Matteo Papini

Ph.D. Student at Politecnico di Milano

Research Intern at Facebook AI Research

Education

2017–present **Ph.D. student**, *Politecnico di Milano*, Milan, Italy.
Advisor: Prof. Marcello Restelli
Thesis (working title): *Safe Policy Optimization*

2015–2017 **M. Sc., Computer Science and Engineering**, *Politecnico di Milano*, 110/110 cum laude.
Master Thesis: Adaptive Batch Size for Safe Policy Gradient Methods

2012–2015 **B. Sc., Computer Engineering**, *Politecnico di Milano*, 110/110 cum laude.

Research Interests

My main research interest is **Reinforcement Learning** (RL), with a focus on *policy optimization* algorithms for continuous control and *safe RL*. My mission is to make RL algorithms more suitable for *industrial applications*, where time and safety constraints are a concrete problem. This requires both to establish theoretical guarantees for RL and to bridge the gap between theory and practice.

Research Experience

Sept–Dec 2020 **Research Intern**, *Facebook AI Research*.
Under the supervision of Matteo Pirotta.

2017–present **Research Assistant**, *Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano*, Milan, Italy, supervised by Prof. Marcello Restelli.
Research Topic: Reinforcement Learning for Industry 4.0.
Including industrial projects with PIRELLI TYRE S.P.A. *and* Scuderia Ferrari.

Publications (Conference and Journal Papers)

[1] **M. Papini**, A. Battistello, and M. Restelli. Balancing learning speed and stability in policy gradient via adaptive exploration. In **AISTATS**, volume 108 of *Proceedings of Machine Learning Research*, pages 1188–1199. PMLR, **2020**.

[2] A. M. Metelli, **M. Papini**, N. Montali, and M. Restelli. Importance sampling techniques for policy optimization. *Journal of Machine Learning Research* **(JMLR)**, 21(141):1–75, **2020**.

[3] L. Bisi, L. Sabbioni, E. Vittori, **M. Papini**, and M. Restelli. Risk-averse trust region optimization for reward-volatility reduction. In **IJCAI**, pages 4583–4589. ijcai.org, **2020**.

[4] **M. Papini**, A. M. Metelli, L. Lupo, and M. Restelli. Optimistic policy optimization via multiple importance sampling. In **ICML**, volume 97 of *Proceedings of Machine Learning Research*, pages 4989–4999. PMLR, **2019**.

[5] M. Beraha, A. M. Metelli, **M. Papini**, A. Tirinzoni, and M. Restelli. Feature selection via mutual information: New theoretical insights. In **IJCNN**, pages 1–9. IEEE, **2019**.

[6] **M. Papini**, D. Binaghi, G. Canonaco, M. Pirotta, and M. Restelli. Stochastic variance-reduced policy gradient. In **ICML**, volume 80 of *Proceedings of Machine Learning Research*, pages 4023–4032. PMLR, **2018**.

[7] A. M. Metelli, **M. Papini**, F. Faccio, and M. Restelli. Policy optimization via importance sampling. In **NeurIPS**, pages 5447–5459, **2018**.

[8] **M. Papini**, M. Pirotta, and M. Restelli. Adaptive batch size for safe policy gradients. In **NeurIPS**, pages 3591–3600, **2017**.

Workshop Papers

[W1] **M. Papini**, A. Battistello, and M. Restelli. Safe Exploration in Gaussian Policy Gradient. NeurIPS-2019 Workshop on Safety and Robustness in Decision Making, Vancouver, Canada, **2019**.

[W2] **M. Papini**, A. Battistello, and M. Restelli. Safely Exploring Policy Gradient. In 14th European Workshop on Reinforcement Learning, Lille, France, **2018**.

Schools and Exchange Programs

Jul–Aug 2018   **Deep Learning and Reinforcement Learning Summer School**, Toronto, Canada.

Oct 2017   **ACAI Summer School on Reinforcement Learning**, Nieuwpoort, Belgium.

Autumn 2016   **Erasmus Programme**, KTH Royal Institute of Technology, Stockholm, Sweden.

Invited Talks

September 2019   **Optimistic Policy Optimization via Multiple Importance Sampling**, *Workshop on Markets, Algorithms, Prediction and LEarning (MAPLE 2019)*, Politecnico di Milano, Milano, Italy.

Teaching Experience

Spring 2020   **Teaching Assistant**, *Politecnico di Milano*.
Artificial Intelligence (online class), Prof. Andrea Bonarini

Autumn 2019   **Teaching Assistant**, *Politecnico di Milano*.
Informatica B (introductory computer science class), Prof. Luca Cassano

Jul 2019   **Teaching Assistant**, *Reinforcement Learning Summer School, Lille, France*, organized by the SCOOL (formerly SequeL) team.

Autumn 2018   **Teaching Assistant**, *Politecnico di Milano*.
Informatica B (introductory computer science class), Prof. Luca Cassano

Spring 2018	**Teaching Assistant**, *Politecnico di Milano*.
	Web and Internet Economics, Prof. Nicola Gatti
Autumn 2017	**Lab Assistant**, *Politecnico di Milano*.
	Informatica B (introductory computer science class), Prof. Luca Cassano
Spring 2016	**Lab Tutor**, *Politecnico di Milano*.
	Prova Finale–Ingegneria del Software (software engineering: final project), Prof. Carlo Ghezzi

Editorial Activities (Reviewer)

2020,2019	Neural Information Processing Systems (NeurIPS).
2020,2019	Conference on Uncertainty in Artificial Intelligence (UAI).
2020,2019	International Conference on Machine Learning (ICML).
2020	European Conference on Artificial Intelligence (ECAI).
2020	International Conference on Artificial Intelligence and Statistics (AISTATS).
2020	AAAI Conference on Artificial Intelligence (AAAI).

Mentoring

2017–present	**Master Students**, *I have co-supervised 7 master theses at Politecnico di Milano*.

Languages

Italian, *mother tongue*.

English, *fluent (FCE, Grade A − C1 CEFR level)*.

Programming Languages and Frameworks

I mainly code in **Python** under *Ubuntu*. I have used *PyTorch* and *TensorFlow* for research projects. I have done student projects in **Java** (game programming) and **C++** with *ROS* (mobile robotics). I have taught (as a TA) **C** and **MATLAB** to undergraduate students. I write scientific manuscripts in *LaTeX*. I use *Git* for version control.

Hobbies

I play the piano.

Contact Information

Institution	Politecnico di Milano.
Department	Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB).
Laboratory	Artificial Intelligence and Robotics Laboratory (AIRLAB).
Office	34/5 Via Ponzio, 20133 Milan, Italy.
Email	**matteo.papini@polimi.it**.