Bradley.J Gram-Hansen

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"Life is nothing but an electron looking for a place to rest"

EDUCATION

UNIVERSITY OF OXFORD

PhD in Machine Learning and Statistics
Supervisors : Prof Yee Wyhe Teh • Dr Tom Rainforth
Dr Atılım Günes Baydin • Prof Frank Wood •
Prof Phil Torr
Expected completion by Aug 2020 | Oxford, UK

UNIVERSITY OF NOTTINGHAM

MMath in Mathematics
Bachelors in Mathematical Physics
2011 - 2015 | Nottingham, UK
First (GPA 4.0/4.0)

LINKS

Github:// **bayesianbrad**
Google Scholar:// **Publications**
LinkedIn:// **bradleygramhansen**
Twitter:// **@bayesianbrad**
Blog:// **Bradley's Blog**

SKILLS

TECHNICAL SKILLS

Statistical Modelling
Machine Learning
Probabilistic Programming
Markov Chain Monte Carlo
Gaussian Processes
Regression
Neural Networks
Deep Learning
Bayesian Inference
Time Series
Differential Equations
Relativity
Analysis
Quantum and Classical Mechanics
Quantum and Classical Information Theory
Linear Algebra
Stochastic Processes
Quantum Field Theory
Mathematical Biology
Non-linear Systems

PROGRAMMING SKILLS

Python• Matlab • Flutter • C++
Git • Docker & Singularity • Shell
Linux & UNIX • LaTeX• HTML

SPECIFIC LIBRARIES

Deep learning : Pytorch • Pyro
Visualization : seaborn • Matplotlib
Data processing : Numpy• Pandas • Jupyter
Machine learning : sklearn • GPyTorch

INTERPERSONAL SKILLS

Team player • Patient • Organised
Motivator • Responsible • Adaptive
Hard-working • Good Listener
Observant• Analytical

LANGUAGES

Englsih (Native) • French (Basic)

REFERENCES

Several available upon request.

EXPERIENCE

OXCSML AND TORR VISION GROUP Researcher, Oct 2016 – Present

- I design probabilistic programming languages and interpretable AI systems, and apply them to social and scientific applications, for physics and health-care.
- I develop new inference strategies that leverage deep learning frameworks.
- I created a probabilistic programming model checking system for "First-order models" called PyLFPPL, enabling new classes of inference algorithms to be deployed to probabilistic programming systems in an automated way.
- I contributed to a framework for automating the calibration of industrial simulators, written in any language.
- I developed a kernel-based algorithm for performing inference on small data-sets.

TECHNICAL CONSULTANT Consulting, Jun 2019 – Present

- I work with several social ventures, to create localised electricity grids and provide education solutions to children across Liberia.
- I offer insights and technical solutions on how to apply statistical analysis and machine learning 'AI' to a variety of different domains.
- This role often requires me to think outside of the box and work with a variety of different teams.

FRONTIER DEVELOPMENT LAB Research Intern, Jun 2018 – Oct 2018

- I designed a state-of-the-art system for generating automated maps of informal settlements from low-resolution satellite imagery. This was the first time any such thing had been done with this type of low-resolution data structure.
- This project was a collaboration between the European Space Agency, Oxford University, SA Catapult, NVidia and UNICEF.
- I had to develop methods that were robust to noisy data and help lead a team of researchers.

UNIVERSITY OF NOTTINGHAM Research Intern, Jun 2014 – Sept 2014

- I worked on developing novel techniques for analysing quantum channels and quantum maps in a relativistic framework using Gaussian states.
- I worked both independently and as part of a small team

INVITED TALKS

- Invited by the UN to give a talk on AI for space at the AI for good global summit. Geneva, CH, 2019
- Invited to the Oxford centre for Human Brain Activity to give a talk on Probabilistic Programming. Oxford, UK, 2018.
- Invited to ESA Esrin to give a talk on using machine learning to detect informal settlements. ESA Esrin, IT, 2018.

AWARDS

ACADEMIC

2020	EY - Best Technology Business Award at the AI for Climate Change Challenge
2019	Runner-up in the Vice-Chancellor's Social Impact Award
2019	NeulPS travel award
2018	FDL Award for Unexpected Discovery
2016-2020	EPSRC Fully-Funded 4-Year PhD Studentship
2014	EPSRC Summer Research Award
2014	BP Ambition Award
2012	Eliahou Dangoor Scholarship
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
2016	Silver Medal, Fell Running Championships
2005-2007	National mini field youth hockey champion U13 and U15

PUBLICATIONS

PRE-PRINTS

- **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** 2020
- **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
- **B. Gram-Hansen** and S.J Roberts, Multi-layer Stacked Gaussian Processes 2019

PUBLISHED PAPERS

- 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
- 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
- **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
- **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 AAAI/ACM Conference on AI Ethics and Society (AAAI) 2018
- **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

WORKSHOP PAPERS

- **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** 2nd Symposium on Advances in Approximate Bayesian Inference (AABI) 2019
- **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
- **B. Gram-Hansen** , P. Helber, I. Varatharajan, F. Azam, A. Coca-Castro, V. Kopackova and P. Bilinski, **Generating Material Maps to Map Informal Settlements** Machine Learning for the Developing World Workshop at the 32nd Conference for Neural Information Processing Systems (NeuIPS) 2018

REVIEWING DUTIES

- Neurlps 2019 workshop on Deep Learning for the Physical Sciences
- Neurlps 2019 main conference
- Neurlps 2018 workshop on Deep Learning for the Physical Sciences
- Neurlps 2018 workshop on Critiquing and Correcting Trends in Machine Learning