Fabio Rossi

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MSc student in High Performance Computing Engineering with hands-on experience building MPI-distributed scientific pipelines and deep learning models for time-series and histology imaging. Interested in scalable computing, bioinformatics workflows, and data-driven automation.

EDUCATION

Politecnico di Milano, *MSc in High Performance Computing Engineering* | Milan, Italy — Sep 2024 – Present
Politecnico di Milano, *BSc in Computer Science and Engineering* | Milan, Italy — Sep 2021 – Mar 2025
Liceo Scientifico Ettore Majorana | Isernia, Italy — Sep 2016 – Jul 2021

EXPERIENCE

Outlier AI, *Coding & Math Expert / AI Trainer* | Remote (Contractor) — Dec 2024 – Present

- Authored and reviewed math and coding problems, validating AI-generated solutions for correctness and clarity.
- Reviewed AI-generated code for correctness, efficiency, and style across Python, C++, and JavaScript.
- Generated and ranked training data to improve model responses; delivered concise, pedagogical feedback.

Politecnico di Milano, *Peer Tutor* | Milan, Italy — Jan 2022 – Sep 2024

- Assisted students at Politecnico di Milano with Foundations of Computer Science and Geometry and Linear Algebra exam preparation.

Skyward Experimental Rocketry, *Logistics Department Member* | Milan, Italy — Sep 2022 – Oct 2023

- Built and managed partner relationships to support logistics operations.

A.S.D. Vastogirardi, *Match Analyst U19 National League* | Vastogirardi, Italy — Aug 2019 – Jun 2021

- Analyzed matches to identify team strengths and improvement areas.
- Prepared training sessions to address findings and improve results.
- Supported the head coach in maintaining team morale and a high-performance environment.

SKILLS

Programming	Python (Flask, Pandas, PyTorch, scikit-learn, OpenCV), C, C++, Java, MATLAB, Julia, Bash, LaTeX
HPC/Tools	MPI (mpi4py), SLURM, Docker, Git, Linux, OpenBabel, AutoDock Vina, HTML, CSS

PROJECTS

HPC Bio Docking Pipeline | Personal project — Jan 2026

- Built an end-to-end virtual screening pipeline for SARS-CoV-2 Mpro (6LU7) using AutoDock Vina.
- Automated ligand generation from SMILES via OpenBabel and implemented MPI-based distributed docking.
- Aggregated and ranked affinities with ligand efficiency metrics; generated interactive NGLView HTML reports and CSV summaries.
- Packaged the workflow for SLURM and Docker execution.

AN2DL Challenge 2 - Histology Slide Classification | Politecnico di Milano — Jan 2026

- Built a histology slide classification pipeline for four breast cancer subtypes (Luminal A/B, HER2+, Triple Negative).
- Implemented HSV-based quality control to filter stained/artifact slides and ROI-centric multi-scale tiling with OpenCV.
- Developed attention-based MIL with a ViT-S backbone (timm/PyTorch), slide-level aggregation, and leakage-safe splits by original slide.
- Advanced from baseline ResNet-18 to ROI+multi-scale and AttnMIL, achieving test F1 = 0.3898.

AN2DL Challenge 1 - Time-Series Pain Classification | Politecnico di Milano — Jan 2026

- Designed a time-series pipeline to predict pain status from multi-sensor data with subject-level splits to avoid leakage.
- Engineered preprocessing: one-hot encoding, variance/correlation filtering, PCA by joint group, and sliding windows (size 25, stride 2).
- Trained RNN/LSTM/GRU models with AdamW, label smoothing, class-weighted loss, and grid search; used 5-fold CV ensembling.
- Achieved test F1 up to 0.9567 with the best LSTM ensemble.

Football Penalty Takers Analysis | Personal project Sep 2024 – Mar 2025

- Developed a full-stack analytics platform to study penalty takers in Serie C, Group B (2024/25 season).
- Built the backend in Python with Flask, using Pandas for data processing and OpenPyXL for automated Excel report generation.
- Created HTML pages with Jinja2 templates, styled with CSS and enhanced with JavaScript for interactive visualization.
- Delivered an end-to-end workflow for data collection, analysis, visualization, and export, deployed on a personal website.

DevOps Project – Color to Grayscale Conversion | Politecnico di Milano Jun 2025

- Developed a Google Test suite to validate grayscale conversion algorithms with property and robustness tests.
- Built CI/CD with GitHub Actions to automate build, test, and deployment.
- Containerized with Singularity and automated deployment to the Galileo100 HPC cluster via SLURM.
- Collaborated in a 4-person team, focusing on deployment automation and reliable container execution.

Parallel Computing Challenge | Politecnico di Milano Nov 2024

- Implemented serial and multi-threaded merge sort in C++, evaluating scalability across input sizes and cutoff thresholds.
- Built a reproducible benchmarking pipeline producing CSV timing datasets and 2D/3D visualizations using Python and Gnuplot.
- Analyzed speedup and efficiency trade-offs between parallel and serial runs; summarized findings in a technical report.

NLA Challenge – Image Processing | Politecnico di Milano Oct 2024

- Implemented an image-processing pipeline in C/C++ with discrete operators for edge detection, smoothing, and sharpening, with reproducible builds via Makefile.
- Handled image I/O and exported intermediate data in `.mtx` format for matrix-level inspection.
- Produced PNG artifacts and histograms to study noise/contrast effects and the behavior of discrete filters on real inputs.
- Built C routines and shell tooling to construct and analyze $\mathbf{A}^\top\mathbf{A}$, computing spectral properties and validating results on real inputs.
- Integrated the LIS (Library of Iterative Solvers) for iterative methods on sparse matrices; managed `.mtx` datasets and produced plots for clean vs. noisy scenarios.

Software Engineering | Politecnico di Milano Jun 2024

- Implemented the board game Codex Naturalis (Cranio Creations) in Java.
- Implemented a client/server protocol to support distributed multiplayer gameplay.
- Applied design patterns across the architecture and codebase.

Logical Networks | Politecnico di Milano Mar 2024

- Implemented a VHDL state machine to verify the credibility of data stored in memory.
- Validated functional correctness against course specifications.

Introduction to Finite Elements and Algorithms | Delft University, *Athens Programme* Nov 2023

- Implemented a finite element method problem using Julia.
- Analyzed the computational cost of linear system solvers.

Algorithms and Data Structures | Politecnico di Milano Sep 2023

- Implemented management software in C to manage a highway and the electric vehicles used to traverse it.
- Analyzed the computational complexity of core operations.

ACHIEVEMENTS

Best Freshman Award - Politecnico di Milano (2021)
National Third Place - Italian Olympiads in Problem Solving (2018)
National Finalist - Italian Olympiads in Mathematics, Teams (2018)

LANGUAGES

English	C1 Level
Italian	Native proficiency
Spanish	A1 (studying)