



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 Jan 2025 – present
- Working as a pre-doctoral researcher ("Researcher 4 contract") in the [Natural Language Processing Lab](#) under the supervision of Bernardo Magnini.
- 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 Aug 2024 – Sept 2024
- MSc Thesis worker in the [Foundation Models for Language and Reinforcement Learning](#) (Larel) group, supervised by Prof. Pekka Marttinen.
- 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 Dainese, 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.

Feb 2022 – June 2022

ThinkIN [🔗](#) – Trento, Italy

Worked as a software developer intern in collaboration with the University of Trento.

- 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 Dainese*, 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 Dainese*, **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 Dainese*, Pekka Marttinen

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

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.

July 2017 – July 2017

Libera Associazioni Nomi e Numeri Contro le Mafie [🔗](#) – Calabria, Italy

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.

Aug 2018 – Aug 2018

Associazione Volontaria "Per un Mondo Migliore" [🔗](#) – Rijeka, Croatia

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.

Languages

Italian: Native

English: C2 (Near-native proficiency)

German: A2 (Basic)