

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