William Harvey

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Department of Computer Science,
University of British Columbia,
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Education

2018 - Present **University of British Columbia**
PhD, Computer Science
Supervised by Dr Frank Wood

2014 - 2018 **University of Oxford**
MEng, Engineering Science - graduated in top 3 of approx. 160 students in year
Supervised by Dr Frank Wood

Industry experience

July - Dec. 2023 **Google DeepMind** *(former Brain team)* **San Francisco, CA**
Student Researcher hosted by Dumitru Erhan
- Built on and improved internal generative AI for video (latent video diffusion models)

June - Sep. 2022 **G-Research** **London, UK**
Quantitative Research Intern
- Investigated novel predictors of stock returns for use in an algorithmic trading strategy

Research interests

Diffusion models; generative models; video generative models

Publications

Peer-reviewed publications:

1. *Trans-Dimensional Generative Modeling via Jump Diffusion Models*
   Andrew Campbell, **William Harvey**, Christian Weilbach, Valentin De Bortoli, Tom Rainforth, Arnaud Doucet
   (Spotlight at) NeurIPS 2023 [Paper] [Code]

2. *Graphically Structured Diffusion Models*
   Christian Dietrich Weilbach, **William Harvey**, Frank Wood
   (Oral at) ICML 2023 [Paper] [Code]

3. *Flexible Diffusion Modeling of Long Videos*
   William Harvey, Saeid Naderiparizi, Vaden Masrani, Christian Weilbach, Frank Wood
   NeurIPS 2022 [Paper] [Code]

4. *Conditional Image Generation by Conditioning Variational Auto-Encoders*
   William Harvey, Saeid Naderiparizi, Frank Wood
   ICLR 2022 [Paper] [Code]

5. *Attention for Inference Compilation*
   William Harvey, Andreas Munk, Atılım Güneş Baydin, Alexander Bergholm, Frank Wood
   (Oral at) SIMULTECH 2022 [Paper] [Code]

6. *Planning As Inference in Epidemiological Models*
   Frank Wood, Andrew Warrington, Saeid Naderiparizi, Christian Weilbach, Vaden Masrani, **William Harvey**,

Adam Scibior, Boyan Beronov, John Grefenstette, Duncan Campbell, S Ali Nasseri
Frontiers in Artificial Intelligence, 2022 [Paper]

7. *Near-Optimal Glimpse Sequences for Improved Hard Attention Neural Network Training*
William Harvey, Michael Teng, Frank Wood
IEEE World Congress on Computational Intelligence 2022 [Paper] [Code]

8. *Structured Conditional Continuous Normalizing Flows for Efficient Amortized Inference in Graphical Models*
Christian Weilbach, Boyan Beronov, **William Harvey**, Frank Wood
AISTATS 2020 [Paper]

Pending patents:

1. *Method and System for Generating One or More Conditionally Dependent Data Entries*
Co-inventors: **William Harvey** (40% contribution), Saeid Naderiparizi (20%), Christian Dietrich Weilbach (20%), Vaden Masrani (10%), Frank Wood (10%). U.S. Patent App. No. 18/199,865, filed May 19, 2023.

Academic roles

2021 - Present — **Reviewer for top machine learning venues**
- Reviewed for **ICML 2021, 2022, 2023** ; **ICLR 2022, 2023** ; **NeurIPS 2021** ; **TPAMI** ; **SPIGM Workshop at ICML 2023**
- Outstanding reviewer at **ICML 2021** (top 10%) and **NeurIPS 2021** (top 8%)

2021 — **Guest lecturer in UBC CS532W Probabilistic Programming**
- Lectured on "Reparametrization and Normalizing Flows" for graduate-level course.

2017 — **Research Intern** at the **University of Oxford (supervised by Dr Frank Wood)**
- Developed machine learning models and infrastructure for serving them within DARPA's D3M program. Represented Oxford's team in a 4-week project planning workshop in D.C.

Awards

2018 — **Head of department's prize for excellent performance in examinations**
Awarded by Oxford's Department of Engineering Science for performance in final undergraduate exams (top 3 of $\sim$160 in year).

2018 — **Four Year Fellowships tuition award**
Awarded by the University of British Columbia to "the best doctoral applicants."

2017 — **Gibbs prize proxime accessit**
Awarded for performance in 2nd and 3rd year undergraduate exams (top 3 of $\sim$160 in year).

2015 — **Gibbs prize proxime accessit**
Awarded for performance in 1st year undergraduate exams (top 3 of $\sim$160 in year).

Skills

Python - Used Python for over 10 years: as my primary language during my PhD; to make contributions to Google's codebase during my Google DeepMind internship; and for contributing to open source project Pyro.

PyTorch - Over 6 years of experience using PyTorch in research projects.

JAX - 5 months of experience using JAX from internship at Google DeepMind.

SLURM/TORQUE - Over 7 years of experience with these and other high-performance computing tools.

C++/Clojure/Julia/MATLAB - Have built ≥ 1 projects in each of these languages.