

Roman Knyazhitskiy

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Summary

MPhil in Machine Learning student at the University of Cambridge with some research in robotics, reinforcement and deep learning. Experienced in developing and scaling novel algorithms for medium-scale problems, with lots of hands-on experience in JAX, Python, and C++. Proven ability to lead research projects in AutoML, LLMs, and optimization, including contributions to Google's open-source JAX ecosystem.

Education

MPhil in MLMI (Machine Learning), University of Cambridge 10/2025 - 08/2026
BSc Computer Science and Engineering, TU Delft 09/2022 - 07/2025

- GPA: 8.7/10. Cum Laude + Honours.

Work Experience

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

- Collaborated on research projects in AutoML, Meta Learning, and LLM applications for code generation.
- Investigated and presented on advanced optimization methods (e.g., Shampoo) and generative models.

Machine Learning Engineer, Delft Mercurians (RoboCup Team) 05/2023 - 09/2025

- Led development of AI control systems, including a real-time Model Predictive Control (MPC) system.
- Built a bespoke continuous-time differentiable physics simulator from scratch in JAX and Equinox.
- Integrated Python ML models into a high-performance Rust codebase for controlling autonomous robots.

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.

Selected Research Projects

IEFT-PFN: Transformers for Hyperparameter Optimization, JAX, AutoML, Meta Learning 2025

- Developed a transformer-based Prior-Data Fitted Network (PFN) for HPO using in-context learning to predict training curves, achieving a 15-20% MMedLL improvement over the IFBO baseline.
- Implemented a multi-stage training curriculum using both synthetic and real curve data.

Lyapunov-Stabilized RL for Continuous Control, JAX, Deep RL, Physics Simulation 2024

- Implemented a novel reinforcement learning framework using Lyapunov stability factors to stabilize truncated backpropagation through time in long-horizon, continuous control tasks.

Technical Skills

- **Languages:** Python, C++, C, Rust, Go, MATLAB
- **ML/DL Frameworks:** JAX/Equinox, PyTorch, ONNX
- **Systems:** Distributed Computing, Linux, Docker, CI/CD

Open Source Contributions

- **Google (jaxtyping):** Contributed enhancements to core functionality.
- **Equinox:** Resolved issues and contributed to the widely used JAX neural network library.
- **libccd:** Fixed a critical infinite loop bug in the C++ robotics collision detection library.

Honours and Awards

- **1st Place**, Bunq Hackathon 6 (2025) – €30,000 prize
- **2nd Place & Special Prize**, Epoch AI Hackathon (2024)
- **Best Software Solution**, RoboCup World Championships, Sydney (2019)
- **Silver Medal**, AIJC International AI Competition for Juniors