Mateusz Juszczak

B.Eng. & M.Sc. Student in CS | HPC, AI Systems, Performance Engineering

Email: mateusz.juszczak@protonmail.com | LinkedIn: in/mateuszjuszczak | GitHub: Gienkooo | Website: mateuszjuszczak.dev

EDUCATION

Poznan University of Technology February 2026 – present
M.Sc. in Computer Science, Specialization: Machine Learning

Poznan University of Technology 2021 – February 2026
B.Eng. in Computer Science **Final Grade: 5.0/5.0 (Summa Cum Laude)**
Coursework GPA: 4.82/5.0 | Final Diploma Grade: 5.0/5.0

Adam Mickiewicz University (POMOST Extracurricular Program) 2025
Completed rigorous mathematics coursework beyond the engineering curriculum: **Linear Algebra 2**, **Mathematical Analysis with Applications 2**.

Erasmus @ University of Zagreb (FER) Autumn 2024
Master's-level coursework in machine learning and data science: **Machine Learning 1**, **Deep Learning 1**, **Introduction to Data Science**.

RESEARCH EXPERIENCE & THESIS

Research Assistant & M.Sc. Student – Neurosymbolic AI Group March 2026 – present
Supervisor: Prof. Krzysztof Krawiec | Institute of Computing Science, PUT

- Investigating transformer-based neurosymbolic architectures (DVP/ASR family) to map visual structures into interpretable, program-like languages for scene decomposition and image reconstruction.
- Engineering a custom procedural dataset generation tool to produce synthetic visual examples with incremental complexity, improving upon CLEVR benchmarks for robust model training.

Engineering Thesis: Hardware Acceleration of MMseqs2 on UPMEM DPUs [Repository]
Supervisor: prof. P.T. Wojciechowski | Grade: 5.0

- **Hardware-Aware Design:** Implemented a UPMEM DPU k-mer search kernel, explicitly managing MRAM-WRAM DMA block transfers and `__dma_aligned` memory layouts to bypass strict 64KB WRAM limits.
- **Lock Minimization & Concurrency:** Engineered a master-worker tasklet model utilizing local hit batch arrays to reduce global mutex contention by 64x when writing to the shared MRAM output buffer.
- **Transactional Resilience:** Designed a stateless transactional batch processing pipeline with dynamic rollbacks to guarantee data consistency during hash index collisions.

PROFESSIONAL ENGINEERING EXPERIENCE

LST-Soft Sp. z o.o. January 2024 – February 2026
Software Engineer (.NET / DevOps) – Part-time (20h/week) alongside full-time studies

- Executed a zero-regression refactoring of a critical 15-year-old legacy C# production backend (reducing codebase size by 20%), working under strict black-box constraints.
- Architected and implemented an end-to-end enterprise routing and scheduling pipeline (VRPTW), replacing bounded approximations with VROOM, OSRM, and Photon geo-services.
- Engineered a scalable, containerized GIS infrastructure on Kubernetes, developing automated CI/CD pipelines.

SELECTED ACADEMIC PROJECTS

HPC & Evolutionary Algorithms: Heterogeneous Optimization [Repository]
Technologies: C++, OpenMP, CUDA

- **CUDA Parallelization:** Developed a shared-memory reduction kernel with cross-block `atomicMax` operations and ensured memory coalescence via Structure of Arrays (SoA) data layouts.
- **OpenMP Scheduling:** Implemented task-based divide-and-conquer parallelism and utilized `schedule(dynamic)` to load-balance stochastic genetic operators.

Distributed Systems: Multi-Resource Mutual Exclusion [Repository]
Technologies: C++17, OpenMPI

- Implemented a Ricart–Agrawala-style MPI permission protocol with Lamport timestamp/process-ID ordering and deferred replies for multiple shared resources.
- Built a dedicated listener thread using `MPI_Iprobe` to dispatch incoming requests, replies, and house-state updates.

HONORS & ACHIEVEMENTS

- **ISCA 2026 MCCS Workshop Speaker:** Awarded a highly competitive full travel grant (~15% global acceptance rate) to attend ISCA. Presented engineering thesis findings on UPMEM DPUs as a live-streamed talk at Prof. Onur Mutlu's MCCSys workshop ([Event Link]).
- **Rector's Scholarship for the Best Students:** Awarded every semester (2021–2026) for placing in the top 10% of the Computer Science cohort at Poznan University of Technology.

- **Competitive Programming (AMPPZ Finalist 2023):** Represented PUT at the regional Polish Collegiate Programming Contest (ICPC format) after securing 1st place in university-wide qualifiers as team leader.
- **Polish National Matura (Advanced Level):** Scored 100% in Computer Science, 100% in Mathematics, and 90% in Physics.

TECHNICAL SKILLS

- **Domain Expertise:** Hardware-Aware Programming, Performance Engineering, HPC, ML Systems Architecture, Processing-in-Memory (PIM), Algorithmic Complexity Reduction.
- **Programming & Systems:** Python, C/C++, CUDA, OpenMP, OpenMPI, C#, Linux, Git.
- **Infrastructure & DevOps:** Docker, Kubernetes, CI/CD pipelines.
- **Languages:** Polish (native), English (C1), German (B1).