

Ben Ellis

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Education

- 2020—** DPhil Autonomous Intelligent Machines and Systems CDT – University of Oxford
Advised by Shimon Whiteson and Jakob Foerster. Research focuses on Reinforcement Learning.
- 2017—2018** MEng Computer Science – University of Cambridge
Distinction – 730.4 / 900 (81%)
Dissertation – *Adaptive Stream Processing with Deep Reinforcement Learning*
– Awarded 80%
– Focused on improving the performance of distributed stream processing systems in Apache Heron using Deep Q-Learning from Demonstration.
- 2014—2017** BA Hons Computer Science – University of Cambridge
First Class – 326 / 400. Ranked 9 / 94.
Awarded David Thompson Scholarship for Academic Excellence
Individual Project – *Community Detection in Social Networks*
– Awarded First Class mark
– Implemented and evaluated two approaches to community detection in social networks and produced multiple combinations of these, one of which outperformed the current state of the art algorithm on the data available.

Employment History

- Oct 2018 —** Man AHL
Oct 2020 *Software Developer*
Developer within the Core Trading Technology Team, which is responsible for technology behind key trading system operations such as limit checking and rolling futures contracts. Major achievements include:
- Planned and rewrote fair fund allocation logic for futures logic. This was a significant project to fix a long-standing logical flaw in the system.
 - Developed proposals for splitting up a monolithic web app to improve build time, a part of a new database clone infrastructure, and making a synchronous web app asynchronous
 - Investigated and resolved active directory problems, which were the major cause of total trading system outage in the last year. Developed algorithm to fail over to a new domain controller, and improved application performance.
- Technologies:** Python 2/3, Docker, git, Mongo, Oracle SQL, Apache Proxies, Envoy, Kubernetes, Javascript, Pyramid web server, Mock, Pandas, Lettuce, Selenium
- July 2017 —** Quadrature Capital
Sep 2017 *Intern Developer*
9 week paid internship as a quantitative developer:
- Designed and developed a tool in Python and C++ for visualisation of the Order Book. Optimised the tool to ensure it was responsive for even very liquid stocks.
 - Investigated lead/lag relationships between different stocks using the Hayashi-Yoshida cross-correlation estimator to examine the feasibility of developing a predictive model.
- Technologies:** Python 3, C++, Cython, OpenGL (basic)
- Jun 2016 —** BlackRock
Aug 2016 *Summer Analyst*

8 week paid internship within the Aladdin Product Group:

- Successfully completed the intern program and rated as ‘outperformed’ in my performance review
- Developed a tool to compare position data for consistency across three different database tables.
- Parallelised a constituent search tool and thereby increased its performance by a factor of 3.
- Winner of the intern coding challenge.

Technologies: Java, SQL, Swing, Spring, Ivy, SVN

Publications and Preprints

Publications

1. Benjamin Ellis, Skander Moalla, Mikayel Samvelyan, Mingfei Sun, Anuj Mahajan, Jakob N. Foerster, and Shimon Whiteson. Smacv2: An improved benchmark for cooperative multi-agent reinforcement learning. In *Thirty-seventh Conference on Neural Information Processing Systems Datasets and Benchmarks Track*, 2023
2. Mingfei Sun, Benjamin Ellis, Anuj Mahajan, Sam Devlin, Katja Hofmann, and Shimon Whiteson. Trust-region-free policy optimization for stochastic policies. In *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, 2022
3. Matthew Thomas Jackson, Michael Tryfan Matthews, Cong Lu, Benjamin Ellis, Shimon Whiteson, and Jakob Foerster. Policy-guided diffusion. *Reinforcement Learning Conference*, 2024
4. Michael Matthews, Michael Beukman, Benjamin Ellis, Mikayel Samvelyan, Matthew Jackson, Samuel Coward, and Jakob Foerster. Craftax: A lightning-fast benchmark for open-ended reinforcement learning. *International Conference on Machine Learning*, 2024

Preprints

1. Michael Schaarschmidt, Alexander Kuhnle, Ben Ellis, Kai Fricke, Felix Gessert, and Eiko Yoneki. Lift: Reinforcement learning in computer systems by learning from demonstrations. *arXiv preprint arXiv:1808.07903*, 2018
2. Anuj Mahajan, Mikayel Samvelyan, Tarun Gupta, Benjamin Ellis, Mingfei Sun, Tim Rocktäschel, and Shimon Whiteson. Generalization in cooperative multi-agent systems. *arXiv preprint arXiv:2202.00104*, 2022
3. Alexander Rutherford*, Benjamin Ellis*, Matteo Gallici*, Jonathan Cook, Andrei Lupu, Gardar Ingvarsson, Timon Willi, Akbir Khan, Christian Schroeder de Witt, Alexandra Souly, Saptarashmi Bandyopadhyay, Mikayel Samvelyan, Minqi Jiang, Robert Tjarko Lange, Shimon Whiteson, Bruno Lacerda, Nick Hawes, Tim Rocktaschel, Chris Lu*, and Jakob Nicolaus Foerster. Jaxmarl: Multi-agent rl environments in jax. *arXiv preprint arXiv:2311.10090*, 2023