# Roman Knyazhitskiy

✉ cv@knyaz.tech — 🌐 knyaz.tech — ⬤ knyazer

## Summary

MPhil student in Machine Learning at Cambridge with research experience in differentiable simulation, reinforcement learning, and control. Developed methods improving stability in BPTT, contributed to AutoML and meta-learning projects under Prof. Tom Viering, and co-authored papers under submission. Also maintains open-source contributions to JAX-based ML libraries.

## Education

**MPhil in MLMI (Machine Learning)**, University of Cambridge          10/2025 - 09/2026

**BSc Computer Science and Engineering**, TU Delft          09/2022 - 07/2025

- GPA: 8.7/10. Graduated with Honours.

## Work Experience

**Research Associate**, TU Delft          03/2023 - 08/2025

- Under supervision of Professor Tom Viering worked on several AutoML and Meta Learning projects, including two yet to be published papers.
- Participated in departmental research meetings and academic discussions.

**Head of AI/Control**, Delft Mercurians (Student Robotics Team)          05/2023 - 09/2025
(Part-Time)

- Led a team of 2-5 engineers in developing AI control systems for RoboCup competition.
- Designed and implemented a Model Predictive Control (MPC) system for real-time trajectory optimization.
- Worked closely with the higher management to ensure adequate integration and planning.
- Ensured AI solution robustness via runtime type checking, and a comprehensive test suite.

## Publications

[1] J. Luijmes, A. Gielisse, R. Knyazhitskiy, and J. van Gemert. ARC: Anchored representation clouds for high-resolution INR classification. In *ICLR 2025 Workshop on Weight Space Learning*, 2025. Accepted.

[2] R. Knyazhitskiy and P. R. Van der Vaart. A simple scaling model for bootstrapped DQN. 2025. Under review.

## Honours and Awards

- **1st Place**, Bunq Hackathon 6 (2025), team of 4 against 50+ teams with a prize of €30,000.
- **2nd Place & Special Prize**, Epoch AI Hackathon (2024).
- **'Best Software Solution'** award, RoboCup World Championships, Sydney (2019).
- **1st Place**, RoboCup Junior National Competitions (2017, 2018, 2019).

## Open Source Contributions

- Enhanced functionalities in jaxtyping and Equinox, resolving multiple issues and enabling IPython runtime type checking.
- Contributed to Gymnax, a widely used JAX RL environments collection with 800+ stars on GitHub.

## Selected Projects

**High-Frequency Weather Forecasting**, Hierarchical Bayesian Models, CNF          2025

- Developed hybrid forecasting system combining continuous normalizing flows with an autoregressive model for well-calibrated forecasting.

**Lyapunov Discounting for BPTT Optimization**, JAX, Differentiable Simulation          2024

- Novel stability improvement method for backpropagation through differentiable simulators, achieving significant gains over windowed BPTT, 5-fold increase in the peak performance achieved on Brax environments

**pytest-mut: High-Performance Mutation Testing**, Python, Parallel Computing          2024

- Developed mutation testing library achieving 10-15x speedup over alternatives through novel partial parallelization strategies