

Xavi Arnal

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[Website](#) | [GitHub](#) | [Linkedin](#)

Software Engineer with a strong background in mathematics + applied cryptography. Combines a rigorous, analytical approach with practical skills in Python and systems programming to solve complex data and performance problems. Proven ability to deliver robust tools and pipelines from research to production.

Experience

Junior Software Engineer | *Huum Fresh*

Feb 2024 - Jul 2025

- Developed data ingestion pipelines for client inventory systems via CSV exports
- Built tools to detect spoilage risks and optimize perishable goods supply chains
- Created automated alert systems and periodic analysis reports for retail clients

Early stage researcher | *NVIDIA + TU/e*

Jan - Oct 2023

- Developed telemetry and performance analysis tools to identify bottlenecks.
- Optimized implementation of post-quantum cryptography on NVIDIA DPUs.
- 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

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

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

Technologies: React, Typescript/Javascript, astronomy-engine

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