

Dinghao Luo

Biomedical Data Scientist | Causal Inference & Applied Statistics | Neuroscience PhD Candidate

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Relocating to UK/EU · Available January 2027

Neuroscience PhD candidate with six years of experience designing controlled studies and building reproducible Python pipelines for high-dimensional longitudinal biological data. Applied generalised linear models, matching, and causal methods across electrophysiology, behavioural and two-photon imaging data. Developed an open-source, human-in-the-loop PyTorch U-Net application that greatly accelerated two-photon data processing. Strong background in experimental design, causal inference and technical communication.

CORE SKILLS

Experimental design	Controlled optogenetic and pharmacological interventions, randomisation, within-subject and repeated-measures designs, power analysis, positive and negative controls
Applied statistics	GLMs, survival analysis, time-series analysis, dimensionality reduction, high-dimensional population analysis, permutation and resampling inference, multiple-testing correction
Causal inference	Treatment-effect estimation, matching, difference-in-differences
Languages	Python (pandas), SQL (PostgreSQL), R (tidyverse, survival, MatchIt), MATLAB
ML and Data	PyTorch, scikit-learn, statsmodels, NumPy, SciPy, Git, data visualisation

EXPERIENCE

Graduate Researcher · Max Planck Florida Institute for Neuroscience May 2021–Dec 2026

- Designed and executed data collection and causal interventions (e.g. optogenetics) across more than 100 animal recording sessions, estimating treatment effects on neural dynamics during goal-directed behaviour.
- Built end-to-end pipelines in Python for processing more than 50 terabytes of electrophysiology and two photon imaging, including time-series analysis, dimensionality reduction, and population-level analysis.
- Applied GLMs, matching and permutation inference to show that dopamine input to the hippocampus tunes an ongoing hippocampal computation instead of initiating it, contrary to the initial hypothesis.
- Open-sourced the analysis pipelines; first-author manuscript submitted to *Cell*.

Undergraduate Researcher · University of Cambridge, Paulsen Lab July 2019–Apr 2020

- Designed electrophysiology experiments testing whether dopamine modulates synaptic plasticity thresholds in hippocampal CA1; First-Class thesis.

Research Intern · UCL Queen Square Institute of Neurology July–Aug 2018

- Quantified cathepsin B activity in Down syndrome mouse models. Co-authored paper published in *Acta Neuropathol. Commun.* 11, 132 (2023).

SELECTED PROJECTS

FibreSight · github.com/dinghaoluo/fibre-sight

- Built and open-sourced a PyTorch U-Net and Qt workbench for automatic axon ROI segmentation in two photon microscopy images; trained on 1,296 curated ROIs across 53 imaging sessions, achieved 0.93 recall and 0.83 F₂ on nine held-out sessions, and reduced manual curation from days to hours.
- Shipped reproducible training, evaluation and prediction workflows with CLI tools, automated testing through GitHub Actions, example data, and a detailed model card.

Kairos · github.com/dinghaoluo/kairos

- Built a Python pipeline using OpenAlex data to test whether historical publication patterns could predict imminent breakthroughs in science, inspired by Park *et al.* (*Nature*, 2023)'s debate on scientific novelty.
- Reviewed candidate papers to build breakthrough labels; evaluated leakage-safe models using expanding window validation and temporal baselines; found a modest improvement beyond a year-only baseline.

EDUCATION

PhD Candidate, Systems Neuroscience · FAU / Max Planck Florida Institute for Neuroscience 2021–2026

- IMPRS Fellow; defence scheduled for October 2026.

BA Biological Natural Sciences, First-Class Honours · University of Cambridge 2017–2020

- Jardine Scholar (full merit funding); Bundy Scholarship.

OTHER

Translator of *Entangled Life* (Sheldrake, 2020), Chinese edition 《菌络万象》; Pingshan Book Award 2025.

Former science editor, *Scientific American China* (2020–2021) and *Neu-reality* (2017–2021).

Native Cantonese and Mandarin; fluent English; conversational German.