur for Brotherhood supporters

—turned neighbours into symbolic enemies. Phrases like “exchange of fire” suggested equal combat between civilians and heavily armed forces, masking extreme asymmetry.

The study finds that this language collapsed moral distance within Egyptian society, presenting lethal state action as national self-defence rather than repression. By combining media framing theory with research on dehumanisation, the project shows how journalism can shift from informing the public to shaping moral consent for violence.

Beyond Egypt, the research contributes to debates on decolonisation, media ethics, and social responsibility by revealing how everyday news language redraws the boundaries of who counts as fully human.

## **‘He Who Takes Long Strides’: Re-evaluating the Arctic Explorer, Dr John Rae, in a Post-Colonial Context**

**Matilda Holt**

*University of Glasgow*

Dr John Rae was a Scottish explorer who in his own lifetime faced adversity, controversy, and ultimately obscurity, having been the first to report on the fateful end of the now-infamous Franklin Expedition of 1845. In recent years, thanks to efforts of historians and the eponymous society, Rae has begun to take his rightful place in the historiography of Arctic exploration and in the pantheon of exploration heroes. However, as Rae moves further into the spotlight, we must understand him not just as an explorer but as a driver and beneficiary of Arctic colonialism and Scottish imperialism under the British Empire. This presentation will ask how we can reconcile John Rae, given the title ‘He Who Takes Long Strides’ by his Inuit friends and companions, and John Rae, Chief Factor of the imperial monolith The Hudson’s Bay Company. Building on the work of Ken McGoogan and Jonathan C. H. King, it will look at Rae’s life from his Orcadian upbringing to the height of his Arctic exploits, at his interactions with indigenous people and his relationship with their material goods and commodities, in an attempt to bridge the dissonance of his character. The aim is to

paint a picture of Rae that gives him due recognition while understanding him in a post-colonial context. A man, neither heroic nor aggressively imperial, but a unique Scot who was both surprisingly progressive and confusingly archaic.

## **AI-Powered Rationalisation of Minimum-Material Vault Structures**

**Ashnah Judith Bufion, Linwei He**

*University of Sheffield*

Vaults are lightweight structural forms that combine material efficiency with architectural expression. Recent advances in computational form-finding have led to the development of new vault layout optimisation methods, as introduced by He et al. (2025), which define a new family of triangulated vaulted structures with significant design freedom. While this approach opens up new research opportunities, the resulting complex geometries require further rationalisation to ensure structural efficiency and constructability.

A natural next step is to optimise these vault geometries using gradient-based methods, such as those proposed by He and Gilbert (2015). However, applying such methods to large triangulated vaults presents major technical challenges, primarily due to the high computational cost of deriving and evaluating complex analytical gradients for numerous design variables.

This research proposes an artificial intelligence (AI)-based strategy to address this limitation. An artificial neural network is trained to predict both objective function values and their gradients directly from the design variables, using training data generated via finite difference approximations. A grid search is employed to identify effective network architectures and hyperparameters. This data-driven approach enables rapid gradient prediction, significantly reducing computational overhead compared to traditional derivative-based optimisation. Constructability is incorporated through objectives and constraints related to panel geometry and assembly, including uniform triangular areas, favourable dihedral angles, avoidance of sharp angles, and smooth geometric transitions.

The results demonstrate that AI-driven gradient approximation enables efficient rationalisation of complex vault geometries, integrating structural performance and constructability within a computationally tractable optimisation framework.

Are Ethnic Pay Gaps in Blue-Collar Occupations in the UK a Result of Structural Inequality?

**Pranav Swarna**

*University of Warwick*

Ethnic pay gaps persist in the UK labour market and have widened in recent years, raising important questions about economic justice and equality of opportunity. This study examines whether ethnic pay gaps within blue-collar occupations—such as construction, manufacturing, transport, and manual roles—are primarily explained by measurable factors, or whether structural inequality continues to play a significant role. The factors considered are: education, occupation type, region, and age. Blue-collar work provides a valuable focus for this analysis, as many ethnic minority and immigrant groups have historically been concentrated in these occupations. Therefore, this study can give us insight into how historical patterns of immigration and labour market segmentation may continue to influence ethnic wage outcomes today, with implications for policies aimed at reducing ethnic inequalities in pay. Using labour market data from the Office for National Statistics, this research analyses differences in hourly pay across ethnic groups within blue-collar occupations, and examines how these gaps change when controlling for the factors mentioned previously. By comparing raw pay gaps with adjusted estimates, the study assesses the extent to which observed wage disparities can be attributed to human capital and job characteristics, and how much remains unexplained. Preliminary findings suggest that while differences in education, occupation, and regional distribution account for part of the ethnic pay gap, significant disparities persist for several ethnic minority groups even after these factors are considered. These findings will contribute to broader debates on economic justice, pay transparency, and equal opportunity in the UK.

# **A Review of Sustainable Alternatives to Antibiotics and Implications For Future Global Health**

**Kate Walter**

*University of Glasgow*

Antimicrobial resistance is a growing issue which poses a global public health risk. This review poster explores new methods of treating bacterial infections to combat the increasing spread of resistant strains of bacteria. Approaches explored include predatory bacteria, fungal metabolites, and antimicrobial peptides.

This poster reviews multiple recent studies to present a detailed, concise outline of current research in the field. Keywords such as antimicrobial resistance, predatory bacteria, fungal metabolites, and antimicrobial peptides were used to identify relevant studies. Studies were selected based on relevance to novelty of mechanism and sustainability potential.

Predatory bacteria, such as *Bdellovibrio*, provide a self-limiting, host-specific method of killing bacteria by using a pilus to alter the peptidoglycan membrane. They have been shown to be effective against pathogens such as *Acinetobacter*, *Klebsiella* and *Pseudomona* spp. Fungal metabolites, such as those from Endophytic fungi, show potential to produce novel and diverse antimicrobial compounds against many pathogens. Many of these differ fundamentally from existing antibiotic classes. Antimicrobial peptides, produced naturally or synthetically, can be engineered for reduced toxicity. Due to their hydrophobic and hydrophilic regions, they are able to provide broad-spectrum activity through membrane disruption.

While often a neglected area of sustainability, this is clearly an area which requires urgent attention. By evaluating these new approaches, this review highlights how sustainable alternatives could strengthen global health resilience.

## **Performance-Aware Deep Learning for Stock Trend Prediction and Investment Decision-Making**

## **Dylan Huang**

*The University of Glasgow*

Financial markets are highly uncertain, driven by complex price dynamics and evolving sources of information. While modern predictive models can generate accurate forecasts, they rarely account for their own past performance when making new decisions. As a result, many systems treat each prediction in isolation and rely on confidence estimates that do not reflect how reliable those predictions are in practice making it difficult to use such models safely in real investment and risk management settings.

This gap is addressed by evaluating whether allowing models to learn from their own past predictions and errors can improve both forecasting reliability and decision-making to produce more economically meaningful investments. Multiple deep-learning architectures designed to learn long-term dependencies in sequential data are trained to predict stock return direction and magnitude using binary and regression approaches. Model outputs are then adjusted using probability calibration techniques so that confidence estimates better reflect observed performance over time.

An end-to-end investment simulation converts calibrated predictions into portfolio allocations using risk-aware staking strategies, enabling evaluation beyond standard accuracy metrics. Performance is assessed using both statistical measures and financial outcomes (return on investment and risk-adjusted performance).

Results indicate that calibrated predictions and meta-learning features significantly improve decision stability and reduce drawdowns compared to uncalibrated or single-model approaches compared to previous baselines. More broadly, this suggests that future AI systems should not only predict outcomes, but continuously evaluate their own reliability as a key mechanism for building trustworthy AI in dynamic and high-stakes domains.

## **Chitinase-3-like protein 1: A Potential Clue to Anti-TNF Resistance in Crohn's Disease**

## **Nishka Pranay, Daisy Lints, Simon Milling**

*University of Glasgow*

Crohn's disease is a chronic inflammatory condition of the gut, caused by multiple factors including genetics, gut bacteria, and immune system imbalance such as overproduction of proteins like Tumour Necrosis Factor (TNF). Many patients rely on anti-TNF therapies to block TNF to control symptoms and prevent long-term tissue damage. However, 40-50% of patients do not respond to these treatments, and the biological reasons for this remain unclear. This project investigated whether the Chitinase-3-like protein 1 (CHI3L1), an inflammation-associated molecule linked to tissue remodelling and fibrosis, is involved in non-responsiveness to anti-TNF therapy.

The study analysed intestinal biopsy samples from patients with Crohn's disease who were classified as responders or non-responders to anti-TNF treatment. Tissue slices were prepared using a microtome and tissue morphology was assessed using H&E (Haematoxylin and Eosin) staining. Immunofluorescence and immunohistochemistry staining techniques were performed to identify CHI3L1-positive cells within the tissue. Quantitative analysis was performed using the softwares ImageJ and QuPath.

Preliminary analysis suggested a higher proportion of CHI3L1-positive cells in non-responders compared to responders. Notably, CHI3L1-expressing cells were found to be localised to granulomas – tight clusters of immune cells characteristic of chronic inflammation – in the non-responder group. These observations align with emerging literature suggesting that CHI3L1 may contribute to persistent inflammation.

Together, these findings indicate that CHI3L1 may contribute to anti-TNF resistance in Crohn's disease. This work adds to a growing body of evidence highlighting CHI3L1 as a promising biomarker with potential relevance for personalised treatment strategies for people living with Crohn's disease.

## **The Nuremberg Process, Difference Between the 2 World Wars and Nowadays Nation Governance**

**Merj Casasola**

This research examines the Nuremberg Trials as a watershed in international justice, marking a decisive shift from the collective national punishment of the 1919 Treaty of Versailles to individual criminal accountability under international law. Where Versailles imposed reparations and territorial losses that fuelled nationalist resentment without establishing personal liability, Nuremberg held leaders criminally responsible for crimes against peace, war crimes, and crimes against humanity—rejecting defences of superior orders or state sovereignty. Yet this framework operates within an international system that realist theory characterises as fundamentally anarchic: lacking central enforcement, states remain trapped in security dilemmas where power, not law, determines outcomes.

This tension between Nuremberg's moral ambition and realist constraints defines contemporary accountability efforts. The research engages this paradox through comparative analysis, tracing how accountability mechanisms evolved from Versailles' failures through Nuremberg's innovations to today's International Criminal Court. It assesses why these institutions remain vulnerable to great-power impunity and selective enforcement—evident in Ukraine and Gaza where Security Council members shield allies.

Rather than dismissing realism, the analysis incorporates its insights to propose resilience strategies: embedding accountability within regional frameworks less susceptible to vetoes; leveraging transnational civil society networks operating below state obstruction; and designing "antifragile" mechanisms that gain strength from geopolitical shocks. The conclusion argues that international justice cannot transcend power politics but must be strategically engineered within its constraints—transforming Nuremberg's fragile ideal into institutions capable of surviving amid the anarchic conditions realists identify. Justice requires sophisticated institutional design that acknowledges power while constraining it.

## **Enhancing Sign Language Learning Through Augmented Reality**

**Sujay Patil**

*University of Glasgow*

Sign language education often relies on in-person instruction, limiting accessibility for learners without access to trained professionals. This project investigates a vision-based system for British Sign Language (BSL) learning that delivers real-time feedback in an augmented reality (AR) environment. The proposed solution integrates hand landmark detection with neural network-based static gesture classification to support interactive self-guided practice. Current development focuses on recognising a subset of single-handed BSL alphabet signs, with upcoming work extending toward dynamic gestures using temporal models. Planned evaluation will measure recognition accuracy and user performance improvements through iterative testing with representative learners. The anticipated contribution of this work is a framework that demonstrates the feasibility of AR-assisted sign language learning and identifies key technical and pedagogical challenges in deploying accessible signing support tools at scale.

## **Engagement with Cardiovascular Disease Screening Among Ethnic Communities in the UK: A Systematic Review**

**Aleesha Karia, Reza Zamani, Tanimola Martins, Abdal Zafar, Ava Zamani**

*University of Sunderland*

Cardiovascular diseases (CVD) affect ~7.6 million people in the UK, disproportionately affecting ethnic minorities. The UK's National Health Service (NHS) Health Check (NHS HC) scheme aims to improve risk assessment of CVD in primary care for prevention and management.

This systematic review investigated the engagement of ethnic minority groups with the NHS HC. Searches of Ovid (MEDLINE), PubMed and Web of Science were conducted per PRISMA-DTA guidelines. Search terms included prevention, cardiovascular disease and ethnicity. Included studies were published between 2012-2022, compared  $\geq 2$  different ethnic groups and presented data on CVD risk factors or screening. Attendee demographics and engagement data were extracted.

Of 1,773 papers identified, 28 full texts were screened. Seven papers were included, comprising 6,622,374 individuals. Ethnic representation of NHSHC attendees was proportional to the UK population (2011 census). Attendees accessed NHSHC either through formal invitation, opportunistically at other healthcare appointments or through existing public health campaigns. The highest engagement with NHSHC was observed in South Asian attendees (21-68%) and the lowest in Chinese attendees (12-61%). Public engagement with NHSHC was low when relying on public health campaigns and increased with formal invitations from GPs for all ethnicities. One study (n=6,184) indicated attendees were more likely to access the service with an opportunistic vs formal invitation.

This review found low engagement with the NHSHC scheme, which varied by ethnicity and invitation type. Engagement can be improved with a proactive approach of targeted and opportunistic invitations for ethnic groups at greater risk of CVD.

## **Understanding of SEL in China and Perception of Its Effectiveness in Improving Primary Schoolers' Empathy: Chinese Primary School Teachers' Perspective**

**Xinxin Chen**

*University of Manchester*

Social and Emotional Learning (SEL) has gained increasing attention across psychology and education as a means of supporting children's emotional wellbeing and social development. While SEL frameworks have been widely developed in Western contexts, less is known about how they are understood by teachers in non-Western settings. This study explores how Chinese primary school teachers understand SEL and how they perceive its role in promoting empathy among primary school students.

Using a qualitative approach, the research draws on semi-structured interviews to examine teachers' interpretations of SEL in classroom practice. Data are analysed through thematic analysis. The study identifies three key areas of insight: how teachers define SEL; how empathy is conceptualised through relational, moral, and classroom-

based perspectives; and how institutional and cultural factors shape the implementation of SEL-informed approaches. These findings illustrate how global educational frameworks are interpreted and adapted within local classroom contexts.

Aligned with the conference's emphasis on interdisciplinarity and inclusivity, this research highlights how psychological theory, educational practice, and cultural context interact in shaping students' social and emotional development. It offers a culturally situated understanding of SEL with practical implications for educators. It contributes to interdisciplinary discussions on wellbeing and human flourishing by examining how global educational goals such as SDG 4.7 are interpreted and enacted within local cultural contexts.

## **Beyond the Field: Exploring Rugby as a Diplomatic Tool in Shaping Regional Identities in the South Pacific**

**Charlotte Rowland**

*University of Warwick*

*"O lea le mea e sili atu ai, o tagata o tagata o tagata."*

What is the most important thing in the world? It is the people, the people, the people.

Rugby is a powerful force that connects not only the Pacific region, but bridges the Pacific to the world. Beyond the field, Pacific nations are increasingly leveraging rugby within diplomatic, cultural and political engagements, formally and informally. As geopolitical attention in the region intensifies, this presentation argues that rugby functions as a unique form of post-colonial diplomacy through which the Pacific nations actively negotiate identity, power and diaspora relations. Examples include PacificAusSport schemes, diaspora promotion and Pacific Island Forum.

Qualitative and interdisciplinary methodology combined comparative case studies of Fiji and Samoa with post-colonial discourse analysis. This presentation draws on Pacific research, policies, media narratives and diaspora engagement initiatives to analyse formal political frameworks alongside social mechanisms of community,

national pride and belonging. It examines how rugby operates as a regionally embedded tool for Pacific nations to curate identities, reassert soft power, and analysing how corruption is a significant limitation to its potential.

By reframing rugby as diplomacy, this research will show how non-traditional tools can be mobilised to counter neo-colonial dynamics through more equitable relations, reclaim agency, address and move beyond colonial legacies of internal corruption and inequitable aid and agreement models. For the Pacific, rugby has converted politics into meaningful change for Pacific people, beyond the field.

## **Artistic Creation and Fiction in Contemporary Times: Artifice and New Materiality**

**Fatmah Ahmad**

*University of Glasgow*

Generative AI's rise in nearly every corner of virtual and material reality forces us to rethink the role of art and fiction in society. Despite this cultural development, I argue that art and fiction cannot be produced by computerized, capitalistic algorithms and how this idea exposes the authoritative structures at play in contemporary times. A superior machine pretending to transcend humanity, regurgitating written and audiovisual "Art" is not an indication of cultural progress. Instead, it mirrors our contemporary environment, a technologized material world obsessed with infinite production and consumption. Art and fiction can not be manufactured through artificial and exploitative algorithms, nor have they ever existed separate from the human. I propose that one answer to this new manifestation of exploitative hegemony, and its consequent cultural stagnation, is to reclaim and recognize the power of fiction, as emphasized in the contemporary field of New Materialism. New Materialism interrogates and exposes essentializing and hierarchical modes of viewing the world by exposing the interconnectivity of all forces that combine to form an inherently complex identity. New Materialist scholars, such as Karen Barad and Donna Haraway emphasize the innately ideological and culturally mechanized position of the human in society. Analyzing Mary Shelley's *Frankenstein* ([1818] 2013) and Kazuo Ishiguro's

Never Let Me Go ([2005] 2025) through a New Materialist lens illustrates how fictional worlds encourage us to think beyond imposed beliefs, identities born from discrimination, and ideological boundaries.

## **Modeling CKD-Induced Cardiac Dysfunction Using Human Cardiac Organoids**

**Alina Khudyk, Tomson Lui, Shameema Imam**

*University of St Andrews*

Commercial health screening tests are increasingly advertised to healthy, asymptomatic UK adults, often on social media, as alternatives to NHS care. However, these tests frequently fall outside NHS recommendations, have limited regulatory oversight, and carry risks of inaccuracy and overdiagnosis. This study explores potential customers' rationale for purchasing these tests, their perceptions of them, and the information they desire. It forms part of a larger, mixed-methods study on information provision and regulation of health tests in the UK.

Three online focus groups (2-4 participants, aged 18-63) were recruited via social media. A semi-structured format enabled flexible discussion of: 1) tests and claims they've seen online, 2) pre-purchase information desires, and 3) preferred sources for reliable information. To resolve any disputes, three researchers collaboratively transcribed, annotated, and thematically analysed the interview data, establishing six themes. These were further grouped as personal rationales (ease of care, information generation) and purchase rationales (purchase decision, test features, data security, results management).

Participants commonly cited convenience, autonomy, ease of access, and hoping that test results could support NHS interactions, as key motivations for considering commercial screening tests. Crucially, they also often emphasised their desire for information about test accuracy and data security, and support in interpreting results. These findings reveal a gap between the market's appeal and current official guidance. To address this, enhanced regulatory oversight is needed to reduce potential harm, help meet evolving public needs, and support informed patient decision-making.

# **Modeling CKD-Induced Cardiac Dysfunction Using Human Cardiac Organoids**

**Abhai Anand, Armaan Verma, Min Xie, Timmy Lee, Jianhua Zhang, Palaniappan Sethu**

*University of Alabama at Birmingham*

Cardiovascular Disease (CVD) is the leading cause of death among patients with Chronic Kidney Disease (CKD), accounting for nearly 50% of all fatalities. The well-established link between CVD and CKD highlights the need to develop physiologically relevant models of CKD-induced cardiac dysfunction to better understand disease mechanisms and advance therapeutic discovery. We explored the use of cardiac organoids – three-dimensional, spherical clusters of cardiomyocytes that better mimic the architecture and behavior of human heart tissue than traditional two-dimensional cell cultures – to model CKD-induced cardiac dysfunction. To create cardiac organoids, induced pluripotent stem cells (iPSCs) were seeded and extracted from PDMS inserts and then differentiated into cardiomyocytes. Cardiac organoids were then conditioned for 48 hours with serum from CKD patients undergoing hemodialysis to simulate cardiac dysfunction linked to CKD. After an additional 48 hours, media were collected and analyzed using multiplex ELISA (Eve Technologies human cytokine/chemokine 96-plex assay) and RNA sequencing. Results showed significantly increased expression of proteins and genes associated with cell death, inflammation, immune response, fibrosis, and contractile and metabolic impairment compared to controls. These findings suggest that cardiac organoids respond to CKD serum in a manner consistent with cardiovascular disease-related changes seen in CKD patients. This three-dimensional organoid model provides a relevant platform to study cardio-renal interactions and evaluate new therapies, with the potential to accelerate drug discovery, reduce development costs, and improve patient outcomes.

## **Species Richness, Occupancy and Activity of Mammals Along an Urban Riparian Corridor**

**Rebecca A. MacArthur, Irene Priorelli, Luigi Cao Pinna, William A.O. McGhee, Anna M. Bracken, Davide M. Dominoni, Dominic J. McCafferty**

*University of Glasgow*

Urbanisation reduces available habitat for species and decreases ecological connectivity through fragmentation. Habitat corridors are therefore often required to connect suitable habitat and facilitate movement, however, limited research has examined habitat features influencing corridor use and emerging evidence suggests urbanisation alters activity patterns. This study therefore explored spatial and temporal species distributions in response to habitat composition along a riparian corridor (riparian meaning riverside) from city to farmland. We hypothesised that richness would depend upon the level of urban habitat and would decline towards the city, species-specific occupancy would depend upon the availability of suitable habitat and activity patterns would change under increasing urbanisation along the corridor. Camera traps were deployed at 10 sites along the River Kelvin corridor in Glasgow from March to September 2023. Detections were categorised by artificial intelligence and manually identified, finding a total of eight species of mammals. Species richness was strongly associated with the proportion of woodland and was highest within suburban areas along the corridor. Species occupancy was greater with increasing woodland for all species. Urban habitat increased occupancy in more generalist species (red fox and grey squirrel), but decreased occupancy in more specialist species (roe deer and hedgehog). Urbanisation altered daily activity in all species with a shift towards greater nocturnality in red fox, reduced activity peaks in roe deer, and small changes in activity patterns of grey squirrels. This study highlights the value of a riparian corridor in supporting urban mammals and in particular the importance of woodland habitats within cities.

## **How Chronic Psychological Stress Rewires the Brain?: Neuroinflammation and its Effects on Memory and Thinking**

**Arman Zaidi**

*Oxford Brookes University*

Chronic psychological stress is a common feature of modern life and is increasingly associated with negative effects on mental and physical health. Many individuals experiencing prolonged stress report difficulties with memory, attention, and decision-making, yet the brain-based mechanisms linking chronic stress to these cognitive difficulties are not always clearly integrated or explained in an accessible way. This research aims to examine how long-term psychological stress may contribute to cognitive decline through neuroinflammatory processes affecting key brain regions involved in memory and complex thinking skills. A structured literature review was conducted using peer-reviewed neuroscience, behavioural neuroscience, and healthcare research. Academic articles and textbooks were analysed to identify consistent evidence linking chronic stress, neuroinflammation, and cognitive performance, with particular focus on the hippocampus and prefrontal cortex, regions essential for memory consolidation, attention, and the ability to organise and regulate thoughts and actions. The reviewed literature suggests that chronic stress activates stress-response systems, including prolonged cortisol release, which may promote neuroinflammatory activity within the brain. Increased activation of brain immune cells (microglia) and inflammatory signalling appears to disrupt hippocampal-dependent memory processes and prefrontal cortex functioning, leading to reduced memory performance, impaired attention, and decreased cognitive flexibility. By synthesising findings across multiple disciplines, this research highlights how stress-related neuroinflammation may play a key role in stress-associated cognitive difficulties. These findings are relevant to healthcare and nursing practice, as they improve understanding of the cognitive effects of long-term stress and emphasise the importance of stress management in supporting brain health and overall cognitive wellbeing.

## **Investigating Heteroatom Effects on Electron Transfer Pathways in Transition Metal–Based Donor–Bridge–Acceptor Complexes**

**Wren McIntosh, Emily Race, Julia Weinstein**

*University of Sheffield*

Donor–bridge–acceptor (DBA) complexes are valuable model systems for understanding electron transfer processes that underpin photochemical processes

relevant to renewable energy generation. This project, conducted as part of the University of Sheffield Undergraduate Research Experience (SURE) scheme, investigated how heteroatom substitution influences electron transfer pathways and excited-state dynamics in transition metal-based DBA systems.

Square-planar  $d^8$  Pt (II) complexes were employed as electronic bridges linking electron-donating and electron-withdrawing ligands. Upon photoexcitation, these systems undergo a cascade of electron transfers that generate charge-separated states. These processes were investigated using a range of steady-state and time-resolved spectroscopic techniques, including ultrafast transient absorption spectroscopy using a femtosecond pump-probe laser setup.

A series of NAP-based complexes (NAP-Pt-Cl, NAP-Pt-Ph-PTZ, and NAP-Pt-Ph-CH<sub>2</sub>-PTZ) were compared with oxygen-substituted analogues to assess heteroatom effects. Steady-state absorption measurements showed that introducing an oxygen atom shifts absorption maxima to higher energy, reflecting changes in electronegativity and electronic structure. Solvent polarity also influenced spectral behaviour, with lower-polarity solvents inducing red shifts and cyclohexane stabilising an additional electronic state. Pump-probe transient absorption data revealed ground-state bleach, excited-state absorption, and stimulated emission signals, with heteroatom substitution affecting intersystem crossing rates and charge transfer dynamics.

These results demonstrate how ligand modifications and solvent environments influence electron transfer behaviour in transition metal-based DBA systems. The work highlights how molecular design can be used to control photophysical properties in light-driven systems, contributing to a broader understanding of charge separation processes relevant to renewable energy research and artificial photosynthesis.

## **Can Psychological Dissonance and Meaning Making Be Mapped as a Structured System?**

**Michael De Val**

*Falmouth University*

Psychological/Cognitive dissonance is often understood as the discomfort caused by conflicting beliefs or actions, but it is less frequently examined as a structured process shaped by the environments in which decisions occur. This research asks whether psychological/cognitive dissonance and meaning making can be understood as part of a broader system that can be mapped and intentionally shaped.

The aim of the research is to develop a new theoretical lens that views dissonance as emerging from the interaction between internal factors: such as intention, values, and expectations and external structures: including rules, constraints, and feedback. Rather than treating meaning as purely subjective, this study approaches it as something that can be scaffolded through design. Digital games are used as an applied domain because they make choice, consequence, and limitation explicit.

The research adopts a qualitative, theory-driven approach via a pilot study (10 People) involving structured gameplay sessions, analysed using reflexive thematic analysis guided by five a-priori heuristic constructs.

Preliminary findings suggest that meaning and dissonance are strongest not when individuals are given unlimited freedom, but when they must actively negotiate constraint, inevitability, and responsibility within a system.

This presentation shares these early findings as a deliberate stress test of the proposed lens, inviting interdisciplinary critique at BCUR. More broadly, the research offers a new way of understanding how interactive systems shape psychological meaning making, with implications for psychology, design, and human-computer interaction.

## **Harmonizing Protein Annotations in the Gene Ontology for Drug Repurposing**

**Svitlana Lorman**

*National University of Kyiv-Mohyla Academy*

The exponential growth of genomic data presents a challenge for biomedical interpretation, particularly in drug repurposing where off-target effects pose significant

safety risks. Accurate functional annotations are crucial for predicting both therapeutic efficacy and potential toxicity; however, automated predictions often lack structural consistency. This study aims to enhance the informativeness of protein functional data by harmonizing predicted annotations within the Gene Ontology (GO) Directed Acyclic Graph (DAG) hierarchy.

The methodological approach involved analyzing the structural constraints of GO, specifically the "True Path Rule," to identify logical contradictions in automated predictions. A harmonization algorithm was developed and implemented using Python libraries (GOATOOLS, NetworkX) to filter low-specificity terms and resolve hierarchical inconsistencies through topological constraints and label propagation.

Key outcomes include the successful implementation of a software module that transforms raw, noisy annotations into consistent hierarchical structures. The harmonization process improved semantic similarity metrics and increased the Information Content (IC) of functional terms, enabling more precise differentiation between therapeutic targets and unintended interactions associated with specific adverse effects, such as hepatotoxicity.

These findings demonstrate that structural harmonization significantly improves the accuracy of computational repositioning pipelines. By reducing data noise and resolving graph contradictions, the proposed method offers a valuable tool for early-stage risk assessment, ultimately contributing to safer and more efficient pharmaceutical development.

## **Expanding Schooling, Persisting Inequality: Long-Run Evidence from Kenya's Free Primary Education Policy**

**Oliver Zab**

*Manchester Metropolitan University*

In 2003, Kenya removed fees from state primary schools in a bid to increase enrolment. The policy was successful in raising enrolment; however, its effect on educational quality was questioned due to rising student-to-teacher ratios, particularly

in high-performing schools prior to the reform. Previous studies focus on short-term outcomes, notably Lucas and Mbiti (2012), who examine access, achievement, and sorting. They find that increased access for poorer households offset reductions in quality, rendering the policy welfare-enhancing in the short run. This paper examines whether the reform generated long-run gains in human capital and whether these translated into economic convergence across counties. Exploiting cross-county variation in pre-reform enrolment levels, this paper compares changes before and after the reform between counties that initially had low and high enrolment rates. Counties with lower baseline enrolment experienced an additional 8 percentage point increase in schooling relative to high-baseline counties, indicating substantial convergence in human capital across regions. However, these gains did not translate into reductions in relative poverty or inequality. While educational disparities narrowed, spatial economic disparities persisted. This paper contributes to the evaluation of policies aimed at expanding access to education. It also informs the design of education policy in developing countries where fiscal constraints limit the range of feasible interventions.

## **Exploring Teachers' Views on Token Economy as a Motivational Strategy in Primary Language Classrooms**

**Tianyang Li**

*University of Glasgow*

Motivating young learners in primary language classrooms remains a key concern in education, particularly in supporting sustained engagement and positive learning behaviours. Token economy, a behaviourist-informed motivational strategy involving the use of symbolic rewards, has been widely discussed in educational psychology. However, less is known about how teachers understand and interpret token economy in everyday classroom practice, especially in primary language learning contexts.

This ongoing undergraduate dissertation adopts a qualitative approach to explore primary school teachers' views on token economy as a motivational strategy in language classrooms. Using semi-structured interviews, the study examines how teachers conceptualise token economy, how they perceive its role in supporting pupils'

motivation and engagement, and how it is implemented in classroom practice. Interview data are analysed using thematic analysis to identify key patterns across teachers' accounts.

The study is anticipated to generate three main insights. First, it explores teachers' understandings of token economy and the meanings they attach to reward-based motivation. Second, it examines perceived impacts on pupils' language learning behaviours, including participation, engagement, and classroom conduct. Third, it considers contextual and pedagogical factors—such as classroom dynamics, pupil characteristics, and teachers' beliefs—that shape the use and evaluation of token economy.

Aligned with interdisciplinary perspectives in psychology and education, this research highlights how motivational theories are interpreted and adapted within real classroom settings. By foregrounding teachers' perspectives, the study contributes to ongoing discussions on motivation and effective practice in primary language education.

## **Personalising Peer-to-Peer Marketing: A Behavioural Study of Prospective Student Decision-Making at UK University Recruitment Events**

**Faten Alahmadi**

*Bournemouth University*

Peer-to-peer (P2P) marketing through student ambassadors is a common feature of UK higher education recruitment events. However, there is limited research on how these in-person interactions influence prospective students' behavioural intentions and decisions. This study investigates the impact of ambassadors' conversations on distinct student groups, using the Theory of Planned Behaviour (TPB) as a theoretical lens to understand the behavioural drivers of student choice.

Drawing on semi-structured interviews with UK and international prospective students after attending recruitment events, the research explores how peer interactions shape personal attitudes, social expectations (subjective norms), and their confidence in

ability to attend (perceived behavioural control, or PBC), while also identifying motivational inhibitors such as financial stress or lack of belonging.

Preliminary insights identify two key prospective student segments: ‘decided’ students who have already made up their minds, and ‘uncertain’ students still considering their options. Early observations suggest that tailored peer responses may significantly influence hesitant students—particularly by increasing PBC (e.g., clarifying affordability or available support services), reframing attitudes (e.g., enhancing social fit), and shifting subjective norms (e.g., through relatable peer stories). In contrast, generic responses may fail to address key concerns, potentially reducing the likelihood of enrolment.

By analysing how segmentation and personalisation influence students’ behavioural drivers, this research offers strategic insights for improving peer-to-peer engagement at live recruitment events. The findings aim to support more inclusive, effective marketing practices grounded in behavioural theory and responsive to diverse student needs.

## **Behind the Breakthrough: Designing a Cooperative Board Game to Improve Public Engagement with Drug Discovery and Development**

**McKenna Fellman**

*University of Leeds*

Public understanding of drug discovery and development (DDD) remains limited, despite widespread interest in how new medicines are created, tested, and approved. This gap has implications for health literacy, trust in science, and public engagement with medical research. Traditional, passive approaches to science communication often struggle to convey the complexity, uncertainty, and collaborative nature of DDD. This project explores whether an experience-based, interactive approach can support more meaningful public engagement.

A cooperative tabletop board game was designed to simulate key stages of DDD, including discovery, pre-clinical testing, clinical trials, and regulatory approval. Players assume professional roles within a fictional pharmaceutical team and collectively manage time, funding, data, and public trust while responding to real-world challenges. By embedding trade-offs and uncertainty into gameplay, the design aims to make DDD processes more accessible and transparent to non-specialist audiences.

The game is evaluated through listening rooms with members of the general public. Participants complete a questionnaire before gameplay to assess baseline knowledge, confidence, and interest in DDD, then play the game in small groups, followed by a post-game questionnaire measuring changes in these outcomes. Gameplay discussions are audio-recorded and analysed qualitatively to examine engagement and collaborative reasoning.

Emerging findings suggest that cooperative gameplay can support accessible learning, stimulate discussion, and increase confidence in engaging with complex health research topics. This work demonstrates the potential of board games as inclusive tools for public engagement and contributes to broader interdisciplinary conversations on creative approaches to science communication.

## **"Something Something Something Scaphoid?"**

**Jarrar Khan, Stephanie Spence, Orla Neilson, Rosaleen McKenna, Max Chambers**

*University of Glasgow*

Carpal bone fractures are a common presentation to the Emergency Department and many require orthopaedic intervention. Whilst some working knowledge of the carpal bones is essential to both students and resident doctors alike, their recollection can be poor in clinical practice.

This study aimed to assess recall of carpal bone anatomy and common carpal injuries across different stages of medical training. Students, resident doctors, trainees, and

orthopaedic surgeons were asked to complete a short survey of 10 questions.

Fifty participants completed the quiz, achieving a mean score of 4.64/10, SD = 3.28. Anatomy students (n = 8) scored lowest (0.63, SD = 0.51), while senior medical students (n = 24) and non-orthopaedic resident doctors (n = 8) performed comparably (4.42, SD = 2.60; 4.14, SD = 2.51). Orthopaedic surgeons achieved the highest scores, with non-consultants (n = 5) averaging 8.8 (SD = 0.98) and consultants (n = 5) scoring 9.0 (SD = 0.89). Use of a mnemonic (n = 29) was associated with higher scores (5.62, SD = 2.62; 3.29, SD = 3.65).

Knowledge of the carpal bones was adequate amongst trainees and surgeons but remains limited in earlier stages of training. Use of any mnemonic was associated with a higher mean score. Future work will promote a standardised mnemonic and reassess performance.

## **Is the Current Famine in Sudan Acknowledged as a Political Process by Government Ministers in UK Parliamentary Discourse?**

**Tara Long**

*University of Warwick*

While famines have often been seen as natural disasters or economic failures, the theory of famine as a political process argues that modern famines are in fact not inevitable; they are the result of decisions made by political actors and governments. This paper presents a discourse analysis of seventeen parliamentary debates from the House of Commons and House of Lords between May 2024 and April 2025 to explore whether government ministers acknowledge the current famine in Sudan as a political process. The analysis shows that the famine was only partly acknowledged as a political process by government ministers. Throughout the debates, the mention of famine was notably sparse, and, at times, the famine was also referred to in a depoliticised manner, particularly in discussions surrounding aid and humanitarian responses. This raises questions for future research including how depoliticised

language regarding famine has impacted public opinion and whether its use has risen amid growing constraints on foreign aid.

## **Reinventing Heat for a Sustainable Culinary Future**

**Kinza Ramzan, Akua Quao, Ambreen Chohan, Shinghai Nyarugwe,  
Sophie Tongyu Wu**

*University of Lancashire*

**Background:** The escalating global energy crisis threatens millions of households worldwide with poverty, with food and fuel insecurity being key drivers of financial and nutritional deprivation. Despite growing interest in low-energy cooking solutions to support households experiencing fuel poverty, much of the evidence for the effectiveness of thermal cooking bags remains anecdotal. This study aimed to evaluate the thermal performance, and overall feasibility of thermal cooking bags in the context of food security and public health.

**Method:** Vegetable-based soup and chicken rice meals were partially cooked using conventional heat before being transferred to a thermal cooking bag once they reached boiling point. Food temperature, internal bag temperature, room temperature, and thermal images (top and side) were recorded every 15 minutes for 7 hours. Control experiments involved the same meals cooked fully using continuous heat and cooled under identical conditions.

**Results:** Both bagged meals demonstrated similar thermal behaviour and maintained heat above the 60°C “danger zone” for upto 5.25 hours compared to the controls (2 hours). Cooking bags kept food at a safe eating temperature for approximately 3.25 hours longer. The bag lining warmed from approximately 24°C to 30°C, creating a thermal buffer to slow heat loss.

**Conclusion:** Thermal cooking bags significantly extend safe food holding times, independent of food type or density, offering affordable, low-energy cooking solutions with potential benefits for food security, energy justice, and public health. Further work

is needed to explore the acceptability of such solutions and to establish the microbial safety during use.

## **Many Crowns of Violets—Classical Reception in Queer Readings of Virginia Woolf**

**C. Rachel Ngai**

*University of Cambridge*

This research examines expressions of queerness through the classical tradition in a selection of Woolf's writing. Queer creatives from less accepting times often turned to the classical world as respite and inspiration, often 'queering' their work with its motifs, imagery, and references. Much previous academic research focused on the experiences of queer men and their interactions with the 'male homosexual' classical world. However, Woolf provides a more complex perspective as she represents not only a queer voice but the voice of a queer woman and feminist. This qualitative content analysis between selections of her works ('A Room of One's Own', 'A Society', Mrs. Dalloway, To the Lighthouse, Orlando, The Waves) alongside Greek and Latin literature that Woolf likely studied reveals a style of 'queering' very different from her male contemporaries. Unlike many queer men of her time, she viewed the classical world not as a 'gay male utopia', but as an imperfect landscape to be redefined for her own literary and sexual expression and exploration. The tenuous nature of being a woman in the arts in the early 20th century also resulted in more delicate 'queer-coding'. With the exception of Sappho, she rarely explicitly names classical figures, instead choosing subtle references through imagery and parallels. Encompassing classical reception, comparative literature, and queer studies, this project shows how Woolf reclaims and reshapes the classical, demonstrating the ever-present persistence of disenfranchised peoples and the importance of reception as a vessel for empowerment.

## **Who Decides "Correct" Language? The Illusion of Inclusive AI in Postcolonial Multilingualism**

## **Melissa Pradhan**

*University of Glasgow*

AI language models are often presented as inclusive tools that support multilingual communication. However, their inclusivity is limited when applied to postcolonial multilingual contexts. Through sociolinguistic and pragmatic analysis, it is illustrated that multilingual practices in postcolonial contexts are structured around authority and power, rather than being purely grammatical choices. Thus, through case studies such as Singaporean and Indian varieties of English, this presentation examines how postcolonial multilingualism is underrepresented in AI systems.

In India, shifting into English frequently signals education, expertise, or institutional control. In Singapore, movement between Singlish and Standard Singapore English marks differences in formality, legitimacy, and social distance. The nuances in the use of English, especially code-switching, are linguistically structured and not random variations. However, AI models are unable to recognise these linguistic markers appropriately, focusing instead on the colonial expectations of Standard English.

Therefore, the presentation argues that AI models, trained predominantly on standardised colonial language varieties, imitate and enforce dominant language ideologies by privileging “correct” forms over socially ingrained forms. Hence, AI becomes a linguistic authority, reinforcing existing hierarchies of legitimacy and marginalising local multilingual grammars.

As such, by foregrounding linguistic evidence from postcolonial English varieties, the perceived inclusivity of AI is challenged. Likewise, the need to recognise non-standard grammars as systematic, the inclusion of regionally grounded language data, and closer collaboration with linguists and speaker communities are highlighted as important stages in greater inclusivity of postcolonial multilingualism within AI models.

## **First of the Camp, Last of the Legion: Study of Roman Military Standards and their Significance to the Average Legionary**

**William Whitmore**

*University of Warwick*

The Roman military has received no shortage of scholarly attention and yet, standard-bearers have suffered from few investigations. As Classics changed from a ‘Great man’ approach to ‘social history’, these middling ranks of the army were overlooked and have remained that way since. Thus, leaving many questions on the role of the standard-bearers open to be answered. This paper shall explore several of these, with an analysis of the military, civil, and theological aspect of this unit’s responsibilities.

The standards were more than a unit identifier – they were an embodiment of the unit’s proud history. Standard-bearers too were more than the soldiers who carried the colours, they were this history personified. Therefore, playing a central role in battle, delivering orders; outside of battle, ensuring the unit ran smoothly; and, perhaps surprisingly, in religion, where the standards were worshipped as quasi-deities. These soldiers existed across all sizes of the army, from the smallest vexillum (detachment) to the largest legion. Their importance is reflected in the title, “first of the camp” refers to the standards’ sanctuary being the first element of camp built every night. “Last of the legion” because the loss of an aquila (eagle-standard) routinely led to the disbandment of that legion and therefore brought shame upon Rome. This paper aims to explore these elements of the standard-bearer and give this role the long-overdue study it deserves. This paper’s outcome is developing the understanding of what soldiers were willing to die for and exploring how the standard-bearers earned such loyalty.

## **Delirium in Osteoporotic Hip Fracture Patients: Incidence, Frailty and Outcomes**

**Jerome Mathew**

*University of Bristol*

Hip fractures constitute a significant public health concern in ageing populations due to their association with functional decline and loss of independence. Delirium is an under-recognised complication following hip fracture surgery and may reflect underlying frailty. This study investigated the incidence of post-operative delirium in

osteoporotic hip fracture patients and explored associations within demographics, recovery outcomes, and compliance with national screening standards.

A retrospective observational study was conducted including 94 patients admitted with hip fractures to a UK District General Hospital. Delirium was assessed using the 4AT bedside screening tool. Data was extracted from clinical records and analysed using descriptive statistics and hypothesis testing to examine relationships between delirium, patient demographics, pre-existing dementia, mobilisation, and length of hospital stay. All data was compared to the National Hip Fracture Database to establish a baseline standard.

Delirium occurred in 35% of patients which is consistent with national benchmarks and existing literature. Pre-existing dementia was strongly associated with delirium, supporting the concept of delirium as a marker of cognitive and physical frailty. A secondary investigation found that early post-operative mobilisation was significantly associated with shorter hospital stays, highlighting its importance in recovery. 4AT screening rates exceeded national standards but under-detected hypoactive delirium, showing it is not a replacement for full clinical assessments.

These findings reinforce the importance of routine cognitive screening, early mobilisation, and multidisciplinary care in hip fracture management. Recognising delirium as an indicator of vulnerability rather than a complication may improve patient outcomes and guide future research into frailty-focused interventions.

## **Education for Sustainable Development: A Scoping Review of Ethical Regulations on the Care of Research Animals in the Gulf States**

**Harry Roberts-Percy**

*University of Leeds*

Animals are used in scientific research and studies including enhancing biological understanding, medicines development, and conservation biology. Currently the ethical requirements and laws regulating the care and use of research animals in the Gulf

states and surrounding region is not well-documented. This presents challenges for ensuring consistent ethical standards, reproducibility, and reliability. This study intends to scope the existence of national and institutional ethical guidelines and processes and the animal welfare regulations in these countries, through a systematic review of papers on PubMed and Scopus. This is important to help inform the development of professional education activities to support humane, high-quality research involving animals across the region.

339 papers which met the inclusion criteria, and not the exclusion, were published in 2024-25. From these, seven countries were found to have specific animal welfare legislation, with three showing evidence of both national and institutional ethical review processes. This indicates the need for legislation and ethical review processes that are tailored to the needs and culture of each country.

The current economic growth and investment towards bioscience research in many of these countries give further cause to this effort to support professional development for those involved in the use of research animals, and in turn, humane, high-quality research. This research will inform the development of country-specific opportunities. Building on this, through the robust methodology established, the work can be expanded into neighbouring countries in the region and surrounding areas or other regions / continents that are also seeking to develop their professional development opportunities.

## **When Prices Change Health: Unequal Impacts of Minimum Alcohol Pricing in Scotland and England**

**Mili Shangari**

*University of Leeds*

Alcohol-related harm remains a major public health challenge in the United Kingdom, with Scotland experiencing particularly high rates of alcohol-related hospital admissions and mortality. In response, Scotland introduced Minimum Unit Pricing (MUP) for alcohol in 2018, setting a legal minimum price per unit of alcohol to reduce harmful consumption. While existing research shows that MUP reduced alcohol

purchases, less is known about whether its health impacts differed across socioeconomic groups, and whether predicted distributional effects translated into observed health outcomes.

This study examines whether the introduction of MUP led to unequal changes in alcohol-related hospital admissions across areas of differing socioeconomic deprivation, using England as a comparison group. I employ a difference-in-differences framework comparing alcohol-related hospital admission rates in Scotland and England before and after the policy's introduction. Publicly available data from Public Health Scotland and NHS Digital are combined with population statistics and area-level deprivation indices to construct admission rates across socioeconomic groups. This approach exploits the policy's implementation in Scotland and the absence of a comparable intervention in England to identify the policy's impact while controlling for broader national health trends.

Based on existing evidence, the analysis expects to find larger post-policy reductions in alcohol-related hospital admissions in Scotland, particularly in more deprived areas. The findings aim to contribute to debates in health and behavioural economics by providing empirical evidence on the distributional health effects of price-based interventions. More broadly, the study has implications for alcohol policy design, public health, and discussions around economic justice and inequality.

## **Maths, Coloniality and the Impact on Students**

### **Risandi Imadowage**

*University of St Andrews*

Mathematics is often seen as a universal subject, yet few consider the historical processes that shaped why this is the case. This project explores the role of colonialism in forming this one-dimensional approach to mathematics and proposes a method to investigate its impact on university-level maths students from the Global South. This topic is increasingly relevant, as the movement of decolonialism continues to gain momentum within STEM: acted on by institutions like the UK's University Quality Assurance Agency.

Even though university students are the future of maths, little work has been done regarding how they have been impacted by coloniality. This project is comprised of a literature review which considers the history of colonialism in maths, how this persists today and the role of 'decolonialism' in addressing this- and culminates in a method that combines the theory and prioritises the opinions of this specific demographic.

In a nutshell, the theory suggests the influence of colonialism in maths lies in eradicating indigenous systems of maths and withholding Eurocentric maths as a form of power. This can be tracked to the present 'universality' which still sees the discreditation of the work of mathematicians from marginalised groups, as well as an attainment gap and a funding disparity in higher education.

Currently, this project is collecting data at the University of St Andrews to assess the real-life need for these efforts and how they can meaningfully transcend theory. Once analysed, the study will expand to include students from other UK institutions, allowing for cross-comparison.

## **Designing Biocompatible, Temperature-Responsive Nanogels for Controlled Drug Delivery Applications**

**Saanchi Agrawal, Sofia Patri, Nazila Kamaly**

*University of Glasgow*

Delivering medicines to the right place at the right time remains a major challenge in modern healthcare. Nanomedicine, which employs nanoscale materials for disease prevention, monitoring, and treatment, offers promising solutions by enabling drugs to be carried and released in a controlled manner. Among these materials, nanogels - tiny, water-based polymer particles - are particularly attractive because they can respond to external stimuli such as temperature. However, many commonly used temperature-responsive materials raise concerns about their long-term safety, which limits their clinical potential.

This project investigates whether biocompatible poly(ethylene glycol) (PEG)-based nanogels can be designed to respond predictably to temperature while remaining safe

for biological use. A series of nanogels were synthesised using different PEG-based building blocks and reaction conditions, allowing their temperature-responsive behaviour to be systematically tuned.

The resulting nanogels were uniform in size, stable in aqueous environments, and exhibited sharp, reversible changes in volume at temperatures relevant for biomedical applications. Importantly, cell studies demonstrated excellent tolerance, supporting their suitability for use in biological systems. By modifying the molecular composition, the temperature at which the nanogels responded could be precisely controlled.

PEG-based nanogels can thus be engineered as safe, adaptable drug delivery platforms. More broadly, this work illustrates how careful molecular design can improve the real-world suitability of advanced materials for applications such as targeted cancer therapy, wound healing, and regenerative medicine.

## **Immunofluorescence-based Predictive Biomarker Panel for Metachronous Polyp Development**

**Ian Benson, Lewis Irvine, Phimmada Hatthakarnkul, Sara Al-Badran, Amna Matly, Gerard Lynch, Noori Maka, Stephen McSorely, Aula Ammar, Joanne Edwards**

*University of Glasgow*

Development of metachronous polyps (new polyps that develop after initial removal) is linked with an increased risk of colorectal cancer (CRC). However, current surveillance for risk stratification may misclassify polyps. Integrating novel biomarkers into current tools may improve predictive accuracy, reducing the need for unnecessary invasive colonoscopies. Using multiplex immunofluorescence (mIF) to detect several proteins in a single sample, this study builds on similar work with immunohistochemistry (IHC) on several proteins, investigated here as a panel - Myc, SOX9, ARID1A, and Ki67 – for their potential as predictive biomarkers for metachronous polyp risk.

Patient polyp tissue (n=54) was obtained to produce tissue microarray (TMA) cores, which were stained for the above protein panel using mIF and analysed using digital pathology. Nuclear protein expression was identified and analysed using ANOVA and t-tests before comparison to immunohistochemistry (IHC) in TMA cores from corresponding patients. Protein expression was also analysed with respect to characteristics such as age, sex and polyp histology.

Significant association between nuclear IF and IHC expression was found with Myc and Ki67. SOX9 expression was significantly greater in tubulovillous (higher-risk) polyps than tubular (lower-risk) polyps, with the opposite results for ARID1A. Myc and Ki67 levels were paradoxically reduced in patients who developed metachronous polyps or CRC.

Early results show potential for the integration of biomarkers such as Myc, Ki67, SOX9 and ARID1A into current surveillance tools. However, paradoxical results for Myc and Ki67 warrant further exploration. Further work using protein expression across entire cells could improve the validity of these biomarkers.

## **Concrete Voices: Exploring Protest, Identity and Lived Experience in Grime and Hip-Hop**

**Jason Shuttleworth**

*Blackpool College*

The project examines how grime and hip-hop function as forms of social testimony, shaped by lived experiences of marginalised communities in Britain and the United States. Examines how artists use rhythm, lyrics, vocal delivery and production to communicate protest, identity and collective memory. It aims to understand how each genre reflects its social conditions and to translate these findings into a creative work that combines recorded composition and an interactive sound installation. These insights feed into the practical component, which uses field recordings, spoken fragments and contrasting sonic textures to reveal how differences in environment, speech patterns and sonic cues inform British and American approaches to musical protest. The study anticipates that presenting these materials side by side will reveal

themes such as resistance and community voice, while demonstrating culturally specific expression shaped by local histories, vernacular language and performance traditions. The project argues that participatory sound installations can create spaces for reflection, allowing audiences to consider how sound shapes understanding of identity, history and social reality. The research demonstrates how creative practice can operate as a method of inquiry, offering ways to analyse culture through listening and interaction.

## **Is Sustainability a Coordination Problem? An Economic Perspective on Collective Action and Moral Responsibility.**

**Mihini Thulanga Palahepitiya Gamage**

*University of Glasgow*

Despite growing awareness of environmental challenges, societies continue to fall short of sustainability targets. While public discourse often frames this failure as a matter of insufficient moral responsibility or weak individual commitment, this paper investigates whether sustainability should instead be understood primarily as an economic coordination problem. Drawing on theories of public goods and collective action, it examines how individually rational behaviour can produce collectively inefficient outcomes even when individuals broadly support sustainable goals. Using a conceptual, literature-based approach, the study synthesises insights from political economy, behavioural economics, and institutional theory to analyse how sustainability outcomes are shaped by incentives, expectations, and structural constraints. Existing theoretical models and empirical findings demonstrate how misaligned incentives, weak enforcement mechanisms, and uncertainty about others' actions generate coordination failures that moral concern alone cannot resolve. By reframing sustainability as a coordination challenge rather than a simple moral deficit, the paper highlights the importance of institutional design and collective mechanisms in achieving sustainable outcomes. This perspective offers a clear analytical framework for understanding persistent inaction and contributes to broader debates on responsibility, economic justice, and the design of effective sustainability policy.

# **AI-Powered Entrepreneurship: Enabling Non-Technical Individuals Transition to Digital Business Ownership in the UK - A Thematic Synthesis Review**

**Martin Sellick**

*University of Lancashire*

This dissertation investigates the question: how can Artificial Intelligence (AI) help non-technical aspiring entrepreneurs in the UK transition into digital business ownership? It focuses on whether AI tools can reduce common barriers to entering online business, including technical complexity, financial constraints, and psychological resistance to new technologies. A thematic synthesis review of existing literature was conducted to evaluate where AI adds practical value for non-technical users and where adoption remains limited.

The synthesis indicates that AI, particularly large language model tools and AI-driven business platforms, can support non-technical entrepreneurs by automating routine tasks, improving decision-making, and simplifying workflows such as planning, content creation, customer interaction, and operational management. However, the literature also highlights barriers that restrict broader uptake, including gaps in digital literacy, accessibility limitations, and anxiety or mistrust linked to AI. The review further identifies a disconnect between academic discussions of AI usability and how AI is implemented and used in practice.

Overall, the dissertation concludes that AI has significant potential to widen participation in digital entrepreneurship in the UK, but inclusive outcomes will depend on targeted support and more practical research. Recommendations include prioritising business outcomes over technical complexity, designing tools that are transparent and accessible, and strengthening education that links theory with real-world application.

## **Predicting Disease Spread in Forests**

**Mariella Ind**

Tree diseases have ravaged plant-life in the UK, resulting in the loss of millions of trees from UK forests, having a devastating impact on the UK's ecosystems.

Therefore, the aim of this presentation is to discuss the utilisation of mathematical models, which follow the 'Susceptible-Exposed-Infected' framework to predict disease spread in forests in order to compare methods of controlling tree disease. The Susceptible-Exposed-Infected framework is a system of differential equations describing disease transmission by splitting a population into groups i.e. those 'infected', those 'exposed' and those 'susceptible' to the disease and estimating the change in proportion of these groups over time.

Deterministic models for tree disease don't account for randomness of the spread of pathogens and thus the Gillespie algorithm may be applied to the deterministic model to convert it into a stochastic simulation. The stochastic simulation can be ran repeatedly to account for randomness. We can include mechanisms from the control methods and run this simulation repeatedly to ensure the accuracy of stochastic simulations. These control methods removed all infected trees or infected trees and their neighbours after a set period. The proportion of trees from the simulation which were infected at the end of the time-period from the simulation was measured.

Ultimately, there were fewer infected trees from simulations when the infected trees and their neighbouring trees were removed in comparison to exclusively removing infected trees. In conclusion, the former method had greater success at controlling disease. However, more healthy trees were removed, and this should be considered.

## **Assessing the Feasibility of Integrating Electric Vehicle Charging Technologies into the M25 Motorway Network**

**Louis Adams-Hall, Elizabeth Morgan, Mardin Abdalqadir**

The increasing adoption of electric vehicles (EVs) has intensified concerns related to driving range limitations and charging availability, which remain key barriers to widespread EV uptake. Dynamic wireless charging has emerged as a potential solution, enabling EVs to charge while stationary or in motion through inductive power transfer using copper coils embedded beneath the road surface. Despite growing interest, UK-specific practical studies evaluating its feasibility on major road networks remain limited.

This study addresses this gap by assessing the feasibility of integrating dynamic electric vehicle charging technologies into the UK motorway network, using a selected section of the A1 Road as a case study. A mixed-methods approach is adopted, combining a review of conductive and inductive charging technologies with an evaluation of key technical parameters, including power transfer efficiency, vehicle speed, lane configuration, and infrastructure requirements. Traffic flow data, EV penetration rates, and road characteristics are analysed to assess suitability for implementation, alongside practical considerations such as installation complexity, safety, and maintenance.

The results indicate that dynamic charging could reduce driving range limitations and reliance on static charging infrastructure on high-traffic routes. The selected A1 section demonstrates favourable conditions for a pilot scheme; however, challenges remain, including high installation costs, efficiency losses at higher speeds, and the need for system standardisation. Further pilot testing and policy support are required before large-scale deployment.

## **License to Spill: Deconstructing the 'Option to Pollute' Hidden in Corporate Balance Sheets**

**Raheema Asim**

*Birkbeck University of London*

Hailed as finance's golden child for decarbonisation, Sustainability-Linked Bonds (SLBs) have become a staple in global portfolios. Unlike Green Bonds, which strictly reserve cash for specific projects, SLBs allow issuers to spend proceeds freely

provided they meet future environmental targets. Failure triggers a contractual penalty of paying a higher interest rate to their investors (typically +0.25%), theoretically aligning corporate profit with the nation's desire for a greener future.

However, this research challenges that consensus by posing a critical question: Does the bond market genuinely reward companies for setting hard, science-based climate targets, or does it inefficiently treat all 'sustainability' promises the same? This research investigates whether the current structure creates a perverse 'Ambition Deficit', where issuers effectively purchase a cheap 'Option to Pollute' to avoid the operational changes the public expects.

To answer this, I employ a mixed-method approach. First, I audit 15 high-profile SLB prospectuses against Science-Based Targets (SBTi) benchmarks to quantify their 'Ambition'. Second, I run a regression analysis on their bond yields to determine if investors genuinely reward robust, high-ambition firms with lower borrowing costs.

Preliminary findings suggest a market failure where investors price greenwashed bonds identically to robust ones. The implication is significant: if the market ignores the quality of these targets, public pension capital is unwittingly subsidising the very pollution it aims to stop. As the UK strives for Net Zero, this research provides the necessary framework to distinguish genuine transition tools from sophisticated marketing ploys, safeguarding the credibility of the entire sustainable finance market.

## **Macewen's Private Journals: How Clinical Sources Contribute to the Study of Emotions and Emotional Regimes in Victorian Surgery**

**Michael McIntyre-Hunt**

*University of Glasgow*

Current literature in the History of Emotions, such as the work of Michael Brown, represent the field of surgery in the 19th century as moving from a romantic emotional regime, emphasising sympathy, compassion, and fostering emotional engagement, to a techno-scientific regime, where patients ceased to be a focus, and emotions were

regarded as impediments to accuracy. This study uses a range of methodologies from the History of Emotions, such as recognising emotives within ‘performative acts’, and Sartre’s approach which appraises the meaning of an expression through the significance of its manifestation on the world. These methods are employed to evaluate the use of historical clinical sources, such as casebooks daybooks and clinical notes, considering a new viewpoint for discovering expressed emotions, expanding the available source base, and helping to analyse the nature of changing emotional regimes in Victorian Scotland’s surgical profession. Through using the private journals of Sir William Macewen – his surviving notes from three wards in the Royal Infirmary between 1879 and 1891 – as a case study it will demonstrate how emotions can be found in historical clinical sources; while also highlighting their limitations. Furthermore, by examining the implications of these insights regarding emotional regimes, it will show that the transition between the earlier regime of romanticism to that of techno-scientific objectivity was not sequential, but rather the two regimes existed, and still exist, simultaneously.

## **Engineering Microglia with Chimeric Antigen Receptor (CAR) to Target Autoimmune B-cells in Multiple Sclerosis**

**Pui Yan Sham**

*The University of Hong Kong*

Multiple Sclerosis (MS) is an autoimmune disease that affects the central nervous system and affects over 1.89 million people globally (Khan & Hashim, 2025). MS is characterised by demyelination, inflammation and neurodegeneration of the CNS. Chimeric antigen receptor therapy (CAR therapy) is an emerging therapy and has revolutionised the treatment of haematological cancers. However, its potential for treating MS is still under investigation. Recently, B-cells have been shown to play a pivotal role in the pathophysiology of MS; therefore, we used a B-cell lymphoma line (A20) as a target in our experiment. This study explores the potential of Chimeric Antigen Receptor (CAR) engineered microglia as a novel therapeutic strategy for MS. Specifically, we examined whether engineered microglia cells, when engineered with CAR, can target the CD19+ B-cell lymphoma line (A20) more effectively than the

non-engineered microglia cell line (BV2) in vitro. Results showed that the phagocytosis of A20 cells increased significantly by 577%, from 4.18% of BV2 cells phagocytosing the A20 cells to 24.12%. Overall, this study demonstrates that CAR significantly enhanced the ability of microglia to target and phagocytose CD19+ B cells in vitro. These results highlight the potential for CAR-microglia as a novel therapeutic strategy for MS. Future studies could focus on translating these findings into human models, overcoming challenges such as blood-brain barrier delivery and evaluating the in vivo efficacy of CAR-microglia.

## **Digital Colonialism and Data Sovereignty: Reproducing Empire Through AI Governance**

**Kavya Srinivasan**

*University of Glasgow*

Artificial intelligence is becoming integrated into economic systems, development programs, and global governance. Emerging research indicates that AI may replicate historical patterns of colonialism through unequal control over data, technology, and regulation, despite the technology's frequent portrayal as neutral and progressive. The purpose of this study is to investigate how modern AI governance frameworks risk sustaining digital colonialism, which primarily affects states in the Global South, and to evaluate whether the existing ethical and legal responses sufficiently address these power disparities

The study uses a qualitative, multidisciplinary approach that integrates decolonial theory, critical political economy, and doctrinal legal analysis. This approach involves close reading and comparison of key international AI governance frameworks, data protection laws, and policy documents, alongside selected case studies on biometric identification systems and data-driven public infrastructure in developing countries. These materials are analysed to identify common themes relating to power, data control, and regulatory inequality. The framework for assessing issues of justice and accountability is based on ethical theory

According to this research, current AI governance frameworks often favour the interests of powerful states and multinational corporations while providing insufficient protection for data sovereignty. Despite rhetoric focused on inclusion and development, this permits ongoing data extraction.

The results emphasise the need for AI governance models based on data sovereignty, participatory regulation, and reparative justice rather than efficiency-driven narratives. The paper contributes to interdisciplinary discussions on how emerging technologies can reinforce or challenge global inequality by placing AI within larger discussions on economic justice, and human flourishing.

## **Feasibility and Design of a Rooftop Photovoltaic System: A Case Study of Newcastle College Energy Academy, North East England, UK**

**Dylan Bingham, Elizabeth Morgan, Mardin Abdalqadir**

*Newcastle College University Centre*

The decarbonisation of educational buildings is a key priority in achieving the UK's net-zero carbon targets, with rooftop photovoltaic (PV) systems offering a practical pathway for on-site renewable energy generation. This study presents a detailed feasibility assessment and system design for a rooftop PV installation at Newcastle College Energy Academy in North East England, UK, providing a site-specific case study tailored to real-world conditions.

Unlike many PV feasibility studies that rely on generic assumptions, this research incorporates location-specific solar irradiance, temperature, shading, and roof geometry data. Annual energy yield is modelled using SolarEdge Designer, while Google Earth Pro and on-site drone inspections are used to assess roof pitch, orientation, usable area, and obstructions. AutoCAD is employed to develop electrical schematics, stringing layouts, and elevation drawings. Voltage drop calculations inform cable sizing, and inverter and component selection are integrated into the final system design in accordance with relevant technical standards.

The results indicate that the Energy Academy has significant potential for on-site electricity generation, enabling reductions in grid dependency and associated carbon emissions. In addition to environmental benefits, the proposed PV system offers educational value by supporting practical, real-world learning for Energy Engineering students. This case study demonstrates how robust, simulation-based PV design can support informed investment decisions and contribute to decarbonisation objectives within further education institutions across the UK.

## **What's in a Voice? Can Intellectual Property Law Protect Actors' and Musicians' Vocal Identity from Deepfakes?**

**Meher Sandhu**

*University of Warwick*

Generative artificial intelligence (AI) has enabled the replication of human likeness with an alarming level of precision. With the projected 1,500% increase in AI-generated images and videos since 2023 (Accelerated Capability Environment 2025), disputes are becoming more prolific and beginning to attract judicial scrutiny. As it stands, voice-based deepfakes occupy a grey area within the law: they are neither protectable as copyright works nor consistently recognised as a defensible aspect of personal identity. As a result, artists whose voices are reproduced, without consent, and subsequently exploited, are often left with few options of recourse from the courts.

This research argues that intellectual property law can offer protection against audio deepfakes, provided the courts are willing to reconceptualise the human voice as an inherent attribute of identity, rather than an incidental feature of an actor or musician's performance. Through a comparative analysis, it examines how courts in India, China, and Germany, as well as legislative proposals in Denmark and the United States, have begun to safeguard artists of varying degrees of fame. These developments suggest an emerging, though uneven, shift toward recognising vocal likeness as a legally defensible interest where imitation enables false endorsement, public deception, or commercial exploitation. To this effect, it concludes that greater clarity is required on three issues: whether liability should focus on misappropriation of identity rather than

copyright infringement; how unauthorised vocal replications should be assessed where authorship cannot be established; and the extent to which harm must be shown to make a successful claim.

## **Students as Co-creators: Co-creating and Collaborating Pathways for Sustainable and Equitable Futures**

**Blythe Kaddour, Laavanya Varadarajan Shanmugapriya, William Sayles**

*University of Glasgow*

Higher Education (HE) is central to sustainable futures due to its influence on future consumer behaviour, choice architecture and sustainable resource management capabilities. While global commitments such as the Talloires Declaration and the United Nations Sustainable Development Goal 4 draw attention to education for sustainable development, employers continue to report that graduates lack interdisciplinary skills, real-world awareness, intrinsic motivation and systems thinking needed to respond to complex ecological and societal problems. Student–staff partnerships, particularly those that transcend disciplinary boundaries and involve non-scientific stakeholders, have increasingly been proposed as effective pathways to address these gaps.

This study introduces and evaluates the University of Glasgow Global Challenges Studio (GCS), a pilot initiative designed to support transdisciplinary student–staff pathways for co-creating sustainable and equitable futures. The research aims to (1) explore current student perceptions of transdisciplinary learning opportunities within the Adam Smith Business School and the School of Geographical and Earth Sciences, and (2) use evidence from the GCS pilot to develop a replicable transdisciplinary student-staff partnerships toolkit.

A mixed-methods approach will be employed, combining surveys, focus groups, and semi-structured interviews with student participants and external stakeholders involved in the GCS. Based on pre-existing literature and lived experience, it is anticipated that students will report limited access to transdisciplinary experiences prior to GCS, while highlighting the value of student-led co-creation in developing graduate attributes,

career readiness, and mattering. These findings aim to inform the design of scalable student–staff partnership models that support sustainable and equitable futures across the HE sector.

## **Beyond Surveys: What Ethnographic Observation Reveals About Students' Digital Learning Tools**

**Karla Mihai, Danny Shevchuk, Hannah Weir, Matthew Stuart, Wiktor Lisewski**

*University of Glasgow*

Digital technologies are critical for university students, but current research frequently depends on questionnaires, which fail to reflect how students actively incorporate these resources. This study investigates how students integrate digital tools into their study practices and what factors drive tool adoption or abandonment.

Five researchers each recruited one participant from the University of Glasgow, conducting 10-15 minutes of observation followed by semi-structured interviews. Participants were third and fourth-year students studying computer science, English literature and linguistics, and geography. The team used open, axial, and selective coding to identify recurrent patterns across fields.

Four key themes emerged: (1) AI as personalized tutors: students use ChatGPT and Copilot for immediate and tailored explanations; (2) Timesaving as primary motivation: all participants valued tools that streamline workflows, with one noting that AI provides "unlimited" access that "makes it easier to stay in the same subject"; (3) Tension between digital and analog methods: despite digital convenience, students prefer handwriting for memorization, writing "the same phrase many times really quickly just so I can remember it"; (4) Rapid tool abandonment: students quickly discarded technologies with friction points including Grammarly's "too many pop ups" and OneNote's syncing failures.

These findings have practical implications for educators and technology developers. Successful tools must save time, minimize cognitive friction, integrate seamlessly, and

deliver immediate value. Tools increasing complexity or proving unreliable are abandoned regardless of support. The study challenges assumptions about digital-native students and offers an empirically grounded framework for building student-centered technologies aligned with authentic behaviors.

## **Investigating the relationship between spatial skills, programming and attitudes towards computing in a Scottish primary school**

**Juliet Wallace**

*University of Glasgow*

There is a persistent gender gap in the study of computing science with women choosing to study computing at lower rates than men (Smith and White, 2025). Research has shown a correlation between spatial skills (the ability to mentally manipulate and transform objects) and computing science (Parkinson and Cutts, 2019). Those with better spatial skills may feel more confident learning programming due to the link between these skills.

Spatial skills can be developed through childhood play activities, such as play with blocks or video games. These activities are often seen as traditionally male and research has suggested that lower rates of engagement in these activities in childhood contributes to women having, on average, poorer spatial skills (Cherney et. al., 2014). The suggestion is that reducing the spatial skills gap in childhood may also lead to a reduction in the gender gap within computing science.

Improvements in spatial and maths skills have been shown from an intervention which integrated spatial skills within maths lessons for primary school aged children (Lowrie and Logan, 2023). In this research, an integrated approach is trialled but instead integrates spatial skills within computing lessons for a primary school age group. This study takes a mixed-methods approach in which pupils complete pre- and post-testing with the researcher present to lead lessons and observe pupil engagement. Focus group sessions are used to gauge attitudes. It is anticipated that evidence of a connection

between spatial skills and attitudes/ability in learning programming in this age group will be found.

## **Development and Optimisation of an On-Premise Virtual Computing System with an Intuitive User Interface**

**Harry Smith**

*Blackpool College*

Within a university computing department, increasing local demand for practical virtualised teaching environments prompted a need to reconsider how such systems are designed and adapted in practice. Rather than responding to this requirement through formal research, this project emerged from direct observation of institutional needs, available resources, and limitations of existing approaches. The aim was to design a flexible and locally controlled virtual environment capable of supporting undergraduate teaching at scale.

The project involved the design and implementation of a virtual computing environment built using Proxmox on existing on-site servers. An iterative, practice-led approach was adopted, beginning with a tightly controlled and isolated system. As the environment entered active use, emerging requirements around scale, access, and student autonomy informed successive changes to network organisation and led to the development of a bespoke web-based platform for provisioning and managing student virtual resources.

Key outcomes included improved efficiency in provisioning virtual environments, reduced administrative effort, and greater flexibility in supporting teaching delivery. These outcomes were not predefined but emerged through sustained use and incremental adaptation of the system.

The project demonstrates how infrastructure can be effectively shaped through observation-driven decision-making rather than predefined technical specifications. By documenting this process, it offers transferable insight for other institutions seeking adaptable, locally governed virtual environments that respond to real needs.

# Multiplexed Chromogenic Immunohistochemistry as Clinically Deployable Data-Rich Biomarker Assays

**Natasha Reid, Leah Officer-Jones, John Le Quesne**

*University of glasgow*

There is increasing demand for detailed biomarker profiling in clinical pathology; however, this is often constrained by limited biopsy tissue and the need for rapid diagnostic turnaround times. While multiplex immunoassays, which enable simultaneous detection of multiple protein biomarkers within a single tissue section, are advancing rapidly in research settings, they remain challenging to implement in clinical practice.

This project aims to bridge this gap by developing clinically compatible multiplex chromogenic immunohistochemistry (mIHC) assays. The assays make economical use of scarce biopsy tissue while enabling rapid and highly detailed histopathological characterisation

In collaboration with pathologists at the Queen Elizabeth University Hospital, we have designed three clinically relevant mIHC panels targeting specific diagnostic challenges to ensure translational relevance. To facilitate routine clinical adoption, the assays are being developed and optimised on the Ventana Discovery Ultra, a fully automated staining platform, using a wide range of tissues. The platform standardises staining protocols, reducing manual variability and ensuring the reproducibility required for diagnostic use.

Following staining, slides are imaged using the Olympus VS200 platform. Furthermore, Visiopharm pipelines are being developed for quantitative tissue and cell segmentation to enable sophisticated downstream phenotypic and spatial profiling.

This study demonstrates the feasibility of translating multiplex tissue profiling into routine clinical practice, with outcomes supporting the next generation of diagnostic tests for tumour classification and treatment selection.

# **Feticide; Reforming the Infant Life (Preservation) Act 1929 for Greater Chances of Imposing Criminal Liability**

**Inbsat Fatima**

*Newcastle College University Centre*

This is a legal research project aimed to deliver a reform proposal for the Infant Life (Preservation) Act 1929 to help establish the guilt in violent feticide cases. Section 1 of this act makes it a criminal offence punishable by up to life imprisonment to destroy the life of a child capable beyond 28 weeks gestation. Despite increasing attacks on pregnant women resulting in miscarriages, mostly in domestic abuse cases, just 6 people were charged for child-destruction, between 2019 and 2023 (CPS, 2023; Donovan, 2018). This is due to difficulty proving specific intent for child-destruction, so charges are often lowered to GBH (Grievous Bodily Harm) against the mother, resulting in lesser sentences as seen in Dusan Baku case (BBC, 2015). A reform is therefore much needed to protect the unborn children and pregnant people from acts of violence by ensuring proportionate accountability.

Hence, this will be secondary research using normative approach (Hamzani et al., 2023), focused at exploring if certain doctrines of mens rea (guilty mind) such as, recklessness and transferred malice can be adopted to satisfy the required mental element. Furthermore, a comparison with US law of Unborn Victims of Violence Act 2004 will be conducted as it is a comprehensive legislation that allows feticide to be treated as a separate offence despite a relaxed requirement of intent. It will also be argued to lower the gestational requirement to 24 weeks matching the legal abortion limit as the foetus achieves viability by this time (Tongue, 2024).

## **Purpose-Built Student Accommodation and Urban Housing Markets: Learning from Glasgow**

**Panida Intachakra**

*University of Glasgow*

The rapid expansion of purpose-built student accommodation (PBSA) has transformed the urban landscape of Glasgow. As higher education expanded, PBSA has become an integral part of the housing system to accommodate both domestic and international students. PBSA was expected to alleviate pressure on the private rented sector by moving student demand from houses in multiple occupation (HMOs) and increasing housing availability for local residents. However, evidence on whether PBSA functions as a substitute for private rental remains mixed and inconclusive. As a new housing supply it may act as a stabiliser, absorbing demand, yet its distinctive feature may generate a positive externality improving the area's attractiveness. Using transaction-level house price data from Glasgow City Council (1991-2013), this study estimates a regression model in which the logarithm of residential property prices is regressed on postcode-level PBSA concentration, controlling for property characteristics and year fixed effects. PBSA is measured using the distribution of bed spaces and grouped into quartiles to compare development intensity. The estimated coefficient on high PBSA concentration is positive, with statistical significance varying across the model specifications. Areas with greater PBSA exposure exhibit higher transaction values relative to low-exposure areas, suggesting that PBSA may generate localised amenity or neighbourhood transformation effects rather than purely relieving housing pressure. These findings challenge the assumption of PBSA as a standard supply-relief effect and highlight the importance of spatial variability and amenity effects when evaluating student accommodation policy and its implications for housing affordability.

## **Alternatives to Stars: Acceptability of Implicit Gender Fair Language in German**

**Rose Greetham**

*Newcastle University*

Background: This study addresses criticisms of gender-fair language (GFL). German writers use diversifying forms (Lehrer\*in ‘teacher’) for general statements representing all genders, instead of the male-biased generic masculine Lehrer ‘teacher’. While the asterisk includes nonbinary people, they feel better represented by gender-neutralising forms like epicenes, which do not inflect social gender, e.g., Lehrkraft ‘teacher’ (Löhr,

2021). Critics argue the asterisk impedes legibility and consistently oppose institutional approval. The field must consider alternatives.

Current study: 40 adult German speakers participated in the first judgement task comparing both forms' acceptability, recruited from social media and snowball sampling. Each question included a minimal sentence pair, e.g., Lehrkräfte / Lehrer\*innen müssen fleißig arbeiten 'teachers have to work hard'. Diversifying forms included the asterisk and colon, and neutralising forms had epicenes and participles (Lehrende 'teachers'). Participants selected which they felt was better written, or that they were equally acceptable.

Results: Epicenes, compared to the asterisk, were the most preferred. Participants commented they flowed better and made more sense. Two participants were ostensibly against all GFL but had preferences between the options. These results suggest the most effective GFL policy minimises the unexpected disruption, as participants were more receptive to the colon, a thinner character than the asterisk. Overall, an epicenity-first approach seems most effective, followed by neologisms (e.g., the asterisk, French iel 'they'). These alternatives give gender-diverse individuals agency over their representation and address GFL criticisms.

## **Investigating the Protein CP12 a PRK chaperon in the Dark**

### **Alexandros Valsamis**

*Newcastle University*

Photosynthesis is essential for plant growth and food production, yet many proteins that regulate it remain understudied. CP12 is a protein present in most photosynthetic organisms. It is known to regulate carbon fixation by interacting with two key enzymes, phosphoribulokinase (PRK) and glyceraldehyde-3-phosphate dehydrogenase (GAPDH), in response to light intensity changes. Previous unpublished data suggests that CP12 might play a wider role in plants, more specifically by protecting PRK from degradation in darkness. This project aims to confirm that CP12 protects PRK from degradation under darkness and investigate the mechanism underlying its chaperoning function. Arabidopsis thaliana wild-type and CP12 knock downs seeds, were grown in

sterile petri dishes under long-day (LD) and continuous-light (CL) conditions. Seedlings were harvested after 10 days for protein extraction to identify the degradation of PRK between genotypes and growth conditions via targeted protein analysis. Additional seedlings grown under CL and LD were transferred to the opposite condition and harvested after 24, 48, 72 hours to monitor PRK levels. Analysis revealed that seeds lacking CP12 had a significant reduction of PRK under LD, while seedlings grown under CL retained detectable levels of PRK. Seedlings transferred from LD to CL showed visible reductions of PRK, whereas CP12 knock downs moved from CL to LD exhibited complete loss of PRK. Increasing our knowledge on this CP12 mechanism has enhanced our understanding on a core protein of the photosynthetic pathway, generating valuable data for future efforts in optimizing photosynthesis and carbon fixation, enhancing plant resilience and improving food security.

## **Tracing Back in Time: Reconstructing the Common Envelope Evolution of a White Dwarf-Brown Dwarf Compact Binary**

**Zhe Shuen Lee**

*University of Sheffield*

The common envelope (CE) phase is a critical stage in the life of binary stars. It occurs when a giant star engulfs its companion, trapping both in a shared envelope. As the binary spirals inward, orbital energy is extracted from it due to drag forces and transferred to the envelope. The envelope is ejected, leaving the giant's core as a white dwarf in a compact binary system. These systems can eventually become supernovae or gravitational wave sources. However, the CE phase remains poorly understood and requires constraining the envelope ejection efficiency via evolutionary reconstruction. This work presents an analysis of the short-period binary system ZTF J2121, a direct product of CE evolution consisting of a white dwarf and a brown dwarf, to provide constraints on this parameter.

High-precision spectroscopy and high-speed photometry were used to determine the stellar and binary parameters required for reconstruction. Shifts in the spectra were

analysed to provide the orbital velocities of the binary, temperature and surface gravity of the white dwarf. Statistical computer modelling simulations were then used to extract the masses and radii for both components from the eclipsing light curves. The CE reconstruction resulted in an envelope ejection efficiency value consistent with the low value range (0.24-0.41) reported by Zorotovic & Schreiber (2022) from a large sample of similar systems. Future work would involve calculating the envelope binding strength, incorporating additional energy sources, and better constraining the evolutionary stage of the giant star at which the CE phase occurs with more sophisticated stellar grids.

## **Exploring Healthcare Access for Hidden Populations in the Northeast of England During a Cost-of-Living Crisis**

**Eddie Buckley, Abigail Collins, Emma Lim, Jo Ball**

*Newcastle University*

What is the connection between the Cost-of-living crisis and Healthcare Access for Hidden Populations in the Northeast of England?

**Background** The Cost-of-Living Crisis (COLC) has seen a fall in real incomes as wages and benefit increases are exceeded by inflation. Previous research shows that healthcare access is affected by financial strains and socio-economic positioning. Two linked projects, one an NHS trust led research project (P1), another an undergraduate dissertation (P2) explore the experiences of healthcare access during a COLC for distinct hidden populations in the Northeast of England: Queer Identifying Individuals (P2) and Young People (P1).

**Methods** Data was gathered through both an online targeted population survey (P2) and two tailored youth group sessions (P1). All data was analysed thematically.

**Results and Conclusions** Both studies reflect that access barriers are rarely caused by a single factor. Instead, arising through the interaction of multiple identity positions (age, gender/sexuality and socio-economic circumstances) alongside COLC related strains. Participants described how social bodily norms in healthcare spaces - assumptions

about “typical” bodies, identities, and behaviour - make services feel unwelcoming. These experiences were intensified by structural economic pressures (rising costs, insecure incomes, and wider austerity-linked constraints) that shape both patients’ resources and the capacity of services. We conclude that more in-depth investigation into healthcare access challenges for hidden populations is needed to ensure equitable access; particularly important in an NHS intended to be free at the point of use. The projects lineage and shared conclusions warrant a joint showcase to seek further collaboration or publication.

## **The Politics of Dual Belonging: UK Nationals' Acquisition of EU Citizenship(s) Post-Brexit**

**Sadhbh Lawrie**

*London School of Economics and Political Science*

The 2016 Brexit referendum marked a profound shift in the UK’s relationship with the European Union (EU), reshaping debates around citizenship, identity, and belonging. While extensive scholarship has examined Brexit’s economic and political consequences, less attention has been paid to UK nationals who have obtained EU citizenship(s) without residing in an EU member state. My research aims to determine why UK citizens have acquired EU citizenship(s) after Brexit, focusing on the interplay between strategic and identitarian reasons.

Drawing on literature from citizenship studies, geography, law, political science, and sociology, this study challenges purely legalistic understandings of citizenship by foregrounding its emotional, symbolic, and identitarian dimensions. Methodologically, a mixed qualitative research design has been employed. A survey was used to generate data on patterns of EU citizenship acquisition by Britons since 2016, and I am now conducting semi-structured interviews from the survey cohort to explore individual stories of UK-EU citizenship and belonging. I am also using photography to capture objects participants associate with their identity and acquired citizenship, enabling an exploration of citizenship as an affective and embodied practice.

By conceptualising citizenship as both a legal status and a lived experience, this research contributes to broader debates on dual belonging and the everyday consequences of Brexit, offering insights into how citizenship has been reimagined in the context of political rupture.

## **Source Evaluation: Developmental and Comparative Insights from Humans and Chimpanzees**

**Achilleas Panagiotis Fanoulis, Olivia Coyne, Elizabeth Price, Bence Bago, Francesca De Petrillo**

Newcastle University

Every day, we encounter information coming from multiple sources, and must often reach conclusions using ambiguous, incomplete, or conflicting evidence. In a world marked by growing uncertainty and information overload, particularly given the rise of artificial intelligence, the evaluation of a source's credibility is an essential cognitive skill. Yet, despite its centrality to our reasoning and decision-making, little is known about how this evaluative ability develops across the lifespan, or how it evolved in the first place, as prior work has either examined isolated developmental stages or overlooked evolutionary perspectives. The present (ongoing) study investigates how humans of different ages (4-60) and chimpanzees- our closest living relatives- solve a probabilistic reasoning problem whilst receiving advice from sources of varying credibility. We employ a modified ratio-bias task, in which participants choose between two arrays with different reward probabilities, first independently and then with an advisor. This paradigm enables precise quantification of how participants weight their own judgments against external social cues, and whether these weightings shift as a function of age, advisor identity, or task difficulty. Comparative testing in chimpanzees allows us to assess whether source evaluation comprises a uniquely human capacity or an evolutionarily conserved feature of social living. We predict developmental and species-level differences, reflecting age- and species-specific cognitive biases, variations in learning competence, and distinct information-processing constraints. Findings aim to elucidate the underlying mechanisms of trust, scepticism, and epistemic vigilance, inform theories of social intelligence, and provide

insight into the vulnerability and resilience to misinformation in uncertain environments.

## **DDRugging Glioblastoma Through the Development of Smart Biomaterials**

**Maria Butchart, Spencer Collis, Tegan Torpey, Aimee Jackson, Oscar March**

*University of Sheffield*

Glioblastoma is a very aggressive brain cancer. The standard treatment is an invasive surgery for maximum tumor resection, followed by temozolomide (TMZ) chemotherapy and radiotherapy. However, residual glioblastoma stem cells (GSCs) often remain, which activate DNA damage response pathways (DDR). They repair DNA, leading to tumour recurrence. DNA damage response inhibitors (DDRi) block DNA repair and sensitise cancer cells to TMZ. However, they cannot reach the brain due to the blood-brain barrier (BBB) being practically impermeable. This project looks to study the local treatment of residual GSCs using a hydrogel disc loaded with either a DDRi or TMZ. Clonogenic assays measured U251 cell sensitivity to TMZ. Swelling assays and UV spectrometry monitored the release of a DDRi (ATMi) from the disc, with a standard curve used for quantification. The effect of the TMZ release on cells was assessed via immunofluorescence, while DNA repair activity was quantified using ImageJ after western blot analysis. Clonogenic assays showed reduced survival fractions, decreasing from 0.95 to 0.62 compared with 1.00 in controls. This is consistent with a dose-dependent loss of colony formation. Release of ATMi can be detected for up to 35 days, indicating prolonged therapeutic exposure. Western blots showed DMSO induced slight ATM activation. Immunofluorescence images showed that the polymer released most or all of the TMZ 21 days post-swelling. This project advances personalised and targeted medicine, with the potential to administer localised post-surgical cancer treatment. The work done contributes to a vital knowledge gap in glioblastoma treatment.

**Seeing Latin Leads**

## **Angela Covarrubias Franco**

*University of Leeds*

This research investigates how Latin America has been visually represented and perceived in Leeds from the 1980's to the present, examining the relationship between community practices, institutional programming, and the colonial gaze. Beginning with the question of how Latin America is 'seen' in Leeds, the project identifies a historically rich yet largely fragmented record of Latin-inspired visual culture, spanning club flyers, festival programmes, museum displays, and collaborative artistic works.

Methodologically, the study combines archival research in Brotherton Special Collections and Feminist Archive North with targeted desk research into film festivals, venue programming, and feminist distribution networks. Informal conversations guided searches, while all analysis centred on accessible, attributable materials. Metadata was compiled for each artefact and synthesised into an interactive public web exhibition featuring a timeline, thematic pages, and digitised graphics.

The findings reveal three patterns: the community visual practices in Leeds are vibrant but dispersed, obscuring their historical continuity; while exoticising imagery persists, Leeds-based programmers, educators, and artists are increasingly reworking the gaze through contextualised, credit-driven, and collaborative roles in circulating Latin American cinema locally, linking community and educational spaces.

By consolidating scattered traces into a single accessible resource, the project contributes new evidence to discussions of spectatorship, decolonial practice, and cultural memory. The resulting website serves as a living archive and learning tool, supporting students, programmers, and community groups in recognising, contextualising, and expanding Leeds' long-standing connections with Latin America.

## **Geographical Patterns of Race and Flood Risk in Colombia**

**Teagan Herbert-Davies**

*Newcastle University*

Flood risk presents a pertinent challenge in Colombia: sea level rise threatens its coasts and rainfall patterns are changing country-wide. This overlays--and is overlaid by--its racial geography, characterized largely by its predominantly white/mestizo highland center, contrasted by the large black and indigenous communities on its coasts and borders, one of many legacies of its history of slavery and colonization. While each of these topics have been investigated in their own right, their conjunction merits further exploration.

This project aims to explore the relationship between racial and hydrological geographies in Colombia by synthesizing published data on spatial demographics and implementation of management and response strategies, as well as qualitative material centering personal experiences and media representation.

Similar studies focusing on the United States have established that the concentration of black communities in areas vulnerable to flooding is compounded by existing institutional and social barriers, causing disproportionate damages to wellbeing. Casting an eye further south, this work asks: how directly paired are experiences of race and of climate in Colombia? How do its racial politics influence allocation of resources before, during, and after flood events? And what does this mean for a socially and climatically just future?

This is in keeping with growing momentum towards holistic, interdisciplinary approaches to issues of climate and human experience. A thorough understanding of socioenvironmental dynamics forms part of the groundwork necessary for more equitable policy in an uncertain future, and knowing where groups are left behind or disproportionately affected informs localized studies foregrounding solutions.

## **The Effect of Calcium Channel Inhibitor Thapsigargin on Bunyamwera Virus Infection in *Aedes aegypti* Mosquitoes**

**Sophie Miller**

*University of Glasgow*

Bunyamwera virus (BUNV) is an arbovirus transmitted by blood-sucking arthropods including *Aedes aegypti* mosquitoes. BUNV can cause febrile illness and in severe cases causes encephalitis or haemorrhagic fever. Climate change is expanding vector ranges, increasing the risk of arboviral transmission and emergence. No approved treatments exist for BUNV infection in humans or animals. This study aimed to test whether repurposing thapsigargin, an inhibitor of the sarco/endoplasmic reticulum  $\text{Ca}^{2+}$ -ATPase (SERCA), that regulates intracellular calcium levels, could reduce BUNV infection in *Aedes aegypti* mosquitoes. Thereby would decrease mosquito vector competence. This represents the first application of thapsigargin in a living mosquito model as a potential antiviral for BUNV. Adult female *Aedes aegypti* were reared and orally infected using BUNV containing blood meals supplemented with thapsigargin at 1  $\mu\text{M}$ , 10  $\mu\text{M}$ , or 100  $\mu\text{M}$ . Mosquitoes were sampled 3 days post-infection where the virus is replicating in the mosquito's midgut before dissemination into neighbouring tissues. Infectious viral titres were determined by plaque assays, a method that measures the number of infectious virus particles in a sample, performed on BHK-21 cells. Viral RNA was quantified using quantitative PCR (qPCR), a sensitive technique for measuring RNA levels, with primers targeting the S, M, and L genomic segments of BUNV. Both plaque assays and qPCR demonstrated dose-dependent reductions in infectious viral titre and viral RNA following thapsigargin exposure, with effects reaching statistical significance. The results indicate that thapsigargin substantially reduces BUNV infection in *Aedes aegypti* and highlights its potential as a vector-targeted antiviral.

## **Structural Shifts in the Phillips Curve: A Cross-Country Analysis**

**Gregory Caron**

*Northeastern University*

This project attempts to explain the contemporary relevance and structure of the Phillips Curve across advanced and developing economies. Traditionally understood as an inverse relationship between unemployment and inflation, the Phillips Curve has served as a cornerstone of monetary policy for nearly seven decades, yet its empirical strength has weakened in recent decades. This project focuses on two key questions:

(1) How do different countries' Phillips Curves respond to shifts in labor productivity? and (2) How do different countries respond to changes in inflation expectations?

To answer these questions, the project combines a comprehensive review of theoretical and empirical literature with cross-country econometric analysis using macroeconomic data spanning recent decades. By comparing national experiences, the analysis explores how structural differences in productivity growth, labor markets, and monetary policy regimes shape the slope, structure, and stability of the Phillips Curve over time.

The project anticipates finding significant cross-country heterogeneity, with productivity dynamics and inflation expectations playing a central role in explaining the apparent flattening or instability of the Phillips Curve. These findings carry important implications for monetary policy, particularly as advances in artificial intelligence reshape productivity and central banking independence faces renewed challenges. By clarifying the conditions under which the Phillips Curve remains informative, this research aims to improve policymakers' ability to manage inflation and employment in an increasingly uncertain global economy.

Can Quantum Computing Accelerate Artificial Intelligence?

**Palak Shah**

*Durham University*

Artificial intelligence (AI) increasingly relies on large-scale computation, complex optimisation, and high-dimensional data processing. Classical computing is struggling to keep pace with this rapid progress. One potential solution is quantum computing (QC), although it remains unclear whether current quantum methods can meaningfully accelerate AI in real-world settings. This research examines whether quantum algorithms are likely to accelerate progress in AI, rather than assuming such acceleration is guaranteed.

The study combines a structured review of key quantum algorithms relevant to AI, including the Harrow–Hassidim–Lloyd (HHL) algorithm, Quantum Neural Networks, and quantum optimisation techniques, with an evaluation of recent developments in quantum hardware such as topological qubits. Alongside this theoretical analysis, a small-scale practical experiment was carried out as an initial case study comparing a classical Support Vector Machine with a Quantum Support Vector Machine implemented on a simulated quantum backend.

The experimental results indicate that, for simple datasets, the quantum model performs worse than its classical counterpart due to factors such as noise sensitivity, data encoding overhead, and simulation costs. However, the wider analysis suggests that certain problem areas, including optimisation, planning, and high-dimensional kernel methods, show strong theoretical advantages as quantum hardware continues to improve.

The analysis offers a grounded perspective on where quantum methods might practically contribute to AI progress. By identifying realistic use cases and recognising current constraints, this work contributes to broader discussions on the future role of QC in AI and emerging computational technologies.

## **Entanglement-Enhanced Quantum Telescopes**

**Caitlin Morrison**

*University of Sheffield*

Telescopes create images of stars by collecting photons (light particles). Their resolution is improved by setting multiple receivers at a distance from each other. Photons are sent from the receivers to an interferometer. This measures phases which encode the star's angular location. Unfortunately, the loss of photons worsens with the distance they travel through a fibre optic. We explored how quantum theory and technologies can overcome this. To find a star's position, two phases must be measured. This requires at least three receivers. We calculated the maximum information that could be extracted from an incoming photon. We then calculated the actual information we extract from a photon with a specific measurement, in terms of

parameters to be determined. Optimum parameters were generated using an algorithm. With these, we found that the information obtained from a measurement could be maximised, and remained arbitrarily close to this maximum at small phases. To demonstrate this, we simulated data and estimated the phases that caused certain photon counts. The mean variances in these estimates decreased with the total photon count, as expected. Therefore, we concluded that an experimental setup exists that allows us to extract the maximum possible information from a single photon entering a three-receiver telescope. This would be realised by an interferometer with specifications given by the optimised parameters. Photons would be teleported here from the receivers, a well-studied technique in quantum information. Further research could explore multiple photon events or telescopes with more than three receivers.

## **Computationally Modelling Urban Heat Stress Under Climate Change Conditions**

### **Gustav Hills**

*University of Warwick*

Urban heat exhaustion poses a growing challenge to human health, especially as the frequency and length of heatwaves increase. As a result, our urban planning must adapt to mitigate rising thermal exposure. This project investigates the effects of surface composition and cumulative heat exposure using a grid-based numerical heat-diffusion model representing an urban environment. Cells are assigned thermal properties. Heat evolution is modelled using a time dependent solar heating system to represent day-night cycles. Multiple green space distribution strategies were implemented, including clustered, uniform, and dispersed configurations.

Simulations show that increased building density raises average temperatures in densely populated areas, while the distribution of green space significantly moderates local heat accumulation. The impact radius of green spaces is analysed to determine the distance at which they produce significant cooling beyond immediate adjacency. Warming scenarios are introduced by increasing the baseline temperature and reducing cooling rate.

Increasing green space coverage can reduce peak temperatures in urban areas by up to 20%, consistent with the higher reflectivity and lower heat retention of vegetated surfaces. However, the reduction is non-linear. Initial additions of green space produce large benefits, while unplanned expansions produce diminishing returns. The model also shows that cooling is spatially limited, with temperature reductions extending only a finite distance from vegetated areas. This indicates that the distribution of green space is as important as its total area, dispersed configurations are more effective than large isolated green space. This demonstrates that simple computational models can provide a framework for future urban planning.

## **Erasure of Indigenous Lineage and Naming Systems -The Politics of Naming and Belonging in Postcolonial Africa**

**Sarabel Odera**

*African Leadership University*

The systems of Naming in African Communities have long been a central mechanism of connection to community and lineage. Pre-colonization, many communities practiced matrilineal or dual-descent naming systems that reflected communal memory and ties to maternal lineage. Colonialism, however, introduced Christian and westernized naming systems that privileged patriarchal, paternal naming norms. This study examines how these colonial interventions reshaped African naming practices and asks how their effects continue to influence identity, gender relations, and belonging in postcolonial societies.

The research draws on feminist and decolonial studies, colonial legal texts, oral histories and historical archives and analyzes them using a qualitative and interdisciplinary approach. This method enables an examination of naming not only as a cultural practice but also as a tool of governance and social control. By tracing shifts in naming practices across colonial and postcolonial contexts, the study highlights the intersection of power, gender, and legitimacy.

The findings suggest that colonial naming systems continue to shape contemporary legal documentation, inheritance rights, and social recognition, often marginalizing

women's lineage and indigenous identities. The study argues that naming is a lived and ongoing issue with real consequences for dignity, inclusion, and cultural continuity.

By framing naming as both personal and political, this research contributes to broader conversations across disciplines, including law, gender studies, anthropology, and psychology. It highlights the importance of decolonizing identity systems as a step toward restoring equity, cultural memory, and more inclusive frameworks of belonging. That decoloniality begins first with self-identity before all else.

## **Womb to World Unheard Harm and the Justice Gap in Black Maternity Care**

**Keira-Nicole Grey**

*University of Warwick*

Black women in the UK are more likely than White women to experience harm or death during pregnancy and childbirth. While clinical research has documented these disparities, far less attention has been paid to how legal systems respond when maternity harm is shaped by racial discrimination rather than individual error. This research will focus on Black women's maternity experiences, examining how existing medical guidelines and legal systems address maternity harm and the implications of these responses.

This study will examine obstetric racism as a structural feature of maternity care. It will analyse how, despite medical guidelines designed to promote equality within the NHS, historical ideas rooted in slavery and colonial medicine continue to shape maternity care through racialised assumptions about pain, credibility, and risk. Using a socio-legal approach, the research will use legal analysis, public health data, and accounts of Black women's experiences to examine how these assumptions influence medical decision-making and access to redress.

Drawing on prior studies and comparative evidence, this research anticipates finding that many forms of racialised maternity harm remain invisible within current UK framework for redress. As a result, Black women are often required to self-advocate. A

comparative analysis with the USA will highlight alternative legal and policy approaches that offer greater scope for challenging systemic discrimination.

The findings will have wider significance for law and healthcare by showing that systems designed to address clinical mistakes are not suited to tackling racial discrimination and points reforms towards systemic accountability, rather than individual self-advocacy.

## **School Meals in India: Estimated Educational Impact of the Mid-day Meal Program**

**Akshaya Singh, Akshar Saxena**

*Nanyang Technological University, Singapore*

This paper examines the impact of school meal provision on enrollment rates in India. Although existing literature documents positive effects of school feeding programs on educational outcomes, limited evidence exists on heterogeneous impacts across states, schools, and sociodemographics in India. Utilizing data from the Mid-day Meal Scheme (officially PM-POSHAN), one of the largest school feeding programs in the world, we investigated how this intervention affects the educational impact across diverse Indian contexts. Using panel data covering 2,224,554 school-year observations from 2010-2017, we use fixed-effects regression models to estimate program impacts while controlling for time-invariant characteristics. Our analysis reveals that meal provision increases enrollment by 6% on average, with significantly larger effects for females over males. Disparities persist across grades and caste groups, with substantial variation across states. We further examine the interactive effects between infrastructure and meal provision, and find larger gains for under-resourced schools. These findings demonstrate that school feeding programs are effective policy interventions that can promote educational access and reduce inequalities in India.

## **Beyond The Bust: A New Narrative For Better Inclusive Design**

**Yik Nok Bryan Lee, Ambreen Chohan, Lauren Haworth, Steven Brindle**

*University of Lancashire*

The design of breast support garment has remained relatively similar since the 1930s. Failure to accommodate the natural diversity of female breast has led to poor bra fit, negatively impacting on women's physical, mental, and overall wellbeing. This study aimed to explore barriers and facilitators to wearability, bra fit.

This cross-sectional cohort study incorporated a mixed methods questionnaire with females. The question domains included: Participant characteristics, Bra Purchasing Habits, Wearability, Challenges with current bras, and Solutions to overcome challenges. Descriptive statistics, thematic analysis and one-way ANOVA were used for data and statistical analysis.

Three hundred responses were included in the final analysis. Most participants (n=242, 81%) reported wearing a bra daily. 64% of respondents had not been professionally measured in the last year or had forgotten their previous fitting date. Age, religion, disability, level of education and employment status all showed to influence participants' responses to the Wearer Acceptability Scale ( $P < 0.05$ ). Facilitators to improved design highlighted development of more affordable, accessible bra options, with focus on ease of fastening, strap design, better underwire alternatives and improved sizing and fitting systems.

This novel study evidenced the current barriers and facilitators women experience daily with bra wearability and fit across key individual, task/design, and environmental factors. Better person-centre design has potential to reduce health inequalities. Well-designed bras are needed to address both functional and sensory concerns across diverse body-types and needs to improve health and wellbeing for women.

## **Alzheimers Disease: Autophagy Dysregulation in Microglia**

**Prisha Mehta, Amy Lloyd**

*University of Dundee*

Alzheimer's disease (AD) is a neurodegenerative disorder which is estimated to affect over 55 million people globally. This disease is associated with amyloid beta ( $A\beta$ ) plaques, abnormal protein clumps that build up and cause memory issues such as dementia.

Microglia, the brain's immune cells, clear away  $A\beta$  plaques through autophagy, a process that removes harmful cells in the body. However, in AD, microglia become dysregulated, leading to impaired  $A\beta$  plaque removal. To understand the role of autophagy in microglia, and if dysregulated autophagy is a feature of microglia in AD, key proteins associated with autophagy in microglia from a mouse model of AD were investigated.

Mass spectrometry data from isolated microglia in the mouse model at 3, 6, and 9 months old were analysed, and autophagy proteins LAMP2 and Beclin-1 were identified. To verify their expression, they were stained along with IBA-1 (microglia marker) and  $A\beta$ , to identify plaques, using immunofluorescence. Quantification of the images revealed a significant increase in LAMP2 and Beclin-1 in microglia from AD brains compared to controls. Beclin-1 was most significant at 3 and 12 months, while LAMP2 was most significant at 3 and 6 months.

In conclusion, LAMP2 and Beclin-1 are potentially expressed in microglia in AD brains, suggesting a role for both autophagy proteins in clearing  $A\beta$ . Further work is required to understand if these proteins are responsible for dysregulated microglia responses in AD, and if either could be targeted to promote microglia  $A\beta$  clearance to rescue disease pathology.

## **A Tale of Two Creeks: Redlining and Creek Flood Risk Perception in Austin, TX**

**Crystal Alao**

*University of Texas at Austin*

Throughout the early 19th century, Austin, Texas, among over 200 other U.S. major cities, used a race-based grading scheme to disparately map housing loan eligibility.

This practice of redlining deemed predominantly Black neighborhoods the most hazardous and least worthy of loans, while predominantly white upper-class neighborhoods were deemed safe and desirable. Redlining is connected to a plethora of contemporary environmental injustices, with recent studies finding that properties in previously redlined neighborhoods experience disproportionately higher exposure to flood risk than similar properties in non-redlined areas. This paper aims to contribute to this literature by examining redlining's impact on hydrological flooding and racial differences in flood risk perception. In environmental justice (EJ), risk perception describes how a community evaluates the risk of interacting with or living in close proximity to potential environmental hazards. With flooding being the most common and costly natural disaster in the U.S., investigating flood risk perception helps better understand disparities in the social vulnerability of populations, thereby allowing for more holistic flood mitigation strategies. This research explores connections between redlining, race, and present-day flood risk perception through a comparison of two Austin creeks: Boggy Creek in the previously redlined East Side, and Shoal Creek in the non-redlined West Side. Using a mixed methods approach consisting of resident surveys, ethnographic interviews, and historical archival analysis, I investigate the societal implications of differences in flood risk perception across spatial and racial factors: neighborhood redlined status and resident race.

## **Life Cycle Assessment of Electric Heavy Goods Vehicles for Sustainable Freight Transport**

**Aidan Roberts, Elizabeth Morgan, Mardin abdalqadir**

*Newcastle College University Centre*

Heavy goods vehicles (HGVs) are a major contributor to greenhouse gas emissions and air pollution within the freight transport sector, largely due to their dependence on petroleum-based fuels. In response to increasing environmental concerns and regulatory pressure to decarbonise transport systems, electric heavy goods vehicles (EHGVs) have emerged as a potential low-carbon alternative. This study evaluates the sustainability of EHGVs in comparison with conventional diesel-powered HGVs using a Life Cycle Assessment (LCA) approach.

The assessment considers environmental, economic, and operational factors across the full vehicle life cycle, including vehicle and battery production, energy generation, vehicle operation, and end-of-life processes. Key indicators analysed include carbon dioxide emissions, energy efficiency, and impacts on local air quality. Economic aspects such as capital costs, operating and maintenance expenses, and total cost of ownership are also examined. Operational constraints, including driving range, battery mass, charging infrastructure availability, and payload capacity, are critically assessed to evaluate practical applicability.

The results indicate that EHGVs can achieve substantial reductions in operational greenhouse gas emissions and improvements in local air quality, particularly when electricity is generated from low-carbon sources. However, overall sustainability performance is strongly influenced by the electricity generation mix and the environmental impacts associated with battery manufacturing. While EHGVs are well suited to short- and medium-distance freight operations, limitations related to range and charging infrastructure currently restrict their suitability for long-haul transport.

The study concludes that EHGVs have significant potential to support more sustainable freight transport, although widespread adoption depends on continued technological development and infrastructure expansion.

## **Sonic Hues in Immersive Therapeutic Sound Design: Exploring Spatial Audio for Neurodiverse Wellbeing- By Amanda Drury**

**Amanda Drury**

*Blackpool College*

Drawing from music therapy, sound design, and contemporary installation practice, this research explores the therapeutic potential of multisensory audio environments. It examines how sonic hues and spatial audio technologies can be applied within immersive sound installations to support emotional regulation, focus, and creativity in neurodiverse individuals. With rising diagnoses of conditions such as ADHD and ASD, and long delays in accessing specialist support there is an increasing need for alternative, non-clinical environments that provide sensory stability and cognitive

support. Drawing from music therapy, sound design, and contemporary installation practice, this research explores the therapeutic potential of multisensory audio environments.

Across a 33-week practice-based investigation, six musical compositions will be created using distinct sonic hues, each designed to evoke varied emotional or cognitive responses. These will be presented through a multi-speaker installation featuring overhead spatialisation and colour-responsive lighting to create an immersive environment. A mixed-methods research design will be used: secondary literature review, analysis of existing sound installations, and primary data collection through questionnaires.

Anticipated outcomes include insights into how specific sonic hues influence participant mood, concentration, and perceived creativity, and how immersive spatial audio shapes user comfort and sensory engagement. The research aims to identify practical considerations for designing therapeutic sound environments within educational or community spaces.

By merging creative sound production with therapeutic inquiry, this project contributes to interdisciplinary discussions on sound-based wellbeing interventions. It positions immersive audio not only as an artistic medium but also as a potential tool for accessibility, neurodiversity support, and inclusive sensory design.

## **The Impact of Wastewater Treatment Works Discharge on Chalk Stream Biofilms**

**Hannah Rhodes, Sally Little, Erika Whiteford**

*Nottingham Trent University*

Chalk streams are a globally rare habitat, with 85% of the total located in England. Their unique geology and nutrient rich water support a great variety of wildlife, making them ‘hot spots’ for biodiversity. Despite their ecological value and rarity, they are threatened by wastewater pollution. Wastewater pollution disrupts the natural microorganism communities that cover the stream bed, leading to the development of

undesirable river biofilms -URBs. These URBs thrive in polluted water systems, outcompeting the natural communities. The aim of this study was to investigate the role of wastewater discharge on biofilm structure and function in chalk streams. To carry out this study a variety of conditions were measured. Water upstream and downstream of sewage treatment works was analysed using the following methods: enzyme activity (phosphatase), phosphate, chlorophyll an and 16S amplicon sequencing. The results showed that wastewater discharge increased phosphate, chlorophyll an and bacterial diversity in chalk streams. Enzyme activity decreased in response to an abundance of phosphate rich wastewater. Next steps include further evaluation of 16S amplicon sequencing using R studio to better understand which bacterial species are driving the shift in diversity. Chalk streams have large effects on ecosystems and people. Due to their abundance in England, they are of great cultural significance and an important part of our heritage that we must preserve. Understanding wastewater pollution and URB growth is crucial to the protection of our freshwater ecosystems, supporting policy change and prevention methods.

## **A Review of the Learning Curve Progression of Robotic Assisted Surgery and its Clinical Significance**

**Tsz Fung Kwok**

*University of Leeds*

Current literature on robotic-assisted surgery suggests that it is feasible and safe. However, the length of surgeon learning curves regarding surgical and functional outcomes is unclear. This review examines literature investigating learning curves of robotic-assisted surgery with three aims: identifying learning progression and factors, comparison with learning conventional methods, and clinical significance of studies. The hypothesis was that a quantifiable learning curve exists for surgeons training in robotic surgery. I used a systematic search strategy for studies assessing learning curves for robotic surgery between December of 2015 and 2025 across PubMed. The PRISMA flow diagram for reporting systematic reviews presents the screening process, and the review was evaluated with quality assessment guidelines. 36 studies met inclusion criteria and were reviewed.

Majority of studies quantified learning using operating time, with a range from 7 to 79 cases needed for proficiency observed. Key ideas proposed by studies to facilitate surgeon learning included general robotic training before specialization, case selection for surgeons early in their learning, mentorship and collaborative learning. For study design, considerations covered the significance of increasing prospective studies, long-term patient follow-up, accounting for systematic differences and applying pre-defined statistical limits. Areas requiring further research include the training of team members like bedside assistants and surgeon stress during different phases of the learning curve. A significant learning curve can be seen in most robotic-assisted procedures, although variation in outcomes and outcome measures is substantial. Future research should prioritize applying standardized methodologies and detailed assessments of confounders to improve clinical interpretability.

## **The Importance of Support for Children Growing up in a Household with Parental Mental Health Conditions**

**Kelly Reid**

*University of glasgow*

The Children's Commissioner (2019) states that 2.9 million children across the United Kingdom (UK) are living in a household with a parent or caregiver that is affected by a mental health condition. JSNA Blackpool (2025) recorded that 49.3% of child assessments flagged that parental mental health was one of the main factors in children in need cases, this is significantly higher than any other area within the UK. (Cudjoe, Chiu, 2020). Causing greater implications for the child when it comes to education, health, and social skills. Kristensen, Lauritzen, Reedtz (2022), Wepf, Leu (2022) and (Behrens, 2025) all suggest that children who have a parent or caregiver with a mental health condition are at a greater risk of developing a mental health condition themselves, along with developmental impacts on, social, emotional, cognitive, and behavioural wellbeing.

The research will analyse professional perspectives on the importance of providing support to children growing up with parental mental health. Further exploring the

support available and what improvement could be suggested. An online questionnaire will be used to gather professional opinions of qualitative cross-sectional design semi-structured questions composed of open-ended questions. The semi-structured questionnaire with open-ended questions will allow professionals to explain in detail their perceptions and experiences of service adequacy (Weller, 2018). Further analyse will take the form of Braun and Clarke thematic analyse method to gather rich professional examples for individuals working in the sector.

## **Translational Standardisation of Ganoderma lucidum Bioactives: Structural Verification and Quality Control of Ganoderic Acid A**

**Chinn Yeu Wu**

*University of Lancashire*

Ganoderic acids are triterpenoid bioactive compounds derived from *Ganoderma lucidum* that have attracted interest for potential anti-cancer activity via proposed mechanisms including immune modulation, anti-angiogenesis, inhibition of tumour cell proliferation, and apoptosis induction. This study aimed to support development of high-quality *G. lucidum* extracts and establish a reliable verification framework for ganoderic acid A, enabling improvement of bioactivity and its use in health-related applications.

An ethanol extract of *G. lucidum* was prepared using an NMR-guided extraction approach, where NMR spectroscopy was used to monitor and optimise extraction conditions to enhance target compounds, followed by isolation and crystallisation of ganoderic acid A. Stereochemical structure was confirmed by X-ray crystallography and supported by density functional theory (DFT), a computational method that predicts molecular structure based on quantum mechanics. For quality and authentication purposes, a rapid chemical fingerprinting technique (high-performance thin-layer chromatography) was used to detect index components. Finally, the fungal identity was confirmed using a DNA-based method that confirms the biological species by comparing a standard genetic marker with known reference sequences.

Key outcomes include a verified ganoderic acid A reference, a reliable quality control method to confirm the identity of *G. lucidum*, and a method to maintain consistency in extract composition between batches. This provides a practical foundation for consistent, high-quality applications in cosmetics, food, and health products, where maintenance effects depend on reliable composition and repeatable dosing over time, and supports future studies linking ganoderic acid A content with measurable biological activity.

## **Designing Psychologically Responsive Levels in Unreal Engine Systems**

**Adam Salter**

*Blackpool College*

To what extent can facial tracking be integrated into gameplay, to enhance player engagement and satisfaction? Motion capture has been widely applied in gaming in the last 20 years, primarily for character animation and VR interaction. However, emotionally responsive gameplay has stagnated with accuracy problems and hardware friction, with PC systems largely relying on traditional keyboard controls and restrictive difficulty settings. This study aims to resolve this by integrating python-based facial tracking with adaptive game mechanics, tailoring Unreal Engine 5 gameplay around the user's emotional state.

Participants aged 18–30 with gaming experience had their facial expressions monitored during gameplay, detecting signs of contentment, boredom, or frustration. Throughout the simulation, changes in facial expressions triggered the display of an on-screen prompt. When displayed, player confirmation was used to validate detected signs of boredom or frustration during gameplay, prompting adaptive difficulty adjustments. This overall aims to create a more responsive and personalised gaming experience.

Findings from this study indicate that adaptive difficulty systems that are highly responsive may inadvertently limit the player in gaining new skillsets and overall exploration during gameplay. Overly responsive systems could unintentionally restrict the range of strategies and experiences the player encounters, focusing on making the

user relaxed, rather than allowing the user to experience strong emotions, both positive and negative. However, when applied selectively as supportive layer rather than a replacement system, emotionally responsive gameplay demonstrates potential to enhance usability and accessibility in modern PC games.

## **Website Security Risks and Mitigation Strategies in a School Management System**

**Ogbeide Prince**

*Newcastle College University Centre*

Web-based school management systems are increasingly used to store and manage sensitive student, staff, and academic data. These systems are helping improve efficiency and ease of access for students. They are also highly susceptible to frequent cyberattacks due to weak security design and poor input validation. This study, therefore, examines website security weaknesses and vulnerabilities, focusing on the school management system, and evaluates practical mitigation strategies to reduce associated risks.

Research Focus:

1. SQL Injection (SQLI),
2. Cross-Site Scripting (XSS)
3. Cross-Site Request Forgery (CSRF)

By using a security-focused web design, this project analyses how these vulnerabilities can be exploited within student management platforms and the risk that they pose to data confidentiality, system integrity, and user trust. The project will also involve Real-world security breaches, such as those at Sony Pictures and YouTube, to illustrate the consequences of insecure web applications.

The methodological approach combines the evaluation of mitigation techniques commonly used in secure web development, vulnerability analysis, and literature

review. These include strict input validation, the use of anti-CSRF tokens, secure cookies, and regular security testing and code reviews. Parameterised queries are also a notable approach to help control any form of data breach.

The findings show that the security vulnerabilities of various websites can be prevented through secure coding practices. This research emphasises the importance of applying security principles to educational systems that manage sensitive user data. The goal of this research is to improve awareness of security risks and provide guidance for developers building management systems.

## **The Accessibility of Social, Emotional and Mental Health Support for Young People and Families within Secondary Schools**

**Teresa Lynch**

*Blackpool College*

Wellbeing support can be accessed by children and young people in both primary and secondary schools. Many schools have low level support in place in the form of Pastoral Care and support networks, details of these can be found via school websites, (St. Mary's Catholic Academy, 2025; Montgomery Academy, 2025). Low-level support is not available in all schools this adds to increased waiting times for Children and Adolescent Mental Health Services (CAMHS), with some children facing wait times of up to two years (NHS England, 2025). As a result, several children may age out of the system before receiving support and will then require referral as adults. The researcher decided to delve further into this topic after talking with parents and carers in Blackpool, England, whose children, ages Eleven to Sixteen, attend mainstream education. The parents and carers reported that support for both children and families appear to decrease as children move from primary to secondary schools. The aim of the research is to examine current research on the government stance on the need for children's social, emotional and mental health support in schools and whether there is a recognised need to support immediate family members too. An interactive quantitative questionnaire sent to the parents of 20 children and structured interviews with

professionals will allow the researcher to gather responses from parents and professional on their views and experiences into what support they would like to be offered.

## **A Practice-Led Investigation into Player Perception of Procedural Environment Design in Unreal Engine 5**

**Carl Jones**

*Blackpool College*

Procedural Generation tools have become a necessity with increasingly complex games. Unreal Engine 5 has created a pipeline of tools to implement these systems, but finding the balance between player cohesion and the scale of an environment is a struggle for both amateur and professional developers.

The dissertation is a practice-led investigation into this pipeline. By using the tools the engine provides, a large-scale environment will be created. Players will navigate a short section of this level, and their perception of the implementation will be explored. Inconsistencies with procedural generation will be recorded. To further enhance the results, certain sections of the artefact will have pieces generated that do not fit with the environment and player acknowledgment of these purposeful flaws will be recorded. Secondary research from professional developers has already been conducted, several of which use these tools in their work.

The importance of this investigation is to see how these tools work at larger scales and note any change in player perception. By placing purposefully incorrect pieces into the environment it is possible to understand the correlation in the tension between intended changes to procedural generation or the reliance on automated generation.

The results are expected to show that players do not notice the initial area is generated procedurally, and some players noticing the generation alterations in the second area. Understanding these results will insights into using these tools responsibly.

Footage of In-Progress Artefact: [https://www.youtube.com/watch?v=wboAO\\_d8Bvw&list=PLc0\\_CITAzxuoB0-v8Sk\\_R0TEmpTId6F0y](https://www.youtube.com/watch?v=wboAO_d8Bvw&list=PLc0_CITAzxuoB0-v8Sk_R0TEmpTId6F0y)

## **Why Do Crises Strike When Confidence is Highest? Measuring Financial Fragility Ahead of the 1997 Thai Crisis**

**Thanaphon Promvijit**

*University of Leeds*

In the 250th anniversary year of The Wealth of Nations, economic focus often falls on the "invisible hand" guiding markets to equilibrium. Hyman Minsky's Financial Instability Hypothesis offers a challenging counter-narrative: that prolonged stability itself encourages risky behaviour, naturally transitioning an economy toward a crash. While Minsky's theories are widely discussed, empirical applications, particularly in the context of emerging market crises, remain relatively scarce. This project bridges that gap using quantitative analysis of the economic boom and bust of Thailand, the epicentre of the 1997 Asian Financial Crisis. The study asks whether Thailand showed measurable build-ups of financial fragility before the Crisis, and whether those signals help explain the subsequent collapse in output and investment.

This study constructs indicators of private-sector fragility—e.g., credit expansion, leverage and debt-service pressure, asset-price, and banking-sector stress—and relates them to real-economy outcomes (GDP and investment) using time-series econometric methods to capture these dynamic, lagged relationships. Model specifications are chosen based on the data's statistical properties, with robustness checks using alternative measures and crisis-period definitions.

Anticipated results suggest that credit expansion coincides with strong short-run growth, but that downturns become more likely and more severe in the longer term, once repayment burdens rise. In other words, warning signs may intensify while the economy looks healthy—consistent with Minsky's theory that 'stability is destabilising'. This study provides a historical roadmap for detecting these warning signs and macroprudential policy in modern economies.

# The Bauhaus Schemata: Rethinking Pedagogy in UK Architectural Education

**Jacob Laslo**

*Oxford Brookes University*

Through a critical analysis of UK architecture curricula (and its recent reforms), institutional structures, and accreditation frameworks, my research suggests how current architectural educational models suppress risk-taking, emotional intelligence, spatial experimentation, identity cultivation, reflection, and promoting diversity in learner types. The study draws on architectural theory, historical precedents such as the Bauhaus, and contemporary pedagogical discourse, alongside a practice-based methodology that incorporates painting, photography, photograms, and sculptural experimentation as parallel forms of architectural research.

By positioning art as a means of spatial inquiry—capable of investigating atmosphere, materiality, perception, and embodiment—this research proposes an alternative educational framework in which architectural thinking is developed through making, sensing, and abstraction as much as through technical resolution. The work argues that such an approach not only strengthens architectural design outcomes but also equips future architects to respond more sensitively to ecological, cultural, and social complexity.

Ultimately, this research calls for a shift away from the current architectural education toward a radical, slower, more reflective, and materially engaged pedagogy. It suggests that re-embracing artistic practice within architectural education is not a regression, but a necessary evolution in training architects capable of meaningful, humane, environmental, and future-oriented design.

The time is now for a radical change in UK architecture education.

**Support for speech and language development within early years settings**

## **Jessica Busby**

*Blackpool College*

The early years foundation stage (EYFS) classifies communication and language as a prime area in terms of development. This area is vital because if this area of development is not established in the first three years, it can have a detrimental impact on a child's overall development, resulting in complex tracking and subsequently delaying interventions. This focus is predominantly premeditated to prevent communication and language inequalities. Finders, et al, (2023), considers strategies used by early years settings to promote Speech and language, evaluating pathological, collective and environmental approaches to enhance communication and language development. That is a focal point on practitioner interaction, this specifies that a child survives on back-and-forth child and adult language interactions. The aims of the study will investigate the strategies are employed by early years practitioners within early years settings to support and enhance speech and language development in children and young people. The methodology will use a mixed-methods approach that will combine both qualitative and quantitative techniques to ensure a comprehensive analysis of the data that was collected from a wide range of professionals. The findings will highlight that language rich environment is vital and more beneficial within a child's language development, rather than focusing on a child's spoken word count.

## **Creating Bilingual Spaces to Support Emotion Conversations Among People with Autism**

### **Jessica Duff**

*Newcastle University*

Conversations about emotions are difficult, especially when bilingual, as different languages represent emotions differently. Autistic traits (including difficulties with social interaction and communication) may complicate this further, making communication feel impossible. Yet, there is a notable lack of autism-related supportive frameworks for bilinguals, with the majority being strictly monolingual.

Talking Mats (TM) is a monolingual framework that facilitates expression through visuals, using a scale across which image-cards are placed. The present study proposes an adapted, bilingual version of TM and gauges its usefulness. We hypothesise the following:

H1: The bilingual TM will improve communicative confidence in bilingual individuals.

H2: Individuals with increased autistic traits will benefit more from the bilingual TM.

The adaptation incorporates language/culture-specific images and words with one language on each side of a card (e.g. ‘sentirse abrumado’, to feel overwhelmed). This should support comfort and reciprocity, bridging gaps between differences in emotional representations. The Comprehensive Autistic Trait Inventory will measure autistic traits. Communicative confidence will be measured through the researcher's judgements on effectiveness of communication, participant evaluations of their engagement, and participants' use of both languages (i.e. the richness of their self-expression). A pilot study (n=15) guided the methodology; Main-study data collection is ongoing.

The importance of this research lies in finding better ways to aid those at risk of emotional suppression, including those isolated in a language environment or operating with a neurodevelopmental condition. The project has the potential to improve communication and regulation for a vulnerable, under-represented population, enhancing their functioning in daily life.

## **Does Insula Play a Role in the Premonitory Urge in Tourette Syndrome?**

**Yaohui Zhang**

*University of Glasgow*

Tourette syndrome (TS) is a neurological disorder characterized by motor and vocal tics with onset typically during the childhood. Over the recent decades, it has been

proposed that the tic behavior should be defined as “semi-voluntary” and triggered by an uncomfortable internal bodily sensation called “premonitory urge” as opposed to the initial theory that considered it as completely “involuntary”. The insula—implicated in interoceptive processing and affective evaluation of bodily states—has emerged as a plausible target for understanding urge generation and its relationship to tic expression. This study conducts the systemized review to critically evaluate the existing primary research literature from Pubmed that using neuroimaging techniques to assess the insula’s abnormalities from several different biological aspects and PUTS to assess the severity of PU, further insula’s role in PU. Specifically, PU severity was most consistently related to altered insula-centered network connectivity, particularly with motor preparation and control-related regions, alongside structural associations within insular subregions. Neurochemical findings were comparatively limited and less consistent. Overall, the evidence supports a network-based role for the insula in PU, while highlighting substantial heterogeneity in imaging methods, task contexts, and insula parcellation, as well as limitations of PUTS as a primarily trait-level measure. In addition, standard GLM analyses often rely on a universal canonical HRF, which may not capture context-specific hemodynamic responses and can reduce the precision of neuroimaging estimates. Future research should aim to standardise approaches and employ more precise modelling to better elucidate the insula's specific role in PU in TS.

## **Exercise Alters Levels of Macrophages in Mesothelioma Tumours**

**Phoebe Southam, Dr Brindley Hapuarachi, Professor Munitta Muthana**

*University of Sheffield*

Immunotherapy has improved outcomes in many cancers by enabling immune cells to recognise and attack cancer cells. However, its effectiveness is dependent on the levels of immune cells present within tumours. Macrophages play a vital immune role within the first-line defence against threats. Within tumours, they exist mostly as two types M1 and M2. M1 are “good” as they have the ability to destroy invaders and initiate further immune responses while M2 are “bad” as they promote tumour growth. In

mesothelioma tumours, a cancer which affects the lining of vital organs (like the lungs), macrophages are skewed towards a M2 profile which can lead to resistance against immunotherapy. This research aimed to investigate whether exercise alone or combined with immunotherapy could alter the macrophage profile present in mesothelioma mouse tumours. Mice were divided into four groups: immunotherapy with/without exercise and isotype control drug with/without exercise. Each of the mouse tumours were then fluorescently stained to show the levels of M1/M2 present and were counted using image J software. The findings observed fewer M2 macrophages and enhanced levels of M1 macrophages in both exercise conditions compared to non-exercise mice with the control drug. This suggests that exercise alone and combined with immunotherapy can positively alter the macrophage profile in mesothelioma tumours. These results indicate promise that combining immunotherapy with exercise might increase immunotherapy responses in mesothelioma patients. Clinical trials are needed to correlate these findings in patients with mesothelioma.

## **Stroke of Genius: Developing a Reconfigurable Upper Arm Telerehabilitation Robot for Stroke Patients**

**Mohammed Ruhaan Butt**

*University of Leeds*

Every 5 minutes, someone suffers a stroke in the UK. Stroke survivors can benefit greatly from intensive rehabilitation in the early stages of recovery, but such exercises are limited to short in-person clinic sessions. This project addresses this gap by developing a low-cost adjustable upper arm telerehabilitation device that enables stroke patients to perform guided, gamified therapy at home.

The development of the device was broken down into 4 stages: design, build, simulation, and testing. Through iterative design reviews and rapid prototyping, the design was simplified into its base joints and links, with an interchangeable wrist attachment, to ensure user safety and manufacturability. During development, a simulated version of the device was used to develop and refine controller configurations before physical testing commenced. Ongoing testing is being done to

evaluate the performance of different controller designs to ensure robustness, repeatability, and comparing real world performance and virtual simulations.

This presentation will report on the performance of both the physical and virtual systems, highlighting the findings from controller testing and how accurate the simulations were when compared to the real system. This work demonstrates i) the potential for low-cost telerehabilitation devices to be used in home-based therapy, and ii) how this real physical system could be used by others to test alternative controllers remotely.

## **Beyond Fines: Rethinking Attendance Policy to Close Attainment Gaps in Leeds**

**Taylor Potter, Lewis Hiron, Muhamad Febrian, Nick Jackson, Ella Stubbings, Charlotte Hardy, Poppy Scott**

*University of Leeds*

With persistent absence rates rising from 10.53% pre-pandemic to 17.63% in 2024/25, England's education system faces a post-pandemic crisis. While existing policy relies on punitive Fixed Penalty Notices, these measures fail to acknowledge that absence operates both because of structural disadvantage and a primary driver of educational scarring. Using school-level DfE data for Leeds, we apply regression analysis to quantify the relationship between absence and attainment. Regressing persistent absence and total absence against Attainment 8 scores create a statistically significant model at the 0.5% confidence level, with adjusted R-squared scores indicating 79-80% of variance in school-level outcomes can be explained by absence patterns. Each 10% point rise in persistent absence is associated with a reduction of 7.2 Attainment 8 points. Spatial analysis using school postcode data reveals that absence clusters geographically within the most deprived wards, with primary persistent absence rates ranging from 7% to 29% in the worst affected wards. Absence patterns also differ significantly across primary, secondary, and special schools. Notably, pupils recorded with unclassified Special Educational Needs (SEN) and Free School Meals (FSM) exhibit the most severe absence patterns (35.4% and 21.1% respectively), suggesting

the most at-risk families remain underrepresented in official statistics. A school-level case study grounds these findings in a concrete Leeds context and explores what additional factors predict absence beyond attainment outcomes alone. Drawing on these findings, we discuss the limitations of current binary attendance thresholds and consider how a more graduated, needs-based policy response could better address the structural drivers of persistent absence.

## **More Output, Less Control? Artificial Intelligence, Productivity, and Cognitive Overload**

**Siang Ching Ng, Chloe Han Yu Lim**

*University of Glasgow*

Artificial intelligence (AI) is increasingly promoted as a means of enhancing productivity in education and the workplace. While economic perspectives tend to emphasise efficiency gains and output maximisation, less attention is paid to the potential psychological costs of intensified AI use. This interdisciplinary project investigates whether perceived productivity gains from AI are accompanied by increased cognitive overload and reduced wellbeing among university students.

Drawing on economic theories of productivity and labour augmentation alongside psychological research on cognitive load, attention, and perceived autonomy, the study examines whether technologies designed to improve efficiency may simultaneously undermine mental wellbeing. Using survey-based evidence from undergraduate students, the research explores relationships between AI usage, perceived productivity, cognitive overload, stress, and sense of control over academic tasks. It is anticipated that higher AI use will be associated with increased perceived productivity, but also with greater cognitive overload and psychological strain.

By integrating economic and psychological perspectives, this project challenges narrow productivity measures that overlook human cognitive limits. The findings aim to contribute to debates on the future of education and work by highlighting the importance of balancing efficiency gains with wellbeing considerations. The research has potential implications for students, educators, and policymakers seeking to design

and implement AI tools that enhance productivity without compromising mental health.

## **Effect of Sedimentary Microplastics on Respiratory Rate and Burrowing Behaviour of Polychaete Worms**

**Deaven Butler**

*Newcastle University*

Globally, plastics are a significant pollutant, with 80% of plastic pollution being in the form of microplastics (MPs). Littering, surface runoff, wastewater and direct release allow MPs to enter waterways. As estuarine environments are frequently drainage basins for urban watersheds, they are significant points of MP pollution. In estuarine environments, MPs penetrate vertically within the substrate, posing significant risk to infaunal organisms. Of these organisms, polychaetes are notable as they are keystone species that provide essential ecosystem services. This study aims to rectify the knowledge gap regarding the impact of MP-contaminated substrate on the respiration and burrowing activity of the polychaete *Hediste diversicolor*. Three treatments were used – 0, 50 microplastic/kg sediment and 100 microplastic/kg sediment.

Measurements were recorded 24, 48, 72, and 94 hours post-exposure. Then, weekly for three consecutive weeks. Respiration was measured via oxygen uptake using a fibre-optic oxygen sensor partnered with PyroScience's Pro Oxygen Logger software.

Burrowing was measured as 'time to begin burrowing'. A linear model indicated no significant effect of MP concentration and respiration or burrowing behaviour. This was in line with *Hediste diversicolor*'s established resilience to extreme environmental conditions and to chemical pollutants. This reliance can be attributed to exposure method. However, there is still concern regarding polychaetes as MP vectors. Despite these concerns, it is positive that *Hediste diversicolor* can continue to provide ecosystem services despite MP contamination. Regarding further study, it would be productive to investigate the upper limits of this tolerance and to incorporate absorbed contaminants within the MPs.

## **Fear of Crime in Online Deception: Examining Factors that Impact Individuals (University Students) in Hong Kong**

**Yin Tong Chan, Ka Man Leung, Hoi Ching Charlotte Leung, Yu Hong Lin**

*City University of Hong Kong*

This study examines the fear of crime associated with online deception, aiming to measure and evaluate factors that impact Hong Kong university students, and inform current policy for addressing crime. A semi-structured interview with 25 university students in their 20s as the participants is used to analyze how the factors influence the perceived risk online through their own words and perceptions. Based on the study, several key findings regarding the relationship between the factors and the degree of fear are concluded. As media exposure is negatively correlated with fear, several opinions suggest that news reports may highlight cases with significant losses, which are considered less personally relatable, differing slightly from previous studies. AI-generated content could be a factor in the positive proportion, given that it poses more difficulties in distinguishing and identifying whether the content is AI-generated or not, which heightens the fear of online deception. This also provides new insights for future studies on the fear of crime and crime prevention. Besides analyzing the factor, the participant would also point out the insufficiency of the current policy in Hong Kong, such as the advertising, which is primarily considered to target older individuals with lower computer skills. Despite publicity and educational activities at universities, students can still be victims of online scams in the current Hong Kong situation. These findings address the gaps in qualitative research on online deception within the Hong Kong context, providing evidence-based implications for policy intervention, public education, and strategies to counter cyber threats.

## **The Political Economy of Global Climate Change Negotiations: A Game Theoretic Analysis of the Global Power Imbalances**

**Shambhavi Sahay**

*University of Glasgow*

This paper discusses the persistent divide between powerful and weaker states in international climate change negotiations using a game-theoretic framework. Existing economic models often represent climate negotiations as symmetric cooperation problems. This often struggles to explain repeated negotiation breakdowns and limited compliance. Building on literature on game theory and climate governance, this paper argues that asymmetries in power, payoffs, and beliefs about the time horizon of negotiations play a key role in shaping a state's behaviour. The analysis uses two game models.

First, a symmetric repeated cooperation game is used to show how cooperation can be sustained when actors share similar incentives and expectations. Second, an asymmetric game under imperfect information is introduced wherein the more powerful actor assumes the negotiation as effectively finite, reflecting its ability to change or terminate it at relatively low personal cost. The weaker actor, in contrast, continues to behave as if the game is infinite and employs cooperative strategies in expectation of long-run reciprocity. Payoffs are represented using ordinal rankings rather than numerical values, allowing the model to study relative incentives without imposing false precision.

The findings suggest that negotiation failures can arise even when actors behave rationally, because players may be responding to different perceived games rather than to a shared strategic environment. This framework helps explain outcomes observed in international climate agreements such as the Kyoto Protocol and the Paris Agreement, and highlights the limitations of cooperative approaches that do not account for structural asymmetries in international negotiations.

## **Investigating Chiral Intracellular Cytoplasmic Streaming**

**Matteo O'Donoghue**

*University of Warwick*

The Stokes' equation is used to model viscous, slow fluid flows over small distances. The flow of cytoplasm within a cell can be modelled using this equation. This helps us to understand how biological systems evolve and develop because many cells use a

method of active transport called cytoplasmic streaming. This is where movement of the cell walls sets up directed flows within cells to bring substrates and enzymes together.

Current methods to solve this equation have focused on problems where there is symmetry within the cell, however there are many biological systems that exist where this is not the case, because the symmetry is broken by chirality. This work extends existing models of cytoplasmic streaming to be able to include these systems, providing new descriptions of biological systems.

The most common examples of chiral environments are those where systems have a swirl, helix or handedness. For example, this work can be applied to the corkscrew helicobacter bacteria where understanding cellular processes can provide ways to treat helicobacter infections. Additionally, human fibroblast cells have been shown to self-organise their cytoskeleton (outer scaffolding) into a swirl shape and understanding the impact this has on cell processes can give insight into what benefit this might bring. In addition to these systems, we hope that a generalised model of transport within cells can give insight into how chirality emerges from symmetric equations.

## **Family Communication Patterns and Coping Strategies: The Mediating Role of Self-Compassion**

**Suet Yiu Sherry Tang**

*City University of Hong Kong*

Family communication is a foundational context shaping individuals' psychological development and adjustment. Prior research has demonstrated that family communication patterns (FCP) are associated with a wide range of psychosocial outcomes, including self-efficacy and resilience. However, limited research has examined how these communication patterns relate to young adults' coping with stress or the underlying psychological mechanisms. This study aims to investigate the relationship between FCP and coping strategies among young adults and to examine whether self-compassion mediates these associations.

A quantitative, cross-sectional survey design will be employed. Approximately 100 unmarried young adults aged 18 to 30 will be recruited to complete an online questionnaire. FCP will be measured using the Revised Family Communication Patterns Instrument, coping strategies will be assessed using the Brief COPE, and self-compassion will be measured using the Self-Compassion Scale–Short Form. Correlation and regression analyses will be conducted using SPSS, and mediation effects will be tested via bias-corrected bootstrapping procedures using the PROCESS macro.

It is anticipated that higher conversation orientation will be positively associated with adaptive coping strategies and higher levels of self-compassion, whereas higher conformity orientation will be related to maladaptive coping strategies and lower self-compassion. Self-compassion is expected to partially mediate the relationships between family communication patterns and coping strategies.

The findings are expected to contribute to a more nuanced understanding of how family communication environments shape coping processes in young adulthood. The results may inform family-based and individual-level interventions aimed at fostering self-compassion and promoting more adaptive coping strategies to enhance psychological well-being.

## **When Art Became Ethnic: The Politics of Mexican Feather Mosaics in Western Collections**

**Martina Campagnoli**

*The Courtauld Institute of Art*

Mexican feather mosaics are products of the early colonial period, testifying to the encounter between European Catholic culture and the Indigenous traditions of the Americas. Produced using pre-Hispanic techniques, feather mosaics depicting Christian iconography played a dual role: they functioned as instruments of conversion for the Aztec population while simultaneously demonstrating extraordinary technical and artistic skill to European patrons. Transported across the Atlantic, these works

entered European cabinets of curiosities, often catalogued as art from afar. Today, however, many feather mosaics are housed in ethnographic collections across Europe.

My research asks how objects which were initially received as works of art came to be reclassified as ethnographic artefacts. What prompted this shift in categorisation? To what extent did medium, materiality, and geographic provenance contribute to the gradual reduction of their status from art to ethnography?

By analysing the cataloguing histories of Mexican feather mosaics, this research identifies a colonial pattern that marked a transition from artistic to ethnographic classification. It argues that feather mosaics represent one of the earliest instances in which Catholic imagery was stripped of its devotional and artistic value and reframed as ethnography. Drawing on limited archival material and existing scholarship, as well as case studies from European collections such as the Kunsthistorisches Museum in Vienna, this paper seeks to reassess the artistic significance of feather mosaics and their importance as material evidence of cross-cultural collaboration between the Catholic West and Indigenous artists of the Americas.

## **Investigation into the Suitability of Kombucha Bacterial Cellulose as a Biomaterial Alternative to Plastic Using Tensile Testing**

**Lubabah Hossain, Elizabeth Heidrich, Kelly Jobling**

*Newcastle University*

Plastics made from fossil fuels are durable but environmentally persistent, creating long-term waste problems. This research investigates kombucha bacterial cellulose (KBC) as a renewable, biodegradable alternative to plastic by examining whether KBC can achieve sufficient strength for practical applications. KBC was grown using four sugar sources: white sugar, brown sugar, and two glucose–fructose blends (50:50 and 70:30). After 14-days, cellulose sheets were dried, cut into strips, and tested to see how much tensile (stretching) force they could withstand before breaking using an Instron machine. Microbial analysis using 16S rRNA microbial sequencing was conducted to identify bacteria involved in cellulose production and assess how sugar type influenced microbial diversity. Results showed that KBC grown using white sugar achieved the

highest strength (1.764 N/mm<sup>2</sup>), while using a greater proportion of glucose to fructose in the 70:30 blend produced the greatest yield of cellulose (3.40 g per sheet). Brown sugar resulted in a weaker and less consistent material. Sequencing confirmed that *Komagataeibacter* was the sole cellulose producer, with microbial diversity varying by sugar source. Findings indicate that feedstock choice affects mechanical properties, production efficiency and microbial contents. KBC grown with white sugar has promising strength compared to other feedstocks, making it a candidate for replacing certain plastic applications. Furthermore, glucose enrichment offers a route to higher cellulose yields, which is critical for scaling production. This study highlights the potential of KBC as a sustainable material for reducing plastic waste, while emphasising the need for further optimisation of growth and processing methods.

## **Sustainability Vs. Sustenance: Examining Stakeholder Coping Mechanisms during Chennai's 61-day Fishing Ban**

**Alaiqa Patro, Samyuktha Shankar, Finley Arcos Archard, Deneb Marden Rull**

*University of Warwick*

Each year, Chennai imposes a 61-day fishing ban to allow marine stocks to recover, but this policy creates hardship for those dependent on the harbour economy. While fishing bans aim to balance ecological sustainability with livelihoods, welfare support often falls short in developing contexts. This study examines how different stakeholder groups in Kasimedu Fishing Village cope with the ban.

We adopt a multi-stakeholder qualitative approach based on semi-structured interviews conducted at Kasimedu harbour. The sample includes fishermen, fishing-allied workers, boat owners, and expert accounts (n = 45). Interviews explored income loss, access to resources, and barriers faced during the ban. Transcripts were analysed using inductive thematic coding.

The data suggests clear inequalities in coping capacities. Fishermen and allied workers, with fewer assets and limited access to institutional support, relied on short-term

strategies such as informal borrowing, irregular alternative work, and pawning gold. These measures provided short-term stability but often trapped households in debt cycles. In contrast, some boat owners with greater capital and savings were less reliant on high-risk coping strategies and instead used formal loans or business diversification.

We argue that the fishing ban reinforces a socio-economic hierarchy shaped by unequal access to support, producing a sustainability–sustenance trade-off. Current welfare policy treats harbour workers as homogeneous, overlooking internal stratification. Therefore, this study advocates for differentiated welfare measures that include targeted income support for precarious workers, expanded access to formal credit, and participatory policymaking within the fishing community.

## **Self-Medication and Mental Health. A Pathway to Hazardous Alcohol Use in the University Environment.**

**Stephen Aruwajoye**

*University of Sussex*

Hazardous alcohol use remains a prominent concern among university students. Existing research has focused on social- and peer-influenced drinking, often overlooking self-medicative motives.

The objective of this study was to examine the links between mental health, alcohol use motives, and hazardous alcohol use among UK university students, with a focus on the structural and social context of university life.

An explanatory mixed-methods design was employed. The quantitative phase analysed REALab's Wellbeing Survey data from 201 university students using correlational matrices and mediational analyses. Sequentially, a qualitative phase, comprising three focus groups, were analysed using reflexive thematic analysis.

Quantitative findings revealed that drinking to cope with depression and anxiety were the motives most strongly associated with hazardous alcohol use among students. Two mediation models showed that depression and anxiety symptoms significantly affected

alcohol use to cope with these symptoms, which directly increased hazardous drinking. Qualitative findings captured students' perceptions of substance use motives and prevalence among their cohort, with alcohol and self-medication consistently reported as key concerns. Student perspectives on contributing factors were captured. This highlighted limited access to long-term wellbeing services, disengagement, lack of belonging, and university lifestyle stressors within a normative substance-using culture, all as drivers of self-medicative alcohol use for students.

To our knowledge, this is the first mixed-methods study to centre students' own accounts of how the university environment and culture contribute to alcohol self-medication. These findings inform a broader project, including a co-produced programme that targets psychosocial variables to impact student wellbeing and academic outcomes nationwide.

## **Effect of Temperature on Bat's Time of Emergence and Activity**

**Maria Eugenia Garcia**

*University of Glasgow*

Bat emergence timing can be treated as a consequential behavioural decision within the nightly activity sequence, mediating the onset of foraging and shaping when bats first engage with nocturnal prey fields. Ambient temperature is commonly identified as an important proximate correlate of bat activity, yet Mediterranean semi-urban systems remain comparatively under-represented in the literature. This study examined whether short-term variation in temperature is associated with evening emergence timing in the common pipistrelle (*Pipistrellus pipistrellus*), and characterised spatial and temporal heterogeneity in nocturnal activity across semi-urban sites on the island of Lesbos, Greece.

Passive acoustic monitoring was conducted at four locations during July 2025 using AudioMoth detectors, paired with local temperature and humidity measurements via iButton data loggers. Emergence timing was operationalised as the first nightly acoustic detection of *P. pipistrellus* relative to sunset and analysed using linear mixed-effects models. Hourly activity was quantified as total detections per hour.

Emergence timing varied with ambient temperature, with warmer nights associated with earlier emergence relative to sunset. Overall activity differed among sites and exhibited temporal structure across the night. Temperature effects on activity were site-specific, whereas humidity showed only a weak association. Acoustic detections were dominated by *P. pipistrellus*.

Taken together, these findings suggest sensitivity of *P. pipistrellus* emergence timing to short-term thermal variation in a Mediterranean semi-urban context, while underscoring the importance of fine-scale spatial setting for activity patterns. Interpretation should remain bounded by the observational scope and the set of measured covariates.

## **Improving Cervical Screening Health Literacy Among Women Experiencing Homelessness in Lancashire: A Mixed-Methods Outreach Study**

**Adeela Asghar, Zuha Akhtar, Parth Thaker**

University of Lancashire

People experiencing homelessness face significant health inequalities and substantially poorer health outcomes compared with the general population. Cervical screening uptake among women experiencing homelessness is notably lower than in the general population, with studies reporting attendance rates of approximately 50–55%, compared with around 70% nationally. Despite this disparity, there remains limited UK-based research examining the relationship between health literacy and cervical screening engagement among homeless women. This study aims to evaluate the effectiveness of a targeted educational outreach programme in improving health literacy, awareness, and engagement with cervical cancer screening among women experiencing homelessness in Lancashire. A mixed-methods design was employed, incorporating an educational outreach intervention delivered across multiple sessions in homeless shelters. Educational materials included illustrated leaflets, a PowerPoint presentation, and a speculum to visually demonstrate the screening procedure. Following informed consent, participants completed an 18-item survey informed by

the Health Belief Model. Survey responses guided 25–40 minute semi-structured interviews exploring understanding, confidence, perceived barriers, and attitudes towards cervical screening. Thirty women participated in the education session. Commonly reported barriers included limited health awareness, fear and embarrassment related to clinical encounters, and challenges accessing healthcare services. Post-intervention, all participants reported increased understanding, empowerment, and appreciation of accessible, shelter-based services. Using a socioecological framework, facilitators to screening engagement were identified at individual, organisational, and policy levels. These findings highlight the importance of accessible, tailored interventions to address persistent health inequalities and inform service development and policy initiatives aimed at improving preventive care uptake in underserved populations.

## **Canada's Human Rights Façade: The Missing and Murdered Indigenous Women and Girls Crisis and the Reality of Embedded Colonial Logic**

**Keya Patel**

*University of Warwick*

This paper examines how Canada's ongoing colonial legal order perpetuates the crisis of Missing and Murdered Indigenous Women and Girls (MMIWG) by sustaining the structural conditions in which violence against Indigenous women and girls is rendered predictable and normalised. This study situates the crisis as a lens through which to evaluate the gap between human rights rhetoric and reality, emphasising that addressing systemic violence requires interrogating the structural role of law itself. Drawing on critical analysis of relevant literature, Canadian law, state practice, investigative reports, and international human rights frameworks, the paper demonstrates that violence against Indigenous women and girls is embedded within lawful state structures. The paper advances the concept of juridical necropolitics, building on necropolitical theory to describe how premature death is sanctioned through the law, both through acts of commission and omission. It posits that international human rights law is oriented towards the regulation of unlawful acts and

is therefore incapable of confronting harm generated through legality itself. Building on the recent recognition of the crisis as a genocide, the paper engages with issues surrounding the interpretation of the term. It maintains that the definition required under international law is satisfied when the term genocide is decolonised and understood as a cumulative process rather than a distinct event. Ultimately, this study reveals fundamental contradictions between Canada's portrayal as an international human rights leader and its domestic legal reality.

## **Can Artificial Intelligence Platforms Diagnose Eye Disease – A Comparison Between Chat GPT-4o Mini and Super-prompt Agent Alan**

**Joanna Louis, Dr Andrew Blaikie**

*University of Glasgow and University of St Andrews*

Eye diseases encompass a range of conditions which can influence quality of life. Artificial intelligence (AI) platforms could provide solutions to address the needs of populations that are inadequately provisioned. This study's objective is to compare two AI systems (Alan and ChatGPT-4o mini) and their outputs when prompted with clinical eye disease cases.

Twenty-five eye disease cases were created based on the World Health Organization's Primary Eye Care manual, with gold standard (GS) answers determined by a consultant ophthalmologist. Each of the cases were put into the respective chat-bot three times and their outputs were analysed based on diagnosis, management and referral suggestions. Additionally, readability was assessed by performing a Flesch-Kincaid analysis; an online readability calculator.

Results showed that cases were diagnosed in line with the GS by Alan in 55/75 and 35/75 by ChatGPT-4o mini. Significant differences between the diagnostic accuracies of the platforms was indicated through statistical testing. Referral suggestions from the correctly diagnosed cases were correct in 39/55 for Alan and 30/35 for ChatGPT-4o mini, with no statistical significance found between referral suggestions. Paired t-tests

showed highly statistically significant linguistic differences between platforms, most notably between the lower average reading ease and word count per transcript from Alan in comparison to ChatGPT-4o mini.

This study aims to build on existing research into the abilities of AI as a diagnostic tool and has shown more favourable outcomes to tailored platforms. Integration of specialised technologies into primary eye care and teleophthalmology could reduce burden on the eye care sector.

## **Between Fear and Wonder: environments of The Hound of Baskervilles and Bleak House**

**Maiia Marina**

*University of Glasgow*

Environmental anxieties and action-stifling fears of climate catastrophe are familiar to so many today. Yet our emotions and non-human environments have been complexly interconnected for some time. The paper explores how emotions, or affects, surrounding non-human environments are depicted in two canonical works of Victorian literature and popular culture: *The Hound of Baskervilles* (1902) by Arthur Conan Doyle and *Bleak House* (1853) by Charles Dickens. I focus on the environmental affects crucial in today's world: fear and complacent comfort. Applying Simon Estok's concept of 'ecophobia' (2013) —the harmful othering of the non-human — the paper shows the detrimental impact of imagining nature as something to be afraid of. Comfort proves to be comparably problematic as it reduces the environment to aestheticised consumer goods. However, the texts also evoke a sense of wonder in their audiences. Originating not from fear, wish to control or exploit but from uncertainty and curiosity, wonder can be considered the first step towards building a sustainable relationship with non-human environments. The paper's methodology combines close readings of well-studied texts with theoretical approaches used less widely to analyse this literary period, namely, ecocriticism paired with affect theory. Such a blended methodology helps me trace some of our environmental anxieties back to the nineteenth century. Moreover, it offers a new perspective on how the non-human

was constructed by popular Victorian literature through evoking strong emotional responses in its audience.

## **'AuDHD' (Autism and ADHD) as a Unique Condition? Exploring Identity and Lived Experiences of Co-Occurring Neurodivergent Conditions**

**Hannah Austin-Brooks**

*University of Glasgow*

'AuDHD' is an unofficial term widely adopted by individuals with co-occurring Autism Spectrum Disorder (ASD) and Attention Deficit/Hyperactivity Disorder (ADHD) (Miller & Loving, 2025). Despite suggestions of a 30-80% co-occurrence rate (Craddock, 2024) and recent recognition of dual diagnosis in the DSM-5 (Ramtekkar, 2017); our clinical understanding and recognition of AuDHD as a distinct lived experience remains limited (Berry, 2025). Growing evidence suggests that AuDHD may warrant a separate diagnosis and individualised support plans, in order to recognise the unique experiences of two co-occurring yet contrasting conditions (Antshel & Russo, 2019).

This study aims to address the limitations of current diagnostic frameworks (Liu et al., 2023) by exploring AuDHD as a distinct neurodivergent condition and centring the lived experiences and identity of AuDHD individuals.

Adopting an interpretivist epistemological position, this study utilises Interpretative Phenomenological Analysis (IPA) of semi-structured interviews with three adult AuDHD participants, using purposive sampling to establish in-depth idiographic analysis.

Our anticipated results suggest that AuDHD individuals' identities and lived experiences are complex and internally conflicting, shaped by interacting autistic and ADHD traits. Participants are also expected to report limited awareness, recognition, and personalised support for AuDHD, reflecting ongoing misdiagnoses within current diagnostic and clinical practices (Berry, 2025; Neff, 2022).

These findings can highlight widespread misconceptions of AuDHD and the limited recognition of co-occurring neurodivergent conditions within current clinical frameworks. Thereby promoting greater academic and clinical insight into how interacting neurodivergent conditions can be more effectively understood and supported than singular diagnostic presentations.

## **The impacts of the U.K. Global Challenges Research Fund on Early Career Researchers: A Case Study**

**Devon Chandler, Paul Denny, Alexander Simpson**

*Durham University*

International collaborations enhance research outcomes by providing partners with increased access to resources, training and multidisciplinary expertise. These partnerships facilitate knowledge exchange and infrastructure development, promoting sustainable research ecosystems. The development of early career researchers (ECRs) is particularly important in strengthening research capacity within international research networks. However, literature regarding their experiences is limited. Here we present a qualitative study of one international research network, the Global Network for Neglected Tropical Diseases, which was funded by the U.K. Global Challenges Research Fund (2018-2022), and its impact on ECR career development. Semi-structured interviews were conducted with 19 ECRs previously supported by the Network, these were then thematically analysed. Key themes were identified relating to ECR experiences with the Network. Findings indicate that the Network provided valuable opportunities for professional development, knowledge exchange and collaborative research, which participants described as transformative for their careers. However, ECRs stressed that structural barriers such as insufficient funding and job insecurity limited the Network's longer-term impact, severely affecting ECR retention and development. These results highlight the benefits of international research collaborations and the need for targeted support and sustainable research funding to retain and develop ECRs.

## **Go with your Gut, or Chicken Out? Exploring the Relationship Between the Gut, Brain Plasticity, and Stress in Adult Hens**

**Olivia Harland**

*Newcastle University*

Recently, the gut has been identified as a key influence on a range of psychological and physiological processes including the stress response, due to the communication which occurs between the gut and brain along the gut-brain axis. Chronic stress has been found to cause dysfunction in specific brain regions such as the hippocampus, which is involved in neuroendocrine and behavioural responses to stress, while simultaneously disrupting the composition of the gut microbiome which mediates communication along the gut-brain axis. In order to explore the relationship between the gut microbiome and brain plasticity in chronic stress, we studied two samples of free-range and caged adult hens, respectively considered chronically stressed or non-stressed based on body condition. Focusing on the hippocampus, which regulates the stress response via its temporal pole, we measured markers of adult hippocampal neurogenesis (AHN) which allowed quantification of brain plasticity in the temporal pole, and observed how these markers of AHN varied depending on the relative abundance of six different bacterial strains in the gut microbiome. Findings suggest that chronic stress had a greater impact on hippocampal plasticity in free-range hens, which was associated with differences in the relative abundance of *Lactobacillus*, *Clostridium*, and *Fusobacterium*. These findings suggest that animal models could allow researchers to further investigate the gut microbiome's influence on brain plasticity under stressful conditions, and there is potential for this to be further developed towards improved understanding of chronic stress and related neuropsychiatric conditions in humans.

## **Re-creating the People and Communities of Medieval Wakefield**

**Juliet Scott**

*University of Leeds*

How do we understand the society and human relationships that existed before our own? Particularly in the Medieval Era (5th-15th centuries), where the way of life differed so profoundly from our modern world? Through recorded human interaction.

This study draws upon peer-reviewed research on late Medieval English court and jury systems, alongside an analysis of trials recorded in the Wakefield Manorial Court Rolls, a major administrative district in northern England, to examine both legal practices and structures in 14th-century England.

Focusing on the case of Tothill v Rode (1331-3), this research applies quantitative social network analysis to reconstruct the relationships among jury members to evaluate whether the trial could be considered fair in the contemporary 14th-century social context. By examining both the relationships among the jury and the outcome of the court case, it reveals the pivotal role that community played, as well as highlighting an interconnected social structure and hierarchy shaped by wealth, status and influence, determining judicial decisions and punishments.

This research contributes to the understanding of late Medieval English society as well as the early development of the impartiality of our modern legal system. Further deepening the understanding of the social structures and power imbalance of Wakefield's Medieval society.

This research was realised in a 25,000-word short story to recreate the relationship between the jury members in the case for a modern audience. Bringing the timeless themes of power, community, and struggle, faced constantly throughout human history to life and Medieval history more accessible to the public.

## **Trading Below the State: Unlocking Subnational Diplomacy and Trade in Post-Brexit Britain**

**Alexander Cloke, Anna Constantinescu, Lauryn Hata, Thom Du Gard, Haadiyah Mulla, Lan Anh Nguyen, Louis Wright, Anna Mishturak**

*University of Leeds*

In the post-Brexit landscape, UK foreign and trade policy remains heavily centralised, overlooking the potential of subnational diplomacy (the international engagement of regions below that of the state) in driving economic performance. This paper assesses the effectiveness of subnational diplomatic engagement, utilising the West Yorkshire Combined Authority (WYCA) as a primary case study. By employing a mixed-methods approach, we investigate current subnational frameworks in the context of international trade and diplomatic agreements.

We compare WYCA against the Greater Manchester Combined Authority (GMCA) to determine whether existing institutional capacity can support the development of international cooperation. We then analyse existing partnership agreements and profile WYCA's and West Yorkshire's sectoral strengths, with particular attention to professional services, health-tech and manufacturing.

The quantitative analysis employs time-series regression of ONS and HMRC data to examine the determinants of regional export and sectoral performance, whilst identifying strengths and imbalances. We expect to find that subnational diplomacy is associated with positive, albeit modest and uneven, gains, while also revealing persistent regional and sectoral imbalances.

Consequently, we propose two initial policy proposals. First, the government must establish a clearer legal and institutional framework to allow combined authorities to engage internationally more independently, whilst addressing regional imbalances. Second, combined authorities must engage internally to strengthen their trade-promotion capacity and utilise their sectoral comparative advantages.

By triangulating our quantitative results with qualitative institutional analysis, our paper provides a robust framework for both combined authorities and the government to unlock regional trade and diplomatic capacity.

## **The Student Mental Health Crisis: Barriers to Accessing University Mental Health Support**

**Paige Smith**

*University of Leeds*

The mental health of university students has come under increased scrutiny in recent years, with record high rates of mental illness and suicides being recorded amongst this population. Although students have access to university support services, research presents that these provisions are often not utilised, with students reporting barriers to access including: the presence of self-stigma; a lack of awareness of service; and long-waitlists. This study aimed to investigate if students with high rates of poor mental health have accessed the University of Leeds's support services, and if not, what are the barriers that have prevented them from doing so. Using a correlational study design, 45 students at the University of Leeds completed self-reported measures of the following: depression, anxiety and stress; their help-seeking status; and their perception of barriers to accessing the university's support services. Although levels of severe depression, anxiety and stress were low, a Spearman's Rho correlation matrix demonstrated that those self-reporting high levels of poor mental health were less likely to access university support services. Barriers ranked as the most impactful included: a preference to handle problems alone; a lack of time; and the belief that difficulties are just normal university problems. Overall, findings provide valuable insight into the type of barriers that are the most impactful upon the help-seeking behaviours of university students. Thus, conclusions can provide specific directions for improvement of support services at the University of Leeds and the general provision of care at UK universities.

## **Intersectional Realities: Subtle Manifestations of Islamophobia and Discrimination in the Experiences of Muslim Women in Scottish Workplaces**

**Rasha Kablan**

*University of Glasgow*

Muslim women face contradictory discrimination due to their intersectionality - oppressed and weak due to their gender, and terrorists and violent for their religion and whilst rates of blatant discrimination towards all marginalised groups continues to

decrease, there is a vast rise of subtle discrimination globally. Society condemns open discrimination, however stereotypes and biases persist to exist and are revealed in the form of subtle discrimination and although seemingly unharmed, subtle discrimination is known to cause barriers and disturbance in the lives of marginalised groups due to its unrecognised, hidden nature. Thus, investigating subtle discrimination would benefit organisations worldwide, and in this study, the context of Scotland has been chosen due to its higher rates of subtle discrimination than blatant discrimination, albeit overall Scottish culture is highly welcoming and friendly towards all marginalised groups in comparison to much of Europe. This study explores the lived experiences of Muslim women through in-depth interviews, employing a qualitative approach grounded in interpretivism research philosophy. Deepening HRM knowledge of the overlapping penalties intersectional identities face particularly in relation to subtle discrimination, to then present an understanding of the compounding reality of marginalised intersectionality and subtle discrimination. This study centres the voices of Muslim women to uncover their personal insights, crafting a HRM framework through their lens, ideas and advice and forming a personalised framework aimed at fostering inclusive workplaces which recognises intersectional identities personal needs and recommendations. Thus, contributing to the Human Resource Diversity and Inclusion Management literature to reduce workplace subtle discrimination worldwide.

## **A Disposable X-Aptamer-Based Point-of-Care Kit for Early Endotoxin Screening in Suspected Sepsis**

**Youngdoo Kim**

*University of Lancashire*

Sepsis is a life-threatening condition caused by the body's extreme response to infection, where delayed recognition significantly worsens patient outcomes, particularly in settings with limited access to laboratory diagnostics. Current diagnostic approaches rely on host inflammatory markers (indirect signs of infection) or blood culture, both of which may be slow or impractical in austere environments such as military field medicine, disaster response, and resource-limited healthcare settings.

This study proposes a conceptual design for a disposable point-of-care screening kit based on X-aptamer technology—synthetic DNA-based binding molecules engineered to attach to specific biological targets—to enable rapid detection of bacterial endotoxin (lipopolysaccharide, LPS), a toxic component of the outer membrane of Gram-negative bacteria and an early indicator of high-risk sepsis. The platform is designed to operate without laboratory infrastructure, delivering results within 10–15 minutes using minimal sample volumes. X-aptamers are selected for their high binding specificity, stability, and suitability for low-cost, single-use deployment.

The primary aim is to support early risk stratification rather than definitive diagnosis, enabling timely clinical escalation in environments where conventional testing is unavailable. Military field medicine is presented as a primary application scenario, informed by the author’s military experience, with secondary applicability to civilian emergency departments, disaster response, and humanitarian healthcare contexts.

While the current concept focuses on endotoxin detection, the modular aptamer-based architecture allows future extension to additional bacterial targets, including markers relevant to Gram-positive infections. This platform highlights the potential role of rapid, portable biosensing technologies in improving early sepsis recognition across clinical settings.

## **Rape as a Tool for War: What Does this Mean for 'Just War Theory'?**

**Jasmine Patterson**

*Newcastle College University Centre*

Rape is strife in war, conflict, and peacetime; whether individual, or mass rape—which is always systemic (Scholz, S.J., 2007: p276)—and as of 1993 due to war tribunals of Rwanda and the former Yugoslavia it is a crime against humanity and a crime of genocide; which dissolved the Soviet Union in 1991, dispelling the ‘inter arma silent leges’ issue of criminology (Walzer, M., 1992: p36). Yet, as conflict increased criminology remained in a ‘state of denial’ about war, at least until asymmetric warfare increased. This is important as rape has been highlighted to be seen as asymmetric

warfare as the fighting terrain subverted (Mrdja, T., 2007). Human rights in war is 'founded' through 'Just War' theory (JWT), a Western, medieval war doctrine recognised globally in international law (Rodin, D., 2020: p157). Therefore, this qualitative literature-based dissertation, self-explanatorily titled "Rape as a Tool for War: What does this mean for Just War Theory?" hopes to highlight a gap in institutional criminology through a key word/phrase search of war criminology, asymmetrical conflict, rape in war, and 'Just War' Theory—using war criminology's 'inter-and-cross criminological dialogues' (Felice-Luna., 2010: p256), alongside other academic disciplines for a chance at a fuller theoretical framework (McGarry, R, and Walklate, S., 2019). Rape then being the chosen war tactic to show the importance of interest groups (Taylor, I., 1997), like feminism—with the hope of critical, realist, and humanist perspectives considered due to the narrative, 'auto-biographical' turn of war criminology (K, Hearty., 2025).

## **Practices that Support Safe and Personalised Physiological Vaginal Birth: A Mixed-method Systematic Review**

**Simran Sadhwani, Soo Downe, Jennifer Kuroski**

*University of Lancashire*

The rates of caesarean sections (CSs) have significantly increased globally, with variation in guidance and practices across healthcare settings. In some cases, CSs are increasingly favoured over physiological vaginal deliveries, despite there being no clear clinical indication.

This review aims to synthesise the evidence around techniques, procedures and environments designed to optimise safe, personalised physiological labour and birth in a range of high, medium, and low-income countries.

A mixed-methods systematic review was conducted following a predefined protocol. Comprehensive searches were undertaken across multiple electronic databases from inception to the present, yielding 41,479 papers. These were filtered for reviews and deduplicated. Titles and abstracts (n=2491) were independently screened, using Rayyan, by three reviewers. Full-text screening and data extraction (n=152) were

conducted by one reviewer with the support of the digital tool Notebook LM. Two reviewers then checked a 20% sample of the included studies and extracted data to ensure accuracy and consistency. Methodological quality appraisal was completed using AMSTAR 2 to assess the confidence of the 26 included studies.

By the time of the conference, synthesis and analysis will be completed to identify key factors that support safe and personalised physiological vaginal birth. Preliminary findings suggest that adequate pain relief, supporting mobility, place of birth, water-birth, close monitoring and breathing exercises are supportive factors.

This work will contribute to providing guidelines which inform future practice and policy development regarding the use of CSs in high, medium, and low-income countries, ensuring safe maternity care is provided.

## **Delivering Autism Education in Initial Teacher Training: A Scoping Review**

**Fatema Nargis, Stephanie Daley, Christina Hancock, Yvonne Feeney**

*Brighton and Sussex Medical School*

Autism is a neurodevelopmental condition affecting social communication and behaviour, with an estimated 1–2% prevalence in the UK. Despite increasing numbers of autistic pupils in mainstream education, many teachers report low confidence in supporting them. While national frameworks promote inclusive teaching, the extent and effectiveness of autism education within initial teacher-training programmes remain underexplored.

This scoping review aimed to map autism-related educational interventions delivered to teacher-training students and evaluate their effectiveness.

A scoping review was conducted in accordance with the Joanna Briggs Institute guidance. Nine databases (including MEDLINE, PsycINFO, ERIC, CINAHL and Scopus) were searched for studies published between 1980–2025. Eligible studies included teacher-training students worldwide and evaluated autism-related training

interventions. Data were extracted and synthesised descriptively, and study quality was appraised using the Mixed Methods Appraisal Tool to enable consistent assessment across qualitative, quantitative and mixed study designs.

Fifteen studies met inclusion criteria across eight countries, predominantly the US. Interventions targeted four outcome domains: knowledge, attitudes, confidence and skills. Five themes were identified: autism-focused teaching/learning (n=13), lived-experience approaches (n=2), literature/media-based learning (n=4), simulation exercises (n=4), and family education (n=2). Ten studies reported positive effects across one or more domains, while five reported mixed effects, most commonly improvements in knowledge. However, intervention content, duration and outcome measures varied, with many relying on non-validated self-report tools.

Autism education interventions appear beneficial, but evidence is limited by methodological heterogeneity and variable quality. Future research should prioritise standardised, practice-based interventions to better inform teacher training and inclusive educational practice.

## **Culturally Acceptable and Clinically Effective: A Critical Review of Dietary Interventions for Type 2 Diabetes in South Asian Populations**

**Manas Agrawal, Sandhya Duggal**

*University of Glasgow*

South Asians experience a disproportionately high burden of Type 2 diabetes mellitus (T2DM), a long-term condition in which the body cannot effectively regulate blood sugar levels. Diet plays a central role in both preventing and managing T2DM, yet many dietary interventions show limited effectiveness in South Asian populations. This critical review evaluates the cultural acceptability and contextual relevance of dietary interventions for South Asians with T2DM, drawing on evidence from systematic reviews, randomised controlled trials, and qualitative studies published between 2014 and 2024.

Interventions such as low-energy diets (calorie-restricted eating plans), dietitian-led counselling, and mobile health technologies show some promise. However, their impact is often constrained by low adherence and engagement. Many interventions fail to account for the cultural significance of food, the influence of family and community, and practical barriers such as language difficulties, stigma, and limited access to digital technologies. When these factors are overlooked, interventions risk reinforcing existing health inequalities and failing to achieve sustainable dietary change.

This review argues for a shift towards culturally embedded, community-informed approaches that align biomedical goals with the lived experiences and values of South Asian communities. Future interventions must move beyond one-size-fits-all models towards co-designed, culturally sensitive strategies that support long-term dietary change and address wider social and economic factors that shape health.

## **Examining Whistleblowing in the NHS: What Strategies / Approaches are Effective for Workers and What are the Enablers?**

**Alice Mary Hewett, Sandhya Duggal**

*Barts and the London School of Medicine and Dentistry*

Whistleblowing in healthcare is when workers raise their concerns (such as a concern about patient safety) with a qualified person in an attempt to rectify the issue.

Unfortunately, there have been several incidences in which the whistleblowing process has failed, and preventable harm has occurred. There have been implementations to improve whistleblowing measures, such as the Freedom to Speak Up Guardian (FTSUG). However, there have been further risks to patient safety since, where the whistleblowing process failed to protect patients.

This critical review aims to explore and identify the enablers and barriers to whistleblowing by examining the experiences of workers involved in the whistleblowing process over the past ten years in the National Health Service NHS).

639 papers were retrieved from 3 databases; after use of inclusion/exclusion criteria, 12 papers were selected for analysis and discussion. The quality of the articles was assessed using the CASP checklist.

This research found that a more thorough understanding of the whistleblowing process is required to improve whistleblowing implementations. It also seems that policymakers need to emphasise implementing methods to effectively change workplace cultures rather than introducing new strategies to enable whistleblowing.

There appears to be a discontinuity between current research findings and whistleblowing implementations. In tandem with this, there is sparse follow-up on the efficacy of these implementations. It appears that despite the wealth of avenues to whistleblow, it is factors such as complex workplace cultures and personal beliefs that are the main factors in preventing workers from whistleblowing.

## **Digital Time Travel: The role of Artificial Intelligence in Unlocking the Secrets of the Herculaneum Papyri**

**Sophia Robinson**

*Birkbeck College, University of London*

Recent advances in artificial intelligence are transforming archaeological research by enabling the analysis of fragile, and previously inaccessible material evidence. This presentation examines the application of AI-driven methods in archaeology, with a particular focus on the Herculaneum papyri—carbonized scrolls buried by the eruption of Mount Vesuvius in 79 CE and long considered unreadable without physical destruction. Combining high-resolution imaging techniques, such as X-ray phase-contrast tomography, with machine learning and computer vision, researchers have developed non-invasive approaches to virtually “unwrap” these scrolls and detect traces of ink hidden within their layers.

The talk will outline the technical principles behind these AI models, including pattern recognition, neural networks, and text reconstruction, and discuss how they are trained to distinguish ink from carbonized papyrus. It will also situate these innovations within

broader archaeological practice, highlighting how AI supports data integration, interpretation, and preservation while raising new methodological and ethical questions. By enabling the recovery of lost literary and philosophical texts, AI not only expands the corpus of classical sources but also reshapes how archaeologists engage with material heritage. The Herculaneum papyri serve as a compelling case study for the interdisciplinary collaboration between archaeology, computer science, and the humanities, demonstrating how artificial intelligence can unlock the past while preserving it for the future.

## **The Effect of Alternative Therapies to Reduce Pain and Improve the Quality of Life in Women Living with Endometriosis**

**Leni-Rae Cormack**

*University of Glasgow*

Endometriosis is an oestrogen-dependent condition that impacts around 10% of women worldwide, with no current cure. Endometriosis is the growth of lesions containing endometrial tissue outside the intrauterine cavity. Endometriosis symptoms include dysmenorrhea, chronic pelvic pain, which can have a negative impact on women's quality of life. Current treatments include hormonal contraceptives, which have proved to be insufficient in relieving pain and contain many side effects, including infertility, showing that they are not a long-term solution. Therefore it is important to find alternative therapies to reduce pain in these women to improve their quality of life.

A comprehensive search strategy was used to gather literature, and 21 papers were chosen to be included. An analysis of pain scales, quality of life questionnaires, and feasibility of the intervention was included to determine the impact of these interventions.

All studies in yoga and acupuncture interventions showed a decrease in pain intensity for endometriosis using the visual analogue scale or numeric pain rating scale. However, there were conflicting results seen in the antioxidant supplementation/diet interventions, with women mainly having little to no change in their pain intensity.

Some studies also included quality of life assessments, which also showed improvement in each subsection.

Future studies should aim to include a wider cohort of participants with a greater age range to allow for a better understanding of the impact these interventions have and if they should be given as a first course of treatment, especially in women who aim to become pregnant.

## **Mary Wollstonecraft – Integrity in the Face of Adversity**

### **Dillon Hey**

*Newcastle University*

My research is focused on the contrasting ideas Mary Wollstonecraft presents within her piece, "A Vindication of the Rights of Woman". The juxtaposing nuances between her revolutionary proto-feminist points and her conservative contradictions creates a body of work that can be critiqued from varying perspectives. The extract I will be focusing on is very accessible, with many of its ideas around female autonomy and equality being commonplace in society today, but I will highlight some of the nuanced conservative elements that underpin her concepts. I think the research is necessary to understand her influences on the feminist movement, and to see how her arguments remain upsettingly relevant to our modern times. My work is important for both further research and for the public. As researchers, we need to understand one of the writers who helped change the female narrative, and to do that, we must accept and understand all aspects of her work – both the revolutionary and conservative. As the public, we should take influence from her revolutionary zeal and use her ideas to combat the male-dominated world we live in. Ultimately, my work showcases that anyone, even someone as radical as Mary Wollstonecraft, can have their ideas stifled by external pressures. Through examining her personal contentions, we can learn the value of keeping integrity in the face of adversity. If we hold any hope of creating a more equal society, we must draw knowledge from those who shared that vision before us.

# **Tolerating the Turn: Can an Alternative Pillow Solution Offer Better Pressure Redistribution During Prone Positioning?**

**Yik Nok Bryan Lee, Ambreen Chohan, Catherine Edwards, Stephen Sunday Ede, Jo-Anne Webb**

*University of Lancashire*

Introduction: “Prone” is a technique to improve blood oxygenation using standard pillows for support by turning and lying the patient on their abdomen. It is widely used to manage patients with respiratory distress (e.g. Covid-19) both in the community and hospital settings. However, inadequate support surfaces can lead to pressure injuries, limiting patient tolerance. This study explored the impact of a new pillow solution on interface pressure and comfort during prone positioning on pressure management and tolerance.

Methods: This quantitative cohort study measured surface-body interface pressures for three different conditions: a standard hospital pillow at the head (HPO), a three-pillow standard hospital prone solution (3HP), and a new two-pillow polyurethane prone positioning solution (NPP) with additional standard head pillow. Contact surface area, Peak and mean pressure, Peak Pressure Index (PPI) at the head, trunk, pelvis, legs, and subjective comfort were calculated for all conditions.

Results: Twenty volunteers participated in this study. The new alternative prone pillow solution (NPP) lowered PPI at the trunk compared to standard pillow prone (3HP) ( $p < 0.017$ ) and prone with head support only ( $p < 0.001$ ). The new alternative solution significantly reduced head PPI compared to lying with only a head support. Both pillow prone conditions (3HP & NPP) significantly improved comfort compared to standard pillow only (HPO).

Conclusions: This new low-tech solution may offer potential earlier intervention in community and hospital settings to promote self-management and reduce health inequalities. This solution could improve tolerance and adherence to patient prone,

offering potential for self-management, reducing hospital stay while improving outcomes.

## **Do Low-Income Earners Have Access to Energy Efficient Homes in Leeds?**

**Owain Prescott, Harry Prosser, Ruby Harris, Shauna Singh, Karim Soliman, Mufida Amna, Freya Warren, Longoae Tembwa**

*University of Leeds*

The UK's Net Zero strategy relies heavily on decarbonising housing, but this transition risks exacerbating income inequality where there is aging urban infrastructure. This paper investigates the accessibility of energy-efficient housing for low-income earners in Leeds, where 37% of homes pre-date 1945 and fuel poverty remains persistent. It questions whether the housebuilding and retrofitting policies of local and national governments provide those individuals with mobility, or merely entrench fuel poverty. This is especially considering, for the average UK low-earner, the median house prices sit at 11.5 times annual earnings.

We examined the Leeds housing market using Ordinary Least Squares (OLS) regression on data from 2011–2019. We modelled the relationship between Energy Performance Certificate (EPC) ratings, Index of Multiple Deprivation (IMD) rankings, and property prices per square metre. Within our model, there were 4,324 observations across 482 Lower Layer Super Output Areas (LSOAs) in Leeds.

Our results demonstrate a significant correlation between higher energy efficiency and higher property prices. A one-point increase in energy efficiency correlates with a roughly £15.52/m<sup>2</sup> rise in property value, confirming a financial barrier that excludes low-income households from energy-efficient homes. This exclusion is compounded by governance failures in the private rented sector, where enforcement of Minimum Energy Efficiency Standards (MEES) remains inconsistent.

We conclude that relying on voluntary and rational actor retrofitting is insufficient. To bridge the energy efficiency gap, policy must be holistic and enforceable. Interventions

must integrate affordability with technical standards, and prevent the transition to Net Zero from widening the social divide.

## **The Death of Fair Play: Quantifying the Cost of Creditor-on-Creditor Violence**

**Ivan Kulesha**

*University of Warwick*

Imagine you're sitting at a poker game. With everything in the middle, you are about to take down the pot, until your buddy next to you, changes the rules and steals the whole pot. Until now, the corporate debt market relied on 'pari pasu', or equal footing, which guaranteed fair treatment for all lenders and equal remuneration. This research argues that the opposite has come about. A shift towards "Covenant Lite" loans, which have contracts with such loose rules, has essentially legalized corporate betrayal.

This concept, known as "Creditor-on-Creditor Violence," allows distressed companies to exploit "trapdoors" in their contracts. They can team up with a few favored lenders to push everyone else to the back of the repayment line, stripping value from the excluded group. The primary aim of this research is to calculate the real-world cost of this unfairness.

Using data from S&P Capital IQ and court filings, I plan to analyze corporate defaults from the 2023-2025 high-interest-rate cycle. By comparing the recovery rates in standard defaults versus those involving the aforementioned hostile legal maneuvers, I expect to obtain a measurable "Loophole Discount", the specific loss in value caused by predatory rule-changing.

This research matters beyond finance because it challenges the reliability of contracts themselves. If a signed agreement can be altered mid-deal, traditional risk models are thrown out of the window. This research aims to propose a new methodology for understanding legal risk and ensuring that investors can be better informed about the risks of their investments.

# How do Public and Legal Discourses about Counter-Terrorism in the UK Restrict Activism?

**Helena Cooper**

*Oxford Brookes University*

With the proscription of Palestine Action in the summer of 2025, further legal restrictions and the formation of impactful public discourses, activism has been restricted in the UK. This raises concerns about activist's freedoms; fuelling frustration and constituting negative impacts on activist work.

Adapting an activist scholar approach, this research examines public and legal discourses about counter-terrorism to find out how they restrict activism in the United Kingdom. In a series of semi-structured, qualitative interviews, six participants from organisations across the UK discussed their contemporary experiences in activism. The aim of the interviews was to gather insights into ways that different factors such as public attitudes and labelling narratives conveyed through legal discourse, influence activism. After building a theoretical framework utilising labelling theory, prior research was evaluated and common themes from the interviews were identified in the coding process.

Participants spoke about feeling unsupported and restricted by the attitudes of authorities, this became apparent through discussions regarding concerns about counter-terrorism measures and human rights' infringements. Clearly, legal and political authorities must change their approach to activism in the UK, so a fair balance between security and the protection of fundamental democratic elements can be achieved.

Ultimately, the aim of this study is to provide a platform for UK activists to highlight restrictions and injustices they face, which is underpinned with academic research into contributing factors. Since this topic is very relevant and greatly under-researched, my study fills a gap and can be used as a foundation for important future research.

# **Managerial Climate Attention and Firm Performance: Evidence from China Tourism Sector**

**Shengkai Xia**

*University College London*

This study explores the impact of managerial climate attention (MCA) on firm performance within China's travel and leisure industry, a sector that faces growing exposure to climate-related risks and increasing pressure to adopt sustainable practices. As environmental considerations become more deeply embedded in corporate strategy, assessing their financial consequences has become an important empirical question.

MCA is measured using the MCM index from the ISETS platform, and firm financial data are drawn from DataStream. To isolate the effect of MCA on firm performance, the analysis controls for firm-specific and time-varying factors by including both firm and year controls. Several additional model specifications are tested to confirm the consistency of the findings.

The empirical results consistently demonstrate a significant negative association between MCA and firm performance. This pattern suggests that increased managerial focus on climate-related issues may introduce short-term financial burdens, such as investments in environmental initiatives, operational restructuring, or shifts in strategic priorities that temporarily impede profitability. These findings highlight the complex trade-offs firms may encounter when attempting to integrate climate awareness into managerial decision-making.

The study contributes to the literature on environmental strategy and corporate performance by offering evidence from an industry where both sustainability and financial pressures are particularly salient. It also provides actionable insights for managers and policymakers seeking to navigate the balance between environmental responsibility, competitive performance, and long-term organizational resilience.

**Communication Breakdown: Examining Compounding Effects of Aphasia and Limited English Proficiency on Acute Stroke Care**

## **and Outcomes**

**Nina Park, Andrew DeMarco**

*University of St Andrews*

Globally, stroke is a leading cause of death and disability. Prior research suggests that communication barriers such as aphasia (experienced by  $\frac{1}{3}$  of stroke patients) and Limited English Proficiency (LEP) may lead to disparities in stroke care. Nonetheless, the interaction of LEP and aphasia has rarely been studied. Here, we leverage a large stroke registry of hospitals in DC, Maryland and Virginia to test the hypothesis that concomitant aphasia and LEP would produce additional disparities in care.

We estimated linear mixed-effects models (LMEMs) to examine the effect of LEP status, aphasia severity, and their interaction on functional independence at baseline, functional independence improvement at discharge, and length of hospital stay (LOS). LMEMs allow us to compensate for confounds arising from idiosyncrasies of specific hospitals.

In our sample ( $N = 22,756$ ), 26.7% had aphasia, 1.6% were LEP, and 0.5% had both. mRS analyses did not present a significant interaction. LEP and aphasia were each associated with 2.72 and 1.75 longer days LOS (LEP:  $t(22,744) = 3.38$ ,  $p < .001$ ; aphasia:  $t(22,744) = 3.96$ ,  $p < .001$ ), and presented a significant interaction ( $\beta = 1.03$ ,  $t(22,744) = 1.97$ ,  $p = .049$ ).

To our knowledge, this is the first study to quantify the interaction of LEP and aphasia on stroke care. Instead of producing additional disparities in care, an increase in aphasia severity removed the effect of LEP on LOS, suggesting that aphasia is an overriding factor. We are currently running models with additional potential moderators including interpreter use, payor, and discharge location.

## **Unlocking NHS efficiency through Neighborhood Diagnostic Centers**

**Anatoly Safiulov, Oscar Kennedy, Shakeal Zaman, Zack Barnard**

Frontline care in the UK remains tethered to an outdated, hospital-centric model, resulting in historical lows in public satisfaction and sustained pressure on workforce constraints and diagnostic capacity. Any incremental changes have not delivered material improvement, leading to prolonged waiting times and poorer patient flows. This paper evaluates whether community based Neighbourhood Diagnostic Centres (NDCs)- integrating urgent care, general practice and onsite diagnostics – can optimise patient throughput and restore system efficiency. We address the “diagnostic bottleneck” by testing whether community-level intervention can remain sustainable within existing financial and workforce constraints.

Our methodology employs a decision analytic evaluation comprising two linked models. First, we estimate urgent care demand redistribution using NHS Hospital Episode Statistics (HES) and the Emergency Care Data Set. Second, we translate these activity volumes into staffing requirements, using NHS workforce statistics and unit cost estimates, to determine fiscal feasibility, where capital expenditure is incorporated using NHS Reference Costs. To ensure robust scenario assumptions, we conduct a comparative analysis of the Singaporean polyclinic model ; identifying plausible ranges for diagnostic integration and “same-day resolution” rates , while acknowledging transferability limits.

Our expected findings will provide a quantitative framework for urgent care design, offering estimates for avoided emergency department admissions and same-day resolution rates. By establishing a workforce feasibility threshold and budget impact analysis, this research will inform policy on where NDCs may be an effective component of urgent care redesign and NHS structural reform.

## **How has Brexit Impacted UK Listed Firms' Performance and Capital-Raising Versus Firms in France, Germany and The Netherlands**

**Oliver Hulme, Alanna Lewis, Francis Jackson, George Palmer, Sara Riziq, Zaya Zorightbat**

*University of Leeds*

While Brexit has been widely analysed from a macroeconomic perspective, its effects on the micro-structure of UK equity markets remains under-researched. This paper examines the impact of Brexit on the market performance and capital-raising capabilities of UK-listed firms, France, Germany and the Netherlands. By analysing weekly equity index data for the FTSE 100, CAC 40, DAX 40, and AEX 30, alongside Bloomberg IPO and M&A datasets (2010-2025), we address the gap emerging between London and EU financial hubs.

The methodology employs a comparative time-series regression = using a Moving Average MA (2) model integrated with dummy variables to isolate three key Brexit phases: pre-integration (2010-2016), the referendum and negotiation (2016-2020), and post-implementation (2021-2025). Our preliminary findings reveal a divergence: while the FTSE 100 recorded strong nominal post-Brexit recovery, this was driven largely by multinational, globally exposed firms rather than domestic capital markets. In contrast, UK IPO activity and M&A volumes have decoupled from EU trends, despite stable values, indicating persistent frictions have reduced the appetite for raising capital in London. We verify that despite post-Brexit reforms, including the Financial Services and Markets Act 2023, the UK's competitive edge remains in a precarious position.

Consequently, we present a critical policy challenge: without accelerated regulatory reform and greater domestic institutional investment, the UK risks ceding its position as Europe's leading capital-raising hub.

## **Technocratic Literacy, the Counter Intuitiveness of Populist Logic and the Recommendations of The Third Agora**

**Adam Sharpe**

*University of Warwick*

Increasing social, economic and technological complexities have forced contemporary governance to adapt. Through this transformation, politics has come to operate in two dimensions of which this paper conceptualises as 'the political' and 'the technocratic'.

‘The political’ is grounded in rituals of debate, campaign, representation and legitimisation— a mediated sphere of democratic life. ‘The technocratic’, by contrast, expands the domains of governance beyond popular and visible politics through the gradual incorporation of expert administration and scientific policy design – performing detached from popular decision making.

Technocracy by its scientific approach produces a birds-eye administrative perspective to governance, rendering citizens as abstract figures which although functionally effective requires a complex cost-benefit argument for its presence in the political orbit. Alongside this and the relative opacity of bureaucratic processes, this creates distance between citizens and contemporary governance— leading to complex policy and its makers being suspect, cognitively incentivising for the public being rationally ignorant and the reinforcement of interpretative gaps. In other words, a large portion of modern governance is unmediated, producing a mediation gap which this paper will argue where the populist logic of simple policy emerges.

Simple policy is easy to understand, however not capture complex realities. Slogan policies and the construct of primed frames exacerbated by social media platforms as policy points does not fix the mediation gap but reinforces it in a new mode.

Conclusively, this paper proposes a series of strategies of reform to fix this duopoly of democratically harmful failures, collectively referred as recommendations of The Third Agora.

## **Exploring Public Understanding of Antibiotics: A Survey of Sixth Formers and Dental Students**

**Yara Alhajji**

*University of Leeds*

Antimicrobial resistance (AMR) is a major global health challenge driven not only by microbial evolution but also by human behaviour, particularly misconceptions surrounding antibiotic use. This study explores how knowledge, beliefs, and intended behaviours relating to antibiotics differ across educational stages, focusing on sixth-

form students and undergraduate dental students. Identifying where misunderstandings persist is essential for improving antimicrobial stewardship and education.

A cross-sectional survey was conducted with 26 participants drawn from three educational groups: sixth-form students and dental undergraduates. The questionnaire assessed understanding of antibiotic purpose and resistance, attitudes towards appropriate use, and intended behaviours such as course completion. Descriptive analysis was used to compare patterns of responses between groups.

Results demonstrated a clear educational gradient. Dental students showed greater conceptual understanding of bacterial specificity and resistance mechanisms than sixth-form students, while those sixth-form students with prior exposure to pharmacology-related teaching also demonstrated higher levels of accuracy than their peers. Despite this improvement with education, misconceptions persisted across all groups. Importantly, a disconnect between knowledge and behaviour was observed: some participants articulated correct principles regarding antibiotic use yet still reported behavioural intentions that could undermine stewardship, such as conditional discontinuation.

These findings suggest that while education improves antibiotic knowledge, it does not consistently translate into appropriate behavioural intentions. The study highlights the importance of introducing antimicrobial education earlier and reinforcing it throughout training, with greater emphasis on decision-making contexts rather than factual knowledge alone. Addressing this gap may strengthen stewardship efforts across both healthcare and public settings.

## **Intersectional Leadership and Innovation: How Women Founders and Senior Leaders Leverage Identity**

**Hawa Hawa**

*Bradford University*

Despite the global increase in women's leadership roles, substantial disparities persist for women whose identities intersect with gender, race, ethnicity, and other social

positions. Current leadership and innovation research predominantly views identity as a source of disadvantage, offering limited insight into its potential as a catalyst for innovation, particularly among founders and senior managers in entrepreneurial and socially focused contexts. This study addresses this gap by examining how intersectional women founders and senior managers leverage their identities to influence innovation and organisational culture. Grounded in Intersectionality Theory, Inclusive Leadership, Social Identity Theory, and Social Role Theory, the research frames identity as both an obstacle and a productive resource shaping leadership behaviours and innovation. It explores how identity informs relational leadership, inclusive decision-making, community-oriented problem-solving, and adaptive practices, while acknowledging challenges like visibility pressures, emotional labour, and stereotype management. The proposed framework posits that identity influences leadership behaviours, which in turn drive innovation and inclusive cultures in founder-led and senior management settings. Using a qualitative, interpretivist approach, the study conducts semi-structured interviews with 15–20 women founders and senior managers across sectors, including technology, education, social enterprise, and non-profits. Thematic analysis will uncover patterns linking identity, leadership, and innovation, supported by secondary data from the Global Gender Gap Report and entrepreneurship trends to highlight structural inequalities. By reframing identity as an innovation catalyst rather than merely a limitation, this research advances leadership and innovation models. It offers practical insights for entrepreneurship support programmes, organisations, and policymakers to foster inclusive, innovation-driven leadership ecosystems.

## **Pathologies of Knowing: Psychiatry, Power and Epistemic Crisis in Bram Stoker's Dracula**

**Sonika Jaiganesh**

*University of Glasgow*

This dissertation examines Bram Stoker's *Dracula* (1897) as a sustained engagement with late-nineteenth-century discourses of madness: how mental illness was defined, legitimised, and instrumentalised within emerging medical and public health

frameworks. Situated within fin-de-siècle debates on degeneration theory and the institutional formation of asylum psychiatry, the paper aims to demonstrate that psychiatric knowledge in this period functioned as a sociopolitical construct before being retroactively justified through claims of biomechanical pathology.

Methodologically, the dissertation adopts a medical humanities approach, combining literary analysis with the history of psychiatry and public health. Drawing on the work of figures such as Henry Maudsley, Cesare Lombroso, and Max Nordau, it interrogates the epistemological foundations of Victorian psychiatric reasoning, particularly its reliance on deductive, self-affirming methodologies. Close readings of *Dracula* foreground the asylum and its diagnostic practices as key sites through which these theories are narratively tested and destabilised.

The dissertation's central finding is that *Dracula* exposes the epistemic fragility of psychiatric authority by revealing how madness is conflated with moral failure, racial and sexual otherness, criminality, and unsanctioned forms of creativity and productivity. Through figures such as Renfield and the Count, madness is reimagined not solely as disorder but as a systematic (if distorted) mode of knowing that at times exceeds the rationality claimed by the novel's medical authority.

More broadly, the dissertation argues that *Dracula* offers a critique of a psychiatric profession in formation, highlighting the role of social determinants, institutional exclusion, and professional self-legitimation in shaping concepts of health, deviance, and mental illness.

## **The Pharmacy Meets the Bakery: Designing Patient-Friendly Treatment Experiences**

**Reya Veronica Colette Saini**

*University of Glasgow*

Many patients experience treatment as more than a biological intervention: it can become a repeated emotional burden, shaped by discomfort, fear, stigma, and treatment fatigue. These factors are strongly linked to reduced adherence, particularly in chronic

illness and paediatrics. This project asks a food-inspired, patient-centred question: could “bakery-like” oral formats - familiar, comforting, and pleasant to consume - support acceptability while still meeting the standards required for safe and precise dosing?

To address this, I will undertake an interdisciplinary scoping review across pharmaceuticals (oral delivery constraints and dosage-form design), behavioural science (acceptability and adherence), ethics/regulation (risk, consent, and classification at the food-medicine boundary), and food/sensory science (processing effects, stability, texture, taste, allergen risks, and storage). The literature will be synthesised into a feasibility framework and research roadmap that defines what evidence is needed to move from a compelling concept to a clinically credible development pathway.

Outputs will include: (1) criteria for identifying use-cases where treatment experience is a key barrier; (2) a structured set of design constraints (dose uniformity, gastrointestinal degradation, stability during processing and storage, interaction/allergen risks, unintended ingestion, and quality control); and (3) a staged evaluation plan mapping concept → formulation → safety testing → acceptability studies → clinical feasibility. A focused case-study lens (e.g., injection-burden conditions) will be used to illustrate both the motivation for patient-centred redesign and the practical feasibility limits.

## **You Let Them Read What?: Indonesian Constructs of Innocence, as Examined Through Children's Literature Censorship**

**Natashia Septiryman**

*University of Toronto*

Children’s literature censorship is a highly politicized topic, largely because of moral panics associated with it. Though the censorship of children’s literature is a widely researched topic in the Global North, relatively little attention has been given to the topic in other countries. This research examines factors underlying the censorship of children’s literature in Indonesia, considering its contrasting cultural and religious context to the Global North. This was investigated through a qualitative analysis of

children's books available in three bookstore chains and two K-12 schools in Jakarta, alongside a thematic analysis of Indonesian news articles and laws pertaining to censorship. This analysis found that sexual and violent content are likely not significant factors underlying censorship. However, queer books appear to be specifically silenced, particularly in Indonesian-owned bookstores.

Furthermore, this research challenges dominant theories in children's literature censorship by examining their applicability in the Indonesian cultural context. In the Global North, virtually all topics censored in children's literature can be openly discussed by adults, even if it is a condemned topic. In Indonesia, topics that are censored for children, like queerness, are also considered by the government as unfit for adult consumption and discussion. Whereas government officials in the Global North openly state that certain books are banned for discussing queerness, in Indonesia, explanations are obscured and queerness is never explicitly mentioned as a factor for censorship. This research highlights the importance of considering how culture shapes censorship practices and urges scholars to consider wider global contexts in their frameworks.

## **The Meaning of Life: A Comparative Investigation into Aristotle's Metaphysics and Historical Materialism**

**Mingxi Qiu**

*University of Glasgow*

This investigation is inspired by the observation of the social phenomenon that contemporary society increasingly pressures individuals to prioritise everyday survival over the meaning of life. The aim of this investigation is therefore to find a plausible foundation for the meaning of life with historical materialism or Aristotle's metaphysics by using the method of compare and contrast.

The research finds that Aristotle's metaphysical answer of eudaimonia (translated as "human flourishing") to the meaning of life causes the problem of circulation — the very definition of morality is found in moral agents, who are defined by morality that

is redefined by themselves. Therefore, it constitutes an implausible answer to the meaning of life.

In contrast to Aristotle, historical materialism shows that moral evolution throughout human history is situationally adjusted and influenced by the development of production, thus avoiding the metaphysical agent-centred arbitrariness and circularity of eudaimonia. Moreover, it predicts morality's future to gradually be more selfless as its theory suggests that advanced production will promote people's morality, thus it is more distinct and hopeful than eudaimonia.

The conclusion of the research on the meaning of life is hence found in historical materialism, which is in the continuous devotion to develop production. This finding can have the significance of inspiring and encouraging contemporary people to pressure a moral of selflessness during the process of developing production. Nevertheless, the research is limited in focusing on Aristotle and historical materialism, thus a wider range of research would carry the certainty of the conclusion further.

## **Redefining Smart Materials: Engineering Novel Non-Aqueous Magnetorheological Emulsions for Superior Performance in Smart Fluids**

**Ashu Anand, Amanda Koh**

*University of Alabama at Birmingham*

Magnetorheological fluids (MRFs) are smart materials notable for rapid, controllable viscosity changes under a magnetic field. Upon magnetization, MRFs undergo a liquid-to-semi-solid transition driven by the alignment of ferromagnetic particles to the magnetic field direction, forming chain-like networks that restrict fluid motion. This tunable behavior makes MRFs ideal for adaptive energy-damping applications, including prosthetics and seismic protection systems. Recent studies in the Koh Laboratory at the University of Alabama demonstrate that integrating emulsions into aqueous MRF systems, termed magnetorheological emulsions (MREms), significantly

enhances energy-damping capacity compared to state-of-the-art MRFs. However, aqueous systems present challenges including instability and limited durability. The study presented here aims to (1) engineer a stable, non-aqueous emulsion system to formulate non-aqueous MREms and (2) benchmark their performance against modern MRFs. An emulsion system was achieved using polydimethylsiloxane (PDMS) emulsified in glycerol and stabilized with a fumed silica Pickering emulsifier. By systematically manipulating key parameters—iron concentration, emulsion droplet size, magnetized soak duration, and magnetic field strength—this study reveals that MREms exposed to prolonged magnetization and elevated fields exhibit enhanced viscosity control. These results establish non-aqueous MREms as a superior alternative to traditional MRFs, pioneering a new class of superior smart materials with transformative potential for energy-damping applications.

## **ApoE4-R251G Corrects Dynamical and Conformational Features of ApoE4**

**Vamsi Singu, Ryan Tuckey, Rory Greer, Sophie Cunningham, Erik Roberson, Yuhua Song**

*University of Alabama at Birmingham*

APOE- $\epsilon$ 4 is the most studied risk factor relative to late-onset Alzheimer's disease (AD). R251G, a rare APOE variant, was discovered to neutralize the risk associated with apoE4 and potentially decrease overall risk of developing AD. Examining how the R251G substitution protects against AD would provide insight into key pathogenic features of apoE4 and reveal novel therapeutic strategies to mitigate risk associated with apoE4. ApoE is synthesized as nonlipidated monomers but is largely lipidated in vivo, which induces distinct structural changes. Hence, we used molecular dynamics simulations to model molecule interactions and determine how apoE4-R251G alters apoE4 by comparing closed/open nonlipidated and lipidated apoE structures. The starting closed nonlipidated apoE structure (PDBID: 2L7B) was run through a coarse-grain molecular dynamics simulation in the presence of dipalmitoylphosphatidylcholine lipids by Prakashchand et al. (PMID: 33979165) to generate a starting structure for lipidated apoE. The open nonlipidated apoE structure

was from Stuchell-Brereton et al. (PMID: 36749730). Using equilibrated trajectories, we generated four representative structures for each apoE3 rep, which we used to generate four structures each for apoE2 and apoE4. Representative apoE4 structures were then converted to apoE4-R251G. Subsequent analysis was performed on the equilibrated trajectories of four simulations for each apoE isoform. Analysis included examining changes in apoE structure, conformation, dynamics, and molecular interactions. ApoE4-R251G appeared distinct from apoE4 in secondary structure, conformational stability, and dynamics in both nonlipidated and lipidated simulations. Structural analysis of apoE4-R251G provides insight into unique and shared characteristics with apoE4 and highlights potentially targetable regions for therapeutics.

## **Effectiveness of Narrative Therapy on Chinese Family Caregivers with Mental Illness Experiencing Low Self-esteem**

**Chun Man Li**

*University of Glasgow*

In Hong Kong, family caregivers often report significant stress and burden stemming from the cumulative effects of emotional exhaustion, role engulfment, and inadequate social support. Chinese cultural expectations of caregiving further perpetuate persistent identity strain, guilt, and self-blame when expectations are unmet. As a result, family caregivers often experience low self-esteem. This issue is even more common among those with mental illness, where stigma leads to self-stigma and a negative self-perception of incompetence.

A six-session therapeutic group, integrating narrative therapy with expressive arts, was conducted at an Integrated Community Centre for Mental Wellness as practice research. It aimed to investigate the effectiveness of this intervention for Chinese family caregivers with mental illness who experience low self-esteem. The group was structured around a shipping journey metaphor to represent the caregiving journey. Through sharing caregiving experiences and creating ship artworks, the intervention helped service users deconstruct problem-saturated stories and reauthor positive

narratives. Their personal qualities, support networks, and positive experiences were highlighted. A pre- and post-group questionnaire using the Rosenberg Self-Esteem Scale (RSES) was administered. Results showed that the intervention enhanced the self-esteem of Chinese family caregivers with mental illness. This practice research also sheds light on culturally suitable therapeutic groups that use narrative therapy and expressive arts to enhance the self-esteem of Chinese family caregivers.

## **Growing Through the Storm: Posttraumatic Growth as a Catalyst in the Trauma-Empathy Relationships for Adults with Autism Spectrum Disorder**

**Tsun Wun Au-Yeung**

*City University of Hong Kong*

Adults with Autism Spectrum Disorder (ASD) frequently encounter adverse childhood experiences (ACEs). Despite extensive research exploring ASD-trauma associations and ASD-empathy challenges, no prior studies have holistically integrated these dynamics, and limited work has considered posttraumatic growth (PTG) in ASD trauma contexts. This leaves a critical gap in understanding resilience mechanisms within neurodiversity research.

This study investigated PTG's role in the trauma-empathy relationship among autistic individuals. Data from autistic and non-autistic adults were analyzed using hierarchical regression and correlations on validated measures including the Empathy Quotient (EQ), Posttraumatic Growth Inventory (PTGI), Adverse Childhood Experiences Questionnaire (ACE-10), Toronto Alexithymia Scale (TAS), Multidimensional Scale of Perceived Social Support (MSPSS), and Psychological Flexibility Questionnaire (PsyFlex).

Hierarchical models suggested a three-way interaction (ACE x PTG x ASD/NT) predicting empathy. PTG positively associated with empathy subscales, while alexithymia negatively predicted outcomes. Psychological flexibility emerged as a positive predictor.

These findings suggest PTG moderates trauma's empathy associations uniquely in autistic adults, potentially transforming adversity into adaptive strengths. This highlights novel interventions targeting growth and flexibility, advancing neurodiversity research by emphasizing resilience over deficits in ASD populations.

## **Culturally Appropriate Use of the EPS Model for a Resident-Led Concern Group of Chinese Older Adults in Hong Kong**

**Ming Yui Woo**

*City University of Hong Kong*

With Hong Kong's aging population, many older residents in public estates that were built decades ago face barriers to using outdated leisure facilities for exercise, socialization, and a more independent daily life. The EPS (Empowerment, Participation and the Strengths Perspective) model, developed by a Hong Kong scholar, is a social work practice framework that emphasises service users' expertise in their own life situations. This practice research project employs the model to empower a resident-led concern group to become a platform for collective action and advocacy to optimize age-friendly leisure facilities in an "old" public housing estate. This project was conducted as part of a social work practicum assignment and therefore did not require additional ethical approval.

The project included activities designed using the EPS Model, such as a community engagement event, an eight-session concern group meeting, community asset mapping, site visits, co-writing a community feedback letter, and meeting with a district councilor. Both qualitative and quantitative data, including the social worker's observations and participants' feedback and reflections, were collected during the project and at its end for ongoing and outcome evaluation.

Findings show that participants shifted from individual complaints to collective action, defining common needs, preparing an advocacy letter, presenting concrete ideas for optimizing leisure facilities, and attending the meeting. The project offers practical insights into applying the EPS Model for culturally appropriate social work practice,

spanning from micro to macro levels, to empower residents and promote age-friendly advocacy, thereby building social capital in densely urbanized settings in Hong Kong.

## **Legislation to Control Music and Sound in Reggio Emilia**

**Iris Rea, Tim Shephard**

*University of Sheffield*

The role of music in everyday life throughout history is a current focus in musicology and links to disciplines like sensory history and soundscape studies. Our research on musical references in the 1501 legal statutes of Reggio Emilia connected to the previous research of my supervisor into fifteenth and sixteenth century European music and contributed to his preparations for future funded research. The significance of this project lay in its contribution to contemporary scholarly trends and in its efforts to understand music in society more broadly, moving away from a larger focus on professional institutions and musicians.

DeepSeek and Google Translate were invaluable in translating and transcribing the statutes, helping us write a conference paper for the Medieval and Renaissance music conference. We subsequently used online databases like Jstor and Early Modern Books to consult contemporary statutes from other city states and analyse secondary literature to create a wider context of music and law in this period. This enriched our earlier discoveries and provided the foundations for a future journal article.

The research highlighted close links between justice, music and sound during this period, with musicians playing a key role in the administration of justice and sound control important to keeping order within society. Already an established fact in larger city states such as Florence, this project highlighted similar trends in the smaller state of Reggio Emilia and built our understanding of broad similarities between cities throughout Italy.

## **Bridging the Gap: Developing Research Skills in Undergraduate Nursing through a National Institute of Health and Care Research (NIHR) Internship**

## **Daniela Grice, Ellie-May Neville**

*University of Leeds*

Research underpins evidence-based practice and high-quality nursing care, making the development of future nurse researchers essential. However, undergraduate nursing students often have limited research opportunities and lack clear pathways into research careers.

The NIHR Undergraduate Internship Programme has enabled us to extend learning beyond the curriculum, deepen our research knowledge, build professional networks and gain a broader understanding of health and social care research.

During the internship, we supported our academic mentors in two NIHR-funded studies: the MEND study which explores attracting, recruiting and retaining more male care workers and the Response study, which evaluates the implementation of the Patient Safety Incident Response Framework.

We undertook screening and data extraction for papers included in the scoping review as part of the MEND study, developing our evidence synthesis skills. In contrast, our work on the Response study took place further along in the research process, producing an infographic to disseminate the findings from the rapid review. The infographic ensured findings are accessible and impactful beyond academic audiences, an audience who plays a key role in shaping this research through Patient and Public Involvement and Engagement, taking the form of co-production workshops or steering groups.

The internship laid the foundations for a career in healthcare research, igniting passion, encouraging curiosity, and informed future aspirations. It addresses the gap in undergraduate research opportunities by offering mentorship and hands-on research experience, which has been instrumental in our professional development.

## **Echoes of Place: Oral Tradition and Cultural Identity in John Francis Campbells Gàidhealtachd Folklore**

**Calvin Politi**

In this dissertation, I argue that the fluid nature of oral storytelling seen in John Francis Campbell's 1860's collection of orally told Scottish folklore displays part of one's identity through personal connection with place. Analysing the same stories told by tellers of varying vocations and location, stories tied to specific places, land and water, and the importance of oral tradition in the Gàidhealtachd (Gaelic Highland and Islands), I suggest that personal and national identity evolves from the connection to place and the ability to show this through one's own storytelling. This dissertation examines these stories, collected at a time of encouraged literacy and soon after the end of the Scottish clearances, resulting in the displacement of many families from generationally inherited land. I will discuss this alongside the critical works of Ernest Renan's 'What is a nation?', Benedict Anderson's *Imagined Communities*, and cultural literature like *Scottish Life and Society – Oral Literature and Performance Culture*, presenting the importance of oral tradition in the Gàidhealtachd and display the importance of Campbell's work at the time. Secondly, I explore Anthony D. Smith's theories of Ethno-symbolism and Ethno-nationalism while analysing four selected stories. Finally, I discuss the cultural impact of this oral folklore from the 1800s to modern neo-Highlandism, examining one of the collected stories still told orally today. The collection of these stories by Campbell after this time of cultural upheaval displays how linked cultural identity is to place, and that the oral tradition of storytelling is the perfect vehicle to understand this.

## **When Hospitals Become Targets: The Silent Toll of Attacks on Healthcare within Conflict Zones**

**Ruth Duthie**

*University of Glasgow*

Hospitals are protected spaces under international humanitarian law (IHL), functioning as symbols of neutrality and care during armed conflict. However, they are increasingly becoming deliberate targets in modern warfare, raising serious humanitarian and legal concerns. This dissertation examines the indirect impacts of

attacks on healthcare infrastructure during armed conflict, focusing on disease epidemiology, healthcare inequality and psychological harm among civilian and medical populations.

This study draws upon primary and secondary data from documented case studies and international datasets, including reports from the World Health Organisation Surveillance System of Attacks on Healthcare, Médecins Sans Frontières field reports and peer-reviewed research on conflict-related disease transmission and mental health outcomes. The analysis is informed by Johan Galtung's theory of structural violence and the concept of "slow violence" developed by Rob Nixon, highlighting how indirect harms unfold gradually but produce profound long-term consequences. These frameworks are applied alongside data from conflict monitoring platforms such as ReliefWeb, Insecurity Insight and the Humanitarian Data Exchange, as well as investigative journalism used as early documentation of healthcare attacks.

The findings indicate that the destruction of healthcare facilities contributes to increased incidence of communicable disease, disruption of essential medical services, widening health inequalities and increased rates of psychological trauma. Despite explicit prohibitions under IHL, attacks on healthcare continue to rise, suggesting significant gaps in enforcement and accountability. This dissertation argues that these violations constitute a critical public health and legal crisis requiring strengthened international legal mechanisms and greater political commitment to the protection of medical services during conflict.

## **Evaluating the Performance Impact of Nested Virtualisation Compared to Bare-Metal Systems**

**Jamie Talbot**

*Blackpool College*

Nested virtualisation has become increasingly relevant as organisations adopt complex cloud-native architectures, multi-tenant environments, and scalable testing infrastructures. Despite its growing use, the performance implications of running virtual machines within virtualised hosts remain insufficiently characterised. This

study aims to provide a systematic evaluation of the overhead introduced by nested virtualisation in comparison to equivalent workloads executed on bare-metal systems.

To achieve this, a controlled benchmarking environment was constructed to measure CPU, memory, disk I/O, and network performance across both configurations. Grafana and Prometheus were employed for real-time data collection, monitoring, and visualisation, enabling high-resolution insight into system behaviour under varying load conditions. Standardised benchmarking tools and repeatable workload patterns were used to ensure methodological consistency.

Preliminary findings indicate that nested virtualisation introduces measurable overhead, particularly in I/O-intensive operations, though the extent varies depending on workload characteristics and hypervisor configuration. CPU-bound tasks show comparatively modest degradation, suggesting that nested virtualisation may be suitable for specific classes of compute-focused applications. The study anticipates further refinement of these results as additional test scenarios are incorporated.

By quantifying the performance trade-offs between nested and bare-metal environments, this research contributes practical guidance for system architects, cloud engineers, and organisations evaluating virtualisation strategies. The findings have broader implications for capacity planning, cost optimisation, and the design of scalable virtualised infrastructures, particularly in contexts where flexibility and isolation must be balanced against raw performance.

## **Roses are Red, Vipers are Blue: Ecology Drives Colour and Pattern in Snakes**

**Leo David, Mark Shirley**

*Newcastle University*

Research on the function of colour and pattern in snakes is lacking; previous studies, mostly in North America, have found an association between ecological factors and pattern traits. This study investigated the relationship between snake ecology and colouration in snakes globally. Ecological data (e.g. habitat, hunting strategy, diet,

activity pattern) was gathered from existing scientific literature and field guides. Colour measurements were made using photo editing software from photos on a citizen science website. Multivariate analysis, which is a statistical technique that allows multiple variables and their relationships to be investigated simultaneously, was carried out in R.

Over fifty snakes from eight families were sampled. The strongest ecological drivers for colouration were habitat (wetland, grassland, or forest), system (terrestrial or arboreal), and hunting strategy (active or ambush). Wetland species were associated with bands, and grassland species with stripes. Terrestrial snakes tended to be banded or patchy. Unsurprisingly, arboreal snakes were mostly green. Active hunters were associated with being monochrome or having light secondary colours, while ambush hunters were mostly brown and patchy.

Previous studies on snake colouration have focused on North American, European, and Australian snakes; this study's global scope expands research to other parts of the world. The fact that findings are consistent suggests these ecological drivers are present across snakes globally. As snakes face threats from environmental destruction and climate change, it is more important than ever to know what drives their evolution to predict how snakes may evolve in response to threats.

## **Evaluating global 'Important Shark and Ray Areas' (ISRAs) to Strengthen Conservation in Areas Beyond National Jurisdiction (ABNJ)**

**Emma House, Lea-Anne Henry**

*University of Edinburgh*

Sharks, rays and chimaeras (chondrichthyans) are under threat from overfishing, climate change and other factors. 'Important Shark and Ray Areas' (ISRAs) are being established, based on scientific criteria to highlight regions of global chondrichthyan significance. However, there is relatively little known about the different evidence types used to establish ISRAs. Comparing and understanding the different evidence

types used can guide conservation efforts in international waters – Areas Beyond National Jurisdiction (ABNJ). The ABNJ cover 95% of the Earth’s ocean volume, yet there are only 4 ISRAs wholly in ABNJ. This study aims to help guide identification of more ISRAs in ABNJ by distinguishing the most practical and commonly used evidence types for these vast remote areas. We used open access ISRA fact files to create a database of evidence types for all 817 ISRA and categories of 30 evidence types. Analyses of evidence types will consist of presence-absence testing and assessing similarities between regions, including ABNJ. This will be used to identify common evidence types, which will then be critically evaluated for their practicality in ABNJ. Research is ongoing but catch data from fishermen and citizen science reports are the most commonly used evidence types to identify ISRAs, with the potential for tagging and diving observations to help boost this process in ABNJ. This research will provide vital assistance to the creation of Marine Protected Areas (MPAs), which were highlighted by the recently ratified High Seas Treaty as an important step in marine conservation.

## **Conducting a Patient Engagement Workshop to Investigate Research Priorities of Women from Black and Ethnic Minorities with Polycystic Ovarian Syndrome**

**Vidhi Gohil, Rebecca Mawson, Dalal Al-Bazz, Grace Edwards**

*University of Sheffield*

Polycystic Ovarian Syndrome (PCOS) is a lifelong condition that lacks high quality evidence-based guidance, especially focusing on ethnic minorities (who make up a large part of those with the condition).

PCOS is a common endocrine disorder, affecting 1 in 10 women in the UK. The cause of PCOS is unknown and the condition is managed primarily through focusing on current symptoms. Wide ranging symptoms, which can range from acne and hirsutism to irregular periods and struggles with fertility, often mean that PCOS is typically managed in primary healthcare settings. Long-term health outcomes that can result

from PCOS - including type 2 diabetes, cardiovascular disease and endometrial cancer – can be neglected.

We aimed to understand how PCOS care can be unsatisfactory and can be improved. We conducted a workshop with ethnic minority women with PCOS, wrote a report highlighting key themes and priorities from the workshop and started reviewing PCOS interventions available in primary healthcare settings worldwide. This involved the following – group discussions with diagrams; active notetaking; database searches; article screening.

Key findings include - PCOS care should be individualised (including considering cultural factors), more support from others with PCOS and healthcare professionals is needed and more research is required to provide high-quality evidence-based care, particularly regarding lifestyle changes. Our research supports previous findings and provides potential solutions. We have produced a PCOS network, allowing exchange of reliable PCOS information, and a report that can help inform areas in PCOS that patients are most interested in, so more relevant research can be conducted.

## **Zooarchaeological Distribution Survey for an Endangered Species: Tracking Archaeological Presence of The Water vole in England**

**Bea Hardwidge**

*Newcastle University*

This dissertation examines the archaeological distribution of the water vole (*Arvicola amphibius*) in England from the Iron Age to the Medieval period. Applied Zooarchaeology is utilised to explore the decline of this endangered species and determine whether these trends are visible archaeologically. Despite the species' severe modern decline and its importance within conservation science, there has been little examination of its long-term archaeological presence. This project addresses that gap by analysing water vole assemblages within the RATTUS database, comparing them to

wider microfaunal patterns, and mapping their spatial and temporal distribution using ArcGIS. It also evaluates whether urbanisation has affected water vole occurrence.

The findings show that the decline in water voles is evident over time and doesn't align with patterns of other microfauna. The results suggest a correlation between urbanisation in England and the decrease in water vole assemblages. Water voles appear more commonly on rural sites compared to the general microfauna. Spatially, water vole remains are concentrated in the south-east and east midlands, with a marked absence in the north-west, though it is uncertain whether this reflects historical distribution or gaps in archaeological sampling.

Further research is needed, but these results are significant both archaeologically and for modern conservation. They show a consistent decline that aligns with modern water vole population knowledge. Future work incorporating larger datasets and predator distributions would enhance understanding of water vole evolution and support conservation efforts. This study highlights how historical patterns of distribution and environmental pressures can inform conservation work.

## **The Relationship Between Eudaimonic Wellbeing and Intrinsic Motivation in the Context of Objective Experimental Performance**

**Hannah Baughan**

*University of Glasgow*

Eudaimonic wellbeing describes personal growth, achieving goals and flourishing in life. This psychological construct closely aligns to the principles of the Self-Determination Theory which provides a framework for human motivation and performance. Despite a strong implied link between wellbeing and motivation, prior research has predominantly investigated the hedonic aspects of wellbeing, relating to pleasure and positive emotions. Furthermore, motivation has been predominantly measured subjectively using self-report measures. The current study uses a novel approach of investigating intrinsic motivation objectively through a link to task ability

and engagement. This provides a more robust understanding of motivation as a dynamic state rooted in our daily activities. Thus, the present study explores the relationship between eudaimonic wellbeing and motivation through an experimental paradigm and relates motivation to task performance.

This study used the n-back, a memory test, to elicit a motivational state in participants. Motivation was then measured subjectively using a questionnaire and objectively using further voluntary participation. Eudaimonic wellbeing was measured with a questionnaire and performance was measured through accuracy and reaction time in the n-back. Results show that motivation has a positive relationship with experimental performance. Interestingly, no relationship was found between eudaimonic wellbeing and motivation. This lack of relationship may be explained by the lack of meaning and intellectual stimulation within the memory task. These results highlight the importance of motivation for driving performance, which could be applied in academic and workplace settings, but suggests that eudaimonic wellbeing may not be the predictor for this in all areas of life.

## **Does Public Healthcare Funding Reduce Avoidable Mortality and Improve Wellbeing? Evidence from the English NHS and Simulated Instruments**

**Wing Lin**

*City University of Hong Kong*

The UK's National Health Service (NHS) faces mounting pressure from an ageing population and rising costs. Despite ever-rising healthcare expenditure, improvements in life expectancy and outcomes have stalled. Therefore, understanding returns to NHS funding is increasingly important for budgetary decisions. While existing literature focuses on long-run returns and cost-effectiveness, less is known about the short-term impact on avoidable deaths and subjective wellbeing. This is crucial for policymakers operating on annual budgets to determine whether additional NHS funding yields immediate health and wellbeing benefits.

To study this, I estimate the causal effect of NHS funding on avoidable mortality and wellbeing using local funding allocation data (2013/14-2019/20). A main estimation challenge is that NHS allocations are “needs-based”. Sicker regions receive more funding, which potentially bias the estimated association between funding and outcomes. To address this bias and estimate the true effects, I employ two-stage regressions with simulated allocations, a counterfactual holding needs and area-specific factors constant.

I find that a 10% increase in NHS funding per capita reduces avoidable mortality by 5.83%, demonstrating positive health returns to additional NHS resources.

Decomposing the results reveals that funding reduces preventable mortality significantly more than treatable mortality, indicating higher marginal returns from prevention. I also find suggestive evidence that funding improves subjective wellbeing. Following HM Treasury’s framework for incorporating wellbeing into cost-benefit analysis, I show that the implied cost of increasing wellbeing by 1 point through the NHS is substantially lower than benchmarks, which can justify further investment in the NHS to maximise societal welfare.

## **Foraging in Thurnscoe - What Barriers Exist and How can we Remove Them?**

**Jodie Edwards**

*University of Sheffield*

2.9 million people used foodbanks in the UK in 2024. With a rise in the cost of living, and an ever greater need to work towards sustainability in food consumption, foraging is a key tool in helping people access fresh, nutritious food for free. It also benefits communities beyond food provision – time spent in nature has mental and physical health benefits and has been shown to reduce anti-social behaviour. This research aimed to establish what barriers exist to foraging and how they can be removed.

A Google survey was created and disseminated on social media. 109 responses were received, which were compiled and analysed using tools in excel to uncover trends. A literature review identified fourteen relevant studies on foraging. A matrix was

generated to identify key themes across the literature. The study findings matched what was found in the wider literature; people lack knowledge, confidence and are concerned about safety and legality. While our findings regarding barriers matched the wider literature, this study also asked people what would help them forage more, with the responses indicating that a map, free foraging courses, and signage around edible planting would be most beneficial.

The results of this research were shared with Barnsley council, who have since committed funding for signage around edible planting, and Walk Leader training that has enabled the local foraging group to run group walks. A comprehensive map of the area is in development. There is potential to re-survey later to establish if these interventions have been successful.

## **The Recuperative Work of Speculative Fiction: Exploring Non-Terrestrial Ways of Knowing and Being as Decolonial Epistemology**

**Madhumaya Anandan Kumaran**

*National University of Singapore*

In the absence of autobiographical narratives, there is painfully little we can recover of the interior lives of violated figures effaced by colonial capitalism. Close to nothing can be known of the pregnant figures who were deemed by transatlantic slavers to be “sick cargo”, and thrown overboard and drowned in the Middle Passage. We know that they were enslaved, African women, and we know of the unspeakable violence they were subjected to—that they were murdered, and that their lives were extinguished along the lines of their blackness, and their sex. We only glimpse them in the preserved words of their enslavers and murderers, as only that registers as legitimate evidence in conventional historical methodology. The very orders of power that killed such figures now obfuscates them from us: we who live in the wake of immense historical atrocity. I investigate how the violence of the conventional historical archive—specifically, its insistence on objectivity and hard, “grounding” evidence—is rooted in the situated knowledge of our terrestrial, anthropoid experience, rendering this claim to objectivity

untenable. I explore the imperative of fiction in recuperating this loss and obfuscation, given fiction's speculative and affective capacities. To do this, I examine Rivers Solomon's *The Deep*, and how the novella draws from the qualities of the oceanic rather than the terrestrial to image a profoundly somatic and sensory means of knowing and mediating, which could constitute a reparative, decolonial practice of Black counter-historical narration whose methodology foregrounds the interiority of the lost, violated figures.

## **The Utility of the Eye-Height to Shoulder Width Ratio When Determining the Passability of an Aperture**

**Paul Mysko, Michael Cinelli**

*Wilfrid Laurier University*

Fajen (2013) proposed a theory; young adults use a ratio of their eye-height to shoulder width (SW) to guide behaviours. The purpose of the study was to determine if eye-height information is the driving factor which dictates actions during a static aperture crossing task. It was hypothesized that an increase in eye-height would make participants perceptually wider, while a decrease would have the opposite effect.

Fifteen young adults (9 male, aged  $22.3 \pm 1.5$  years) walked along a 7.5m pathway in virtual reality (VR) towards a goal with an aperture formed by two vertical poles (20cm in diameter) positioned 5m from the start. Participants completed three VR eye-height manipulations: 1) Normal (unaltered eye-height); 2) Tall +30cm to normal height; and 3) Small -30cm from normal height. The participants' objective was to reach the goal by either passing through or around stationary poles without rotating their shoulders or colliding with one of the 9-block randomized aperture sizes (ranging from 0.8-1.8xSW). HTC Vive Pro 2 recorded head position in VR space (90Hz) and aided in the calculation of critical point (CP) (aperture size in which participants switched from walking through the aperture and went around).

There was a significant main effect of height on CP [ $p < .001$ ], such that during the Small condition (0.95x SW), participants walked through narrower aperture sizes compared to the Normal (1.02x SW) and Tall (1.06x SW) conditions.

Therefore, when navigating a static environment, the ratio between eye-height and shoulder width may shape young adults' body-size perceptions, thereby influencing behaviour.

## **Pedestrians Underground: An Investigation into the Pedestrian Experience of Newcastle's Underpasses**

**Rosa Goodman Fleischmann**

*Newcastle University*

My undergraduate dissertation explored the pedestrian experience of Brandling Park Underpass in Newcastle upon Tyne. Created as merely by-products of the larger motor vehicle infrastructure surrounding them, underpasses began to spread over the UK driven by radical car centric urban planning models in the 20th century. Despite their overlooked and under-considered position, this part of the built environment often evokes very strong emotional reactions, frequently appearing in local news debates on safety and regeneration. This recurring attention suggests a profound public interest in the underpass. It is a space that seems to linger in our collective memory; we can all relate to the specific experience of the underpass even if it can be hard to articulate. The project uses a phenomenological, interpretivist approach to qualitative research, giving greater agency to participants through a two-stage methodology. The first stage elicited photographs from passersby through a QR code poster over 2 weeks. These photographs were turned into a temporary, disruptive exhibition in the underpass where users were invited to annotate the images over a day. Four key themes emerged from this research: Moving Through and Moving Away, Haunted by Absence, Fragmented Belonging, and Traces of Life. Together they create a rich language of the space, revealing the underpass as not only a space to be left in the history of urban design but as one shaped everyday by the interactions it facilitates.

## **Evaluating the Effectiveness of Bioremediation Techniques in Regulating the Nutrient Levels in Williamson Park, Lancaster**

**Austin Kitching**

This investigation aims to evaluate the effectiveness of the bioremediation techniques implemented by Thrive.eco at Williamson Park's main lake and to determine whether the *Bacillus* species are effective in degrading plant-based hydrocarbons present and returning nutrient levels to natural levels.

Bioremediation is a technique that is used to breakdown and detoxify environments polluted by excessive organic and/or inorganic pollutants, e.g. industrial effluents, heavy metals, pesticides and organic halogens (Sharma, 2021). Bioremediation is a more environmentally friendly, cost-effective, less invasive and easier to implement method compared to more traditional, physical and chemical processes such as excavation and chemical precipitation used to breakdown pollutants (Sustainability Directory, 2025).

Data collection involved, collecting water samples using three different containers, 1) sterile bottle for micro test, 2) glass jar for DO, 3) plastic bottle for chemical tests from six locations on the main lake, testing for dissolved oxygen, biological testing and chemical testing. The locations had been selected based on where the bacteria was applied. Performing chemical tests on the water identify any changes in nutrient levels (phosphates and nitrates) which would be presented using bar and scatter graphs. Statistical analysis tests such as ANOVA and Spearman's rank correlation test to see if there were any significant differences between the sites and months. Groups of birds occupied a number of sites, which can be associated with higher ammonia and nitrate levels, seen in data collected. The findings could see bioremediation techniques more widely applied to recreational lakes with excess nutrient problems.

## **An Investigation into Whether Children's Books are Pivotal for their Emotional Development**

**Emily Sykes**

*University of Sunderland*

Tens of millions of children's books are sold in the UK annually. Many aim to support children's socio-emotional development, which is fundamental to their growth and ability to become independent, self-aware, and empathetic towards others in adulthood. This paper argues that one of the most beneficial and accessible ways to support a child's emotional development is through engagement with illustrated picture books. Drawing upon the educational theories of Vygotsky, I present a comparative analysis of six fictional children's books; *A Birthday for Frances* by Russell Hoban, *Where the Wild Things Are* by Maurice Sendak, *The Shopping Basket* by John Burningham, *The Sad Book* by Michael Rosen, *Lost and Found* and *The Heart in the Bottle* by Oliver Jeffers. Findings highlight how illustrations can function as pedagogical and psychological tools, reinforcing scaffolding through multimodal learning, allowing children to be able to recognise, interpret, and regulate emotions. Far beyond aesthetics, this research points to the pivotal role that illustrations play in scaffolding social-emotional learning within children, specifically building self-awareness, self-management and resilience.

## **Ionic Thrust and Their Potential Role in Sustainable Aviation**

**Ethan Mclemon**

*Blackpool College*

The aviation industry contributes approximately 2.5% of global carbon dioxide (CO<sub>2</sub>) emissions annually (Ritchie, 2024). This growing contribution exacerbates climate change and underscores the need for innovative, low-emission propulsion technologies, motivating interest in ionic thrusters. This study examines the aviation sector's environmental impact, reviews international efforts to reduce aviation-related carbon emissions, and evaluates alternative propulsion methods, with a particular focus on the feasibility of ionic thrusters for aircraft applications.

Experimental testing was conducted using a prototype ionic thruster system across a range of exit velocities to calculate generated thrust. Results showed an average thrust-to-weight ratio of approximately 0.001232, which is substantially lower than anticipated. These findings indicate that ionic thrusters, in their current form, are not

viable as a primary propulsion method for conventional aircraft. However, the results suggest potential for further research into hybrid propulsion systems that integrate ionic thrusters with traditional propulsion methods to improve overall efficiency.

Although the prototype operated as intended and demonstrated promise in design and energy efficiency, the magnitude of thrust produced was minimal. This research therefore contributes to ongoing exploration of novel propulsion concepts and may inform future developments toward more sustainable aviation technologies.

## **The Perception and Characterisation of Scent**

**Richard Abdulajev**

*University of Sunderland*

Unlike something that can be seen and touched, trying to portray a scent or fragrance with no true physical form can prove elusive. This project explores the contextual backgrounds of perception and the ways senses and reactions to outer stimuli can be explored in illustration through the lens of olfaction.

Humans are capable of detecting a vast array of different chemicals with different signatures - we can perceive far more smells than we can colours - and yet our reliance on sight as a communicable construct dominates that of our sense of smell, perhaps because our ability to perceive more coherent qualities such as form, colour, depth, and movement is clearer than the more ambiguous aspects of olfaction (Bochicchio & Winsler, 2020).

While odours are often categorised by qualities like intensity or pleasantness, or scent characteristics like floral, fruity, or earthy, and while the concept of ‘primary’ odours (akin to primary colours in colour theory) has been proposed, (e.g., Weiss et al., 2012), there is no framework for testing these theories (Stefano & Spence, 2025). A further complication is that odours are bound up in memory and so their perception is both present and reflective (Stefano & Spence, 2025): memories affect our current perceptions of scent.

This research project involved the creation of images in response to collected perceptions of scent to investigate the extent to which words, colours, and images can engage or counter preconceived notions to visually create the feel or character of a scent.

## **Harnessing AI in Nutrition: a Comparative Analysis of AI Models for Dietary Recommendations During Care and Post-discharge**

**Pheobe Hammond, Nikhil Deshpande, Kyle Harrington, Aislinn Bergin, Fiona McCullough**

*University of Nottingham*

Over 3 million individuals in the UK are at risk of malnutrition. With increasing pressure on healthcare systems, there is growing interest in whether artificial intelligence (AI) could supplement dietetic support, particularly post-discharge. This project evaluated how effectively different AI tools can provide personalised dietary guidance for patients without access to a dietitian, using criteria of accuracy, adaptability, accessibility, safety, and NHS integration potential.

Three types of AI tools were comparatively evaluated: large language models (LLMs) including GPT-4 and Co-Pilot; diet tracking apps(MyFitnessPal) and virtual behavioural companions (Replika). 10 patient profiles based on real clinical scenarios were developed, representing diverse ages, medical conditions, and backgrounds. Red-teaming scenarios tested safety under high-risk prompts. Evaluation criteria were informed by NHS and British Dietetic Association (BDA) guidelines and refined with supervisor input. This student-led service evaluation did not require ethical approval.

LLMs provided evidence-based and tailored recommendations but failed to signpost to professional services. Replika offered motivational support but lacked clinical accuracy. Diet-tracking apps were accessible but struggled with portion accuracy and adaptability to complex conditions. None of the tools provided culturally tailored advice. Although no major safety breaches occurred, unprompted safety features were

limited. This is concerning given that 51% of patients do not receive post-discharge nutritional follow-up.

AI show potential to support post-discharge nutrition care through basic guidance and habit-building, acting as a bridge where dietetic access is limited. Significant gaps remain in cultural sensitivity, safety signposting, NHS integration; highlighting the need for further development and validation before clinical implementation.

## **Reinventing Comfort: Is a Low-Tech Mattress the Future of Pressure Management in Acute Care?**

**Abdalla Jalal, Ambreen Chohan, Yik Nok Bryan Lee, Deborah Harrison, Jo-Anne Webb**

*University of Lancashire*

Pressure injuries (PIs) cost the NHS around £1.4 million per day. PIs (or bed sores) are painful, slowly healing, areas of skin and tissue damage caused by prolonged pressures, especially over bony areas such as the back or heels. With 73% of patients spending 4 hours or less in A&E, prolonged time on narrow trolleys increases PI risk before admission. This may extend hospital stay and increase NHS strain. This study explored whether low-tech mattresses could improve pressure redistribution and comfort compared to standard foam mattresses.

Twenty healthy volunteers participated in this quantitative study exploring bed-body interface pressure mapping of two mattresses (standard foam vs a new polyurethane foam). Analysis focused on areas at high-risk of PIs (head, sacrum, heels, full body), contact surface area, peak pressure integrals, comfort scores, and preferences. Each test lasted 21 minutes, including 6 minutes foam settling time.

The new low-tech mattress significantly increased average contact surface area by 33%. Peak Pressure Index (PPI) decreased by 47.3% on the low-tech mattress, with the greatest reductions seen at the heels and sacral region. The new low-tech mattress significantly decreased average pressure by 13.4% with 85% of participants reporting greater comfort and preference for it.

The implementation of new low-tech mattresses may reduce PIs in acute care. While not replacing good clinical care or shortening waiting times, this low-tech solution offers an opportunity to improve health and wellbeing by potentially preventing avoidable PIs. It represents a resource friendly improvement supporting patient-centred care.

## **Infantile Epileptic Spasms Syndrome: Carer Recorded Smartphone Videos Informing Machine Learning Diagnostics**

**Aimee Boyle**

*Sunderland University*

Visual storytelling is increasingly explored as an adjunct tool in clinical and trauma-informed therapeutic settings, including outpatient counselling, community mental health services, art therapy practice, and youth mental health support. Pollard's (2022) sequential illustration can be applied in talking therapy and other clinical interventions to support communication, insight and the development of empathy, especially in client group settings. Comics, as a hybrid medium combining image and narrative, offer a structured yet flexible format through which clients can externalise distressing memories, enabling clients to approach sensitive content with a sense of control rather than being overwhelmed by it. Clinical art therapists have highlighted this principle as a key therapeutic benefit.

By organising internal experiences into sequential narratives, comics support reflective processing, emotion regulation, and the communication of lived experience in ways beyond single-image artmaking or traditional talk-based methods. This project examines the potential therapeutic value of comics as a distinct medium: the addition of sequential images and structured dialogue allows for a new type of written communication that certain individuals may find beneficial. drawing primarily on the theory of the creative process as a therapeutic one, and trauma-informed perspectives on non-verbal expression. Foundations for this work include emerging literature on the use of comics in clinical practice and recent calls for integrating comics into

therapeutic and health humanities settings because of their ability to make internal states visible and approachable for clients, clinicians, and researchers alike.

## **Evaluating New Frontier Artificial Intelligence Models' Response Accuracies in Simulated Ophthalmology Advice Requests: Doc V Bot 2**

**Eunice Wong, Aaron Robertson, Iain Livingstone**

*University of Glasgow*

**Introduction:** Telemedicine enables remote clinical assessment, reducing outpatient waiting times. Ophthalmology consultants manage high volumes of referral advice requests. As artificial intelligence (AI) integrates into NHS Scotland workflows, large language models (LLMs) may function as decision support tools, accelerating referrals while preserving clinician oversight. This study evaluates frontier LLMs providing ophthalmology vetting and management advice using a retrieval-augmented generation (RAG) framework to improve factual grounding and guideline consistency.

**Aims:** Evaluate LLM responses (index) against consultant ophthalmologists (reference) in clinical reasoning and management from simulated ophthalmology advice requests.

**Methods:** Responses generated by Claude Sonnet 4.5, Copilot (powered by GPT-5), and consultants were assessed in a masked online survey by ophthalmologists in NHS Forth Valley. Responses were rated for quality, completeness, relevance, and practicality using a five-point Likert scale (1 = poor, 5 = excellent). Participants also selected the best overall response per case and provided free-text feedback. Friedman's test will compare response groups, preference analysed via frequency counts, and free-text thematically.

**Results:** Interim analysis demonstrated mean overall scores of 3.0/5 for Copilot, compared to Claude (2.56/5) and consultant responses (2.13/5). Copilot was most frequently selected as the best overall response. Free-text feedback raised concerns

regarding factual accuracy and clinical nuance. LLM responses were generated in under one minute, highlighting efficiency in referral workflows.

Conclusion: Pilot results imply AI's time-saving potential, with RAG guardrails enhancing response quality. Interpretation is limited by the vignette-based design. This study evaluates AI-supported ophthalmology referral workflows, with future work focusing on clinician-centred service evaluation and real-world usability.

## **The Evolution of the Vaginal Speculum in Gynaecology for Improvements in Patient-centred Care and Holistic Treatment**

**Ciara Oxford**

*University of Glasgow*

The vaginal speculum is an essential instrument in gynaecological practice, with a role in both diagnosis and therapeutic procedures. Although praised widely throughout medical practice, it is also an instrument with historical and current-day associations of apprehension, fear, and pain.

Speculae were first used in ancient Greece and Rome, fashioned as rigid, cylindrical tubes, designed for ease of practitioner use without patient consideration. Progress resulted in currently used designs – such as the Cusco's and Sims' models – which continued to be practitioner-centred, lacking patient comfort and autonomy.

This study aimed to explore historical perceptions of vaginal speculae, investigate advancements in speculum design and their implications for gynaecological practice, and consider how practitioners can further prioritise patient dignity and comfort during examination and treatment.

Methods included structured searches of historical and medical literature, thematic analysis of selected texts on use and attitudes, and artefact analysis of speculae from a museum collection.

Findings identified a material change from metallic to single-use plastic, which contributed to improvements in both physical and emotional aspects of the patient

experience, while supporting a more holistic approach to treatment. Advances including speculum self-insertion and improved communication by medical professionals has a considerable benefit on patient examination experience.

These results suggest that both evolution of material design and changing historical attitudes contribute to the removal of stigma surrounding the use of the vaginal speculum in gynaecological examination and that both technological and cultural aspects are important in improving the patient experience.

## **From Development to Deployment: Achieving Zero Downtime and Zero Vulnerabilities in Enterprise Microservices at VodafoneThree**

**Hannah Nobeebux**

*Blackpool College*

VodafoneThree prioritises performance and security requirements to ensure that enterprise applications meet high standards before deployment to production environments and customer use. As a software engineering degree apprentice at VodafoneThree, I contribute to enterprise-scale microservices that support daily customer operations. For my Level 6 End Point Assessment (EPA) project, I focused on enhancing performance testing practices and resolving security vulnerabilities within enterprise applications.

PaCE (Performance and Chaos Engineering) is a VodafoneThree framework designed to simulate high levels of traffic on application programming interfaces (APIs) to verify that systems can withstand sudden increases in demand during peak trading periods, such as Black Friday. In addition, Mend and Trivy are scanning tools that detect vulnerabilities and security risks within applications and infrastructure files. For the first part of the project, I implemented comprehensive performance testing suites using Locust, a Python-based performance testing framework, to verify that applications can manage high volumes of traffic. The second component involved researching and resolving security vulnerabilities flagged through Mend and Trivy

scans to ensure that applications did not contain outdated or high-risk dependencies, which could lead to bugs or cybersecurity issues.

This project addresses industry-standard practices for enterprise-level development. The implementation of performance testing is highly beneficial at VodafoneThree, especially to support busy trading periods. The key step to building high-quality applications is to ensure that services are available 24/7 for customers, minimising disruption and a loss in revenue. Furthermore, maintaining a clean security scan is crucial to ensuring compliance with internal cybersecurity requirements.

## **Gradually and Suddenly: Financial Resilience and Changes to Service Expenditure in English Local Government Since 2010**

**Anna Calvert**

*University of Leeds*

Since 2010, English councils have experienced funding cuts and rising demand for high-cost 'acute' services. As a result, many councils have sought to become 'resilient' to financial pressure. Often, this has manifested as focusing resources on the most urgent services or on alternative income sources. This means seemingly lower-priority universal and discretionary 'neighbourhood' services, like libraries, parks, and waste collection, have often faced the largest cuts. Underinvestment in these services can have significant effects on people's satisfaction with their councils and the areas they live in.

In this study, longitudinal local government finance data is used to model changes in acute and neighbourhood service expenditure between 2009/10 and 2024/25. The results show neighbourhood services expenditure fell consistently between 2010 and 2018, and remained at a lower level despite slightly higher local government funding since 2020. Meanwhile, acute services spending has risen consistently for a decade. This suggests a lasting institutional change in spending across the sector. This behaviour is observed in councils at varying levels of area deprivation, despite lower service and income pressures in less deprived councils.

The results of the study have clear practical applications ahead of the current government's proposed reforms to local government finance from 2026/27, which seek to facilitate higher investment in neighbourhood services.

## **Forecasting Indoor Temperature in Homes with Air-Source Heat Pumps to Enable Flexible Low-Carbon Heating**

**Alexander Gledhill, Stephanie Gauthier**

*University of Southampton*

Space heating accounts for around 40% of household energy use in the UK, making it a central challenge for building decarbonisation. As gas boilers are replaced by electrically powered air-source heat pumps (ASHPs), peak electricity demand will rise while reliance on variable renewable generation will grow. Accurate indoor temperature forecasting is therefore essential to manage peak electricity demand while maintaining occupant comfort. This work builds on the LATENT project, which examined the impact of third-party control of domestic heat pumps during peak demand. A novel physics-informed machine-learning framework was developed to predict indoor temperature in ASHP-heated homes. Using half-hourly data from a criteria-based purposive sample of 64 UK dwellings across the 2023/24 heating season (including weather data, heat-pump power, and surveyed building metadata), three approaches were assessed: (1) a physics-based Resistance–Capacitance (RC) model with parameters calibrated via Bayesian inference; (2) a hybrid model that integrates the calibrated RC forecast with a neural network to capture unmodelled thermal dynamics; and (3) transfer learning, whereby homes were first clustered by age and floor area, then parametric distributions from data-rich homes were used as priors to calibrate similar dwellings. For 96-hour forecasts, the RC model achieved RMSE = 1.38 °C, reduced by 68% with the hybrid model (RMSE = 0.44 °C). Transfer learning further reduced mean prediction error by 30.4% (RMSE = 0.39 °C). These results validate our approach to accurate, interpretable temperature prediction, with clear potential for integration into smart thermostats that schedule heating around user preferences and grid conditions.

# **Transforming Global Supply Chain Education through 'SA2SCD': A Scalable, Professional-Grade Game Addressing Critical Gaps in Supply Chain Design and Sustainability**

**Dan Trowsdale, Sahil Rupani, Chidiuma Enechi, Rommel Pacheco  
Hernández, Carlos Adrián Peña Olvera, Eduardo Bastida Escamilla,  
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Contemporary supply chain education faces a persistent disconnect between sustainability theory and practice. This research presents Sustainable Approaches to Supply Chain Design (SA2SCD), a role-based supply chain game developed by the University of Leeds and Tecnológico de Monterrey. The game addresses this gap through immersive experiential learning, simulating business operations and complexity.

SA2SCD is underpinned by a mathematical model integrating the SCOR (Supply Chain Operations Reference) framework with Life Cycle Assessment, and incorporating business metrics (costs, margins and SG&A) mirroring supply chain economics. Teams of six students adopt management roles (CEO, Production, Sales, HR, Supply & Procurement, and Design) to design and optimise a headphone manufacturing supply chain serving North African markets.

Teams start with an angel investment and play through 10 simulation rounds, making role-specific strategic and operational decisions. Each decision impacts sustainability performance and market share, with the overall success determined by a composite of environmental, social and economic scores, preventing purely profit-maximising strategies. The game programmed in JavaScript is available as a real-time browser accessible HTML link.

Extensive pilot testing was conducted with 50+ students and professors across disciplines, involving 7 sessions conducted at the University of Leeds and one session at Monterrey Tec. Post-sessions' data demonstrated significant gains in students' ability

to anticipate sustainability impacts of supply chain redesigns, with scores improving from 89.13 to 95.71.

SA2SCD's validated pedagogy, integrated sustainability dynamics and scalable digital platform position it for worldwide adoption, offering institutions a transformative tool to develop current students into tomorrow's Sustainability-oriented Supply Chain leaders.

## **How eCommerce has Democratised Board Game Publication, to the Advantage of Freelance Illustrators**

**Tia Muncaster**

*University of Sunderland*

Crowdfunding platforms first emerged in the mid 2000s, to grant independent and smaller publishers a visible platform to pitch their ideas. Crowdfunding allows entrepreneurs to easily access funding through like-minded people, who in return receive rewards for doing so. This method of crowdfunding is referred to as Reward-Based Model Crowdfunding and is a way to motivate the crowd to make donations. The idea of being instantly rewarded upon donating can be appealing to many, as backers are able to enjoy a small piece of the project instantly instead of waiting for the full release. Reward-based crowdfunding also allows the community to feel more connected with the project due to having similar interests to other people connected to the same project (Lambert, 2024).

In the board game industry, it has become easier than ever to turn a concept into reality by using platforms like Kickstarter. Before the launch of Kickstarter, popular board games such as Carcassonne, and Catan were released by hobbyists. Funding was slow, and the profits made from even popular games was just enough to break even. Platforms like Kickstarter have been revolutionary for the board game market (Attia, 2016).

This research tracks the research undertaken to bring my previous project 'Hot Pot' and my next project to the commercial market and assesses the relative importance and

success of crowdfunding to the genre.

## **Investigating the Survival of Bacteria from Different Commercial Probiotic Drinks Under Simulated Gastric and Intestinal Conditions**

**Velta Ziedina**

*Blackpool College*

Probiotics are defined by the World Health Organization as live microorganisms that confer a health benefit on the host when administered in adequate amounts, provided this benefit is supported by scientific evidence. They play a key role in maintaining gut microbiota balance, supporting digestion, immune function and overall wellbeing. Most commercial probiotic products contain strains from the genera *Lactobacillus* and *Bifidobacterium*, which are widely used due to their established safety profiles and potential health benefits. However, for probiotics to be effective, they must survive the harsh conditions of the gastrointestinal tract, including exposure to gastric acidity, digestive enzymes and bile salts. Evidence suggests that the survival of probiotic bacteria varies considerably between products and formulations, with discrepancies often reported between labelled and actual viable bacterial counts.

This study aims to investigate the survival of probiotic bacteria from different commercially available probiotic drinks under simulated gastrointestinal conditions. Bacterial cultures will be prepared from selected products and exposed sequentially to simulated gastric and intestinal fluids. Viable plate counts will be used to quantify bacterial survival before and after exposure, allowing comparison of survival rates between products.

The anticipated outcome is that probiotic survival will differ significantly between drinks, reflecting differences in formulation, bacterial strain and protective matrices. The findings will contribute to improved understanding of probiotic viability during digestion and highlight inconsistencies in commercial probiotic products. This research

may help inform consumers, support evidence-based product development, and emphasise the importance of scientific validation in the probiotic industry.

## **Antibiotic Stewardship in Epigastric Hernia Mesh Repair: Implications for Sustainable Healthcare**

**Tanisha Tanzania, Dr. Eleanor Todd, Mr Ahmed Abdelmaguid, Mr Azzam Al-Amin**

*University of Lancashire*

Antimicrobial resistance is a growing global public health threat driven in part by unnecessary antibiotic exposure. The routine use of prophylactic antibiotics in clean surgical procedures, such as epigastric hernia mesh repair, remains variable despite limited evidence of benefit.

This audit aimed to assess the necessity of routine antibiotic prophylaxis in patients undergoing epigastric hernia mesh repair by comparing surgical site infection (SSI) rates between those who

A retrospective audit was conducted of patients undergoing epigastric hernia mesh repair at a tertiary centre over a 12-month period (August 2023–July 2024). Emergency and elective cases were included. Factors affecting SSI risk, including body mass index, smoking status, and co-morbidities, were recorded. Laparotomies with additional hernia repairs and patients with active infections were excluded. Antibiotic prophylaxis, administered at the surgeon's discretion, was extracted from electronic patient records. The primary outcome was SSI incidence.

Ninety-three patients were included, of whom 45 received prophylactic antibiotics. The SSI rate was 9% (4/45) in the prophylaxis group and 17% (8/48) in the non-prophylaxis group. Chi-squared analysis demonstrated no statistically significant difference in SSI rates or other post-operative complications, likely reflecting limited sample size.

These findings support antimicrobial stewardship in routine surgical practice and suggest that selective use of prophylactic antibiotics may be appropriate in low-risk procedures. This has broader relevance for sustainable healthcare, aligning with SDG 3 (Good Health and Well-Being) and SDG 12 (Responsible Consumption and Production), while maintaining patient safety.

## **Who Benefits from Growth? A Case Study of Rapid Versus Moderate National Growth Rates and their Distributional Effects.**

**Preesha Nangia**

*University of Strathclyde*

Economic growth is seen as a feat of success within a capitalist economic framework. Yet, rising Gross Domestic Product is often unevenly distributed, not benefiting everyone equally. Different growth rates also affect distribution as they are achieved through varying sectors.

This paper analyses who benefits most from a growing GDP, and its impact on the distributional equality within the country- by comparing the growth trajectories of India and the UK. These countries have been selected due to their contrasting growth patterns and widely available comparable data, allowing for a case-study method. India, one of the fastest growing economies over the past three decades, is compared to the UK which has shown a more moderate growth rate; however, this has not proportionately translated into improved living standards, or income equality between the two economies.

The research makes use of secondary data on GDP growth rate and GDP per capita, in contrast to trends in real wages, and the income Gini coefficient. The paper also considers specific sectors- such as the Tech/IT sector which has shown rapid growth in India, in contrast to the UK, still being deeply internally unequal, despite high revenue generation.

The study finds that periods of rapid growth such as in India show more uneven gains than the growth seen in the UK. By highlighting even the most booming industries

growing unequally within their structures, the study questions the assumption of growth tying to economic justice and GDP being synonymised for success.

## **Characterising the Cardiotoxic Actions of Osimertinib in H9C2 Myoblasts**

**Hannah Boldy**

*University of Glasgow*

Osimertinib is a third-generation kinase inhibitor used in the treatment of non-small cell lung cancer (NSCLC). There is a growing use of osimertinib as a first-line treatment due to its efficacy and favourable safety profile, but it has been reported that 4.4% of patients develop treatment related cardiac events, which is of concern as cardiovascular complications are the main cause of illness and death among cancer survivors. This study aims to assess the cardiotoxic actions of osimertinib in an in vitro model by quantifying cell viability.

H9C2 cells, a rat cardiomyoblast cell line, commonly used for cardiotoxicity screenings, were treated with osimertinib at the concentrations; 30 nM, 100 nM, 300 nM and 600 nM. Cell viability was assessed through multiple imaging techniques and assays to quantify the number of cells that were alive, damaged and detached.

Findings showed no significant reduction in cell viability when treated with osimertinib at all tested concentrations compared to control, suggesting that the cardiotoxic actions of osimertinib observed are not through cell death and may instead be caused by other mechanisms. This study highlights the importance of drug toxicity screenings and supports further research into the underlying mechanism of osimertinib to develop its safe use in patients.

## **Founders' Preference for Control and Merger and Acquisition (M&A) Intentions**

**Salma Yeng Seidu Sarunah**

Mergers and acquisitions (M&A) can be strategic growth tools for businesses, particularly in emerging markets where firms often face high failure rates and constrained access to capital. However, M&A activity in these regions remains relatively low. Existing research focuses on post-merger outcomes or the influence of macroeconomic indicators such as GDP growth and inflation on decisions to pursue M&A. Yet even during periods of conducive macroeconomic conditions, fluctuations in M&A activity persist, suggesting that factors beyond macro-level conditions shape strategic decision-making. This study advances this conversation by examining how founders' preference for control influences their intentions to engage in M&A. The study adopts a survey research approach focusing on R&D-intensive SMEs in Ghana. Data will be collected using likert-scale measures, and the proposed relationships will be assessed quantitatively through structural equation modeling.

The study is expected to reveal that founders who perceive M&A as a potential gain rather than a threat to their control will hold more positive attitudes toward M&A. Social influences, such as stakeholder expectations and peer behaviors, are expected to strengthen these intentions. Moreover, firms with higher R&D intensity are projected to exhibit a stronger positive link between perceived benefits and openness to M&A.

This shift in attention from macroeconomic determinants to founder-level factors highlights the behavioral barriers that often remain invisible in macroeconomic analysis. The findings are expected to inform policymakers seeking to improve the investment climate and guide investors in understanding local corporate decision-making dynamics.

## **Investigating Shared Blind Spots in Predicting Overall Survival in HGSOc**

**Janvi Ranish**

University of Sheffield

High-grade serous ovarian cancer (HGSOC) is the most common and lethal form of ovarian cancer. It accounts for over 70% of ovarian cancer deaths, with recurrence occurring in the majority of patients. Multiple prognostic gene signatures have been proposed to predict survival or recurrence in HGSOC, yet survival misclassifications persist and the underlying biology remains unclear. In this research, I apply three recently published HGSOC prognostic gene signatures to TCGA-OV data (N = 433) and examine where they fail. Scores were computed from log<sub>2</sub>-transformed RNA-seq data using weights derived from multivariate Cox models. For each patient, a signature was considered to have failed if it assigned a below-median score to a patient who died within three years of diagnosis; patients with failures in at least two of the three signatures were classified as “cross-signature blind-spot” cases. 55 blind-spot cases were identified with a mean survival of 21.4 months, significantly lower than the 42.1-month average of the remaining cohort. 37 of these occurred in immune-cold tumours, with a Fisher’s exact test odds ratio of 2.28 (95% CI 1.22 – 4.42, p = 0.006), indicating a dominant blind spot across the three signatures. These findings require validation in independent HGSOC datasets with detailed recurrence and immune data.

## **Infantile Epileptic Spasms Syndrome: Carer Recorded Smartphone Videos Informing Machine Learning Diagnostics**

**Rachel Bonner, Professor Sameer Zuberi**

*University of Glasgow*

Infantile Epileptic Spasm Syndrome is a common severe epilepsy affecting young children. Increasing time to diagnosis and management is associated with poorer developmental impairments and premature mortality. To improve patient outcomes, we plan to create a machine learning algorithm (MLA) based on currently uploaded spasm videos to identify potential spasms and support diagnosis. The aim of this project was to assess the quality of current uploaded spasm videos and determine whether the semiology of these spasms was representative of the literature.

In this single centre pilot study 58 videos from 21 patients comprising a total of 380 spasms were assessed. Camera movement was still (143) or minor (179). Lighting was

low or poor in 31/380. 215 spasms included the whole body, 100 included head, arms and torso. Videos were assigned definitely (45%) or probably (22%) 'suitable' for use in developing an MLA with 19% definitely 'unsuitable'. Spasm phenotypes were consistent with those described in the literature with mixed extension and flexion (23%) the most common. Mean Inter-Spasm Time Interval was 8.4 seconds (SE=3.36 seconds). Time interval was consistent for individual patients but varied significantly between patients.

This pilot study confirms the suitability of smartphone video in developing machine learning algorithms for video analysis. The inter-spasm time interval data is novel. Power calculations confirm that we will have sufficient suitable videos to inform MLA from collaborating centres. We have established a Trusted Research Environment for MLA and a pilot grant for computer vision scientists & clinicians to progress this work.

## **Factors Shaping Post-Pyrogenic Succession in Pine Oak Forests in Ukraine**

**Anzhelika Zarebina**

*National University of "Kyiv-Mohyla Academy"*

Forest ecosystems are increasingly affected by wildfires, with fire frequency and severity rising due to climate change and anthropogenic impacts including military pressures. Pine-oak forests represent one of the most widespread forest types in Ukraine and therefore that makes it critical for understanding of post-pyrogenic successional processes and forming potential ecosystem restoration and forest management strategies. Despite growing research on fire ecology in Eastern Europe, the combined effects of fire and other related disturbance factors on post-pyrogenic succession in pine-oak forests remain insufficiently explored.

This ongoing study investigates the key factors influencing post-pyrogenic succession in pine-oak forests in Ukraine, using fire-driven succession as the main conceptual work. Geobotanical surveys were conducted across seven forest sites in Koncha-Zaspa (central Ukraine) representing different successional stages under mixed disturbance

regimes, including wildfire and post-fire management plantations. Species composition was analysed using a comparative, factor-based approach, classifying plant species into functional and successional groups with a particular attention to dominant and invasive taxa and their potential role in shaping the succession process.

It is hypothesized that early successional stages will be characterised by a high contribution of pioneer and ruderal species, including potentially invasive taxa that may alter succession trajectories. Differences in dominance structure, invasive species presence, site conditions suggest that non-fire disturbances and management practices can modify post-pyrogenic pathways.

Understanding the factors shaping post-pyrogenic succession in pine-oak forests is crucial in the context of increasing fire risk driven by climate change and anthropogenic disturbances in Ukraine and can support evidence-based forest restoration planning.

## **Analysis of the State of Green Spaces and their Potential in Improving the Comfort of Life in Kyiv**

**Veronika Sobkovych**

*National University of “Kyiv-Mohyla Academy”*

Green spaces are a key element of the urban environment, contributing to ecological stability, biodiversity conservation, and the improvement of overall quality of life. In the context of global climate change and increasing urbanization, their role becomes particularly significant. Accordingly, the EU, within the framework of the Biodiversity Strategy for 2030, identifies urban green areas as an important tool for climate adaptation, environmental risk reduction, and the enhancement of urban resilience.

Meanwhile, Ukrainian cities face additional challenges related to the consequences of the full-scale war initiated by Russia, which further emphasizes the importance of green spaces not only for environmental improvement but also for supporting the psychological well-being of the population. One of the Ukrainian cities that has been

gradually integrating relevant approaches into strategic planning and urban development documents is the capital of Ukraine, Kyiv.

This study provides an analytical overview of green spaces in the city of Kyiv, Ukraine, based on a review of scientific literature, regulatory documents, and official analytical materials. The research focuses on the spatial distribution and current condition of urban green spaces within the city.

The central focus of the study is the functional performance of green spaces, particularly their capacity to deliver their main functions under contemporary urban conditions. Special attention is given to the role of green spaces in regulating the urban microclimate. By synthesizing findings from previous research, the study explores how Kyiv's green spaces contribute to thermal regulation and identifies key factors influencing their performance.

## **Measuring Transport Connectivity Across Greater London**

**Tim Salecl Zizek**

*Birkbeck, University of London*

I am proposing a study to measure transport connectivity across Greater London by analysing how quickly different areas can reach one another using public transport. The project divides London into its postcode districts and assigns each a representative geographical centre. Using the Transport for London Unified API, I plan to collect journey-time data between every pair of districts, including total travel time and the modes involved (Underground, buses, rail, or walking). These measurements will be repeated at different times, such as Monday morning rush hour and Sunday afternoon, to obtain a more representative estimate.

From these data, I will calculate a “connectivity score” for each district, based on the average time required to reach the rest of the network. This will allow the creation of heat maps and comparative tables that make the results easy to interpret. Additionally, I will compare connectivity with existing data, including average house prices and long-standing geographic divides, to identify unusual cases such as expensive districts with

weaker-than-expected links or areas with low property values that are very well connected.

The project is designed to remain workable even if unexpected obstacles arise. If necessary, I can switch to an alternative routing service, such as Google Maps API, or use a simplified division system to ensure consistency.

Transport accessibility shapes people's daily lives and their economic opportunities. The study aims to provide a clearer picture of which districts benefit from strong transport links and which may be disadvantaged, presenting the findings through straightforward visualisations and tables.

## **The Parasites of European Perch (*Perca fluviatilis*) in Dubh Lochan, Scotland**

**Emily Stewart**

*University of Glasgow*

The European perch (*Perca fluviatilis*) is a freshwater fish found across the UK. It is also a common host to several internal parasites such as the tapeworm *Triaenophorus nodulosus* and the roundworm *Camallanus lacustris*. Parasites have a profound impact on fish populations, and their effects can be altered due to climate change. This study aims to investigate how the parasite community impacts the population of European perch in Dubh Lochan, Scotland. Dissections were performed on the liver and intestines of 56 perch, caught between June and August 2025; and 63 perch, caught by a previous student, between October 2024 and January 2025. The perch exhibited a 60.5% prevalence rate of *T. nodulosus* cysts and a mean infection intensity of 2.38 cysts per fish. Statistical analysis found a significant result between the length of the fish (mm) and the intensity of infection, with larger fish having a higher parasitic load. There was also a significant relationship between sex and infection intensity, with females having a higher parasitic load than immature fish. 56 fish were examined for *C. lacustris* which had a prevalence rate of 26.8% and a mean infection intensity of 0.48. There was a significant relationship between larger perch size and the number of *C. lacustris* worms, but not between sex and infection intensity. Analysis also revealed

that both parasites displayed overdispersion within the host population and thus there are differences in host susceptibility. This investigation highlights the need to constantly monitor fish and their parasites in a changing climate.

## **From Wind Hazard to Urban Opportunity: CFD-Based Evaluation of Building Height & Spacing Effects for Wind Energy Harvesting in Urban Environments**

**Maryam Begum**

*University of Westminster*

Severe wind safety failures at Bridgewater Place in Leeds have highlighted how interactions between tall buildings and urban wind flow can generate hazardous pedestrian-level conditions, pressure concentrations, and unsteady aerodynamic loading. As cities densify vertically, such incidents demonstrate the growing need to understand how high-rise buildings shape urban wind environments in order to mitigate risks and inform resilient urban design.

This research investigates how building height, geometry, and urban configuration influence wind-induced structural performance, using CFD as a tool for risk mitigation and future sustainable design. Motivated by the Leeds case study, simplified urban building configurations are examined to assess how variations in building height and spacing affect wind flow behaviour. Two-dimensional CFD simulations were conducted in ANSYS Fluent under both steady and unsteady flow conditions, capturing velocity fields, pressure distributions, vortex shedding behaviour, and aerodynamic force responses. Comparative analysis demonstrates that unsteady modelling provides critical insight into transient wind effects that are underestimated by conventional steady-state approaches.

Beyond evaluating wind hazards, this work reflects a broader ambition to transform high-energy urban wind zones into productive assets. The ongoing stage of the research investigates the feasibility of urban wind energy harvesting, using CFD outputs to identify regions of accelerated flow around high-rise buildings—such as

rooftops, façades, and Venturi-type urban corridors—that may be suitable for building-integrated wind energy systems. The poster presentation links wind hazard mitigation with renewable energy generation, demonstrating how problematic urban wind environments can be reimagined as productive, sustainable assets for future resilient urban infrastructure worldwide.

## **Barbarians - Tracing Imperial Rhetoric Across Western Civilisation**

**Alastair Graham**

*University of Glasgow*

Adam Smith's foundational economic and sociological text, *An Inquiry into the Nature and Causes of the Wealth of Nations*, celebrates its 250th anniversary this year, inviting us to look critically on Smith's writings and the rhetoric which he employs. When discussing celebrations of music and dance across cultures, Smith compares three civilisations: the contemporary Africans and the historical "ancient Celtes [...] and [...] ancient Greeks." Despite the re-use of the term "ancient" each of these civilisations are over 1000 years apart and geographically distant. They are connected only through one word used to categorise them all - "barbarous."

Through a multidisciplinary approach incorporating postcolonial historical analysis and literary theory, this talk will approach the ontology of the 'barbarian' and its rhetorical history, comparing colonial ethnographers such as Caesar of ancient Rome, across medieval Europe to the colonial officers of imperial Britain. It will also investigate the comparison of 'barbarian' peoples as a process that both creates 'others' and empowers imperial culture. Finally, the talk will cover the implications of 'barbarism' in the present day through analysing the rhetoric of twentieth century politicians in discussions of migration and foreign policy.

This study hopes to reveal the violence innate in imperial categorisation and shed light on the long history of 'barbarians', the immortal savages at the gates of western civilisation.

# Fear Is Not Normal: Volatility Persistence and Investor Risk Perception Following Market Shocks

**Manesha Sundar**

*University of Leeds*

Periods of financial stress are characterised by sharp increases in market volatility, often interpreted as heightened investor fear. Standard asset pricing models assume that such shocks are transitory and that volatility returns quickly to normal levels. However, prolonged episodes of elevated uncertainty suggest that fear may remain embedded in markets for longer than theory predicts. Understanding volatility persistence is crucial for asset pricing, portfolio allocation, and risk management, particularly in an environment where macroeconomic shocks have become more frequent.

Using daily data for the S&P 500 index from 2015 to 2025, I examine the persistence of volatility, particularly focusing on the inflationary effects of the COVID-19 shock on market sentiment. Realised volatility, estimated through rolling-window methods, is compared with volatility forecasts generated by Generalised Autoregressive Conditional Heteroskedasticity (GARCH) models. High-fear episodes are identified using implied volatility indices, such as the VIX, enabling a comparison of volatility dynamics across distinct economic regimes.

To assess whether investors continue to demand compensation for downside risk after observed volatility declines, the study analyses the behaviour of the volatility risk premium by contrasting implied and realised volatility before, during, and after the stress period. We expect to find that volatility exhibits greater persistence than standard mean-reversion models imply. This pattern suggests that markets systematically overprice fear following crises.

By clarifying how long fear remains priced into financial markets, this research contributes to debates on volatility modelling, behavioural responses to macro shocks, and the design of more resilient portfolio strategies in uncertain economic regimes.

# Exploring the Impact of Land-Use Change on Eurasian Lynx (*Lynx lynx*) Reintroduction Potential in Southern Scotland

**Jack Macdonald**

*University of Warwick, University of Western Ontario*

The feasibility of reintroducing the Eurasian lynx (*Lynx lynx*) to Scotland remains debated, particularly in the fragmented woodlands of the Southern Uplands. Previous modelling by Ovenden et al (2019) identified Kielder Forest, a key woodland complex within this region, as a low-viability release site but did not test whether improving habitat could change this outcome. This study used RangeShifter, a spatial simulation model that follows individual animals across landscapes and links their movement to population dynamics, to assess whether woodland enhancement in southern Scotland could improve lynx reintroduction prospects centred on Kielder.

Simulations ran for 100 years under baseline conditions and several habitat interventions: improving woodland quality within existing forest patches, expanding patch size, and creating woodland corridors between the release patch and a neighbouring woodland. The model also tested two landscape assumptions: one in which animals that reached the edge of the mapped area were kept within Scotland, and another in which they were lost from the population, simulating dispersal beyond the Scottish border.

Habitat enhancement substantially improved outcomes. Under the “closed” landscape assumption, persistence at 100 years increased from 21% to 88% under the strongest intervention. When lynx could disperse beyond the mapped landscape, persistence ranged from 7% to 48%. Corridor creation had limited effects.

These findings indicate that targeted woodland expansion around Kielder could materially improve reintroduction feasibility. However, long-term outcomes remain sensitive to dispersal beyond the Scotland-only landscape, particularly into adjacent English woodland, highlighting the importance of cross-border connectivity in future modelling and reintroduction planning.

# **Beyond Accuracy: A Scoping Review on Demographic Reporting in AI Diagnostic Imaging Studies**

**Anusha Butt**

*University of Glasgow*

Artificial intelligence (AI) is increasingly being implemented into diagnostic medical imaging, with studies often reporting strong performance across clinical tasks. However, concerns persist regarding fairness in diverse populations as performance alone does not equate to equitable clinical use. Whilst AI diagnostic accuracy is widely reported, is performance across patient groups even considered? This scoping review maps existing evidence on AI applications in diagnostic imaging to evaluate how, and if, studies assess demographic subgroup performance.

A scoping review was conducted in accordance with PRIMSA-ScR guidelines. PubMed and Web of Science were searched for studies in English, published between 2015 and 2025, that evaluated AI application in diagnostic medical imaging. Following screening, data was extracted on patient demographics and reporting of demographic subgroup performance. Additionally, performance metrics, patient safety considerations, and validation approach were evaluated to provide context for interpretation. Findings were then synthesised narratively.

The majority of studies reported high diagnostic accuracy and agreement between AI systems and clinicians across many imaging modalities. Age and sex were reported in some studies, whilst race or ethnicity were often omitted. Few studies reported model performance across demographic subgroups.

The current literature contains limited assessment of performance across demographic subgroups. This creates concerns regarding potential bias existence and uncertainty on whether AI performance is consistent across patient populations. Future research should prioritise this to support responsible clinical implementation of AI. This is especially important as bias in AI systems could exacerbate existing health inequalities.

**Nuclear Data Analysis leveraging Machine Learning**

## **Zachie Beattie Mckerrow**

*University of Glasgow*

One of the major challenges facing current research in Nuclear Physics, is the limited data (and limited quality of such data) available to researchers. Databases such as EXchange FORmat (EXFOR) have catalogued thousands of experiments conducted over decades, however in many cases the data is incomplete (analysing reactions over limited energy ranges) or includes no uncertainties, thereby making it difficult to quantify the usefulness of the data. This is problematic in the context of novel nuclear reactor designs which require detailed understanding of reactions which have not previously been widely investigated. This research is focused on Generation-IV Molten Chloride Fast Reactors. The Cl-35(n,p) reaction, where a Cl-35 atom absorbs a neutron, emits a proton and transmutes into a Sulfur-35 atom is of crucial importance to this design, as it controls the criticality of the reactor (the rate of the nuclear chain reaction). Of interest is the cross section (the likelihood of the reaction occurring) vs the energy of the incident neutron. There is currently large uncertainty in these data, which limits efforts to successfully model these reactors. Machine learning algorithms, specifically Random Forests and Gaussian Process Regression have been shown to reduce that uncertainty, improving to modelling of these reactors. This research aims to evaluate the effectiveness of Machine Learning in this application, and examine whether the uncertainty of this reaction can be reduced significantly. The methods used have widespread application to other areas of research, and better understanding of this reaction specifically will assist future reactor design.

## **The Integration of Artificial Intelligence into Higher Education: Implications for Academic Staff Workload and Feedback Practice**

**Jenson Yin Lok**

*University of Glasgow*

Artificial Intelligence (AI) is becoming increasingly more common within higher education, where its use by students has rapidly increased from 66% in 2024 to 92% in 2025 (Higher Education Policy Institute, 2025). It was found that AI was often used to improve work quality and time efficiency on tasks such as summarising and editing, its benefits extend to academic staff as the Department for Education highlights the potential for AI to help generate personalised feedback. Although 75.2% (National Student Survey, 2025) of students found feedback to be useful in improving their work, current feedback practices are constrained by the heavy workload placed on academic staff. As a reported 68% of academic staff experienced an increase in workload resulting from COVID-related changes (The University and College Union, 2022). Consequently, the depth and quality of feedback personalisation have reduced, creating uncertainty on how to improve. This paper will investigate opinions on how AI-assisted approaches can transform feedback by reducing administrative workload. The qualitative study will use semi-structured interviews with both academic staff and students to explore the opinions of AI tools in feedback processes and workload management. The current hypothesis is that the study will reveal the importance of academic feedback on students, and by doing so prompt a stronger focus on better feedback by academic staff. Furthermore, easing the workload of academic staff through training of AI tools such as Microsoft Copilot is hypothesised to increase time spent towards achieving consistency in academic feedback.

## **Observational Study of Same Day Elective General Surgery Cancellations in East Lancashire Hospitals NHS Trust**

**Hamish Symon, Jasmine Bampton, Charlotte Lewis, Kimberly Gayle, Iga Sawicka, Jason Lie, Caolan Stowe**

*University of Lancashire*

Background/ Introduction: Same day surgical cancellations are estimated to cost the NHS £400 million annually. Preventing cancellations may increase utilisation of limited resources and improve patient outcomes.

**Aim:** The aim of this study was to identify the reasons for same day cancellations of elective procedures in general surgery at East Lancashire Hospitals NHS Trust (ELHT).

**Methods:** Using a centralised trust database (OLI), 341 cancellations of elective general surgery patients were reported between 1st June 2024 - 1st June 2025. This data was then anonymised and randomised, giving a total of 100 patients. Patient notes (Cerner) were individually searched and data extracted on reasons for cancellation, patient demographics, surgery details, pre-operative factors, anaesthetic factors and organisational factors. Broad cancellation categories were created and applied to the OLI data and patient notes by three team members independently before reaching consensus.

**Results:** The three most common reasons for cancellation on Cerner were theatre factors (32%), nil documented (14%), and both medical optimisation/fitness for surgery and patient factors (12%). The three most common reasons on OLI were theatre factors (25%), patient factors (15%), and operation not required or inappropriate listing (14%). Documented reasons did not match between OLI and Cerner in 45% of cases.

**Conclusions:** These findings highlight theatre overrun as a key area for improvement, which requires further investigation into ELHT's perioperative processes. Additionally, consistency in documentation requires improvement to ensure accurate representation of cancellations

## **Rights of Nature and the Powers of Politics: Ecuador's Eco-Constitutionalism**

**Kira Jensen**

*University of Toronto*

In 2008, Ecuador adopted a new constitution that, for the first time globally, granted legal standing to the natural environment. This reform is widely described as a landmark in global environmental governance that pushed beyond anthropocentric

approaches to environmental protection. The constitutional drafting process involved extensive political debate in which lawmakers expressed competing views about nature, development, and attitudes towards the environment. Drawing on official records of those legislative debates, this paper investigates how human-environment relations were articulated, and how sentiments therein contributed to the passage of the Rights of Nature laws in Ecuador's 2008 constitutional reforms. The paper specifically undertakes discourse analysis to examine the role of sentiment in how the environment was framed—for example, as a resource to be managed, a social responsibility to be upheld, or a rights-bearing entity. By developing an annotation codebook and training a closed-source large language model to categorize sentiment, this approach allows for systematic comparison of how environmental values were expressed across the constitutional debates and captures relational and ethical orientations in legislative speech. Building on the work of Lalander & Merimaa (2018), the paper interprets legislative sentiment in relation to the social and political conditions surrounding the constitutional reform. Findings are expected to identify patterns of environmental values that supported the ratification of the Rights of Nature laws, clarifying the conditions under which progressive environmental commitments can become legally binding.

## **How Cryptochrome May Act as a Magnetic Compass in Birds: The Role of Electron Hopping and the Fourth Tryptophan**

**Saja Isabella Ilott, Cass D Pearse, Benjamin Tigg**

*University of Exeter*

Many migratory animals, including birds, are thought to navigate using a “magnetic compass” based on quantum effects inside a light-sensitive protein called cryptochrome. When cryptochrome absorbs light, it triggers the movement of electrons along a chain of molecules called tryptophans, briefly creating pairs of magnetically sensitive chemical states. The behaviour of these states is believed to depend on the Earth's magnetic field, potentially allowing animals to sense direction.

Most models of this process involve three tryptophans, but in birds a fourth tryptophan is also present. This raises an important question: does having four instead of three improve the magnetic compass, or does it serve another purpose? One proposal is that an electron can hop back and forth between the third and fourth tryptophans, balancing magnetic sensitivity with the need to pass the signal on inside the cell.

In this project, we developed an efficient computational model to simulate this hopping behaviour and directly test the role of the fourth tryptophan. For the known structure of bird cryptochrome, we found that including the fourth tryptophan does not improve magnetic sensitivity compared to the simpler three-tryptophan case. However, by exploring slightly different molecular arrangements and reaction rates, we identified scenarios in which the four-tryptophan system could improve magnetic sensitivity by more than three times, while still allowing the signal to be passed on.

These results suggest that cryptochrome's magnetic sensitivity may be finely tuned by molecular structure and evolution, and demonstrate a powerful new way to study quantum effects in biological systems.

## **Epidermal Archives: Evidencing Being through Imprint Epistemology in Feminist Artistic Practice (Late Twentieth to Twenty-First Centuries)**

**Zofia Gmurek**

*University of Leeds*

Within the field of art theory, this paper proposes imprint epistemology - knowledge generated and gathered through material traces of presence, as they emerge and as they are later assembled and reread - a model for knowing through proximity, reframing bodily contact as an evidentiary act.

Instead of prioritising the disembodied gaze, this paper argues that knowledge that clings, scars, or stains is organic and foundational. When the body is both source and instrument, its existence is evidenced through the material imprint - cast, residue, transfer - redefining the artistic process as a visceral verification of life.

The research gathers "epidermal archives" - physical accumulations of somatic traces that shift the archive from an institutional record toward personal, intimate material registration - from the practices of Alina Szapocznikow, Kiki Smith, and Mona Hatoum. Across these practices, bodily autonomy is asserted, reclaiming the right to document and witness materiality. From Szapocznikow's polyurethane 'fragments' to Hatoum's hair-woven textiles, the work demonstrates how substance becomes index, exemplifying what this paper defines as the body's Evidentiary Practices - procedures that register one's work, existence, and being through adhesion, scarring, and staining.

Methodologically, the study combines close visual-material analysis with indexical semiotics, feminist theories of situated knowledge, and scholarship on material witnessing. Drawing on Barad, Haraway, and Didi-Huberman, this framework redistributes the authority of proof, relocating it from detached observation to embodied registration.

Ultimately, naming the Epidermal Archive provides a portable framework for reading how bodies and materials co-produce evidence, positioning the situated 'being' as an authoritative witness to its own existence.

## **Diagnosing Gene Expression Variability in Plants: Novel Family-Structured Variance Decomposition Approach**

**Daniel Cairns, Patricia Lopez-Calcano**

*Newcastle University*

Identical genes inserted into different crop plants can vary over 100-fold in expression, forcing expensive screening of hundreds of candidates to find acceptable lines. We adapted family-structured variance decomposition from human population genetics to determine whether this stems from chromosomal insertion position, gene copy number, or construct design—factors often confounded in transformation studies.

The method inverts a standard problem: in human genetics, family structure confounds analyses; here, it becomes experimental control. Sibling plants share insertion sites but segregate for copy number, enabling statistical separation. Analysing over 700 tobacco

plants revealed gene-specific heterogeneity: one gene showed position dominance (62% of variance), another mixed contributions (position 33%, dosage 30%), and a third showed negligible position effects.

Critically, even where position and dosage together explained ~70% of variance, absolute variability (60-144%) far exceeded commercial standards (<15%). This demonstrates that insertion position, copy number, and construct design must all be controlled simultaneously—what we term the "Triple Lock."

This validated pipeline can now be applied to other crop systems to diagnose variance architecture and direct engineering efforts to limiting factors. For de novo systems lacking diagnostic data, the Triple Lock framework provides the necessary engineering standard, as variance architecture cannot be predicted in advance. This work establishes both a diagnostic tool and a rational design framework for predictable transgene expression.

## **Advancing Native Ion Mobility Mass Spectrometry for Structural Analysis of G-quadruplex Oligonucleotides**

**Ava Bauer**

*University of Leeds*

Oligonucleotides, short DNA/RNA sequences 13-200 nucleotides long, can adopt a range of higher-order structures. One prominent example is the G-quadruplex (G4), seen in guanine-rich sequences. Endogenously occurring G4s are involved in key cellular processes including transcription and translation regulation, DNA replication, and telomere maintenance, with potential implications in various biological processes such as cancer and aging. Synthetic oligonucleotides with G4 structures, such as aptamers, have recently been utilised as therapeutic agents to modulate enzyme activity and gene regulation. To understand and modulate G4 functions, their detailed structural characterisation is required. One key challenge in their analysis stems from their ability to adopt multiple coexisting conformations. Unlike other structural techniques, ion mobility mass spectrometry (IM-MS) enables the simultaneous detection of multiple coexisting conformations using minimal sample quantities. However, data analysis is

made challenging by salt adduction, inadequate comparative standards, and limited background literature. In this study we used native IM-MS to monitor the structure of model G4 thrombin binding aptamer (TBA), providing experimental validation for novel ion-mobility calibrants and novel emitters used for nanospray ionisation. These new method developments improved spectral quality, reduced salt adducts and improved signal-to-noise, enabling the analysis of oligonucleotides across a wider range of buffer compositions previously limited by salt adduction and demonstrating that native IMS-MS is a valuable tool for monitoring structure of oligonucleotides. Overall, this work addresses a longstanding methodological bottleneck in IMS-MS analysis of oligonucleotides and presents an important step forward in developing analytical approaches for studying G4s and other oligonucleotide structures.

## **Fine Art, Psychology and Robotics: Welcome to the 'Uncanny Valley'**

**Eloise Robinson**

*Birkbeck College, University of London*

The initial aim of this art historical research was to consider and answer the question of whether Meredith Frampton's paintings fell into the 'Uncanny Valley'. Frampton produced stunning hyper-realistic artworks from 1920-1945, but these prompted feelings of disquiet and eeriness, both when originally exhibited and in more modern times. The concept of the uncanny valley arose decades later from Japanese robotics in the 1960/70s, when Professor Masahiro Mori hypothesised about the feelings of repulsion and disquiet experienced as robots approached human likeness.

The research scope subsequently widened to consider the psychological insights provided by Ernst Jentsch and Sigmund Freud in their papers on the uncanny, and to assess the broader relevance, value and importance of the uncanny valley today. Thus bringing these initially disparate threads of British Realism painting between the wars, early twentieth-century psychology debate, and Japanese robotics research into a coherent, fascinating and relevant whole.

The research found that understanding the uncanny valley in visual arts has tangible value for artists, creatives (including filmmakers, robotic and AI engineers) and art historians, with potential financial impact and negative critique when ignored. Using Meredith Frampton as one example, it also provides salutary lessons from the past, helping us to avoid repeating them in the future, particularly relevant given today's increasing use of AI. Recent examples from modern films and art provide meaningful insight into why the uncanny valley is just as relevant now as it was one hundred years ago, with the overall conclusion we ignore it at our peril.

## **The Princess of (Post) Punk: The Gossip Columns of Paula Yates and their Role in Defining 'Post-Punk Feminism'**

**Cory Gourley**

*Newcastle University*

This thesis explores how media personality and writer, Paula Yates, disrupts second-wave feminist discourses surrounding gender, sex and desire, in her Gossip Columns for both the Record Mirror and Cosmopolitan (1979-1983), during the 'Post-Punk' era, as defined by Simon Reynolds' Rip it up and Start again (2005). I will articulate this argument by suggesting that Yates exercises the freedoms afforded to her by the gossip column, and uses three different 'gossip personae' to express her views. Those being: the 'Peroxide Predator'; the 'Pop Tart'; the 'Camp Queen'. I propose that each different personae come together to define a new brand of womanhood that: encourages heterosexuality and the eroticisation of men; opposes ideas of the 'sisterhood'; and sees women become a type of "drag manifestation". This will be framed as 'Post-Punk Feminism', which sees women 'rip it up and start again' by prioritising their own individualised voice. It is a project that builds on Nancy Whittier's argument that the 1980s was an era that saw younger women at war with their 'bra-burning elders', fighting against more restrictive forms of feminism. Essentially, this project intervenes in debates about the nature of feminism in the period between the second and third waves by identifying, through the work of Yates, a distinctive form of feminism. Thus separating the term 'Post-Punk' from the 'Post-Feminist' and 'Riot Grrrl' movements of the 1990s. It will also consider the cultural

longevity of Yates's writing in British Pop-Culture, and her role as an overlooked precursor to British 'Ladette culture'.

## **Before the Colonial Port: Reconstructing Malay Kingship and Community in Early Singapore**

Sapphire Ling

*Newcastle University*

This research examines the largely obscured history of Malay kingship and community life in Singapore prior to British colonisation, with a particular focus on how systems of record-keeping and heritage preservation have shaped what is remembered and forgotten about the island's past. While Singapore's national identity is frequently narrated through narratives of economic progress and colonial development, comparatively little attention is paid to pre-colonial Malay governance, communal relations, and everyday practices such as fishing, trading, and cooperative labour. The absence of extensive written records has often been used to justify this marginalisation, yet it simultaneously highlights deeper questions about whose histories are prioritised, what forms of knowledge are valued, and how cultural memory is constructed.

This study is based on a review on scholarship in Singapore and the Malay world, which provides key insights into indigenous political structures and lived experiences. By synthesising these perspectives, the research suggests that colonial economic narratives have contributed to the erasure of pre-colonial Malay contributions, reinforcing assumptions that material infrastructure and economic growth are more significant than social practices, cultural traditions, or communal ways of living. This research matters beyond the field of history because it encourages the public to reconsider what is valued in society: economic growth, or the cultural histories that shape a people's sense of identity? By highlighting the stakes of remembering, the study calls for greater archival, historiographical, and public interest in recovering Malay pre-colonial pasts, opening pathways for future research and more inclusive narratives of Singapore's origins.

# **Fan Readings on Racial Othering, Hierarchies, Stereotyping, and Speciesism in the Star Wars Franchise**

**Zapran Carlsson**

*University of Bristol*

This dissertation investigates how the characterisation of aliens is negotiated in the Star Wars franchise, using fan readings as a foundation to explore how meaning is interpreted from reproductions of racial hierarchies, stereotypes, speciesism and racialised “othering”. I will investigate fan readings as a form of primary data, synthesised from Reddit, YouTube and Instagram, on the presentations of alien species in relation to these four key concepts. I will first conduct a discourse analysis of species’ accents, dialogue, and narrative complexity, and then a visual analysis of costume design. In the penultimate section, notable themes found in the fan readings will be compared to depictions of racial othering in wider popular culture and film, exploring four other films and TV shows (Doctor Who, Avatar, Zootopia, and Elemental). Analyses will be grounded in the intersectionally feminist and critically racial theoretical frameworks of the project. The findings show that although complex nuances of world-building are captured in Star Wars, fans felt that presentations of race, species and cultural traditions are not imagined with a great degree of creativity or narrative complexity. This research combines fan analysis, theoretical context, and a vast range of academic writing spanning political science, sociology and media studies to emphasise the importance popular culture has on our understandings of multiculturalism, racial discrimination, and even complex geopolitics. The dissertation concludes by reflecting on how we can create more celebratory representations of race and culture, via fictional worlds, on the big screen.

# **The Great Reversal: Optimal Governance Thresholds for Climate Transitions**

**Murvet Sanem Sarikaya**

*University of Sussex*

This study challenges the foundational assumption that higher governance quality improves environmental outcomes by documenting a complete reversal in the relationship between institutional quality and renewable energy adoption. While conventional wisdom suggests better governance facilitates climate transitions, mounting evidence reveals a governance paradox where institutional excellence may hinder rapid renewable deployment.

Using panel data from 45 countries (2003-2021), this study employs fixed effects models with structural break analysis to examine temporal evolution in governance-environment relationships. The methodology includes quadratic threshold identification, instrumental variables for causality testing, and comprehensive robustness analysis across multiple specifications.

The analysis documents the largest coefficient reversal in environmental economics: governance readiness effects shifted from strongly positive (2003-2012) to significantly negative (2013-2021). Quadratic analysis reveals an optimal governance threshold, beyond which additional institutional complexity becomes counterproductive, with countries in this "sweet spot" substantially outperforming over-governed nations despite lower institutional complexity.

These findings necessitate fundamental recalibration of climate policy frameworks. Rather than building institutional capacity, most countries require governance streamlining for effective renewable transitions. This research introduces Crisis-Response Governance Theory, distinguishing institution-driven from crisis-driven adoption mechanisms and offering new insights for governance design during climate transitions.

## **Exploring the Experiences of Young Women with Musculoskeletal Conditions Accessing UK Health Care Services**

**Theadora Gallie**

*University of Bristol*

With over 1 in 3 adults in the UK suffering from a musculoskeletal condition, health care research and policy improvement is key for addressing health inequalities and barriers to access for a large proportion of the population. Research suggests that age and gender intersect to create unique and complex discrimination and health inequities, with a growing academic focus on the barriers faced by older women. However, there remains no prior research specifically considering the experiences of younger women with musculoskeletal conditions. Through semi-structured qualitative interviews with young women (aged 18-25) with musculoskeletal conditions, this study explores how intersectionality between age and gender (as well as additional identities) impact access to health care in the UK. Drawing from the methodological work of Virginia Braun and Victoria Clarke, reflexive thematic analysis will be utilised to highlight key themes prevalent across the data. NVIVO will be used to support the process of selecting and refining codes and themes. Results are anticipated to suggest that gender and age influence experiences of health care. Implications for policy and practice will be presented based on these themes, alongside suggestions for future research. As a result, this research adds to the growing literature concerning age-gender intersectionality in health care access. It will also provide insight into possible policy initiatives to minimise inequities in musculoskeletal health care in the UK.

## **Measuring Intra-city Inequality in England**

### **Yiping Ding**

*University of Sheffield*

Spatial inequality refers to the uneven distribution of socioeconomic resources, opportunities, and living conditions across places. In England, it is often summarised through large-scale narratives such as the North–South divide, yet regional contrasts can conceal substantial differences within regions and cities. This study provides a detailed assessment of spatial inequality using the 2019 English Index of Multiple Deprivation (IMD), analysed at Lower Layer Super Output Area (LSOA) level and aggregated to cities and regions via two routes: a direct LSOA-to-city/region pathway and a hierarchical pathway aligned with administrative boundaries (LSOA→Local Authority District→city/region).

To capture deprivation levels and internal distribution, we report population-weighted and unweighted versions of the mean IMD score, the Gini coefficient, and the Theil index, with Theil decomposition separating within-area from between-area inequality. We also calculate the share of neighbourhoods in the most deprived deciles. Based on the relationship between population-weighted mean deprivation and inequality, regions fall into three clusters that refine the conventional North–South picture: London combines moderate deprivation with very high internal inequality; the South and East are relatively affluent but still exhibit disparities; and the North and West Midlands face high deprivation and inequality.

Population-weighted measures consistently reveal stronger inequalities than unweighted summaries, better reflecting where residents experience deprivation. City-level results mirror regional patterns and show that within-city differences can rival differences between cities. Overall, the findings indicate that policies relying solely on regional averages risk overlooking localised deprivation and should incorporate within-area inequality when designing targeted interventions.

## **Computational Review of Technology-Assisted Medical Evidence Synthesis through Human-LLM Collaboration: A Case Study of Cochrane**

**Yiping Ding, Xiaorui Jiang**

*University of Sheffield*

Medical evidence synthesis, typically done by systematic reviews, requires extensive manual effort across stages such as searching, screening, extraction, and synthesis, making them slow and costly. These limitations hinder timely updates and rapid responses during health crises. Interests in technology-assisted evidence synthesis have been increasing, driven by artificial intelligence

(AI) and large language models (LLMs). In 2024, four major networks including the Cochrane, Campbell Collaboration, Joanna Briggs Institute and Collaboration for Environmental Evidence jointly launched an AI Methods Group to advance automation

in evidence synthesis. This chapter presents a large-scale computational analysis of technology-assisted MES across 7,271 Cochrane reviews (2010–2024), identifying computer tools—software, packages, or algorithmic implementations—used at different review stages via an LLMhuman collaborative annotation pipeline. A multi-LLM mechanism combining suggestion, verification, and self-critical questioning achieved high-recall tool extraction. Evaluation against five “gold-standard” tool lists showed major gains: approximately 100 additional tools were identified compared to each existing review-based, database-based, and Cochrane-curated gold standards. Eventually, a list of in total 514 tools was compiled. Two annotators verified all candidates within two days, demonstrating notable efficiency. A followup bibliometric analysis provides the first computational map of technology used in Cochrane evidence synthesis, revealing trends across time, domains, and regions.

## **The Retrofit Paradox: A Multivariate Analysis of the Disconnect between EPC Ratings and Respiratory Health in Greater Manchester**

**Jules Buckland**

*University of Manchester*

The UK government’s £1.8bn Warm Homes Plan relies on the assumption that retrofitting housing stock directly reduces respiratory illness. However, the primary evidence for this policy is drawn largely from studies of timber-framed housing in New Zealand, raising questions about its applicability to the solid-brick terraces of Northern England.

This study investigates this disconnect in Greater Manchester. Using a decade of Energy Performance Certificate (EPC) data matched with NHS hospital admission rates for Chronic Obstructive Pulmonary Disease (COPD) across 151 neighbourhoods, this research employs multivariate regression analysis to test the policy’s core efficacy.

The results reveal no statistically significant correlation ( $p = 0.230$ ) between energy efficiency improvements and reductions in respiratory hospitalisations. Conversely, the

Index of Multiple Deprivation (IMD) was found to explain 79% of the variance in health outcomes ( $p < 0.001$ ).

This paper proposes a "Retrofit Paradox" to explain these findings. In low-income Manchester neighbourhoods, technical interventions fail due to three compounding factors: (1) the hermetic sealing of solid-wall properties without adequate ventilation; (2) the "rationing" of heating by fuel-poor residents; and (3) the dominance of poverty-related stress over environmental factors. The findings suggest that without integrating ventilation strategies and financial support, current retrofit policies risk failing the populations they intend to protect.

## **Climate-Resilient Design of a Recreational Building in Jesmond Dene, Newcastle-upon-Tyne**

**Sadiyah Rahman**

*Northumbria University*

This project explores the adaptation of the proposed Jesmond Dene Recreation Building into a climate resilience hub for Newcastle. The work is grounded in the core Level 5 civil engineering tasks set by the university, which include a site evaluation, structural design and analysis in accordance with BS EN 1991-1-1, foundation design to Eurocode 7, and a flooding evaluation using hydrological principles. Building upon these mandatory deliverables, this proposal extends the scope through targeted research into international resilient design, drawing inspiration from flood-adaptive raised structures in Bangladesh and passive cooling techniques from traditional Indian architecture. The aim is to create a building that addresses the UK's increasing weather extremes, specifically summer heatwaves and winter cold, alongside the established flood risk from the Ouseburn River. The design integrates high thermal mass from the specified Grey Fell Sandstone cladding, enhanced natural ventilation, and improved insulation to maintain thermal comfort with minimal energy use. Additional technical analyses include an embodied carbon assessment of the facing stone and advanced flood water level estimation using HEC-RAS software to supplement the required Rational Method and Manning's equation calculations. The outcome is a practical,

multi-hazard resilient design that fulfills the original project brief while demonstrating how recreational infrastructure can also serve as a reliable community asset during climate emergencies. This work illustrates the holistic nature of civil engineering, where site investigation, structural integrity, material selection, and hydraulic analysis converge to create sustainable and adaptive public infrastructure.

## **That They May All Be One: Public Second Cycle Education in Colonial Ghana's Boarding Schools, 1919-1957**

**Yasmin Abdul Nasser**

*Georgetown University in Qatar*

On January 1, 1927 the doors of the Achimota Senior High School, previously the Prince of Wales College, were formally opened to the public in the Gold Coast (currently Ghana) as a bold experiment in colonial education. The founders of the school intended for it to provide an education that redefined what colonial education meant. In colonial officer Gordon Guggisberg's own words, Achimota would be an institution in Africa that was "second to none" but was comparable in quality to the likes of its counterpart in England and beyond. This paper intends to elucidate the history behind character training in boarding schools in Ghana tracing back to colonial times. The key question I ask is what ways character training was operationalized in colonial education, and what values were prioritized in the curriculum in Achimota School between 1919-1957. To do this effectively, this research relies on archival materials obtained from the Special Collections Unit of the University of Oxford Bodleian Library and secondary literature on boarding schools and colonial education. This research investigates the Achimota's educational model and interrogates how colonial ideology, transatlantic exchanges, and local agency intersected to shape the formation of African leadership and identity during the late colonial period. By situating Achimota within broader debates about race, education, and colonial modernity, the study contributes to ongoing scholarship on the cultural politics of schooling in colonial Ghana. My findings suggest the persistence of these disciplinary frameworks in contemporary Ghanaian boarding schools reflects the enduring legacy of colonial educational structures.

# Using Natural Language Processing to Support Early Detection of Endometriosis

**Keira MacDonald**

*University of Warwick, University of Western Ontario*

Endometriosis is a chronic inflammatory condition that affects approximately 190 million women who are assigned female at birth. Endometriosis lesions cause severe, often debilitating pain. Despite its prevalence and impact, endometriosis remains one of the most misdiagnosed conditions in women's health. Endometriosis diagnoses are often delayed several years due to the subjective nature of its symptoms. As a result, clinically relevant information exists primarily in patient narratives. This study explores natural language processing (NLP) techniques to extract meaningful diagnostic signals from patient narratives. The aim of this study is to support earlier identification of individuals at risk of endometriosis. Anonymous patient narratives are analysed using NLP to parse common symptom descriptions and pain descriptors, which is used to train supervised machine learning models to differentiate narratives associated with diagnosed endometriosis and control cases. Model interpretability techniques are applied to identify language patterns associated with risk. The expected outcome is that NLP-based models will identify language patterns characteristic of endometriosis, including cyclic pain descriptions and evolving symptom predictions over time. These models are expected to outperform baseline heuristic approaches based on isolated symptom indicators. This suggests that patient narratives contain underutilized diagnostic signals relevant to early clinical consideration. This study highlights the feasibility of using NLP-driven analysis of patient-reported data as a scalable and non-invasive support tool for earlier identification of endometriosis. It demonstrates the potential of computational methods to combat diagnostic delays in conditions that may be widely experienced but underrepresented, providing a possible framework to support other underdiagnosed diseases.

## When Risk Models Fail: Empirical Evidence from Value at Risk During Financial Crises

## **Finley Sutcliffe**

*University of Leeds*

Value at Risk (VaR) is the most widely used risk measure in financial institutions and is embedded into regulatory frameworks like Basel III and IV; yet its reliability has been repeatedly questioned following periods of market stress. This study provides an empirical comparison of three common VaR methodologies: Historical, Parametric, and Monte Carlo, across distinct market regimes, including periods of financial crisis.

Using publicly available, daily equity index return data, each model is evaluated through standard back testing techniques, with a focus on the frequency of exceedance and stability across both calm and volatile periods. The results demonstrate that while all three models perform similarly during stable markets, significant divergence occurs during crises, with parametric approaches underestimating tail risk most frequently. This links to vulnerabilities that are consistent with Black Swan Theory, which emphasises the impact of rare, unpredictable events on financial markets.

The findings highlight the role of assumptions in distributions and volatility clustering in model failure, suggesting that the limitations of VaR arise less from model simplicity and more from structural instability during stress. This research contributes to discussions on quantitative risk management by emphasising interpretability and statistical diagnostics over increasing model complexity.

## **The Effects of Gut Health on Insulin Resistance through PFAS Exposure**

### **Avnika Mittal**

*King's College London*

Insulin resistance is most commonly associated with type 2 diabetes mellitus (T2DM). It is frequently present in metabolic syndrome, kidney or cardiovascular diseases. Per- and polyfluoroalkyl substances (PFAS) are highly stable, widely used chemicals, with high persistence both environmentally and in human blood. Both high serum PFAS and

gut microbiome disruption (dysbiosis) are independently associated with impaired insulin sensitivity, though their potential interrelationship is unclear.

Data from the Human Gut Microbiome Atlas, GMrepo, and PFAS-Tox were used to determine typical microbiota composition and metabolite production in three groups: healthy controls, insulin resistant individuals, high serum PFAS individuals.

Significant reductions in microbiota biodiversity were observed in both insulin resistance and high serum PFAS compared to healthy controls. Losses may include *Bacteroides uniformis* and *Odoribacter splanchnicus*, species recently suggested to sequester PFAS. Both insulin resistant and high serum PFAS groups also exhibited decreased bile acid metabolite levels compared to controls, consistent with interference in bile acid signalling in insulin sensitivity by PFAS. Short chain fatty acid production, which regulates glucose production in the liver, differed in both groups compared to healthy controls, it decreased in the insulin resistant group and increased in the high serum PFAS group.

Diseases associated with insulin resistance are amongst the leading causes of mortality in the UK, with T2DM accounting for up to 9% of the NHS budget. Further research into the relationship between PFAS exposure and gut health on insulin resistance could relieve NHS strain and improve public health through earlier diagnosis and diet-focused therapeutic strategies.

## **Destroying Statistics Phobia Among Postgraduates**

**Sitara Lewis, Dr Katja Vogt**

*University of Lancashire*

STATISTICS PHOBIA —fear of statistics—is common among many students in research globally. It remains a pervasive barrier across education levels and disciplines, including medicine. Moreover, struggles with confidently applying statistical methods weakens evidence-based medicine, often leading to flawed analyses and compromised findings. This study evaluates the effectiveness of a 2000-word biostatistics assignment designed to address this phobia. It intends to equip postgraduates with the critical thinking skills necessary to confidently select, justify, and apply biostatistical methods.

The study recruited consented international and UK Masters of Research (MRes) postgraduates with diverse academic backgrounds. A mixed-methods approach was employed: a pre- and post-assignment Likert scale survey (n=28) assessed changes in self-reported confidence, applying a paired t-test. One-on-one interviews followed among a subset of participants (n=8) regarding their experiences post-assignment and graduation.

Results demonstrated a significant increase in confidence in students' perception of using statistical methods, with agreement (agree/strongly agree) rising from 28.6% pre-assignment to 85.7% post-assignment ( $p < 0.05$ , t-test). Thematic analysis revealed three core themes: increased interest and confidence towards biostatistics, a shift from memorisation to justification of statistical methods, and greater career advancement potential.

This intervention challenges traditional memorisation-focused approaches, offering a model for educational reform that prioritises critical thinking. It justifies the need to improve statistics curricula and education. Promoting deeper learning in statistics ensures the production of reliable evidence-based research, especially in medicine. Future research will explore scaling this approach to undergraduate programs, driving systemic changes in national and global statistics education.

## **Bubble Dynamics and Investor Risk in AI-Related Assets: Cross-Market Evidence from Five Economies**

**Yiling Guo**

*University of Warwick*

The recent artificial intelligence (AI) boom has been accompanied by rapid technological diffusion and sharp price increases for AI-related financial assets, raising concerns about speculative bubbles and investor risk. While existing research frequently debates whether AI-related bubbles exist, there has been little research on how speculative behaviour arises and how investor losses vary across markets.

To fill this gap, this study conducts a cross-market empirical analysis of AI-related assets across five major economies: the United States, Taiwan, South Korea, Japan, and Mainland China. Using daily price data from December 2019 to October 2025, the analysis identifies periods of abnormally rapid price growth, examines how long volatility persists following market shocks, and evaluates investor losses in terms of both sudden crashes and prolonged drawdowns. The study also investigates whether risk conditions move together across markets over time.

The results indicate that all five markets experience episodes of speculative price pressure, but the form and duration of risk vary substantially across markets. The United States shows relatively strong co-movement with Taiwan and South Korea, while Japan exhibits weaker and less persistent linkages. In contrast, Mainland China follows a largely independent adjustment path with extended drawdown periods. Overall, the findings suggest that although global AI narratives influence multiple markets, market-specific dynamics shape AI-related financial risk.

## **Enhancing Personal and Professional Growth for Early Career Social Workers: Insights from Applying the Satir Model**

**Yan Zong Chua**

*City University of Hong Kong*

Hong Kong social workers' personal and professional growth are often eclipsed by the demands of key performance indicators (KPIs). The use of Satir Model, a humanistic intervention approach that focuses on enhancing humans' self-esteem, fostering congruence and communication, appears to be a particularly valuable work method. Congruence represents a state of completeness in which an individual's thoughts, feelings, and actions are in alignment.

This study examines how applying Satir Model in service delivery simultaneously facilitates early career social workers' personal and professional growth. The analyses are conducted based on documentation and critical reflection of the author's practicum school-based casework sessions in Hong Kong. Although existing literature and understanding focus on cultural tensions between Western therapeutic emphasis on

individual self-awareness and Chinese collectivist values emphasizing service and sacrifice, this study's preliminary findings reveal that Satir Model can be well-adapted in the Hong Kong Chinese context with some pre-conditions. These include the establishment of trust and relationship between the worker and the client, readiness of both worker and client, high-quality professional coaching, and adequate time allocated for the process. Besides being a useful strategy to help the client, practising Satir Model could promote early career social workers' self-awareness of communication patterns and inner thoughts, cultivating emotional congruence and boundary management, and preventing feelings of powerlessness and exhaustion that may emerge from endlessly helping clients, which reflects a valued aspect of Chinese culture. Moreover, it may lower reliance on cultural tendencies to hide true feelings and "save face", promoting greater overall congruence.

## **A Person is a Place: Visualising TCK Identity Through Stop-Motion Animation**

**Vivienne Ponsford**

*University of Warwick*

This Student Devised Assessment (SDA) interrogated the nature of identity and belonging for Third Culture Kids (TCKs), posing the question: 'Is a person a place?' Moving beyond traditional definitions of fixed geography, I argue that home for multi-site migrants is a relational geography – a "stream of experience" anchored in social ties rather than physical coordinates. Through the lens of 'suitcase aesthetics', I explore how memory and identity can be carried as portable hoards of objects, sounds, and sentiments.

The argument is delivered via a stop-motion animation that visualises my TCK experience as a palimpsest. Using layered paper and reconfigured lighting to create partial transparency, the film demonstrates how past cultural influences are never fully erased but instead form a blurred, composite whole. This visual layering is paired within location-specific soundscapes – ranging from calls to prayer to crashing waves – to evoke a subconscious knowledge of place.

Ultimately, the project subverts the metaphor of “suitcase-as-baggage”, presenting the suitcase instead as a vessel for a ‘Third Space’ of hybridity. By concluding with a zoom-out that reveals the hand-constructed nature of the animation setup, the work illustrates Stuart Hall’s concept of identity as a ‘production’. The film suggests that for the TCK, belonging is not a destination to be reached, but a perpetual, relational process of becoming.

## **Weather Derivatives as Climate Risk Hedges in UK Agriculture**

**Andrea Barra**

*University of Glasgow*

Climate change is increasingly threatening UK agriculture by intensifying the frequency and severity of extreme weather events, including heatwaves, droughts, and irregular rainfall, which reduce crop yields and heighten financial uncertainty for farmers. Recent climate shocks have highlighted the vulnerability of staple grain production and raised concerns about the long-term economic sustainability of farming under growing climate variability. Consequently, there is increasing interest in innovative financial instruments that can help manage weather-related income risk and complement existing insurance mechanisms.

Methodologically, this project adopts an empirical approach to evaluate the viability of weather derivatives as climate risk hedging tools in UK agriculture. We analyse historical UK climate and crop yield time series to simulate the performance of weather-indexed derivative contracts, such as options based on temperature and rainfall indices (e.g., Heating Degree Days), under extreme weather scenarios. The study employs established techniques from the literature, including Burn analysis for derivative pricing and Value-at-Risk (VaR) to assess farm income risk and hedging effectiveness.

We expect that appropriately designed weather-indexed contracts could reduce farm income volatility by providing targeted financial protection against adverse climate conditions. By comparing income outcomes with and without hedging strategies, the research evaluates the extent to which weather derivatives can serve as a

complementary risk-management tool alongside traditional agricultural insurance. Overall, the findings aim to contribute to discussions on agricultural resilience and provide evidence-based insights for farmers, policymakers, and stakeholders on the role of financial innovation in adapting UK farming to climate change

## **Bioimpedance Measurements and Brain Tissue Phantoms for Cancer Neuroscience**

**Sheena Varghese**

*Queen Mary University of London*

The present project focuses on utilising electrical impedance spectroscopy (EIS) to differentiate healthy and tumour tissues based on electrical properties. Electrical impedance characterises how a material resists and stores electrical energy when an electrical current flows through. Glioblastoma (GBM), the most aggressive primary brain tumour in adults, can be identified from differences in impedance characteristics as these are affected by increased water and ion content. Impedance measurements can be used to determine tumour margins and diseased tissue, addressing the high recurrence rates of ~90% due to challenges in complete surgical removal of cancerous tissue.

Agarose-based polymer gels with conductivities of 0.1, 0.2, 0.3 and 0.4 S/m were developed by incrementally adding saline to deionised water, prior to dissolving agarose powder into the solution. Gels were set at room temperature and impedance measurements were performed using EIS across a wide frequency range, using a four-electrode platinum electrocorticography (ECoG) array. Impedance magnitude and phase were used to compare impedance measurements.

As expected, there was an inverse relationship between conductivity and impedance. Lower frequencies exhibited increased impedance. Repeats showed strong agreement, suggesting that EIS with ECoG arrays has the potential to discriminate between diseased and healthy tissue during surgery. Although the gel conductivities were within reported physiological ranges for white matter, grey matter and GBM tissue, spatial changes in conductivity were not accounted for. Brain tissue can differ in cellular

composition which can influence impedance values. Future work will focus on measurements of heterogeneous phantoms to more accurately model tumour-healthy tissue boundaries.

## **Horses, Helmets, Hegemony: Do Amateur Equestrian Sports Reinvent or Reinforce Gender Norms?**

**Ryan Isherwood**

*University of Warwick*

The Equestrian community is often positioned as a 'gender blind' sport due to its lack of sex-based segregation during competitions. However, previous sociological literature has primarily focussed on elite riders. This research focuses on the amateur athlete and explores comparisons between the two and how gender is negotiated at the different levels.

Literature suggests that due to the gender-blind nature of competitions, there is gender freedom and equality. However, this assertion fails to include the implications that class, age and access to monetary resources have on riders, and their ability to freely express themselves. This dissertation aims to bridge this gap by examining whether contemporary Equestrian sports disrupt or reinforce gender norms and how this shapes riders' gender identities in the UK.

This project draws upon semi-structured interviews and an open-ended online questionnaire with amateur riders aged 18-69 in the UK. This data was then coded based on the research questions and analysed through a Feminist framework.

Findings suggest that despite the public perception of gender-blindness, amateur athletes experience substantial gendered pressures regarding their weight, age and self-presentation, particularly on social media. Femininity is reported as being heavily policed, with many women strategically adopting traditionally feminine traits or engaging in self-objectification to secure their success.

Unlike wider society, masculinity is largely marginalised, with both cisgender and transgender riders reporting immense pressure to conform to a feminised persona. This study demonstrates that Equestrian sports simultaneously disrupt and reproduce gender hierarchies by offering conditional empowerment to those willing to trade their agency.

## **Crisis and Clamor: A Model of Populist Communication in Economic Turmoil**

**Alberto Ornaghi**

*London School of Economics and Political Science & Paris School of Economics*

Recent examples of populist candidates winning elections during periods of economic turmoil abound: Javier Milei and Donald Trump (2024) won around periods of abnormally high inflation. To study these phenomena, I present a theory of populist communication about economic policy in periods of crisis. To do so, I solve a game theory model where a populist candidate, moderate candidate and a voter interact, with the candidates proposing policies and engaging in campaign communication about the state of the economy. The candidates can enact either a status-quo policy or a reform, with the latter policy being good in a crisis. The voters observe the campaign communication, form expectations about the state of the economy, and elect the candidate more likely to enact the policy that is correct given the expected state of the economy.

My model shows how voters' perceptions of past economic policy, the realisation of a crisis, communication efforts and the rigidity of candidates' ideology impact populists' electoral fortunes. I find that populists thrive when voter perceptions of past economic policy are negative, and can communicate to win elections when crises occur. Further, I find that negative perceptions of status-quo (moderate) policy combined with moderates failing to communicate can cause populists to win and implement economic reform when it was not necessary, leading to suboptimal outcomes. To conclude my analysis, I interpret my model's theoretical predictions using Trump's 2024 election victory and Farage's communication when faced with different moderate candidates.

# **Blocking Roads, Building Support: Positive Radical Flank Effects in the UK's Environmental Movement**

**Alberto Ornaghi**

*London School of Economics and Political Science & Paris School of Economics*

Groups such as Just Stop Oil (JSO) have responded to the increasing severity of the climate crisis by adopting more extreme activism strategies. I thus investigate the existence and direction of radical flank effects (RFEs), whereby activists using more extreme tactics may have a positive or negative effect on support for the wider social movement they belong to. In the literature, estimates of RFEs differ greatly, with studies finding positive, negative and null effects.

To shed light on these contradictions, I ran an online survey experiment (n=116) to causally assess the RFEs on support for moderates, official environmental policy, and the radical flank itself. First, I find that radical groups generate far more awareness than moderate groups. Next, I hypothesise that using radical tactics decreases support for the radical activists, but that this effect will be mitigated for those with high levels of pro-environmental traits. I find strong support for the former hypothesis, with the probability of support decreasing by 24 to 36 percentage points due to radical tactics. However, I find limited support for the latter hypothesis. I also hypothesise that there exists a positive RFE on support for moderates and policy, and find strong evidence for both. Support increases by up to 10.3% and 14.1% on average for activism and policy respectively. I therefore find strong evidence of a positive RFE, suggesting that radical activism can raise both awareness and support, posing no tradeoff for the wider social movement.

## **Design and optimisation of Ram Air Turbine (RAT)**

**Mohamed Waziri**

*Blackpool College*

Safety-critical redundancy is essential in modern aircraft systems engineering to ensure continued controllability during extreme failure scenarios. One key emergency system is the Ram Air Turbine (RAT), a deployable, airflow-driven device that provides electrical and/or hydraulic power when both the main engines and the Auxiliary Power Unit (APU) are unavailable, such as during total fuel loss. As a passive system, the RAT must deliver reliable power across a wide range of flight conditions while minimising aerodynamic penalties.

This project investigates the engineering design and performance of ram air turbines, focusing on how turbine blade geometry and system configuration affect power output, efficiency, and aerodynamic impact. Multiple RAT blade designs are analysed using analytical calculations and Computational Fluid Dynamics (CFD) to evaluate airflow behaviour, pressure distribution, and turbine bypass effects under emergency operating conditions.

Comparative performance results are presented through CFD outputs and analytical data, supported by experimental testing and flow visualisation to validate simulation predictions. The combined analytical, numerical, and experimental approach enables identification of key design features that enhance RAT efficiency and reliability.

The findings contribute to a clearer understanding of emergency power system design in aviation and demonstrate how optimised RAT configurations can improve aircraft survivability. The study also offers insights applicable to small-scale wind turbine development, highlighting the wider relevance of aerospace design methodologies.

## **Behavioral Correlates of Humpback Whale Social Calls on their Breeding Grounds in Maui, Hawai'i**

**Alexander Holm, Marc Lammers, Julie Oswald, Maura Schonwald, Adam Pack**

*University of St Andrews*

Humpback whales (*Megaptera novaeangliae*) are famous for their song; However, they also produce social calls that are independent of song and remain understudied. Social

calls are short, varied vocalizations that are believed to serve important behavioral and social roles. This study used 69 hours of acoustic-video data from suction cup tags deployed on 19 individuals (2021-2023) to investigate potential relationships between social calls and behavior on the Hawaiian breeding grounds. Behaviors (activity level, social grouping, surface activity, and physical contact) were quantified from video footage collected by the tag, and the social calls were organized into a seven-category catalog. A multinomial mixed-effects model illustrated that activity level consistently predicted vocal behavior across all call categories ( $p < 0.05$ ), and that the whales demonstrated a clear relationship between arousal and the frequency of their calls. Both medium and high frequency calls (HFC) were significantly more likely at higher activity levels than low frequency calls, with activity level exerting the strongest effect on HFCs. Furthermore, physical contact, a high-arousal behavior, further increased the probability of HFC production. These results provide the first evidence that humpbacks follow the common mammalian trend where higher arousal states elicit vocalizations with higher fundamental frequencies. Additionally, a linear mixed-effects model revealed whales in pairs exhibited a significantly lower call rate than whales competing for females in competitive groups ( $p < 0.05$ ). These findings reveal that humpback whale social call production is driven by physiological arousal and social context, a critical step towards inferring arousal states and behavior without direct observation.

## **Role of Cognitive Empathy as a Mediator in the Influence of Traits on Perspective-taking**

**Yeuk Tung Liang**

*University of Glasgow*

Perspective-taking is a crucial cognitive process for mentalizing others' intentions. However, individuals exhibiting Dark Triad, including narcissism, Machiavellianism and psychopathy, are limited in their perspective-taking capacities. Narcissism involves conflicts between one's grandiosity and insecure selves. Machiavellianism is characterized by result-oriented and manipulation of others while psychopathy is known for empathy deficits and impulsive behaviors. Deficits in empathy are also found to be associated with weaker mentalizing ability. We aim to investigate the

perspective-taking abilities and mediating effect of cognitive empathy (CE) among individuals with varying degrees of Dark Triad using Visual Perspective-Taking Task (VPT), in which participants are asked to access their own and others' visual perspectives in either consistent or inconsistent scenarios. We hypothesize that higher degree of psychopathy has a relatively larger and negative correlation with CE and perspective-taking abilities. CE is hypothesized to mediate the effect between Dark Triad and perspective-taking capacities. 101 samples are collected among Hong Kong college students. VPT shows that participants react significantly slower in inconsistent than consistent trials and in “Other” than “Self” perspectives, which reflects that a greater mental effort is required to overcome the egocentric bias—individual’s own perspective influencing their ability to understand other’s. Significant positive correlation is found between narcissism and CE, indicating that narcissists are not necessarily egocentric. They may strategically manipulate other’s viewpoints for managing their public images. Yet Dark Triad is not significantly correlated with VPT task, and no mediation effect is found, which prompts us to clarify the mechanisms between implicit and explicit perspective-taking.

## **Orientalism and Indigeneity: The Role of Discourse in Settler Colonialism and Colonial Resistance**

**Alisyn Parfait**

*University of Chicago*

This work aims to address the goals and methods of the global settler colonial mission and how it encourages cross-cultural solidarity. It is a case study comparison between American indigenous groups and Palestinians, particularly focusing on how the experiences of settler colonialism encourage global colonial resistance. By using the ongoing Palestinian genocide as a point of reference, this paper strives to compare American conceptions of indigeneity with well-established principles of Orientalism. Additionally, it examines the role that religion plays in the cementation of colonial roles and the methods of settler colonialism, such as racialization and re-racialization. This work delves into the hegemonic links between Orientalism and conceptions American indigeneity, and in doing such, examines how the similarities and differences

between these discourses enables or resists settler colonialism. By doing this, we can further understand the underlying goals of the settler colonial mission, its relative successes and failures, and formulate increasingly effective methods of social awareness and resistance.

## **Beyond Coding - Rebalancing Technical Rigour and Digital Literacy in Secondary Computing Education**

**Mudassar Islam**

*University of Warwick*

Since the introduction of the national computing curriculum in England in 2014, secondary schools have been tasked with preparing young people for participation in an increasingly digital society. While the curriculum places strong emphasis on programming and computational thinking, growing debate questions whether this technical focus sufficiently addresses the broader forms of digital literacy, including ethical awareness, critical engagement, and digital citizenship. This research investigates how current policy and pedagogical approaches balance technical rigor with wider social and civic responsibilities.

The study adopts a critical synthesis approach, drawing on academic research, policy documents, and inspection frameworks to examine three interconnected themes. The prioritization of technical competence over digital literacy, the role of teacher capacity and professional development in curriculum enactment, and the implications of computing education reform for equity and inclusion. The analysis highlights that while technical proficiency is essential, an overemphasis on coding risks marginalizing critical dimensions of digital engagement. Evidence also suggests that limited subject confidence, uneven access to professional development, and systemic constraints significantly shape how computing is taught in practice, often resulting in inconsistent learning experiences across schools.

The findings indicate that effective and inclusive computing education depends not only on curriculum design, but on sustained support for teachers and deliberate integration of technical and critical perspectives. By situating computing education

within wider societal challenges, such as ethical technology use, artificial intelligence, and equitable access, this research contributes to interdisciplinary conversations about how education can support sustainable, responsible, and inclusive digital futures.

## **From Bretton Woods to Quantitative Easing: Inflation and Inequality in the UK's Post-1971 Fiat Monetary Regime**

**Ollie Sherwin**

*University of Warwick*

Since the end of the Bretton Woods system in 1971, the UK has operated under a fully fiat monetary regime characterised by persistent positive inflation, expanding credit, and rising macroeconomic intervention. While inflation is typically treated as a technical macroeconomic problem, its distributional consequences are less widely recognised. This research investigates whether the UK's post-1971 monetary framework has contributed to inequality by acting as a regressive “stealth tax” that erodes real wages and savings while amplifying asset price gains.

The study combines UK time-series evidence on consumer price index inflation, real wage growth, M4 broad money, credit measures, and asset prices with fiscal indicators including government spending, tax receipts, and debt dynamics. It compares distinct periods: the 1970s inflation era, the post-1997 inflation-targeting era, and the post-2008 quantitative easing and low-interest-rate environment. The analysis focuses on whether credit expansion and inflationary episodes coincide with real wage compression, and whether loose monetary policy and persistent fiscal deficits redistribute economic outcomes towards asset holders.

Initial findings indicate that inflation is not equitable. It appears to be highly regressive for households reliant on wages and cash-like savings, while fostering wealth inequality through asset appreciation in periods of cheap credit and monetary expansion. The research argues that monetary stability is therefore a matter of economic justice, and prolonged instability can induce a demand for alternatives. This is reflected by renewed interest in sound money (gold and bitcoin), and small-state policy reforms to protect future living standards and fiscal sustainability.

# Conversational' Artificial Intelligence as a Misnomer

**Gavin Stewart**

*University of Glasgow*

Large Language Models are often described as ‘conversational’; in being termed as conversational AI, and interactions being called conversations. In this research, I depart from this mainstream position and argue that LLMs should not be seen as capable of participating in conversation. Using Bart Geurts' view of conversation as being rooted in negotiated mutual social commitments, I firstly argue that LLMs cannot be seen as socially committed to the truth of their outputs. As such, I contend, they are unable to participate in conversation.

The argument then turns to the mutuality of commitments in conversation. I argue for an interpretation of LLM outputs as being generated by different interlocutors after each prompt. The conclusion reached is that since there is no consistent LLM interlocutor, the commitments can never be mutually held. Therefore, I again argue that this demonstrates the inability of LLMs to participate in conversation.

Having shown that LLMs are unable to participate in conversation, I conclude that the established terminology used to describe these models, 'conversational', is a misnomer. I argue that describing LLMs as 'conversational' AI may contribute to harmful user anthropomorphisation of LLMs, and, as such, it should be avoided.

## Emotion Proportion Judgement in Multiple Faces: an Event-Related Potential Study

**Valeria Cojocaru**

*Bournemouth University*

Ensemble perception involves rapid extraction of summary statistics from groups of similar objects, such as the average facial expression in a crowd. Despite the importance of perceiving the average facial expression in a crowd, average emotion

can be driven by few strong facial expressions. In real-world contexts, proportion of faces showing an emotion could be an important measure. Our on-going behavioural research consistently showed that people can judge to a certain accuracy the proportion of faces showing a specific emotion in a crowd. However, there is no research to date on the neural mechanisms of this process. Furthermore, it remains unclear whether the emotion proportion judgement is an automatic process.

Using the event-related potential (ERP) technique, this study investigated these questions with multi-face displays containing neutral and angry faces. Participants were asked to judge the emotion proportion of angry faces in each display (active task), or simply to divert attention away from the faces and respond to infrequent onsets of a black circle on top of the faces (passive task).

No difference across emotion proportions was found in the early perceptual ERP component of N170 (130-160 ms after display onset). However, there was a monotonic ERP amplitude change across proportion levels in the active task between 180-330 ms over the frontal region, but not in the passive task. The results suggest that the emotion proportion judgement requires focal attention and is not an automatic process.

## **Neurosyphilis Mimicking Antibody-Negative Autoimmune Encephalitis: A Diagnostic Pitfall**

**Sarah Shwea, Gemma Maxwell**

University of Sunderland

Neurosyphilis is a rare but serious manifestation of *Treponema pallidum* infection that can occur at any stage of syphilis. This case demonstrates how neurosyphilis can mimic antibody-negative autoimmune encephalitis (AIE), leading to diagnostic delay.

We describe the clinical course, neuroimaging, cerebrospinal fluid (CSF) findings, and serological investigations of a transgender woman, who presented with recurrent encephalitic episodes over one year.

The patient initially presented with confusion, hallucinations, fever, and behavioural disturbances. Brain magnetic resonance imaging (MRI) did not reveal new lesions, while lumbar puncture showed mild CSF pleocytosis (white cell count (WCC)  $30 \times 10^6/L$ ), negative viral polymerase chain reaction (PCR), and a negative AIE antibody panel. She transiently improved but was readmitted with seizures and new MRI lesions leading to a diagnosis of antibody-negative AIE and treatment with corticosteroids, intravenous immunoglobulin (IVIg), and levetiracetam. One year later, she re-presented with confusion, dysphasia, fever, headache, and vomiting, with markedly worsened CSF pleocytosis (WCC  $389 \times 10^6/L$ ) and new inflammatory MRI lesions. Infective encephalitis was suspected and treated empirically with intravenous aciclovir and ceftriaxone; however, symptoms persisted. Despite an unremarkable sexual history, sexually transmitted infection screening revealed positive syphilis serology (serum rapid plasma reagin (RPR) 1:64; CSF RPR 1:8), confirming neurosyphilis. Treatment with intravenous benzylpenicillin led to clinical improvement.

Neurosyphilis can mimic autoimmune encephalitis, even in patients without classical risk factors. Routine syphilis testing should be considered in unexplained or recurrent encephalitic presentations.

## **Analysis of the Representation of Skin Tone Diversity Amongst Medical Resources Illustrating Dermatological Manifestations of Pulmonary Disease**

**Stacey Kihumba, Giles Dixon, Matthew Wells, John Pauling, Harsha Gunawardena, Jo Hardy, Sarah Rudd, Huzaida Adamali, Shaney Barratt**

*University of Bristol*

Introduction: Interstitial lung disease (ILD) can be a manifestation of an underlying systemic autoimmune disease. These conditions have various cutaneous manifestations. There is a lack of tone diversity illustrating dermatological disease in medical education; leading to inequitable healthcare delivery (1). We aimed to identify skin tone representation amongst resources illustrating clinical signs relevant to ILD.

Hypothesis: lighter skin tones would be disproportionately over-represented.

Methods: Resources were identified with the support of NBT NHS Library and Knowledge Services. One author sought images associated with systemic sclerosis(SSc), dermatomyositis(DM), vasculitis(VSc), cystic lung disease(CLD), sarcoidosis(SD) and general respiratory signs(GRS). A Monk's skin tone scale score was applied (2) and the 1-10 skin scale was collapsed into categories 1-3 (fair skin), 4-6 (medium skin) and 7-10 (dark skin).

Results: A total of 989 images from 16 e-resources and 26 textbooks were analysed - Of this total 189 SSc, 375 DM, 198 VSc, 94 CLD, 43 SD & 90 GRS. Overall, 843/989 were from categories 1-3, 108/989 = 4-6, and 38/989 = 7-10.

Conclusions: This work highlights the lack of representation of people with darker skin, despite this cohort having a higher incidence of and greater morbidity associated with these conditions. We ought to raise awareness of differences in dermatological appearances and promote inclusivity.

## **How Language Complexity in Expert Reports Shapes Juror Comprehension and Perceived Credibility**

**Mikayla Frith**

*Bournemouth University*

Jurors frequently rely on expert reports when evaluating complex evidence, yet such reports are often written using technical language that may be difficult for non-experts to understand. Despite the central role of expert testimony in legal decision-making, relatively little is known about how language complexity specifically influences juror comprehension and credibility judgments (Bali & Martire, 2024)

This study will investigate how language complexity within expert reports influences juror comprehension and perceived credibility of the expert. Participants will complete an online experimental task in which they will read short expert report scenarios relating to a fraud case. The wording of these reports is systematically manipulated to

vary language complexity. Participants will then provide credibility ratings, comprehension responses, and likelihood of conviction, based on the expert report, allowing examination of how different levels of complexity affect juror understanding and decision-making.

It is expected that clearer, moderate language will improve comprehension accuracy, and that reports using language that is neither overly simplistic nor highly technical will be perceived as most credible. These anticipated findings support research in cognitive psychology suggesting that linguistic framing can shape interpretation and judgment (Bali, Martire, & Edmond, 2021).

By examining how language affects juror understanding, this research contributes to psychological theory on language comprehension and has practical implications for the legal system. Improving the clarity of expert reports may enhance juror decision-making and reduce misunderstanding in courtrooms. This work highlights the role of linguistic framing in high-stakes decision-making and offers directions for future research on legal communication and evidence presentation.

## **It's Not Part of the Job: Menstrual Stigma, Job Quality, and Workplace Inclusion for Women in the UK Hospitality Sector**

**Charity Rymer**

*University of Warwick*

Despite being a routine bodily process experienced by millions of people, menstruation remains a widely stigmatised topic, particularly within the workplace. While existing scholarship explores the prevalence of menstrual pain and silence surrounding menstruation, there is scarce research on how menstrual stigma shapes everyday working conditions. Thus, this dissertation aims to investigate the extent to which menstrual stigma impacts job quality and workplace inclusion in the United Kingdom hospitality sector, an industry characterised by precarious contracts, demanding physical labour and a predominantly female workforce. This dissertation adopts a qualitative research design, utilising semi-structured interviews with women employed in part-time or zero contract roles in food and beverage hospitality roles. Guided by

Goffman's Theory of Social Stigma and Sen's Capability Approach, the analysis will explore how workers conceal, manage and interpret menstruation in customer-facing environments, and how these practices intersect with organisational structures and precarious working conditions. This research anticipates that findings will centre around how menstrual stigma contributes to presenteeism, limited access to formal support and restricted capacity to request sick leave, thereby undermining both physical wellbeing and inclusion at work. By conceptualising menstrual stigma as a determinant of job quality, this study addresses a significant gap between reproductive health, sociological and employment literatures on menstruation. The findings of the research paper aim to inform more inclusive workplace practices and contribute to wider debates on decent work, gender equality and sustainable employment in highly feminised industries.

## **AR/MR Guided Construction**

### **Oscar Ash**

*Blackpool College*

The construction industry continues to face persistent challenges, including human error, low productivity, and a growing skills shortage. These issues are exacerbated by a heavy reliance on traditional 2D drawings and manual supervision methods, which can be difficult to interpret and inefficient for both experienced professionals and trainees. Recent advances in immersive technologies, particularly Augmented Reality (AR) and Mixed Reality (MR) present a promising opportunity to transform how construction tasks are delivered, monitored, and taught. By overlaying digital building information directly onto the physical environment, AR/MR systems have the potential to provide intuitive, real-time guidance that bridges the gap between design intent and on-site execution.

This project investigates the feasibility of AR/MR as a guided construction and training tool, with a particular focus on improving task accuracy, efficiency, and user understanding. A prototype AR application will be developed to deliver step-by-step, spatially aligned instructions for a modular construction task. The system aims to

“Lego-ise” the construction process by visually guiding users through assembly sequences, thereby reducing reliance on conventional drawings and written instructions.

The prototype will be evaluated through user testing with multiple participants, comparing task completion times, error rates, and overall user experience against traditional construction guidance methods. Quantitative performance data will be supported by qualitative feedback to assess usability, learning outcomes, and perceived value. The findings will provide insight into the practical benefits and limitations of AR/MR within construction contexts and offer recommendations for future development and potential integration into industry practice and construction education.

## **Implementation Analysis of Congestion Pricing in London**

### **Christopher Rios**

*University of Chicago*

My case study evaluates the implementation and long-term trajectory of the London Congestion Charge (LCC) through Francis Fukuyama’s policy-making framework: problem definition, solutions development, and implementation analysis. Launched in 2003 to mitigate critical gridlock costing the city up to £4 million weekly, the LCC has shifted from a traffic management tool into a broader environmental strategy.

The research employs a qualitative analysis of policy adaptation, utilizing Transport for London (TfL) monitoring reports, legislative acts, and stakeholder data. It examines how policymakers maintained legitimacy across three mayoral administrations by iteratively refining the scheme’s objectives.

The LCC’s success stems from its capacity for constant evolution, such as adjusting fee structures and integrating emissions-based pricing (ULEZ) to remain relevant. However, the 2010 repeal of the Western Extension Zone (WEZ) demonstrates that policy stagnation occurs when public engagement fails to evolve alongside technical

adjustments. Data suggests that without periodic innovation, behavioral "creep" and population growth eventually erode the deterrent effect of static tolls.

This research identifies a "Reframing Paradox," where the LCC's survival depended on shifting its justification from traffic management to climate action. By analyzing the "Incentive Trap" of electric vehicle discounts, the study argues that urban policies must be viewed as "living" frameworks. Ultimate success depends not on initial design, but on the political courage to constantly iterate in response to changing urban demands.

## Further Examination of the Stroop Interference Effect

**Shi Tong Xu**

*City University of Hong Kong*

The Stroop interference (SI) effect refers to the slowing of responses to colour-incongruent stimuli (e.g., RED printed in green) relative to neutral stimuli (e.g., XXXX in green). Recent research in English suggests SI occurs because the brain "binds" word meaning and print colour into a single mental object. This binding can be eliminated by briefly showing the word itself (in white) before the coloured target, which "uncouples" the integration. The present study examines this mechanism in logographic Chinese, providing a critical cross-linguistic test. Unlike alphabetic English, Chinese characters map more directly to meaning, making them an ideal case for testing whether "perceptual binding" is a universal cognitive principle. Thirty Cantonese-speaking undergraduates completed a colour-naming Stroop task under two conditions: Control (target preceded by a #) and Identity Priming (target preceded by the same colour name in white). Results showed a significant interaction between Priming and Congruency. While a robust SI of 127 ms ( $p < .001$ ) was observed in the Control condition, it was reduced to 30.75 ms ( $p < .001$ ) in the Identity condition. Distributional analyses indicated that, in the Control condition, SI increased as response times lengthened, whereas in the Identity condition, the SI effect remained stable across reaction time distributions. These results are consistent with previous findings, showing that the perceptual integration between word form and colour is a primary driver of the Stroop effect.

# **Research Question: What is the Effect of Bilingualism on Cognitive Development, Measured Through Raven's Test Scores, Among Indian Middle-School Children?**

**Cyrine Mokrani**

*University of Warwick*

Cognitive skills formed in childhood play a crucial role in later educational success, productivity, and social outcomes. In multilingual societies, children often grow up using more than one language, yet evidence on whether bilingualism strengthens or hinders cognitive development remains mixed. My study explores the following: What is the effect of bilingualism on children's cognitive development, measured using Raven's Progressive Matrices, among middle-school students in India? This question is particularly relevant given India's National Education Policy, which promotes multilingual education without clear evidence on its cognitive consequences. Using microdata from approximately 1,100 children aged 9-11 across Delhi, Patna and Hyderabad, my research examines how bilingualism relates to non-verbal cognitive performance. Raven's Progressive Matrices are used because they assess reasoning ability while minimising language bias. The analysis controls for gender, socioeconomic background, language of instruction and regional differences. Beyond standard regression methods, the study employs quantile regression, which allows the effects of bilingualism to be examined across different points of the cognitive score distribution rather than only at the average. This approach helps identify whether bilingualism benefits lower or higher-performing students differently. Preliminary results suggest a positive association between bilingualism and cognitive scores, though the magnitude of this relationship varies across cities and performance levels. Ongoing analysis explores whether bilingualism mitigates the cognitive challenges faced by students learning in a non-home language. These findings contribute to debates in education, economics, and psychology offering evidence relevant to language-in-education policy in multilingual contexts and highlighting how linguistic environments may shape cognitive inequality.

# **AI Adoption and Educational Attainment in the United States**

**Sebastian Barbu**

*University of Toronto*

Artificial Intelligence has had, and continues to have an enormous impact on the economy, particularly through employee productivity. Theoretically, AI improves the productivity of both college-educated and non-college-educated workers. However, it is unclear if AI will improve the job market competitiveness of both groups. Non-college-educated workers may face reduced competitiveness due to AI automation, while college-educated workers may be displaced by lower-cost, non-college-educated workers using AI. This study examines the relation between AI adoption and the proportion of college-educated workers in several industrial sectors in the United States. Data on AI adoption ranging from August 28, 2023 to September 21, 2025 were obtained from the United States Business Trends and Outlook Survey. Data on proportion of college-educated workers and mean hourly wage were compiled from the Integrated Public Use Microdata Series for the Current Population Survey. The study estimates the association of the change in proportion of college-educated workers as a function of AI adoption and mean hourly wage using a regression framework. It is expected that worker educational attainment is positively related to both AI adoption and mean hourly wage. This research has important implications for policy and society. Governments may need to expand educational opportunities to strengthen the competitiveness of non-college-educated workers. As a result, the rising economic value of a college degree may accelerate growth in the number of university graduates.

# **Investigating Glasgow Airport's Post-COVID Decline in North American Connectivity**

**David Orrock**

*University of Glasgow*

Since BAA sold both Glasgow and Edinburgh Airports, competition between the two has increased, particularly in securing long-haul routes that generate important

economic and connectivity benefits. This research investigates why Glasgow Airport has lost transatlantic market share, despite historically serving as Scotland's primary gateway to North America. The analysis concentrates on the post-COVID period, during which airline network reshaping appears to have accelerated this shift.

The primary research question asks how the interaction between airline network decisions, joint venture strategies, and government policy has influenced transatlantic route development in Scotland. To address this, the research uses semi-structured interviews with current and former aviation executives, selected for their detailed knowledge of the case study. Qualitative thematic analysis is used to identify key factors shaping airline decision-making.

The findings suggest that Edinburgh's post-COVID success is linked not only to market demand but also to more effective recovery management, stronger partnerships, and competitive airline reactions. The study contributes to academic debates on airport competition by offering a focused regional case study and informing wider discussions on regional tourism development and post-COVID recovery strategies. By examining how strategic decisions are made in practice, this research highlights why airport competition matters beyond regional connectivity, extending to aspects such as tourism and local investment.

## **Beyond the hype: Measuring the Real ROI of AI Adoption in India**

**Aryan Agarwal**

*University of Warwick*

The recent hype of Artificial Intelligence (AI) has stirred several debates in the business world. With trillions of dollars deployed toward AI, expectations of returns from AI are extremely high. Due to implications on business strategy, AI adoption is now essential, 80% of Fortune 500 CEOs viewing AI as critical to long-term strategy. Hence, this paper provides a longitudinal and quantitative analysis of AI adoption impacts on Indian firm value.

This research employs a quantitative approach, using the latest econometrics Difference-in-Difference techniques to evaluate returns of investment into AI over a period of three years. The methodology comes from filtering through all news articles surrounding AI developments by publicly listed firms in India, via LSEG Refinitiv Workspace. This enables me to manually create a unique dataset to evaluate the changes in the financial metric 'Return on Capital' (ROC) post AI adoption. A thorough analysis of ROC implications, using Callaway's 2024 Staggered Difference-in-Difference method, will produce results to provide insight into true profitability levels of AI investments.

This research has novel contributions to existing literature through the focus on ROC effects rather than stock price movements, as analysed by the majority of existing literature. In particular, ROC is a comprehensive financial metric that accounts for both the costs and profits of capital allocation, providing added practical insight into the costs and benefits of AI from a financial perspective. Lastly, this paper analyses emerging market effects through an investigation into Indian firms, which is sparse in existing literature.

## **Assessing Irritable Bowel Syndrome (IBS) Management at a General Practice in Rural England: A Retrospective Clinical Audit**

**Leha Mahesh Kumar, Siddharth Uma Rajah**

*University of Lancashire*

Irritable Bowel Syndrome (IBS) is a chronic condition of the gut-brain interaction that causes recurrent abdominal pain and impacts quality of life. While the National Institute for Health and Care Excellence (NICE) outlines management of IBS in its CG61 guidelines, adherence varies. In rural areas with limited specialist access, effective local management is essential. This ensures timely patient care while reducing the burden on overstretched NHS hospitals.

This retrospective audit aimed to evaluate IBS management at a rural general practice and identify opportunities to enhance guideline adherence through practical strategies. Records of 35 adults newly diagnosed with IBS in the practice between April

2023 and March 2025 were reviewed. Performance was measured against NICE-derived criteria: physical activity assessment, providing lifestyle/dietary advice, and offering/prescribing symptomatic-relief medication (antispasmodics). Data were extracted from the practice's electronic health records (EMIS) and compared to set standards (80%, 95%, 75% respectively). These were set based on the significance and practicality of each intervention. The practice compliance fell short of set standards. 30% had physical activity assessed, 46% received lifestyle/dietary advice, and 71% were offered/prescribed antispasmodics.

The results indicate a significant gap in guideline adherence. Reduced compliance may result from limited time, documentation issues, training gaps, and patient factors. A multi-faceted approach was proposed. Strategies include implementing guideline-based prompts on EMIS, staff training on guidelines and providing accessible information to patients to improve health literacy. These aim to enhance patient care and safety, with a re-audit currently underway.

## **The Effectiveness of Mindfulness-Based Group Intervention on Mental Health in Social Workers: A Randomised Controlled Trial**

**Hui Yu Carol Lam**

*City University of Hong Kong*

Current research has highlighted interventions to address mental health problems among healthcare professionals. Social workers undertake a wide range of responsibilities, from performing administrative tasks to delivering services. Consequently, the accumulated stress experienced in this demanding career could lead to negative mental health outcomes. Meanwhile, mindfulness has become a widely adopted approach incorporated into different mindfulness-based interventions (MBIs) for enhancing well-being among healthcare professionals. Nevertheless, few MBIs target social workers, and the existing interventions is challenged for their ambivalent effectiveness on various outcomes. Lengthy intervention and rigid schedule also pose barriers to time commitment, particularly for these professionals with demanding working schedules.

This study addresses these gaps by evaluating the MBI with shorter duration and reduced time commitment to improve real-world feasibility and accessibility, while measuring its effectiveness in well-being outcomes. This study is a two-arm randomised controlled trial (RCT) with a waitlist control. Participants will receive 4 MBI sessions over two weeks. The anticipated outcomes are to reduce burnout, anxiety and depressive symptoms, improve resilience, and mental well-being in social workers. Findings of this study may inform the effectiveness and feasibility of administering brief MBIs for social workers.

## **Optical Delay Lines for a High-Energy Laser Prototype for Inertial Fusion Energy Applications**

**Toby Graham**

*University of Glasgow*

In 2022, the National Ignition Facility (NIF) in California, USA, focussed 192 high-power laser beams on to a small target and demonstrated, for the first time, a nuclear fusion experiment in which the energy produced exceeded the laser energy used to drive it. This landmark result has accelerated global efforts to design more efficient laser systems for future inertial fusion energy (IFE) power plants.

At the STFC Central Laser Facility, the UK Programme for Laser Inertial Fusion Technology for Energy (UPLiFT) is addressing this challenge by developing a scalable prototype laser driver. It is necessary for lasers to have a long pulse duration for them to be efficient. However, inertial fusion reactions are limited to sub-20 ns laser pulses, due to plasma instabilities arising at longer durations. UPLiFT's laser concept prevents this by overlapping shorter sub-pulses in the amplifier sequentially in time within the amplifier. Achieving the required temporal spacing ideally demands digital control, but budget constraints prohibit such solutions.

This work presents a cost-effective free-space method for generating the necessary temporal delays. The design of a multi-pass (Herriott) cell optical delay line is demonstrated, capable of reducing optical path lengths of up to 22.5 m by a factor of 30 into a compact footprint on a standard optical table. A small-scale prototype has

been experimentally characterised to validate the design and suitability for the UPLiFT laser concept. Future work aims to integrate this into the prototype laser driver.

## **Miniaturising Pharma: Design and Early-Stage Development of 3D-Printed Microfluidic Lab-on-Chip Platforms**

**Rindhiya Vishnu Shankar**

*Queen Mary University of London*

Diffusion, a seemingly simple concept that underpins many pharmacological processes, remains challenging to evaluate quantitatively. Whilst conventional diffusion testing methods are widely used, they can be expensive, time-consuming, and limited in reproducibility. Microfluidic lab-on-chips have recently emerged as viable alternative platforms for studying controlled diffusion at physiologically relevant length scales, while using minimal sample volumes. Within these systems, hydrogels have been increasingly used in toxicology studies due to their ability to tune solute transport.

Early-stage designs of the 3D-printed microfluidic lab-on-chips incorporate a three-channel design that comprises a source and sink channel, separated by a central hydrogel channel, functioning as a selective diffusion interface. Building on previously reported hydrogel-partitioning designs, this study focuses on improving performance and scalability through simplified fabrication and the use of commercially available photopolymer resins. The chips were designed using CAD tools and fabricated via digital light processing (DLP) 3D printing, followed by post-curing and bonding to APTES-coated glass slides.

Several design iterations, incorporating pillar capillary and phase-guide hydrogel barrier features, were tested to investigate hydrogel confinement and diffusion behaviour. Both fibrin-based hydrogels and organo-hydrogels were tested to observe differences in meniscus formation and diffusion behaviour. Dyed buffer solutions were used to visualise the flow across the hydrogel barriers. The research identified practical user limitations of the design, especially when sealing the printed chips to the glass slide. The insights gained from the limitations were used to design a more user-

oriented microfluidic platform for hydrogel-based diffusion studies that lab technicians can easily use.

## **Socio-Cultural Grounds of Continued Dependence on the Fossil Fuel Industry**

**Dana McCutcheon**

*University of Warwick*

We continue to increase carbon emissions despite globally pressing climate concerns. Public dependence on the fossil fuel industry may go some way towards explaining this. This project therefore investigates what forms are taken by dependence on the industry and how it is produced and reproduced.

I draw inspiration from economic anthropology to develop a concept of ‘contingently necessary’ activities: these are, roughly, the particular forms of universal activities (eating, communication, etc.) which characterise a culture. I bring this into a theory of dependence on fossil fuels which builds on Unruh’s (2000) idea of ‘carbon lock-in’ as well as Hausknotz’s (2020) discussion of sustainability, the ‘lifeworld’ and state imperatives. In exploring how increases in cultural compatibility and automatic systems contribute to the development of a powerful technological system, I adapt Hughes’ (1994) descriptions of ‘technological momentum’. Finally, I use literature on communities in extraction zones, fossil fuel advertising and propaganda, and the cultural integration of carbon-heavy technologies to demonstrate the ability of dependence to reproduce through its influence on cultural perceptions of the industry and through co-opting the reproduction of a carbon-saturated culture.

This framework connects and contextualises manifestations of carbon lock-in by framing them as forms of dependence. Such research helps to identify the most influential and flexible aspects of the social tendency to contribute to climate change. Targeting these areas should be particularly effective in combatting climate change. Further research may examine limitations, conditions and alternatives for the ‘dependence’ explanation of continued emissions.

# **Exploring Post-Harvest Issues from Stakeholder Perspectives: The Case of Central Malawi's Tomato Supply Chains**

**Aidan Muir**

*University of Glasgow*

As global population continues to grow - and with it, global food demand - food losses and waste (FLW) present an increasingly troubling environmental, economic and humanitarian challenge. In the Global South, FLW is concentrated between the harvest and retail stages of the food supply chain (FSC). Thus, this research aims to contribute, through a case-study of tomato supply chains in Malawi, to the vital, emerging body of post-harvest literature focused on Sub-Saharan Africa.

While research in this area is growing, two problematic trends are emerging: crop bias and methodological homogeny. These trends are creating a fragmented body of knowledge which, without correction, will fail to comprehensively capture issues of food loss in the region. Furthermore, a lack of research on horticultural crops threatens to exclude some farmers and vendors (who are among the most affected by post-harvest losses) from any progress achieved.

Taking an inductive approach, this research engages stakeholders in Malawi's tomato supply chains including farmers, researchers and consultants. Via a combination of interviews and questionnaires, it seeks to understand: the structure of the tomato supply chain; the perceived drivers of post-harvest losses; and, the perceived barriers to the adoption of post-harvest solutions.

Exploring these issues from a diversity of stakeholder perspectives provides rich insight and grounds upon which to make informed recommendations to policy-makers, NGOs and entrepreneurs operating in the region. This approach also emphasises the nascent value of stakeholder engagement and qualitative analysis in the broader research contexts of food security and food supply chains.

## **Partner similarity and Relationship Satisfaction in Hong Kong Young Couples**

**Pik Yi, Vicki Cheung, Chuk Ling, Julian Lai**

*University of Glasgow*

Western studies have suggested that couple similarity exists, in which higher similarity between partners contributes to a steadier and longer-lasting partnership than those who are not congruent (George et al., 2015; Rammstedt et al., 2013; Rammstedt & Schupp, 2008). This study aims to fill the knowledge of couples in Hong Kong. Although a recent study with young dating couples in Hong Kong has shown that personality predicted relationship satisfaction, the findings were generated using response surface analysis (e.g., Ye et al., 2023), which may not be similar to findings derived from a different method. This study aimed to explore the similarities between young dating couples by examining profile similarity, to further assess the generalizability of couple similarity findings across age groups. This study assesses couples' similarity and the correlation between couple similarity and relationship satisfaction via self-rating surveys by targeted Hong Kong local young heterosexual dating couples aged 18 to 30 years old. Participants were asked to respond to scales that can assess their personal values, political attitudes, habitual activities, and relationship satisfaction. Two main research questions of the study are: (1) Do young dating couples resemble their partner? (2) Does higher similarity between couples benefit their relationship satisfaction? The study anticipates observing that young Hong Kong dating couples will show similarity across multiple domains and higher similarity predicts higher relationship satisfaction within this age group. These findings were expected to demonstrate couple dynamics among young couples and inform counseling practices that foster harmonious relationships.

## **The Moderating Role of Emotion Regulation in the Relationship Between Childhood Trauma and Empathy among University Students in Hong Kong**

**Ching Hei Kwok**

*City University of Hong Kong*

Childhood trauma, encompassing various forms of abuse and neglect, significantly impacts psychological development, particularly empathy. Empathy is a multidimensional construct comprising cognitive empathy—the ability to understand another’s mental state—and emotional empathy—the capacity to share and resonate with another’s emotional experience. Despite its importance, empirical findings regarding the relationship between trauma and empathy remain inconsistent, with studies reporting both empathic deficits and post-traumatic growth. This study aims to clarify these discrepancies by investigating the moderating role of emotion regulation (ER) strategies. ER is the process involving conscious and automatic management of emotional responses to meet environmental demands. It is hypothesized that the way individuals process traumatic experiences through adaptive or maladaptive ER determines whether their empathic capacities are enhanced or impaired.

Utilizing a cross-sectional design, data will be collected from 120 university students in Hong Kong using the Childhood Trauma Questionnaire-Short Form (CTQ-SF), the Basic Empathy Scale (BES), and a battery of ER instruments. Moderation analyses will examine how adaptive strategies (e.g., reappraisal, acceptance, problem-solving) and maladaptive strategies (e.g., suppression, avoidance) influence the link between trauma and the two dimensions of empathy. It is anticipated that adaptive ER will strengthen the relationship between trauma and empathy, whereas maladaptive ER will weaken it. This research is significant as it identifies a specific mechanism—emotion regulation that explains empathic outcomes following trauma. Furthermore, by incorporating a comprehensive range of ER strategies, the findings provide deeper insights for clinical interventions aimed at fostering social functioning and emotional resilience in trauma survivors.

## **The Paradox of Optimization**

**Hoi Him Lee**

*University of Sheffield*

Many AI-based algorithms employed in finance, technology and other highly technical sectors function by maximizing 'objective functions'- mathematical constructs to

achieve complex goals: ranging from social media recommendations (Youtube, Tiktok, etc) to complex trading bots aimed at maximizing profit. However, there have been prevalent and recurring phenomena that suggest these algorithms can satisfy their specified objectives while violating the designers' intent: For instance, the 2010 Flash Crash saw algorithmic trading bots wipe out nearly \$1 trillion in equity and execute trades at absurd valuations, causing a devastating market crash. My research does not consider these 'failures' as technical errors, but manifestations of a greater philosophical implication.

Ludwig Wittgenstein's Rule-Following Paradox argues that no formal rule can strictly contain the instructions for its own application: in other words, rules that implies unspoken rules under human interpretations are absolute commands to AI. This leads into Goodhart's law, which dictates that when a metric becomes a target, people manipulate loopholes to achieve it ignoring all external factors- and AI is no better, while doing a much better job than humans at this.

By conducting comparative analysis of cases of short-term, efficiency optimized functions against metrics involving long term stability, I aim to show that mathematical specifications are strictly finite while real-world context are infinite, thus anticipating the inevitability of algorithms acting blindly in broader contexts. I hope to challenge the current industries' reliance on 'provable safety' and tendencies of aggressive optimization, implying the necessity for humans to remain in decision making and moderating.

## **Volatility Risk Premium of the Options Market: From Behavioural Mispricing to an Algorithmic Edge Exploiting Intraday Volatility Asymmetries**

**Aryan Khaunte**

*University of Glasgow*

Options markets are theoretically efficient since Black and Scholes (1973) established the foundational no-arbitrage framework – yet behavioural finance consistently

documents systematic volatility overpricing driven by investor psychology. Fat-tailed distributions, the volatility smile, and transaction costs contradict Black-Scholes' core assumptions. Merton's jump-diffusion extension acknowledges discontinuous price movements, while Heston (1993) captures the dynamic, stochastic nature of implied volatility that Black-Scholes cannot. This dissertation investigates whether the persistent wedge between implied and realised volatility – the Volatility Risk Premium (VRP) represents a structural, exploitable inefficiency.

Traditional literature overlooks rapid premium convergence during intraday volatility spikes. Behavioural finance, particularly Kahneman and Tversky's "Prospect Theory" and Shleifer and Vishny's "Limits-to-Arbitrage" attributes this persistence to fear-driven demand and capital constraints that prevent rational correction. The strategy exploits the empirical outcome: near-delta-neutral short strangles entered at premium convergence – when put-call parity and market microstructure confirm symmetrically overpriced legs. Filters incorporating timing logic, conditional volatility (IV, RV, GARCH), and Greek constraints ensure entry only when premium richness is economically meaningful, maximising Vega and Theta whilst maintaining near-zero directional exposure.

Utilising a granular 1-minute intraday algorithmic back-testing engine, the research analyses over 17,000 trades across NIFTY, BANKNIFTY, and FINNIFTY (2020–2025). Results demonstrate robust risk-adjusted returns across the primary indices, with statistically significant win-rates, profit factors, and risk-adjusted ratios confirmed at  $p < 0.001$ . OLS regressions confirm IV percentile and VRP proxy as statistically significant return predictors. Robustness is validated through combinatorially symmetric cross-validation, walk-forward analysis, and false discovery rate correction – providing strong evidence the edge is structural rather than overfitting.

## **Whistle Repertoires of False Killer Whales (*Pseudorca Crassidens*): A Population Comparison**

**Helen Black, Kirsty Clay, Maya Couey, Elle Debiegne, Kai Kerlaff, Emily Pondaven, Rosie Wharton, Louisa Willan, Yvonne Barkley, Jennifer**

## **McCullough, Emily McCloskey, Hannah Worthington, Olexandr Konovalov, Vincent Janik, Julie Oswald**

*University of St Andrews*

A key factor when assessing animal communication complexity is the number of different signal types present in a repertoire. A common hypothesis is that species that are more social and are cognitively advanced have larger repertoires of signals than less social and less cognitive ones. Following this argument, great apes, parrots and dolphins are expected to have large signal repertoires. Yet, few studies report repertoire sizes in these taxa and there is a lack of recognized methods for comparative studies in this field.

We investigated the number of whistle types used by three populations of false killer whales, a large dolphin species that lives in tropical waters. We compared two inshore, island populations and one offshore population around the Hawaiian Islands using existing and novel machine learning techniques to explore their whistle repertoires. We used ARTwarp, an established neural network whistle classifier, and also explored self-organising maps as another machine learning approach for whistle categorization.

A total of 3,684 whistles from 4-11 encounters with each population were analysed. Whistle repertoires of the two nearshore populations consisted of 49 and 77 whistle types respectively, while the offshore animals scored in between at 60 whistle types. This is a considerably smaller repertoire size than found for bottlenose dolphins but is similar to that of other oceanic dolphin species as well as chimpanzee gestural signals. Our analysis shows that repertoire sizes can be compared across species if analysis methods are standardized and that repertoire size can vary considerably even within highly social species.

## **Income Tax Progressivity: A Comparative Mirrleesian analysis of Income Tax Systems in Australia, Denmark, and the UK**

**Euan Davies**

*University of Glasgow*

Income Taxation is a substantial source of government revenue for most nations, with decisions surrounding income tax policy tending to be highly-politicised. This research seeks to explore how the income tax burden should be distributed under an optimal system, by evaluating the optimality and progressivity of income tax systems in three nations: Australia, Denmark, and the UK. This has been done by applying the theoretical results of the Mirrlees model of Income Taxation to OECD data on Labour Taxation from 2024, and undertaking a comparative analysis of Net Personal Marginal and Net Personal Average Tax rates for couples with two children in each country, alongside constructing their respective Tax functions using indexed income data in the form of Real GDP per Capita as a proxy for Average Wages.

The results from this analysis highlight diverging governmental priorities and social preferences - with Denmark displaying a strong appetite for redistributive policies by choosing to implement non-optimal Marginal Tax Progressivity in its tax function. Meanwhile, Australia's tax function contains discontinuities and has an indefinite form, contravening the theoretical results from the Mirrlees Model and creating labour disincentives within its tax system. Finally, my results highlight that the income tax systems in these nations are not optimal under the Mirrlees model, nevertheless, elements of optimality persist to varying extents in all.

## **Impacts of Acoustic Startle Sounds on Killer Whale Vocalisations in Norwegian Herring Fisheries**

**Jeen Riemer De Vries, Thomas Goetz, Deanna Marie Leonard, Emma Vogel, Audun Rikardsen, Martin Biuw, Julie N Oswald, Vincent M Janik**

*University of St Andrews*

In the Norwegian spring-spawning herring fishery, killer whales frequently approach purse-seine fishing vessels – specialised industrial ships that encircle schools of fish with large nets that are subsequently drawn closed, aggregating the catch – to feed on herring, increasing the risk of whale bycatch and herring depredation. The Targeted Acoustic Startle Technology (TAST), a non-lethal mitigation tool designed to elicit a startle reflex and promote short-term avoidance in whales, has been used successfully

to deter whales from fishing operations in Norway. However, it is unclear how the use of this tool may affect the whale behaviour on a social level.

This study investigates how killer whale vocalisations are influenced by exposure to brief, broadband, non-communicative TAST stimuli. Analysis of nine 10-minute TAST exposure trials collected using broadband hydrophones in November 2024 during fishing operations in the Kvænangen fjord will identify changes in killer whale call and whistle type production. Vocalisations will be extracted from recordings made during exposure trials and manually traced and categorized into types using established bioacoustics software to examine whether the use of specific calls and whistles changes after exposure.

By examining changes in vocalisation types and occurrence in relation to TAST exposure, this research aims to assess whether acoustic startle stimuli are associated with altered social communication. Expected outcomes include shifts in vocalisation type use and their acoustic parameters following exposure. Understanding the effects of TAST on killer whale vocal behaviour is critical for evaluating how whales respond to the introduction of this technology.

## **Why One Size Doesn't Fit All: Creative Systems Thinking on Stress and Wellbeing in the Era of Gene Editing**

**Ribana Cristescu, Kalpana Surendranath**

*University of Westminster*

Human wellbeing emerges from dynamic interactions across the gut–immune–endocrine–brain axis, yet these systems are often examined in isolation. By moving beyond single triggers toward a cumulative, context-dependent model of regulation, science can gain a deeper understanding of the mechanisms underlying physiological dysregulation.

This project adopts an integrative systems-level approach, synthesising evidence from epigenetics, microbiome science, and neuroplasticity. To examine regulatory mechanisms experimentally, the presentation outlines a proposed CRISPR–dCas9

(CRISPRi/a) framework for tunable modulation of gene expression in human-relevant neuronal models (e.g., iPSC-derived neurons). Using exemplar stress- and neuroregulatory genes such as SLC6A4 (serotonin transporter) and NR3C1 (glucocorticoid receptor), the approach demonstrates how reversible transcriptional up- or down-regulation can be used to investigate stress-sensitive pathways without permanent genomic alteration. Anticipated outcomes include measurable shifts in downstream inflammatory and plasticity-related signalling, highlighting how small regulatory changes can scale into broader system effects.

To bridge the gap between complex molecular biology and public understanding, the presentation also employs a structured science-storytelling framework, conceptualising biological identity as a "garment." While the fabric (genetics) is inherited, the fit and durability (wellbeing) are shaped by how environmental stressors alter the weave over time.

The central aim is to underscore that dysregulation rarely arises from a single "thread," but from systemic shifts across interconnected biological networks. Framing health as a dynamic and personalised process, this work invites audiences to view human flourishing as a continuous personalised dialogue between biology and biography.

## **The Mediating Roles of Self-Compassion and Psychological Flexibility in Linking Dispositional Mindfulness, Balanced Time Perspective, and Impulsivity: A Mixed-Methods Study**

**Wing Hei Alison Pak**

*City University of Hong Kong*

Dispositional mindfulness (DM) and balanced time perspective (BTP) are established buffers against impulsivity, yet their underlying mechanisms remain unclear, particularly in high-pressure contexts like Hong Kong which further amplify youths' neurodevelopmental vulnerability. This study posits an integrated model hypothesizing that self-compassion (SC) and psychological flexibility (PF) serve as independent parallel mediators, explaining how DM and BTP reduce impulsivity.

The research employs a mixed-method design comprising two concurrent studies. Study 1 is a correlational, cross-sectional survey. An independent sample of Hong Kong youths aged 18-24 (target  $N \geq 85$ ) will complete an online survey measuring the core dispositional constructs including six validated scales: MAAS, ZTPI, SCS, AAQ-II, BIS-11, and the Money Choice Questionnaire. Study 2 is an experimental study, where a separate sample (target  $N \geq 50$ ) from the same population will be recruited and randomly assigned to one of two conditions: an experimental group receiving the "Mindfulness-Incorporated Balanced Time Perspective" (MI-BTP) manipulation or a neutral control group. Following the manipulation, all participants will complete an online survey assessing state-level SC, PF, and impulsivity to test for immediate causal effects.

Integrated findings are anticipated to support the model, demonstrating that DM and BTP reduce impulsivity both directly and indirectly via enhanced SC and PF. The experimental manipulation aims to provide causal evidence that enhancing these states could lower state impulsivity. These insights offer a critical framework for designing targeted clinical interventions to enhance well-being and reduce maladaptive impulsivity in at-risk youths.

## **Uncovering Past Colonization Events of the Invasive Noble False Widow Spider into Ireland**

**Isobel Oliver**

*Newcastle University*

The Noble False Widow spider (*Steatoda nobilis*) is one of the most globally invasive species of spider. The first record of *Steatoda nobilis* in Ireland came in 1999 and it has since become the most common spider found in urban areas across Ireland. Despite this high abundance, the invasion history of *Steatoda nobilis* into Ireland has only been inferred from observational studies and remains unresolved. This study presents the first population-genetics investigation of *Steatoda nobilis*' invasions into Ireland.

DNA barcoding is used to determine how many times *Steatoda nobilis* has entered and established successful populations in Ireland. In this study, DNA barcoding data is

collected by sequencing the DNA extracted from *Steatoda nobilis* individuals taken from geographically distinct locations across Ireland, this is analysed along with all available relevant DNA barcoding data to identify genetically distinct populations, locate the geographic origins of populations and reconstruct genetic lineages.

The results of this study are expected to show some genetic differences between populations within Ireland, with higher divergences between populations which are the most geographically distant. Most populations are expected to be genetically similar to large populations in Europe.

Tracking the history of *Steatoda nobilis*' invasions into Ireland provides important insights into its evolution, the genetic diversity of *Steatoda nobilis* in Ireland and the genetic connectivity between Ireland's populations. Understanding the route of colonization pathways can help to inform management strategies and model future colonization events.

## **Why Quantitative Models Fail to Predict an Irish Border Poll: The Rise of Interest-Driven Politics in Northern Ireland**

**Oliver Pearce**

*University of Warwick*

As per the Good Friday Agreement (1998), a referendum on the political status of Northern Ireland may be called by the Secretary of State when he or she believes a majority would vote in favour of Irish unity. I will explore the futility of mathematics in predicting such a time to show that qualitative reasoning is equally as relevant as quantitative evidence in political forecasting. In particular, my ambition is to identify interest-driven politics as the determining factor in an Irish border poll.

By constructing mathematical models built upon historical data concerning nationalist and unionist communities, we can attempt to model the cultural breakdown across NI and so infer voter beliefs. Testing these models against the contemporary political climate, however, shows that they fail to capture the current landscape.

I argue that this failure reflects the growing importance of interest-driven politics: political opinions shaped by the perceived immediate material or economic benefit of a given constitutional outcome, rather than by enduring cultural affiliation. Because such motivations are contingent on changing economic and political circumstances, they are resistant to quantitative modelling based on fixed historical patterns.

This investigation demonstrates the limits of relying solely on mathematical models to predict when an Irish border poll might occur. When voter behaviour is increasingly shaped by short-term interests, such models lose much of their predictive value. UK and Irish governments therefore cannot wait for definitive evidence before considering what Irish unification might look like, but should begin conversations immediately to avoid being caught unprepared.

## **“A Brighter Day”: Commodity Frontiers, Iñupiaq Resilience and Imperial Expansion in Alaska’s shore-based whaling stations, c.1884-1910**

**Felix McIntyre**

*University of Glasgow*

This project examines the emergence of shore-based whaling stations on Alaska’s North Slope with regard to their role as commodity frontiers within the wider process of imperial consolidation in Alaska, in contrast with previous studies that have viewed these communities as isolated anomalies in the historiography of the imperial frontier trading post. Inspired by small-scale Iñupiaq hunting methods, these outposts allowed teams of commercial whalers to bolster their take as the success of pelagic steamboats waned in the 19th century. By employing Iñupiaq men from local villages, outposts became centres for trade and cultural exchange. I argue the imposed processes of American capitalism upon local subsistence economies already suffering from food shortage in the era of commercial whaling constituted a ‘commodity frontier’ - a site at which resources, labour and knowledge are swallowed into the global capitalist economy. Bowhead whales were transformed from social contemporaries to commodities; Iñupiaq whale hunting was restructured to ensure each man competed

against the next; communal resources were assigned values so as to facilitate exchange with American goods. Throughout the rest of Alaska, the processes of imperial expansion familiar in the contiguous United States were underway. Whaling stations in the far reaches were the prospective cornerstones of a ‘civilised’ Alaska. I recontextualise these commodity frontiers within the scope of American imperialism in the Alaskan territory, discussing the ways in which capitalism affected Iñupiaq life, and the way those communities adapted to it, benefited from it, and maintained important cultural practices despite imperial efforts at assimilation.

## **Maladaptive Metacognitive Beliefs and Rumination in Emotionally Sensitive Student**

**Yiu Wa Kwan**

*The City University of Hong Kong*

Rumination refers to self focused negative thinking about one’s feelings, concerns, or experiences is well established as a contributor to the onset and maintenance of depression and anxiety. According to the Self Regulatory Executive Function (S-REF) model, maladaptive metacognitive beliefs may act as cognitive vulnerability factors that predispose individuals to habitual rumination. Sensory processing sensitivity (SPS), a personality trait involving heightened emotional reactivity and deep processing of stimuli, may further moderate this link in emotionally sensitive students. The present study examines how maladaptive metacognitive beliefs contribute to rumination and whether SPS influences this relationship.

This cross sectional correlational study will recruit undergraduate and postgraduate students aged 18–25 through campus bulletins. Participants will complete the following questionnaires: the Highly Sensitive Person Scale (HSPS) to measure SPS, the Metacognitions Questionnaire 30 (MCQ 30) to assess metacognitive beliefs, and the Ruminative Responses Scale (RRS) to measure rumination. Additional measures will include the Big Five Inventory–2 Short Form (BFI 2 S; neuroticism), the Patient Health Questionnaire 9 (PHQ 9; depression), and the Generalized Anxiety Disorder 7 (GAD 7; anxiety), along with age and gender as covariates. Data will be analysed

using SPSS, including descriptive statistics, reliability checks, correlation analyses, and moderation tests controlling for neuroticism, depression, and anxiety.

By integrating cognitive (metacognitive beliefs) and dispositional (SPS) factors, this study aims to explain why some emotionally sensitive students are more prone to repetitive negative thinking. The findings may inform screening practices and interventions that reduce maladaptive beliefs while promoting more adaptive emotional reflection.

## **Exploring Technology Use During Physical Activity in Adolescents with T1D: A Qualitative Study of Perceived Challenges, Benefits and Considerations**

**Tallulah Ngamy, Jane Smith, Jenny Lloyd, Ross Clarke, Parth Narendran, Gina Gardener, Renuka P Dias, Robert C Andrews, Haniyah Rajani, Emma J Cockcroft**

*University of Exeter*

The incidence of Type 1 Diabetes (T1D) in the youth is increasing in the UK. Previous research highlights the physical, psychological and financial burden of this diagnosis on the individuals, their families and healthcare teams (HCPs). Research shows a decrease in participation in physical activity (PA) for young people with T1D compared to their peers. Technology such as continuous glucose monitoring (CGM) and automated insulin delivery (AID) systems have become the standard of management. This qualitative study aims to understand, in the context of PA, the impact of technology for adolescents with T1D, their parents and HCPs in the management of T1D.

Participants were recruited through paediatric diabetes networks. Following informed consent, online semi-structured interviews were recorded and transcribed. The results were analysed thematically using NVivo.

Diabetes technology offers clear benefits in the context of PA, including reduced cognitive load and increased independence, but several challenges remain. Financial

barriers, concerns about appearance, injury risk, and unreliable exercise modes may limit effective use. During physical activity, issues such as device removal, required proximity to a mobile phone and the addition of wearables were highlighted as important considerations.

While diabetes technologies reduce cognitive burden and offer reassurance, challenges related to their use during physical activity, physical and psychosocial drawbacks, and inequitable access highlight the need for improved guidance, design, and accessibility.

## **Light vs Dark Romance: Intimacy, Power and Sexuality**

**Weronika Joanna Zakrzewska**

*Newcastle University*

Contemporary romance fiction has become an important cultural space where ideas about intimacy, gender, power and consent are explored and debated, especially within male and female heterosexual relationships. This paper examines how “light” and “dark” romance novels represent relationships and desire, challenging the common assumption that light romance depicts healthy intimacy while dark romance represents harmful or unethical relationships. Through a comparative analysis of *Toxic* by Nicole Blanchard and *Icebreaker* by Hannah Grace, it explores how both texts present complex and ambivalent portrayals of power and intimacy.

Using a feminist methodology, the paper analyses female narration, depictions of consent, and the ways emotional and sexual power are structured within romantic relationships. It also considers reader responses from digital reading communities such as BookTok and Goodreads, where the labels “light” and “dark” romance are widely used to guide expectations around comfort, safety and content, which are very critical to today’s youth.

The analysis shows that both novels include unequal power dynamics, but differ in how these dynamics are framed. *Toxic* makes imbalance and discomfort visible, encouraging readers to confront ethical uncertainty, while *Icebreaker* embeds similar asymmetries within narratives of emotional safety and care. In both cases, intimacy is

carefully shaped by narrative design rather than occurring naturally or equally. But also allowing similarities between both texts.

This research highlights how light and dark romance function less as moral opposites and more as narrative strategies for representing desire, consent and female self-discovery in contemporary romance fiction, where two subgenres can work together.

## **Banana Leaf Disease Detection and Classification Using Convolutional Neural Networks**

**Manoj Suresh, Virendra Kumar Shrivastava, Abdel-Hamid Soliman**

*Newcastle University*

One of the most extensively farmed tropical fruits is the banana. It produces 16% of global fruit, second only to citrus. Leaves diseases affect banana crop production which results in poor economic condition of banana farmers. This research focuses on the detection and classification of banana plant diseases using deep learning and transfer learning models. The primary objective is to develop a reliable tool for farmers which enables early and accurate banana plant disease detection to protect crop loss and reduce financial losses. Researchers employed multiple convolutional neural network models, such as VGG19, LeNet, ResNet101V2, MobileNetV2, and InceptionV3, to classify six different banana plant diseases, namely Insect Pests, Cordana, Pestalotiopsis, Sigatoka, Bract Mosaic, and Moko. VGG19, model has delineated the best performance, achieving an accuracy of 97%. This study highlights the potential of transfer learning models used in plant disease detection tasks and provides a scalable solution for managing crop health. By enabling accurate, automated disease diagnosis, this research offers a practical decision-support tool that can be integrated into mobile or field-based systems, empowering farmers with timely interventions, improving yield quality, and strengthening agricultural sustainability in banana-producing regions.

## **SkyRide: An AI-Driven Urban Air Traffic Management System for Single-Passenger Aerial Mobility**

## **Amir Hossein Javadi Baygi**

*University of Warwick*

Urban congestion remains a critical challenge in modern cities, while existing urban air mobility solutions often rely on complex, high-altitude airspace integration. This research proposes SkyRide, a conceptual AI-driven urban air traffic management system designed for low-altitude, single-passenger aerial vehicles operating along ground-based road networks.

The core idea of SkyRide is to map existing urban road layouts into structured aerial corridors located slightly above surface-level obstacles, such as pedestrian bridges. Instead of free-form air navigation, vehicles follow predefined aerial routes analogous to road lanes, enabling the application of traffic rules similar to those used in ground transportation. The system employs autonomous vertical take-off and landing (VTOL) vehicles operating between rooftop-based stations distributed across the city at metro-like intervals.

The methodological approach focuses on decentralized decision-making using artificial intelligence, where vehicles communicate locally at aerial intersections to manage right-of-way, reduce conflicts, and maintain safe separation. This removes the need for continuous centralized control while allowing scalable and resilient traffic flow. The research outlines a theoretical framework for intersection coordination, routing logic, and congestion mitigation, supported by conceptual simulations of vehicle interactions.

The anticipated outcome is a traffic management model that improves safety, scalability, and efficiency in dense urban environments. SkyRide demonstrates how integrating AI, traffic systems, and urban infrastructure can enable a practical and structured approach to urban air mobility. The findings contribute to ongoing discussions on sustainable transportation and provide a foundation for future simulation-based or real-world implementations.

## **Immunoepitidomic Profiling of HLA-DRB1 Alleles in Inflammatory Bowel Disease**

## Daisy Barrow

*University of Dundee*

Inflammatory bowel disease is a chronic-immune mediated disorder characterised by loss of tolerance to commensal microbes and self. Genome wide association studies consistently identify the HLA class II locus as a major determinant of disease risk, with HLA-DRB1\*01:03 being established as a risk allele for ulcerative colitis. The mechanisms by which this allele contributes to disease susceptibility remains unclear. This project aimed to directly compare the immunopeptidomes of DRB1\*01:03 and the closely related, non-risk allele, DRB1\*01:01 to determine how allele-specific peptide presentation may contribute to IBD pathogenesis.

HLA class II bound peptides were isolated from B cell lines using immunoaffinity purification and analysed by LC-MS/MS. Peptides were analysed for length distribution, peptide repertoire, source protein origin, gene ontology enrichment, and binding predictions.

DRB1\*01:03 expression cells presented a broader, more diverse peptide repertoire. Functional annotation of source proteins revealed enrichment of proteins associated with immune activation and inflammatory responses in DRB\*01:03. In contrast, DRB1\*01:01 presented enrichment of peptides that are associated with pathways related to metabolic regulation and cellular homeostasis. Motif and positional amino acid enrichment analyses demonstrated allele-specific binding preferences, with DRB1\*01:03 favouring positively charged residues within the predicted binding core, suggesting differences in peptide selection.

Characterisation of the HLA class II immunopeptidomes of DRB1\*01:03 and DRB1\*01:01 demonstrates that allelic polymorphisms can create shifts in antigen selection and peptide presentation. These differences in antigen presentation may contribute to immune dysregulation and intestinal inflammation associated with IBD and guide future investigations into how HLA polymorphisms shape disease susceptibility in IBD.

# **Interactive Online Naloxone Training: Exploring Attitudes Towards Opioids and Substance Use**

**Luke Azaredo, Richard De Visser, Raquel Nogueira-Arjona, Pablo Romero-Sanchiz, Jacqueline Carhoun**

*University of Sussex*

There is a global rise, including the UK, in opioid misuse and drug-related deaths. Naloxone can reverse some effects of an opioid overdose, has saved lives, and is freely accessible in the UK. Online training programs have proven effective in teaching people about Naloxone, improving their knowledge, attitudes and stigma towards the crisis.

Despite this, two big gaps exist. Firstly, at-risk groups are often overlooked, including general UK university students/staff. Secondly, most online Naloxone training uses standard videos, which limit engagement and hands-on practice.

This study addresses both gaps through an innovative online intervention. The aim is to understand the impact of this training on people's knowledge, attitudes, and stigma toward opioid use/overdose response. I developed a training video tailored for university students/staff, and a gamified assessment tool, the "Interactive Naloxone Knowledge Assessment Tool" (INKAT). Using INKAT, participants can practice in a simulated opioid overdose scenario to build confidence using Naloxone.

I conducted an RCT pilot study, in university students/staff. All participants completed opioid knowledge, attitude, and stigma measures (OOKS, OOAS, OSM) before and after their control or intervention (Naloxone training) condition.

Results show that the intervention group presented greater improvement in knowledge and attitudes than the control group, supporting the effectiveness of this novel harm-reduction approach, highlighting its potential for a scalable, accessible, engaging form of training. This project has garnered significant support already, including Change Grow Live, which awarded certificates to my participants, and received the People's Choice Award at the JRA poster session.

# State Capture and Convergence: Decomposing the Effects of Institutional Quality on Economic Growth in EU Transition Economies

**Rares-Constantin Dascalu**

*University of Leeds*

The deceleration of economic convergence amongst Central and Eastern European EU (CEE-EU) states with their Western counterparts raises questions surrounding their constraints to economic growth. Some propose delays in their institutional development are a primary cause of decelerating convergence (Wieser et al., 2024), likely influenced by the vast literature emphasising the explanatory validity of variations in institutional quality towards variations in growth (e.g. Acemoglu et al., 2001, 2002; Sokoloff and Engerman, 2000; Rodrik et al., 2004). Furthermore, lagging institutional development across the majority of CEE-EU nations is often attributed to their unique status as ‘transition’ economies. Specifically, their transition from centrally-planned socialist economies to market-based economies is believed to have established a systemic form of corruption known as ‘state capture’, where powerful firms and individuals have continued to influence government policies and laws to serve their own private interest (Hellman et al., 2003). Using a statistical approach isolating the effect of governing institutions on economic growth through controlling for unique variations across different regions and time periods, this paper examines the institutional constraints to growth within transition economies in the EU. It utilises a standardised, survey-based measure of institutional quality (the European Quality of Government Index), and decomposes it into its three sub-indices (quality of public services, impartiality, and corruption) to identify which institutional channels act as the greatest constraint to growth in these economies. Preliminary results suggest that measures of institutional quality, especially impartiality and corruption, inhibit economic growth in transition EU economies more than in their non-transition counterparts.

# From Python to FPGA: Bridging the gap in FPGA-Accelerated High-Frequency Trading

**Daniyal Naqvi**

*University of Liverpool*

High-frequency trading firms demand microsecond-level execution speeds that challenge traditional computing, yet the pathway from machine learning algorithms to optimised hardware remains poorly documented for undergraduate researchers. This project addresses this gap by demonstrating the complete cycle of translating Python-based trading algorithms into FPGA (Field-Programmable Gate Array, a reconfigurable chip that can be custom-configured for a specific task) hardware.

Working with five years of Bitcoin tick-by-tick market data, I developed and compared two machine learning architectures: Logistic Regression and Multi-Layer Perceptron using scikit-learn. Through feature engineering of 14 financial indicators, the MLP model achieved a 58% prediction accuracy on unseen data, outperforming the 49% Logistic Regression baseline. Tested across various monthly periods, the peak difference between the two models reached 9 percentage points, though average separation was smaller, reflecting the difficulty of market prediction.

The critical challenge involved converting these software models to hardware using HLS4ML on a Xilinx Artix-7 FPGA. By quantising the model to fixed-point arithmetic, the design focuses on achieving an inference latency of under 10 $\mu$ s while maintaining prediction accuracy. Unlike CPU-based execution which suffers from operating system latency and jitter, this hardware implementation provides the consistent timing critical for financial applications.

This system integrates ML inference with finite state machine decision logic, demonstrating that sophisticated trading strategies can be deployed on affordable hardware (under £120). This research aims to validate future methodology for undergraduates to navigate the intersection of Quantitative Finance and Digital Systems, producing industry-relevant skills in real-time signal processing within a hardware domain.

# Food For Thought: Exploring the Interplay Between Dietary Patterns and Socioeconomic Factors in Alzheimer's Disease Prevention

**Grace Lothian, Dorina Cadar**

*Sussex University*

Alzheimer's disease (AD) is a neurodegenerative disorder characterised by cognitive and functional decline (Arora et al., 2023) with dietary patterns suggested to influence dementia risk (Chu et al., 2022). This study investigated two diets - the Alternate Mediterranean Diet (AMED), consisting of fruits, vegetables and grains known to reduce AD risk (Shannon et al., 2023) and the Western diet (WD), consisting of processed red meats, full-fat dairy products and confectionary suggested to increase AD risk (Sullivan, 2020). While AMED may be protective, its adoption is challenging and financially driven in Western populations, where the WD is more common (Colaprico et al., 2024). The link between dietary patterns, socioeconomic factors, and dementia risk was investigated using longitudinal data from 80,064 UK Biobank participants aged 40 - 70 years. Participants completed the Oxford WebQ dietary questionnaire to measure diet adherence. Two logistic regression models assessed associations between diet scores, dementia risk, demographic covariates and socioeconomic status. There were 268 dementia cases identified. AMED adherence was associated with reduced dementia risk (Odds Ratio = 0.90; 95% CI 0.82 - 0.99;  $p = 0.025$ ), but this association became non-significant after adjustment for income ( $p = 0.106$ ), indicating financial position mediated the effect. The WD was not protective ( $p = 0.475$ ). The estimated weekly cost of AMED (£45) exceeded that of the WD (£30), highlighting affordability barriers. These findings suggest that while Mediterranean-style diets may reduce dementia risk, benefits are influenced by socioeconomic status. Therefore, prevention strategies should address income related inequalities to ensure equitable access to nutrition.

**Ikigai Purpose Assessment for Leaders and Businesses:  
Analysis of Quantitative Data**

## **Szymon Kwidzinski**

*Imperial College London*

Ikigai, a Japanese concept meaning “a reason for being,” describes a sense of purpose that emerges where what we love, are good at, can be paid for, and what the world needs overlap. While Ikigai is often discussed as a personal experience, far less is known about how it operates within organisations. This study explores how individual and organisational purpose align, and where they diverge, across cultures, sectors, and leadership levels.

Using an international dataset of 2,195 respondents, the research applies quantitative analysis to compare individual and organisational Ikigai across four dimensions: Love, Good, World, and Market. Statistical tests examine how purpose varies by age, leadership responsibility, cultural context, and professional sector.

The findings reveal a clear and consistent gap: individuals report significantly higher levels of Ikigai than the organisations they work in. Personal purpose increases with age and leadership responsibility, suggesting that experience, autonomy, and responsibility strengthen meaning at work. Cultural differences shape individual values modestly, with some emphasis on autonomy in individualist contexts and relational integrity in collectivist ones. However, organisational purpose shows similarity across countries and industries.

Together, these results highlight a growing “meaning gap” between people and institutions. The study suggests that modern organisations increasingly define purpose through measurable performance, while individuals seek meaning through ethics, relationships, and contribution, raising important questions about the future of meaningful work.

## **Dragons Gene Editors of the Future: A Vertically Integrated Model for Inclusive Cutting-Edge Science Education**

**Nadheerah Begum, Ann Mariya Job, Sofia Alibhai Dhanani, Gulzhan Kerimbekova, Khalid Akram, John Murphy, Kalpana Surendranath**

Educational research consistently shows that early, scaffolded research engagement enhances student confidence, sense of belonging, retention, and progression into research careers, especially for students who might otherwise self-exclude. However, access to authentic research experiences in higher education remains uneven, with students from underrepresented backgrounds facing persistent structural barriers, particularly in infrastructure-intensive fields.

This paper presents Dragons Gene Editors of the Future, a vertically integrated, research-rich educational model that uses CRISPR genome editing as a focal application while operationalising evidence-based approaches such as undergraduate research-based learning, near-peer mentoring, and networked communities of shared interest. Over five iterations, the annual programme has integrated co-curricular, and extracurricular pathways through PhD- and faculty-led research activity, laboratory taster sessions, team-based challenges, public engagement, and interdisciplinary forums, mirroring findings from inclusive pedagogy and team-science literature.

Programme evaluation employs a mixed-methods approach, drawing on quantitative participation and demographic data, pre- and post-engagement surveys, and longitudinal tracking of student involvement, alongside qualitative analysis of reflective narratives, feedback forms, and student-led outputs. These data are used to examine changes in research confidence, skills enhancement, scientific identity, sense of belonging, and intentions to pursue advanced study or research-adjacent careers. Strikingly, evidence indicates increasing engagement with 366 registrations as of November 2025 and strong representation of women at 83%.

The initiative operates as a high-impact, low-cost model, evolving from a small £300 pilot into a nationally recognised programme. Beyond CRISPR, our work demonstrates how empirically grounded, authentic and inclusive research models can embed emerging, cutting-edge science within higher-education ecosystems at scale.

## **Zines as Praxis: Participatory Arts-Based Politics in Contemporary Scottish Zinemaking Communities**

## Alexandra Ramsay

*University of Glasgow*

Zines are small, self-published paper publications with long histories as outsider, do-it-yourself practices rooted in feminist, underground, and marginalised communities. Traditionally produced outside formal institutions, zines are valued for their autonomy, ephemerality, and resistance to mainstream hegemony. Recently, however, zinemaking has been adopted within universities as a participatory, arts-based research method. This shift raises important questions about how historically outsider practices are translated, valued, and reshaped within academic contexts.

This research asks how the process of participatory zinemaking supports the articulation of political identities and experiences within contemporary zine communities. It uses a qualitative, interpretivist study of a zinemaking workshop in central Scotland, utilising participant observation, with thematic and visual-material analysis of zines and processes observed.

The research finds participatory zinemaking enables political identities and experiences to emerge in material-affective ways that often go unrecognised until confronted. Participants frequently did not initially identify as political actors, yet through making together, articulated deeply personal-political experiences connected to marginalisation, feminism, institutional tensions, and structural critique. Zinemaking's autonomous and ephemeral nature was central to this process, enabling non-linear and beyond-textual forms of meaning-making. The research notably highlighted tensions surrounding the academic use of zines, with participants expressing both appreciation for progressive methodologies and discomfort with co-option and loss of autonomy.

Overall, this research highlights the potential and the limits of participatory zinemaking as a creative research method. By centring zinemakers' perspectives, it contributes to interdisciplinary debates on creative methodologies, participation, and the ethical challenges of institutionalising practices rooted in community-based and oppositional histories.

# **Can the Neutrophil to Lymphocyte Ratio (NLR) Predict Sepsis in Infants and Children? - A Meta-Analysis and Systematic Review**

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*University of Lancashire*

Newborns are extremely vulnerable to infection, including developing neonatal sepsis, an uncontrolled infection. It remains a major cause of morbidity and mortality worldwide, yet early diagnosis is difficult due to vague symptoms and delays in standard testing procedures. In sepsis, the immune system alters white blood cell levels, therefore, one proposed solution is to assess the ratio of different white blood cells, eg. neutrophil-to-lymphocyte ratio (NLR). Systematic reviews previously relied on reported NLR values rather than calculations from raw blood count data. This study aimed to systematically review and meta-analyse whether NLR, calculated directly from immune markers rather than reported values, is associated with sepsis. This enables standardised and transparent comparison across studies. This review was conducted in accordance with PRISMA 2020 guidelines. Embase, Ovid and the Cochrane Library were searched up to March 2024 for studies reporting neutrophil and lymphocyte data in neonates with/without sepsis. NLR was calculated and studies were categorized. The overall quality and reliability of the evidence were assessed. Seventeen studies met inclusion criteria, of which six were suitable for meta-analysis. Analysis showed no statistically significant difference in NLR between septic and non-septic neonates (mean difference  $-0.26$ , 95% CI  $-1.00$  to  $0.49$ ); however, substantial heterogeneity was present ( $I^2 = 95.9\%$ ) and overall certainty of evidence was low. Although NLR may reflect sepsis-related inflammation, inconsistent methods and definitions currently limit its clinical application.

## **Prompting Prevention: Using Low-Cost Visual Cues to Improve Smoking Cessation Support in Primary Care**

**Saud Hassan**

*University of Lancashire*

Smoking is a major cause of preventable illness and death, yet support to help people quit is frequently missed during routine healthcare encounters. This quality improvement project examined how small, low-cost changes to everyday working environments can influence professional behaviour and improve preventive care delivery. The aim was to increase the proportion of patients aged 15 years and over who were offered smoking cessation support (SCS) in two underperforming general practices within Preston North Primary Care Network.

Public health data revealed variation between practices, prompting investigation into why opportunities to offer support were missed. Using established improvement frameworks, contributory factors were identified, including reliance on memory during busy consultations and the absence of visible prompts. These findings reflect challenges across complex systems where attention and competing priorities shape outcomes.

Clinician-facing posters placed in consultation rooms were chosen as the intervention to act as visual cues reminding healthcare professionals to offer SCS. This approach was chosen for its minimal financial cost, ease of implementation and grounding in behavioural science evidence demonstrating the effectiveness of environmental prompts. Outcome, process and balancing measures were defined to assess changes in offer rates, intervention uptake and potential effects on consultation time.

Although final results were not available at submission, evidence suggests visual prompts can increase preventive conversations and referrals. This project highlights how modest system-level design changes can support behaviour change and improve public health outcomes. The findings are relevant for any discipline concerned with behaviour, system design and low-resource interventions to improve real-world practice.

## **Designing Embodied Immersive Narratives in Virtual Reality Filmmaking**

**Judy Hu**

*University of Leeds*

Virtual Reality (VR) filmmaking has emerged as an experimental yet increasingly influential form of cinematic practice, challenging conventional film language through immersive and interactive spatial environments. While existing research has examined VR filmmaking in terms of technical workflows, narrative experimentation, and audience experience, less attention has been paid to how filming and directing techniques operate as embodied narrative strategies. This study investigates how VR filmmaking techniques can be developed to support embodied spectatorship within immersive storytelling design.

Drawing on embodiment theory and contemporary film and media studies, this research adopts a qualitative, design-led methodology. The study combines critical literature analysis with close reading of selected VR film case studies to examine how spatial composition, camera positioning, viewer locomotion, and temporal control contribute to embodied narrative experience. These elements are analysed in relation to key experiential dimensions such as presence, agency, and bodily orientation.

The research anticipates identifying a set of spatial and cinematic design principles that distinguish embodied VR filmmaking from traditional screen-based cinema. By reframing VR filmmaking as a form of immersive storytelling design rather than a purely technical innovation, this study contributes to the development of emerging VR film theory. Its findings aim to inform filmmakers, designers, and scholars seeking to create more meaningful, affective, and embodied narrative experiences in virtual reality.

## **Improving Smoking Cessation Engagement in Primary Care Using Automated Follow-Up: A Quality Improvement Project**

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Despite national reductions in prevalence, the NHS reports smoking remains the leading cause of preventable mortality and morbidity in England. Smoking accounts for half a million hospitalisations annually, with smokers seeing their GP three times more often than non-smokers. Smoking prevalence within Preston North & East

Primary Care Network (PNE-PCN) remains higher than the national average (16.4% vs 14.5%), despite the PCN recording a higher rate of Smoking Cessation Support (SCS) offers than the national average (94% vs 93.6%). This paradoxical pattern highlights a key gap: offers are not translating into uptake, prompting further analysis to identify barriers to cessation.

This quality improvement project aims to improve engagement with SCS within PNE-PCN, by addressing patient barriers to uptake, thereby informing scalable implementation strategies in primary-care.

A fishbone analysis revealed multiple barriers including socioeconomic deprivation, limited follow-up, and system incentives that skew clinician focus towards recording offers, rather than ensuring uptake. Change ideas were prioritised using a resource-impact matrix to identify the most feasible high-impact, low-resource intervention. The selected intervention was an automated follow-up text integrated into the electronic medical record system, from the same clinician, triggered one week after documentation of SCS offer. This serves as a behavioural nudge, prompting reflection and re-engagement, while overcoming barriers to SCS uptake, such as mistrust and clinician variability.

It is anticipated that structured, low-resource follow-up will increase SCS uptake and reduce local prevalence, offering a scalable behavioural intervention aligned with NHS Long Term Plan preventative priorities in primary care.

## **Is Improving the Gut Microbial Community a Key Factor in Recovery from Severe Acute Malnutrition in Children?**

**Om Joshi**

*University of Lancashire*

Severe acute malnutrition (SAM) in children is a significant worldwide issue, especially in developing nations, where conventional nutritional interventions frequently fail to ensure lasting recovery. Children with SAM frequently exhibit stunted growth, compromised immune function, and increased susceptibility to

infections. New studies show that changes in the gut microbiota, which is the community of microorganisms in the intestines that helps with metabolism and immunity, may make recovery less likely to happen. However, there exists insufficient scientific evidence regarding the impact of clinical treatment on gut microbiota recovery in children with SAM.

This study examines alterations in the gut microbiota preceding and following standard hospital treatment for SAM, aiming to determine whether microbial recovery correlates with clinical intervention. Stool samples were obtained from children aged 1–5 years diagnosed with SAM at three hospitals in Maharashtra, India, both prior to and following a standard 15-day therapeutic treatment along with healthy control samples. DNA sequencing was used to examine the gut microbiota composition and see how the diversity of microbes changed after treatment.

Before treatment, children with SAM had severe gut dysbiosis, low microbial diversity, and a higher number of pathogenic bacteria. After treatment, the microbial diversity and bacteria that are good for gut health increased. The most significant enhancement was noted in children undergoing synbiotic-dietary therapy, as their microbial profiles closely mirrored those of healthy controls.

These results present new clinical evidence, both pre- and post-treatment, that connects the recovery of gut microbiota with the outcomes of SAM treatment.

Improving Patient Advice for Conjunctivitis in Primary Care: A Quality Improvement Project

## **Saud Hassan**

*University of Lancashire*

Conjunctivitis, commonly known as “pink eye,” is a frequent reason for people to visit their GP. Most cases are mild and resolve without medication, but patients often seek guidance on self-care and when to seek further help. Ensuring consistent, accurate guidance is important for patient well-being and to avoid unnecessary use of antibiotics.

This project evaluated how well a GP surgery provided advice to patients with conjunctivitis and identified areas for improvement. Medical records of 35 patients at Ashurst Primary Care were reviewed, focusing on documentation of self-care instructions, warning signs requiring urgent review, and follow-up guidance.

Analysis revealed that only 57% of patients received clear self-care advice, 23% were informed about concerning symptoms, and 89% were advised on follow-up. None of these reached the recommended standards, highlighting gaps in communication and documentation.

Practical measures were recommended, including the use of structured templates in electronic records and prioritising guidance that encourages self-care when appropriate. These changes aim to make advice more consistent while making best use of limited appointment time.

This project illustrates how small, focused interventions in everyday healthcare can improve patient support, reduce unnecessary treatments, and promote responsible use of medical resources.

## **Meta-analysis of the Efficacy of Motor Function Rehabilitation After Haemorrhagic Stroke in the UK and India**

**Nikhil Lal**

*University of Warwick*

Haemorrhagic stroke is strongly associated with extreme long-term motor dysfunction, effective rehabilitation is critical to partial and full recovery. While motor rehabilitation schemes are widespread, there is little consistency between and even within healthcare systems. Comparative evidence on the efficacy of these schemes is limited. This study aims to systematically compare and evaluate the effectiveness of these interventions in the NHS system of the United Kingdom, and of the private healthcare system in India.

A systematic review and meta-analysis will be conducted following PRISMA guidelines. Online publication databases including PubMed, Embase, Nature, and

Cochrane library will be searched for studies published between 2006 and 2026. Studies will be deemed eligible if they include randomised controlled trials and observational studies assessing motor rehabilitation methods and outcomes in adult haemorrhagic stroke patients. Primary outcomes include motor function measures Fugl-Meyer assessment, Barthel index, and functional independence measure. Random effects meta-analysis will be used to estimate effect sizes, will subgroup analyses being used to compare outcomes between UK and India.

The analysis will identify differences in rehabilitation efficacy, with anticipation that the efficacy of India's private healthcare rehabilitation delivers a much higher level of positive outcomes than the UK's NHS. These findings will highlight the best practices for motor function rehabilitation and hopefully serve to inform clinicians and NHS public health professionals on how their rehabilitation strategies should be optimised to deliver better healthcare. This study aims to contribute to more equitable and effective stroke rehabilitation globally.

## **Invisibility by Design: The Law as an Enabler of Global Exploitation**

**Shanessa Nevo**

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Global supply chains underpin everyday consumer goods, connecting wealthy markets to sites of production and extraction in economically vulnerable territories. While these systems are often lauded for efficiency and low consumer costs, they remain central to persistent labour exploitation. Despite the law being commonly assumed to function as a mechanism of corrective justice through corporate accountability, global harm continues to prevail.

This research project argues that harm in global supply chains often persists not despite the law, but through it, as legal frameworks governing transnational corporations prioritise economic efficiency over substantive accountability. Rather than merely failing to prevent injustice, the law is often structured to enable and normalise it.

Using a doctrinal and theoretical approach, this research examines international corporate governance and transparency initiatives through the lens of structural injustice. To demonstrate how legal structures operate in practice, the research draws on two major sites of global exploitation: mineral extraction in the Democratic Republic of Congo in response to rising demand for technological production, and garment production in Bangladesh following the expansion of fast fashion. Despite their differences, both demonstrate how law distances responsibility from corporate beneficiaries while rendering harm lawful, routine and invisible.

The primary finding is that disclosure-based regulation is undermined by weak law enforcement, thereby encouraging harmful practices. I propose that addressing injustice in global supply chains requires a shift beyond symbolic transparency, so that law engages with global exploitation not as an illusory saviour, but as an active and effective means of confronting injustice.

## **Is There a Legal Defence for Direct Action?**

**Celina Deng**

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Should you be allowed to take the law into your own hands? This project explores criminal law defences for those prosecuted for directly interfering with perceived political wrongdoing, otherwise known as direct action. It addresses how judges are reluctant to recognise political action as defensible, resulting in the limited application of the defences.

Three defences are considered. The first is ‘duress of circumstances’, where immediate situational threats necessitate force to avoid serious harm. The second is the ‘prevention of crime’, where reasonable force can be used to prevent other crimes, and the third is necessity, which justifies the lesser of two evils where there is no other choice. Adopting a doctrinal approach, I evaluate the feasibility of these defences through the analysis of cases such as *R v Jones*. There, all three defences were deemed inapplicable in politically motivated protest in functioning democratic societies. I propose that where there are concurrent non-political motivations, where illegal force

has been used on the protestor, and where there is a failure in the democratic process, protestors should have the opportunity to apply the defences. Furthermore, I highlight how the judicial concern about legitimising political disorder forms a consistent theme across legal decisions.

What is the appropriate role of protest in an increasingly policed society? By evaluating one of the most divisive forms of protest, this project explores the extent of recourse citizens have when democracy fails them.

## **Investigating the Effect of SAHA on Expression of Inflammatory Cytokines and Microglial Markers in LPS Activated Microglial Inflammation**

**Jana Soliman**

*University of Leeds*

Chronic neuroinflammation holds a critical role in Alzheimer's progression. Microglial polarization towards pro-inflammatory M1 or anti-inflammatory M2 phenotypes are key in chronic neuroinflammation and cytokine release. Histone deacetylase (HDAC) inhibitors regulate chromatin accessibility and potentially suppress M1-associated cytokine transcription while amplifying an M2 state. This study investigated if suberoylanilide hydroxamic acid (SAHA), a HDAC inhibitor, could attenuate M1 activation markers in lipopolysaccharide (LPS) stimulated BV-2 microglial cells. BV-2 microglia were treated with either control, 1  $\mu$ L LPS with or without 2  $\mu$ L SAHA. mRNA expression of pro-inflammatory cytokines (IL-6 IL-1 $\beta$ ) and M1 and M2 activation markers (IBA1, CD86, CD206) was quantified using RT-qPCR (n=3) and IL-6 protein concentration was measured using ELISA (n=1). Microglial phenotype was observed using immunofluorescence staining (n=1). IL-6 protein concentration was reduced by 54% in SAHA+LPS microglia ( $326.8 \pm 109.6$ pg/mL). LPS stimulation in mRNA expression showed consistent attenuation of IL-1 $\beta$  ( $35.6 \pm 19.4\%$ ) and IL-6 ( $16.1 \pm 6.1\%$ ) in SAHA+LPS microglia, however no statistical significance was reached. Immunofluorescence analysis of polarization markers yielded inconclusive findings. These findings suggest SAHA could suppress microglial pro-inflammatory

cytokine production, potentially presenting SAHA as a viable therapeutic for regulating neuroinflammation. Future direction should explore SAHA's effect on the anti-inflammatory (M2) factors (IL-10, Arg1, CD206), particularly in a more realistic microglia environment.

## **The Aftermath of the Ban on Universal Injunctions on Chapter 15 and the U.S. Foreign Bankruptcy Court's Remedial Powers**

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This research examines how a recent Supreme Court decision (*Trump v. Casa, Inc.*) affects cross-border bankruptcy proceedings. In *Trump v. Casa, Inc.*, the Court held that federal courts in civil proceedings could not issue injunctions in favour of individuals not party to the case before the court (“non-party injunctions”). Although the court did not mention bankruptcy law, injunctions in favour of non-parties are widely used in cross-border bankruptcies filed under Chapter 15 of the United States Bankruptcy Code. The question we address is whether the bankruptcy court's power to issue those injunctions survives the Court's holding in *Trump v. Casa*.

Cross-border bankruptcy under Chapter 15 involves a company that, upon completing a foreign bankruptcy proceeding, seeks to enforce the same remedies in the U.S. When a foreign court has issued non-party injunctions in the original proceeding, United States bankruptcy courts commonly issue identical injunctions that are enforceable in the United States. They may also issue a new non-party injunction—one that was not issued by the foreign court—to support the foreign proceeding.

Our research analyses the history of bankruptcy statutes and cross-border proceedings to identify statutory grounds that enable bankruptcy courts to issue non-party injunctions in Chapter 15 cases. Our preliminary analysis suggests that the courts are prohibited from issuing new non-party injunctions to support foreign proceedings. Our conclusions are more tentative regarding injunctions identical to those issued by the foreign court. Our historical findings also suggest that Congress may have contemplated the practice when drafting Chapter 15.

# Seeing Through Touch: A Wearable Sensory Substitution System to Aid Navigation of the Visually Impaired

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Throughout the years, many assistive technologies were developed to make independent navigation easier for visually impaired individuals. However, as of now such devices cannot communicate all the richness of visual information, making navigation of complex dynamic environments, such as city streets, a challenge. Sensory substitution, communicating visual information through a different sensory medium, could be an answer. However, this requires a large information bandwidth, which has been difficult to achieve.

For this research we propose a design of a wearable assistive device, based on sensory substitution using tactile sensations. Reconstructed 3d-environment around the wearer is presented to them using a tactile display. Computer Vision techniques are employed to categorise objects and remove unimportant information. The sensations are stimulated using controlled high-frequency electrical impulses applied to a 5 by 5 electrode array strapped to user's fingertip. To increase the resolution, the user is allowed to scan a larger tracking surface with their finger. Tactile patterns can then be produced depending on the position of the user's fingertip, drastically increasing the resolution.

The device is currently in process of active development. As of now, testing of individual systems is performed to evaluate their performance. Full device testing on blindfolded or visually impaired subjects is planned and will help to determine the better way of information presentation.

We believe that this system will massively aid visually impaired individuals in not only tasks of navigation but, with the flexibility of electro-tactile display interface, could open a world of accessible applications.

## **Does Sycophantic Behaviour in Artificial Intelligence Indicate Intentionality, or the Product of Algorithmic Design, Self-learning, or AI Gaining Consciousness?**

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As the world faces rapid changes due to advances in artificial intelligence, communication and social interactions are increasingly reshaped by AI systems. A significant feature of these systems is their tendency toward sycophantic behaviour. Sycophancy refers to a behaviour that prioritises agreement, affirmation, and user satisfaction.

The aim of this research is to explore the sycophantic tendencies of AI and investigate the underlying reasons behind such behaviour. Moreover, the study examines whether these behaviours result from algorithmic design, self-learning, or the possibility of intentionality or consciousness of AI.

The study will use secondary research. A systematic literature review will collect and evaluate existing knowledge on AI sycophancy, followed by conceptual analysis applying behavioural, cognitive, and technical frameworks to identify patterns and causes. Additionally, different AI systems such as Copilot will be used to conduct thoughtful research and analysis regarding behavioural patterns and reactions. Furthermore, the study will consider the potential harmful effects of sycophantic behaviour on individuals, while considering whether such behaviour reflects intentionality or consciousness.

The outcomes of the research are still unknown, however, by examining both technical and perceptual perspectives, this research aims to clarify why sycophantic behaviour occurs in AI. I expect this investigation to clarify whether AI sycophantic behaviour

reflects intentionality, consciousness, algorithmic design, or self-learning. Moreover, the outcome of the research can help consider the implications for ethics, user trust, legal frameworks, and regulations of AI systems. Understanding sycophantic behaviour is increasingly important as AI becomes more socially embedded and influential in everyday interactions.

## **From Children to Guides: Young Adults' Cognitive Awakening and Shift from Child-Centred Views to Family Leadership**

**Qiyue Wang**

*University of Glasgow*

In contemporary families, differences in values, educational backgrounds, and historical contexts often lead to frequent conflicts between parents and young people. Many young people interpret their parents' behaviour through a self-centred, child-focused lens, which can result in blame and misunderstanding. However, the potential for young people to become active drivers of positive change within family relationships remains underexplored.

This study examines how young adults experience cognitive awakening and role transformation, shifting from a child-centred perspective to roles of understanding and guidance within the family. Living in a new social and historical context, young people possess new ideas and educational experiences that enable them to recognise generational differences and consciously guide family relationships toward greater harmony and adaptation to modern society.

Using a qualitative approach, this research draws on reflective personal narratives, informal conversations with peers and family members, and questionnaire-based surveys with young adults. These methods explore factors associated with cognitive awakening, including experiences of family conflict, perspective shifts, and the development of leadership awareness.

The study expects to find that cognitive awakening often emerges through role transition, as young people gain deeper understanding of their parents' lived

experiences and recognise generational gaps. Through intergenerational understanding, young people move beyond self-centred views and begin to assume responsibility for guiding family relationships. This research highlights youth leadership within families as a meaningful pathway to reducing conflict, strengthening family cohesion, and fostering social harmony.

## **A Cost-Effective, Open-Source Indoor Environmental Monitoring Device to Support Energy Performance Research in Buildings**

**Mariana de Sene Bavaresco**

*University of Glasgow*

Many buildings consume more energy in operation than predicted at the design stage; this discrepancy is known as the energy performance gap. This gap is not only caused by design factors but is also widened by operational factors such as building management and occupancy. Recent studies suggest that incorporating real-world monitoring data into building models improves their accuracy and predictive capabilities.

This ongoing project aims to develop a cost-effective, open-source monitoring device that measures carbon dioxide concentration, relative humidity, and temperature. The device is designed to transmit the measured data periodically using MQTT, a lightweight Wi-Fi communication protocol. It is intended to operate using either mains or battery power, allowing deployment in a variety of rooms regardless of the availability of power sockets.

Multiple devices will be deployed to collect environmental data from different locations across the University of Glasgow. Measurements from these devices will be compared with data from pre-existing sensors to validate results and assess consistency, reliability, and repeatability to determine the device's viability for research use.

If validated, the resulting data could support the Civil Engineering Department in developing digital twin models by providing real-world measurements for energy

performance research, contributing to efforts to achieve net-zero carbon emissions. As an open-source system, the device eliminates subscription fees for data storage and reduces the risk of discontinued support or maintenance, since the source code remains accessible for continued development and long-term use.

## **Establishment of an Ethical Framework for Neuroscience Studies in Long-Duration Space Missions**

**Wendy Lucia Sanchez Delgado, Alejandra Ruiz Conejo Koc, Valeria Fernanda Granados Gutierrez**

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Recent advancements in space technology have opened the possibility of future long-duration missions to the Moon and Mars, raising inquiries about potential risks on astronauts' health, especially in brain function and neuroplasticity. However, to this day, there exists no official ethical framework for medical procedures in space missions that addresses both scientific and moral considerations. This study examines current standards, guidelines and proposals related to medical ethics and space law to propose an integrated ethical framework for brain-related studies conducted during space missions of long duration. It addresses topics such as cognitive autonomy, experimental methods, dual-use risks of neurotechnology in space, government policy, and data ownership and privacy. This study contributes to the promotion of sustainable experimentation techniques for space medicine, as well as to the possibility of a future establishment of a universal medical ethics framework, which will finally serve to safeguard astronauts' health and advance the feasibility of long term missions to the Moon and Mars.

## **What is lost when Religion is excluded from climate communications?**

**Ismail Ahmad Shaikh**

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Despite the escalating urgency of climate change, climate communication often struggles to translate scientific knowledge into sustained public engagement. Much climate messaging is produced and consumed within spheres where audiences are already environmentally engaged, while broader segments of general public remain under-engaged. Social institutions, particularly religious organizations, function as influential, community-embedded communication structures for large proportions of the global population. In a world where 87% of the global population is projected to identify with a religion by 2050, the limited use of religious institutions as climate communicators reflects a misalignment between communication strategies and social contexts in which information is received, rather than a deficit in scientific credibility.

Despite extensive research, there is limited evidence on whether and how religious institutions are incorporated into climate communication and interventions.

This study examines the consequences of excluding religion from climate communication, focusing on implications for reach, trust, equity, and evidence generation.

A scoping review of major academic and multidisciplinary databases and grey literature was conducted. Studies were systematically mapped and analyzed to identify patterns of engagement with religious institutions.

Religious institutions were infrequently included in climate communication research. Their exclusion was associated with a systematic under-representation of the socio-ecological model's community level, alongside reduced communication reach, inequitable engagement across populations, and limited evaluative evidence for community-level interventions.

Drawing on public health evidence, where faith-based communication has enhanced vaccination uptake, screening programmes, and health initiatives; integrating analogous approaches into climate communication may strengthen dissemination and improve community-level engagement without compromising scientific integrity.

## **Between Slop and Sophistication: The Agential Implications of Generative Artificial Intelligence in the Film Industry**

## **Sophia Lu**

*Georgetown University*

For a film industry that has long prided itself on representing the pinnacle of human creativity, the proliferation of generative artificial intelligence has emerged as an existential challenge to the livelihoods of its creative workers. Though studios have scrambled to adopt the technology in the name of productivity gains and tech companies have promoted a possible “democratization of creativity,” the actual situation on the ground of how it is changing the nature of creative work remains poorly understood. Utilizing 50 semi-structured interviews with film industry professionals ranging from actors and directors to producers and screenwriters in the United States, this research shows that while generative artificial intelligence has demonstrated the sufficient technical capabilities to take over ancillary aspects of the film production process, such as pre-visualization, script coverage, and transcription, the industry has still relied on creative professionals to drive the core storytelling work. Indeed, the technology has proven far more useful as a tool in the filmmaking process, rather than an outright replacement. Simultaneously, however, the rush to embrace generative artificial intelligence has resulted in significant creative labor market disruptions: due to less job opportunities and lower wages, emerging talent has found it increasingly difficult to break into the industry and freelancers have experienced increased instability. Yet, new opportunities have also emerged for filmmakers who are experimenting with the technology. Ultimately, these results suggest that much disruption remains on the horizon for the film industry, even as human-driven storytelling will retain a premium in the creative economy.

## **A Non-pathologising Way of Working with Service Users with Psychotropic Substance Abuse Issues through Narrative Therapy**

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Who defines the problem in substance abuse —the professionals or the service users? This paper aims to examine how a non-pathologising approach, grounded in narrative therapy, can be applied when working with individuals experiencing psychotropic substance abuse issues. The study draws on practice-based research from facilitating a narrative therapy group designed to enhance participants' self-care capacity in a welfare service setting serving people with substance use issues in Hong Kong. By reflecting on the group sessions and practice observations, the paper analyses how narrative therapy principles operate within this context.

The analysis focuses on the tensions between narrative therapy and conventional intervention approaches for substance abuse. Narrative therapy adopts a non-pathologising stance, viewing substance use as a problem only when it is experienced and defined by the service user. In contrast, traditional approaches in many service settings frame substance use as inherently harmful and emphasise correction, compliance, and abstinence. These diverse perspectives pose ethical, professional, and practical dilemmas for social workers who have to navigate institutional expectations while maintaining a client-centred stance.

Drawing on practice data and reflective analysis, this paper argues that such contradictions may limit the application of narrative therapy in social work settings and shape social workers' professional positioning. At the same time, the discussion highlights possibilities for integrating narrative therapy concepts into broader social work and prevention practices, suggesting a more collaborative and non-pathologising way of engaging with service users experiencing substance abuse.

## **Vision-based Stiffness-Controllable Dynamic Range Force Sensor for Tissue Palpation**

**Hashir Hamid, Arvin Tharumalingam, Taima Holden, Abu Bakar Dawood, Kaspar Althoefer**

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Haptic feedback is a critical element in surgical procedures, enabling surgeons to assess tissue properties through palpation. In minimally invasive surgery, restricted access to internal organs significantly reduces this sensory feedback. To address this limitation, the present work focuses on the development of a soft, stiffness-controllable, vision-based force sensing probe capable of estimating both the magnitude and direction of applied forces. The sensor comprises a silicone dome reinforced with an integrated mesh layer to extend the measurable force range while limiting excessive deformation and reducing hysteresis. An internal endoscopic camera captures dome deformation, which is analysed using a neural network to estimate the angle and magnitude of applied forces, including non-normal interactions. By modulating internal pressure, the stiffness of the dome and the effective force measurement range can be dynamically adjusted. The probe was calibrated and evaluated under varying internal pressures to assess force range, sensitivity, and hysteresis behaviour. Experimental validation further demonstrated the sensor's ability to detect stiffness variations in tissue-mimicking phantoms with different elastic properties. These results indicate the potential of the proposed design for integration into robotic surgical tools, providing adaptive and reliable tactile feedback in constrained surgical environments.

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