Waylon Jepsen

Rust Systems Engineer waylonjepsen1@gmail.com

Experience

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

- Implemented cryptographic primitives in Rust.
- Built the fastest client side proving backend.
- Addressed performance needs by discovering circuit constraint optimizations in NIST cryptographic TLS candidates resulting in a 5x performance increase.
- Optimized compile pipelines across WASM, Circom, and Rust, resulting in a 5x performance increase.

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

- Built agent-based simulation modeling tools in Rust.
- Contributed to the core Rust Ethereum core infrastructure (reth, revm, and ethers-rs).
- Developed and maintained security and analysis tools for the EVM in Rust used by the larger community.

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

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

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 500 Linux workstations.
- Built automation scripts, recorded offline backups, and managed security upgrades.
- Performed database management using MariaDB, PostgreSQL, and MongoDB.

Education

Jan 2020 - May 2022

Colorado State University
Master of Science, Computer 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 Constant Function Market Makers. DARPA Riser at Colorado State University, Sep 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

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

Industry Involvement

Crypto Economics Security Conference (CESC'22)

Zero-Knowledge Proof Workshop (affiliated with CESC22)

ACM Conference on Economics and Computation (EC'22) *Ethereum Foundation, Grant Recipient, Part time, December 2023*

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

Aztec, Contractor, Part time, July 2022

- Wrote Zero-knowledge proving infrastructure in Rust

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.

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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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