Orso Forghieri

PhD Candidate in Hierarchical Reinforcement Learning

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Experience

2022-2025 **PhD Thesis in Reinforcement Learning, CMAP, École Polytechnique**. Hierarchy learning for subtask discovery in uncertain environment. Model explanation with real-world applications. Supervised by Erwan Le Pennec, Hind Castel and Emmanuel Hyon. Key publications :

- *Approximate Dynamic Programming and State Abstraction Discovery*, Forghieri, Castel, Le Pennec, and Hyon, Journal of Machine Learning Research Volume 26 (under peer review)
- *State Abstraction Discovery from Progressive Disaggregation Methods*, Forghieri, Castel, Le Pennec, and Hyon, EWRL 2024, Toulouse, France.
- *Progressive State Space Disaggregation for Infinite Horizon Dynamic Programming*, Forghieri, Castel, Le Pennec, and Hyon, ICAPS 2024, Banff, Canada.

Parallel activities :

- **Teaching Assistant, École Polytechnique** : Teaching in *Statistical Learning, Probabilities* courses with Eric Moulines, Gersende Fort, and Tabea Rebafka in the Engineering Degree program.
- **Teaching Assistant, Université Paris Nanterre** : Teaching *Operational Research* courses with Claire Hanen and Emmanuel Hyon within the Bachelor of Science program.
- **Alpha Testing, Laboratoire d'Informatique de Paris 6** : Beta testing of Marmote MDP Solver, developped by Emmanuel Hyon and Alain Jean-Marie.

Mar. 2022 **Research Intern in Hierarchical Reinforcement Learning, Télécom SudParis.** Exploration of server energy and performance optimization under uncertainty using Hierarchical Reinforcement Learning, in collaboration with **Energy4Climate**.

Mar. 2021 **Research Intern in Combinatorial Optimization at Orange** Research in Combinatorial Optimization for Edge Computing in the 6G research context.
Service Placement under Affine Delay Constraint for computational resources management, Carlinet, Forghieri and Perrot, ROADEF2022.

Mar. 2020 **Machine Learning Intern at SNCF** Modelling and forecasting of delay propagation in the rail network using Boosted Decision Trees and Bayesian networks, enhancing scheduling and resource management.

Sep. 2019 **Research Project in Market Forecast** in collaboration with Lusis (Trading Solutions). Developed predictive models leveraging LSTM, CNN, and NLP on financial time series and news headlines, contributing to improved trading strategies.

Education

2021 – 2022 **Master's Degree MVA (Mathematics, Vision, Learning)**, *École Normale Supérieure Paris Saclay*,
Time Series Analysis, Deep and Reinforcement Learning, Object Recognition

2018 – 2021 **École Polytechnique**, *Engineer's Degree*,
Statistical Learning, Uncertainty Quantification and Risk Analysis, Functional analysis, Algorithmic, Machine and Deep Learning

Skills

Languages French (native), English (Fluent), German (Written)

Programming Python (Jax, Pytorch, Tensorflow, Pandas), Git, R, Java, C++