Matteo Bettini
Curriculum Vitae

✉ *matteo.bettini2@gmail.com*
🌐 *www.matteobettini.com*
in *bettinimatteo*
○ *matteobettini*
Ⓡ *Matteo Bettini*
ⓘ *0000-0001-8679-0151*

Education

2021– Jun 2025	**PhD in Computer Science**, *University of Cambridge* Researching heterogeneity and resilience in learning for multi-robot/agent systems
2020–2021	**MPhil in Advanced Computer Science**, *University of Cambridge* *Distinction* GPA: 87.09/100 Thesis on transport network design for multi-agent routing
2017–2020	**BEng in Computer Engineering**, *Politecnico di Milano* *110 Cum Laude/110 (Honors)* GPA: 29.16/30

Experience

Work

Jun–Oct 2023	**Meta, PyTorch**, *Machine Learning Engineer Intern (PhD)*, London Worked in the TorchRL team. ○ Integrated multi-agent in TorchRL ○ Developed *BenchMARL*, a facebook research multi-agent reinforcement learning library
Jun–Sept 2021	**Amazon Web Services (AWS)**, *Software Development Engineer Intern*, Cambridge Worked in the EC2 team using the Rust programming language to implement an interactive serial console for Xen-based EC2 instances. ○ Developed a deep knowledge of the Rust programming language ○ Used cryptographic and asynchronous programming libraries

Teaching

2021–present	**University of Cambridge**, *Teaching Assistant and Supervisor*, Cambridge ○ Teaching assistant, demonstrator, and robot fleet manager for the "Introduction to Robotics" undergraduate and postgraduate course ○ MPhil thesis supervisor ○ Supervisor for undergraduate courses

Awards and Recognition

2021	Graduated with Distinction from the University of Cambdrige
2017-2020	Achieved 30 Cum Laude/30 (Honors) for 13 of 25 exams at Politecnico di Milano and graduated Cum Laude
2017-2020	Merit-based scholarship at Politecnico di Milano - 50% tuition reduction
2017	Best Freshmen of Politecnico di Milano Award - 1500€

Skills

Programming languages	Python, Java, Rust, C, JavaScript	*Deep learning*	PyTorch, scikit-learn, NumPy, SciPy, TorchRL, TorchGeometric

Languages

English	Full proficiency	*Certifications: TOEFL IBT 112/120 (Sept 2019)*
Italian	Native	

Interests

- Multi-Robot Systems
- Reinforcement Learning
- Heterogeneous Multi-Agent Learning
- Graph Neural Networks

Publications

[1] Albert Bou, **Matteo Bettini**, Sebastian Dittert, Vikash Kumar, Shagun Sodhani, Xiaomeng Yang, Gianni De Fabritiis, and Vincent Moens. Torchrl: A data-driven decision-making library for pytorch. In *The Twelfth International Conference on Learning Representations*, 2024.

[2] **Matteo Bettini**, Ajay Shankar, and Amanda Prorok. System neural diversity: Measuring behavioral heterogeneity in multi-agent learning. *arXiv preprint arXiv:2305.02128*, 2023.

[3] **Matteo Bettini**, Ajay Shankar, and Amanda Prorok. Heterogeneous multi-robot reinforcement learning. AAMAS '23. International Foundation for Autonomous Agents and Multiagent Systems, 2023.

[4] Steven Morad, Ryan Kortvelesy, **Matteo Bettini**, Stephan Liwicki, and Amanda Prorok. Popgym: Benchmarking partially observable reinforcement learning. In *International Conference on Learning Representations*, 2023.

[5] **Matteo Bettini**, Ryan Kortvelesy, Jan Blumenkamp, and Amanda Prorok. Vmas: A vectorized multi-agent simulator for collective robot learning. *The 16th International Symposium on Distributed Autonomous Robotic Systems*, 2022.

[6] **Matteo Bettini** and Amanda Prorok. On the properties of path additions for traffic routing. *IEEE International Conference on Intelligent Transportation Systems (ITSC) Workshop on Co-Design and Coordination of Future Mobility Systems*, 2022.

Invited talks

BenchMARL: Benchmarking Multi-Agent Reinforcement Learning

2024	Distributed and Collaborative Intelligent Systems and Technology (DCIST) Collaborative Research Alliance (CRA)
2023	InstaDeep knowledge sharing session - *InstaDeep*

Multi-Agent Simulation and Learning in TorchRL

2023	Artificial Intelligence Research Group Talks (Computer Laboratory) - *University of Cambridge*
2023	Multi-agent Reinforcement Learning Reading Group - *University of Maryland, College Park*

Heterogeneous Multi-Robot Reinforcement Learning

2022	Distributed and Collaborative Intelligent Systems and Technology (DCIST) Collaborative Research Alliance (CRA)

Courses taught

2021-22, 2022-23	**Introduction to Robotics**, *MPhil, Part III, Part II in Computer Science*, University of Cambridge Teaching assistant, grader, demonstrator, mini-project supervisor, and robot fleet manager
2021-22, 2022-23	**Concepts in Programming Languages**, *Part IB in Computer Science*, University of Cambridge Creation & grading of personalized supervision sessions for 5 groups of 2 undergraduate students

Thesis supervision

2023 **Alex Shaw**, *MPhil in Machine Learning and Machine Intelligence*, University of Cambridge

2023 **Sepand Dyanatkar**, *MPhil in Advanced Computer Science*, University of Cambridge

Selected projects

- **BenchMARL**: created the facebook research BenchMARL project for standardized benchmarking of multi-agent reinforcement learning (Fig. 1a). *Link*
- **TorchRL**: I am the second contributor of the official PyTorch reinforcement learning library [1]. *Link*
- **Heterogeneous robot learning**: crystallized the role of heterogeneity in multi-robot reinforcement learning through simulations and real-world experiments [3] (Fig. 1b). *Link*
- **Vectorized multi-agent simulator**: designed and implemented a batched multi-agent simulator in PyTorch for multi-agent reinforcement learning [5] (Fig. 1c). *Link*
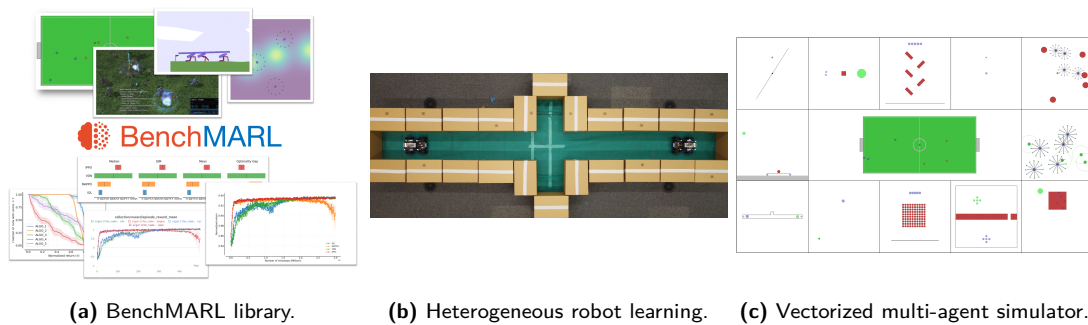

(a) BenchMARL library.   **(b)** Heterogeneous robot learning.   **(c)** Vectorized multi-agent simulator.

Figure 1: Project media

Academic service

Organization

2023 **ICRA 2023 Workshop on Multi-Robot Learning**, *Contributions Committee*

Reviewer duty

- ICRA
- IROS
- RA-L
- MRS
- The International Journal of Robotics Research

Outreach

2023 **Computer Science Open Day**, *Volunteer*, University of Cambridge
Explained and demonstrated multi-agent learning to kids of all ages.