Bradley **Gram-Hansen**

Projects: https://github.com/bayesianbrad • Email: bradleygramhansen@gmail.com • Publications: Google Scholar

Experience

PhD in Machine Learning with 5+ years of industry experience developing and deploying high-impact ML models. Expertise in large-scale, real-time anomaly detection, driving multi-million-dollar revenue growth. Skilled in Python and leading ML frameworks, with deep end-to-end ML lifecycle knowledge and a proven track record of leading cross-functional teams to deliver impactful solutions

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Senior Applied Scientist

Seattle, US

Apple

Mar 25 – Present

- Lead the cross-functional machine learning effort for capacity planning in the AIML org.
- Responsible for developing ML models that directly influence how over $1B+ annually is distributed across data operations and drive efficient allocation of resources.

Senior Research Scientist

Seattle, US

Dataminr

Promotion: 01/25 – 03/25

- Led the development and creation of an end-to-end, real-time anomaly detection framework for detecting and summarising anomalous time-series across the entire internet and dark web, which had to work at scale (1M+ messages per second) and run efficiently. Built primarily in Python (PySpark, Scikit-learn, GPyTorch, Hugging Face (utilizing RLHF)) and led to **$3M+ in ARR** business impact. This anomaly detection framework would also be applicable in real-time fraud detection scenarios.
- To improve the cyber security offerings at Dataminr, I proposed, developed and fine-tuned large language models (LLMs) for cybersecurity use cases such as vulnerability detection (e.g., CVEs, TTPs) and threat actor profiling, which led to two additional product features being added to Dataminrs cyber offering

Research Scientist II

Promotion: 12/22 – 01/25

- Built and developed ontologies for Dataminrs cyber knowledge graph, which led to **70% improved alert precision** and enabled rapid, context-aware responses across 1M+ data sources.
- Led multiple cross-functional collaborations with C-suit, product and engineering teams to build scalable end-to-end ML models, from ideation, feature engineering, training, and deployment, generating **$7M+ in additional ARR** and powering over 220K Dataminr cybersecurity alerts monthly.
- Managed projects with JIRA, maintained project code with Git, documented projects with Confluence; conducted and designed over 50 annotation tasks using label studio for a variety of ML based projects; built several ETL pipelines (Spark, Python, Airflow) for ingesting data into Dataminrs internal knowledge graph in Neo4j.

Research Scientist I

06/21 – 12/22

- Deployed multiple ML models utilizing transformer architectures (i.e. sequence-to-sequence, DistilBERT, RoBERTa, T5) for tasks such as geo prediction in multiple languages - going from 6 languages to over 40+ languages, while still maintaining model precision, recall, speed and cost (deployed on AWS inferentia).
- Set up A/B testing pipelines using Python and SQL (Snowflake) to power dashboards in Looker for monitoring model drift and key performance metrics, as the underlying input data distributions changed frequently.
- Built internal models for process optimization resulting in **60% higher-quality outputs,** which saved the editorial team over 800 hrs per week of alert reviewing, enhanced the consumer facing product and led to **operational cost savings of $500K annually.**

Co-founder (Chief Technology Officer) *London, UK*

Intelligent Networks *06/20 – 06/21*

- Co-founded Intelligent networks as part of the EF accelerator to tackle problems in infrastructure monitoring in large-scale utilities.
- Raised seed funding from investors, acquired paying customers directly from cold calls, and built the core ML / Deep learning platform using AWS (Amplify, RDS, ECS) and Python (Pandas, PyTorch, Flask, Requests, Scikit-learn, Numpy).
- Built probabilistic ML solutions for our enterprise customers using probabilistic programming and large-scale simulators, that reduced false alarm incidents by 96% and generated a significant ROI for them.

Research Scientist (DPhil) *Oxford, UK*

University of Oxford *09/16 – 06/20*

- Designed a system to calibrate malaria simulators using probabilistic programming and deep learning, optimizing prevention strategies under financial and geographical constraints. This work led to publications at ICML and AABI.
- Developed open-source deep learning and Bayesian generative modeling toolkits (PPX and PyProb)(available on GitHub), contributing to NeurIPS and ICML publications. This was part of a multi-organization research initiative applying probabilistic programming to large-scale scientific simulations, in collaboration with researchers from CERN, Intel, Google, Lawrence Berkeley Labs, and NYU.
- Led a cross-industry team with Nvidia, NASA, ESA, Google Cloud, and UNICEF to develop a solution for detecting informal settlements from low-resolution satellite imagery using Canonical Correlation Forests. This innovation saved UNICEF $100,000 annually in surveying costs and was published at AAAI and presented at the UN AI Conference for Social Good.

Education

University of Oxford *04/21*

Ph.D. in Machine Learning and Computer Science

- ***Thesis****: Extending Probabilistic Programming Systems and Applying them to Real-World Simulators*
  Supervisors*: Prof. Yee Whye Teh, Dr Tom Rainforth, Dr Atılım Günes Baydin, Prof. Philip Torr*

University of Nottingham *07/15*

Master's in Mathematics and Bachelor's in Physics

- ***Dissertation:*** *An Investigation into the Creation of Entanglement Mediated by Interaction.*
  Supervisor: *Dr Alexander Ossipov*
- ***Thesis:*** *Quantum Random Walks*
  Supervisor: *Prof Mădălin Guţă*

Graduated in the top 5%. Equivalent GPA 4.0.

Publications

1. Saeid Naderiparizi, Adam Scibior, Andreas Munk, Mehrdad Ghadiri, Atilim Gunes Baydin, **B. Gram-Hansen**, Christian A Schroeder De Witt, Robert Zinkov, Philip Torr, Tom Rainforth, Yee Whye Teh, Frank Wood, *Amortized rejection sampling in universal probabilistic programming,* The 24th International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2022
2. **B. Gram-Hansen**, Extending Probabilistic Programming Systems, *Extending probabilistic programming systems and applying them to real-world simulators*, Doctoral Thesis, University of Oxford, 2021
3. **B. Gram-Hansen***, C. Schroeder de Witt*, N.Nardelli, A. Gambardella,R. Zinkov, P. Dokania, Siddharth N. A. B. Espinosa-Gonzalez, Lord A. Darzi, P.H.S. Torr and A. G. Baydin, *Simulation-Based Inference for Global Health Decisions,* 2020, ML for Health Workshop at the International Conference on Machine Learning (**ICML**), 2020

4. **B. Gram-Hansen***, C. Schroeder de Witt, P.H.S.Torr, Y.W. Teh, A. G. Baydin and T. Rainforth, *Efficient Bayesian Inference for Nested Simulators*, The 2nd Symposium on Advances in Approximate Bayesian Inference (**AABI**), 2019
5. AG. Baydin, L. Heinrich, W. Bhimji, **B. Gram-Hansen**, G. Louppe, L. Shao, K, Cranmer and F.Wood, *Efficient Probabilistic Inference in the Quest for Physics Beyond the Standard Model,* The International Conference on Neural Information Processing Systems (**NeurIPS**), 2019
6. **B. Gram-Hansen***, C. Schroeder de Witt*, P.H.S.Torr, Y.W. Teh, T. Rainforth and AG. Baydin, *Hijacking Malaria Simulators with Probabilistic Programming*, AI for Social Good Workshop at the International Conference on Machine Learning (**ICML**), 2019
7. AG. Baydin, L. Heinrich, W. Bhimji, **B. Gram-Hansen**, G. Louppe, L. Shao, K, Cranmer and F.Wood, *Etalumis: Bringing Probabilistic Programming to Scientific Simulators at Scale*, The International Conference for High-Performance Computing, Networking, Storage, and Analysis (**SC**), 2019, *Nominated for Best Paper*.
8. **B. Gram-Hansen***, Y, Zhou*, T. Kohn, T. Rainforth, H. Yang and F. Wood, *A Low-Level Probabilistic Programming Language for Non-Differentiable Models*, The 22nd International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2019
9. **B. Gram-Hansen***, P. Helber*, I. Varatharajan, F. Azam, A.Coca-Castro, V. Kopackova and P. Bilinski, *Mapping Informal Settlements in Developing Countries using Machine Learning and Low-Resolution Multi-spectral Data*, The Thirty-Third AAAI Conference on Artificial Intelligence (**AAAI**), 2018
10. **B. Gram-Hansen***, Y, Zhou*, T. Kohn, T. Rainforth, H. Yang and F. Wood, *Hamiltonian Monte Carlo for Probabilistic Programs with Discontinuities*, The International Conference on Probabilistic Programming, 2018

Invited Talks

- *Life after the PhD: Solving real world, large-scale problems in industry,* University of Oxford, UK, 2023
- *Applying probabilistic programming to construct knowledge graphs*, Dataminr, New York, US, 2021
- *AI for space*, United Nations: AI for Good Global Summit, Geneva, CH, 2019
- *Probabilistic Programming,* Oxford Centre for Human Brain Activity, Oxford, UK, 2018
- *Using machine learning to detect informal settlements*. European Space Agency, IT, 2018

Awards

Academic

- 2020 EY (Ernst & Young) Best Technology Business Award, out of 50 teams
- 2019 Runner-up in the Vice-Chancellor's Social Impact Award, out of 300 people
- 2019 NeulPS Travel Award
- 2018 FDL Award for Unexpected Discovery, out of 30 people
- 2016-2020 EPSRC Fully-Funded 4-Year PhD Studentship, 1 of 10 out of 240 people
- 2014 EPSRC Summer Research Award
- 2014 BP Ambition Award, 1 of 20 out of 600 people
- 2012 Eliahou Dangoor Scholarship, 1 of 5 out of 1000 people
- 2012 PWC High Flyers Award
- 2011 Sir Peter Mansfield High Achiever Scholarship
- 2011-2015 St Ann's Experian Scholarship
- 2011-2015 First in the Family Scholarship

- 2010 Excellent Dedication and Contribution A-level Physics
- 2010 Interest and Enthusiasm A-level Mathematics

Sporting

- 2016 IronMan Copenhagen, 11th in age group, out of 400 people
- 2016 Silver Medal, Fell Running championships, competing against 150 people
- 2005-2007 National Mini-field Youth Hockey champion U13 and U15 out of 25 teams

Reviewing Duties

- AABI 2024 main conference
- AISTATS 2022 main conference
- NeurIPS 2021 main conference
- NeurIPS 2020 workshop on Deep Learning for the Physical Sciences
- NeurIPS 2020 main conference
- AISTATS 2020 main conference
- NeurIPS 2019 workshop on Deep Learning for the Physical Sciences
- NeurIPS 2019 main conference
- NeurIPS 2018 workshop on Deep Learning for the Physical Sciences
- NeurIPS 2018 workshop on Critiquing and Correcting Trends in Machine Learning