

# Xavi Arnal

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

Software engineer with a background in competition mathematics and a focus on building well-structured production systems. Particularly strong in algorithm thinking, modeling, and structuring complex systems, with a focus on Python services and data infrastructure.

## Experience

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### Software Engineer | *Huum Fresh*

Feb 2024 - Current

- Engineered robust data pipelines to ingest, normalize, and validate daily inventory CSV exports from 200+ retail locations. (*Python, pandas, FastAPI, SQLAlchemy*)
- Developed an automated alerting suite that identified spoilage risks, resulting in an estimated 15% reduction in waste for clients. (*Python, pandas, FastAPI, SQLAlchemy*)
- Built a data analysis toolkit, used for creating periodic tailored analysis reports for clients. (*Python, pandas, scikit.learn, SQLAlchemy, mpl*)

### Early stage researcher | *NVIDIA + TU/e*

Jan - Oct 2023

- Optimized latency & throughput 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

- Co-architected secure electronic voting protocols with post-quantum cryptography.
- Co-developed, benchmarked and optimized cryptographic protocols in Rust.
- Assessed resilience of said protocols against quantum adversaries.

## Skillset

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**PROGRAMMING LANGUAGES** Python (*primary*) | JavaScript / Typescript | C | Rust

**PYTHON LIBRARIES** NumPy | Pandas | Selenium | SQLAlchemy | FastAPI

**TECHNOLOGIES** SQL | Git | React | Docker | PyTest

## Honors & Teaching

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- Bronze medalist — International Mathematics Competition (2019)
- Freelance teacher (2017-2022) — Mathematics & CSS (undergrad/early grad level)
- Volunteer mentor — UB Olympiad Program (2019)
- Author — Language learning resources with 1k+ users ([Chinese](#), [Japanese](#))

## Independent projects

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**Planets** ([website](#), [github](#)) - Highly configurable astrology dashboard powered by a custom 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 emotive embeddings from tracks to build similarity-based playlists and graphs. Includes web UI and REST API.

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

## Education

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**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](#) )