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**, *Università di Bologna* and *Politecnico di Milano*.
Thesis: Unsupervised Reinforcement Learning via State Entropy Maximization.
Advisor: Marcello Restelli.
Reviewers: Mohammad Gheshlaghi Azar, Lerrel Pinto.

2018 **M.Sc. in Computer Science and Engineering**, *Politecnico di Milano*, 110/110 cum laude.
Thesis: Configurable Markov Decision Processes.
Advisor: Marcello Restelli.

2015 **B.Sc. in Engineering of Computing Systems**, *Politecnico di Milano*, 110/110 cum laude.

Summer Schools

2019 **Machine Learning Summer School (MLSS)**, *University College London*.

2019 **Intrinsically Motivated Open-ended Learning (IMOL)**, *FIAS*, Frankfurt.

Positions

2023-Present **Postdoc**, *Reinforcement Learning Research Labs, Technion - Israel Institute of Technology*.
Research Interest: Reinforcement learning from theory to practice.
Advisor: Aviv Tamar.

2018-2023 **PhD student**, *Artificial Intelligence and Robotics Lab, Politecnico di Milano*.
Research Interest: Unsupervised reinforcement learning.
Advisor: Marcello Restelli.

2018 **Research fellow**, *Artificial Intelligence and Robotics Lab, Politecnico di Milano*.
Resaerch: Predictive models of disruptive events during drilling for ENI S.p.a., Italian Oil&Gas.

Teaching

2020-2022 **Teaching assistant** for *MACHINE LEARNING*, M.Sc. at Politecnico di Milano (1/2 TAs).

2018-2022 **Teaching assistant** for *INFORMATICA B*, B.Sc. at Politecnico di Milano (1/1 TA).

Honors

2021-2024 **Outstanding reviewer** at NeurIPS 2021, 2022, 2023, ICLR 2022, 2024, ICML 2022.

2023 **Honorable mention** for the best PhD thesis on artificial intelligence granted by the Italian Association for Artificial Intelligence (AIxIA).

2023 **Expert reviewer** for the TMLR journal.

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).

2018 **Ph.D. scholarship** granted to Ph.D. 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*, Italy.

06/2023 **(Non)Convex Reinforcement Learning**, *ETH LAS group & AI Center*, Zurich, Switzerland.

02/2023 **Convex Reinforcement Learning**, *Rising Stars in AI Symposium 2023*, KAUST, Saudi Arabia.

09/2022 **Unsupervised Reinforcement Learning via State Entropy Maximization**, *Technion - Israel Institute of Technology*, Haifa, Israel.

05/2022 **Unsupervised Reinforcement Learning via State Entropy Maximization**, *Facebook AI Research - External Seminars*, Virtual.

11/2019 **Configurable Markov Decision Processes**, *International Conference of the Italian Association for Artificial Intelligence (AIxIA 2019)*, Cosenza, Italy.

Student Supervision

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

[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. Oral: 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 Emtropy 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

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