Bradley.J Gram-Hansen

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

EDUCATION

UNIVERSITY OF OXFORD

DPhil in Autonomous Intelligent Machines and Systems
Supervisors : Prof Yee Wyhe Teh • Dr Tom Rainforth
Dr Atılım Günes Baydin • Prof Frank Wood
Prof Phil Torr
Expected completion July 2020 | Oxford, UK

UNIVERSITY OF NOTTINGHAM

MMath in Mathematics
2011 - 2015 | Nottingham, UK
Grade: 75% avg over 4 years. First

LINKS

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

SKILLS

TECHNICAL SKILLS

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• Shell• C++ • Matlab
Clojure • Git • Docker & Singularity
LaTeX• HTML

SPECIFIC LIBRARIES

Pytorch • Pyprob • Matplotlib • Seaborn
Numpy • Scit-learn • SciPy • PyMC3

INTERPERSONAL SKILLS

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

DISABILITIES

Mildly Dyslexic • Dyspraxic
Having learning disabilities enables me to empathise with others who suffer the same difficulties.

REFERENCES

Several available upon request.

EXPERIENCE

FRONTIER DEVELOPMENT LAB

Open Collaborative Intership with the European Space Agency, Oxford University, SA Catapult, NVidia and UNICEF
June 2018 – Oct 2018 | Oxford, UK & ESA Esrin, IT

- Focused on the task of using freely available data to help AID-agencies and NGOs perform their operations in a cost-effective and efficient manner.
- Developed an automated inference framework that was computationally efficient, in both monetary and computational cost, for automatically detecting informal settlements in a low-resolution satellite image. This was the first time any such thing had been done with this type of low-resolution data structure.

CLASSICAL FOUNDATIONS TUTORING

Mathematics Tutor
Apr 2016 – June 2016 | Nottinghamshire,UK

- Perform one-to-one tuition with a wide variety of different pupils.
- Adapt to the different needs and questions asked by each pupil, which ranged from GCSE lower tier to A2-level mathematics.
- Enable the pupil to develop as a character and open their mind to other aspects of mathematics.
- Inspire the pupil to see that they had the potential to achieve.

EPSRC INTERN

Performed Research on Relativistic Quantum Maps
June 2014 – Sept 2014 | University of Nottingham, UK

- Research performed in the Mathematical Physics group, supervised by Dr Gerardo Addesso and Dr Antony Lee.
- Worked on developing novel techniques for analysing quantum channels and quantum maps in a relativistic framework using Gaussian states.

RESEARCH

OXCSML AND TORR VISION GROUP

Oct 2016 – Present | Oxford, Uk

- Designing probabilistic programming languages and interpretable AI systems, with a focus on social and scientific applications.
- Created a customisable probabilistic programming system for "First-order models", enabling new classes of inference algorithms to be deployed in probabilistic programming systems.
- Developed a framework for overriding any industrial simulator, written in any language and connecting it to a generic probabilistic programming systems to perform parallezible and statistically correct inference.
- Developed my own framework and algorithm for performing inference on small data-sets with Gaussian Processes.

MATHEMATICAL PHYSICS GROUP

Sept 2013 – May 2014 & Sept 2014 - May 2015 | Nottingham, UK

- Dissertation : An Investigation into Electron-Proton Entanglement in the Hydrogen Atom. Supervisor: Dr Alexander Ossipov.
- Thesis : An Insight into Quantum Random Walks. Supervisor: Dr Madalin Guta.

AWARDS

ACADEMIC

2019	Nominated for Vice-Chancellor's Social Impact 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, Qualified to Represent UK for Long Distance Duathlon
2016	Silver Medal, Nottinghamshire Fell Running Championships
2005-2007	National mini field youth hockey champion U13 and U15

INVITED TALKS

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

PUBLICATIONS

PUBLISHED PAPERS

- 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 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 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 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.Whye Teh, T. Rainforth and AG. Baydin, Hijacking Malaria Simulators with Probabilistic Programming AI for Social Good Workshop at the International Conference on Machine Learning 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 2018

UNDER REVIEW

- 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 Under review at the International Conference on Neural Information Processing Systems 2019

PRE-PRINTS

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