Gabriel Coutinho de Paula

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ABOUT ME

Programming languages, the infinite garden, and great storytelling. I research and build public-good technologies in Web3.

I'm a contributor in the Cartesi ecosystem, building core technologies and infrastructure. Currently, I'm building the Dave fraud proof system. It is based on two algorithms: permissionless refereed tournaments and the eponymous Dave algorithm, of which I'm a co-author. Check my Devcon 24 presentation on it. I write both on-chain components like smart contracts and off-chain components. The implementation can be found here.

I joined the project part-time in 2020, and full-time in 2021 after I defended my Master's thesis. My research was in programming languages, advised by professor Roberto Ierusalimschy.

EDUCATION

Computer Science, M.Sc.

Pontifical Catholic University of Rio de Janeiro (PUC-Rio) | 2019–2021

Research in Programming Language, advised by Professor Roberto Ierusalimschy; *A Foreign Function Interface for Pallene* (thesis and paper). Winner of *Best Non-Student Paper Award*.

Computer Engineering (B.Eng.)

Pontifical Catholic University of Rio de Janeiro (PUC-Rio) | 2012–2018

EXPERIENCE

Cartesi

Head of Research | January 2025 — present
Lead Blockchain Researcher & Engineer | October 2021 — December 2024
Software Engineer | June 2020 — September 2021 (part-time)

- Co-authored "Dave: a decentralized, secure, and lively fraud-proof algorithm”.
- Presented Dave algorithm at Devcon SEA 2024.
- Lead the development of rollup fraud-proof system (Dave), using the novel "Permissionless Refereed Tournaments” algorithm.
- Designed and developed smart contracts in Solidity, using *Foundry*.
- Prototyped Rust rollup node, using *ethers-rs* and *alloy*.
- Prototyped Lua rollup node and tooling in Lua.
- Designed aggregated transaction and data compression for rollup sequencer.
- Designed and developed key libraries and infrastructure in Solidity, Rust and Lua, including cryptographic primitives.
- Participated in podcasts and interviews like TheRollup and TheDefiant, presented at events like L2Days, EpicWeb3, and in debates like ProofIt.
- Actively participated in the vision and roadmap of the Cartesi.

Software Developer at GoBlock

Software Developer | January 2018 — June 2020

Apple Developer Academy PUC-Rio

Internship | October 2014 — December 2016

Undergraduate researcher

Laboratory for Advanced Collaboration (LAC) | June 2016 — September 2017
PUC-Rio, UFRJ, and LNCC | January 2013 — July 2015

AWARDS

SBLP *Best Non-Student Paper Award* winner

October 2022

Issued by Brazilian Symposium on Programming Languages (SBLP), paper called "A Foreign Function Interface for Pallene".

Apple *World Wide Developers Conference (WWDC)* scholarships

2020 (remote); 2018 (San Jose); 2017 (San Jose); 2016 (San Francisco)

SELECTED PUBLICATIONS

Dave: a decentralized, secure, and lively fraud-proof algorithm

arXiv | November 2024

A Foreign Function Interface for Pallene

Brazilian Symposium on Programming Languages (SBLP) | November 2024

Chiral Chlorohydrins from the Biocatalyzed Reduction of Chloroketones: Chiral Building Blocks for Antiretroviral Drugs

ChemCatChem | February 2015

SELECTED WRITINGS

- Scaling Content: How to truly tackle blockchain's scalability problem
- Fraud Proofs Are Broken, but we can fix them

LINKS

- GitHub: https://github.com/GCdePaula/
- Warpcast: https://warpcast.com/gcdepaula
- Twitter: https://x.com/GCdePaula_
- Linkedin: www.linkedin.com/in/gcdepaula