Job Petrovčič

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Personal Profile

Mathematics MSc student working at the intersection of machine learning and formalised mathematics: graph neural networks for premise selection in Lean 4 (NeurIPS MATH-AI'25), and a from-scratch Python reimplementation of the Lean kernel as an RL environment. IMO bronze medallist, two-time IMC First Prize.

Education

University of Ljubljana, Faculty of Mathematics and Physics — Ljubljana, Slovenia

- **Bachelor of Mathematics** (2020 - 2023) — Cumulative GPA: 9.87/10.00
  Awarded monetary **Prešeren's Prize** for one of the three best theses in the department
  Awarded **Dean's Prize** for the first three years

- **Master of Mathematics** (2023 - Ongoing), additional year — Cumulative GPA: 10.00/10.00

Selected undergraduate courses: Data structures and algorithms I and II, Statistics, Selected topics in data analysis: machine learning; Master: Advanced machine learning, Logic in computer science, Measure theory; Doctoral: Topics in mathematical foundations of computer science: Formalization of mathematics and proof assistants

Technical University of Munich — Munich, Germany

- **Erasmus+ Exchange, Master of Mathematics** (April - August 2026)
  Courses: Mathematical Foundations of Machine Learning, Advanced Deep Learning for Robotics, Mathematical Data Analysis

Research and projects

Machine Learning for Formalised Mathematics

- Researched premise selection using machine learning methods: extracted graph from Lean 4 source code, applied graph neural networks to outperform ReProver baseline
- Rewrote the Lean 4 kernel into Python to create a reinforcement learning environment (Python implementation of Lean kernel available at LeanPy, environment implementation available at RLEnvironment)

Agda-Unimath Visualization

- Applied data analysis techniques to a formal mathematics project
- Developed a visualization tool for the Agda Unimath library available at unimath.github.io under the Library Explorer section (4th section)

Formalisation

- Led team formalising the Artin-Wedderburn theorem in Lean 4 available at Artin-Wedderburn formalisation
- Work highlighted by Prof. Andrej Bauer: mathstodon.xyz

Conference publications

- Job Petrovčič, David E. Narváez, and Ljupčo Todorovski, Combining Textual and Structural Information for Premise Selection in Lean, 5th MATH-AI Workshop at NeurIPS'25. Available at: arxiv.org/abs/2510.23637
- Job Petrovčič, Sebastian Mežnar, and Ljupčo Todorovski, Sequential DAG Generation, in *Proceedings of the 17 Jožef Stefan International Postgraduate School Students' Conference (IPSSC 25)*, 2025. Available at: ipssc.mps.si (archived).
- Job Petrovčič, Sebastian Mežnar, and Ljupčo Todorovski, Kernel-level expression generator, EuroProofNet WG5 Workshop, Edinburgh, UK, 7–8 April 2025. Available at: europroofnet.github.io/_pages/WG5/Edinburgh25/abstracts/9.pdf

Talks

Workshop on Theorem Proving and Machine Learning in the Age of LLMs — Edinburgh, UK
Delivered a talk on applying reinforcement learning techniques to generate expressions in type theory — April 2025
Link: conference europroofnet.github.io, slides: easychair.org

Seminar for Foundations of Mathematics and Theoretical Computer Science — Ljubljana, Slovenia
Presented my work on an expression generator at the faculty research seminar — April 2025
Link: fmf.uni-lj.si

Jožef Stefan International Postgraduate School Students' Conference — Kamnik, Slovenia
Gave a short research presentation on generating directed tree and graph structures, Link: ipssc.mps.si — May 2025
Slovenian Network Analysis Researchers' Meeting — Ljubljana, Slovenia
Presented work on premise selection using graph neural networks, Link: netslo.mf.uni-lj.si — January 2026

Awards

International Mathematical Olympiad (IMO) 2020 — online
Bronze medal — September 2020
Link: imo-official.org

International Mathematics Competition for University Students (IMC) — Blagoevgrad, Bulgaria
Two-time First Prize; ranked 41st and 96th out of ~400 participants (from ~80 universities) — August 2023, August 2024
Links: imc-math.org.uk, imc-math.org.uk

University Programming Marathon, team competition, Slovenia — Ljubljana, Slovenia
Three-time champion, one-time runner-up — October 2021, 2022, 2023, 2024
Links: tekmovanja.acm.si, tekmovanja.acm.si

Central European Regional Contest
24th place (twice) out of ~60 teams — December 2021, 2022
Links: cerc2021.acm.si, cerc2022.acm.si

European Physics Olympiad 2020 — online
Bronze medal — July 2020
Link: eupho.ee

Simon Marais Mathematics Competition 2024 — online
4th place out of 55 pairs, international competition, monetary prize of A$ 900 — October 2024
Link: simonmarais.org

Scholarships

DMFA Scholarship, corporate-sponsored, awarded to ~2-3 per year in Slovenia — October 2025 - September 2026
Link: dmfa.si
Zois Scholarship, state scholarship "for achieving outstanding accomplishments" — 2016 - 2026
Link: srips-rs.si

Work Experience

- **Internship at Cosylab**
  Learned how to develop industry-grade software in C++.
- **Lecturer for IMO preparations**
- **Coordinator at European Girls' Mathematical Olympiad 2023**
- **Grader for national math competition**

IT Skills

- **Programming:** Python, Lean, C++, Agda, OCaml, Wolfram Mathematica
- **Machine Learning:** PyTorch, LibTorch (C++ frontend of PyTorch), NumPy, Pandas, TensorFlow, NetworkX, Deep Graph Library, Scikit-learn, PyTorch Geometric, Optuna, Wandb, OpenAI Gymnasium
- **AI Systems:** Claude Code, agentic coding workflows with subagents and multi-agent orchestration

Languages

- **English:** C2 level (IELTS band 8.5)
- **German:** Basic proficiency
- **Slovene:** Native