via Stampa Soncino, 30
Vaprio d'Adda, 20069, Milano, Italy
✉ matteo.pirotta@gmail.it
teopir.github.io
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updated January 4, 2017

Matteo Pirotta

Postdoctoral Researcher at INRIA

Curriculum Vitae

Matteo Pirotta is a postdoctoral researcher at INRIA – Team SequeL (France). He received his PhD in Information Technology from the Politecnico di Milano (Italy) in 2016. His main research interest is in *reinforcement learning* and online learning. His works are equally balanced between theory and applications. A particular focus is posed on financial applications involving portfolio management and trading, just to mention a few. Dr. Pirotta has been employed in industry and has worked as scientific advisor.

Work Experience

01/17–present **INRIA - Team SequeL**, *(Lille, France)*, Postdoctoral Researcher.
Supervisor: Prof. A. Lazaric

06/16–12/16 **Politecnico di Milano**, *(Milano, Italy)*, Postdoctoral Researcher.
Supervisor: Prof. M. Restelli

11/15–05/16 **UniCredit**, *(Milano, Italy)*, Artificial Intelligence, ICT Project Manager.
Member of a small team applying machine learning to solve complex real problems.

Education

01/16 **PhD in Information Technology**, *Politecnico di Milano*, *PhD cum laude.*
Thesis: *"Reinforcement Learning: from Theory to Algorithms."*
Supervisors: Prof. L. Bascetta and Prof. M. Restelli

Awards:

- *Dimitris N. Chorafas Foundation Award 2016.*
- *Honourable mention* for the EurAI Distinguished Dissertation Award 2015.

Research visits:

- Intelligent Autonomous Systems, Technische Universitaet Darmstadt, Darmstadt (Germany), March-August 2015. Headed by Prof. Jan Peters.

PhD Schools:

- Online Learning Summer School, Copenhagen (Denmark), July 2015
- Machine Learning Summer School, Tübingen (Germany), August-September 2013
- Regularization Methods For High Dimensional Learning, Genova (Italy), June 2013

09/12 **Master of Science in Computer Engineering**, *Politecnico di Milano*, *110/110 cum laude.*
Thesis: *"Safe Policy Iteration: A Monotonically Improving Approximate Policy Iteration Approach."*

Awards:

- Special mention from AI*IA (Associazione Italiana per l'Intelligenza Artificiale) among best Italian master thesis

Honors

09/16 *Dimitris N. Chorafas Foundation Award 2016* (PhD thesis).
09/16 *Honourable mention* for the EurAI Distinguished Dissertation Award 2015 (PhD thesis).

12/12 *Special mention* from AI*IA (Associazione Italiana per l'Intelligenza Artificiale) among best Italian master thesis.

Publications

International Journals

[J4] S. Parisi, M. Pirotta and J. Peters. "Manifold-based Multi-objective Policy Search with Sample Reuse". In: *Neurocomputing* (Accepted 2016).

[J3] G. Manganini, M. Pirotta, M. Restelli, L. Piroddi and M. Prandini. "Policy search for the optimal control of Markov decision processes: a novel particle-based iterative scheme". In: *IEEE Transactions on Cybernetics 46:11* (November 2016), pp. 2643–2655.

[J2] S. Parisi, M. Pirotta and M. Restelli. "Multi-objective Reinforcement Learning through Continuous Pareto Manifold Approximation". In: *Journal of Artificial Intelligence Research 57* (October 2016), pp. 187–227.

[J1] M. Pirotta, M. Restelli and L. Bascetta. "Policy Gradient in Lipschitz MDPs". In: *Machine Learning 100* (September 2015), pp. 255–283.

International Conferences and Workshops

[C12] C. D'Eramo, A. Nuara, M. Pirotta and M. Restelli. "Estimating the Maximum Expected Value in Continuous Reinforcement Learning Problems". In: *Proc. of 31th AAAI Conference on Artificial Intelligence, AAAI, San Francisco, California, USA, February 2017.* AAAI Press, 2017. (acceptance rate: 638/2590 (24.64%))

[C11] M. Pirotta and M. Restelli. "Inverse Reinforcement Learning through Policy Gradient Minimization". In: *Proc. of the 30th AAAI Conference on Artificial Intelligence, AAAI, Phoenix, Arizona, USA, February 2016.* AAAI Press, 2016. (acceptance rate: 549/2132 (25.8%), oral presentation: 263/2132 (12.3%))

[C10] M. Pirotta, S. Parisi and M. Restelli. "Multi-Objective Reinforcement Learning with Continuous Pareto Frontier Approximation". In: *Proc. of the 29th AAAI Conference on Artificial Intelligence, AAAI, Austin, Texas, USA, January 2015.* AAAI Press, 2015. (acceptance rate: 531/1991 (26.7%))

[C9] D. Caporale, L. Deori, R. Mura, A. Falsone, R. Vignali, L. Giulioni, M. Pirotta and G. Manganini. "Optimal Control to Reduce Emissions in Gasoline Engines: An Iterative Learning Control Approach for ECU Calibration Maps Improvement". In: *European Control Conference, ECC, Linz, Austria, July 2015.*

[C8] G. Manganini, M. Pirotta, M. Restelli and L. Bascetta. "Following Newton Direction in Policy Gradient with Parameter Exploration". In: *Proc. of the International Joint Conference on Neural Networks, IJCNN, Killarney, Ireland, July 2015.*

[C7] S. Parisi, M. Pirotta, N. Smacchia, L. Bascetta and M. Restelli. "Policy Gradient Approaches for Multi-Objective Sequential Decision Making: A Comparison". In: *IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning, ADPRL, Orlando, Florida, USA, December 2014.* IEEE, 2014.

[C6] S. Parisi, M. Pirotta, N. Smacchia, L. Bascetta and M. Restelli. "Policy Gradient Approaches for Multi-Objective Sequential Decision Making". In: *Proc. of the International Joint Conference on Neural Networks, IJCNN, Beijing, China, July 2014.*

[C5] M. Pirotta, G. Manganini, L. Piroddi, M. Prandini and M. Restelli. "A particle-based policy for the optimal control of Markov decision processes". In: *Proc. of the 19th IFAC World Congress, IFAC, Cape Town, South Africa, August 2014.*

[C4] M. Pirotta, M. Restelli and L. Bascetta. "Adaptive Step-Size for Policy Gradient Methods". In: *Advances in Neural Information Processing Systems 27, NIPS, Lake Tahoe, Nevada, USA, December 2013.* (acceptance rate: 360/1420 (25.3%))

[C3] M. Pirotta, M. Restelli, A. Pecorino, and D. Calandriello. "Safe policy iteration". In: *Proc. of the 30th International Conference on Machine Learning, ICML, Atlanta, Georgia, USA, July 2013.* (acceptance rate: 283/1204 (23.5%); oral presentation: 143/1204 (11.9%))

[C2] M. Migliavacca, A. Pecorino, M. Pirotta, M. Restelli and A. Bonarini. "Fitted Policy Search". In: *IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning, ADPRL, Paris, France, April 2011.* IEEE, 2011.

[C1] M. Migliavacca, A. Pecorino, M. Pirotta, M. Restelli and A. Bonarini. "Fitted Policy Search: Direct Policy Search using a Batch Reinforcement Learning Approach". In: *Proc. of the 3rd International Workshop on Evolutionary and Reinforcement Learning for Autonomous Robot Systems, ERLARS, Lisboa, Portugal, August 2010.*

Teaching Activities and Supervision

2015 **Teaching assistant**, *Politecnico di Milano*, Milano, Italy.
Course "Fondamenti di Informatica", Prof. C. Bolchini, Bachelor in Computer Engineering

2014 **Laboratory Tutor**, *Politecnico di Milano*, Milano, Italy.
Course "Informatica A", Prof. O. Mejri, Bachelor in Business Engineering

2014 **Laboratory Tutor**, *Politecnico di Milano*, Milano, Italy.
Course "Informatica B", Prof. V. Zaccaria, Bachelor in Mechanical Engineering

2013 **Teaching assistant**, *Politecnico di Milano*, Milano, Italy.
Course "Robotics", Prof. M. Restelli, Bachelor in Computer Engineering

2013 **Laboratory Tutor**, *Politecnico di Milano*, Milano, Italy.
Course "Fondamenti di Automatica", Prof. L. Bascetta, Bachelor in Aerospace Engineering

Supervision of Master's Students

Since 2014 I have been co-supervisor of 9 master thesis.

Scientific Activities

- Program Committee and Reviewer: AAAI (2017), NIPS (2015-2016), IJCAI (2017)
- Journal Reviewer: Journal of Machine Learning Research, Adaptive Behavior

Project and Funding

Industrial Projects

2016–2017 **Investigator**, *Reinforcement Learning for DVA Hedging*, Reply s.p.a..
Automatic DVA hedging via reinforcement learning.

2016–2017 **Investigator**, *Machine Learning for Swaption Calibration*, Intesa San Paolo Group Service.
Data-driven model for swaption calibration.

2016 **Investigator**, *Development of data-driven models for Cyber Tyre*, Pirelli s.p.a..
Detection of inflating point from tyre sensor data.

Research Projects

2013 **Investigator**, *FIDELIO - FIxtureless DEburring of wheeLs by human demonstratIOn*, (EU Project).
Reinforcement Learning for deburring of wheels.