

# ANTOINE MOULIN

*Ph.D. Student in Machine Learning*

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## RESEARCH INTERESTS

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Online Learning (adaptive algorithms), Reinforcement Learning (exploration in infinite-horizon Markov decision processes with function approximation, adversarial environments, distribution shift).

## EDUCATION

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### Ph.D in Machine Learning

*Universitat Pompeu Fabra*

Dec 2021 – Present

Barcelona, Spain

- The overarching topic is to identify and exploit structural properties of Markov decision processes that make large-scale reinforcement learning (RL) statistically and computationally feasible.
- Part of the ELLIS program, advised by Gergely Neu and Arthur Gretton.

### Master of Science in Machine Learning

*ENS Paris-Saclay*

Sep 2019 – Sep 2020

Paris, France

- Grade: 17.34/20.00. Courses: RL, Computer Vision, Graphical Models, Convex Optimization, Deep Learning, Neurosciences, Kernel Methods, Sequential Learning, Multi-scale models, Biostatistics.

### Engineering Degree

*Telecom Paris*

Sep 2017 – Sep 2020

Paris, France

- GPA: 4.00/4.00. Equivalent to a Masters, top 5% cohort. Some courses: Measure & Probability Theory, Functional Analysis, Signal Processing, Statistics, Machine Learning, Optimization, Algorithm Design.

### Preparatory Classes

*Lycée Janson-de-Sailly*

Sep 2015 – Jul 2017

Paris, France

- GPA: 3.96/4.00. Post-secondary two-year program in Advanced Mathematics and Physics.

## EXPERIENCE

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### Student Researcher

*Google DeepMind*

Jun 2024 – Present

London, UK

- Working on epistemic uncertainty quantification. The goal is to efficiently compute finite-time predictive intervals for general function classes using ensemble methods and approximations thereof. Advisor: Ilya Kuzborskij.

### Research Engineer

*Research Intern*

*INRIA*

Feb 2021 – Apr 2021

May 2020 – Oct 2020

Lille, France

- Focus on deep RL. Implemented extensions of actor-critic methods (PPO, TRPO) to improve exploration, worked on reproducibility issues in RL. Advisor: Philippe Preux.

### Research Intern

*Aalto University*

Summer 2019

Helsinki, Finland

- Reviewed the literature on canonical correlation analysis (CCA) methods and implemented an efficient extension of a sparse kernel CCA method. Advisor: Juho Rousu.

### Analyst Intern

*Crédit Agricole*

Summer 2018

Caen, France

## PUBLICATIONS & PREPRINTS

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- [1] A. Moulin and G. Neu, “Optimistic planning by regularized dynamic programming,” in *International Conference on Machine Learning*, PMLR, 2023, pp. 25 337–25 357.
- [2] A. Moulin, E. Esposito, and D. van der Hoeven, “When lower-order terms dominate: Improved loss-range adaptivity for expert algorithms,” *preprint*, 2024.

## TALKS

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<b>Learning in Adversarial Linear MDPs</b> <i>University of Tokyo</i>	Mar 2024 Tokyo, Japan
<b>Optimistic Planning by Regularized Dynamic Programming</b> <i>Princeton University</i>	Aug 2023 Princeton, NJ
<b>Optimistic Planning by Regularized Dynamic Programming</b> <i>Stanford University</i>	Jul 2023 Stanford, CA
<b>Infinite Horizon RL with Linear Function Approximation</b> <i>Universitat Pompeu Fabra</i>	Mar 2023 Barcelona, Spain
<b>Primal-dual Methods for RL</b> <i>Gatsby Unit, University College London</i>	Sep 2022 London, UK
<b>Introduction to JAX</b> <i>ELLIS Doctoral Symposium</i>	Sep 2021 Tubingen, Germany

## TEACHING

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<b>Machine Learning</b>	Universitat Pompeu Fabra	2022 – 2023
<b>Algorithm Design</b>	Universitat Pompeu Fabra	2022 – 2024
<b>Computer Science</b>	IPESUP, bootcamp for high-school students	2023
<b>Probabilities</b>	Universitat Pompeu Fabra	2022
<b>Mathematics Examiner</b>	Lycée Janson-de-Sailly, preparatory classes	2018 – 2019

## ACADEMIC ACTIVITIES

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- Organizer of the RL theory virtual seminars.
- Organizer of the workshop *Aligning Reinforcement Learning Experimentalists and Theorists* (ARLET at ICML 2024).
- Organizer of the Reinforcement Learning Summer School 2023 (RLSS 2023).
- Reviewer at EWRL 2023, ARLET 2024.
- Chair of the ELLIS RL reading group (2021 – 2022).
- Volunteer at AISTATS 2021.

## SKILLS

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<b>Programming Languages</b>	Python (JAX, PyTorch), MATLAB, C++, Java, SQL, HTML. French (native), English (fluent), Spanish, Italian (intermediate).
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## OTHER ACTIVITIES

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- Organizer of the beach volley tournament at DTIC, Universitat Pompeu Fabra (2022 – 2023).
- Communication manager in a student-led company at Telecom Paris (2018 – 2019). Organized workshops, study cases, visits and a gala for students & partner companies (€27K budget). Managed missions in Machine Learning for several companies.
- Hobbies include climbing, (beach) volleyball, ski, table tennis.