

Bruno K. Mlodozieniec

PhD in Machine Learning

University of Cambridge

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Education

University of Cambridge | PhD in Advanced Machine Learning

Jan 2023-2026

Supervised by Richard Turner, David Krueger and Bernhard Schölkopf

Department of Engineering

Generalisation in deep learning, machine learning theory, generative modelling, diffusion models, probabilistic machine learning

University of Cambridge | Master of Engineering

2016-2020

Computer and Information Engineering

Emmanuel College

Performance

- Year 1: 1st Class.** Top 10% of class.
- Year 2: 1st Class.** Top 8% of class.
- Year 3: 1st Class.** Top 7% of class.
- Year 4: 1st Class for Master's Thesis.** Courses unclassified that year due to COVID-19.

Awarded Rowley Mainhood College Prize and Frank Marriott Scholarship for academic performance on exams.

Master's Thesis: Causal Inference: A Probabilistic Modelling Perspective supervised by Professor Richard Turner.

Experience

Qualcomm | Deep Learning Researcher

Oct 2021 - Dec 2022

Amsterdam, Netherlands

- Worked on robustness of deep learning algorithms, particularly in the context of federated learning and non-*iid* data
- Developed a novel method for efficiently learning invariances in deep learning models, leading to the ICLR 2023 article [Hyperparameter Optimization through Neural Network Partitioning](#)

Microsoft Research | AI Resident

Sep 2020 - Sep 2021

Cambridge, UK

- Worked on equivariant deep generative models for accelerating Molecular Dynamics simulation
- Developed a transferable generative model for accelerating molecular dynamics simulation, resulting in the article [Timewarp: Transferable Acceleration of Molecular Dynamics by Learning Time-Coarsened Dynamics](#)
- Worked on Bayesian Optimisation and probabilistic modelling methods automate synthetic biology experiments
- Applied [Reinforcement Learning for optimising machine learning code](#)

Apple | Machine Learning Engineering Intern | Siri

June 2019 - Sep 2019

Cambridge, UK

- Applied unsupervised learning methods for distributional shift detection for the Siri development pipeline

University of Cambridge | Machine Intelligence Laboratory Intern

Aug 2018 - Sep 2018

Supervised by Professor Mark Gales

Cambridge, UK

- Developed a novel method for training uncertainty-aware neural networks: [Ensemble Distribution Distillation](#)
- Continued working with the group after the internship to write a paper on our method, leading to a shared first-author publication at ICLR 2020

Harvard University | Visual Computing Group Intern

July 2018 - Aug 2018

Cambridge, USA

- Investigated novel methods for analysing large networks of synaptic connectivity in a brain through motif discovery.

Cisco Systems | Machine Learning Intern

July 2017 - Sep 2017

Oslo, Norway

- Implemented and benchmarked deep learning architectures for a speech detection system at Cisco Webex

Publications

- 2024 **Influence Functions for Scalable Data Attribution in Diffusion Models.** Bruno Mlodozieniec, Runa Eschenhagen, Juhan Bae, Alexander Immer, David Krueger, Richard E. Turner.
- 2024 **Implicitly Bayesian Prediction Rules in Deep Learning.** Bruno Mlodozieniec, Richard E. Turner, David Krueger. *Proceedings Track of AABI.*
- 2024 **Improving Linear System Solvers for Hyperparameter Optimisation in Iterative Gaussian Processes.** Jihao Andreas Lin, Shreyas Padhy, Bruno Mlodozieniec, Javier Antorán, José Miguel Hernández-Lobato. *NeurIPS 2024.*
- 2024 **A Generative Model of Symmetry Transformations.** James Urquhart Allingham, Bruno Mlodozieniec, Shreyas Padhy, Javier Antorán, David Krueger, Richard E. Turner, Eric Nalisnick, José Miguel Hernández-Lobato. *NeurIPS 2024.*
- 2024 **Denosing Diffusion Probabilistic Models in Six Simple Steps.** Richard E. Turner, Cristiana-Diana Diaconu, Stratis Markou, Aliaksandra Shysheya, Andrew Y. K. Foong, Bruno Mlodozieniec.
- 2023 **Timewarp: Transferable Acceleration of Molecular Dynamics by Learning Time-Coarsened Dynamics.** Leon Klein[†], Andrew Y. K. Foong[†], Tor Erlend Fjelde[†], Bruno Mlodozieniec[†], Marc Brockschmidt, Sebastian Nowozin, Frank Noé, Ryota Tomioka. *NeurIPS 2023 Spotlight.* [† equal contributions first authors]
- 2023 **Hyperparameter Optimization through Neural Network Partitioning.** Bruno Mlodozieniec, Matthias Reisser, Christos Louizos. *ICLR 2023.*
- 2020 **Causal Inference – A Probabilistic Modelling Perspective.** Bruno Mlodozieniec, Richard Turner. *MEng Thesis*
- 2020 **Ensemble Distribution Distillation.** Andrey Malinin[†], Bruno Mlodozieniec[†], and Mark Gales. *ICLR 2020.* [† equal contributions first authors]

Honours & Awards

Royal Academy of Engineering | | Engineering Leaders Scholarship

2018

Royal Academy of Engineering, UK

- I was awarded a £5000 scholarship aimed at supporting engineering undergraduates with potential to become future leaders in their fields, and who are able to act as role models and inspire a future generation of engineers.

International Mathematical Olympiad (IMO) | | Honourable Mention

July 2015

Thailand

- I was twice invited to represent Norway at the International Mathematical Olympiad after ranking 6th and 3rd in two consecutive years in the Norwegian Mathematics Olympiad.

Societies

2018 - 2020 **Founder,** Cambridge University Artificial Intelligence Society

University of Cambridge

- I co-founded, and chaired, the Cambridge University Artificial Intelligence Society – a student society dedicated to providing opportunities for collaboration on machine-learning projects
- I started the society, organised a group of people passionate about its vision, and collaborated to organise talks and events that we felt were sorely missing from the Cambridge extracurricular scene