Qisheng (Adam) Zhu

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Summary: BA&MSc Cambridge graduate with backgrounds in mathematics, specialised in cognitive neuroscience. Experiences in computational modelling, neural networks, human behavioural experiments.

Education

University of Cambridge, Cambridge, UK *2021.10 - 2025.07*
Master of Science in Natural Sciences, Systems Biology
- Grade: Class I, ranked 2/15.
- Thesis: *The Emergence of N-gram Neurons and Feature Binding from an In Silico Visual Cortex.* Supervisor: Greg Davis. Thesis awarded the cohort's Best Research Project Prize.

Bachelor of Arts in Natural Sciences, Psychology
- Grade: Class I, ranked 6/38.
- Thesis: *Causal Basis of Biases in Visual Estimation.* Supervisor: Paul Bays. Thesis nominated by the University of Cambridge for the 2024 EPS/BSA Project Prize.

Research Experiences

University of Cambridge, Department of Psychology, Visual Cognition Lab *2023.12 - present*
Supervisor: Dr. Greg Davis
- Graduate research project investigating the feature binding problem in vision.
- Independently developed a biologically inspired spiking neural network model of the visual cortex. Designed and executed in silico object recognition tasks to train the cortex. Investigated the emerged neural tuning properties and feature binding in the cortex.
- Gained experiences in building artificial neural networks, modelling biophysically realistic neurons, conducting in silico electrophysiological experiments, and analysing neuronal tuning and network dynamics using Python (PyTorch). Acquired knowledge in GPU programming (CUDA Numba) and operating high-performance computing clusters.
- Intermediate results submitted as an MSc thesis and awarded the cohort's 2025 Best Research Project Prize in Systems Biology. Abstract accepted for conference presentation.

University of Cambridge, Department of Psychology, Computational Cognition Group *2023.10 - 2024.06*
Supervisor: Prof. Paul Bays
- Undergraduate research project investigating the neural resource allocational biases in human visual working memory.
- Independently built a stochastic neural population coding model to quantify neural resource allocation strategies across visual items in working memory. Additionally, contributed to experimental execution on human participants and behavioural data analysis.
- Gained experiences in stochastic modelling and constructing population coding models using Python (SciPy) and MATLAB. Acquired knowledge in Bayesian statistics and Bayesian hypothesis testing using JASP. Learned skills in scripting and executing psychophysical experiments on MATLAB (Psychtoolbox) with eye-tracking devices.
- Project resulted in an undergraduate thesis and received a theoretical full mark. Nominated by the University of Cambridge for the 2024-2025 EPS/BSA Undergraduate Project Prize.

University of Cambridge, Department of Genetics *2025.03 - 2025.04*
Supervisor: Dr. Karen Lipkow
- Collaborative project investigating the dynamics of harmful algal blooms in waterbodies.
- Independently developed a Fourier-based LSTM ensemble model for forecasting algal blooms events in North American water systems. Applied to real-world forecasting tasks.
- Gained experiences in designing and building neural networks using Python (TensorFlow). Acquired skills in data mining and ML pipelining.

- Project led to a poster presentation and awarded the 2025 Stephen G. Oliver Group Project Prize in Systems Biology.

University College London, Institute of Behavioural Neuroscience, Solomon Lab *2023.08 - 2024.04*
Supervisor: Prof. Samuel Solomon

- Independent research project investigating the influence of environmental contexts on motion perceptions in human vision.
- Independently designed a VR-based psychophysical experiment. Additionally, developed a stochastic staircase algorithm for data collection.
- Gained experiences in building VR-based psychophysical experiments using Unity engine (C#) and Blender. Learned skills in operating VR head-mounted displays.

University College London, Institute of Behavioural Neuroscience, Saleem Lab *2023.06 - 2023.08*
Supervisor: Prof. Aman Saleem

- Research project investigating the effect of self-locomotion on human optic flow perception.
- Executed VR-based human behavioural experiments with motion tracking devices. Managed bulk data analysis and in silico simulations on behavioural recordings.
- Gained experiences in conducting bulk data analysis and Monte Carlo simulation using Python (SciPy) and R. Acquired knowledge in operating VR displays and motion-trackers.

Work Experiences

Neureality *2022.12 - present*
Scientific Editor

- A member of editorial team of Neureality, an online non-profit organization aiming at broadcasting news and research breakthroughs in neuroscience to the general public.
- Assisted in selecting neuroscience-related articles from reputable, royalty-free journals, publications, and web-based blogs and translating them into Chinese.

Publications & Conferences

Zhu, Q., & Davis, G. (2025, October). *Emergence of partial conjunctions in artificial neural networks: a tractable solution to the binding problem in vision*. Poster presentation at the Society for Neuroscience Annual Meeting (SfN 2025), San Diego, CA, United States.

Award & Scholarships

Scholar of St. Catharine's College *2024 & 2025*

- Awarded for exceptional academic achievements (Dean's List equivalent).

Best Research Project Prize in Systems Biology *2025*

- Awarded for the best research thesis in the Cambridge systems biology cohort.

Stephen G. Oliver Group Project Prize in Systems Biology *2025*

- Awarded for the best group research project in the Cambridge systems biology cohort.

ESP/BSA Undergraduate Project Prize *(Nomination)* *2024*

- Nominated for the best psychological undergraduate research thesis across UK universities and research institutes.

Programming & Skills

Python (NumPy, Pandas, SciPy, PyTorch, TensorFlow, CUDA Numba, PyStan), **R**, **JASP**, **MATLAB** (Psychtoolbox), **C#**, **LINUX**, **LaTeX**, **Unity Engine**, **Blender**, **High-performance Computing**, **VR HMDs**, **Eye Tracking Devices, Motion-trackers**