

PhD researcher in Machine Learning Systems at the University of Edinburgh working on efficient machine learning. Work spans language models, spiking neural networks, GPU programming and FPGA acceleration.

Education

University of Edinburgh | Edinburgh, UK

PhD in Machine Learning Systems | Sep 2024 – Present

Supervisors: Henry Gouk and Elliot J. Crowley.

Heriot-Watt University | Edinburgh, UK

BEng in Computer and Electronics Engineering, First-Class Honours | Sep 2019 – Jun 2023

Dissertation: Denoising Dynamic Vision Sensors using Spiking Neural Networks.

Research and Engineering Experience

University of Edinburgh | Edinburgh, UK

Research Assistant | Jan 2026 – Sep 2026

Rigpa AI | Edinburgh, UK

Research & Development Engineer | Dec 2023 – Aug 2024

Designed hardware for a language model accelerator; co-designed a quantized model format and its hardware implementation on Xilinx Alveo FPGAs.

Neuromorphic Engineer Intern | Jun 2023 – Dec 2023

Accepted Papers

Benchmarking Open-Ended Multi-Agent Coordination in Language Agents

Kale-ab Abebe Tessler, Andras Szecsenyi, **Cameron Barker**, Alexander Rutherford, Davide Paglieri, Aidan Scannell, Henry Gouk, Elliot J. Crowley, Tim Rocktäschel, Amos Storkey.

NeurIPS 2026, Evaluations & Datasets Track. [Paper](#).

Kalman Linear Attention: Parallel Bayesian Filtering For Efficient Language Modelling and State Tracking

Vaisakh Shaj, **Cameron Barker**, Aidan Scannell, Andras Szecsenyi, Elliot J. Crowley, Amos Storkey.

ICML 2026. [Paper](#).

Implemented chunked scan kernels in CUDA, Triton and Metal. Contributed to model development and pretraining.

Manuscripts Under Review

Heterogeneous Structured Pruning Under Resource Constraints for Hardware-Efficient Large Language Models

Cameron Barker^{*}, Andreas Paraskeva^{*}, Jan N. van Rijn, Elliot J. Crowley, Henry Gouk.

Under review at AAAI-27. [Project page](#).

Proposed and developed a hardware-aware pruning method for language models. Implemented sparse GPU kernels for the NVIDIA Jetson Orin Nano Super.

Beyond Context Length: Characterising the Difficulty of Long-Context Reasoning

Shiwen Qin, **Cameron Barker**, Henry Gouk, Elliot J. Crowley, Shay B. Cohen, Mirella Lapata, Miao Li.

Under review at ICLR 2027. [Project page](#).

CopuAdapt: An Attentional Copula Adapter For Improved Joint-Distribution Sampling In Probabilistic Time-Series Forecasting

Benjamin R Redhead, Chang Xu, **Cameron Barker**, Thomas L Lee, Elliot J. Crowley, Henry Gouk, Víctor Elvira, Amos Storkey, Li Zhao.

Under review at ICLR 2027. [Project page](#).

Technical Skills

Programming: Python, C, C++, SystemVerilog.

Machine learning and GPU computing: PyTorch, JAX, CUDA, Triton, Metal.

Hardware: Xilinx Alveo FPGAs, Vivado and Vitis.

Development tools: Linux (NixOS), Git, Docker, Kubernetes, $\text{\LaTeX}$.

Additional Experience

Heriot-Watt University | Edinburgh, UK

Intern with Donald S Reay | May 2023

Developed FPGA lecture and laboratory materials for “Advanced Digital Electronics”.

Researcher with Yoann Altmann | Jun 2022 – Aug 2022

Implemented a published variational learning model for probabilistic spiking neural networks and evaluated it against deterministic spiking networks.

Research Presentations

- **Efficient AI for Novel Hardware through Neural Architecture Search.** APRIL AI Hub Seed Funding Webinar, 23 September 2026.
- **Heterogeneous Structured Pruning.** Poster and lightning talk, AutoML26, Ljubljana (2026).
- **When should you use diffusion language models?** MLSystemsCDT company day (2025).

Awards and Funding

- Helped secure a £40,000 EPSRC APRIL AI Hub seed grant for efficient LLMs on edge hardware, with a matched industrial contribution.
- EPSRC Centre for Doctoral Training in MLSystems PhD studentship.
- Heriot-Watt University Deputy Principal’s Award, three times.