Francesco Forcher

Personal data

Citizenship, Birth, Location:	Italian | 1994 | Lugano	LinkedIn:	francesco-forcher
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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 lifelong passion for programming and mathematics. I emphasize a fast, reliable style of development. **ETH Zürich CSE MSc**. Areas of interest include Rust development, AI/Machine Learning, Computer Vision, NLP, physics, robotics, High-Performance Computing (HPC), functional programming, distributed systems.
- Good teamplayer, I have experience working in teams with different structures. I've learned to tap into each team member's strengths to get the best results. Always on the look for better tools and methodologies, I proactively seek better ways to solve difficult problems.

Technology areas

Currently:	**Rust**, **Python**, **Julia**, **Data Warehouse**, **Docker**, **Kubernetes**, **Time Series Forecasting**
Previous experiences:	**C++**, **Java**, **R**, **Javascript/Typescript**, **Stochastic Differential Equations**, **Quantum Mechanics**, **Deep Learning**, **Matlab**

Employment

Freelance technical consultant • Apr 2024 - Curr

- Technical co-author on a paper by Prof. **A. Matranga**: reconstruct the cost function underlying paths of roman aqueducts, using custom Dijkstra on Hi-Res topographic GIS dataset. The high-performance algorithm is being developed using **Dask** and **Numba**.
- RA for Stockholm Uni paper analyzing the link between econ development and art innovation, combining multimodal AI models with FAISS for efficient similarity search and clustering of embeddings.
- Attending advanced courses on concurrent and distributed systems, using **Rust** and formal methods.

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 warehouse Consultant at **BLU software** • Jan 2021 - Jun 2021

- Used **Talend** and **Airflow** for **ETL**/**ELT** workloads. Created interactive forecasts of demand using Facebook's Prophet framework.

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