

Andrea Tirinzoni

Postdoctoral Researcher at Meta AI

Facebook France

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Work Experience

- Present **Postdoctoral Researcher**, *Meta AI*, Paris, France.
- Apr 2022 *Research Topics*: Reinforcement Learning
- Mar 2022 **Postdoctoral Researcher**, *INRIA - SCOOOL Team*, Lille, France.
- Apr 2021 *Research Topics*: Reinforcement Learning
- Apr 2020 **Research Intern**, *Facebook AI Research*, Paris, France.
- Jan 2020 *Research Topics*: Exploration-exploitation in structured bandits
Supervisor: Alessandro Lazaric
- May 2017 **Research Assistant**, *Purposeful Prediction Laboratory, University of Illinois at Chicago*.
- Jan 2017 *Research Topics*: Inverse Reinforcement Learning, Robust Control, Adversarial Prediction
Supervisor: Brian Ziebart
- Aug 2011 **Internship**, *Bankadati Credito Valtellinese*, Sondrio, Italy.
- Jun 2011 System and network administration

Education

- Mar 2021 **Ph.D. cum laude in Computer Science**, *Politenico di Milano*, Milan, Italy.
Thesis: "Exploiting Structure for Transfer in Reinforcement Learning"
Advisor: Marcello Restelli
- Oct 2017 **M.Sc. in Computer Science and Engineering**, *Politenico di Milano*, Milan, Italy.
Final Mark: 110/110 summa cum laude
Thesis: "Adversarial Imitation Learning under Covariate Shift"
Advisor: Marcello Restelli
- May 2017 **M.Sc. in Computer Science**, *University of Illinois at Chicago*, Chicago, Illinois.
Final GPA: 4.0/4
Thesis: "Adversarial Inverse Reinforcement Learning with Changing Dynamics"
Advisor: Brian Ziebart.
- Jul 2015 **B.Sc. in Computer Engineering**, *Politenico di Milano*, Milan, Italy.
Final Mark: 110/110 summa cum laude

Awards, Scholarships, and Grants

- From 2019 Reviewer awards: top 50% NeurIPS 2019 reviewers, top 33% ICML 2020 reviewers, outstanding reviewer award at ICLR 2021, top 8% NeurIPS 2021 reviewers
- 2018 - 2019 Travel awards: ICML 2018, 2019, NeurIPS 2018
- Jul 2017 Ph.D. scholarship granted by the Italian Ministry of Education, University and Research
- Jun 2017 Scholarship "Tesi all'estero" for the best students doing a master's thesis in a foreign country
- Jul 2016 UIC scholarship for the best Italian graduate student in Computer Science
- May 2016 Scholarship "SEM" for the best students that are residents in Valtellina
- May 2014 Scholarship "SEM" for the best students that are residents in Valtellina

Teaching

- Dec 2021 **Teaching Assistant**, *Reinforcement Learning*, ENS Paris-Saclay, Paris, France.
- Sep 2021 Master MVA (Mathématiques, Vision, Apprentissage)
Lecturer: Matteo Pirotta

- Dec 2019 **Teaching Assistant**, *INFORMATICA*, Politenico di Milano, Milan, Italy.
- Sep 2019 Bachelor's degree in Civil Engineering
Lecturer: Marcello Restelli
Topics: C and Fortran programming
- July 2019 **Teaching Assistant**, *Reinforcement Learning Summer SCOOL*, Inria, Lille, France.
 July 2019 *Topics*: Reinforcement Learning and Bandits
- Dec 2018 **Laboratory Assistant**, *INFORMATICA B*, Politenico di Milano, Milan, Italy.
 Sep 2018 Bachelor's degree in Mechanical Engineering
Lecturer: Luca Cassano
Topics: C and MATLAB programming
- June 2018 **Teaching Assistant**, *Web and Internet Economics*, Politenico di Milano, Milan, Italy.
 Mar 2018 Master's degree in Computer Science and Engineering
Lecturer: Nicola Gatti
Topics: Markov Decision Processes, Reinforcement Learning, Multi-armed Bandits
- Dec 2017 **Laboratory Assistant**, *INFORMATICA B*, Politenico di Milano, Milan, Italy.
 Sep 2017 Bachelor's degree in Mechanical Engineering
Lecturer: Luca Cassano
Topics: C and MATLAB programming

Schools

- July 2019 **Machine Learning Summer School (MLSS)**, *UCL*, London, England.
 July 2019 **Reinforcement Learning Summer SCOOL (RLSS)**, *Inria*, Lille, France.

Student Supervision

- Mar 2021 **Thesis Supervision**, I have supervised more than 15 MS theses, including research projects and industrial collaborations, on topics related to transfer/meta RL, exploration in RL, model-based RL, policy search, risk-averse & robust RL, bandits, autonomous driving, car racing.

Industrial Collaborations

- Mar 2021 **RSE**, *Machine Learning for Photovoltaic Systems*.
 Dec 2020 *Topics*: Machine learning methods for fault detection and diagnosis in photovoltaic systems.
 Mar 2021 **Ferrari**, *Reinforcement Learning for Car Racing*.
 Sep 2019 *Topics*: RL and inverse RL techniques for several car racing applications.
 Mar 2021 **Magneti Marelli**, *Reinforcement Learning for Autonomous Driving*.
 Dec 2017 *Topics*: RL and inverse RL techniques for high-level decision-making in autonomous driving.

Editorial Activities

- From 2021 **Senior Program Chair**, *AAAI 2022*.
 From 2017 **Program Committee**, *NeurIPS 2019, 2020, 2021, 2022, ICML 2020, 2021, 2022, 2023, AAAI 2020, 2021, ICLR 2020, 2021, AISTATS 2021*.
 From 2017 **Program Committee Subreviewer**, *IROS 2017, AAAI 2018, IJCAI 2018, AAAI 2019*.

Talks and Seminars

Talks at International Conferences

- Jun 2019 **Transfer of Samples in Policy Search via Multiple Importance Sampling**, *International Conference on Machine Learning*, Long Beach, California, 2019.
 Dec 2018 **Policy-Conditioned Uncertainty Sets for Robust Markov Decision Processes**, *Neural Information Processing Systems*, Montreal, Canada, 2018.
 Jul 2018 **Importance Weighted Transfer of Samples in Reinforcement Learning**, *International Conference on Machine Learning*, Stockholm, Sweden, 2018.

Talks at International Workshops

- Oct 2018 **Transferring Value Functions via Variational Methods**, *European Workshop on Reinforcement Learning*, Lille, France, 2018.

Jul 2018 **Policy-Conditioned Uncertainty Sets for Robust Markov Decision Processes**, *Workshop on Planning and Learning @ ICML 2018*, Stockholm, Sweden, 2018..

Seminars

Sep 2019 **Structured Multi-Armed Bandits**, *DEIB*, Politecnico di Milano, Milan, Italy.

Feb 2018 **Meta Reinforcement Learning**, *DEIB*, Politecnico di Milano, Milan, Italy.

Publications

Conference Papers

[C22] Aymen Al-Marjani, Andrea Tirinzoni, and Emilie Kaufmann. "Active Coverage for PAC Reinforcement Learning". In *Conference on Learning Theory (COLT)*, 2023.

[C21] Liyu Chen, Andrea Tirinzoni, Alessandro Lazaric, and Matteo Pirotta. "Layered State Discovery for Incremental Autonomous Exploration". In *International Conference on Machine Learning (ICML)*, 2023.

[C20] Andrea Tirinzoni, Matteo Pirotta, and Alessandro Lazaric. "On the Complexity of Representation Learning in Contextual Linear Bandits". In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Valencia, Spain, 2023.

[C19] Liyu Chen, Andrea Tirinzoni, Matteo Pirotta, and Alessandro Lazaric. "Reaching Goals is Hard: Settling the Sample Complexity of the Stochastic Shortest Path". In *International Conference on Algorithmic Learning Theory 34 (ALT)*, Singapore, 2023.

[C18] Andrea Tirinzoni, Aymen Al-Marjani, and Emilie Kaufmann. "Optimistic PAC Reinforcement Learning: the Instance-Dependent View". In *International Conference on Algorithmic Learning Theory 34 (ALT)*, Singapore, 2023.

[C17] Andrea Tirinzoni, Matteo Papini, Ahmed Touati, Alessandro Lazaric, and Matteo Pirotta. "Scalable Representation Learning in Linear Contextual Bandits with Constant Regret Guarantees". In *Advances in Neural Information Processing Systems 35 (NeurIPS)*, New Orleans, 2022.

[C16] Andrea Tirinzoni, Aymen Al-Marjani, and Emilie Kaufmann. "Near Instance-Optimal PAC Reinforcement Learning for Deterministic MDPs". In *Advances in Neural Information Processing Systems 35 (NeurIPS)*, New Orleans, 2022.

[C15] Andrea Tirinzoni and Rémy Degenne. "On Elimination Strategies for Bandit Fixed-Confidence Identification". In *Advances in Neural Information Processing Systems 35 (NeurIPS)*, New Orleans, 2022.

[C14] Clemence Reda, Andrea Tirinzoni, and Remy Degenne. "Dealing with Misspecification in Fixed-Confidence Linear Top-m Identification". In *Advances in Neural Information Processing Systems 34 (NeurIPS)*, Online, 2021.

[C13] Matteo Papini*, Andrea Tirinzoni*, Aldo Pacchiano, Marcello Restelli, Alessandro Lazaric, and Matteo Pirotta. "Reinforcement Learning in Linear MDPs: Constant Regret and Representation Selection". In *Advances in Neural Information Processing Systems 34 (NeurIPS)*, Online, 2021.

[C12] Matteo Papini, Andrea Tirinzoni, Marcello Restelli, Alessandro Lazaric, and Matteo Pirotta. "Leveraging Good Representations in Linear Contextual Bandits". In *International Conference on Machine Learning (ICML)*, 2021.

[C11] Riccardo Poiani, Andrea Tirinzoni, and Marcello Restelli. "Meta-Reinforcement Learning by Tracking Task Non-stationarity". In *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

[C10] Andrea Tirinzoni, Matteo Pirotta, Marcello Restelli, and Alessandro Lazaric. "An Asymptotically Optimal Primal-Dual Incremental Algorithm for Linear Contextual Bandits". In *Advances in Neural Information Processing Systems 33 (NeurIPS)*, Vancouver, Canada, 2020.

[C9] Andrea Tirinzoni, Riccardo Poiani, and Marcello Restelli. "Sequential Transfer in Reinforcement Learning with a Generative Model". In *International Conference on Machine Learning (ICML)*, Vienna, Austria, 2020.

[C8] Andrea Tirinzoni, Alessandro Lazaric, and Marcello Restelli. "A Novel Confidence-Based Algorithm for Structured Bandits". In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Palermo, Italy, 2020.

[C7] Giorgia Ramponi, Amarildo Likmeta, Alberto Maria Metelli, Andrea Tirinzoni, and Marcello Restelli. "Truly

Batch Model-Free Inverse Reinforcement Learning about Multiple Intentions". In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Palermo, Italy, 2020.

[C6] Pierluca D'Oro, Alberto Maria Metelli, Andrea Tirinzoni, Matteo Papini, and Marcello Restelli. "Gradient-Aware Model-Based Policy Search". In *AAAI*, New York, 2020.

[C5] Andrea Tirinzoni, Mattia Salvini, and Marcello Restelli. "Transfer of Samples in Policy Search via Multiple Importance Sampling". In *Proceedings of the 36th International Conference on Machine Learning (ICML)*, Long Beach, California, 2019. (acceptance rate: 773/3424 (22.57%))

[C4] Mario Beraha, Alberto Maria Metelli, Matteo Papini, Andrea Tirinzoni, and Marcello Restelli. "Feature Selection via Mutual Information: New Theoretical Insights". In *International Joint Conference on Neural Networks (IJCNN)*, Budapest, Hungary, 2019.

[C3] Andrea Tirinzoni, Xiangli Chen, Marek Petrik, and Brian Ziebart. "Policy-Conditioned Uncertainty Sets for Robust Markov Decision Processes". In *Advances in Neural Information Processing Systems 31 (NeurIPS)*, Montreal, Canada, 2018. Spotlight. (acceptance rate: 168/4856 (3.46%))

[C2] Andrea Tirinzoni, Rafael Rodriguez, and Marcello Restelli. "Transfer of Value Functions via Variational Methods". In *Advances in Neural Information Processing Systems 31 (NeurIPS)*, Montreal, Canada, 2018. (acceptance rate: 1011/4856 (20.82%))

[C1] Andrea Tirinzoni, Andrea Sessa, Matteo Pirotta, and Marcello Restelli. "Importance Weighted Transfer of Samples in Reinforcement Learning". In *Proceedings of the 35th International Conference on Machine Learning (ICML)*, Stockholm, Sweden, 2018. (acceptance rate: 618/2473 (24.99%))

Journal Papers

[J3] Lorenzo Bisi, Davide Santambrogio, Federico Sandrelli, Andrea Tirinzoni, Brian D. Ziebart, and Marcello Restelli. "Risk-Averse Policy Optimization via Risk-Neutral Policy Optimization". *Artificial Intelligence*, 2022.

[J2] Amarildo Likmeta, Alberto Maria Metelli, Giorgia Ramponi, Andrea Tirinzoni, Matteo Giuliani, and Marcello Restelli. "Dealing with Multiple Experts and Non-stationarity in Inverse Reinforcement Learning: an Application to Real-life Problems". *Machine Learning*, 2021.

[J1] Amarildo Likmeta, Alberto Maria Metelli, Andrea Tirinzoni, Riccardo Giol, Marcello Restelli, and Danilo Romano. "Combining Reinforcement Learning with Rule-based Controllers for Transparent and General Decision-making in Autonomous Driving". *Robotics and Autonomous Systems*, 2020.

Workshop Papers

[W4] Andrea Tirinzoni, Matteo Pirotta, and Alessandro Lazaric. "A Fully Problem-Dependent Regret Lower Bound for Finite-Horizon MDPs". *Workshop on Reinforcement Learning Theory @ ICML 2021*.

[W3] Pierluca D'Oro, Alberto Maria Metelli, Andrea Tirinzoni, Matteo Papini, and Marcello Restelli. "Gradient-Aware Model-Based Policy Search". *Meta-Learning Workshop @ NeurIPS 2019*.

[W2] Andrea Tirinzoni, Rafael Rodriguez, and Marcello Restelli. "Transferring Value Functions via Variational Methods". In *European Workshop on Reinforcement Learning 14*, Lille, France, 2018. Oral.

[W1] Andrea Tirinzoni, Xiangli Chen, Marek Petrik, and Brian Ziebart. "Policy-Conditioned Uncertainty Sets for Robust Markov Decision Processes". In *Workshop on Planning and Learning @ ICML 2018*, Stockholm, Sweden, 2018. Oral.

Languages

Italian: Mother tongue

English: Fluent (TOEFL 100/120)

French: Basic knowledge

Computer Skills

Operating Systems GNU/Linux, Microsoft Windows, Mac OS

Programming Languages Python, Java, C, C++, C#, Scala, MATLAB, R, Lua, Javascript, PHP, Lisp

Frameworks Apache Spark, Tensorflow, Keras, Torch

IDEs Eclipse, PyCharm, Visual Studio, MATLAB, Dev-C++

Typesetting LaTeX, HTML, Microsoft Word