

Lucas Berry

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SUMMARY

Machine learning researcher with 8+ years of experience spanning startups, academic research, and a nearly completed PhD at McGill University. I specialize in uncertainty estimation for generative AI, with work on diffusion models, large language models, and probabilistic ensembles. I've published at top venues and developed applied systems across algorithmic trading, medicine, NLP and VLMs.

EDUCATION

McGill University

Doctorate of Philosophy: Computer Science

Areas of Study: Uncertainty Estimation, Normalizing Flows, Diffusion Models

Research Projects:

- Expressive Aleatoric Normalizing Flow Ensembles Models with Accurate Epistemic Uncertainty
- Pairwise Distances to Estimate Epistemic Uncertainty for Probabilistic Ensembles
- Epistemic Uncertainty Estimation for Image Generation for Diffusion Models

Montreal, QC

Expected Fall 2025

Concordia University

Masters of Arts: Mathematics

Areas of Study: Machine Learning, Hidden Markov Models, Actuarial Science

Thesis: Hybrid Hidden Markov Model and Generalized Linear Model for Auto Insurance Premiums

Montreal, QC

December 2016

University of British Columbia

Bachelors of Arts: Mathematics Major, Psychology Minor

Average in Math Courses 83% (A-)

Vancouver, BC

April 2013

WORK EXPERIENCE

Birds of Color Algorithms (Algorithmic Trading Startup)

Founding Partner

Montreal, QC

Jun 2019 – May 2024

- Utilized proficiency in Machine Learning to train neural network models for NHL betting, resulting in a notable 2.13% profit in 2023 and a sustained increase of 6.79% in 2024.
- Engineered automated systems employing BeautifulSoup, Selenium and Pandas to systematically collect and clean NHL statistics, amassing a dataset spanning 15 years and encompassing over 18,000 games.
- Created a semi-automated notification system, promptly alerting users to opportune betting scenarios via email, and logging bets following user execution.
- Leveraged expertise in reinforcement learning to build a robust pipeline for stock trading, leveraging 20 years of historical stock data. Successfully trained a reinforcement learning agent to buy and hold Google stock.
- Managed development workflows using Git for version control and branch management, facilitating effective collaboration, parallel experimentation, and reliable code integration.

McGill University (Department of Family Medicine)

Research Assistant

Montreal, QC

Apr 2017 – May 2022

- Built an application, hosted online, that facilitated the analysis of statistical outcomes in 3+3 phase 1 drug trials. This user-friendly platform empowered practitioners by integrating a Bayesian framework, allowing seamless incorporation of prior beliefs.
- Successfully fine-tuned a pre-trained language model (XLNet) to develop a robust fake news predictive model. Our model secured 13th place out of 300 competing teams in a nationwide competition (Fact or Fake News?).
- Created a predictive model to ascertain the presence of Idiopathic Pulmonary Fibrosis from a combination of covariates and CT scans. We competed in an international competition securing the 22nd position out of 2,097 competing teams.

Black Eagle Algorithms S.E.N.C. (Cryptocurrency Arbitrage)

Montreal, QC
Sep 2018 – Jun 2019

Founding Partner

- Constructed a comprehensive codebase that systematically queried the APIs of 10 prominent cryptocurrency exchanges at five-minute intervals, generating an expansive database (over 440 billion lines).
- Leveraged this extensive dataset to conduct in-depth statistical analyses, successfully identifying and isolating lucrative arbitrage opportunities within the cryptocurrency market.
- Built a fully automated trading algorithm capable of executing trades on various cryptocurrency exchanges. Returning a 4% profit monthly for 10 months until market conditions shifted unfavorably due to bankruptcy of a cryptocurrency exchange.

Concordia University & HEC Montreal (Department of Mathematics)

Montreal, QC
Sep 2015 – May 2016

Course Lecturer

- Effectively taught classes of over 70 students (Introduction to Statistics, Calculus 1) by encouraging questions and explaining concepts differently to cater to various learning styles.
- Provided individualized help before and after class, in addition to office hours, to help relieve math anxiety.

RESEARCH PAPERS

- **Lucas Berry** and David Meger. Normalizing Flow Ensembles for Rich Aleatoric and Epistemic Uncertainty Modeling. Proceedings of the AAAI Conference on Artificial Intelligence, 37(6):6806–6814, 2023.
- **Lucas Berry**, Axel Brando and David Meger. Shedding Light on Large Generative Networks: Estimating Epistemic Uncertainty in Diffusion Models. In The 40th Conference on Uncertainty in Artificial Intelligence 2024.
- **Lucas Berry** and David Meger. Efficient Epistemic Uncertainty Estimation in Regression Ensemble Models Using Pairwise-Distance Estimators. *Accepted at NeurIPS 2025*.
- **Lucas Berry**, Axel Brando, Wei-Di Chang, Juan Camilo Gamboa Higuera, David Meger. Seeing the Unseen: How EMoE Unveils Bias in Text-to-Image Diffusion Models. arXiv preprint arXiv:2505.13273.
- Faraz Lotfi, Khalil Virji, Farnoosh Faraji, **Lucas Berry**, Andrew Holliday, David Meger and Gregory Dudek. Uncertainty-aware hybrid paradigm of nonlinear MPC and model-based RL for offroad navigation: Exploration of transformers in the predictive model. In 2024 IEEE International Conference on Robotics and Automation (ICRA).

COMMUNITY INVOLVEMENT

Mentor (Tyndale St. Georges & UBC)

Jan 2012 – Jan 2017

- Assisted high school students with their math homework by systematically breaking down complex problems into more manageable and comprehensible components.
- Cultivated strong connections with students by aligning mathematical concepts with their interests and effectively communicating in their preferred language (English or French).

President (Math & Stat Graduate Student Association, Concordia)

Sep 2014 – Sep 2015

- Built a more integrated community within the department by organizing events that featured graduate students and faculty.
- Effectively managed expenditures to adhere to the fiscal budget while strategically optimizing spending.

ADDITIONAL

Coding Skills: Python (Numpy, Pytorch, Matplotlib, Pandas, Scipy), Web Scraping (Beautiful Soup, Selenium), R, Matlab, Julia, Slurm, LoRA, Data Parallelism, MoE, Git, Huggingface

Languages: Fluent in English, Conversational Proficiency in French

Certifications: Passed 3 Actuarial Exams (P, FM, MFE)

Reviewer: NeurIPS (2023, 2024), ICML (2023, 2024, 2025), CoRL (2018), IROS (2018, 2023), ICLR (2024, 2025)