Li KEVIN Wenliang

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I am interested in finding general principles of intelligence underlying artificial and biological agents. In capability research, I work on generative models, approximate inference and density estimation, with a particular focus on time-series data and training flexible/deep models. For scientific research, I reveal failure modes and elucidate success factors of existing methodologies, raising awareness for theoreticians and practitioners. I draw inspiration from cognitive neuroscience.

PROFESSIONAL EXPERIENCE

2022-pres. **DeepMind** Research Scientist, Universal Artificial Intelligence
Developing state-of-the-art models in sequence prediction and uncertainty quantification
Understanding and interpreting large-scale image and language models

2021-pres. **University College London** Honorary Research Fellow, Wellcome Trust Centre for Neuroimaging

EDUCATION

2015-2021 **Gatsby Unit, University College London**
PhD in Machine Learning and Theoretical Neuroscience
Advisors: Maneesh Sahani and Peter Dayan
Thesis: Nonparametric Enrichment in Computational and Biological Representation of Distributions

2010-2014 **University of Cambridge, Trinity College**
BA (Class I) and MEng (Distinction), Information Engineering. Advisor: 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) among > 300 students
Master thesis: Inference and Learning on a Nonlinear State-space Model for Spiking Data

2012-2013 **Massachusetts Institute of Technology**
Cambridge-MIT Exchange in Electrical Engineering and Computer Science, GPA 4.9/5.0.

RESEARCH EXPERIENCE

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

2020-2021 Department of Psychology, University of Cambridge Visitor to Zoe Kourtzi, visual perceptual learning

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

7 / 2016 Brains, Minds and Machines Summer School, Woods Hole Participant

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

6-10/ 2014 Microsoft Research Cambridge Research Intern, computer vision, with Sebastian Nowozin

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

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

Reviewer: JMLR, TMLR, NeurIPS (top 10%), ICML (expert), ICLR, AISTATS, Neurocomputing, Neural Computation

TEACHING EXPERIENCE

7 / 2023 Computational and Cognitive Neuroscience, Suzhou TA in Maths, Deep Learning; mentored 6 projects

7 / 2021 NeuroMatch Academy Summer School, online project mentor, course content consultant

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

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

2016-2017 Gatsby Unit courses, London TA in unsupervised learning, theoretical and systems 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 (JAX/Haiku, PyTorch, TensorFlow, Caffe), Julia, MatLab, C/C++, Ruby, HTML/CSS, JavaScript

PUBLICATIONS

Referred journals and conference proceedings

- **LKW**, …, Arthur Gretton, Mark Rowland *Distributional Bellman Operator on Mean Embeddings*. Under review, 2023
- Grégoire Delétang, …, **LKW**, …, Marcus, Hutter, Joel Veness. *Language modeling is compression*. Under review, 2023
- Tianyuan Teng*, **LKW***, Hang Zhang. *Bounded Rationality in Structured Density Estimation*. **NeurIPS**, 2023
- Tim Genewein, …, **LKW**, …, Joel Veness. *Memory-Based Meta-Learning on Non-Stationary Distributions*. **ICML** 2023
- Grégoire Delétang, …, **LKW**, …, Shane Legg, Pedro A Ortega. *Neural networks and the Chomsky hierarchy*. **ICML**, 2022
- **LKW**, Ben Moran. *Score-based generative models learn manifold-like structures with constrained mixing*. **NeurIPS Workshop** on score-based models, 2022
- Bin Dai, **LKW**, and David Wipf. *On the Value of Infinite Gradients in Variational Autoencoder Models*. **NeurIPS**, 2021
- Longyuan Li, Jian Yao, **LKW**, …, David Wipf, Zheng Zhang. *GRIN: Generative Relation and Intention Network for Multi-agent Trajectory Prediction*, **NeurIPS**, 2021
- **LKW**, Heishiro Kanagawa. *Blindness of score-based methods to isolated components and mixing proportions*. **NeurIPS Workshop** Your model is wrong: Robustness and misspecification in probabilistic modeling, 2021
- Tianlin Xu*, **LKW***, Michael Munn, Beatrice Acciaio. *COT-GAN: Generating sequential data via causal optimal transport*. **NeurIPS**, 2020
- **LKW**, Theodore Moskovitz, Heishiro Kanagawa, Maneesh Sahani. *Amortised learning by wake-sleep*. **ICML**, 2020
- **LKW**, Maneesh Sahani. *A Plausible model for online recognition and postdiction in dynamic environment*. **NeurIPS**, 2019
- **LKW***, Dougal Sutherland*, Heiko Strathmann, and Arthur Gretton. *Learning deep kernels for exponential family densities.* **ICML**, 2019
- **LKW** and Aaron Seitz. *Deep neural network for modelling visual perceptual learning.* **Journal of Neuroscience**, 2018
- Chunfang Liu, **Wenliang Li**, Funchun Sun, Jianwei Zhang. *Grasp planning by human experience on objects with complex geometry*. **IROS**, 2015

Referred conference abstracts

- Tianyuan Teng*, LKW*, Hang Zhang. *Economically expanding internal models in human density estimation*. **CCN**, 2022
- **LKW**. *A distributional Bayesian learning theory for visual perceptual learning*. **COSYNE**, 2022
- **LKW**, Eszter Vértes, Maneesh Sahani. *Accurate and adaptive recognition in a dynamic environment*. **COSYNE**, 2019
- **LKW**, Maneesh Sahani. *Neural network represents uncertainty by nonlinear moments*. **COSYNE**, 2018