

Bradley Gram-Hansen

Projects: <https://github.com/bayesianbrad> • Email: bradleygramhansen@gmail.com • Publications: [Google Scholar](#)

Experience

AI Research Scientist II

Dataminr

Seattle, US

Dec. 22 – Present

- Spearhead development of scalable machine learning (ML) solutions utilizing LLMs (LLAMA2, PALM, Mistral), NLP (DeBERTa, BERT and others), statistical methods (Bayesian statistics, generative modeling), and knowledge graphs (Neo4J, Cypher) resulting in 60% higher-quality alerts, \$500k+ annual efficiency cost savings, and new product streams for cyber security leading to \$5M+ ARR.
- Lead and direct two technical initiatives with 4 direct reports: one for cyber security and the other for anomaly detection across 1M data sources that consist of multiple modalities (text, images, audio, sensor data).
- Build foundational models using closed and open source LLMs (LLAMA, OpenAI GPT3.5 Turbo) for cyber vulnerability detection and knowledge summarization tasks.

AI Research Scientist I

Dataminr

Seattle, US

June 21 – Dec. 22

- Deployed 16 custom ML models (transformers, CNNs, RNNs) using Python (PyTorch, Scikit-learn, Pandas and Hugging Face) in cloud environments (Databricks, AWS) for internal process optimization and enhancing the consumer-facing product.
- Developed Looker and Snowflake dashboards using SQL for stakeholder communication, monitoring model drift, and performing A/B tests on new features on 10's of models.
- Managed projects with JIRA, maintained project code with Git, documented projects with Confluence; conducted and designed 8 annotation tasks using label studio; created 9 ETL pipelines (Spark, Python, Airflow); supervised and planned intern research; conducted interviews.

Co-founder (Chief Technology Officer)

Intelligent Networks

London, UK

June 20 – June 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.

AI Research Scientist

University of Oxford

Oxford, UK

Sept. 16 – June 20

- Collaborated with CERN, Intel, Google, and NYU to develop open-source deep learning and Bayesian generative modeling toolkits (PPX and PyProb) for probabilistic programs and large-scale simulators, resulting in NeurIPS and ICML publications.
- Partnered with the Bill & Melinda Gates Foundation to calibrate malaria simulators, utilizing Bayesian deep learning, to optimize prevention strategies with financial and geographical constraints, resulting in ICML and AABI publications.
- Led a cross-industry team involving Nvidia, NASA, ESA, Google Cloud, and UNICEF to pioneer a solution for informal settlement detection from low-resolution satellite imagery using Canonical correlation forests, saving UNICEF \$100,000 annually in surveying costs, the work was published at AAAI and presented at the UN AI conference for social good.

Education

University of Oxford

April 2020

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

July 2015

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 Guță

Graduated in top 5%. Equivalent GPA 4.0.

Publications

1. Saeid Naderiparizi, Adam Scibior, Andreas Munk, Mehrdad Ghadiri, Atılım 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

- NeurIPS 2023 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