LI Kevin WENLIANG

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Searching for computational principles of artificial and biological intelligence from a statistical learning perspective

EDUCATION

2015-2021   **Gatsby Unit, University College London**

PhD in Machine Learning and Theoretical Neuroscience

Supervisers: Maneesh Sahani and Peter Dayan

Thesis: Nonparametric Enrichment in Computational and Biological Representation of Distributions

Ongoing work: distributional reinforcement learning, visual perceptual learning, optimal transport

2010-2014   **University of Cambridge, Trinity College**

B.A. (Class I) and M.Eng. (Distinction), Information and Computer Engineering

Supervisor: Máté Lengyel

Scholarship: £18,510 p.a. for four years, Trinity College senior scholar

Ranking: top 10 for 1st, 2nd, and 4th years (3rd year at MIT) out of > 300 students

Master thesis: Inference and Learning on a Nonlinear State-space Model for Spiking Data

2012-2013   **Massachusetts Institute of Technology**

GPA: 4.9/5.0, Cambridge-MIT Exchange in Electrical Engineering and Computer Science.

RESEARCH EXPERIENCE

2020-2021   Institute of Neuroscience, Chinese Academy of Science   Visitor to Liping Wang, sequence perception

2021   Department of Psychology, University of Cambridge   Visitor to Zoe Courtzi, visual perceptual learning

7 / 2016   Brains, Minds and Machines Summer School, Woods Hole   Intuitive physics with Josh Tenenbaum

1-4 / 2015   Tsinghua University, Beijing   Research Assistant in grasp planning with Fuchun Sun

6-9 / 2014   Microsoft Research Cambridge   Research Intern in computer vision with Sebastian Nowozin

Reviewer: NeurIPS 2020 (top 10%), ICML 2021 (expert), ACML 2020, AISTATS 2021, Neurocomputing

CAREER EXPERIENCE

2020-2021   Amazon Web Services, Shanghai   Research Scientist Intern with David Wipf

6-9 / 2013   Microsoft R&D, Shanghai   Program Manager Intern, payment security

6-9 / 2011   Swiftkey (purchased by Microsoft), London   Engineer Intern in natural language processing

TEACHING EXPERIENCE

7 / 2020   NeuroMatch Academy Summer School, online   TA in fundamental theoretical neuroscience

7 / 2019   Machine Learning Summer School, London   TA in fundamental machine learning

2016-2017   Gatsby Unit courses, London   TA in unsupervised learning, theoretical and system neuroscience

INVITED TALKS

3 / 2021   Beijing Normal University (Ke Zhou Lab)   Postdictive inference in perception

1 / 2021   Chinese Institute for Brain Research, Beijing   Nonparametric methods for theoretical neuroscience

3 / 2020   Neurocomputation and AI in Neuroscience, Cambridge   Postdictive inference in perception

SKILLS

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

Language: English, Chinese (trained interpreter)

PUBLICATIONS

Referred journals and conference proceedings

Li K. Wenliang and Aaron Seitz. *Deep neural network for modelling visual perceptual learning.* **Journal of Neuroscience**, 2018
- Proposed using deep neural network to model behavioural and neural data, designed and conducted experiments

Tianlin Xu, **Li K. Wenliang**, Michael Munn, and Beatrice Acciaio. *COT-GAN: Generating sequential data via causal optimal transport*. **NeurIPS**, 2020
- Proposed and analysed a debiasing correction to the Sinkhorn divergence, proposed and conducted most experiments

Li K. Wenliang, Theodore Moskovitz, Heishiro Kanagawa, and Maneesh Sahani. *Amortised learning by wake-sleep*. **ICML**, 2020
- Proposed direct ML gradient approximation with kernel ridge regression and automatic differentiation, designed experiments, conducted all but matrix factorisation experiments, managed collaboration

Li K. Wenliang and Maneesh Sahani. *Plausible model for online recognition and postdiction in dynamic environment*. **NeurIPS**, 2019
- Proposed filtering algorithm and temporal features for encoding memory, designed flash-lag effect and occluded tracing experiments, conducted all experiments

Li K. Wenliang*, Dougal Sutherland*, Heiko Strathmann, and Arthur Gretton. *Learning deep kernels for exponential family densities.* **ICML**, 2019
- Developed meta-learning algorithm for training deep network kernels, design and conducted experiments, analysed normalisability of kernel exponential family distributions and issues of score matching

Chunfang Liu, **Wenliang Li**, Funchun Sun, and Jianwei Zhang. *Grasp planning by human experience on objects with complex geometry*. **IROS**, 2015
- Proposed a framework to classify objects and identify of graspable part, conducted experiments related to computer vision

Referred workshop abstracts

Li K. Wenliang, Eszter Vértes and Maneesh Sahani. *Accurate and adaptive recognition in a dynamic environment*. **COSYNE**, 2019
- Proposed biological inference and learning algorithms, designed and conducted experiments, scored within top 6%

Li K. Wenliang and Maneesh Sahani. *Neural network represents uncertainty by nonlinear moments*. **COSYNE**, 2018
- Hypothesised that activations of RNN trained to perform inference represent uncertainty with distributed distributional code, designed and conducted experiments