

Mirco Mutti

Postdoc at the Technion

✉ muttimirco@gmail.com

Research Interest

I am interested in all the facets of *reinforcement learning*. My aim is to advance theoretical understanding that can lead to successful application of reinforcement learning in the real world.

Education

- 2023 **Ph.D. in Data Science and Computation**, Politecnico di Milano and Università di Bologna.
Thesis: Unsupervised Reinforcement Learning via State Entropy Maximization.
Advisor: Marcello Restelli (*Reviewers:* Mohammad Gheshlaghi Azar, Lerrel Pinto).
Grade: Excellent.
- 2018 **M.Sc. in Computer Science and Engineering**, Politecnico di Milano.
Thesis: Configurable Markov Decision Processes.
Advisor: Marcello Restelli.
Grade: 110/110 cum laude.
- 2015 **B.Sc. in Engineering of Computing Systems**, Politecnico di Milano.
Grade: 110/110 cum laude.

Positions

- 2023-Present **Postdoc**, Technion – Israel Institute of Technology.
Research Interest: Reinforcement learning from theory to practice.
Advisor: Aviv Tamar.
- 2018 **Research fellow**, Politecnico di Milano.
Research: Predictive models of disruptive events during drilling commissioned by ENI S.p.a.
Advisor: Marcello Restelli.

Teaching

- 2020-2022 **Teaching assistant**, *MACHINE LEARNING*, M.Sc. at Politecnico di Milano.
- 2018-2022 **Teaching assistant**, *INFORMATICA B*, B.Sc. at Politecnico di Milano.

Honors

- 2023-2024 **Expert reviewer** for the TMLR journal.
- 2021-2024 **Outstanding reviewer** at NeurIPS 2021, 2022, 2023, ICLR 2022, 2024, ICML 2022, 2024.
- 2023 **Honorable mention** for the best PhD thesis on artificial intelligence granted by the Italian Association for Artificial Intelligence (AIXIA).
- 2023 **Notable paper** at AISTATS 2023.
- 2022 **Outstanding paper award** at ICML 2022.
- 2019 **Thesis award** for the best Master's thesis on artificial intelligence granted by the Italian Association for Artificial Intelligence (AIXIA).
- 2019 **Selected for attendance** at the highly competitive Machine Learning Summer School (MLSS).
- 2018 **Ph.D. scholarship** granted to applicants with outstanding merits by the Italian Ministry of Education, University and Research.
- Travel award** at ICML 2018 (Stockholm), MLSS 2019 (London), AAAI 2020 (New York), ICML 2022 (Baltimore), NeurIPS 2022 (New Orleans), AAAI 2023 (Washington D.C.).

Editorial Activities

- 2022 **Program Co-Chair** of the European Workshop on Reinforcement Learning (EWRL 2022).
Reviewer of NeurIPS (2021-2024), ICML (2021-2024), ICLR (2021-2024), AAAI (2021-2023), IJCAI (2020-2021), AISTATS (2021-2022), Machine Learning, and TMLR (Expert reviewer).
Action Editor of the TMLR journal.

Invited Talks

- 04/2024 **Unsupervised Reinforcement Learning**, VANDAL lab at Politecnico di Torino.
06/2023 **(Non)Convex Reinforcement Learning**, LAS group & AI Center at ETH Zurich.
02/2023 **(Non)Convex Reinforcement Learning**, Rising Stars in AI Symposium 2023 at KAUST.
09/2022 **Unsupervised Reinforcement Learning**, Robot Learning Lab at the Technion.
05/2022 **Unsupervised Reinforcement Learning**, Facebook AI Research - External Seminars.
11/2019 **Configurable Markov Decision Processes**, International Conference of the Italian Association for Artificial Intelligence (AlxIA).

Student Co-Supervision

- 2024 **Yonatan Ashlag**, M.Sc. in Electrical and Computing Engineering, Technion.
2023-2024 **Duilio Cirino**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2023 **Stefano Civelli**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2022-2023 **Vlad Marian Cimpeanu**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2021-2023 **Majid Molaei**, M.Sc. in Telecommunications Engineering, Politecnico di Milano.
2021-2022 **Juan Calderon**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2021-2022 **Pietro Maldini**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2020-2021 **Mattia Mancassola**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2020-2021 **Stefano Del Col**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2019-2023 **Riccardo De Santi**, M.Sc. in Computer Science, ETH Zurich.
2019-2020 **Lorenzo Pratissoli**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.
2018-2019 **Giovanni Pelosi**, M.Sc. in Computer Science and Engineering, Politecnico di Milano.

Publications

Journal

- [J1] **Mirco Mutti**, Riccardo De Santi, Piersilvio De Bartolomeis, and Marcello Restelli. *Convex Reinforcement Learning in Finite Trials*. JMLR, 2023.

Conference

- [17] Filippo Lazzati **Mirco Mutti**, and Alberto Maria Metelli. *How does Inverse RL Scale to Large State Spaces? A Provably Efficient Approach*. NeurIPS 2024.
[16] Riccardo Zamboni, Duilio Cirino, Marcello Restelli, and **Mirco Mutti**. *The Limits of Pure Exploration in POMDPs: When the Observation Entropy is Enough*. RLC 2024.
[15] Riccardo Zamboni, Duilio Cirino, Marcello Restelli, and **Mirco Mutti**. *How to Explore with Belief: State Entropy Maximization in POMDPs*. ICML 2024.
[14] **Mirco Mutti** and Aviv Tamar. *Test-Time regret Minimization in Meta Reinforcement Learning*. ICML 2024.
[13] Riccardo De Santi, Federico Arangath Joseph, Noah Liniger, **Mirco Mutti**, and Andreas Krause. *Geometric Active Exploration in Markov Decision Processes: the Benefit of Abstraction*. ICML 2024.
[12] Filippo Lazzati, **Mirco Mutti**, and Alberto Maria Metelli. *Offline Inverse RL: New Solution Concepts and Provably Efficient Algorithms*. ICML 2024.

- [11] **Mirco Mutti**, Riccardo De Santi, Marcello Restelli, Alexander Marx, and Giorgia Ramponi. *Exploiting Causal Graph Priors with Posterior Sampling for Reinforcement Learning*. ICLR 2024.
- [10] Martino Bernasconi, Matteo Castiglioni, Alberto Marchesi, and **Mirco Mutti**. *Persuading Farsighted receivers in MDPs: the Power of Honesty*. NeurIPS 2023.
- [9] Alberto Maria Metelli, **Mirco Mutti**, and Marcello Restelli. *A Tale of Sampling and Estimation in Discounted Reinforcement Learning*. AISTATS 2023. Notable paper: 32/1689 (2%).
- [8] **Mirco Mutti**, Riccardo De Santi, Emanuele Rossi, Juan Felipe Calderon, Michael Bronstein, and Marcello Restelli. *Provably Efficient Causal Model-Based Reinforcement Learning for Systematic Generalization*. AAAI 2023.
- [7] **Mirco Mutti**, Riccardo De Santi, Piersilvio De Bartolomeis, and Marcello Restelli. *Challenging Common Assumptions in Convex Reinforcement Learning*. NeurIPS 2022.
- [6] **Mirco Mutti**, Riccardo De Santi, and Marcello Restelli. *The Importance of Non-Markovianity in Maximum State Entropy Exploration*. ICML 2022. Outstanding paper award: 10/5630 (0.17%).
- [5] **Mirco Mutti**, Stefano Del Col, and Marcello Restelli. *Reward-Free Policy Space Compression for Reinforcement Learning*. AISTATS 2022.
- [4] **Mirco Mutti**, Mattia Mancassola, and Marcello Restelli. *Unsupervised Reinforcement Learning in Multiple Environments*. AAAI 2022.
- [3] **Mirco Mutti**, Lorenzo Pratissoli, and Marcello Restelli. *Task-Agnostic Exploration via Policy Gradient of a Non-Parametric State Entropy Estimate*. AAAI 2021.
- [2] **Mirco Mutti** and Marcello Restelli. *An Intrinsically-Motivated Approach for Learning Highly Exploring and Fast Mixing Policies*. AAAI 2020.
- [1] Alberto Maria Metelli*, **Mirco Mutti***, and Marcello Restelli. *Configurable Markov Decision Processes*. ICML 2018. Long talk: 210/2473 (8.5%). *equal contribution

Preprint

- [P1] Chinmaya Kausik, **Mirco Mutti**, Aldo Pacchiano, Ambuj Tewari. *A Theoretical Framework for Partially-Observed Reward-States in RLHF*. Arxiv, 2024.

Selected workshop

- [W4] **Mirco Mutti**, Riccardo De Santi, Marcello Restelli, Alexander Marx, and Giorgia Ramponi. *Exploiting Causal Graph Priors with Posterior Sampling for Reinforcement Learning*. EWRL 2023.
- [W3] **Mirco Mutti**, Riccardo De Santi, Emanuele Rossi, Juan Felipe Calderon, Michael Bronstein, and Marcello Restelli. *Provably Efficient Causal Model-Based Reinforcement Learning for Systematic Generalization*. RLDM 2022.
- [W2] **Mirco Mutti** and Marcello Restelli. *An Approach for Learning Highly Exploring and Fast Mixing Policies via Intrinsic Motivation*. Workshop on Intrinsically Motivated Open-ended Learning (IMOL) 2019.
- [W1] Alberto Maria Metelli*, **Mirco Mutti***, and Marcello Restelli. *Configurable Markov Decision Processes*. EWRL 2018. *equal contribution