

# COLIN P. ROBERTS

Denver, CO



## X<sup>1</sup> Mathematics:

Mathematical Modeling, Data Analysis (incl. TDA), Computational Methods, PDEs, Dynamical Systems, Discrete Geometry, Pure Math, Algebra, Topology, Differential Geometry

## </> Software Engineering:

Architecture, Simulation, Parallel Computing, Async/Await, Concurrency, Rust, Python, Git, Linux

## 🔒 Cryptography & Security:

Zero-Knowledge Proofs (ZKPs), MPC, TEEs, Proving Systems, Elliptic Curves, Lattices, Codes

## 👤 Leadership & Communication:

Technical Leadership, Mentorship, Open Source Mgt., Cross-functional Collaboration, Technical Writing, Presentations

## OVERVIEW

Mathematician and physicist turned research engineer with expertise in modeling, simulation, cryptography, and distributed systems. My focus is on architecting innovative solutions for complex challenges and leading teams to impactful execution. I want to be challenged and to make a difference.

## EDUCATION

### Colorado State University

*Ph.D. Mathematics* **2022**  
*Focus: Geometric Inverse Problems*

*B.S. Mathematics & Physics* **2017**  
*Honors Program*

## HOBBIES

- 🚴 Mountain biker
- 🏃 Runner
- ♥ Health enthusiast
- </> OSS contributor and maintainer
- 🖨 Self hosting
- 🔌 Electronics hobbyist
- 📝 Technical writer

## WHAT SETS ME APART

A leader that is not afraid to speak up even when it's unpopular. This courage has led to high-impact decisions for product and engineering ushering a team to pivot into a new direction. Since I'm a teacher at heart, I'm able to communicate complex ideas simply, effectively, and pedagogically.

## EXPERIENCE

### Staff Research Engineer | Cryptography **2024 – 2025** *Pluto*

- Led cryptography R&D team of three to develop a memory-bound NIVC proving system [Web Prover](#) and [Edge](#) with Circom and Noir for fast proving on mobile devices and browsers
- Designed and implemented folding-based [Circom circuits](#) to enable extracting data from HTTPS transcripts
- Researched ZK, MPC, and TEEs for secure computation and which led to a team-wide decision to use TEEs for creating [Web Proofs](#)
- Managed [Ronkathon](#), an open-source cryptography repository with 15+ contributors, multiple bounty paying issues, and hackathon prizes

### Staff Research Engineer | DeFi & Simulations **2022 – 2024** *Primitive*

- Lead developer of [Arbiter](#); Open source Rust-based multi-agent simulation framework with 700+ stars, 30+ contributors
- Led simulations using [Arbiter](#) to study Primitive's various DeFi protocols; found vulnerabilities that other auditors missed
- Researched, designed, and built novel AMMs for DeFi on Ethereum such as [DFMM](#) and [RMM](#), both of which allow for dynamic liquidity allocation
- Contributed to [solstat](#) for onchain statistical function approximation
- Contributed to multiple open-source blockchain projects (e.g., [revm](#), [ethers-rs](#))

### NASA Intern | Plasmas & TDA **2021** *NASA Glenn Research Center*

- Developed geometric framework for Maxwell-Vlasov equation for deeper theoretical understanding of plasma physics
- Researched cellular sheaves and their applications to space networks to improve network design and resilience

### Research | Data Assimilation & Modeling **2019 - 2022** *AIM & MCRN*

- Collaborated to develop novel data assimilation software for high-dimensional nonlinear systems and presented at numerous conferences [\[Paper\]](#)
- Developed multiscale epidemic model incorporating real-world data which was used by [JBS Foods](#) in Greeley, CO for workplace safety planning

### Graduate Student | Research & Teaching **2017 – 2022** *Colorado State University*

- Attained new results on geometric inverse problems using Clifford analysis and Hodge theory [\[Paper\]](#) [\[Thesis\]](#)
- Taught seven different courses (including three courses that were self-coordinated) and developed open-source educational materials including a textbook: [Applied Mathematics for Physicists and Chemists](#)