

DANI VILARDELL

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ABOUT ME

Self-driven and motivated fifth year Engineering and Mathematics student adept at facing new technological challenges and improving my security and cryptography skills.

Possessing great analytical and problem solving experience, I am able to work on fast paced and long term projects both on teams and by myself.



EDUCATION - CURRENT GRADE: 9/10

Cryptography researcher at UC Berkeley under Dawn Song's supervision UC, Berkeley 4/2023 to 5/2024

- One year stay to work on Zero Knowledge Proof's research using my mathematics and coding experience to help both theoretical and experimental parts of the field development. Currently advised by Professors Dawn Song and Yupeng Zhang.
- I have written along with Yupeng Zhang and Dawn Song an article on the construction of the main cryptographic primitives over rings.
- I have presented a highly welcomed proposal to Ripple Labs outlining the construction of a zk-bridge on the XRPL, a non-smart contract ledger.
- I have built a circuit for the DEFLATE compression algorithm to be used to generate zk-SNARKS for compressed data.
- The stay is covered by several scholarships both from Spain, UC Berkeley and RDI Frontier Research Fellowship

Telecommunications and System Engineering Bachelors degree Universitat Politècnica de Catalunya 9/2019 to 5/2024

- Symmetric and asymmetric encryption, cryptographic hashing and digital signatures knowledge. Source and channel encoding as well as information theory courses.

Pure Mathematics Bachelors degree Universitat Politècnica de Catalunya 9/2019 to 5/2024

- Algebraic structures course, advanced knowledge in the probability field and good discrete mathematics and combinatorics skills.

Higher Interdisciplinary Education Center

CFIS is a talent center that selects the best technical students from Spain, only 6 with a fully paid scholarship, and allows them to do two degrees simultaneously.

Zero Knowledge Proofs MOOC Online organized by UC Berkeley Spring 2023

Fully completed the ZKP MOOC that provided an introduction to this cryptographic primitive both theoretically and practically.

Junior high school year in Texas The Woodlands College Park 2018

WORK EXPERIENCE

Software Engineer Intern Cognite 6/2022 - 9/2022

Joined the Authentication (OIDC) and Authorisation team in Cognite, an industrial data company, and worked on enhanced access controls for row-based read access and refactoring the current Java based auth monolith into Rust based micro-services.

Implemented a new cryptography module that enabled AES, RSA and triple DES encryption where I learned about padding techniques as well as many well known exploits.

Software Engineer Intern HappyScribe

6/2021 - 9/2021

Developed several tools to grade subtitles and improved, using NLP libraries and complex algorithms, the way subtitles were split.

The result was measured using the grading tools I created myself as well as professional transcribers. Had to learn new technologies such as Ruby on Rails, Heroku, AWS, Python NLP libraries, Flask and improved my GIT and tech company workflows.

PROJECTS

All of my projects along with others can be found in my personal website listed on the top of the resume.

Competitive programming team at UPC C++, Data Structures, Algorithms

- Selected as one of 9 participants to go to Milan South Western ICPC(International Collegiate Programming Contest) competitive programming competition based on my algorithm knowledge.
- Selected as one of the 3 participants to go on an ICPC training camp in Poland sponsored by Huawei on October 2022.

Berkeley ZKP Hackathon winner Go, gnark, ZKP, ZK-bridge

- First place in the XRPL ZK-bridge category where I had to provide a bridge construction proposal for a blockchain without smart contracts using a similar idea to the one proposed in the *zkBridge: Trustless Cross-chain Bridges Made Practical* paper. A short video explaining the results can be found [here](#).

Cryptonotes - my cryptography blog Go, gnark, ZKP, ZK-bridge

- Blog where I explain and talk about interesting papers or ideas in the cryptography world, from bilinear pairing construction to providing a solution to a particular version of Yao's Millionaire's problem. It can be found [here](#).

Random hamiltonian cycle generator on NxN grid and Snake game AI Javascript, Algorithms

- Developed an algorithm that generates random hamiltonian paths on a NxN grid using a modification of Kruskal algorithm to generate minimum spanning trees. The result can be seen [here](#).
- Using the random hamiltonian path generator I created an AI that completes the snake game only 1.2 times slower than the current best AI there is. The result can be seen [here](#).

Randify Javascript, NodeJS, Spotify API, Databases, Deployment and user tracking

- Created a random Spotify playlist generator by using a big song database from MusicBrainz, Spotify API and Nodejs .

Google Hash Code C++, Big data, Algorithms

- Achieved the top 0.5% both in 2021 and 2022 competitions by working with a team of three and using our competitive programming knowledge.

Hack UPC winner C++, Javascript, WASM, Web development, WebSockets

- 2021 - Won third place out of 75 teams in hackathon at UPC by working with three colleagues to develop a tool named Edge++ that enables programming interactive websites with no javascript and instead use basic C++.
- 2022 - Won third place out of 100 teams in hackathon at UPC by working with three colleagues to develop a multiplayer online game that would make people compete to escape a random generated maze. The maze was generated using hamiltonian paths and multiple graph algorithms.

SKILLS

Languages

C++, Java, Rust, Javascript, Python, Ruby, Go, several crypto libraries.

Hard Skills

Cryptography, Network protocols, Algorithms, Data structures, Signal processing,

Soft Skills Probability, Linear algebra, OAuth2, Algebraic structures, Complex analysis.
Time Management, Teamwork, Communication, Problem Solving, Leadership.

AWARDS

Enrolled in CFIS fully paid college scholarship at UPC	2019
Santander scholarship winner	2023
Cambridge Advanced C1 level certificate	2017
Driving licence, availability to travel	2019
Fluent Catalan, Spanish and English. High level in French.	
European and Spanish sailing champion as well as coach throughout several years.	
Studied 16 years of both jazz and classical piano and played a 1h solo piano concert on 2019	