THE UNIVERSITY of EDINBURGH
Digital Research Services

Digital Research Conference

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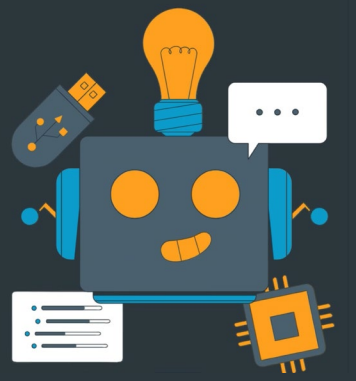
Book of Abstracts

Digital Research Conference
26 February 2026



AI in Research: Promise, Pitfalls & Practice

Discover how AI reshapes research - automating tasks, ethical considerations, governance, and practical AI tool applications across fields.

ANDREW NEAL

School of Social and Political Science

Digital Research Conference
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Lightning Talk

DOING DISCURSIVE RESEARCH ON NATIONAL SECURITY AT SCALE: A NON-STATS EXPERT'S JOURNEY THROUGH LLMS, VIBE CODING, AND METHODOLOGICAL HUMILITY

This presentation reflects on scaling discourse analysis of state security documents—and what that process reveals about validation, interpretation, and computational methods in critical security research. As someone analysing why states publish national security strategies, I confronted fundamental tensions: how do you categorise expressed motivations across 119 countries and 800+ quotes without losing interpretive rigour? How do you validate classifications you cannot personally verify across this scale?

My approach treated LLMs as a panel of fallible coders rather than authoritative classifiers. Using five independent models (Claude, GPT, Mistral, DeepSeek, Llama), I required supermajority agreement and calculated inter-rater reliability using Krippendorff's alpha ($\alpha = 0.70$)—comparable to human coder standards. Each failure became methodological learning: discovering which models refuse military content, understanding that cross-validation matters precisely because all models train on similar corpora, deciding when to override algorithmic consensus.

The political questions multiplied. Does ensemble agreement mean anything substantive? Am I reproducing existing security knowledge hierarchies? When LLMs already 'know' the literature, are they discovering patterns or confirming priors?

The point isn't just replicability but reflexivity: what does computational scale do to the interpretive sensibilities that make critical research critical?

CHARIS WONG, Harris Khalid, Katarzyna Stefanska, Florence Do, Mohammed Abomostafa, Gemma Dalgety, Malcolm R. Macleod

Centre for Clinical Brain Sciences

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Lightning Talk

AI-ENABLED SYSTEMATIC REVIEW PLATFORMS: HOW WELL DO THEY PERFORM?

There has been a recent emergence of AI-enabled systematic review platforms promising faster and more comprehensive reviews. Independent validation of these platforms is needed to assess their suitability to augment or replace human reviewer efforts.

We are evaluating the performance of three platforms (Elicit.AI, Nested Knowledge and Scispace) by replicating three recently published systematic reviews and comparing the performance of each platform against original published findings. We pre-registered our protocol (doi:10.17605/OSF.IO/8NF6H).

As of October 2025, we completed citation screening across all platforms for the first review (https://doi.org/10.12688/wellcomeopenres.21302.1). Of the 15 studies included in the original review, Elicit and Scispace both included 6 studies (sensitivity 40%). We identified all 15 studies using Nested Knowledge with a dual-stage, dual-reviewer set up; Their AI-based Robot Screener yielded a sensitivity of 72.7% and precision of 42.1% for abstract screening. We terminated our evaluation of Scispace on the basis of futility: data files and exports were corrupted hindering evaluation.

Preliminary findings highlight significant variability in the performance of AI-enabled systematic review platforms. Low sensitivity and technical limitations in some platforms may compromise reliability. Further analyses of later review stages and replication of two additional systematic reviews using Elicit.AI and Nested Knowledge are underway.

EVAN MORGAN

Edinburgh College of Art

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Lightning Talk

ADVENTURES IN VIBE CODING!

"Vibe coding" - Collins Dictionary's Word of the Year for 2025 – describes the process of developing software exclusively through interactions with an AI coding assistant. If the developed software does what we want it to then “hooray!” If it doesn’t - ask the AI to fix it!

The approach promises to make software development more accessible, allowing researchers with little coding experience to develop and deploy working applications, tools, and prototypes. But can vibe coding generate “good” software? And what are the issues and pitfalls with this approach to software development?

As a research software engineer in the Institute for Design Informatics, Evan will share his experiences of using generative AI to develop research software and discuss where he sees opportunities and challenges in this evolving landscape. He will also share some practical advice on tools and techniques for those looking to explore the world of AI-assisted software development.

GOZDE CAAN, Neshika Samarasekera, Charis Wong, Malcolm Macleod

Centre for Clinical Brain Sciences

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Poster

INTRODUCING ICH-SOLES: AN AI-POWERED LIVING EVIDENCE PLATFORM FOR ADVANCING INTRACEREBRAL HAEMORRHAGE RESEARCH

Intracerebral haemorrhage (ICH) is a debilitating form of stroke with a survival rate of ~40% after the first month. Despite extensive research, disease understanding remains limited, and clinical outcomes have not improved in over 25 years. Traditional evidence synthesis methods struggle to effectively consolidate the wealth of findings.

To overcome this, we will develop a Systematic Online Living Evidence Summary of Intracerebral Haemorrhage (ICH-SOLES). ICH-SOLES will apply the SOLES R package, a streamlined workflow integrating artificial intelligence and systematic review tools to retrieve and synthesise human and animal ICH literature. We will develop automated 'living' searches across biomedical databases to retrieve citations in real time. Retrieved citations will be processed through a validated machine learning screening algorithm and tagged for population/models, interventions, outcomes, risk of bias measures and transparency measures using regular expressions techniques against our dictionaries. The resulting evidence base will be accessible through an interactive web application enabling users to interrogate these data. ICH-SOLES will provide a continually updated systematic evidence map and an accelerated starting point for more in-depth systematic review. Thus, ICH-SOLES will have the potential to facilitate prioritisation of mechanisms for further evaluation and drug repurposing in clinical trials.

ISADORA AÏNOHA GRIOT, Rob Ward

Royal (Dick) School of Veterinary Studies

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Poster

COMPARING VETERINARIANS AND CHATGPT RESPONSES TO PET OWNERS' MEDICAL QUESTIONS RELATING TO THEIR PETS POSTED ON AN ONLINE FORUM

Artificial Intelligence (AI) is becoming increasingly important in veterinary medicine, particularly for answering pet owners' medical questions. Its integration could reduce the workload of veterinary professionals while improving access to medical advice. However, the reliability and quality of AI-generated responses compared to veterinarians' remain largely unexplored.

This cross-sectional study aimed to determine whether pet owners find AI-generated responses comparable to those from veterinarians. Two medical questions posted on Reddit's AskVet forum were selected, and both a veterinarian and ChatGPT (GPT-4o, May 2024) provided anonymized answers. These responses were presented in a survey distributed via mailing lists and public Facebook groups.

Participants evaluated each response for structure, quality, and empathy using a five-point Likert scale. They also indicated whether they trusted the response and which one they preferred. Results showed that over two-thirds of the 201 participants preferred the ChatGPT-generated answers ($p < 0.05$), rating them higher in structure, quality, and empathy.

In conclusion, AI could support veterinary client communication and improve accessibility to medical advice. However, its use should be supervised by veterinary professionals to ensure accuracy and to safeguard patient care.

Samuel Mcinerney, Matus Falis, **FRANZ GRUBER**, Arlene Casey, David Lowe, Peter Hall

Institute of Genetics and Cancer

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Poster

CAN AI EXTRACT THE STORY OF CANCER CARE? EVALUATING LLAMA 3.1 FOR CLINICAL ENTITY EXTRACTION IN BREAST CANCER RECORDS

Fragmented electronic health records (EHRs) in oncology increase clinician workload and the risk of critical omissions. Large language models (LLMs) offer potential to structure and summarise this information, but their performance on real-world data is unclear.

This study evaluated LLaMA 3.1 (8B) for extracting key breast cancer entities from imaging, pathology, and clinical notes. Using a retrospective dataset of ten patients from DataLoch, zero-shot prompts were designed to identify disease response, biomarkers, and systemic therapy toxicities. Outputs were compared against a clinician-annotated gold standard using precision, recall, and F1 metrics.

Across 630 documents, mean micro-averaged performance was Precision 81.6%, Recall 87.8%, F1 84.3%. Macro F1 scores were highest for pathology (90.3%) and radiology (88.4%), but lower for clinical notes (79.6%) due to hallucinated side effects such as nausea and vomiting in unremarkable text.

While LLaMA 3.1 demonstrates strong potential for automating data extraction from heterogeneous oncology records, hallucinations substantially limit clinical reliability. Future work will focus on oncology-specific fine-tuning and retrieval-augmented approaches to improve robustness and reduce false positives. This evaluation highlights both the promise and current limitations of general LLMs for real-world cancer informatics applications.

SIMRAN SONAWALLA

School of Philosophy, Psychology, and Language Sciences

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Poster

AI AND REFLEXIVITY: A DIALOGIC APPROACH TO QUALITATIVE RESEARCH

Qualitative research traditionally relies on an interpretive paradigm, grounded in the recursive relationship between researcher, context, and data, where meaning emerges through researchers' experience and reflexive engagement. The rise of generative artificial intelligence (GenAI) in qualitative data analysis introduces a critical epistemological tension: If AI-generated interpretations are not grounded in human consciousness or lived experience, can they support meaningful qualitative analysis?

This presentation explores how researchers can use AI in a dialogic and reflective way, treating AI outputs as prompts for further questioning rather than accepting outputs uncritically. By engaging in an iterative back-and-forth with AI by testing prompts, comparing outputs, and examining biases, researchers can surface new insights while maintaining control over the interpretive process. Importantly, this approach preserves researcher authority, enabling critical judgement shaped by theoretical, contextual, and ethical considerations. Engaging in reflexivity while using AI emphasises responsible use for emerging technologies and researcher integrity by interrogating their processes and biases in producing knowledge that contributes to supporting societal development. By situating GenAI as a tool for epistemic expansion rather than substitution, this presentation contributes to evolving debates about AI's transformative impact and the future of qualitative knowledge production.

STEVE WRIGHT

Edinburgh Medical School

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Poster

GENERATIVE AI IN QUALITATIVE DATA ANALYSIS: BEYOND THE HYPE AND DOOM

Should we use LLMs in qualitative data analysis?

The process and tradition is being “disrupted” by the introduction of Large Language Models (LLMs) and “generative AI”. This is presented as a revolution – but is it? As programmes such as NVivo, ATLAS.ti and MAXQDA incorporate ChatGPT and other packages based on LLM approaches such as AILYSE join the direct use of AI chatbots to analyse text and images the process is framed by booster hype and doomster rejection.

This poster explores current integrations and contextualises them in terms of their continuities with previous opportunities for automated text from classification via earlier tools that enabled computational approaches to linguistic classification and content analysis.

It critically explores how these tools and traditions have incorporated and approached identifying meaning and the relative importance of concepts such as interpretive depth, researcher reflexivity, and theoretical insight and their application through approaches such as coding, annotating and writing.

By using analogies from the kitchen, and framing analytic intent using bHabermas, it advocates for thoughtful, transparent, and context-sensitive use of AI in qualitative analysis.

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Interdisciplinary Digital Research: From Humanities to Medicine

Explore interdisciplinary research where digital methods foster collaboration and innovation across diverse fields, from humanities to medicine.

SALMAN KHAN, Richard Jones

Edinburgh Law School

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Lightning Talk

THE WORK OF TRANSLATION: REFLECTIONS FROM AN INTERDISCIPLINARY RESEARCH PROJECT ON THE SOCIAL IMPLICATIONS AND RISKS OF AI-INTEGRATED SMART WEARABLES

What happens when team members from across the disciplines of sociology, STS, criminology, computing science, and psychology come together in critically examining the social implications and risks of the emerging technology of AI-integrated smart wearable devices?

Drawing on reflections recorded in a project investigating this in relation to Meta's AI-enabled Ray-Ban Display smart glasses, this paper mobilises concepts in STS including translation (Latour, 1987) and boundary objects (Star and Griesemer, 1989) to bring forth an account of the work that goes into bringing different problem framings, conceptualisations and epistemic practices in alignment with one another. Focusing on the team's collaboration in negotiating and finding agreement on analysis of qualitative data, as well as their experiences of periodically taking down reflections on this process, it demonstrates the disjunctions that arise in the pursuit of interdisciplinary collaboration. It argues that such disjunctions, and the practices by which they become subject to negotiation and then are subsequently overcome, are key to the added value gained by bringing different knowledges together in researching the forms taken by AI across diverse societal domains.

SOFIA DE LA FUENTE GARCIA, Alicia Nuñez-Garcia, Fasih Haider, Saturnino Luz

Centre for Medical Informatics, Usher Institute

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Lightning Talk

SPEECH AND BIOSIGNALS AS DIGITAL BIOMARKERS IN XR-MEDIATED INTERACTIONS WITH CULTURAL HERITAGE

This interdisciplinary study within the INT-ACT project evaluates how digitally mediated encounters with cultural heritage influence psychological wellbeing and cognitive health. Using a bespoke Extended Reality (XR) system based on the Calanais standing stones in Scotland, participants from three groups (namely, young adults, older adults, and individuals with mild cognitive impairment) engage in structured sensory and narrative interactions with cultural content delivered through a tablet-based XR application.

We employ a mixed-methods design integrating physiological data (electrodermal activity, heart rate, salivary cortisol), validated wellbeing questionnaires, and natural speech analysis. Voice recordings are analysed using large language models and acoustic signal processing to identify linguistic markers of affect, psychological wellness and cognitive function, with a view to harnessing speech as a non-invasive digital biomarker for wellbeing and neurodegeneration in the context of heritage interventions.

This work explores how interdisciplinary research and digital technologies can develop inclusive systems to facilitate interactions with cultural heritage. It also evaluates the effect of these interactions on the promotion of health, specifically psychological wellbeing and cognitive health.

PRAGYA MODI, Alex Kwong, Saturnino Luz Filho, Joanne Kenney

School of Informatics

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Lightning Talk

DECODING ADOLESCENT DEPRESSION: SLEEP PATTERNS AND INTERPRETABLE ML

Adolescent depression is common but often underdiagnosed. Current tools rely on self-report and interviews, which are limited by bias and poor scalability. Sleep problems are a core feature of depression, and wearable devices offer a non-invasive way to measure them. This study used data from 3,166 participants in the Adolescent Brain Cognitive Development (ABCD)® Study, combining multi-night Fitbit sleep recordings with KSADS-based diagnoses. Machine learning models were trained to classify depression, and feature importance was examined with explainable AI methods.

The Random Forest model achieved high performance (AUC = 0.95, accuracy = 0.92), while the LSTM model failed to discriminate between groups, likely due to short sequence length and modest dataset size. Key predictors included lower sleep efficiency, higher night-to-night variability, and more poor-quality nights, with smaller effects from REM and deep sleep.

These findings suggest that interpretable machine learning applied to wearable data can provide accurate, scalable, and clinically meaningful predictions. The research demonstrates the feasibility of using wearable-derived sleep features as part of future approaches to support early identification and intervention in adolescent mental health care.

TERESITA SUAREZ NOGUEZ, Samantha Lycett

Roslin Institute

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Lightning Talk

GENERATING SYNTHETIC DATA FOR DISEASE TRANSMISSION MODELS: BALANCING PRIVACY AND ACCURACY

Working with sensitive data, such as records of livestock movements between farms in Scotland, presents significant challenges when modelling the spread of infectious diseases. Detailed records of animal movements contain confidential data that cannot be shared freely, which makes anonymisation essential for protecting privacy and complying with data protection regulations. To address these barriers, in this work we generate synthetic data that mimics the statistical and structural properties of the original network, while still enabling the development of accurate models for disease transmission. We use spatial aggregation of geographical data to a higher level (e.g. county and parish) and exclude sparsely populated areas, so individual farm locations are not identifiable. We perform network analysis on the generated dataset to identify key nodes and pathways of transmission and simulate the spread of disease within the network using mathematical models such as SIR modelling. By anonymising the datasets, we can make them freely available to epidemiologists, data scientists, and policymakers, enabling cross-disciplinary collaboration.

JIUMING JIANG, Jingjie Li, Daniel Woods, Shidong Pan

School of Informatics

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Poster

COMPUTATIONAL ANALYSIS OF CODES OF CONDUCT FOR ONLINE SAFETY IN VIDEO GAMES AT SCALE

Video games have become complex online environments where players engage in immersive experiences of collaboration and competition. However, persistent challenges, including harassment, discrimination, inappropriate content, privacy violations, fraud, and cheating, continue to affect players' sense of safety and belonging. The nature and scale of these issues vary across games due to complex technical and gameplay mechanics, as well as varying community cultures. To proactively mitigate these risks, video game companies publish Codes of Conduct (CoC) documents that communicate online safety expectations and resources to players. Yet, a holistic understanding of how games adopt CoCs and identify online safety issues remains missing.

We present a digital research approach that applies natural language processing (NLP) to analyse CoCs at scale. Combined with online safety and social norms analysis, we found that CoC adoption and the recognised safety issues are skewed, while communicating and enforcing CoCs still remain an open challenge. Our method bridges NLP, game studies, and digital ethics. It raises broader discussions on safety and inclusivity in online environments, and sheds light on designing more effective online safety communication, e.g., supporting the community-centric model for CoC adoption.

MINGSHENG CAI, Jiuming Jiang, Wenhao Huang, Che Liu, Rossella Arcucci

School of Informatics

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Poster

ADVANCING MULTIMODAL ECG REPRESENTATION LEARNING THROUGH LLM-BASED CLINICAL ENTITY INTEGRATION

Electrocardiogram (ECG) recordings are vital for cardiac diagnosis but traditionally require extensive manual annotation to support supervised learning. In this study, we introduce a supervised pre-training framework for multimodal ECG representation learning that utilizes Large Language Model (LLM)-driven clinical entity extraction from ECG reports to construct structured cardiac queries. Instead of relying on categorical labels, our model aligns ECG signals with these standardized queries, enabling zero-shot classification of previously unseen cardiac conditions. Evaluations on six downstream datasets show a zero-shot AUC of 77.20%, surpassing state-of-the-art self-supervised and multimodal baselines by 4.98%. These results highlight that integrating structured clinical knowledge through LLM-extracted entities yields more semantically grounded and generalizable ECG representations than conventional contrastive or generative learning objectives.

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Green Digital Research Practices & Sustainability

Explore how to make digital research environmentally responsible, covering strategies and examples for reducing ecological impact.

ANDRONIKI PAPATHANASI, Desen Kirli, Oscar Sánchez Santillán, Karla G. Cedano-Villavicencio, Daniel Friedrich

Institute for Energy Systems

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Lightning Talk

GOVERNING HOUSEHOLD ENERGY BEHAVIOUR UNDER CLIMATIC EXTREMES: A VAM–BAL FRAMEWORK FOR FAIR, SAFE DEMAND REDUCTION ACROSS DIVERSE CONTEXTS

This work introduces the Vulnerability–Agency Matrix (VAM) and the Behavioural Adaptation Ladder (BAL), a combined VAM–BAL framework for governing household energy behaviour under climatic extremes and guiding fair, safe demand reduction across diverse contexts. VAM–BAL links who is exposed, constrained or empowered in the energy system with the kinds of behavioural changes that are realistic, safe and just to expect from households facing heatwaves, cold spells or other shocks. Rather than treating demand reduction as a neutral technical exercise, the framework makes visible how structural conditions, housing quality, tariffs and social protection shape both vulnerability and agency.

Drawing on insights from work in the UK, China and Mexico, VAM–BAL is used to illustrate how it can: characterise households' vulnerability and agency profiles; distinguish where participation in demand response is appropriate versus where shielding from additional risk is needed; and support co-designed policies that prioritise health, dignity and basic energy needs. While grounded in domestic energy use, the framework is designed to be transferable across geographies and policy settings, offering a practical tool for regulators, system operators and local actors seeking to align demand reduction with energy justice.

DAVID MAHONEY

Design Informatics

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Lightning Talk

THE WASTEBACK MACHINE: ANALYSING DIGITAL GROWTH AND SUSTAINABILITY THROUGH WEB ARCHIVES

This paper introduces the Wasteback Machine, a JavaScript library that repurposes web archives to analyse historical web page size and composition. It addresses a key limitation in current approaches to web sustainability assessment, which rely on live measurements and therefore obscure the cumulative environmental effects of long-term digital growth. By making web archives amenable to quantitative analysis, the Wasteback Machine enables new forms of historical inquiry into the evolution of page size and composition and their environmental implications. In doing so, it demonstrates how web archives can function as analytical resources rather than merely records of cultural memory.

This paper will demonstrate the capabilities of the Wasteback Machine, examine representative analyses of historical web development, and situate its contributions within wider debates in web archiving and sustainability. It will further consider the reuse of “reborn” digital materials for quantitative inquiry, the long-term ecological implications of persistent web expansion, and the challenges and responsibilities facing the future of web archives.

JOYCE SERWAA OPPONG

Moray House School of Education and Sport

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Lightning Talk

FROM CLOUD TO WASTE: QUESTIONING THE ETHEREALITY OF ARTIFICIAL INTELLIGENCE

AI technology, applications and the internet are sometimes considered to be "ethereal", "immaterial" or abstract. However, these “ethereal” applications have physical infrastructures that host applications and allow data to be transmitted or machines to function. These physical infrastructures include computers, phones, laptops and a host of electronic and electrical devices used by individuals and organisations. With the rapid evolution of AI technology, the volume of electronic waste (e-waste) has increased as devices become obsolete. Other factors that lead to the increase in e-waste include the shorter life span of devices, consumerism culture, the electrifying of non-electrical equipment and the absence of effective repair and recycling policies.

Electronic waste is currently the fastest waste stream globally. Unfortunately, a colossal amount of e-waste is managed by vulnerable informal workers in developing countries.Vulnerable populations working in the informal e-waste recycling industry face systemic and social issues, as well as significant health and safety challenges,and the situation is particularly dire for children. In this presentation,I would share the experiences of children recycling e-waste in Ghana to inform policy and encourage AI inventors/creators to invent sustainable technologies and implement efficient e-waste management practices to reduce its negative impact on the environment and humans.

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Digital Research Infrastructure and the Future of Research Computing

Learn about core technologies and platforms enabling current and future digital research, focusing on infrastructure innovations and computing capabilities.

J. MICHAEL HERRMANN, Reuben T. Lynch, Juan Suarez-Minguez

School of Informatics

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Poster

DIGITAL TWINS FOR FOREST MANAGEMENT

Forest ecosystems play a critical role in biodiversity, carbon sequestration, and ecosystem services. Managing these complex systems effectively is vital for combating climate change, enhancing biodiversity, and meeting increasing demands for timber and recreation. Traditional methods of forest management struggle to capture dynamic interactions between biotic and abiotic factors across various scales, leading to inefficiencies and missed opportunities. Emerging technologies like Digital Twins (DTs) incorporating forest-research theory, high-resolution remote sensing and artificial intelligence, provide transformative capabilities to model, monitor, and optimise forest ecosystems dynamically. Remote sensing technologies, such as aerial and ground LiDAR and UAV-based sensors provide spatially explicit data to capture information on individual trees, enabling detailed mapping of both quantitative (e.g. height, crown size, spatial distribution) and qualitative attributes (e.g. species identification, health status) that are essential for assessing ecological processes.

We report on-going work towards DTs in forestry showcasing the potential to provide flexible platforms to visualise, quantify, and analyse forest-system dynamics at multiple scales to reduce process uncertainty in order to predict forest dynamics and risks such as windthrow, effects of pollution, and pathogen outbreaks.

MICHAEL CAMILLERI, Dorian Gouzou

School of Engineering

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Poster

RAMBLINGS FROM BEYOND THE DIVIDE - WORKING ON HEALTH DATA WITHIN A SAFE HAVEN

Machine learning and AI has ushered in unprecedented capabilities to learn from, and infer patterns about, large swathes of health data. However, dealing with such sensitive information has its repercussions: appropriating a phrase from Uncle Ben (SpiderMan) "With 'big' health data comes 'great' responsibility." This work shares our experience in working on individual-level health records within the National Safe Haven framework to develop AI solutions at scale. We discuss the opportunities that come from such research, highlight some of the challenges and give tips on how they were surmounted.

STUART DUNBAR

DataLoch, School of Population Health Sciences

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Poster

DATALOCH: DEVELOPING NEW OPPORTUNITIES FOR PROJECTS TO IMPROVE HEALTH AND SOCIAL CARE

DataLoch brings together health and administrative data from South-East Scotland (1.6 million people over time), including 90% of GP practices, at a unique level of depth and coverage. Through comprehensive data linkage, an holistic overview of health and wellbeing is possible.

Data for research and innovation: DataLoch works with experts – including NHS Lothian clinicians – to ensure the data are high-quality, and provides safe data access through a Trusted Research Environment. This platform offers extended capabilities for researchers from across disciplines and organisations.

Research and innovation opportunities: DataLoch improves the potential for cutting-edge projects by: harmonising codes across primary and secondary care systems; curating new theme-specific databases; integrating non-medical data to allow exploration of social determinants of health; and developing Natural Language Processing tools to gain further value from routine records while preserving confidentiality.

Scottish Safe Haven Network (SSHN): Alongside SSHN partners, DataLoch is piloting coordinated access to detailed health data across Scotland. Significantly, this avoids researchers submitting multiple applications to multiple data services, leading to swifter data access. Together, SSHN partners play crucial roles in enabling access to detailed data to the right people for the right reasons, and supporting projects that improve population-wide health and wellbeing.

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Ethics, Security & Integrity in Digital Research

Focus on trust, privacy, and ethics in digital research, focusing on safeguarding data and maintaining research integrity.

JIANI PAN

Edinburgh Law School

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Lightning Talk

THE EXPANDING POWER OF TECHNOLOGY: LEGAL CHALLENGES IN PROTECTING THE RIGHT TO PRIVACY DURING AUTOMATED GOVERNANCE

The right to privacy has long been recognized as fundamental, despite varying levels of legal protection across different spheres. In private law, safeguarding privacy mainly involves balancing conflicting interests and protecting individuals from intrusions by other private actors. From a public law perspective, privacy rights shield individuals from undue government interference and are usually evaluated through public interest tests.

Yet, technological progress is now reshaping this landscape. Unlike traditional private actors, technological intermediaries have become significantly more powerful. At the same time, governments' increasing reliance on digital technology creates new legal challenges, especially regarding the tension between privacy and transparency. Governments may use automated tools to collect and process personal information more efficiently, and potentially more intrusively. This research argues that the ongoing digital shift calls for a critical review of how current legal frameworks safeguard the right to privacy. It also emphasizes the need for updated accountability mechanisms to manage the complex interactions among multiple stakeholders.

RAYA ROHITH YADAV

School of Informatics

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Lightning Talk

ZERO-KNOWLEDGE GOVERNANCE: AUDITING RESEARCH INTEGRITY IN SECURE MULTI-PARTY COMPUTATION (SMPC)

Digital research workflows increasingly rely on sensitive data and multi-institution collaboration, limiting the feasibility of traditional research integrity audits that require access to raw datasets, intermediate values, or proprietary methods. This work proposes Zero-Knowledge Governance, a governance model that leverages established Secure Multi-Party Computation (SMPC) techniques to support integrity auditing without disclosure. The approach draws on well-studied cryptographic guarantees provided by malicious-secure SMPC protocols, including correctness of computation, resistance to protocol deviation, and privacy of participant inputs.

Research integrity audit targets such as algorithm adherence, data-use constraint compliance, preprocessing consistency, and result provenance are formalised as verifiable claims derived from SMPC execution artefacts and zero-knowledge enforcement mechanisms. Rather than auditing data or models directly, the framework enables verification of procedural correctness and compliance through cryptographic attestations. By framing SMPC as a governance mechanism rather than solely a privacy tool, this work outlines a feasible path toward accountable digital research practices without increasing data exposure risk.

RHODA JIANG

School of Social and Political Science

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Lightning Talk

FROM SOCIAL WORK VALUES TO AI PRACTICE: FINE-TUNING LARGE LANGUAGE MODELS FOR TRAUMA-INFORMED HOMELESSNESS SUPPORT

Artificial Intelligence (AI) has the potential to support social work practice, but its integration raises challenges of feasibility, ethics, and alignment with core social work values. This pilot study explores the development of a domain-specific large language model (LLM) chatbot tailored to homelessness services, with a focus on trauma-informed practice. The study pursued four outcomes: (a) construction of a preliminary dataset of homelessness-related cases, (b) development of a functional prototype chatbot, (c) initial alignment experiments using supervised fine-tuning, reinforcement learning from human feedback (RLHF), and direct preference optimisation (DPO), and (d) transparent documentation of data, methods, and ethical considerations. Using Mistral-7B as a baseline, we demonstrate that a modestly sized LLM can be adapted to generate responses in the style of social work practice. Evaluation with expert reviewers highlights both the potential of such systems to enhance service delivery and the critical challenges of safety, fairness, and privacy. We discuss the implications of this pilot for the ethical integration of AI into social work, and identify future directions including participatory evaluation with service users and the embedding of social work values into AI design.

BAILEY CARTHOUSER

School of Philosophy, Psychology, and Language Sciences

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Poster

RESEARCH-TALES: THE PROBLEM OF NON-EXISTENT RESEARCH

The use of large-language-models in digital research has seen the emergence of fictious research. Non-existent researchers, non-existent article and non-existence journals has led the charge in non-existent research. In this piece I will discuss research that does not exist. I will argue that non-existent research facilitates an unethical and problematic set of consequences in the digital research space. Non-existent research enables a more untrustworthy, unreliable and risk-induced research.

First, I'll show how non-existent research is a world-building activity and how non-existent research is situated in the world, in an epistemic sense. I will then argue that non-existent research creates a more untrustworthy and unreliable research practice since it's coupled with real research. It is because non-existent research is grounded in the real research, that trust and reliability in real research is undermined and eroded. Finally, I'll discuss the problem of inductive risk and how non-existent research exacerbates this problem. It's by virtue of an erosion of trust and reliability of real research that the non-epistemic values of research become less intelligible and useful. As the volume of real and non-existent research grows and becomes more interconnected because of AI, the ethical and epistemic problems need to continue to be confronted.

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Embedding Digital Tools in Research, Innovation, Teaching and Learning

Discover how digital tools are embedded in research and teaching to build interdisciplinary skills and foster digital literacy across careers.

CHRISTINE WEAVER, Johnny Tam, Suvankar Pal

The Anne Rowling Regenerative Neurology Clinic

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Poster

ACOUSTIC SPEECH ANALYSIS AND MACHINE LEARNING IN THE DIAGNOSIS AND MONITORING OF NEURODEGENERATIVE DISORDERS

Aim: There is an urgent need for scalable, non-invasive and quantifiable biomarkers in neurodegenerative disorders (NDDs) including dementia. Speech is an attractive candidate, with potential for remote and cost-effective assessments. Development of robust models is currently limited by a lack of high quality clinically annotated speech data. We aim to develop novel speech processing and machine learning (ML) approaches by interrogating a large prospective longitudinal speech cohort including people with cognitive disorders, motor neuron disease (MND), Parkinson's disease (PD), and multiple sclerosis (MS).

Methods: People living with NDDs and healthy individuals recorded longitudinal standardised recording tasks on an App co-produced with patients, aligned to contemporaneous deep clinical phenotyping (clinical rating scales, cognitive tests and blood-based biomarkers). We used state-of-the-art ML models to classify individuals in the MND and cognitive disorder groups. Conventional and deep learning features were extracted for inputs to random forest classifiers. To assess confounding effect, data was matched and balanced by age and sex, and performance on non-speech segments of recordings were also reported.

Results: 800 participants provided 5665 recordings over 1000 assessments. Classifiers discriminating between disease and healthy individuals demonstrated promising test ROC-AUC of ~0.85 in both groups. Conversely, non-speech segment models performed at or near random chance levels, demonstrating limited bias from recording quality or environment.

EMILY ADAMS, Kevin Chalmers, Eddie Donaghy, Caroline Sanders, Maria Wolters, Stewart Mercer

Advanced Care Research Centre, Usher Institute

Digital Research Conference
26 February 2026

Poster

"'YOU DON'T KNOW WHAT YOU DON'T KNOW': DIGITAL EXCLUSION OF OLDER PEOPLE EXPERIENCING HOMELESSNESS IN SCOTLAND.

As homelessness support services increasingly shift to digital platforms, understanding the barriers and facilitators to internet access and device use among people experiencing homelessness becomes crucial. Digital exclusion constitutes a major obstacle to escaping homelessness, as it blocks access to housing, employment, benefits, and support services, which are now often reliant on online systems. Older individuals experiencing homelessness encounter additional barriers, including reduced visibility in services, diminished self-advocacy, and mistrust of providers.

Street Support Edinburgh (SSE) is a digital platform that provides support service information for people experiencing homelessness. This study conducted usability tests of SSE with 18 individuals aged 50 and above experiencing homelessness in Edinburgh. The study's findings identify key themes related to user engagement with technology, internet access, and access to services. The study findings demonstrate the need for co-designed, person-centred digital interventions that complement relational care and address the lived realities of digitally excluded populations.

LIN WATSON, Javier Tejera

Edinburgh Medical School

Digital Research Conference
26 February 2026

Poster

CONSULT-ED: BRIDGING GLOBAL HEALTH AND AI IN MEDICAL TRAINING

The emergence of generative artificial intelligence (AI) offers significant opportunities to rethink educational practices, with particular opportunities within medical education. This poster introduces "Consult-Ed," an innovative AI application aimed at enhancing the learning experience within an online family medicine Master's degree. By using interactive virtual patient cases set in diverse locations - rural Kenya and peri-urban Indonesia - the app deepens students' understanding of varied healthcare contexts and refines their clinical consultation skills. Developed with input from students and alumni, "Consult-Ed" ensures authenticity and real-world relevance.

This study investigates the app's development and integration, employing a transdisciplinary approach involving collaboration across Law, Engineering, and Medical Education. We examine the potential of AI to transform teaching methods, offering educators new tools to prepare students for the complexities of the healthcare landscape. The project’s successes and challenges in embedding AI into the curriculum are analysed, providing valuable insights for educators keen on incorporating digital innovations.

Our findings show that "Consult-Ed" enhances learning outcomes by creating an engaging and practical educational environment that supports vital skill acquisition. This research highlights the transformative potential of AI in advancing medical education and showcases the importance of interdisciplinary collaboration in developing forward-thinking educational technologies.