Matheus Venturyne Xavier Ferreira

Personal Data

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Research Interests

Market Design, Security and Applied Cryptography, Game Theory

Education

Princeton University, NJ, USA
Ph.D in Computer Science 2022
Thesis: *Economics and Computation in Decentralized Systems*; advised by S. Matthew Weinberg

Universidade Federal de Itajubá, Itabira, MG, Brazil
B.S. with Honors in Computer Engineering 2016

University of California, San Diego, CA, USA
Exchange student fully funded by a BSMP Fellowship 2014

Work Experience

Harvard University, Boston, MA, USA
Postdoctoral Fellow in Computer Science 2021 - Present
Research Assistant Summer 2020

Broadcom Corporation, San Diego, CA, USA
Software Development Engineer Intern in Bluetooth/NFC Summer 2014

Selected Honors and Awards

- RIT's Future Faculty Career Exploration Program 2022
- SEAS Award for Excellence, Princeton School of Engineering and Applied Sciences 2020
- LATinE Fellow, Purdue University College of Engineering 2020
- 2020 CRA-WP Grad Cohort for URMD, CRA 2020
- Dean's Grant, Princeton University Graduate School 2016 - 2021
- First Year Fellowship in Engineering, Princeton University 2016
- Congratulations from Higher Counsel, Universidade Federal de Itajubá 2016
- Motion of Applause, Municipal Chamber of Itabira 2016
- CNS Espresso Prize for Excellence in Networking, University of California, San Diego 2014
- 1^{st} place in 2nd Line Follower Robot Competition, Universidade Federal de Itajubá [Video] 2013

Publications

1. Matheus V. X. Ferreira, Ye Lin Sally Hahn, S. Matthew Weinberg, and Catherine Yu. Optimal strategic mining against cryptographic self-selection in proof-of-stake. In *Forthcoming Proceedings of the 23st ACM Conference on Economics and Computation*, EC '22, New York, NY, USA, 2022. Association for Computing Machinery

2. Meryem Essaidi, Matheus V. X. Ferreira, and S. Matthew Weinberg. Credible, Strategyproof, Optimal, and Bounded Expected-Round Single-Item Auctions for All Distributions. In *13th Innovations in Theoretical Computer Science Conference (ITCS 2022)*, pages 66:1–66:19, Dagstuhl, Germany, 2022. Schloss Dagstuhl – Leibniz-Zentrum für Informatik

3. Matheus V. X. Ferreira, Daniel J. Moroz, David C. Parkes, and Mitchell Stern. Dynamic posted-price mechanisms for the blockchain transaction-fee market. In *Proceedings of the 3rd ACM conference on Advances in Financial Technologies*, AFT '21, New York, NY, USA, 2021. Association for Computing Machinery

4. Matheus V. X. Ferreira and S. Matthew Weinberg. Proof-of-stake mining games with perfect randomness. In *Proceedings of the 22nd ACM Conference on Economics and Computation*, EC '21, page 433–453, New York, NY, USA, 2021. Association for Computing Machinery

5. Matheus V. X. Ferreira and S. Matthew Weinberg. Credible, truthful, and two-round (optimal) auctions via cryptographic commitments. In *Proceedings of the 21st ACM Conference on Economics and Computation*, EC '20, pages 683—-712, New York, NY, USA, 2020. Association for Computing Machinery

6. Tithi Chattopadhyay, Nick Feamster, Matheus V. X. Ferreira, Danny Yuxing Huang, and S. Matthew Weinberg. Selling a single item with negative externalities. In *The World Wide Web Conference*, WWW '19, pages 196—206, New York, NY, USA, 2019. Association for Computing Machinery

TALKS AND WORKSHOPS

1. **Crypto Monthly**
   Ripple Labs, June 21, 2022
   Economics and Computation in Distributed Systems

2. **Harvard Theory of Computation Seminar**
   Harvard University, February, 2022
   Proof-of-Stake Mining Games with Perfect Randomness

3. **Spotlights Beyond WINE, The 17th Conference on Web and Internet Economics**
   December 2021
   Proof-of-Stake Mining Games with Perfect Randomness

4. **3rd ACM Conference on Advances in Financial Technologies**
   September 26-28, 2021
   Dynamic Posted-Price Mechanisms for the Blockchain Transaction-fee market [Video]

5. **16th Workshop on the Economics of Networks, Systems and Computation**
   July 23, 2021
   Dynamic Posted-Price Mechanisms for the Blockchain Transaction-fee market

6. **22nd ACM Conference on Economics and Computation**
   July 2021
   Proof-of-Stake Mining Games with Perfect Randomness [Video]

7. **Princeton University Research Day**
   Princeton University, May 2021
   Proof-of-Stake Mining Games with Perfect Randomness [Video]

8. **Princeton Theory of Computation Day**
   Princeton University, April 2021
   Proof-of-Stake Mining Games with Perfect Randomness

9. **Microsoft Research, Algorithms Group**
   Redmond, CA, March 2021
   Economics and computation in Distributed Systems

10. **Operations research and financial engineering reading group**
    Princeton University, March 2021
    Algorithms, game theory and blockchains

11. **INFORMS Annual Meeting**
    November 2020
    Credible, Truthful, and Two-Round (Optimal) Auctions via Cryptographic Commitments

12. **Poster Session, Tapia Conference**
September 2020
Proof-of-Stake Mining Games with Perfect Randomness

13. **Poster Session, LATinE Fellow**
Purdue University, July 2020
Economics and Computation in Distributed Systems

14. **21st ACM Conference on Economics and Computation**
July 2020
Credible, Truthful, and Two-Round (Optimal) Auctions via Cryptographic Commitments [Video]

15. **Princeton University Research Day**
Princeton University, May 2020
Credible, Truthful, and Two-Round (Optimal) Auctions via Cryptographic Commitments [Video]

16. **Poster Session, Computing Research Association, Widening Participation**
Austin, TX, March 2020
Proof-of-Stake Mining Games with Perfect Randomness

17. **Lightning Talk and Poster Session, Web and Internet Economics Conference**
Columbia University, December 2019

18. **Princeton Theory of Computation Day**
Princeton University, June 2019
Credible, Truthful, and Two-Round (Optimal) Auctions via Cryptographic Commitments

19. **Poster Session, The Web Conference**
San Francisco, May 2019
Selling a Single Item with Negative Externalities: To Regulate Production or Payments?

20. **Poster Session, ACM Conference on Economics and Computation**
Cornell University, June 2018
Selling a Single Item with Negative Externalities: To Regulate Production or Payments?

21. **Princeton Mechanism Design Seminar**
Princeton University, June 2017
Selling a Single Item with Negative Externalities: To Regulate Production or Payments?

SERVICE

Program Committee.

Web and Internet Economics (WINE)	2022
ACM Advances in Financial Technologies (AFT)	2022
International Conference on Mathematical Research for Blockchain Economy (MARBLE)	2022
Global Challenges in Economics and Computation	2020

Journal Reviewer.

Journal of Cryptoeconomic Systems	2020, 2021
Games and Economic Behavior	2020

Conference Reviewer.

Symposium on Theory of Computing (STOC)	2022
ACM-SIAM Symposium on Discrete Algorithms (SODA)	2022
ACM Economics and Computation (EC)	2021
USENIX Security	2021
ACM Advances in Financial Technologies (AFT)	2020
Innovations in Theoretical Computer Science (ITCS)	2019, 2020
Web and Internet Economics (WINE)	2018, 2019, 2020

Teaching

Princeton University - Teaching Assistant

Spring 2020	Junior Independent Work (COS 398)
Spring 2018	Economics and Computation (COS 445)
Fall 2017	Computation Geometry (COS 451)

Universidade Federal de Itajuba - Teaching Assistant

2015	Computer Security
2013	Objected-Oriented Programming (ECO 30)

Undergraduate Students Mentoring

- Tinashe Handina. *Princeton University*, now Ph.D. student at Caltech — June 2020-May 2021
  Title: *A Random walk in Extensive Form Games: An Investigation into information, strategy-proofness and Credibility*
- Catherine Yu. *Princeton University* — June 2020-May 2022
  Title: *Optimal Strategic Mining Against Cryptographic Self-Selection in Proof-of-Stake*
  Published at ACM EC 2022
- Michelle Woo. *Princeton University* — Fall 2020-May 2021
  Title: *Computing optimal selfish mining strategies for Proof-of-Stake blockchains via MDPs*
- Anthony Hein. *Princeton University* — Sept 2021-May 2022
  Title: *Searching for Optimal Strategies in Proof-of-Stake Mining Games with Access to External Randomness*
  Outstanding Computer Science Senior Thesis Prize
- Luca D'Amico-Wong. *Harvard University* — June 2022-Present

Diversity, Inclusion & Outreach

- Mentor, Algorithmic Game Theory Mentoring Workshop (AMW), SIGECOM — 2020 - 2021
- Peer Mentor, Graduate Scholars Program, Princeton University — 2019 - 2021
- Peer Educator, LGBTQIA Peer Ed Program, Princeton University — 2019 - 2020
- Mentor, Princeton Summer Programming Experience, Princeton University — 2017
- Mentor, Princeton Women in Computer Science, Princeton University — 2016 - 2017

Software

Vein: Rivers of Blood [Video]: A distributed, real-time, 3D, multiplayer survival race game of microorganisms in the human body using C++ and DirectX11. My contributions focused on physics simulation, artificial intelligence and developing the game engine.

Caminhos Drummondianos [Google Play]: Android app for a tour in the Drummond's Path in the city of Itabira, the only literary path in South America. Drummond is considered one of the greatest Brazilian poet of all times.

Languages

Portuguese:	Mothertongue
English:	Fluent

Computer Skills

Programming:	Python, C/C++, Java, Matlab, OpenGL, SQL, JavaScript, OCaml, R, Perl
Others:	Linux, Windows, Bash, GDB, Git, LaTeX