

RESEARCH SCIENTIST · MPI-SWS

# Dr. Johnnatan Messias

*Blockchain Fairness · DeFi · DAO Governance · Prediction Markets*

**2,000+**

Citations

**30+**

Publications

**7+**

Program Committees



Max Planck Institute for Software Systems · Kaiserslautern, Germany



## Research Scientist at MPI-SWS

I am a Research Scientist at the **Max Planck Institute for Software Systems (MPI-SWS)** in Kaiserslautern, Germany, and a former Research Scientist at **Matter Labs (ZKsync)** and Research Intern at **Chainlink Labs**.

My research advances **fairness in blockchain technology and Decentralized Finance** from transaction ordering transparency to DAO governance power concentration.

**Ph.D. in Computer Science (Magna Cum Laude)** from MPI-SWS & Universität des Saarlandes.

2018–2024

**Ph.D. CS · Magna Cum Laude**

MPI-SWS & Uds, Germany

2015–2017

**M.Sc. Computer Science**

UFMG, Brazil

2009–2015

**B.Sc. Computer Science**

UFOP, Brazil

## RESEARCH AREAS



### Blockchain Fairness

Auditing Bitcoin & Ethereum for biased transaction ordering, miner collusion, and opacity in priority rules.



### DeFi & MEV

Cross-rollup arbitrage, liquid staking, airdrop economics, and maximal extractable value across L2 ecosystems.



### DAO & Governance

Power concentration in decentralized autonomous organizations, token delegation, staking, and voting transparency.



### ZK-Rollup Performance

Stochastic Petri Net models to evaluate throughput, latency, and cost trade-offs in ZKsync and other L2 networks.



### Prediction Markets

Prediction markets as societal signals, studying collective beliefs and their implications for society at scale.



### Social Computing

Misinformation on WhatsApp, algorithmic bias in Twitter, and demographic inequalities in social media systems.

## SELECTED PUBLICATIONS

Blockchain

ACM IMC · 2021

### Selfish & Opaque Transaction Ordering in Bitcoin

Statistically significant evidence of mining pools deviating from fee norms  
→ implications for chain neutrality.

DeFi-MEV

Financial Cryptography and Data Security (FC) · 2023

### Dissecting Bitcoin & Ethereum Transactions

Private relay transactions facilitate miner collusion and user overcharging  
→ critical for blockchain stability.

★ Best Paper

MARBLE · 2024

### Liquid Staking Tokens in Automated Market Makers

While trading fees offset impermanent loss, full staking is more profitable  
→ questions about LST sustainability.

DeFi

Preprint · 2025

### Airdrops: Giving Money Away Is Harder Than It Seems

Up to 66% of tokens rapidly sold post-claim; actionable guidelines for more effective airdrop designs.

DAO

Preprint · 2025

### Fairness in Token Delegation in DAOs

Delegation misalignment with token holders' priorities; ranking interfaces exacerbate power concentration.

MEV

FC-CAAW · 2026

### Cross-Rollup MEV: Non-Atomic Arbitrage on Layer-2

500K+ untapped arbitrage opportunities on Arbitrum, Base, Optimism, and ZKsync  
new MEV strategies needed.

## SELECTED PUBLICATIONS

MEV

*Preprint · 2025*

### The Express Lane to Spam and Centralization

First large-scale study of Arbitrum Timeboost: 11.5M+ express-lane txs and 151K auctions; two entities win 90%+ of auctions and ~22% of txs revert.

DAO

*Preprint · 2025*

### Understanding Blockchain Governance

Empirical study of Compound and Uniswap: 370+ proposals; as few as 3–5 voters can sway majorities; voting costs burden smaller holders.

Social Comp.

*The Web Conference · 2019*

### (Mis)Information Dissemination in WhatsApp

Large-scale analysis of misinformation in public political WhatsApp groups during Brazil's 2018 elections; identifies fake-image sources and propagation patterns.

Social Comp.

*ACM FAccT · 2019*

### On Microtargeting Socially Divisive Ads

Case study of Russia-linked Facebook ads showing how ad infrastructures enable efficient targeting of divisive political content at vulnerable sub-populations.

Social Comp.

*ACM CSCW · 2017*

### Quantifying Search Bias

Introduces a framework to distinguish input-data bias from ranking-system bias in Twitter political search; both sources shape ranked outputs.

Social Comp.

*ICWSM · 2019*

### WhatsApp Monitor

Fact-checking system for WhatsApp public groups in Brazil and India; used to monitor highly shared content during the 2018 Brazilian general election.

## RESEARCH IMPACT

**2,000+**

**Total Citations**

Google Scholar

**30+**

**Publications**

Intl. Venues

**7+**

**Program Committees**

FC, WWW, AFT, CAAW

**★ Magna**

**Ph.D. Distinction**

Cum Laude

## PUBLISHED AT TOP VENUES

ACM IMC

Financial Cryptography (FC)

ACM WWW

ACM FAccT

ACM CSCW

IEEE SysCon

MARBLE

CAAW

SOUPS

ICWSM

## KEY RESEARCH FINDINGS

90%+

### of Timeboost auction wins

controlled by just 2 entities — Arbitrum's Timeboost fails on fairness and decentralization.

3–5

### voters sufficient

to sway the majority of DeFi governance proposals in Compound and Uniswap.

66%

### of airdrop tokens

sold immediately after claim in recipients' first post-claim transaction — airdrop farming is rampant.

90%

### of inscriptions

on ZKsync Era were meme coin mints — inscriptions accounted for ~90% of Arbitrum transactions on peak days.

+20%

### throughput gain

from increased L2 adoption, but latency can rise >100% with larger ZK-Rollup batches.

500K+

### arbitrage opportunities

identified across Arbitrum, Base, Optimism, and ZKsync — cross-rollup MEV is economically significant.

## TALKS & COMMUNITY

### Selected Talks

**2026** Prediction Markets as Societal Signals

RPTU Kaiserslautern

**2025** Fairness in Token Delegation in DAOs

TUM Blockchain Salon

**2025** Airdrops: Giving Money Away Is Harder

TUM Blockchain Conf.

**2025** Inscriptions & EVM Blockchains

Ethereum Zürich

**2024** Understanding Blockchain Governance

New York City

**2021** Selfish & Opaque Transaction Ordering

ACM IMC (Virtual)

### Academic Service

**Program Committee**

FC '25/'26 · WWW '24/'26 · AFT '24/'25 · CAAW '25/'26

**Guest Editor**

ACM Transactions on the Web — Special Issue on Decentralized Web

**Guest Editor**

Springer Discover Networks — Emerging Technologies in Social Networks

**Teaching**

Seminar on Blockchains & DeFi, UdS (Busy Beaver Nominee); Guest lectures at RPTU & UFPI

## AWARDS & RECOGNITION



2026

### IC3 Winter Retreat 2026

Selected participant — Engelberg, Switzerland



2025

### Alexander von Humboldt Foundation

Invited to represent Germany at BRAGFOST Symposium (Brazil–Germany) in Mannheim, Germany



2025

### IC3 Winter Retreat 2025

Selected participant — Engelberg, Switzerland



2024

### Best Paper Award · MARBLE 2024

Liquid Staking Tokens in Automated Market Makers



2024

### Magna Cum Laude Ph.D.

High distinction — MPI-SWS & Universität des Saarlandes, Germany



2024

### Alexander von Humboldt Foundation

Invited to represent Germany at INDOGFOE Symposium (India–Germany) in Mumbai, India



### IC3 Winter Retreat 2024

Selected participant — Les Diablerets, Switzerland



### Busy Beaver Award Nominee

Outstanding lectures — Seminar on Blockchains & DeFi, Saarland University



### CISPA Summer School

Trustworthy AI — one of ~100 students selected worldwide

## CURRENT WORK & VISION

### Active Research Lines

#### Cross-Rollup MEV & Timeboost

Empirical study of Arbitrum's Timeboost; non-atomic arbitrage economics across Ethereum L2s.

#### DAO Governance Fairness

Token delegation misalignment, centralization mechanisms, and novel fair-delegation frameworks.

#### ZK-Rollup Performance Modeling

Stochastic Petri Net models for ZKsync and other rollup systems — cost, throughput, latency.

#### Prediction Markets as Signals

Collective beliefs from prediction markets as societal and political signals beyond calibration.

### Research Vision

*Building a fairer, more transparent blockchain ecosystem — where transaction ordering is neutral, governance power is equitably distributed, and DeFi protocols serve broad communities rather than privileged insiders.*

#### Measurement

Large-scale empirical studies on real blockchain data

#### Modeling

Formal & stochastic models to capture system trade-offs

#### Fairness

Principled definitions of fair ordering and governance

#### Policy Impact

Evidence-based recommendations for protocol designers

# Let's Connect & Collaborate

I am always happy to discuss research, collaborations,  
or new ideas in blockchain fairness and DeFi.



[johnme@mpi-sws.org](mailto:johnme@mpi-sws.org)



[johnnatan-messias.github.io](https://johnnatan-messias.github.io)



[linkedin.com/in/johnnatan-messias](https://linkedin.com/in/johnnatan-messias)



[@johnnatan\\_me](https://twitter.com/johnnatan_me)



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