

# Research Internship

## Multi-Agent Reinforcement Learning Implementation

### Topic profile

theory/math



coding



### Tags

#AI

#neural networks

#reinforcement learning

#multi-agent

### Supervision

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### Why multi-agent reinforcement learning?

Reinforcement learning (RL) enables agents to learn decisions by interacting with their environments, solving challenges in robotics, gaming, and autonomous systems. Multi-agent RL (MARL) extends this to scenarios where agents must cooperate or compete, tackling real-world problems like traffic management, robot coordination, and energy optimization. MARL helps create smarter, adaptable systems for complex environments.

### What we are looking for

We are looking for an intern with strong programming skills in Python and experience with ML libraries, particularly PyTorch, as well as familiarity with simulation environments like OpenAI Gym. An understanding of reinforcement learning and multi-agent systems is recommended, with prior experience in cooperative MARL being a plus. Familiarity with version control systems like Git is also advantageous. Strong communication skills are important for documenting and sharing findings.

### The team

You will be part of an interdisciplinary research team at [ENS Paris-Saclay](#) near Paris, working on different aspects of artificial intelligence, synthetic biology, distributed computing, and circuit design.

### Research

Our research addresses the scalability challenge in centralized multi-agent reinforcement learning (MARL), where growing state and action spaces make learning inefficient. We aim to develop a more efficient centralized approach that handles larger systems while maintaining strong coordination.

As a Research Intern, you will:

- Design and implement novel reinforcement learning algorithms tailored for cooperative multi-agent environments.
- Develop or customize simulation environments to test and benchmark RL methods.
- Train agents in cooperative scenarios and optimize their performance for predefined tasks.
- Analyze and evaluate the performance of developed algorithms using appropriate metrics.

### You are interested or would like to join us?

Please send us your questions or, in case you would like to apply, a short statement of interest and a CV, to Benedikt Bollig ([bollig@lmf.cnrs.fr](mailto:bollig@lmf.cnrs.fr)), Matthias Fuegger ([mfuegger@lmf.cnrs.fr](mailto:mfuegger@lmf.cnrs.fr)), Thomas Nowak ([thomas@thomasnowak.net](mailto:thomas@thomasnowak.net)) and Zhuofan Xu ([zxu@lmf.cnrs.fr](mailto:zxu@lmf.cnrs.fr)).