Matteo Bettini

Curriculum Vitae

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Education

2021–Sept 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)*

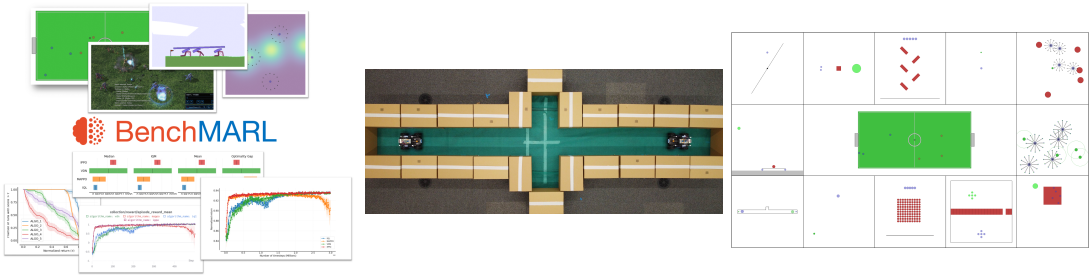
Italian Native

Interests

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

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

Selected 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. *arXiv preprint arXiv:2306.00577*, 2023.

[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.