Waylon Jepsen

Staff Rust Engineer. waylonjepsen1@gmail.com

Experience

Staff Applied Cryptography Rust Engineer, Pluto Labs Inc, May 2024 - Current

- Implemented post-quantum cryptographic primitives in rust
- Built the fastest client side proving backend in rust in record time.
- Addressed companies performance needs by discovering circuit constraint optimizations in NIST cryptographic TLS candidates
- Optimized compile pipelines across wasm circom and rust

Principal Research Engineer(Rust), Primitive Bits, April 2022 - May 2024.

- Perform research and development of decentralized financial instruments in the EVM. Particularly dynamic automated market makers.
- Participated in discussion and implementation details of EIPs
- Built Agent Based Simulation modeling tools in Rust: Arbiter
- Contributed the Reth, Revm, and ethers-rs
- Wrote technical educational content on rebalancing, arbitrage and constant function market makers.
- Developed and maintained security and analysis tools for the EVM in rust used by the greater community.

Ethereum Foundation, Grant Recipient, Part time, December 2023

- Received a grant to perform cryptanalysis of Poseidon algebraic hash function.

Optimism, Developer Advisory Board, Part time, November 2023 - Season 1

- Served on a technical board of advisors for optimism governance to ensure the technical quality of projects receiving funding from the optimism foundation.

Aztec, Contractor, Part time, July 2022

- Wrote Zero-knowledge proving infrastructure in Rust

Researcher, Network Engineering, Colorado State University, May 2021 - May 2022.

- Investigated the tropical algebraic semirings.
- Modeled TCP Congestion with Tropical Algebra.
- Built discrete event simulators to validate the model.

Developer Relations, Hedera Hashgraph, July 2021 - April 2022.

- Produced written and recorded content to educate software engineers on how to use our software development kits.
- Led workshops to teach software engineers how to write and deploy their smart contracts to the Hedera network (Besu EVM).
- Worked on open cryptography problems concerning threshold cryptography and Shamir's Secret Sharing.

Systems Administrator, Colorado State University Aug 2020 - Dec 2021.

- Assisted the systems team with the administration of more than than 500 Linux workstations.
- Built automation scripts, recorded offline backups, and managed security upgrades.
- Performed database management using MariaDB, PostgreSQL, and MongoDB.

Cyber Security Analyst, Academic Computing and Networking services Jan 2017 - 2018.

- Performed research and development of distributed ledger technology to improve the security of our University networks.
- Presented on identity authentication and phishing attacks.
- Created voting security software using distributed ledger technology.

Education

Aug. 2022 - (Dropped Out)

Colorado State University
Computer Science Ph.D. Program

Thesis Topic: Economic activity in distributed ledgers.

Jan 2020 - May 2022

Colorado State University
Master of Science M.S

Thesis Topic: Tropical Algebraic Modeling of TCP Congestion.

Aug. 2012 - May 2017

Colorado State University
Bachelor of Science in General Mathematics & Philosophy
Thesis Topic: Elliptic Curve Cryptography

Research

1. W. Jepsen, *Replicating Portfolios: Constructing Permissionless Derivatives*, preprint, 2022. Available at arXiv: 2205.09890.
2. W. Jepsen *Cyclic Redundancy Checks and Error Detection*, preprint, 2022. Available arxiv: 2205.11344

Talks

Analysis of Statistical Arbitrage in Blockchains. Database Security Group at Colorado State University, Oct 2022

Analysis of Constant Function Market Makers. DARPA Riser at Colorado State University, Sep 2022

Constant Function Market Makers. Database Security Group at Colorado State University, Aug 2022

Tropical Algebraic Analysis of TCP. Computer Science Seminar at Colorado State University, May 2022

Cyclic Redundancy Checks and Error Detection. Computer Science Seminar at Colorado State University, Aug 2021

The Lazarus Group: North Korea's Cyber War. Cyber Security Seminar at Colorado State University, May 2021

Epistemic Temporal Logic and Information flow Security. Cyber Security Seminar at Colorado State University, Jan 2021

HTTPS What it is and why it's Important. Cyber Security Seminar at Colorado State University, Aug 2019

The Mathematics of Elliptic Curve Cryptography. Cyber Security Seminar at Colorado State University, April 2019

Industry Involvement

Zuzalu Resident, explored the future of city states with other leaders in the industry

Crypto Economics Security Conference (CESC'22)

Zero-Knowledge Proof Workshop (affiliated with CESC22)

ACM Conference on Economics and Computation (EC'22)

Hacker Houses, Part time, September 2022 - 2024

- Raised over $250k in grants from Venture Capitalist
- Organized 6 hacker house series with over 2800 visitors in 3 continents
- Hosted 200 residential hackers who hacked 90 projects and raised more than $30M for their projects

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Teaching and Awards

CS 364: Computer Security, *Supervised College Teaching* Spring 2022
DARPA Riser *Research Award* Fall 2022

Masters Advisor

Name Craig Partridge
Department Colorado State Computer Science
Position Department Chair
Contact Craig.Partridge@colostate.edu

Doctoral Advisor

Name Amani Altarawneh
Department Colorado State Computer Science
Position Assistant Professor
Contact Amani.Altarawneh@colostate.edu