



Matteo Merler

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Summary

I am a pre-doctoral researcher at FBK NLP in Trento, Italy, with an MSc in Machine Learning, Data Science, and AI from Aalto University in Helsinki. My research focuses on **bridging large-scale models** (such as LLMs and VLMs) **with methods like Reinforcement Learning (RL) and Symbolic Planning**. I aim to explore how RL's ability to learn from experience can complement the strengths of LLMs, which currently lack this capacity. I'm particularly interested in **model-based RL and world models**, investigating how large-scale models can be trained to plan ahead and imagine future states, helping them to adapt to complex reasoning and long-horizon planning beyond pattern matching.

Education

M.Sc. Aalto University [↗](#), Machine Learning, Data Science and Artificial Intelligence Sept 2022 – Sept 2024

- Graduated with honors, with a **final grade of 5.0/5.0** and a **GPA of 5.0/5.0**.
- **Thesis** [↗](#): **Generating Code World Models with Large Language Models Guided by Monte Carlo Tree Search**, supervised by Prof. Pekka Marttinen, published at NeurIPS 2024.
- Thesis awarded as one of the three **best MSc theses of 2024** at the School of Science.
- Received the Dean's Scholarship for outstanding academic performance.

B.Sc. University of Trento [↗](#), Computer Science Sept 2019 – July 2022

- Graduated with a **final grade of 110/110 cum laude (with honors)** and a **GPA of 28.46/30**.
- Thesis: **Route Optimization for Indoor Spaces**, supervised by Prof. Alberto Montresor (in Italian).

H.S. Liceo Scientifico Leonardo da Vinci [↗](#), Liceo Scientifico (Italian Scientific High School Diploma) Sept 2014 – July 2019

- Graduated with a **final grade of 100/100**.

Experience

Researcher, Fondazione Bruno Kessler [↗](#) Trento, Italy
Working as a pre-doctoral researcher ("Researcher 4 contract") in the **Natural Language Processing Lab** [↗](#) under the supervision of Bernardo Magnini. Jan 2025 – present

- Lead researcher on FBK's side of a joint project on **planning with Vision-Language Models** (with Aalto University), under resubmission.
- Led a second project on **selectively integrating VLM guidance with model-free Reinforcement Learning** based on the agent's own uncertainty, with a preliminary version accepted at the CAIPI workshop at ECAI 2025 and a full paper in preparation.
- Participating on private research for collaborations with companies.
- Contributing to the draft of a **Horizon Europe funding proposal**, leading the lab's team for Language and Reinforcement Learning.

- Active participation to the research group's scientific activities, including monthly meetings and collaborative discussions.

Research Assistant, [Aalto University](#) [↗](#)

Helsinki, Finland

MSc Thesis worker in the [Foundation Models for Language and Reinforcement Learning](#) [↗](#) (Larel) group, supervised by Prof. Pekka Marttinen. Aug 2024 – Sept 2024

- Conducted a research project on **Symbolic Regression with Large Language Models**, presented at the ACL Student Research Workshop.
- Co-led a research project on **Code World Models** with PhD candidate Nicola Dainesi, forming the basis of my Master's Thesis, accepted at NeurIPS 2024.
- Started a project on **planning with Vision-Language Models**, later continued by both Aalto University and my current group at FBK.
- Regularly attended lab meetings and participated in broader academic activities, including the Seminar on Large Language Models.

Internship, [ThinkIN](#) [↗](#)

Trento, Italy

Worked as a software developer intern in collaboration with the University of Trento. Feb 2022 – June 2022

- Designed and built a prototype for an indoor navigation system specifically targeted for supermarkets, to be used with the company's own location tracking system.

Publications

Guiding Reinforcement Learning with Selective Vision-Language Model Supervision [↗](#) Oct 2025

Matteo Merler, Giovanni Bonetta, Bernardo Magnini

ECAI Workshop on AI-based Planning for Complex Real-World Applications (CAIPI'25)

ViPlan: A Benchmark for Visual Planning with Symbolic Predicates and Vision-Language Models [↗](#) May 2025

Matteo Merler[†], Nicola Dainesi[†], Minttu Alakuijala, Giovanni Bonetta, Pietro Ferrazzi, Yu Tian, Bernardo Magnini, Pekka Marttinen

arXiv preprint

Generating Code World Models with Large Language Models Guided by Monte Carlo Tree Search [↗](#) Dec 2024

Nicola Dainesi[†], **Matteo Merler**[†], Minttu Alakuijala, Pekka Marttinen

Advances in Neural Information Processing Systems 37 (NeurIPS 2024)

In-Context Symbolic Regression: Leveraging Large Language Models for Function Discovery [↗](#) Aug 2024

Matteo Merler[†], Katsiaryna Haitsiukevich[†], Nicola Dainesi[†], Pekka Marttinen

Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics, Volume 4: Student Research Workshop (ACL 2024 SRW)

[†] denotes equal contribution

Additional Experience and Awards

Master's Thesis Award [↗](#): My Master's thesis was awarded as one of the three best MSc theses of 2024 at the School of Science.

Volunteer

Volunteer, [Libera Associazioni Nomi e Numeri Contro le Mafie](#) [↗](#)

Calabria, Italy
July 2017 – July 2017

I participated in a volunteering camp experience in southern Italy where we cultivated the fields of mafia-confiscated houses for the Libera association, while also taking part in various activities on the territory and listening to testimonies from victims and policemen.

Volunteer, [Associazione Volontaria "Per un Mondo Migliore"](#) ↗

I participated in a volunteering camp experience in Rijeka, Croatia where we helped different families and associations in need around the city and in mainland Croatia while living together in a shared home.

Rijeka, Croatia
Aug 2018 – Aug 2018

Languages

Italian: Native | **English:** C2 (Near-native proficiency) | **German:** A2 (Basic)