

# HENRY MOSS

henry.moss@secondmind.ai

## RESEARCH INTERESTS

---

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

**Gaussian processes:** scalable models; multi-fidelity; string kernels.

**Experimental design:** gene design; molecule search.

## CURRENT ROLE

---

**Senior Machine Learning Researcher**, Secondmind, Cambridge.

2020 - 2021

## EDUCATION

---

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

2016 - 2020

- *Information-theoretic Bayesian optimisation for natural language processing:*
  - Extended information-theoretical Bayesian optimisation for batch and multi-fidelity designs.
  - Developed Bayesian optimisation methods for high-cost string design problems.
- Supervision by Prof. David Leslie (Statistics) and Prof. Paul Rayson (Computer Science).

**MRes in Statistics and Operational Research**, Lancaster University.

2016 - 2017

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

2013 - 2016

## PUBLICATIONS

---

### Published:

Vakili S., Moss H. B., Artmev A., Dutordoir V. & Picheny V. Scalable Thompson Sampling using Sparse Gaussian Process Models. In *The Conference on Neural Information Processing Systems* (NeurIPS), 2021.

Moss H. B., Leslie D. S., Gonzalez J. & Rayson P. General-purpose Information-based Bayesian Optimisation. In *The Journal for Machine Learning Research* (JMLR), 2021.

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. In *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**).

## Under Review:

Griffiths R., Thawani A., Jamasb A., **Moss H. B.**, Bourached A., Jones P., McCorkindale W., & Aldrick A. A Case for Domain Expert Dataset Curation in Machine-Learning Enabled Chemistry.

## PRIZES

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

## INTERNSHIPS AND SUMMER SCHOOLS

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

## PRESENTATIONS

<b>Gaussian Process Summer School:</b> <i>Overview of Secondmind's Toolboxes</i> (talk).	2021
<b>ECML:</b> <i>MUMBO: Multi-task Max-value Bayesian Optimisation</i> (talk).	2020
<b>Microsoft Research Cambridge:</b> <i>Bayesian Optimisation in Gene Design Loops</i> (talk).	2020
<b>Mathematics of Data Science Conference, ICML: RealML Workshop:</b> <i>BOSH</i> (talk).	2020
<b>ICASSP, Amazon Research Cambridge and University of Melbourne:</b> <i>BOFFIN TTS</i> (talk).	2020
<b>Prowler.io, Sheffield, Lancaster and Manchester Universities;</b> <i>MUMBO</i> (talk).	2019
<b>Amazon Intern Colloquium:</b> <i>Rapid Speaker Adaptation with Bayesian Optimisation</i> (poster).	2019
<b>ACL:</b> <i>FIESTA: Fast Identification of SOTA</i> (talk).	2019
<b>Google NLP Summit:</b> <i>Reliable and Efficient Hyper-parameter Tuning for NLP</i> (poster).	2019
<b>STOR-i Forum and Lancaster Data Science Group:</b> <i>A Crash Course in Bayes Opt</i> (talk).	2018
<b>Microsoft AI Summer School and COLING:</b> <i>Using J-K-fold Cross Validation ...</i> (poster).	2018
<b>UCREL Summer School in Corpus-based NLP:</b> <i>Instabilities in NLP models</i> (poster).	2017

## RESEARCH SUPPORT

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

## OTHER RELEVANT EXPERIENCE

<b>Internship Supervisor:</b> Supervisor for two summer placement students .	2021
<b>Reviewer:</b> Reviewed manuscripts for Neural Computation .	2021
<b>Program Committee:</b> Committee member for the NeurIPS ML4Molecules Workshop.	2020-2021
<b>Reviewer:</b> Reviewed manuscripts for AISTATS and ECML .	2020

<b>MSc masterclass:</b> Designed and taught short course on Bayesian optimisation.	2019 - 2020
<b>Statistical consultant,</b> Natural Language Identification Project, Lancaster University.	2018
<b>STOR-i computing team:</b> Assist peers with coding and distributed computing.	2017 - 2019
<b>Tutor:</b> Undergraduate Mathematics and MSc Data Science.	2017 - 2019
<b>Lancaster University outreach:</b> Interactive sessions with local secondary schools.	2016 - 2018

## COMPUTING SKILLS

---

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