RAFAEL BELCHIOR

Researcher, Developer

[Personal Webpage - click me! 🌍](#)

EDUCATION

Massachusetts Institute of Technology (MIT), USA 🇺🇸   *April 2023 - August 2023*
Visiting Researcher, under a Fulbright Scholarship

Instituto Superior Técnico, Lisbon, Portugal 🇵🇹   *Sept 2014 - February 2024*
- Ph.D. candidate - Information Systems and Computer Engineering
Nominated for best Ph.D. thesis
- Invited Assitant Professor
- MSc in Information Systems and Computer Engineering (thesis)
- BSc in Information Systems and Computer Engineering

Warsaw University of Technology, Warsaw, Poland 🇵🇱   *Feb 2018 - July 2018*
MSc in Information Systems and Computer Engineering (Erasmus)

AWARDS

- **Fulbright Scholarship to research blockchain interoperability at MIT**

- **Ph.D. Scholarship (top 1% candidates)**

- **Hyperledger's Scholarship Program 2020**

RESEARCH INTERESTS, SKILLS & TOOLS

- **Research interests: Interoperability, Security, and Privacy of Distributed Systems**

- **Programming Languages: Typescript, Python, Rust 🦀, Go, see Github** 💻

- **Stack: Docker, Google Cloud, Gitlab/Github CI, Angular**

WORK EXPERIENCE

Blockdaemon 😈**, Remote**   **February 2022 – present**
Senior R&D Engineer

· **Fundraising ($72k+), training and managing a team working on several open-source projects (example, mentor profile).**
· **Co-creator and driver of SATP's protocol, consulting with the Central Bank of Korea on implementing the interoperability module.**
· **Proposed, led, researched, and implemented several projects in the context of security, privacy, and interoperability: Hyperledger Cacti, IETF's SATP working group, security by specification techniques for cross-chain models, and SNARK-based bridges.**
· **Developed several in-house innovation projects: DeFi API and bridge aggregator (Golang, Solidity), tools for data management, reporting and transaction auditing (Python), and interacting with blockchains (Rust, Typescript).**
· **Led academic efforts in the company by bridging academic experience with business needs, namely producing academic research, developing proofs-of-concept (see bellow), technical articles, produced outreach materials for PR. Maintained and developed collaborations with key partners in standardization, research, and development (examples: Hyperledger Foundation, MIT). Produced research published in reputable international venues.**

Quant Network, Remote   July 2021 − January 2022
R&D Engineer

· Created a modular, extensible Substrate Connector supporting Polkadot, Kusama, Rococco, and the dev chain, with a total of 39k LoC (Typescript, Rust).
· Created a CI pipeline, technical documentation, and automated operations
· Wrote an academic paper that was published in a top-tier blockchain journal, executed various research tasks.
· Contributed to the cryptography and security parts of a blockchain course with King's College London counting with 2,500+ students.
· Improved Quant's Overledger general data model and SDK.

Linux Foundation, Remote   June 2020 − November 2020
R&D Engineer

· In-depth mastering of Hyperledger Fabric blockchain: smart contracts, infrastructure, full-stack dApp. Blockchain course (distributed systems, security), and Fabric, 80+ students.

IGFEJ, Portuguese Minister for Justice, Portugal   Sep 2018 − April 2020
R&D Engineer

· Working alongside the Portuguese government to improve the status quo by leveraging blockchain technology for securing justice data. The solution provides an ontology to standardize and decentralize access control logs for critical tribunal systems.

Técnico Lisboa, Portugal   Sep 2018 − July 2021
Invited Assistant Professor

· Taught IT Infrastructure Management and Administration, Software Engineering, User-Centered Design, and Autonomous Agents and Multi-Agent Systems.

SELECTED PUBLICATIONS

Harmonia: Securing cross-chain applications using zero-knowledge proofs   2024
R. Belchior, D. Dimov, Z. Karadjov, J. Pfannschmidt, A. Vasconcelos, and M. Correia

· Submitted

A Brief History of Blockchain Interoperability   2024
R. Belchior, J. Süßenguth, Q. Feng, T. Hardjono, A. Vasconcelos, and M. Correia
· Communications of the ACM

Do You Need a Distributed Ledger Technology Interoperability Solution?   2022
R Belchior, L Riley, T Hardjono, A Vasconcelos, M Correia
· Distributed Ledger Technologies: Research and Practice (ACM DLT)

HERMES: Fault-Tolerant Middleware for Blockchain Interoperability   2021
R. Belchior, A.Vasconcelos, M.Correia, Thomas Hardjono
· Future Generation Computer Systems

ACADEMIC, EXTRACURRICULAR

- President at a computer science student's group from Técnico Lisboa, managing a team of 11. Fundraising (\$4000+).Organized programming competitions with a total of 140+ participants. Idealized, created and executed several projects, with a total of 500+users.

- Technical Writing: university course on blockchain, contributor at a [major Portuguese newspaper](#), I actively contributed to 5 out of 10 of the biggest Medium publications with my experience in Blockchain, Software Engineering, and Data Science. Written around 70 articles, with a total of 100k+ views.

- Technical short-term course Smart Cities: Turin, Italy (2020)

- Technical short-term course about Rehabilitation with Technology: Prague, Czech Republic (2019)

- Technical short-term course about Environmental Sustainability: Reykjavik, Iceland (2018)

- European Innovation Academy Team Leader / CTO (2017).

- Técnico MOOC on Digital Transformation (2017)

- Technical short-term course about 3D Printing: Barcelona, Spain (2017)

*updated Feb 2024