Rafael F. Cunha

University Lecturer in AI

Ph.D. Candidate

Dutch citizen

Netherlands

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Scientific interests

- Reinforcement Learning
- Deep Learning & Data Science
- Control & Dynamical Systems
- Multi-agent Systems

Programming Skills

Matlab, Python, Git

Numpy, Pandas, PyTorch

MuJoCo, Linux/HPC

Languages

English	C1
Dutch	B1
Portuguese	Native

Soft Skills

- Critical thinking
- Problem-solving
- Teamwork
- Willingness to learn

Hobbies

- Playing table tennis
- Biking in the countryside

Experience

Apr. 2023 – current **Lecturer at University of Groningen (BKO certified, 2024)**

- **Course Development & Teaching**: Created and coordinated courses for the AI curriculum, including the Reinforcement Learning course and the project-based RL Practical course for the bachelor program. Contributed lectures on policy gradient methods and multi-agent RL to the master's Deep RL course, co-created the Object-Oriented Programming course (first Python-based iteration), and gave guest lectures in Introduction to AI and other courses. Managed courses using Brightspace learning management system.
- **Student Supervision**: Supervised over 15 bachelor's and 5 master's thesis projects on RL topics, with several resulting in publications at venues such as NLDL 2025 and ECAI 2025 workshops.

Sept. 2018 – current **PhD Candidate at University of Groningen**

- **Reinforcement Learning**: Development and convergence analysis of multi-agent **machine learning** algorithms that are able to transfer knowledge between different tasks.
- **RL for Dynamic Systems Control**: Developed a Deep RL approach to determine the optimal **switching policy** between existing controllers for longitudinal vehicle platoons, focusing on modeling system dynamics under stochastic disturbances and improving system efficiency.
- **Game Theory and Markov Process**: Study of a general case of imitation dynamics where the structure of the game and the imitation mechanisms change in time according to a continuous-time Markov jump process.

Sept. 2019 – Sept. 2022 **Teaching assistant at University of Groningen**

- Daily supervisor of master and bachelor students enrolled in their thesis projects. Total of five projects, one each academic semester, in the fields of reinforcement learning and stochastic process.
- Tutorial classes for the course "Modelling and Analysis of Complex Networks".

Feb. 2018 – Aug. 2018 **Teaching assistant at UNICAMP**

- Exercise classes and tutoring for the course "Linear Systems Analysis".

Aug. 2009 – Feb. 2017 **Petroleum Engineer at PETROBRAS, Brazil**

- **2011 - 2017 Reservoir Engineering**: On-shore oil field management and reservoir simulations.
- **2010 - 2011: Production and Artificial oil lift design**: Developing projects to equipping, monitoring and resolving failures of wells in on-shore oil fields.
- **2009 - 2010 Petrobras Graduate program**: Petroleum Engineer Course with specialization in Production and Reservoirs, with a workload of 1800 hours.

Education

Sept. 2018 – current. **PhD Candidate**

Faculty of Science and Engineering, DTPA, University of Groningen

Research focus: Transfer learning in multi-agent reinforcement learning problems.

Mar. 2017 – Aug. 2018 **Masters in Electrical Engineering**

University of Campinas (UNICAMP), Campinas – Brazil

Thesis: Robust partial sampled-data state feedback control of Markov jump linear systems

Feb. 2003 – Dec. 2008. **Bachelor in Electronic Engineering**

Technological Institute of Aeronautics (ITA), São José dos Campos – Brazil

Thesis: Development of a two-axis controller for radars

Courses / Certifications

- University Teaching Qualification - University of Groningen - Jul/2024
- Deep Learning Specialization - Coursera - Nov/2022
- Machine Learning Specialization - Coursera - Sep/2022
- Eastern European Machine Learning Summer School - Jul/2022
- Dutch Institute of Systems and Control (DISC) Educational Program - Sep/2020

Selected Publications

J. Peralez, A. Delage, J. Castellini, **R. F. Cunha**, and J. S. Dibangoye, "**Optimally Solving Simultaneous-Move Dec-POMDPs: The Sequential Central Planning Approach**," in *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2025.

A. Todorov, J. Cardenas-Cartagena, **R. F. Cunha**, M. Zullich, M. Sabatelli, "**Sparsity-Driven Plasticity in Multi-Task Reinforcement Learning**," in *Transactions on Machine Learning Research (TMLR)*, 2025.

T. R. Gonçalves, **R. F. Cunha**, V. S. Varma, S. E. Elayoubi, "**Fuel-efficient switching control for platooning systems with deep reinforcement learning**," in *IEEE Transactions on Intelligent Transportation Systems*, 2023.

J. Ferrao and **R. F. Cunha**, "**World Model Agents with Change-Based Intrinsic Motivation**," in *Proceedings of the 6th Northern Lights Deep Learning Conference (NLDL)*, 2025.

R. F. Cunha, L. Müller, T. Rooijakkers, P. de Haan, and F. Turkmen, "**Seed Scheduling in Fuzz Testing as a Markov Decision Process**," in *Workshop on Security and Privacy-Preserving AI/ML at ECAI*, 2025.

D. Rigoni, **R. F. Cunha**, F. Fransen, P. de Haan, A. Javadpour, and F. Turkmen, "**Collaborative Reinforcement Learning for Cyber Defense: Analysis of Strategies and Policies**," in *Workshop on Security and Privacy-Preserving AI/ML at ECAI*, 2025.

R. A. Tarunokusumo and **R. F. Cunha**, "**Boosting Accuracy and Efficiency of Budget Forcing in LLMs via Reinforcement Learning**," in *SLLM Workshop at ECAI*, 2025.