

Lars C.P.M. Quaedvlieg

Website, Google Scholar, LinkedIn, GitHub, Devpost, Projects ❖ larsquaedvlieg@outlook.com

SUMMARY

Highly motivated final-year master's student with a broad range of experiences across various machine learning domains, including foundation models, reinforcement learning for decision-making, and AI for mathematics. I am particularly interested in using multimodal foundation models for embodied sequential decision-making agents.

Interests: Foundation Models, Sequential Decision-Making (RL), AI4Math.

SKILLS

Languages	English (C2), Dutch (C2), German (B1), French (A2).
Programming	Python, Java, SQL, R, C, C++, JavaScript, CSS, HTML.
Tools	Jax, Haiku, Optax, Flax, PyTorch, Hydra, Neptune, Google Cloud Platform, HDF5.
Relevant Courses	Optimization, Natural Language Processing, Graph Machine Learning, Computer Vision.

WORK EXPERIENCE

Scholar Research Assistant

Oct. 2023 – Present

Caglar Gulcebre Lab for AI Research

Lausanne, Switzerland

- I perform part-time research in **state-space models**, **reinforcement learning (RL)**, and **AI for mathematics**.
- Learning to encode reinforcement learning algorithms with state-space models, on problems requiring a context length of 100,000+ tokens (*Primary project, in progress*).
- Creating a **large language model** (7B+ parameters) for mathematical theorem proving and problem solving, participating in the [AI Mathematics Olympiads competition](#) (*Side project, in progress*).

Research Intern

Jun. 2023 – Jan. 2024

InstaDeep AI

Paris, France

- Worked on the PASTA project, which involved pre-training state-action conditioned transformers on a variety of reinforcement learning environments. I was responsible for the pipeline on the Atari domain.
- Implemented and trained a **VQ-VAE** to near pixel-perfect reconstruction of Atari frames.
- Successfully implemented and pre-trained transformers on a vast offline RL dataset containing > 1 billion transitions in a multi-processing setting, resulting in a >80% testing accuracy.
- Fine-tuning the pre-trained transformers using **Offline RL** methods, resulting in outperforming previous state-of-the-art performance by up to 2.5x on some Atari environments.

Research Assistant (Unofficial)

Nov. 2022 – Oct. 2023

Laboratory for Information and Inference Systems

Lausanne, Switzerland

- Developed a method to use **self-supervised learning** for **combinatorial optimization** problems, resulting in a new state-of-the-art for the Maximum Independent Set problem and good out-of-distribution generalisation.
- Utilised **graph neural networks** and reinforcement learning for the nurse rostering problem, achieving superior performance across both synthetic and real-world datasets and high out-of-distribution generalisation.

AI Research Intern

Jun. 2018 – Jun. 2020

Aucos A.G.

Aachen, Germany

- Explored a solution to the online multi-hoist scheduling problem using graph neural networks and **multi-agent reinforcement learning**, enhancing production line throughput by coordinated and learned job allocations.
- Demonstrated a 7.50% to 10% performance improvement over conventional algorithms and ensuring provable deadlock avoidance in all scenarios.

EDUCATION

École Polytechnique Fédérale de Lausanne

Sep 2022 – Jul, 2025 (*Expected*)

MSc in Data Science

Lausanne, Switzerland

- Excellence Fellowship holder; Research Scholarship recipient; 5.7/6 GPA (*Currently*)
- Google Developer Student Club PR Manager: In the founding year of the club, we organised 15 events with 212+ total attendees, and 163 community members together with a team of 11 members.

Maastricht University

Sep 2019 – Jul, 2022

BSc in Data Science and Artificial Intelligence

Maastricht, The Netherlands

- Graduated with *summa cum laude* distinction; Best bachelor's thesis award recipient with a thesis grade of 9.5; Ranked first of 104 within the cohort; 9.50/10 GPA.
- **Student Representative:** I demonstrated leadership skills in representing peer viewpoints by advocating for their interests, and fostering academic improvements by the enhancement of the program curriculum.
- **MSV Incognito Board Member:** In three distinct roles within the board, I orchestrated educational and social events for an 800-member study association, demonstrating strong leadership and organisational skills.

SELECTED AWARDS & HONOURS

First Place Hackathon Winner, HackUPC [[website](#)]

May 2024

Project on e-mail question-answering using GPT-4 and Retrieval Augmented Generation with hybrid search.

Research Scholar Assistant, EPFL

Feb 2024

Year-long highly competitive research program. Part-time researcher at the Caglar Gulcerhe's Lab for AI Research.

CS-503 Visual Intelligence Best Project Award, EPFL [[website](#)]

Jul 2023

Researched dynamics between predators and prey using self-play on an asymmetric zero-sum game with RL.

Best Bachelor's Thesis Award, Maastricht University

Jan 2023

University-wide award for the best bachelor's thesis research among all other students in the cohort.

Master's Excellence Fellowship, EPFL

Sep 2022

Two-year fellowship, awarded to ~3% of EPFL master students based on outstanding academic records.

EXTRACURRICULARS & INTERESTS

AI Horizon: Personal blog [[website](#)] where I write about state-of-the-art machine learning research, with over 10,000 total page views.

Semi-professional Field-Hockey player: Represented HC Nova in the Dutch semi-pro men's hockey league from 2016 to 2022.

PUBLICATIONS (* = equal contributions)

Boige, R., Flet-Berliac, Y., **Quaedvlieg, L.C.P.M.**, Flajolet, A., Richard, G., Pierrot, T.

Aug 2024

PASTA: Pretrained Action-State Transformer Agents. *International Conference on Reinforcement Learning (RLC)*.

Quaedvlieg L.C.P.M.*, Brusca L.*, Skoulakis S., Chrysos G., Cevher V.

Dec 2023

Maximum Independent Set: Self-Training through Dynamic Programming. *Advances in neural information processing systems (NeurIPS)*.

Quaedvlieg L.C.P.M.

Jul 2023

Optimising Job Allocation using Reinforcement Learning with Graph Neural Networks. (*Thesis preprint*)