

# Xavi Arnal

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

## Experience

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### 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 and technical findings to a large team, receiving commendations for clarity and effectiveness.

### 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

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**PROGRAMMING LANGUAGES** Python (*primary*) | C | JavaScript | Java | Rust

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

**TECHNOLOGIES** SQL | Git | Docker | Linux | PyTest

## 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](#) )

## Independent projects

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**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

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<b>Bronze medalist</b>	International Mathematics Competition	2019
<b>2nd place</b>	Prova Santaló	2019
<b>1st place</b>	Torneig de Tardor, UB	2019
<b>2nd place</b>	Torneig de Tardor, UB	2018