Lioba Heimbach

PHD STUDENT · ETH ZURICH

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Education

Ph.D. Student

ETH ZURICH

Zurich, Switzerland
Feb 2021 - exp. May 2025

- Supervised by Roger Wattenhofer at the Distributed Computing Group.
- Teaching role includes supervision of student projects, (head) teaching assistant in lectures offered by our group, and conducting, writing, and grading of exams.
- Scientific staff representative in the department and member of a student panel for a faculty hiring committee.

M.Sc. in Electrical Engineering and Information Technology

ETH ZURICH

Zurich, Switzerland
Sep 2018 - Sep 2020

- Graduated with honors and awarded an ETH medal for exceptional M.Sc. thesis.
- Exchange semester at the Chinese University of Hong Kong.
- Organization of Electrical Engineering for ETH Students (EE4ETH). EE4ETH is a student-initiated and led project to produce short video tutorials explaining the core concepts of mandatory courses in the Bachelor program.
- President of the department's university politics team, student representative, and member of a faculty hiring committee.

B.Sc. in Electrical Engineering and Information Technology

ETH ZURICH

Zurich, Switzerland
Sep 2015 - Jan 2020

- Student representative in the department.

Professional Experience

Research Consultant

COMMON PREFIX (CP)

Zurich, Switzerland
November 2024 - present

- Writing statement of work proposals for prospective clients.
- Guiding blockchain projects in developing protocols through targeted research support.

Research Intern

ANDREESSEN HOROWITZ CAPITAL MANAGEMENT (A16Z)

New York City, United States
May 2024 - August 2024

- Ph.D. summer research internship program in the crypto research team.
- Worked on transaction fee mechanisms and empirical measurements.

Senior Associate

BANK FOR INTERNATIONAL SETTLEMENTS

Basel, Switzerland
Feb 2023 - May 2023

- PhD Fellowship Programme at Monetary and Economic Department.
- Worked on measuring and determining the drivers of leverage in decentralized finance.

Teaching Assistant

ETH ZURICH

Zurich, Switzerland
Sep 2017 - Jun 2019

- Taught first- and second-year electrical engineering students in mathematics courses: Linear Algebra, Numerical Methods, and Discrete Mathematics.

Publications

PEER-REVIEWED CONFERENCE AND WORKSHOP PAPERS

SoK: Attacks on DAOs
Rainer Feichtinger*, Robin Fritsch*, Lioba Heimbach*, Yann Vonlanthen* and Roger Wattenhofer
In Sixth International Conference on Advances in Financial Technologies (AFT), September 2024
Non-archival: 4th Workshop on Decentralized Finance (DeFi), March 2024.
Non-archival: The Latest in DeFi Research (TLDR) Conference, May 2024.
Non-archival: European DAO Workshop (DAWO) 2024, July 2024.

Non-Atomic Arbitrage in Decentralized Finance
Lioba Heimbach, Vabuk Pahari and Eric Schertenleib
In IEEE Symposium on Security and Privacy (SP) 2024, May 2024
Non-archival: 4th Workshop on Decentralized Finance (DeFi), March 2024.

Dissecting the EIP-2930 Optional Access Lists
Lioba Heimbach*, Quentin Kniep*, Yann Vonlanthen*, Roger Wattenhofer* and Patrick Züst*
In Financial Cryptography and Data Security (FC), Willemstad, Curaçao, Mar 2024

Ethereum Proof-of-Stake Consensus Layer: Participation and Decentralization
Dominic Grandjean*, Lioba Heimbach* and Roger Wattenhofer
In 5th Workshop on Coordination of Decentralized Finance 2024, Mar 2024

A Fair and Resilient Decentralized Clock Network for Transaction Ordering
Andrei Constantinescu*, Diana Ghinea*, Lioba Heimbach*, Zilin Wang* and Roger Wattenhofer
In 27th International Conference on Principles of Distributed Systems (OPODIS), Tokyo, Japan, December 2023.

Ethereum's Proposer-Builder Separation: Promises and Realities
Lioba Heimbach, Lucianna Kiffer, Christof Ferreira Torres and Roger Wattenhofer
In 2023 ACM Internet Measurement Conference (IMC), Montreal, QC, Canada, October 2023.

DeFi Lending During The Merge
Lioba Heimbach*, Eric Schertenleib* and Roger Wattenhofer
In 5th Conference on Advances in Financial Technologies (AFT), Princeton, NJ, USA, October 2023.

Base Fee Manipulation In Ethereum's EIP-1559 Transaction Fee Mechanism
Sarah Azouvi*, Guy Goren*, Lioba Heimbach* and Alexander Hicks*
In 37th International Symposium on Distributed Computing (DISC), L'Aquila, Italy, October 2023.

FnF-BFT: A BFT Protocol with Provable Performance Under Attack
Zeta Avarikioti*, Lioba Heimbach*, Roland Schmid*, Laurent Vanbever*, Roger Wattenhofer* and Patrick Wintermeyer*
In 30th International Colloquium on Structural Information and Communication Complexity (SIROCCO), Alcala de Henares, Spain, June 2023.

Short Squeeze in DeFi Lending Market: Decentralization in Jeopardy?
Lioba Heimbach*, Eric Schertenleib* and Roger Wattenhofer
In 3rd Workshop on Decentralized Finance (DeFi), Bol, Brač, Croatia, May 2023.

DeFi and NFTs Hinder Blockchain Scalability
Lioba Heimbach*, Quentin Kniep*, Yann Vonlanthen* and Roger Wattenhofer
In 27th Financial Cryptography and Data Security (FC), Bol, Brač, Croatia, May 2023.

Exploring Price Accuracy on Uniswap V3 in Times of Distress
Lioba Heimbach*, Eric Schertenleib* and Roger Wattenhofer
In 2nd ACM Workshop on Decentralized Finance and Security (DeFi), Los Angeles, California, USA, November 2022.

Risks and Returns of Uniswap V3 Liquidity Providers
Lioba Heimbach*, Eric Schertenleib* and Roger Wattenhofer
In 4th ACM Conference on Advances in Financial Technologies (AFT), Cambridge, Massachusetts, USA, September 2022.

SoK: Preventing Transaction Reordering Manipulations in Decentralized Finance
Lioba Heimbach and Roger Wattenhofer
In 4th ACM Conference on Advances in Financial Technologies (AFT), Cambridge, Massachusetts, USA, September 2022.
Non-archival: SNB-CIF Conference on Cryptoassets and Financial Innovation, May 2023.

Eliminating Sandwich Attacks with the Help of Game Theory
Lioba Heimbach and Roger Wattenhofer
In ACM Asia Conference on Computer and Communications Security (ASIA CCS), Nagasaki, Japan, June 2022.

An Empirical Study of Market Inefficiencies in Uniswap and SushiSwap
Jan Arvid Berg*, Robin Fritsch*, Lioba Heimbach* and Roger Wattenhofer
In 2nd Workshop on Decentralized Finance (DeFi), Grenada, May 2022.

Behavior of Liquidity Providers in Decentralized Exchanges
Lioba Heimbach, Ye Wang and Roger Wattenhofer
In 2021 Crypto Valley Conference on Blockchain Technology (CVCBT), Rotkreuz, Switzerland, October 2021.

Ride the Lightning: The Game Theory of Payment Channels
Zeta Avarikioti*, Lioba Heimbach*, Yuyi Wang* and Roger Wattenhofer
In 24th Financial Cryptography and Data Security (FC), Kota Kinabalu, Sabah, Malaysia, February 2020.

PEER-REVIEWED JOURNAL PAPERS

PIBES - A Competing-Flow-Aware Protocol for Real-Time Video Applications
Lioba Heimbach, Lingfeng Guo, Rudolf KH Ngan and Jack YB Lee
In IEEE Open Journal of the Communications Society, August 2020.

PRE-PRINTS

Deanonymizing Ethereum Validators: The P2P Network Has a Privacy Issue
Lioba Heimbach*, Yann Vonlanthen*, Juan Villacis, and Lucianna Kiffer, Roger Wattenhofer
Awarded a bug bounty by the Ethereum Foundation.

The Potential of Self-Regulation for Front-Running Prevention on Decentralized Exchanges
Lioba Heimbach*, Eric Schertenleib* and Roger Wattenhofer
Non-archival: 22nd Workshop on the Economics of Information Security (WEIS'23), July 2023, awarded best talk award.
Non-archival: 4th Workshop on Decentralized Finance (DeFi), March 2024.

On the Lifecycle of a Lightning Network Payment Channel
Florian Grötschla*, Lioba Heimbach*, Severin Richner* and Roger Wattenhofer
Non-archival: Workshop on Scalability & Interoperability of Blockchains (SIB) @ AFT 24, October 2024.

DeFi Leverage
Lioba Heimbach* and Wenqian Huang*
Non-archival: SNB-CIF Conference on Cryptoassets and Financial Innovation, May 2024.

* listed alphabetically

Teaching Experience

2021 - present	**Computational Thinking**, Head Teaching Assistant
2024	**Decentralized Finance and the Future of Money**, Guest Lecturer
2021 - 2023	**Distributed Systems**, Teaching Assistant
2021 - 2022	**Principles of Distributed Computing**, Teaching Assistant
2018 - 2019	**Numerical Methods**, Teaching Assistant
2018	**Discrete Mathematics**, Teaching Assistant
2017	**Linear Algebra**, Teaching Assistant

Mentoring

During my Ph.D. studies, I had the privilege to (co-)supervise over 25 student projects (Bachelor's, semester, and Master's theses). Some of these have led to peer-reviewed publications. I keep a full list of projects supervised on my website.

Awards, Fellowships, & Grants

2024	**Research Grant**, Robust Incentives Group at Ethereum Foundation	*30,000 US$*
	Research Grant, Ethereum Foundation	*30,000 US$*
	Academic Research Award, Sui	*25,000 US$*
	Bug Bounty, Ethereum Foundation	
2023	**Best Talk Award**, 22nd Workshop on the Economics of Information Security (WEIS)	
	Research Grant, Institute for Quantitative Research Europe (Inquire Europe)	*10,000 €*
2022	**ETH Medal for Exceptional M.Sc. Thesis**, ETH Zurich	
2019	**Mobility Scholarship**, ETH Zurich	
	The Rector's Impulse Fund, ETH Zurich	*24,600 CHF*

Professional Services

2025   **Program Committee Member**: FC, CAAW@FC
       External Reviewer: STOC
2024   **Program Committee Member**: AFT, CAAW@WWW, DeFi@CCS, SIB@AFT
2023   **Program Committee Member**: DeFi@CCS
       External Reviewer: DISC, PODC
2022   **External Reviewer**: FC, AFT, WWW, OSDI, MobiCom
       Invited Reviewer: IEEE/ACM Transactions on Networking
2021   **External Reviewer**: FC, AFT, WWW