Curriculum vitae

Liam Chalcroft

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Machine learning researcher working on medical and spectral imaging: domain generalisation, physics-constrained synthetic data, and self-supervised pre-training for 3D imaging. Currently Founding Computer Vision Scientist at Prospectral.

Experience

Founding Computer Vision Scientist 2025–present

Prospectral, London

- Lead machine learning research and integrate the models into the product.
- Build production systems spanning spectral sensing, computer vision and model deployment.
- Set the technical direction for machine learning in spectral imaging.

Computer Vision Researcher 2024

Tractive, London

- Led ML research at an a16z-backed pre-seed startup applying 3D generative AI to retopology.
- Trained transformers at scale with PyTorch and FSDP on Google Cloud.
- Wrote production backend code in C++ and Rust.

PhD Researcher 2021–2026

Wellcome Centre for Human Neuroimaging, University College London

- Built a physics-constrained synthetic data framework for stroke lesion segmentation across clinical scanners and MRI sequences.
- Designed convolutional attention architectures for 3D segmentation, presented at the Medical Imaging meets NeurIPS 2023 workshop.
- Developed sequence-invariant contrastive pre-training for 3D MRI encoders.
- Contributed to the ISLES'22 challenge ensemble published in *Nature Communications*.

MRes Researcher 2020–2021

University College London

- Built hypernetwork-based segmentation conditioned on imaging domain.
- Studied frame-level false positives in ultrasound segmentation, with a paper at the ASMUS workshop at MICCAI 2021.

Research Scientist, Intern 2018–2019

Schlumberger Cambridge Research, Cambridge

- Characterised non-Newtonian drilling fluids by rheology and diffusing-wave spectroscopy.

Education

PhD, Machine Learning 2021–2026

University College London

- Thesis: Robust Deep Learning for Stroke Detection in Clinical Neuroimaging.
- Supervised by Prof. John Ashburner and Prof. Cathy J. Price FRS.
- i4health CDT (EPSRC and Wellcome).

MRes, Medical Imaging 2020–2021

University College London, *Distinction*

MSci, Chemical Physics 2016–2020

University of Bristol, *First Class Honours*

Teaching and supervision

Fellowship Project Supervisor 2023–2024
Fatima Fellowship

MSc Project and Research Supervisor 2022–2026
University College London

Tutor, Machine Learning and Data Science 2022–2024
Cambridge Spark

Outreach Project Supervisor 2022
In2Research and University College London

Teaching Assistant and Guest Lecturer 2021
COMP0090 Introduction to Deep Learning, University College London

Talks

Gradient-manifold alignment scheduling for physics-guided diffusion April 2026
SPIE Photonics Europe 2026, *oral*.

Domain-Robust Deep Learning for Stroke Detection in Clinical Neuroimaging April 2026
yESMInar #37: AI in Medical Imaging, European Society for Molecular Imaging, *invited talk*.

Publications

GAZE: Grounded Agentic Zero-shot Evaluation with Viewer-Level Tools and Literature Retrieval on Rare Brain MRI. *AIiH 2026*. 2026

Tokenizer-Generator Coupling in Medical Image Generation. *NeurIPS 2026*. 2026

Gradient-manifold alignment scheduling for physics-guided diffusion. *SPIE Photonics Europe 2026*. 2026

Robust Deep Learning for Stroke Detection in Clinical Neuroimaging. *UCL PhD 2026*. 2026

Self-directed multimodal AI: multi-turn reasoning vision–language models for rare brain pathology. *RCR Open 2026*. 2026

Unified 3D MRI Representations via Sequence-Invariant Contrastive Learning. *SASHIMI 2025*. 2025

Domain-Agnostic Stroke Lesion Segmentation Using Physics-Constrained Synthetic Data. *MICCAI 2025*. 2025

Synthetic Data for Robust Stroke Segmentation. *MELBA 2025*. 2025

DeepISLES: a clinically validated ischemic stroke segmentation model from the ISLES'22 challenge. *Nature Comms 2025*. 2025

LKA: Large-kernel Attention for Efficient and Robust Brain Lesion Segmentation. *NeurIPS MedImg 2023*. 2023

Development and evaluation of intraoperative ultrasound segmentation with negative image frames and multiple observer labels. *ASMUS 2021*. 2021

Skills

Python, Rust, C++, MATLAB. languages

PyTorch, MONAI, SPM. frameworks

Medical image analysis, domain generalisation, synthetic data, self-supervised learning, generative modelling, spectral imaging. domains