Francesco Forcher

Personal data

Citizenship, Birth, Location:	Italian | 1994 | Lugano	LinkedIn:	francesco-forcher
Email:	francesco.forcher@gmail.com	Github:	github.com/f-forcher
Website/Portfolio:	forcher.dev	Languages:	English C2, Italian native

About me

- **Software Developer** and **Machine Learning Engineer** with **over 6 years** of **professional** experience, driven by a life-long passion for programming and inspired by my academic career in physics and applied mathematics. **ETH Zürich CSE MSc**. Areas of expertise and interest include **Rust, AI/Machine Learning, robotics. Autonomous AI agents, distributed systems**, Computer Vision, Physics, High-Performance Computing (HPC), functional programming,

Technology stacks

Currently:	**Rust**, **Python for ML**, **Databases/SQL/NoSQL**, **Docker**, **Kubernetes**, **Time Series**, **Julia**,
Previous experiences:	**C++**, **Javascript/Typescript**, **Java**, **R**, **Stochastic Differential Equations**, **Quantum Mechanics**, **Deep Learning**, **Matlab**

Employment

Research assistant at **University of Stockholm** • Feb 2025 - Curr

- Coauthor responsible for the AI research and ML engineering side of a research project in political economy, led by professors **Alex Lee** and **Per Andersson**. We analyze the link between economic development and innovations in art and culture using multimodal AI to analyze large scale art datasets efficiently.

Freelance technical consultant • Jan 2021 - Curr

- For **BLU software** (2021): Used **Talend** and **Airflow** for **ETL**/**ELT** workloads. Created interactive forecasts of demand using Facebook's Prophet framework.
- Technical co-author contributing ML, algorithms, and performance optimization work on a research project by **Per Andersson** and Prof. **A. Matranga** (2024): reconstruct the cost function underlying paths of roman infrastructure such as aqueducts, using Dijkstra-like algorithms on Hi-Res topographic GIS dataset.

Rust Database Developer and AI Engineer at **Natzka** • Jun 2021 - Mar 2024

Contributed to the design and development of a next-generation **OLAP database for data warehousing**:

- Development of several **engine and query language features**, such as Boolean formulas and COUNT algorithms, with **Rust**. Contributed to **backend** database **API** development, including **gRPC** and **REST** API.
- Integration of AI/ML features into the product. Bringing Python and Julia scripts from research prototypes into production-ready **containerized microservices**, integrating state-of-the-art **Gaussian Process** based time series **forecasting services** optimized for **low latency**. Worked on a custom **Julia distributed logger** for **observability**.
- Research on a custom **Kubernetes predictive autoscaler**. Advanced load testing with **Grafana k6**.

Data analyst and Physicist at **CERN, BE-ABP-HSS** • Sep 2016 - May 2018

CERN Technical Student in the Beams Department, Accelerator and Beam Physics Group.

- I developed advanced statistical routines using **Python Pandas** and **scikit-learn** to analyze crystal parameters for CERN's **UA9** experiment. My algorithm enabled the analysis of **very noisy** datasets, with a significant impact in the tender process to award the crystal manufacture contract worth **several hundred thousands CHF**.
- My thesis has been published as CERN internal note.
- Using **C++** `ROOT` library, I developed routines to analyze nuclear dechanneling for high energy particle beams in bent crystals, improved the simulation accuracy of `SixTrack` software.

Education

ETH Zürich Master's Degree in Computational Science and Engineering • Sep 2018 - Dec 2020

- Master's degree with courses on high performance parallel computing, differential equations, Quantum Computing, Computational Statistics, Deep Learning and Computer Vision. I worked at **PSI** to develop an application to perform intrusive **Polynomial Chaos** expansion for **uncertainty quantification** in simulations based on approximate Hamiltonian maps, using **SymPy**.

University of Padova Bachelor's Degree in Physics • Oct 2013 - Sep 2017

- Physics degree with an emphasis in Computational Physics, simulations, statistics and data analysis