

ANDREW Y. K. FOONG

Personal website: <https://andrewfoongyk.github.io/>

Google Scholar: <https://scholar.google.com/citations?user=2U0jgIUAAAAJ&hl=en>

EXPERIENCE

Microsoft Research Cambridge

November 2022 - Present

Senior Researcher

- Research on deep learning applied to molecular modelling in the AI4Science team. Conceptualised, developed, trained and evaluated novel probabilistic deep generative models to predict the time-evolution of protein dynamics. Ran large-scale computational experiments on Azure.

DeepMind

February 2022 - May 2022

Research Scientist Intern

- Research on data-efficient and Bayesian learning under Dr. Michalis Titsias. Designed and implemented novel deep generative models.

Microsoft Research Cambridge

July 2021 - October 2021

Research Intern

- Research on deep learning for molecular simulation under Dr. Sebastian Nowozin.

Cambridge University Engineering Department

2018 - 2021

Undergraduate Supervisor (analogous to US teaching assistant)

- Supervised third-year undergraduates in small group teaching sessions for the modules 3F7 Information Theory and 3F8 Inference.

Cambridge University Engineering Department

Summer 2016

Undergraduate Research Opportunities Program

- Research under Prof. Robin Langley on the theoretical foundations of statistical mechanics. Wrote hard-sphere molecular dynamics simulation programs in MATLAB.

EDUCATION

Ph.D. in Machine Learning, University of Cambridge

October 2018 - November 2022

Thesis: *Approximate Inference in Bayesian Neural Networks and Translation Equivariant Neural Processes*.

Ph.D. under Professor Richard E. Turner at the Computational and Biological Learning Lab. Research areas: Bayesian deep learning, approximate inference, deep generative models, meta-learning, equivariances, PAC-Bayes, molecular simulation.

MEng and BA in Engineering, University of Cambridge

October 2014 - June 2018

First Class Honors with Distinction

Specialised in information and computer engineering, with Master's project on approximate inference and information theory. Scored in the top first or second percentile in year group of ~300 students for first three years, awarded Institution of Engineering and Technology Prize in 4th year.

RESEARCH PAPERS

- Leon Klein*, **Andrew Y. K. Foong***, Tor Erlend Fjelde*, Bruno Mlodozieniec*, Marc Brockschmidt, Sebastian Nowozin, Frank Noé, Ryota Tomioka. Timewarp: Transferable Acceleration of Molecular Dynamics by Learning Time-Coarsened Dynamics. *arXiv preprint arXiv:2302.01170*. Under review.
- Wessel P. Bruinsma*, Stratis Markou*, James Requeima*, **Andrew Y. K. Foong***, Tom R. Andersson, Anna Vaughan, Anthony Buonomo, J. Scott Hosking, Richard E. Turner. Autoregressive Conditional Neural Processes. In *International Conference on Learning Representations*, 2023.
- **Andrew Y. K. Foong***, Wessel P. Bruinsma*, David R. Burt, Richard E. Turner. How Tight Can PAC-Bayes be in the Small Data Regime? In *Neural Information Processing Systems*, 2021.
- Marcin B. Tomczak, Siddharth Swaroop, **Andrew Y. K. Foong**, Richard E. Turner. Collapsed Variational Bounds for Bayesian Neural Networks. In *Neural Information Processing Systems*, 2021.
- Wessel P. Bruinsma, James Requeima, **Andrew Y. K. Foong**, Jonathan Gordon, Richard E. Turner. The Gaussian Neural Process. In *Symposium on Advances in Approximate Bayesian Inference*, 2021.
- **Andrew Y. K. Foong***, Wessel P. Bruinsma*, Jonathan Gordon*, Yann Dubois, James Requeima, Richard E. Turner. Meta-Learning Stationary Stochastic Process Prediction with Convolutional Neural Processes. In *Neural Information Processing Systems*, 2020. Accompanying blog: <https://yannidubs.github.io/Neural-Process-Family>
- **Andrew Y. K. Foong***, David R. Burt*, Yingzhen Li, Richard E. Turner. On the Expressiveness of Approximate Inference in Bayesian Neural Networks. In *Neural Information Processing Systems*, 2020.
- Tim Pearce, **Andrew Y. K. Foong**, Alexandra Brintrup. Structured Weight Priors for Convolutional Neural Networks. In *Uncertainty in Deep Learning Workshop, ICML*, 2020.
- **Andrew Y. K. Foong***, David R. Burt*, Yingzhen Li, Richard E. Turner. Pathologies of Factorised Gaussian and MC Dropout Posteriors in Bayesian Neural Networks. In *Bayesian Deep Learning Workshop, NeurIPS*, 2019.
- Jonathan Gordon*, Wessel P. Bruinsma*, **Andrew Y. K. Foong**, James Requeima, Yann Dubois, Richard E. Turner. Convolutional Conditional Neural Processes. In *International Conference on Learning Representations*, 2020. (Oral presentation)
- **Andrew Y. K. Foong**, Yingzhen Li, José Miguel Hernández-Lobato, Richard E. Turner. ‘In-Between’ Uncertainty in Bayesian Neural Networks. In *Uncertainty in Deep Learning Workshop, ICML*, 2019. (Oral presentation)

ORGANISATION AND REVIEWING

- Organiser for the NeurIPS 2021 Approximate Inference in Bayesian Deep Learning Competition.
- Reviewer for Journal of Machine Learning Research (JMLR), NeurIPS, AISTATS, ICML Uncertainty in Deep Learning Workshop, NeurIPS Bayesian Deep Learning Workshop.

AWARDS AND SCHOLARSHIPS

Trinity Hall Research Studentship Ph.D. Funding.	2018-2021
George and Lilian Schiff Foundation Studentship Ph.D. Funding.	2018-2021
Institution of Engineering and Technology Prize For outstanding students who have completed an IET accredited course.	2018
Institution of Civil Engineers Baker Prize Awarded to the two highest scoring students in the Cambridge third-year Engineering course.	2017
BP First Year Prize Awarded to the four highest scoring students in the Cambridge first-year Engineering course.	2015

SOFTWARE PROFICIENCIES

· Python, git, GitHub, PyTorch, JAX, NumPy, MATLAB, L^AT_EX