Xavi Arnal

xavi.aclm@gmail.com | +34 629486185

Website | GitHub | Linkedin

Software engineer with competition mathematics background and long-term experience building production systems. Trained as a mathematician, with particular strength in algorithmic thinking and modeling, and comfortable applying that background to Python-centric backend development, data pipelines, and performance-sensitive code.

Experience

Software Engineer | *Huum Fresh* Feb 2024 - Current

- Built Python pipelines to ingest and validate retail inventory data from CSV exports
- Created automated alert systems and periodic analysis reports for retail clients
- Contributed to a Kotlin-based mobile client for data upload and alert display

Early stage researcher | *NVIDIA + TU/e* Jan - Oct 2023

- Optimized implementation of post-quantum cryptography on NVIDIA DPUs.
- Developed telemetry and performance analysis tools to identify bottlenecks.
- Delivered regular presentations on research progress to a large team.

Research assistant | *Universitat Politècnica de Catalunya* Feb - Nov 2022

- Worked in the application of post-quantum cryptography in electronic voting.
- Co-developed, benchmarked and optimized cryptographic protocols in Rust.
- Assessed resilience of said protocols against quantum adversaries.

Freelance teacher 2017 - 2022

- Undergrad to early grad level, in mathematics and computer science
- Volunteer mentor in Universitat de Barcelona's olympiad program (2019)

Skillset

Programming Languages	Python *(primary)* | C | JavaScript | Java | Rust
Python Libraries	NumPy | Pandas | Selenium | SQLAlchemy | FastAPI
Technologies	SQL | Git | React | Docker | Linux | PyTest

Education

MSc in Mathematical Engineering | *U. Politècnica de Catalunya* 2021 - 2022

- Minor in Innovation and Research in Informatics
- Thesis on *multivariate cryptography key optimization* (Honors | report)

BSc in Mathematics | *Universitat de Barcelona* 2016 - 2021

- Minor in Computer Science
- Thesis on *topological generalization metrics in deep learning* (9.4 | report)

Independent projects

Planets (website, github) - A highly configurable astrology dashboard with extensive customization options. Powered by a client-side astronomic calculation engine.

Technologies: React, Typescript/Javascript, astronomy-engine

Tansō (github) - Language learning tool for sentence-based Anki card generation. Includes automatic parsing, sentence retrieval, dictionary integration, and audio synthesis.

Technologies: SQLAlchemy, PyQt6, AnkiConnect, ffmpeg

Resonant (github) - Music library analysis tool that extracts emotional embeddings from tracks and builds similarity-based playlists and graphs. Includes web UI and REST API.

Technologies: FastAPI, SQLAlchemy, TensorFlow, h5py, D3.js

cps_sat (github) - CNF modeling toolkit with SAT-style constraints and solver integration.

Awards

Bronze medalist | International Mathematics Competition 2019

2nd place | Prova Santaló 2019

1st place | Torneig de Tardor, UB 2019

2nd place | Torneig de Tardor, UB 2018