

SAFWAN LABBI

PhD Student in Machine Learning

Applied Mathematics Department (CMAP)
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📄 Personal Webpage
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Education

- 2023–2026 **PhD, Machine Learning**, *Ecole Polytechnique, IP Paris*, Palaiseau.
Supervisors: Eric Moulines, Alain Durmus, Karim Abed-Meraim
Interests: Federated Reinforcement Learning, Personalized Federated Learning, Reinforcement Learning, Optimization, Deep Reinforcement Learning, Actor-Critic Methods
- 2022–2023 : **Master Year 2 Mathematics, Vision, Learning (Master MVA)**, *Ecole Normale Supérieure Paris-Saclay, Paris-Saclay University*, Saclay.
Grade: Distinctions with jury's congratulations.
Relevant coursework: Reinforcement learning, Graphs in machine learning, Computational statistics, Statistical learning, Deep learning, Bayesian machine learning, Computer Vision
- 2020–2023: **Master of Science in Applied Mathematics and Machine Learning (Diplôme d'ingénieur Télécom)**, *Télécom Paris, IP Paris*, Saclay.
Grade: GPA 4/4.
Relevant coursework: Signal processing, Machine Learning, Deep Learning, Statistics, Optimization, Advanced probability, Numerical analysis, Markov chains, Martingales, Stochastic calculus.
- 2019–2020: **Preparatory Classes for the Grandes Écoles (CPGE MP*)**, *Lycée du Parc*, Lyon.
Grade: GPA 4/4.
Description: Second year of intensive university-level preparation for highly competitive nationwide science exams (Mathematics, Physics and Computer science).
- 2018–2019: **Preparatory Classes for the Grandes Écoles (CPGE MPSI)**, *Lycée Alphonse Daudet*, Nîmes.
Grade: GPA 4/4.
Description: First year of intensive university-level preparation for highly competitive nationwide science exams (Mathematics, Physics and Computer science).

Publications

In Conference Proceedings

- 2026 **Safwan Labbi**, Daniil Tiapkin, Paul Mangold, and Eric Moulines. Beyond softmax and entropy: Convergence rates of policy gradients with f-softargmax parameterization & coupled regularization. In *The Fourteenth International Conference on Learning Representations*, 2026.
- 2026 **Safwan Labbi**, Paul Mangold, Daniil Tiapkin, and Eric Moulines. Refined analysis of entropy-regularized actor-critic. In *Forty-Third International Conference on Machine Learning*, 2026.
- 2026 **Safwan Labbi**, Paul Mangold, Daniil Tiapkin, and Eric Moulines. On global convergence rates for federated softmax policy gradient under heterogeneous environments. In *The 29th International Conference on Artificial Intelligence and Statistics*, 2026.
- 2025 **Safwan Labbi**, Daniil Tiapkin, Lorenzo Mancini, Paul Mangold, and Eric Moulines. Federated ucbl: Communication-efficient federated regret minimization with heterogeneous agents. In *The 28th International Conference on Artificial Intelligence and Statistics*, 2025.
- 2025 Antonio Ocello, Lorenzo Mancini, **Safwan Labbi**, Daniil Tiapkin, Adel Belouchrani, and Eric Moulines. Mean-field multi-agent learning: A trust region approach. *The 33rd European Signal Processing Conference*, 2025.

- 2024 Paul Mangold, Sergey Samsonov, **Safwan Labbi**, Ilya Levin, Reda Alami, Alexey Naumov, and Eric Moulines. Scaffls: Taming heterogeneity in federated linear stochastic approximation and td learning. *Advances in Neural Information Processing Systems*, 2024.
- 2024 Lorenzo Mancini, **Safwan Labbi**, Karim Abed Meraim, Fouzi Boukhalfa, Alain Durmus, Paul Mangold, and Eric Moulines. Joint channel selection using feddrl in v2x. In *IEEE Middle East Conference on Communications and Networking (MECOM)*. IEEE, 2024.

Book Chapters

- 2025 Lorenzo Mancini, **Safwan Labbi**, Karim Abed Meraim, Fouzi Boukhalfa, Alain Durmus, Paul Mangold, and Eric Moulines. Integrating feddrl for efficient vehicular communication in smart cities. In *Internet of Vehicles and Computer Vision Solutions for Smart City Transformations*, pages 431–450. Springer, 2025.

Research Experience

- Apr. 2023 – **Research Internship, BMI (Biomedical Informatics) lab, ETH Zurich.**
 Sep. 2023 I completed my master's thesis at the BMI (Biomedical Informatics) Lab on PAC-Bayes model selection in deep learning.
 Advisors : Vincent Fortuin, Alexander Immer
- July 2022 – **Research Internship, LTCI lab, Télécom Paris, IP Paris, Saclay.**
 Sep. 2022 I carried out a three-month research internship on variational inference at the LTCI lab.
 Advisor : François Roueff
- July 2021 – **Software Engineering Internship, MELEXIS, Neuchatel, Switzerland.**
 Aug. 2021 Assigned tasks:
 - Designed and implemented a Python user interface for coordinating multiple laboratory devices used in sensor measurements.
 - Handled various current sensors and laboratory instruments (current source, magnetic field generator, sourcemeter, etc.) to perform rigorous testing and validation of the program.

Teaching Experience

- 2024-2026 **Oral examiner in charge of assessing candidates' mathematical level** during the admissions process for the Master in Data Science for Business at École Polytechnique & HEC Paris, Saclay.
- 2024-2025 **Teaching assistant for the Machine Learning course** in the Master's program in Data Science for Business at École Polytechnique & HEC Paris, Saclay.
- 2021-2023 **Mathematics oral examiner ("colleur") for undergraduate-level students**, Lycée Saint-Louis and Lycée Lakanal, Paris.

Talks

- Jan. 2026 **REDEEM seminar on Distributed Learning**, Inria Paris, *Topic*: Heterogeneity in Federated Reinforcement Learning
- Nov. 2025 **Monthly Group Meeting of the Applied Mathematics Department**, Ecole Polytechnique, *Topic*: Model-Based Federated Reinforcement Learning
- Oct. 2025 **PRISME Monthly Group Meeting**, University of Orléans, *Topic*: Federated Reinforcement Learning: Collaboration under Heterogeneous Environments
- June 2025 **Monthly Group Meeting of the Applied Mathematics Department**, Rouen, *Topic*: On global convergence rates for federated softmax policy gradient under heterogeneous environments
- March 2025 **Workshop on Themes across Control and Reinforcement Learning**, CWI Amsterdam, *Topic*: Federated UCBVI: Communication-Efficient Federated Regret Minimization with Heterogeneous Agents

Jan. 2024 **CMAP reading group on Federated Learning** , Ecole Polytechnique, *Topic: Heterogeneity in Federated Reinforcement Learning*

Reviewing experience

2026 ICML, TMLR

2025 NeurIPS, AISTATS, ICLR, GRETSI

Skills

Programming Python, PyTorch, JAX, C++, JAVA, GIT

Languages French (native) - Arabic (native) - English (fluent)

Referees

Prof. Eric Moulines

Department Chair of Machine Learning,

Professor of Machine Learning

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Dr. Paul Mangold

Associate Professor of Machine Learning

Department of Applied Mathematics

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Prof. Alain Durmus

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