

HENRY MOSS

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RESEARCH INTERESTS

Bayesian optimisation: information-theory; batch design; multi-fidelity.

Gaussian processes: multi-fidelity models; string kernels.

Experimental design: gene design; molecule search.

Natural language processing: AutoML; hyper-parameter tuning; text-to-speech.

EDUCATION

PhD in Machine Learning and Statistics, STOR-i CDT, Lancaster University.

2017 -

- *Information-theoretic Bayesian optimisation for natural language processing:*
 - Developing Bayesian optimisation methods for high-cost string design problems.
 - Extending information-theoretical Bayesian optimisation for batch and multi-fidelity designs.
 - Applying statistical arguments to improve reliability and efficiency in NLP pipelines.
- Supervision by Prof. David Leslie (Statistics) and Prof. Paul Rayson (Computer Science).

MRes in Statistics and Operational Research (Distinction), Lancaster University.

2016 - 2017

MA (Hons) in Mathematics (2:1), Emmanuel College, University of Cambridge.

2013 - 2016

PUBLICATIONS

Published:

Moss H. B., Beck D., Leslie D. S., Gonzalez J. & Rayson P. Bayesian Optimisation over String spaces. In *The Conference on Neural Information Processing Systems* (NeurIPS), 2020 (**spotlight**).

Moss H. B. & Griffiths R. Gaussian Process Molecule Property Prediction With FlowMO. In *The Conference on Neural Information Processing Systems: Machine Learning for Molecules Workshop* (NeurIPS: ML4Molecules Workshop), 2020.

Moss H. B., Leslie D. S. & Rayson P. BOSH: Bayesian Optimisation by Sampling Hierarchically. In *The International Conference on Machine Learning: Workshop on Real World Experimental Design and Active Learning* (ICML: Real-ML Workshop), 2020.

Moss H. B., Leslie D. S. & Rayson P. MUMBO: Multi-task Max-value Bayesian Optimisation. In *The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (ECML), 2020.

Moss H. B., Aggarwal V., Prateek N., Gonzalez J. & Barra-Chicote R. BOFFIN TTS: Few-shot Speaker Adaptation By Bayesian Optimisation. In *The International Conference on Acoustics, Speech and Signal Processing* (ICASSP), 2020.

Moss H. B., Moore A., Leslie D. S. & Rayson P. FIESTA: Fast IdEntification of State-of-The-Art Models Using Adaptive Bandit Algorithms. *The Annual Meeting of the Association of Computational Linguists* (ACL), 2019.

Moss H. B., Leslie D. S. & Rayson P. Using J - K -fold Cross Validation to Reduce Variance when Tuning Natural Language Processing Models. In *The International Conference on Computational Linguistics* (COLING), 2018 (**area chair favourite**).

In Preparation:

Moss H. B., Leslie D. S., Gonzalez J. & Rayson P. General-purpose Information-theoretic Bayesian Optimisation: Unifying Batch Heuristics Though an Entropy Approximation.

PRIZES

NeurIPS spotlight paper: Top 3% of submissions at NeurIPS.	2020
ML4Molecules contributed talk: Top 5% of submissions at the ML4Molecules Workshop at NeurIPS.	2020
Nick Smith prize: Best second-year Statistics PhD student at Lancaster University.	2019
Area chair favourite: Nominated for overall best paper at COLING 2018.	2018

INTERNSHIPS AND SUMMER SCHOOLS

Visiting researcher , School of Computing and Information Systems, University of Melbourne.	2020
• Derived Bayesian optimisation for sequence design under syntactic constraints.	
Amazon PhD internship , Text-To-Speech Team, Amazon Alexa, Cambridge.	2019
• Used Bayesian optimisation to fine-tune neural systems to synthesise new voices with limited data.	
Amazon Intern Colloquium , Amazon Research, Cambridge.	2019
Google NLP Summit , Google Research, Zurich.	2019
Microsoft AI Summer School , Microsoft Research, Cambridge.	2018
UCREL NLP Summer School , Lancaster University.	2017
Wellcome Sanger internship , University of Cambridge.	2016
• Designed a system to automatically flag promising compounds during image-based drug screening.	
Summer research internship , STOR-i CDT, Lancaster University.	2016
Equity analyst: Oil & Gas researcher at Redburn International.	2015

PRESENTATIONS

ECML: MUMBO: Multi-task Max-value Bayesian Optimisation (talk).	2020
Microsoft Research Cambridge: Bayesian Optimisation in Gene Design Loops (talk).	2020
Mathematics of Data Science Conference, ICML: RealML Workshop: BOSH (talk).	2020
ICASSP, Amazon Research Cambridge and University of Melbourne: BOFFIN TTS (talk).	2020
Prowler.io, Sheffield, Lancaster and Manchester Universities; MUMBO (talk).	2019
Amazon Intern Colloquium: Rapid Speaker Adaptation with Bayesian Optimisation (poster).	2019
ACL: FIESTA: Fast Identification of SOTA (talk).	2019
Google NLP Summit: Reliable and Efficient Hyper-parameter Tuning for NLP (poster).	2019
STOR-i Forum and Lancaster Data Science Group: A Crash Course in Bayes Opt (talk).	2018
Microsoft AI Summer School and COLING: Using J-K-fold Cross Validation ... (poster)	2018
UCREL Summer School in Corpus-based NLP: Instabilities in NLP models (poster).	2017

RESEARCH SUPPORT

Visiting researcher grant: Collaboration sponsorship from the University of Melbourne.	2020
STOR-i research fund: Support for visit to the University of Melbourne from Lancaster University.	2020
Workshop sponsorship: Support for Bayesian optimisation workshop from Amazon Research.	2019
Faculty of Science and Technology travel grant: Travel support from Lancaster University.	2018
STOR-i PhD scholarship: Full funding for MRes and PhD programme.	2016

OTHER RELEVANT EXPERIENCE

Program Committee: Committee member for the NeurIPS ML4Molecules Workshop.	2020
Reviewer: Reviewed manuscripts for ECML .	2020
Intern supervisor , Supervised undergraduate statistics project, Lancaster University.	2018
Statistical consultant , Natural Language Identification Project, Lancaster University.	2018
MSc masterclass: Designed and taught short course on Bayesian optimisation.	2019
STOR-i computing team: Assist peers with coding and distributed computing.	2017 - 2019
Tutor: Undergraduate Mathematics and MSc Data Science.	2017 - 2019
Lancaster University outreach: Interactive sessions with local secondary schools.	2016 - 2018

COMPUTING SKILLS

Python, Tensorflow, PyTorch, GPflow, Git, Maintainer of BOSS, Maintainer of FlowMO, Contributor to Emukit, Contributor to Trieste, GPy, GPyOpt, Cython, MXNet, R, C	
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