

Luca Zanolini

Research Scientist · Distributed Systems, Consensus & Reliability

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lucazanolini.com | [DBLP](#) | [Google Scholar](#) | [GitHub](#)

PROFILE

I am a researcher working on the formal foundations of distributed systems: consensus, Byzantine fault tolerance, and the safety, liveness, and reliability of large-scale systems that must not fail. My work connects formal models and proofs with specifications and deployed protocols; consensus designs and security analyses I led or co-authored inform the roadmap of Ethereum. Trained as a mathematician, I moved through cryptography into distributed computing and ramp quickly into new technical domains; I am particularly interested in bringing this reliability and verification discipline to AI systems and infrastructure. PhD in Computer Science from the University of Bern; 20+ peer-reviewed publications, including at ACM CCS, PODC, and IEEE ICDCS.

EXPERIENCE

Research Scientist

2022-2026

Ethereum Foundation, Protocol Consensus

Seoul / Remote

- Led the formal security analysis of EIP-7732 (enshrined proposer-builder separation) end to end: scoped the program, set milestones, built open models and proofs, and delivered observable security guarantees under explicit adversarial and network assumptions to inform protocol decisions.
- Co-designed consensus protocols and confirmation rules (3-Slot Finality, fast confirmation, accountable liveness) and drove their translation from research papers into specifications and roadmap discussions, including analysis of interactions among concurrent upgrades (ePBS, FOCIL, PeerDAS).
- Prioritized research directions with protocol teams by making trade-offs explicit, relating safety, liveness, latency, accountability, and dynamic participation to design and roadmap decisions.
- Coordinated the EF Academic Grants Round as its main technical contact, working with institutions including Duke University, Stanford, a16z crypto, and IC3 across time zones; co-organized research workshops; mentored interns and graduate researchers; communicated results through research notes, blog posts, and talks worldwide.

Visiting Scholar

2025-2026

University of Cambridge, Department of Computer Science and Technology

Cambridge, UK

- Weekly small-group supervision for Concurrent and Distributed Systems; invited seminar and guest teaching on blockchain and Ethereum.

Research and Teaching Assistant

2019-2023

University of Bern, Cryptology and Data Security Group

Bern, Switzerland

- Developed theory and algorithms for asymmetric trust, Byzantine quorum systems, and consensus; organized PhD-group seminars and research collaborations; ran tutorials, exercises, and assessment for Cryptography and for Privacy and Data Security.

Research Intern

Summer 2021

Chainlink

Remote

- Built Go research prototypes and participated in distributed-systems and blockchain research seminars.

Ethereum Developer

2017-2019

Interlogica

Italy

- Designed and implemented Solidity smart contracts in production; earned the ConsenSys Ethereum Developer Certification.

EDUCATION

PhD in Computer Science, cum laude

2019-2023

University of Bern – Advisor: Prof. Christian Cachin

Bern, Switzerland

MSc in Mathematics, 110/110 cum laude

2015-2017

Catholic University of the Sacred Heart

Italy

BSc in Mathematics, 110/110

2012-2015

Catholic University of the Sacred Heart

Italy

RESEARCH IMPACT, TECHNOLOGY TRANSFER, AND OPEN SOURCE

- Formal security analysis of EIP-7732/ePBS: open models, proofs, and specification analysis for a major planned Ethereum upgrade.
- Concurrent and Distributed Systems in Rust (2026-): an independent open-source course-in-a-repository developing distributed-systems theory through working Rust implementations, from replicated key-value stores and Raft to Byzantine broadcast, with scripted failure demonstrations and exercises.
- 3-Slot Finality and fast confirmation rules: co-authored protocol designs and analyses shaping Ethereum’s consensus roadmap toward faster finality.
- Public research communication: Finality Is in the Eye of the Beholder (2025, with Vitalik Buterin and Ittai Abraham); Why Ethereum Needs a Dynamically Available Protocol (2025); Ethereum research notes on 3-Slot Finality, fast confirmation, and upgrade interactions (2023-2025).

SELECTED PUBLICATIONS

Seven of 20+ peer-reviewed papers; full list on DBLP and Google Scholar.

Accountable Liveness

Andrew Lewis-Pye, Joachim Neu, Tim Roughgarden, Luca Zanolini. ACM CCS 2025. doi

DAG-based Consensus with Asymmetric Trust

Ignacio Amores-Sesar, Christian Cachin, Juan Villacis, Luca Zanolini. ACM PODC 2025. doi

TOB-SVD: Total-Order Broadcast with Single-Vote Decisions in the Sleepy Model

Francesco D’Amato, Roberto Saltini, Thanh-Hai Tran, Luca Zanolini. IEEE ICDCS 2025. doi

Data Independent Order Policy Enforcement: Limitations and Solutions

Sarisht Wadhwa, Luca Zanolini, Aditya Asgaonkar, Francesco D’Amato, Chengrui Fang, Fan Zhang, Kartik Nayak. ACM CCS 2024. doi

Recent Latest Message Driven GHOST: Balancing Dynamic Availability With Asynchrony Resilience

Francesco D’Amato, Luca Zanolini. IEEE CSF 2024. doi

Asymmetric Distributed Trust

Orestis Alpos, Christian Cachin, Björn Tackmann, Luca Zanolini. Distributed Computing, 37(3):247-277, 2024. doi

A Simple Single Slot Finality Protocol for Ethereum

Francesco D’Amato, Luca Zanolini. CBT at ESORICS 2023. doi

SELECTED TALKS

What Does ePBS Actually Guarantee?

KAIST School of Computing - Invited research seminar

Aug 2026

Daejeon, Korea

The Whys Behind Ethereum’s Consensus Design

BUIDL Asia 2026

Apr 2026

Seoul, Korea

What Comes Next for Institutions on Ethereum

Ethereum Korea One - Closing talk

Apr 2026

Seoul, Korea

Towards a Faster Finality Protocol for Ethereum

PaPoC 2025 - Keynote

Mar 2025

Rotterdam, Netherlands

A Fast Confirmation Rule for the Ethereum Consensus Protocol

Devcon

2024

Bangkok, Thailand

The Ethereum Consensus Protocol

Yale University - Invited talk

2023

New Haven, USA

Recent Latest Message Driven GHOST

a16z Crypto Research Summer School

2023

New York, USA

MENTORING AND COMMUNITY

- Supervised and mentored Ethereum Foundation research interns and an industrial PhD intern; mentored master’s students; provided weekly small-group supervision of University of Cambridge students in Concurrent and Distributed Systems (2025).
- Organized PhD-group research seminars at the University of Bern; co-organized Ethereum Foundation research workshops and cross-institutional protocol discussions.
- Regularly review technical manuscripts, protocol specifications, and research artifacts in distributed systems, cryptography, and blockchain security.

ACADEMIC SERVICE

Program committees and reviewing: DISC (2022, 2025); OPODIS (2024, 2025); PaPoC (2025); Science of Blockchain Conference (2026); IEEE SRDS (2026); Financial Cryptography (2026); Asiacrypt (2020); Distributed Computing (2021).

SKILLS

Distributed algorithms and consensus | Byzantine fault tolerance | Safety, liveness, and reliability | Formal protocol and specification analysis | Concurrency | Cryptography | Go | Rust | Solidity | AI-assisted development workflows (Claude Code, OpenAI Codex) | Dev containers | GitHub | LaTeX | Cross-team collaboration across geographies and time zones.