

Pedro M. F. Pereira, PhD – Curriculum Vitae

Personal Profile

Age: 30; **Nationality:** Portuguese; [My GitHub](#)

Contacts: pp144@proton.me; [My LinkedIn](#)

I am an aspiring polymath with a formal education in Science and Technology and an informal one in everything else.

Currently, my primary interest lies in blockchain technology, particularly its applications in digital identity (DIDs, VCs), privacy (user-centric data ownership, zero-knowledge proofs, homomorphic encryption), and governance (DAOs, voting systems).

I am committed to contributing to the modernisation of financial and governmental infrastructures, with the goal of empowering individuals to reclaim control and ownership from large corporations and governments.

During my PhD, I frequently presented my work and engaged in discussions on complex topics, honing my ability to communicate intricate concepts in a clear and accessible way. This skill, further developed through positive teaching experiences, drives my passion for outreach and improving public literacy on blockchain.

Work Experience

2024-

Blockchain Engineer at [Parfin](#) - Remote, Lisbon

- Played a key role in developing products leveraging **zero-knowledge proofs**, privacy, and cryptography within a blockchain framework.
- Contributed to the development of a **zero-knowledge privacy token project**, utilizing Circom and Gnark, Fully Homomorphic Encryption (FHE), elliptic curve cryptography (specifically the Baby Jubjub curve), Pedersen commitments, Solidity, and Go. Participated in the entire product lifecycle, from the proof-of-concept phase to the final delivery to clients.
- Helped designing and implementing a **zero-knowledge Delivery versus Payment (DVP)** framework leveraging privacy tokens.
- Authored detailed technical documentation for developers, translating complex cryptographic research papers into practical, actionable guidelines.
- Served as a **critical link between the Engineering and Research teams**, fostering strong collaboration and ensuring smooth communication throughout the development process.

2023-2024

Blockchain Developer at [Celfocus](#) - Hybrid, Lisbon

- Gained expertise in Decentralized Identifiers (DIDs) and Verifiable Credentials (VCs) while working on **Identity and Credential Management**. This project involved utilizing technologies such as Hyperledger Besu, Quorum, KILT, React, Node.js, and Express.js.
- Developed smart contracts in Solidity for an **NFT-based Carbon Credit Marketplace**, enhancing my experience with Ethereum, Polygon, and EVM networks. This role also involved using Hardhat, Metamask, Truffle, and Foundry, as well as developing serverless REST APIs using Node.js, TypeScript, and Azure Functions. The Solidity contracts were designed to be pausable and included access control with three distinct roles. Interactions among the four contracts were managed through interfaces and trigger functions. Each contract utilized a library containing stateless definitions and pure logic functions. Additionally, the contracts featured numerous mappings and handled various events.

- Contributed to a **Token-based Loyalty System Project** within a Hyperledger Fabric framework, where I wrote smart contracts (chaincodes) in Golang and developed Fabric applications in Java to enable communication between the chaincodes and the backend.
- Built an extensive set of reusable libraries, APIs, configuration files, and deployment strategies utilizing Node.js, TypeScript, and Vercel Turborepo. These tools are designed to effortlessly integrate EVM-based chains and Hyperledger Fabric in future blockchain-based solutions.

Throughout these projects, I collaborated in a team environment adhering to an agile framework, employing tools such as GIT, Jira, and Jenkins for version control, task management, and CI/CD processes.

Academic Education

2019-2023

PhD in Theoretical Particle Physics - [Instituto Superior Técnico, Lisboa](#)

- [Thesis available here](#)
- [My Physics Publications](#)

2013-2018

Bachelor's in Physics and Master Degree in Theoretical Particle and Nuclear Physics - [Instituto Superior Técnico, Lisboa](#)

- Exchange Semester in Theoretical Particle Physics at [University of Amsterdam](#)

Academic Publications (Blockchain and Cryptography)

- **Rayls II: Fast, Private and Compliant CBDCs** - Mario Yaksetig, **Pedro Pereira**, Stephen Yang, Mahdi Nejadgholi and Jiayu Xu Published on Journal of Mathematical Cryptology, 2025 Presented at [FCiR25 - Financial Cryptography in Rome 2025](#)

Courses & Certifications

A selection of the most relevant, see full list at [my LinkedIn](#).

- **2023:** Certified Quorum Developer - [Blockchain Council](#) - [my notes](#).
- **2023:** Ethereum and Solidity: The Complete Developer's Guide - [Udemy](#) - [my notes](#).
- **2023:** Full Web3 Website Course - [Learn Web3 with EdRoh](#) - [my notes](#).
- **2023:** Ethereum and Solidity Course - [CryptoZombies](#) - [my notes](#).
- **2022-2023:** Cardano Developer Course - [Gimbalabs](#) - [my notes](#).
- **2022-2023:** IOG Haskell Course & Haskell on Exercism - [IOG](#) - [my notes](#).

Skills

Machine Learning and Artificial Intelligence

- Fitting a model to experimental data via Loss function minimization, see [this repository](#).
- Reinforcement Learning, see [this repository](#).
- Proficient in utilizing LLM models like ChatGPT, Claude and GitHub Copilot as AI assistants to enhance code development. Skilled in crafting strategic prompts to maximize their effectiveness.

Programming Languages

- C, C#, C++, Python (University, Intermediate), Haskell (Self-taught, Intermediate), Java, Javascript, Typescript, Golang (Self-taught, Professional), Rust (Self-taught, Beginner).

Blockchain

- Cardano/Plutus, Foundry and KILT (Self-taught, Beginner), Ethereum/Solidity, Polygon and EVM networks, Hardhat, Ethers, Truffle + Ganache, Hyperledger Besu, Hyperledger Fabric, Quorum (Self-taught, Professional).

Zero-Knowledge Proofs, Cryptography and Privacy

- Circom, Gnark, Pedersen Commitments, Elliptic Curve Cryptography, Baby Jubjub Elliptic Curve (Self-taught, Professional).

Web Development

- Backend: Node.js, Express.js, Azure Functions (Self-taught, Professional).
- Frontend: React, CSS, HTML (Self-taught, Intermediate).

Software Miscellaneous

- Git, Jira, Postman API, REST APIs, Markdown, CERN's ROOT, Linux, Bash Scripting, Mathematica, LaTeX, Unity, MIT App Inventor (Self-taught, Professional).

Languages

- Portuguese (Native), English (Fluent), Spanish (Intermediate), Italian (Beginner), French (Beginner).