Dr. Johnnatan Messias P. Afonso

Research Scientist — Blockchain & Decentralized Governance

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Summary

Research Scientist at the Max Planck Institute for Software Systems (MPI-SWS), with prior research experience at Matter Labs (ZKsync Era) and Chainlink Labs. I hold a Ph.D. in Computer Science (Magna Cum Laude) from Saarland University and MPI-SWS. My research focuses on blockchain technologies, decentralized finance (DeFi), DAO governance for decentralized applications. I am recognized for award-winning research, strong industry collaborations, and leadership in cross-functional projects.

Professional Experience

Nov 2024 – Present **Research Scientist**, *Max Planck Institute for Software Systems (MPI-SWS)*, Saarbrücken, Germany

Lead blockchain research projects focusing on governance fairness, delegation mechanisms, and decentralized finance.

- Designed methodologies for evaluating decentralization in governance protocols.
- Delivered invited talks at FC, TU Munich, Ethereum Zurich, and more.
- Served as a Program Committee (PC) member for FC 2026 and AFT 2025.

Sep 2023 – Oct 2024 **Research Scientist**, *Matter Labs*, Remote/Germany

Led projects on Sybil resistance, DAO governance, airdrop design, and blockchain data analysis for Ethereum and L2 blockchains.

- Developed fair airdrop mechanisms and resistance strategies against Sybil attacks.
- Collaborated with cross-functional teams.
- Served as a PC member for FC 2025, AFT 2024, and ACM WWW 2024.

Feb 2022 – Aug 2022 **Research Intern**, *Chainlink Labs*, Remote

Improved quality of Chainlink Price Feeds using time series analysis and econometrics.

- Designed feed quality scoring models.
- Built reference price indexing systems to improve reliability.

Mar 2020 – Jan 2021 **AI and Scientific Advisor**, *AI Robots*, Remote/Germany

Worked voluntarily as a scientific advisor and team leader to help them scale their robotic AI solutions and train their software engineering team. This company is a young Brazilian startup approved in the 2020 Microsoft Program (We Ventures Fund).

Jun 2017 – Jul 2018 **Data Scientist and Full Stack Software Engineer**, *Kunumi*, Belo Horizonte, Brazil

Built and deployed an automation system for medical appointment requests using AI to address compliance with each patient's insurance plan and medical conditions.

- Awarded Brazil's most innovative health software in 2019 according to IT Forum 365, promoted by PwC and ITMidia.

Education

2018 – 2024 **Ph.D. in Computer Science**, *Saarland University & MPI-SWS*, Germany, *Magna Cum Laude*

Advisor: Prof. Dr. Krishna P. Gummadi. Research: Fairness in blockchain governance and decentralized finance.

- Thesis: On Fairness Concerns in the Blockchain Ecosystem

2015 – 2017 **M.Sc. in Computer Science**, *Universidade Federal de Minas Gerais*, Brazil

Advisor: Prof. Dr. Fabrício Benevenuto. Two research internships at MPI-SWS, Saarbrücken, Germany.

- Thesis: Characterizing Interconnections And Linguistic Patterns In Twitter

2009 – 2014 **B.Sc. in Computer Science**, *Universidade Federal de Ouro Preto*, Brazil
Exchange program at Eötvös Loránd University, Budapest, Hungary (2013–2014) via Science Without Borders.
- Thesis: Framework para Sistemas de Navegação de Veículos Aéreos não Tripulados

Skills

Research Areas	Blockchain, DAO Governance, DeFi, Mechanism Design, Machine Learning, Data Science.
Technical	Python, Solidity, SQL, Time Series Analysis, Data Visualization.
Soft Skills	Scientific and non-scientific presentations, ownership, teaching, leadership, and self-management.
Languages	English (Fluent), Portuguese (Native), German (Basic).

Awards & Honors

2025 Selected Participant — Brazilian-German Frontiers of Science and Technology (BRAGFOST) Symposium, 2025.

2024 Selected Participant — Indo-German Frontiers of Engineering (INDOGFOE) Symposium, 2024.

2024 Best Paper Award — MARBLE 2024 for "Liquid Staking Tokens in Automated Market Makers"

2024 Magna Cum Laude distinction — Ph.D. in Computer Science

2023 "Busy Beaver" teaching award nomination for Seminar on Blockchains and DeFi seminar — Saarland University

2022 Selected Participant — CISPA Summer School on Trustworthy Artificial Intelligence: Part of the approx. 100 students selected worldwide.

2019 Stipend Award — Swiss Blockchain Winter School: Received a stipend award provided to selected students to participate in the event.

2019 Brazil's Most Innovative Health Software — IT Forum 365, promoted by PwC and ITMidia.

2015 M.Sc. Research grant — Grant by the Brazilian National Council for Scientific and Technological Development (CNPq) and by the Coordination for the Improvement of Higher Education Personnel CAPES)

2013 Scholarship award — Granted a scholarship for academic excellence to study in a European university for 14 months.

2013 B.Sc. Research grant — Grant by the Brazilian National Council for Scientific and Technological Development (CNPq).

Publications

My work has been published at top venues in Computer Science, including FC, IMC, WWW, ICWSM, and CSCW. Some of my scientific efforts have also been covered by the news media and specialized blogs, including The New York Times, The Huffington Post, MIT Tech Review, BBC Brasil, and Folha de São Paulo.
My publications reached a Google Scholar h-index of 16 with an i-10 index of 20. For a complete list of publications, kindly check my Google Scholar or DBLP profile.

1. M. Inês Silva, **J. Messias**, B. Livshits. *A public dataset for the ZKsync rollup*. In *Proceedings of the Financial Cryptography and Data Security: 4th International Workshop on Cryptoasset Analytics (CAAW)*, 2025.
2. **J. Messias**, K. Gogol, M. I. Silva, B. Livshits. *The writing is on the wall: Analyzing the boom of inscriptions and its impact on EVM-compatible blockchains*. In *Proceedings of the Financial Cryptography and Data Security: 4th International Workshop on Cryptoasset Analytics (CAAW)*, 2025.
3. K. Gogol, R. Fritsch, M. Schlosser, **J. Messias**, B. Kraner, C. Tessone. *Liquid staking tokens in automated market makers*. In *Mathematical Research for Blockchain Economy (MARBLE)*, 2024. **Best Paper Award**.
4. K. Gogol, **J. Messias**, D. Miori, C. Tessone, B. Livshits. *Quantifying arbitrage in automated market makers: An empirical study of Ethereum zk rollups*. In *Mathematical Research for Blockchain Economy (MARBLE)*,

2024.

5. K. Gogol, **J. Messias**, D. Miori, C. Tessone, B. Livshits. *Layer-2 arbitrage: An empirical analysis of swap dynamics and price disparities on rollups*, 2024.
6. J.J. Omena, **J. Messias**, A. Cossu, F. Gouveia, A. Falcão, R. Ventura, A. Benedetti, M. Huang, L. Ye. *Digital methods for blockchain research*, 2024.
7. **J. Messias**, V. Pahari, B. Chandrasekaran, K. P. Gummadi, P. Loiseau. *Dissecting Bitcoin and Ethereum transactions: On the lack of transaction contention and prioritization transparency in blockchains*. In *Financial Cryptography and Data Security (FC'23)*, 2023.
8. **J. Messias**, V. Pahari, B. Chandrasekaran, K. P. Gummadi, P. Loiseau. *Understanding blockchain governance: Analyzing decentralized voting to amend DeFi smart contracts*. arXiv:2305.17655, 2023.
9. **J. Messias**, A. Yaish, B. Livshits. *Airdrops: Giving money away is harder than it seems*. arXiv:2312.02752, 2023.
10. **J. Messias**, M. Alzayat, B. Chandrasekaran, K. P. Gummadi, P. Loiseau, A. Mislove. *Selfish & opaque transaction ordering in the Bitcoin blockchain: The case for chain neutrality*. In *Internet Measurement Conference (IMC'21)*, 2021.
11. **J. Messias**, M. Alzayat, B. Chandrasekaran, K. P. Gummadi. *On blockchain commit times: An analysis of how miners choose Bitcoin transactions*. In *KDD Workshop on Smart Data for Blockchain and Distributed Ledger (SDBD)*, 2020.
12. G. Resende, P. Melo, H. Sousa, **J. Messias**, M. Vasconcelos, J. Almeida, F. Benevenuto. *(Mis)information dissemination in WhatsApp: Gathering, analyzing, and countermeasures*. In *World Wide Web Conference (WWW'19)*, 2019.
13. P. Melo, **J. Messias**, G. Resende, K. Garimella, J. Almeida, F. Benevenuto. *WhatsApp monitor: A fact-checking system for WhatsApp*. In *AAAI Conference on Web and Social Media (ICWSM'19)*, 2019.
14. J. Kulshrestha, M. Eslami, **J. Messias**, M. B. Zafar, S. Ghosh, K. P. Gummadi, K. Karahalios. *Search bias quantification: Investigating political bias in social media and web search*. *Information Retrieval Journal*, 22(1), 2019.
15. J. Kulshrestha, M. Eslami, **J. Messias**, M. B. Zafar, S. Ghosh, K. P. Gummadi, K. Karahalios. *Quantifying search bias: Investigating sources of bias for political searches in social media*. In *CSCW'17*, 2017.
16. **J. Messias**, P. Vikatos, F. Benevenuto. *White, man, and highly followed: Gender and race inequalities in Twitter*. In *IEEE/WIC/ACM Web Intelligence (WI'17)*, 2017.
17. P. Vikatos, **J. Messias**, M. Miranda, F. Benevenuto. *Linguistic diversities of demographic groups in Twitter*. In *ACM Hypertext and Social Media (HT'17)*, 2017.
18. A. Chakraborty, **J. Messias**, F. Benevenuto, S. Ghosh, N. Ganguly, K. P. Gummadi. *Who makes trends? Understanding demographic biases in crowdsourced recommendations*. In *AAAI Conference on Web and Social Media (ICWSM'17)*, 2017.
19. M. Mondal, **J. Messias**, S. Ghosh, K. P. Gummadi, A. Kate. *Longitudinal privacy management in social media: The need for better controls*. *IEEE Internet Computing*, 21(3):48–55, 2017.
20. M. Mondal, **J. Messias**, S. Ghosh, K. P. Gummadi, A. Kate. *Forgetting in social media: Understanding and controlling longitudinal exposure of socially shared data*. In *Symposium on Usable Privacy and Security (SOUPS)*, 2016.
21. **J. Messias**, F. Benevenuto, I. Weber, E. Zagheni. *From migration corridors to clusters: The value of Google+ data for migration studies*. In *IEEE/ACM ASONAM*, 2016.
22. **J. Messias**, L. Schmidt, R. Rabelo, F. Benevenuto. *You followed my bot! Transforming robots into influential users in Twitter*. *First Monday*, 18(7), 2013.

Service

PC Member	FC 2026, AFT 2025, FC 2025, CAAW 2025, FinTeAchIn 2025, AFT 2024, WWW 2024.
Guest Editor	ACM Transactions on the Web — Special Issue on Decentralized Web.

Selected Talks

2025: Fairness in Token Delegation: Mitigating Voting Power Concentration in Decentralized Autonomous Organizations. 3rd Edition of the TUM Blockchain&Cybersecurity Salon, Munich, Germany.

2025: The Writing is on the Wall: Analyzing the Boom of Inscriptions and its Impact on EVM-compatible Blockchains. CAAW, Miyakojima, Japan.

2025: A Public Dataset for the ZKsync Rollup. CAAW, Miyakojima, Japan.

2025: Fairness Concerns in the Blockchain Ecosystem at the Max Planck Institute for Security and Privacy (MPI-SP), Bochum, Germany.

2025: Web3 Is Broken? Airdrops, UX & Ethics Explained by Research Scientist. Decentralized Voices.

2025: The Writing is on the Wall: Analyzing the Boom of Inscriptions and its Impact on EVM Blockchains. Ethereum Zürich. Zürich, Switzerland.

2024: Fairness Concerns in the Blockchain Ecosystem. INDOGFOE, Indo-German Frontiers of Engineering Symposium by Alexander von Humboldt Foundation. Mumbai, India.

2024: Blockchain Research: Where society becomes decentralized at the Max Planck Institute for Software Systems (MPI-SWS), Kaiserslautern, Germany.

2024: Airdrops: Giving Money Away Is Harder Than It Seems. EthCC. Brussels, Belgium.

2024: Understanding Blockchain Governance. SBC DAO Workshop. New York City, USA.

2023: Dissecting Bitcoin and Ethereum Transactions: On the Lack of Transaction Contention and Prioritization Transparency in Blockchains. Financial Cryptography and Data Security (FC). Bol, Croatia.

2021: Selfish & Opaque Transaction Ordering in the Bitcoin Blockchain: The Case for Chain Neutrality. ACM SIGCOMM Internet Measurement Conference (IMC). Virtual Event.

Teaching

Summer 2023 Organized and taught a summer seminar on Blockchains and Decentralized Finance (DeFi) at the Saarland University.

2019–2020 Teaching Assistant for Operating Systems at MPI-SWS and Saarland University.

2016–2017: Teaching Assistant for Analysis and Algorithm Design at UFMG.

2013 Instructor for high school courses (Algorithms, Operating Systems, Hardware Introduction) at Escola Estadual Dom Silvério, Brazil.