HENRY MOSS

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RESEARCH INTERESTS

Bayesian optimisation: information-theory; batch design; discrete structures; multi-fidelity.
Gaussian processes: multi-fidelity models; string kernels.
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 Dr. 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., 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 (**AC favourite**).

Under Review:

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

In Preparation:

Moss H. B., Leslie D. S., Gonzalez J. & Rayson P. GIBBON: a General-purpose Information-Based Bayesian OptimisatioN. In *Journal of Machine Learning Research* (JMLR).

PRIZES

NeurIPS spotlight paper: Top 3% of submissions 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
Rock Services' Data Team: *Reproducible and Reliable Parameter Tuning in ML* (talk). 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

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, Contributor to Emukit Python Library, Beta tester for OptiFlow, GPy, GPyOpt, Cython, MXNet, R, C