

Xavi Arnal

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

Software developer with a strong foundation in mathematics (International Mathematics Competition medalist) and experience in cryptography and applied software development. Since 2024, I have focused on software design outside academia, completing independent projects that demonstrate my ability to design, build, and deploy real-world systems.

Experience

PhD track (performance analytics, cryptography) | NVIDIA + TU/e 2023

- Developed telemetry and performance analysis tools to identify bottlenecks.
- Optimized implementation of post-quantum cryptography on NVIDIA's DPUs.
- Delivered regular presentations on research progress and technical findings to a large team, receiving commendations for clarity and effectiveness.

Early stage researcher | Universitat Politècnica de Catalunya 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 | 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, ffmpeg, AnkiConnect, PyQt6

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: TensorFlow, FastAPI, SQLAlchemy, 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