

# Pascal Leroy

PHD STUDENT · MACHINE LEARNING

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## PERSONAL STATEMENT

I am a PhD student in **machine learning**. My research focuses on training teams of agents with **multi-agent reinforcement learning**, which can evolve in fully cooperative or mixed cooperative-competitive environments. I am particularly passionate about applying reinforcement learning to address **real-world** challenges and contribute to **impactful applications**. I am currently writing my PhD thesis and exploring opportunities for a position abroad to further contribute to the development of concrete applications.

## EDUCATION

- Ph.D. student in Machine Learning - *Montefiore Institute, ULiège, Liège* 08/2018 - Now  
Advisors: Damien Ernst and Jonathan Pisane.  
Research interest: reinforcement learning and multi-agent systems.
- Master in Computer Science and Engineering - *ULiège, Liège* 09/2016 - 09/2018  
Master thesis: Automatic defect recognition in X-ray imaging by machine learning.  
*Cum Laude* - 75%
- Bachelor in Engineering - *ULiège, Liège* 09/2010 - 06/2016

## WORK EXPERIENCE

- Research Engineer 08/2018 - Now  
*Montefiore Institute, ULiège*  
Projects with industrial consortia of Belgian companies:
- IRIS: responsible for the design of environments and algorithms for multi-agent reinforcement learning for decision-aid. Partners: JCD, ACIC, Multitel, ERM.
  - IADAS: responsible for compressing and optimising neural networks for embedding in drones and satellites. Partners: Deltatec, ALX Systems, Spacebel, Multitel.
- Student Trainee 10/2017 - 06/2018  
*X-Ray Imaging Solutions (Liège)*  
Master thesis and development of image processing filters dedicated to X-ray image optimisation.

## PUBLICATIONS

- IMP-MARL: a Suite of Environments for Large-scale Infrastructure Management Planning via MARL  
Pascal Leroy, Pablo G. Morato, Jonathan Pisane, Athanasios Kolios, Damien Ernst  
*Thirty-seventh Conference on Neural Information Processing Systems Datasets and Benchmarks Track (NEURIPS), 2023.*
- Value-based CTDE Methods in Symmetric Two-team Markov Game: from Cooperation to Team Competition  
Pascal Leroy, Jonathan Pisane, Damien Ernst  
*Deep Reinforcement Learning Workshop NeurIPS, 2022.*
- QVMix and QVMix-Max: extending the deep quality-value family of algorithms to cooperative multi-agent reinforcement learning.  
Pascal Leroy, Damien Ernst, Pierre Geurts, Gilles Louppe, Jonathan Pisane, Matthia Sabatelli  
*AAAI-21 Workshop on Reinforcement Learning in Games, 2021.*

## PERSONAL EXPERIENCE

- AGEL ASBL 10/2014 - 09/2016  
*Treasurer (2014-2015) and President (2015-2016)*  
The Association Generale des Etudiants Liegeois is a non-profit organisation in charge of the holding of main student events (turnover > 300k, 15000 students).
- As Treasurer, responsible for the financial viability and accounting management.
  - As President, responsible for managing the team, public communication and major choices.
- FEDE ULiège ASBL 10/2013 - 09/2016  
*Elected member of the general assembly and member of the Board of Directors of ULiège (2015-2016).*  
The Federation des etudiants ULiège is a non-profit organisation in charge of representing students to academic authorities (23000 ULiège students). Responsible of the representation of the Fede and the students as a member of the Board of Directors of the University of Liege.

## SKILLS

- **Programming:** Python, Git, Bash, C, C++, Java, Matlab, Latex, Typst.
- **Libraries:** PyTorch, TensorFlow, Numpy, Matplotlib, Pandas, Gymnasium, RLLib,...
- **Languages:** French (native), English (professional proficiency).

## TALKS

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- *Multi-Agent Reinforcement Learning*. Deep Reinforcement Learning, University of Groningen. 05/2023
- *Emergent Tool Use From Multi-Agent Autocurricula*. Advanced Machine Learning, ULiège. 04/2020

## TEACHING

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- *Optimal decision-making for complex problems*. 2020 & 21 & 22 & 23
- *Introduction to artificial intelligence*. 2019 & 20
- *Complementary computer science course*. 2019 & 20

## REVIEWING

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- *Workshop: SynS and ML* (ICML, 2023)

## AWARDS

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- NeurIPS Travel Award (2023).

## REFEREES

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- Damien Ernst (dernst@uliege.be) - Ph.D. advisor.
- Jonathan Pisane - Ph.D. advisor.