# Francesco Forcher

## Personal Data


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| Languages: | English C2, Italian native |


## Summary


**Software Developer** and **Machine Learning Engineer** with **over 6 years** of **professional** experience, driven by a lifelong passion for programming and mathematics. I emphasize fast, reliable, iterative development with good attention to detail. **ETH Zürich CSE MSc**.


## About me

- 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

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

## Employment

Freelance technical consultant • Apr 2024 - Curr

- Contributing as technical co-author on a paper by Prof. **A. Matranga**: reconstruct the cost function that explains the path of roman aqueducts, using a variant of Dijkstra's algorithm on a high resolution topographic GIS dataset. The high-performance algorithm is being developed using **Dask** and **Numba**, targeting HPC clusters.
- Attending an advanced course 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 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 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 a selection of courses on high performance parallel computing, differential equations, 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