

# GERGELY FLAMICH

St John's College, Cambridge, UK

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## EDUCATION

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### PhD in Machine Learning (St John's College, Cambridge)

Oct 2020 - Present (Expected Graduation: Feb 2025)

Supervisor: Dr José Miguel Hernández-Lobato

**Research interests:** Compression algorithms using relative entropy coding, learned data compression using variational autoencoders and implicit neural representations, generative modelling, Bayesian optimization

### MPhil in Machine Learning and Machine Intelligence (St John's College, Cambridge)

Oct 2018 - Oct 2019

*Graduated with Commendation*

**Courses taken:** Deep Learning, Probabilistic Machine Learning, Computer Vision, Reinforcement Learning, Natural Language Processing, Speech Recognition, Advanced Machine Learning, Statistical Machine Translation, Statistical Speech Synthesis, Control Theory, Introduction to Machine Learning, Probabilistic Automata

**Average grade:** 75% (A)

**Dissertation Topic:** Compression, Information Theory, Variational Auto-Encoders (graded 80.5%)

### BSc Joint Honours in Mathematics and Computer Science (University of St Andrews)

Sept 2014 - June 2018

*Graduated as Valedictorian in Computer Science, with First Class Honours*

**Relevant achievements:** In my first year of studies, I implemented a **genetic algorithm** to find optimal playing strategies for the game Starcraft 2 in a very large search space, which was assessed by the department to be the best solution (**graded 100%**). As part of a third-year group project, I have implemented a **parallelised Monte Carlo Tree Search** agent to play the board game Catan (**graded 87.5%**).

**Average grade:** 86% (17.2 / 20)

**Dissertation Topic:** Cryptography, Fully Homomorphic Encryption (graded 92.5%)

## WORK EXPERIENCE AND RELEVANT PROJECTS

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### Student Researcher: Relative Entropy Coding for Practical Data Compression

July 2022 - Dec 2022

Google Brain, London

Host: Dr Lucas Theis

### Research Assistantship: Bayesian Optimization & Data Compression

Oct 2019 - July 2020

University of Cambridge

Supervisor: Dr José Miguel Hernández-Lobato

### Master's Dissertation: Compression without Quantization

May 2019 - Aug 2019

University of Cambridge

Supervisors: Marton Havasi, Dr José Miguel Hernández-Lobato

### Research Assistant / Google Soli Alpha Developer: Gesture Recognition

June 2016 - Aug 2016

St Andrews HCI Group

Supervisor: Prof. Aaron Quigley

### Research Assistant: Categorising Materials with Radar Waves

Jan 2016 - April 2016

St Andrews HCI Group

Supervisor: Dr David Harris-Birtill, Prof. Aaron Quigley

## ACADEMIC ACHIEVEMENTS

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2022	Highlighted Reviewer	ICLR 2022 ( <a href="https://iclr.cc/Conferences/2022/Reviewers">https://iclr.cc/Conferences/2022/Reviewers</a> )
2019	Commendation	University of Cambridge, <i>awarded for good performance in my MPhil</i>
2018	Adobe Prize	University of St Andrews, <i>highest average grade in Computer Science</i>
2018	Dean's List Award	University of St Andrews, <i>annual award for academic excellence</i>
2016	Dean's List Award	University of St Andrews, <i>annual award for academic excellence</i>
2015	Top of Class	First-Year Programming Projects
2013	2 <sup>nd</sup> Prize	International Hungarian Mathematics Competition

## PUBLICATIONS

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- J. He<sup>†</sup>, **G. Flamich**<sup>†</sup>, Z. Guo, J. M. Hernández-Lobato. RECOMBINER: Robust and Enhanced Compression with Bayesian Implicit Neural Representations. *Submitted to ICLR 2024*.
- Sz. Ujváry, **G. Flamich**, V. Fortuin, J. M. Hernández-Lobato. Estimating optimal PAC-Bayes bounds with Hamiltonian Monte Carlo. *Submitted to NeurIPS 2023 Mathematics of Modern Machine Learning Workshop*.
- J. A. Lin, **G. Flamich**, J. M. Hernández-Lobato. Minimal Random Code Learning with Mean-KL Parameterization. In *ICML Neural Compression Workshop 2023*.
- **G. Flamich**. Greedy Poisson Rejection Sampling. In *NeurIPS 2023*.
- **G. Flamich**<sup>†</sup>, Z. Guo<sup>†</sup>, J. He, Z. Chen, J. M. Hernández-Lobato. Compression with Bayesian Implicit Neural Representations. In *NeurIPS 2023*. Received **Spotlight** (top 10% of accepted papers, top 2% of submitted papers).
- **G. Flamich**<sup>†</sup>, S. Markou<sup>†</sup>, J. M. Hernández-Lobato. Faster Relative Entropy Coding with Greedy Rejection Coding. In *NeurIPS 2023*.
- **G. Flamich**, L. Theis. Adaptive Greedy Rejection Sampling. In *IEEE International Symposium on Information Theory 2023*.
- **G. Flamich**<sup>†</sup>, S. Markou<sup>†</sup>, J. M. Hernández-Lobato. Fast Relative Entropy Coding with A\* coding. In *ICML 2022*.
- **G. Flamich**<sup>†</sup>, M. Havasi<sup>†</sup>, J. M. Hernández-Lobato. Compressing Images by Encoding Their Latent Representations with Relative Entropy Coding. In *NeurIPS 2020*.
- **G. Flamich**, M. Havasi, J. M. Hernández-Lobato. Compression without Quantization (*Workshop paper*). In *NeurIPS 2019 Workshop on Information Theory and Machine Learning*.
- H.-S. Yeo, **G. Flamich**, P. Schrempf, D. Harris-Birtill, and A. Quigley. RadarCat: Radar categorization for input & interaction. In *Proceedings of the 29th Annual Symposium on User Interface Software and Technology*, pages 833–841. ACM, 2016.

<sup>†</sup> equal contribution.

## INVITED TALKS

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- Design Space Exploration of Heterogeneous SoCs using Multi-Objective Bayesian Optimization. At *Semiconductor Research Corporation (SRC) TECHCON 2020 (Virtual)*.

## REVIEWING

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**NeurIPS (2021 – 2023), ICLR (2022 – 2024), ICML (2021 – 2023), AISTATS (2021 – 2023), TMLR (2022 – 2023), ICML Neural Compression Workshop 2023**

## TEACHING EXPERIENCE

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### Master's Thesis Supervision

*University of Cambridge*

		<i>Thesis Title</i>
2023	Szilvia Ujváry	How tight can a PAC-Bayes bound be?
2023	Jiajun He	Compression with Bayesian Implicit Neural Representations
2021	Kristopher Miltiadou	Probabilistic Machine Learning

### Undergraduate Supervision

*University of Cambridge*

2023	Daniel Goc	Supervised an 8 week undergraduate research project on improving theoretical results on relative entropy coding algorithms.
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### Undergraduate Teaching

*University of Cambridge*

2023	Supervised* 5 groups of two fourth-year undergraduate students for <i>3F8: Inference</i>
2022	Supervised* 2 groups of three fourth-year undergraduate students for <i>3F8: Inference</i>

\* Supervision is a form of small-group teaching at Cambridge and Oxford.

## TECHNICAL SKILLS

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<b>Languages</b>	Python, Javascript, Java, Haskell, Matlab, C, C++, $\LaTeX$
<b>Frameworks &amp; APIs</b>	Tensorflow, Autograd, SciPy, OpenCV, D3.js, Qt

## EXTRACURRICULAR

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### School President of Computer Science (2017-2018)

- Organised first Computer Science Ball, and Research Fayre for UGs
- Successfully implemented a mentoring scheme for newcomers

### Executive Committee Member of the Computing Society (2015-2017)

- Organised 4 hackathons, 9 student talks and 6 programming contests