

EPFL Computer Science student (BSc, expected 2027) working across quantitative research and machine learning — from statistically rigorous backtesting and hypothesis-driven trading studies to neural networks implemented in raw NumPy.

EDUCATION

École Polytechnique Fédérale de Lausanne — BSc in Computer Science · expected 2027
Coursework: Machine Learning, Probability & Statistics, Algebra, Analysis, Algorithms & Data Structures, Software Construction, Computer Architecture
Lycée International de Saint-Genis-Pouilly — French Baccalauréat, High Honors · 2024

QUANTITATIVE RESEARCH & PROJECTS

ADF Filtering in Pairs Trading — Independent Quantitative Research 2026

Independent research · [github.com/sefaav/quant-research-notebooks](#) · Python, pandas, NumPy, statsmodels

- Tested whether ADF stationarity filtering applied during the formation window improves subsequent out-of-sample pairs-trading performance, using a reproducible walk-forward study of 92 economically related ETF pairs across 34 folds (2008–2026).
- Main result: no statistically detectable benefit — mean difference -0.25 pp per window, $p = 0.23$, 95% CI [-0.66, +0.17].
- Inference used Fama–MacBeth, cross-checked with Newey–West standard errors, block bootstrap, two-way clustered regression, and seven robustness checks.

QuantLab — Reproducible Quantitative Research Platform 2026

Personal project · [github.com/sefaav/QuantLab](#) · Python, pandas, NumPy

- Built a modular platform turning financial hypotheses into reproducible, bias-aware experiments, covering data validation, signals, portfolio allocation, cost-aware execution, risk analytics and reporting through YAML-configured workflows.
- Implemented a look-ahead-safe backtesting engine (signal at t , position at $t+1$) with realistic transaction costs and gross-vs-net reporting, supporting momentum, mean reversion, trend following and pairs trading.
- Built risk and validation tooling including Sharpe, Sortino, Calmar, VaR/CVaR, alpha/beta, walk-forward validation, sensitivity analysis, bootstrap and permutation tests.
- Designed for reproducible research, reporting all results alongside documented limitations, with >80% core test coverage, CI and locked dependency versions.
- Built an interactive Strategy Explorer documenting each strategy's methodology, assumptions, parameters and diagnostics, with tools to explore parameter effects and strategy behavior.

Machine Learning from Scratch — MLP, K-Means & Model Selection 2026

EPFL coursework (CS-233) · Python, NumPy, Matplotlib

- Implemented a multi-layer perceptron in raw NumPy — fully connected layers, forward pass, backpropagation, mini-batch gradient descent — with softmax cross-entropy for classification and an identity output with MSE loss for regression.
- Added L2 regularization, validation-loss monitoring and early stopping with best-weight restoration; implemented K-Means with vectorized distances, empty-cluster handling and majority-vote labelling.
- Designed a validation-based grid search over architecture, learning rate, batch size and regularization, with an evaluation pipeline comparing accuracy, macro F1, MSE and confusion matrices.
- On a behavioural dataset, the best MLP reached 87.0% test accuracy and 0.811 macro F1 (MSE 0.999 on the regression target), outperforming K-Means; cross-entropy improved recall on the rare minority class.

Additional projects

ReCHor (Java) — Pareto-optimal public-transport route planner, offline multi-criteria search. EPFL Events (Scala) — real-time multi-user event platform, concurrency-safe state-machine backend.

TECHNICAL SKILLS

Programming

Python, Java, C, Scala, SQL, Verilog, RISC-V Assembly, JavaScript

Quantitative

NumPy, pandas, statsmodels, backtesting, walk-forward validation, statistics, time series analysis, hypothesis testing, regression analysis, risk analytics (Sharpe, Sortino, VaR/CVaR), bootstrap & permutation testing, transaction-cost modeling

Machine Learning

PyTorch, TensorFlow, Neural networks (forward/backprop in NumPy), K-Means, logistic & linear regression, gradient descent, L2 regularization, hyperparameter tuning, model evaluation

EXPERIENCE

Bäckerei & Konditorei Tschorek — Vienna, Austria Jul–Aug 2024

Seasonal bakery role: cashier duties and production support.

“Chez Bob” — Saint-Palais-sur-Mer, France Jun–Jul 2022

Kitchen prep in a high-volume seaside restaurant, up to 1,500 covers per service, 20-person team.

Sporticamp & Tennis School — Saint-Genis-Pouilly, France Sep 2022–Jun 2023

Assistant tennis coach, children aged 4–12.

Aicogy (Coding & Robotics) — Ferney-Voltaire, France 2017–2020

Teaching assistant for coding and robotics workshops, ages 6–15.

LANGUAGES

French (native) · English (B2) · Turkish (B2)

VOLUNTEERING

Food bank collections, since 2022 · Robotics workshops with PanglossLabs (FabLab) and Centre SocioCulturel Les Libellules

INTERESTS

Quantitative finance · Machine learning · Statistics · Tennis · Mountain hiking