

Li Kevin Wenliang

GCNU 25 Howland St, London, W1T 4JG

kevin-w-li.github.io

kevinli@gatsby.ucl.ac.uk

[Link to Google Scholar](#)

Education

Gatsby Unit, University College London, PhD candidate in machine learning and theoretical neuroscience **2015 – Mar 2021**

- ♦ Supervised by **Maneesh Sahani** (primary) and **Peter Dayan** (secondary)
- ♦ Thesis: nonparametric enrichment in computational and biological representation of distributions
 - Amortised learning: maximum likelihood learning of latent variable models without inference
 - Density estimation: deep kernel exponential family
 - Human perception as inference: theory on how the brain may encode uncertainty in the environment
 - State-space models: inference and learning of models defined by nonlinear exponential family densities
- ♦ Other research: visual perceptual learning, causal optimal transport GAN
- ♦ Visits: **Liping Wang** (Chinese Academy of Science), **Zoe Kourtzi** (University of Cambridge)

University of Cambridge, Trinity College Information and Computer Engineering

2010 – 2014

- ♦ B.A. (1st Hon.) and M.Eng. (Distinction), scholarship £18,510 p.a. for four years
- ♦ College Senior Scholar, product design competition prize winner
- ♦ Ranked within top 10 of the year for 1st, 2nd and 4th years (3rd year at MIT)
- ♦ Master thesis: inference and learning on a nonlinear state-space model for neural spiking data, with **Máté Lengyel**

Massachusetts Institute of Technology

2012 – 2013

- ♦ GPA: 4.9/5.0, Cambridge-MIT Exchange in Electrical Engineering and Computer Science.
- ♦ Course projects: Shadow removal (image processing), modelling information propagation (network science)
- ♦ Research: an automated pipeline for a new peptide synthesis method at the Chemistry department.

Research and career experiences

Amazon Web Services, applied scientist intern, with **David Wipf**

Dec 2020 – Present

CNeuro Summer School, by Tsinghua University

Aug 2020

Brains, Minds and Machines Summer School, by Harvard University/MIT

Aug 2016

human perception of object stability, modelled by simulation engines and heuristics, **Josh Tenenbaum**

Tsinghua University, Research Intern

Dec 2014 – Mar 2015

3D object representation on point-cloud data, grasp planning, with **Funchun Sun**

Microsoft Research Cambridge

Jul 2014 – Oct 2014

Research Intern, road network recognition by marked point process, with **Sadia Ahmed** and **Sebastian Nowozin**

Microsoft R&D Shanghai, program manager intern

Jul 2013 – Sept 2013

MeritCo Services, due diligence consulting

Sept 2013

Swiftkey, research in natural language processing for non-whitespace languages

Jul 2011 – Sept 2011

Programming: Python (PyTorch, TensorFlow, Caffe), Julia, MatLab, C/C++, Ruby, HTML/CSS, JavaScript

Teaching experiences

NeuroMatch Academy Summer School, TA

Jul 2020

- ♦ Taught computational tools for analysing neural recordings, advice on career and research projects

Machine Learning Summer School (UCL), TA

July 2019

- ♦ Helped students complete tutorials and answered questions, organised by **Marc Deisenroth** and **Arthur Gretton**

UCL TAs: probabilistic and unsupervised learning, approximate inference, theoretical neuroscience

Sept 2016 – Jun 2017

- ♦ Marked homework, led tutorials, responded to questions and managed annotated reference list

Publications (with contributions)

Referred journal papers

- ♦ Li Wenliang, Aaron Seitz, *Deep neural network for modelling visual perceptual learning*, Journal of Neuroscience, 18
Modelled behaviour, system and neural data using deep neural network, designed and conducted 2-AFC orientation and face gender discrimination experiments, wrote paper

Referred conference proceedings

- ♦ Tianlin Xu*, Li K. Wenliang*, Michael Munn, Beatrice Acciaio, *COT-GAN: Generating sequential data via causal optimal transport*, NeurIPS, 20
Proposed and analysed a debiasing correction to the Sinkhorn divergence, proposed and conducted most experiments, wrote paper.
- ♦ Li K. Wenliang, Theodore Moskovitz, Heishiro Kanagawa, Maneesh Sahani, *Amortised learning by wake-sleep*, ICML, 20
Direct ML gradient approximation with kernel ridge regression and automatic differentiation, designed experiments, conducted all but matrix factorisation experiments, managed collaboration, wrote paper
- ♦ Li K. Wenliang, Maneesh Sahani, *Plausible model for online recognition and postdiction*, NeurIPS, 19
Online filtering smoothing temporal perceptual memory, designed auditory continuity illusion, flash-lag effect and occluded tracing experiments, conducted all experiments, wrote paper
- ♦ Li K. Wenliang*, Dougal Sutherland*, Heiko Strathmann, Arthur Gretton, *Learning deep kernels for exponential family densities*, ICML, 19
Developed meta-learning algorithm for training deep network kernels, design and conducted experiments, discussed normalisability of kernel exponential family distributions and issues of score matching, wrote paper
- ♦ Chunfang Liu, Wenliang Li, Funchun Sun, Jianwei Zhang, *Grasp planning by human experience on objects with complex geometry*, IROS, 15
Proposed a framework to classify objects and identify of graspable part trained using small datasets, conducted experiments related to computer vision, wrote paper

Referred workshop abstracts

- ♦ Li K. Wenliang, Eszter Vértés, Maneesh Sahani, *Accurate and adaptive recognition in dynamic environment*, COSYNE, 19
Proposed biological real-time filtering and learning algorithms based on wake-sleep, designed and conducted experiments, wrote abstract, scored within top 6%
- ♦ Li K. Wenliang, Maneesh Sahani, *Neural network represents uncertainty by nonlinear moments*, COSYNE, 18
Hypothesised that activations of RNN trained to perform inference represent uncertainty with distributed distributional code, designed and conducted experiments, wrote abstract

Invited Talks

Chinese Institute for Brain Research, Minmin Luo	Jan 2021
Peking University, Hang Zhang	Oct 2020
Neurochat, invited talk, Chinese Association for Psychological & Brain Science	Apr 2020
Neurocomputation and AI in Neuroscience, invited talk, Dynamics in vision and touch (cancelled)	Mar 2020
DeepMind PhD workshop, UCL, invited talk	Feb 2020
Beijing Normal University, Wu Li's	Jan 2019