Dr. Florian Felten

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Academic appointments

07/2024– Post-Doctoral Researcher, Chair of Artificial Intelligence for Engineering Design, ETH Zurich
Advisor: Prof. Dr. Mark Fuge.

Education

06/2021– **Ph.D.**, Computer Science, University of Luxembourg
06/2024 **Thesis**: "Multi-Objective Reinforcement Learning."
Advisor: Dr. Grégoire Danoy.
Project: Automating the Design of Autonomous Robot Swarms (ADARS).
09/2016– **M.Sc.**, Computer Science, AI & Optimization, Université Catholique de Louvain
06/2018 – Grade: *High Distinction*
09/2013– **B.Sc.** Computer Science, Université Catholique de Louvain
06/2016 – Grade: *Distinction*

Research Interests

Multi-objective optimization, reinforcement learning, benchmarking, open-source software, multi-agent systems

Awards & Honors

11/2024 Excellent Thesis Award of the University of Luxembourg (top 10 %)
02/2022 Nominated for the Best Student Paper Award at ICAART conference, see [C3]

Publications

Google Scholar † → Equal contribution ‡ → Top tier venues (Q1 journal or A* conference)

Journal Articles

J1. ‡ **Felten, Florian**, Talbi, E.-G. & Danoy, G. Multi-Objective Reinforcement Learning Based on Decomposition: A Taxonomy and Framework. ***Journal of Artificial Intelligence Research*** (Feb. 2024).

Peer-reviewed Conference Proceedings

C1. ‡ **Felten**†**, Florian**, Alegre†, L. N., Nowé, A., Bazzan, A. L. C., Talbi, E.-G., Danoy, G. & Silva, B. C. d. *A Toolkit for Reliable Benchmarking and Research in Multi-Objective Reinforcement Learning* in *Proceedings of the 37th* ***Conference on Neural Information Processing Systems (NeurIPS)*** (2023).

C2. Alegre, L. N., **Felten, Florian**, Talbi, E.-G., Danoy, G., Nowé, A., Bazzan, A. L. & da Silva, B. C. *MO-Gym: A Library of Multi-Objective Reinforcement Learning Environments* in *Proceedings of the 34th* ***Benelux Conference on Artificial Intelligence (BNAIC/BeNeLearn)*** (2022).

C3. **Felten, Florian**, Danoy, G., Talbi, E.-G. & Bouvry, P. *Metaheuristics-based Exploration Strategies for Multi-Objective Reinforcement Learning* in *Proceedings of the 14th* ***International Conference on Agents and Artificial Intelligence (ICAART)*** (2022).
– Nominated for the Best Student Paper Award.

C4. **Felten, Florian**, Talbi, E.-G. & Danoy, G. *MORL/D: Multi-Objective Reinforcement Learning based on Decomposition* in *Proceeding of the* ***International Conference in Optimization and Learning (OLA)*** (2022).

Peer-reviewed Workshop Papers

W1. **Felten, Florian**, Gareev, D., Talbi, E.-G. & Danoy, G. *Hyperparameter Optimization for Multi-Objective Reinforcement Learning*. **Multi-Objective Decision Making Workshop (MODeM)**. Oct. 2023. http://arxiv.org/abs/2310.16487 (2023).

Other Papers

M1. **Felten, Florian**, Ucak, U., Azmani, H., Peng, G., Röpke, W., Baier, H., Mannion, P., Roijers, D. M., Terry, J. K., Talbi, E.-G., Danoy, G., Nowé, A. & Rădulescu, R. *MOMAland: A Set of Benchmarks for Multi-Objective Multi-Agent Reinforcement Learning* arXiv:2407.16312 [cs]. July 2024. http://arxiv.org/abs/2407.16312 (2024).

M2. Huang†, S., Gallouédec†, Q., **Felten, Florian**, Raffin, A., Dossa, R. F. J., Zhao, Y., Sullivan, R., Makoviychuk, V., Makoviichuk, D., Danesh, M. H., Roumégous, C., Weng, J., Chen, C., Rahman, M. M., Araújo, J. G. M., Quan, G., Tan, D., Klein, T., Charakorn, R., Towers, M., Berthelot, Y., Mehta, K., Chakraborty, D., KG, A., Charraut, V., Ye, C., Liu, Z., Alegre, L. N., Nikulin, A., Hu, X., Liu, T., Choi, J. & Yi, B. *Open RL Benchmark: Comprehensive Tracked Experiments for Reinforcement Learning* arXiv:2402.03046 [cs]. Feb. 2024. http://arxiv.org/abs/2402.03046 (2024).

Tools & Software

A toolkit for Empirical Research in Multi-Objective Reinforcement Learning

MO-Gymnasium: **lead dev** (3 devs, 10+ contributors). A standardized API and library for multi-objective reinforcement learning (MORL) environments. It is now the **most widely used library for MORL, with >100K downloads on PyPi**, and 250+ ★ on GitHub.

MORL-Baselines: **lead dev** (3 devs, 10+ contributors). The only library containing implementations of MORL algorithms. It is used to kickstart MORL research or application in the real-world, 300+ ★.

Open RL Benchmark: dev (30+ collaborators). The **biggest open dataset of experimental RL results with over 72k hours of tracked experiments**. 200+ ★.

Multi-Objective Multi-Agent Reinforcement Learning

MOMAland: **lead dev** (8 devs). The first standardized API and library for multi-objective multi-agent reinforcement learning environments. 50+ ★.

CrazyRL: **lead dev** (4 devs). A multi-objective multi-agent reinforcement library for learning control of swarms of drone (full JAX). 50+ ★.

Presentations

Talks

T1. **Felten, Florian**. *'It Depends': Dealing with Multiple Objectives in (MA)RL.* **Invited talk** at Montefiore Institute (University of Liège, Belgium). Oct. 2024.

T2. **Felten, Florian**, Talbi, E.-G. & Danoy, G. *Multi-Objective Reinforcement Learning: A taxonomy and Framework.* Journal to conference track at the **European Conference on Artificial Intelligence (ECAI)**. Oct. 2024.

T3. **Felten, Florian**. *Automated Generation of Heuristics.* **Invited talk** at AI lab (Vrije Universiteit Brussels, Belgium). July 2023.

T4. **Felten, Florian**, Houitte, P.-Y., Talbi, E.-G. & Danoy, G. *CrazyRL: A Multi-Agent Reinforcement Learning library for flying Crazyflie drones.* **International Conference in Optimization and Learning (OLA)**. Apr. 2023.

Demonstrations

D1. **Felten, Florian** & Danoy, G. *Controlling Robots with AI.* Partnership Days of the Interdisciplinary Centre for Security, Reliability and Trust (SnT), Luxembourg. May 2023.

D2. **Felten, Florian**, Houitte, P.-Y. & Danoy, G. *Autonomous Control of Robots.* FNR Luxembourg Researchers' Days. Nov. 2023.

D3. **Felten, Florian**, Stolfi, D. & Danoy, G. *Autonomous Swarms of Drones.* Innovation days at the European Investment Bank. Oct. 2023.

Media Coverage

05/2023 Fond National de la Recherche (FNR), Spotlight on Young Researchers: The challenge of getting autonomous systems to work together seamlessly. YouTube video.

Teaching

University of Luxembourg

2022 & 2023 — Teaching Assistant, Optimization for Computer Scientists – Spring term
Genetic Algorithms, Reinforcement Learning (Master level). Mentoring of project groups (3 students per group).
- First year: "Optimizing Recharging and Pickup Schedules for Electric Autonomous Taxis."
- Second year: "Hyperparameter Optimization for Multi-Objective Reinforcement Learning."
Course responsible: Prof. Dr. Pascal Bouvry.

2021 & 2022 — **Course responsible**, Programming Fundamentals 3 (PF3) – Fall term
Introduction to Functional and Concurrent Programming (Bachelor Level). 14 hours of lectures and 14 hours of practical sessions. Co-teached with Dr. Pierre Talbot.

Université Catholique de Louvain

2015 & 2016 — Tutor, Programming paradigms, abstraction, and concurrency – Fall term
Functional and Concurrent Programming with Oz (Bachelor level).
Course responsible: Prof. Dr. Peter Van Roy.

Academic Advising

Internships – Masters

2024 — Marchand, Elisa, ISIMA Clermont-Auvergne: "Development of a Unity-based Visualization tool for Reinforcement Learning enviroments."

2023 — Ledez, Coline, ISIMA Clermont-Auvergne: "Open-source Development of a Reinforcement Learning Library for the Control of Drones."

Projects – Bachelors

2022 & 2023 — Ucak, Umut, University of Luxembourg: "Reinforcement Learning and Planning for Robot Control."

Academic Service

Journals Reviewer

2024 — Neural Computing and Applications (NCAA)

Conferences Reviewer

2022–24 Optimization and Learning Conference (OLA)

Workshops Reviewer

2023 & 2024 Multi-Objective Decision Making (MODeM)

2023 & 2024 Adaptive and Learning Agents (ALA)

Other Experience

01/2023– Project Manager, Farama Foundation, Remote
Project management of open-source libraries: contributions, reviews, support, and long-term vision.

06/2018–06/2021 Tech Lead, N-SIDE, Louvain-la-Neuve, Belgium
Software engineer for clinical trials optimization software for 2 years: development, support, API design, teamwork (7 devs + 20 devs using our APIs). Stack: Scala, Scala.js, Akka.
I then became a Technical Lead on a product which optimizes the schedule of works on the electrical grid for the Belgian transport system operator using constraint programming. My job ranged from translating the client's requirements to architecting, developing, and deploying the application as well as managing the development team (3 devs). Stack: Scala, Akka, IBM CP Optimizer.

Last updated: November 6, 2024