

# ANTOINE MOULIN

*PhD student in Machine Learning*

[Homepage](#) ◇ [Google Scholar](#) ◇ Email: [antoine.moulin@upf.edu](mailto:antoine.moulin@upf.edu)

## RESEARCH INTERESTS

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Reinforcement learning (efficient exploration in Markov decision processes with function approximation, adversarial environments, distribution shift), online learning (adaptive algorithms, post-training of language models).

## 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 – Dec 2024

London, UK

- Worked on epistemic uncertainty quantification and how to compute finite-time predictive intervals for general function classes using ensembles and approximations thereof. Advisor: [Ilja Kuzborskij](#).
- Worked on task-specific data mixture selection for large language models.

### 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](#).

## PUBLICATIONS & PREPRINTS

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**Optimistically Optimistic Exploration for Provably Efficient Infinite-Horizon Reinforcement and Imitation Learning** [*arXiv*]

Antoine Moulin, Gergely Neu, and Luca Viano ( $\alpha$ - $\beta$  order).  
(Submitted)

**When Lower-Order Terms Dominate: Improved Loss-Range Adaptivity for Expert Algorithms**

Antoine Moulin\*, Emmanuel Esposito\*, and Dirk van der Hoeven.  
(Submitted)

**Spectral Representation for Causal Estimation with Hidden Confounders** [*arXiv*]

Haotian Sun, Antoine Moulin, Tongzheng Ren, Arthur Gretton, and Bo Dai  
(AISTATS 2025) 28th International Conference on Artificial Intelligence and Statistics.

**Optimistic Planning by Regularized Dynamic Programming** [*arXiv*]

Antoine Moulin, Gergely Neu  
(ICML 2023) 40th International Conference on Machine Learning.

## TALKS

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**Learning in Adversarial Linear MDPs** Mar 2024  
*University of Tokyo* Tokyo, Japan

**Optimistic Planning by Regularized Dynamic Programming** Aug 2023  
*Princeton University* Princeton, NJ

**Optimistic Planning by Regularized Dynamic Programming** Jul 2023  
*Stanford University* Stanford, CA

**Infinite Horizon RL with Linear Function Approximation** Mar 2023  
*Universitat Pompeu Fabra* Barcelona, Spain

**Primal-dual Methods for RL** Sep 2022  
*Gatsby Unit, University College London* London, UK

**Introduction to JAX** Sep 2021  
*ELLIS Doctoral Symposium* Tübingen, 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 ICML workshop *Aligning Reinforcement Learning Experimentalists and Theorists*.
- 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</b>	Python (JAX, PyTorch), MATLAB, C++ , Java, SQL, HTML.
<b>Languages</b>	French (native), English (fluent), Spanish, Italian (intermediate).

## SCHOLARSHIPS, PRIZES & GRANTS

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<b>ELISE mobility grant</b>	2022, 2024
<b>Doctoral scholarship, Universitat Pompeu Fabra</b>	2021
<b>Doctoral scholarship, University of Cambridge (declined)</b>	2021
<b>Doctoral scholarship, University of Geneva (declined)</b>	2021
<b>Research studentship (Gatsby Unit), University College London (declined)</b>	2021
<b>3rd place for “Virtual Sculpture” at Innovation Day, Telecom Paris</b>	2018

## 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.