



GLASGOW COMPUTING SCIENCE INNOVATION LAB

world changing innovation in computing science

Foreword: Change of Leadership

Phil Trinder, GLACSIL Director

So long and thanks for all the fish! Welcome to the Autumn GLACSIL Newsletter!

I will retire from the University and School at the end of September, and so will give up my role as a Director of GLACSIL. Jill Dykes will continue as a Director until the end of 2025 when she too will depart to pastures new. Prof Colin Perkins now joins GLACSIL as its new Director. Colin brings a wealth of Impact and Knowledge Exchange experience, and I'll leave him to introduce himself. In short: GLACSIL remains in safe and energetic hands.



It's great to see how GLACSIL has developed since being launched with six founding partners in March 2024. The first year focused in figuring out how best to collaborate: establishing a range of activities including a series of workshops and sandpits on topics of mutual interest, newsletters like this, research seminars. The second year has focused on deepening interaction, e.g. collaborating on Continuing Professional Development (CPD courses), and growing the number of partners: KEPSoft Collaborative - our first social enterprise, Tata Consultancy Services (TCS), and School start-up, Very Connect.

I wish you all every success over the coming years,

Phil Trinder

Welcome: New GLACSIL Director, Professor Colin Perkins

I'd like to thank to Phil Trinder and Jill Dykes, the outgoing directors of GLACSIL, for their leadership over the past two years. Their vision, energy, and dedication have built a growing research and innovation community, providing a strong foundation for the future development of the Innovation Lab. I'm sure you'll join me in wishing Phil an enjoyable retirement, and Jill success in her future endeavours. Their presence and experience will be deeply missed.

It's my privilege to take on the role as director of GLACSIL. My background has been at the intersection of research and technical standards development, designing Internet protocols and technologies, working closely with industry in the Internet Engineering Task Force (IETF) to incorporate research results into the technical standards that define the Internet, and helping build connections between the standards community, industry, and academic researchers. I look forward to bringing my experiences to GLACSIL, and to meeting with you all and learning from your experiences in turn to strengthen the GLACSIL community.



This edition of the GLACSIL newsletter celebrates the recent award of four prestigious European Research Council awards to the School. I'm also pleased to announce the next GLACSIL event will be on 10th November, where Dr Handal Gül Calikli and Dr Debasis Ganguly will talk about how to leverage large language models in software development, exploring strategies for effective use of AI to improve code quality and generate effective test cases. I hope to see you there!

Colin Perkins

School Scores 4 European Research Council Awards!

It's every researcher's dream. Freedom from most other responsibilities plus 5 years of funding to focus deeply on your research. Such is the offering with European Research Council grants, highly competitive programmes of funding available to researchers at different stages of their careers to do ground breaking work in their relevant discipline. These awards are highly prestigious and so highly competitive.

RIGHT NOW, 4 GLASGOW COMPUTING SCIENTISTS IN ONE RESEARCH GROUP HAVE AN ERC AWARD!

The Human Computer Interaction area of the School's research, known as GIST (Glasgow Interaction SysTems) has enjoyed great success in attracting ERC funding in recent years. This edition of the GLACSIL newsletter will focus on these award holders, and the research they're changing the world with.

Sponsorship Opportunity—STAC Conference November 2025

Support Computing Science Teaching in Schools

STACS (Scottish Teachers Advancing Computing Science) is a new kind of teacher association for Scottish CS teachers – run by teachers, for teachers – and supported by Scottish Government since 2022. STAC working to significantly improve outcomes in CS across all Scotland's schools, primary and secondary, addressing issues such as uptake, gender imbalance, teacher professional development, and the profile of the subject.

Their first annual conference will be held on 29th November 2025 at the Stirling Conference Centre. Industry partners, as stakeholders in the computing skills and education of young people, are offered an opportunity to support, attend, and engage with the STAC community through sponsorship of the conference—helping to ensure that teachers from all over Scotland are able to take up this opportunity to develop their skills, knowledge and network to take back to their classrooms.

Contact Professor Quintin Cutts for more details: quintin.cutts@glasgow.ac.uk

European Research Council Award Holders

FUTUREFAUNA—Animal Technology Interactions for Animal Welfare

Dr Ilyena Hirskyj-Douglas

Technology can enhance animal welfare by allowing animals greater control over their environment and choice over their social connections. Current animal-computer interfaces are often repurposed from human technology, neglecting animals' diverse physical capabilities, sensory perceptions, and cognitive processes. For instance, touch screens suited to human fingers pose challenges for animals with paws, beaks, or unique appendages, while human-based cognitive models underlying these interfaces potentially misinterpret or overlook critical aspects of animal cognition and behaviour. This disconnect between technology and animal users hinders effective interaction and constrains our capacity to gain accurate insights into animal minds.



To address this challenge, FUTUREFAUNA's ultimate goal is to draw from empirical evidence to develop a comprehensive framework for designing, implementing and adapting technologies for animal users. The ambition is to fundamentally reshape how animals implement control over their environment and provide radically different opportunities for social connections to improve their well-being. This level of agency will allow us new ways to observe how animals make choices, solve problems, and navigate social situations when given tools that match their abilities.

In the long term, FUTUREFAUNA will open up a new frontier to expand the use of information technology. It tests the foundations of human-computer interaction by looking at new ways to understand users and creating entirely new avenues for studying animal intelligence and social structures. By providing animals with more nuanced and species-appropriate ways to interact with their environment and each other, researchers will be able to explore questions about animal consciousness, emotional intelligence, and cognitive flexibility that were previously out of reach.

Ilyena has partnered, published, and worked in the tech industry, including Samsung EU, Microsoft Research, and Snapchat, as well as zoos and aquariums such as Korkeasaari Zoo and Blair Drummond Safari Park. Her research has also been featured in EU policy horizon scanning. She sees commercial opportunities in several sectors: zoos, aquariums, and safari parks seeking more effective enrichment technologies; companies developing technology for the home or pet tech market that need to better consider pets; and agricultural operations looking to enhance animal welfare. Much of her recent focus has been on how technology can enhance people's relationships with animals, such as in Cat Cafes, Zoos, etc.

Ilyena is keen to with forward-thinking companies for both commercial innovations and animal welfare improvements.

European Research Council Award Holders

BODYELECTRIC—NEW HAPTIC INTERACTIONS FOR DAY TO DAY TECHNOLOGIES

Professor Steven Brewster

BodyElectric will develop a new form of haptics using electrotactile stimulation to transform our ability to incorporate tactile feedback into everyday products, to create richer interactive experiences, with lower environmental cost.

Tactile haptics is a key feature of many devices, from phones to in-car user interfaces, significantly improving usability and user experience. However, touch is limited to vibration. Vibration actuators are bulky, low bandwidth, use non-sustainable materials, and only evoke a very limited set of sensations. This means we cannot make full use of our powerful touch sense and limits the applications of haptics. Electrotactile stimulation is the only effective solution for adding tactile displays to flexible devices with different geometries, at a low cost, power consumption and complexity. However, there are 4 key challenges that must be addressed:

- **Perception** – Knowledge of how electrical stimulation is perceived is limited; we have no clear basis on which to design comfortable, safe and effective stimuli
- **Electrode Design** – There are no sustainable electrodes, printable on to the surfaces of everyday devices to deliver stimulation
- **Impedance Changes** - Skin impedance and sensitivity vary over the body and over time; the same level of stimulation could become painful (or imperceptible) if the user sweats or moves their body
- **Interaction Design** - Little is known about how to design effectively using electrotactile haptics and there are no tools to help

Our vision to solve these problems requires ground-breaking work at the intersection of HCI, psychology and biomedical engineering to:

- Conduct fundamental studies in the perception of electrotactile stimulation
- Engineer sustainable electrode hardware and closed-loop impedance management for personalized feedback
- Create and validate new electrotactile and multimodal interactions
- Evaluate and demonstrate the practical effectiveness of electrotactile haptics in real world use

Steve says, “my second ERC Advanced Grant is a chance to return to my roots in haptics research and to rethink the foundations of how to deliver touch feedback and how we can use it across a whole new range of applications.”



European Research Council Award Holders

FUSION: XR Interaction Design for Immersive Technologies

Professor Julie Williamson

FUSION: Immersive technology (XR) designed for always-on interaction will forever change the way we communicate, collaborate, and connect with one another. XR technologies are rapidly advancing in terms of form factor and capabilities, but there is a present-future gap between how we use XR now and the rich social and interpersonal contexts where XR will be used in the future. If we fail to develop social XR interaction that bring us together, these devices could create isolating and fragmented human experiences.

There are open challenges around how XR will work in social settings and how engaging with immersive content will change the way we interact. A radical new approach is needed to break past current constraints of XR and realise the potential of social XR. FUSION proposes a novel combination of physical and virtual social signal processing to advance our understanding of how people experience hybrid reality/virtuality together and stabilise interpersonal human experiences in social XR.

Julie says “An ERC grant is a unique opportunity to immerse yourself in deep foundational research while addressing an ambitious blue-sky problem. The design of the ERC research programme requires both, where my project involves fundamental data driven research in human behaviour to inform the broader ways we’ll connect with each other in future immersive contexts.”

Open Science: Practicing open science isn’t about just sharing datasets, it’s about transparency in all aspects of your scientific work, including your ideas. As part of my dedication to open science, I’ve shared my successful FUSION proposal, alongside the failures on the path to that success, as CC-BY-NC-ND resources for the community.



<https://eprints.gla.ac.uk/330901/>

European Research Council Award Holders

Designing Interaction Freedom via Active Inference (DIFAI)

Professor Rod Murray-Smith

Algorithms can be useful tools and valuable partners to human decision making. However, as AI and machine learning continue to advance in capability, it's important that freedom is designed into systems to avoid the risk of humans becoming controlled and deskilled by algorithms instead of empowered by them.

The DIFAI project will develop tools for designing and analysing human interaction with artificial intelligences. Using a theoretical framework known as 'active inference', the project aims to harness the potential of sensing technologies and rich data spaces to link human behaviour with reliable, predictable computer assistants capable of stepping in to offer more help when required and stepping back when humans choose to take full control.

By the end of the project, Professor Murray-Smith and his co-investigators Dr John H. Williamson and Dr Sebastian Stein will have developed new systematic, composable software tools and mathematical models for a new generation of computational interaction design, as well as several practical demonstrator projects.

Professor Murray-Smith said: "Algorithms already play a major role in our lives, making decisions on our behalf on what we watch on TV, what music we listen to, which products we buy, which friends we keep in touch with. They also make life-and-death decisions in autonomous vehicles, medical care and organising our cities.

Dr Williamson added: "However, the field of human-computer interaction hasn't developed the theoretical tools and software at the pace required to keep up with these developments. Researchers haven't been able to create shared computational models which will enable us to build the strong foundations we need, to ensure a future where we can live useful, creative lives with the support of properly directed and controlled AI.

Murray-Smith concluded: "It will be challenging work, but will have potentially transformative impact on any future products which combine computers, sensors and humans. The Advanced Grant funding will be a critical factor in enabling this ambitious research, and we are enjoying being able to focus on this!"



School Start-Up VeryConnect Becomes GLACSIL's Newest Member

GLACSIL welcomes its newest member and long-standing partner and friend to the School, [VeryConnect](#). Founded in 2013 by 2 (then) School of Computing Science PhD students, Kyle White and Simon Jouet.



VeryConnect provides innovative events and membership management software solutions to a global customer base spanning societies, nonprofits, alumni networks, and professional organisations. Based in Glasgow, VeryConnect has a world-class development team including many SoCS graduates.

In 2020, VeryConnect became one of the first companies to join our Graduate Apprenticeship programme, and has been a continued participant ever since. It makes perfect sense to continue and to expand their connection with the School through GLACSIL membership. We look forward to seeing Kyle and the team at future GLACSIL events.

Fifth Glasgow Computational Biology Conference 2025 a grand success!



Over two days in September, biomedical researchers from across the university and beyond met in the ARC to share fantastic science. Fascinating keynotes from Dr Ava Khamseh (University of Edinburgh), Prof Ram Dasgupta (University of Glasgow) and Dr Kate Duncan (Newcastle University) gave insights on the latest bioinformatics methods and the challenges of interpreting the increasingly complex data. Topics ranged widely from the newest sequencing methods to innovative artificial intelligence and physical simulations applied to cancer, virology, marine data and so much more!

Brilliant talks and posters from students and staff along with a panel session on the challenges of software engineering in biology completed the exciting schedule. Prize winners were Javier Sanz-Cruzado (1st place poster), Benjamin Livesey (2nd place poster), Nina Fajs (flash talk) and Zita Fulop (talk).

The conference is the flagship event of the Glasgow Computational Biology Community – an organisation that runs regular events to connect the researchers across the university who face challenges. It's open to all researchers using computers to solve biology problems. If you have a big data set you can't interrogate deeply, or you have novel algorithms you'd like to apply to a data set, then working closely with peers in the Computational Biology Community can open new avenues.

Join the mailing list and find out more about the community at <https://glasgow-compbio.github.io/>

Making a Difference—World Leading Research at Glasgow

Detection of Infantile Epileptic Spasms from AI Video Analysis

Congratulations to our [Dr Edmond Ho](#), alongside clinical colleagues at NHS Greater Glasgow and Clyde (Professor Sameer Zuberi, and Dr Neil Patel) on securing £174,981 from the Epilepsy Research Institute UK to develop AI video image analysis technology. This research aims to develop an AI-based system that can detect Infantile Epileptic Spasms (IES) from smartphone videos.

This area is recognized as a top priority because early and accurate diagnosis of epilepsy, especially in infants, is crucial for timely treatment and improved outcomes. There are a few studies which analyse the body movements of the patient from RGB videos for epileptic seizure detection and classification. However, the videos were recorded in a controlled environment (e.g. in hospital) and only a small patient cohort (eg <10) was recruited. In contrast, the approach proposed by this team focuses on analysing videos recorded by parents/carers of infants in uncontrolled environments (e.g. home) which will more accurately reflect the community and clinical resources worldwide.

Using AI for video analysis offers a scalable, non-invasive, and cost-effective solution, potentially revolutionizing how epilepsy is detected in clinical and home settings. The AI system will be incorporated into a web-based decision support tool, helping and not replacing the clinician in the diagnostic process.

The research will involve organising PPIE activities to co-create a user-centric AI system for supporting caregivers in recording videos with the required quality. The videos will be collected using the secure NHS-adopted vCreate Health Web-App, which will be assessed and annotated by clinical experts to identify body movement patterns associated with IES. An AI software prototype will be developed and trained using the video data with the clinical annotation to perform the automated IES detection. The data access and analysis will be done within a secured cloud computing platform to ensure data security and privacy. The AI prototype to be developed will serve as the pilot study results to inform future research and development directions for patient pathway integration.

This research is expected to enhance understanding of how subtle movement patterns in infants can be early indicators of epilepsy, specifically IES. It will demonstrate the potential of AI to identify these patterns from smartphone videos recorded by caregivers, which may not be easily noticed by caregivers or even specialists.

The impact of this study could be transformative for people affected by epilepsy, particularly infants and their families. The AI system could significantly reduce the time to diagnosis, allowing for earlier intervention and improved treatment outcomes. Additionally, the remote, video-based nature of the system can provide access to specialized assessments for those in underserved or remote areas, reducing the burden on healthcare systems and improving the quality of life for affected individuals and their families.

The PPIE work carried out with children and families emphasised that AI must be implemented alongside human, clinical specialists not as an alternative.



HOLD THE DATE—Upcoming Events

GLACSIL events, and School research seminars are **open to research and innovation staff of member partners**, and by request from other industry friends and colleagues. In person attendance is encouraged to aid discussion and networking. Some events have remote participation options. Please Visit and **subscribe to all upcoming events and seminars** in the School of Computing Science at <https://samoa.dcs.gla.ac.uk>.

Please contact compsci-innovation@glasgow.ac.uk for further information about finding and joining our events, or to suggest event topics.

Leveraging LLMs in the Software Development Lifecycle: Practical Insights on Code Quality and Test Generation

Dr Handal Gül Calikli & Dr Debasis Ganguly, School of Computing Science

10th November, 12:15pm—1:45pm, Studio 2, Advanced Research Centre, University of Glasgow

Register at: <https://www.eventbrite.co.uk/e/1737843770499>

Large Language Models (LLMs) like GPT-4.o are becoming powerful tools in modern software engineering—powering code assistants, enabling rapid prototyping, and now playing a growing role in testing. This talk shares two industry-relevant research studies focused on helping developers make the most of LLMs in real-world workflows.

The first study addresses a common challenge in feature-driven and rapid development environments: how do you assess the quality of generated code when you don't yet have tests? We present a practical technique that uses in-context learning (ICL) to estimate the functional correctness of LLM-generated code by analyzing ranked alternatives—similar to how search engines rank results. By showing LLMs examples of correct code during generation, developers can get more reliable signals about which output is most likely to work.

The second study dives into automated unit test generation—a time-consuming but critical task. We evaluate how LLMs perform when prompted with different types of test examples: human-written, traditional tool-generated (like SBST), and LLM-generated. Our findings, based on popular benchmarks and GPT-4.o (used in tools like GitHub Copilot), show that the right few-shot examples—especially human-written ones—can significantly improve test quality and code coverage. We also demonstrate how combining code and problem similarity helps select the most effective examples automatically.

Packed with actionable insights, this session will help practitioners understand how to better guide LLMs, improve the reliability of generated code, and boost the effectiveness of automated testing—all without overhauling existing workflows.



[Dr Gul Calikli](#)



[Dr Debasis Ganguly](#)

How to Join GLACSIL

Glasgow Computing Science Innovation Lab is a hybrid venture that brings together that brings the School's research community together with our committed research-led industry partners.

Further information on benefits, how to join, news and events is available at www.gla.ac.uk/schools/computing/industry/innovationlab/.



Share Your News with GLACSIL Partners and the School

GLACSIL industrial partners, colleagues, and friends of the School are invited to share their news in the next edition of this newsletter. News stories for social media distribution can be submitted at any time.

Please email compsci-innovation@glasgow.ac.uk with approved text, images and links.

