

# GLASGOW COMPUTING SCIENCE INNOVATION LAB

world changing innovation in computing science

## Foreword: Professor Phil Trinder, GLACSIL Director and Academic Lead

Welcome to the first quarterly GLACSIL newsletter. We are delighted to have launched the GLASgow Computing Science Innovation Lab (GLACSIL) with 6 founding partners: Nokia Bell Labs, BT Research, Thales, Moodagent, International Data Flows, and DotPhoton. We expect other partners to join soon!

The induction and launch events on the 22nd March were great fun. In addition to the seminar series, there are a sequence of engagement events planned in the coming months, starting with one on Open Source Software in late May.

We are just starting out, and welcome suggestions and ideas.

*Phil Trinder*



## RESPONSIBLE AI RECEIVES FUNDING BOOST

A multi-disciplinary team of researchers, led by [Dr Simone Stumpf](#), and colleagues at the University of Glasgow's School of Computing Science, has just been awarded £3.5m by Responsible AI UK to investigate and develop and deploy AI auditing techniques. The team identified that a significant barrier to reaping the benefits of predictive and generative AI is their unassessed potential for harms. The project, brings together a consortium of 7 academic institutions and 23 partner organisations, to fix this fundamental challenge through the novel concept of **participatory AI auditing**. A diverse set of stakeholders without a background in AI, such as domain experts, regulators, decision subjects and end-users, will undertake audits of predictive and generative AI, either individually or collectively.

The research is grounded in four use cases: **health, media content, cultural heritage and collaborative content generation**. To enable stakeholders to carry out an audit, the project will produce **workbenches** that support them in assessing the quality and potential harms of AI. The participatory audits will be embedded in **methodologies** which guide how, when and who carries out these audits. The research team will then **train** stakeholders in carrying out participatory audits and work towards a **certification framework** for AI solutions.

Known as "Participatory Harm Auditing Workbenches and Methodologies" (PHAWM), the project brings together a consortium of seven academic institutions – **Glasgow (lead), Edinburgh, Kings College London (KCL), Sheffield, Stirling, Strathclyde and York** – to extend the ecosystem of researchers currently engaged in RAI research. The team includes 25 named team members from a variety of disciplines. The project will recruit an additional 9 post-doctoral researchers, across HCI, Arts and Humanities, Social Sciences, Computer Science and Information Science disciplines, and will sponsor 6 PhD studentships aligned with this project.

PHAWN has received commitment from 23 external partner organisations, indicating the strong interest in new auditing approaches that can improve RAI and further an EDI agenda. The research is grounded in 4 use cases, developed with partners who will provide datasets and facilitate access to stakeholders: **NHS NSS** will contribute to the Health use case, **Istella** will contribute to the Media Content use case, **National Library of Scotland, Museum Data Service and David Livingstone Birthplace Trust** will participate in the Cultural Heritage use case, and **Wikimedia and Full Fact** will be involved in the Collaborative Content Generation use case. Individuals from **Women's Enterprise Scotland, the Scottish Government and IBM**, representing stakeholders, will also participate in the advisory board.



Companies already actively involved in RAI research, such as GLACSIL members, **Nokia Bell Labs, Microsoft Research NYC, and Microsoft Research UK, Meta and Fujitsu** will contribute directly to project activities through access to experts.

The funding comes as part of a wider investment of £12m from Responsible AI in a series of research projects in this field. [https://rai.ac.uk/press\\_release/12-million-for-uk-projects-to-address-challenge-of-rapid-ai-advances/](https://rai.ac.uk/press_release/12-million-for-uk-projects-to-address-challenge-of-rapid-ai-advances/)

# Making a Difference—World Leading Research at Glasgow

## Resilience for Critical National Infrastructure

Last month, [Professor Dimitrios Pezaros](#) of the School of Computing Science proudly announced the beginning of his 5-year RAEng Research Chair programme in “Digital Resilience for Critical National Infrastructure”.

Critical National Infrastructure (CNI) is the process of being digitally enhanced and interconnected by an interface of Operational Technology (OT) with generic ICT capability. These technological developments bring modernisation and sustainability of the CNI, but also means they are increasingly exposed to cyberattacks with potentially catastrophic consequences to society, national defence, and the functioning of the state.

Ensuring the resilience of the CNI against a dynamically evolving set of threats comes with a myriad of problems including resource constraints, the lifespan of necessary OT components and supply chain strategies which limit their cyber resilience making the process incredibly challenging.

The aim of this research chair is to devise a holistic approach to increase digital strength of converged IT/OT technology used by Defence and Civil Nuclear CNI sectors, addressing relevant technical and organisational challenges. Over the next five years the Dimitris and his team will investigate the instrumentation, measurement and control mechanisms necessary to bolster the ability of systems to respond to challenges in their dynamic operation. Furthermore, they will develop data-driven and machine-learning approaches to quickly identify adversarial events common in digital infrastructure by combining operational data with global cyberthreat intelligence feeds. Finally, they will assess the impact of the consequent enhanced cyber-response automation to relevant organisational processes, and devise guidelines for the enhancement of cybersecurity and resilience guidance and standards.

Dimitris co-supervises a studentship with GLACSIL partners, [BT Research](#), on how to devise network-wide platforms that can manage and interconnect Network Functions for many customers at scale and over the Internet.



## Win for Biomedical AI and Cancer Research

The School's [Dr Jake Lever](#) has been successfully awarded £373,349 by the National Institute for Health in the US to develop and apply machine learning techniques that will automatically read cancer research papers to help catalogue the meaning of different cancer mutations and how they may affect patients' treatments.

Modern DNA sequencing technologies enable us to probe the genetics of individual cancers. Each cancer is unique and can have a multitude of mutations. However, understanding the importance and impact of each of those mutations is hugely challenging and relies heavily on searching the research literature. The CIViC database, managed by the Griffith Lab at Washington University at St Louis, collates this knowledge on cancer mutations from research papers for fast searching by clinicians and researchers worldwide. However, keeping it up to date involves a lot of human effort to read the latest research. The collaboration with Dr Lever here at Glasgow will enable the latest innovations in language technologies to be applied to automatically process research papers and flag relevant research useful for the CIViC database.



### The goals of the project are to:

- Develop new approaches for identifying mentions of genes, cancers, drugs and mutations in research papers and identify the described impact of those mutations on the associated cancer;
- Build new AI methods to identify the level of support a paper gives for this information (i.e. whether it is a clinical guideline or a weakly supported hypothesis).

This vital work will help the team of curators at the CIViC database to speed up their curation by integrating natural language processing (NLP) methods into how they read papers.

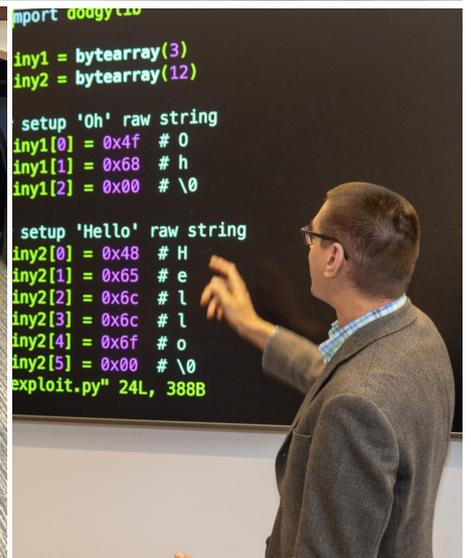
This project and the methods developed will likely be of interest to pharmaceutical companies who need to collate and track biomedical knowledge published in the latest literature. The developed methods will be valuable for extracting many different types of biomedical knowledge.

# GLACSIL LAUNCHES WITH 6 FOUNDING PARTNERS

On March 22nd, founding member companies and School of Computing Science Colleagues celebrated the official launch of GLACSIL. Industrial partners worked with us through the morning as we traded information on our research strengths and interests to help aid future exchanges and collaborations.

In the afternoon, slides were swapped for drinks and canapes, opening words from [Professor Dame Muffy Calder](#), and Head of School, [Professor Simon Gay](#), in amongst demonstrations of some of the impressive research and technologies under development within the School, and a pop-up talk on secure programming by [Dr Jeremy Singer](#).

The greatest success of the day was the cemented relationships between member companies and the School, along with a refreshed appetite to work together.



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# HOLD THE DATE—Upcoming Events

GLACSIL has recently announced an event programme for the remainder of 2024. 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. The event series aims to explore a range of topics at the intersection of academia and industry interests. Visit and **subscribe to all upcoming events and seminars** in the School of Computing Science at <https://samoa.dcs.gla.ac.uk>, and via the links below for up to date details of talks, speakers, venues, and links for remote participation. New events, speakers, and full details are updated regularly so subscribe to the GLACSIL channel and others of interest for the latest information on what's on.

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

## GLACSIL Events

28<sup>th</sup> May, 2pm – 4pm

Title: [Open Source: Academic and Industry Perspectives](#)

This session explores the opportunities and risks of contributing to and utilising open source resources in both an academic and industrial context. Led by School Open Source Lead, Dr Sean MacAvaney, we'll hear about the role that open source can play in achieving research impact, and what factors to consider. Dr William Petterson will share insights from the Kidney Exchange Project as an example of both open source and proprietary technology being commercialised in a spin out company. Also confirmed to speak is Ian Hendry, Software Engineering Manager at SAS R&D in Glasgow, on his experiences of the AWS Open Search Project.

25<sup>th</sup> June, 2pm – 4pm

Title: [Building and Sustaining a Successful Research Culture](#)

What does a successful research culture look like, and how does this differ in an industry versus an academic environment. Colleagues and industrial partners will share their thoughts on this topic, including Fahim Kawsar, Director of Device Research at Nokia Bell Labs, and Professor of Mobile Systems within the School of Computing Science.

17<sup>th</sup> September, 12pm – 2pm

Title: [Research Skills for Innovation](#)

This event will focus on the skills needed for excellent research and innovation in different academic and commercial contexts. Speakers TBA.

29<sup>th</sup> October, 12pm – 2pm

Title: [Topic TBC](#)

More on this soon

3<sup>rd</sup> December, 2pm – 5pm

Title: [GLACSIL Partner Studentship Showcase & Festive Celebration](#)

We'll complete the year with a celebration of the research students, and their work, at the heart of GLACSIL membership. These industrially sponsored students and graduates will demonstrate and / or present their projects in amongst festive drinks and nibbles.

## SoCS Research Seminars

13th May, 3pm -4pm

Information Retrieval Section

Title: [In-Context Learning: How I learned to stop worrying and love Applied Information Retrieval](#)

Speaker: Dr Debasis Ganguly, School of Computing Science, University of Glasgow

15th May, 3pm, 4pm

Low Carbon and Sustainable Computing Theme

Title: [Programming Languages Concepts for \(Climate\) Science](#)

Speaker: Dr Dominic Orchard, Co-director at Institute of Computing for Climate Science, University of Kent (Remote presentation)

16th May, 1pm—2pm

Human Computer Interaction Section (GIST)

Title: [Sonic Entanglement. Exploring Audio AR's impact on human behaviour and its possible application in digital humanities](#)

Speaker: Alessandro Privitera (visiting PhD student)

22nd May, 3pm—4pm

Programming Languages Theme

Title: [Implementing a Language Server Protocol for Links](#)

Speaker: Brandon Forrest (MSci Project Talk)

3rd June, 3pm—4pm

Information Retrieval Section

Title: [TBC](#)

Speaker: Ferdinand Schlatt, Friedrich Schiller University Jena

6th June, 3pm—4pm

Centre for Computing Science Education

Title: [TBC](#)

Speaker: Harold Thimbleby, Swansea University

17th June, 3pm—4pm

Information Retrieval Section

Title: [TBC](#)

Speaker: Yanran Tang, University of Queensland

# Partnership Wins! GLACSIL Studentship Successes

Congratulations Dr Marco Aversa who successfully defended his PhD thesis at the university of Glasgow. His work was co-sponsored by Dotphoton, a member of the Glasgow Computing Science Innovation Lab (GLACSIL), and QuantIC – The UK Quantum Technology Hub in Quantum Enhanced Imaging, and supervised by Professor Roderick Murray-Smith in the School of Computing Science, and Professor Daniele Faccio in the School of Physics and Astronomy.

Dr. Aversa's research has advanced the field of computational imaging through the use of physics-informed and generative models in machine learning. This aligns closely with Dotphoton's commitment to integrating quantum physics insights into raw image compression, particularly for applications in biomedical, automotive and aerospace industries. His efforts have led to innovative methods for generating metrologically accurate synthetic data, enhancing the robustness of machine learning models.

Throughout his studentship, Dr. Aversa collaborated closely with Glasgow's experts in variational inference and quantum sensing, enriching both his research and its applications in quantum image processing. His contributions have not only broadened the academic horizons of the University, but have also infused new technological perspectives into practical, real-world challenges faced by Dotphoton, building a model that can generate accurate synthetic images for histopathology, a method to adapt the vision pipeline of satellites to accurately and affordably identify vehicles on earth and technology to ensure the robustness of AI when facing real-world variability.

As a result of this work, Marco has been appointed as Senior Research Scientist at Dotphoton, where he'll be working on synthetic data generation for critical and sensitive applications.

Marco says "collaborating between industry and academia has given me insight into the demands of real-world applications while exploring and developing state-of-the-art research models".

Co-supervisor, Professor Roderick Murray-Smith said "This work is an exciting example of the interdisciplinary research that has been developing at the University of Glasgow over the last decade, as part of the EPSRC-funded QuantIC project, bringing computing science and physics researchers together. Marco's Ph.D. brought the strengths of data-driven machine learning together with physical insight, to better achieve the goals and meet the practical constraints of real-world applications."

CEO of Dotphoton, Bruno Sanguinetti remarked "AI has been moving fast, and as the technology we develop is rather advanced, having Marco onboard, who has four year experience in it, is invaluable. It is a real pleasure to collaborate with the University of Glasgow, which manages to keep at the forefront of technology without losing practical applications from sight."



Congratulations to Dr Tom Wallis who passed his PhD Viva on 8th May 2024, as a result of the studentship sponsored by GLACSIL partners, International Data Flows.

Tom said, "I'm very happy to have completed my PhD viva! It's been a fantastic experience. My project was on the application of Aspect-Oriented Programming to simulations & models. In it, we've taken concepts from the design of programming languages and found that they apply well to the design & development of software models. This gives research software engineers a new tool to use when building experiments and other research software."

"The work may help to design experiments in new ways, and to simplify the development and maintenance of complicated research projects. The sponsors of the project — International Data Flows — have been extremely supportive throughout my PhD, and their guidance has helped to ground the research in its practical applications, for which I'm especially grateful! I know our conversations have helped to

add new perspectives in their own R&D too. We still talk about the design of models and projects we could try. I'm now a research software engineer at Kings College London, and still thinking often about aspect orientation and model design!"

Fergus Cloughey, CEO of International Data Flows said, "we have sponsored many students at all levels from the School of Computer Science. We are absolutely delighted that Tom has reached doctoral level and we congratulate him on achieving his PhD. The University of Glasgow has always produced world class engineers and we are delighted to have played our part in Tom's development and look forward to supporting more students through the university and GLACSIL going forward".

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## 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/](http://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. The deadline for submissions is 30th August for publication no later than 13th September.

News stories for social media distribution can be submitted at any time.

Please email [compsci-innovation@glasgow.ac.uk](mailto:compsci-innovation@glasgow.ac.uk) with approved text, images and links.



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