Matheus V. X. Ferreira

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Personal Data

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Research Interests

I'm broadly interested in Algorithmic Design under Uncertainty and the interplay of Algorithmic Game Theory, Cryptography and Machine Learning.

Education

In Progress	Doctor of Philosophy in Computer Science, **Princeton University** Research Advisor: Matthew Weinberg
Sept 2018	M.A. in Computer Science, **Princeton University** Gpa: 3.95/4.00
July 2016	B.S. in Computer Engineering at **Universidade Federal de Itajuba** Gpa: 92.8/100
Jan–Dec 2014	Non-degree international student, **University of California, San Diego** Gpa: 3.92/4.00

Work Experience

Jun-Sept 2014	Broadcom Corporation at San Diego, California *Software Development Engineer Intern in Bluetooth/NFC Software Team* Supported the BTE Blueotooth stack, profiles and protocols – software development, debugging and testing. Developed enhancements in Bradcom WICED and Bluetooth tracing and testing tools

Research Papers

- **Selling a Single Item with Negative Externalities: To Regulate Production or Payments?**

  Tithi Chattopadhyay, Nick Feamster, Matheus V. X. Ferreira, Danny Yuxing Huang, S. Matthew Weinberg.

  In Proceedings of The Web Conference 2019.

Working Papers

- **Proof-of-Stack Blockchain Minting Games**

  Matheus V. X. Ferreira, S. Matthew Weinberg.

- **How to Force Mechanisms to Commit**

  Matheus V. X. Ferreira, S. Matthew Weinberg.

TALKS

June 2019	Theory of Computer Science Group, Princeton University **How to Force Mechanisms to Commit**
May 2019	The Web Conference 2019, San Francisco, CA **Selling a Single Item with Negative Externalities: To Regulate Production or Payments?**
December 2018	Gems of Theoretical Computer Science Seminar, Princeton University **Simple** $\log\log rank$ **competitive algorithm for matroid secretary**
June 2018	Poster Session, 19th ACM EC 2018, Ithaca, NY **Mitigating Insecure Devices, to Regulate Consumers or Manufacturers?**
March 2018	Mechanism Design Seminar, Princeton University **The matroid secretary problem for minor-closed classes and random matroids**
October 2017	Gems of Theoretical Computer Science Seminar, Princeton University **Rational seceret sharing and secure multi-party computation**
June 2017	Mechanism Design Seminar, Princeton University **Selling a Single Item with Negative Externalities: To Regulate Production or Payments?**

Research Experience

Princeton University

Fall 2018 — **How to Force Mechanisms to Commit.**

- We show commitment schemes are sufficient to construct truthful, credible auctions with constant communication when buyers have MHR distribution. However, when distributions are regular even with commitments, no mechanism is truthful, credible and have constant rounds of communication.

Spring 2017 — **Selling a Single Item with Negative Externalities: To Regulate Production or Payments?**

- We model a regulation of production and/or payments when selling an item cause externalities to society (e.g. security vulnerabilities from computer devices, pollution from oil exploration licenses). We show simple regulations (regulates only production or only payments) are not optimal but are approximately optimal.

Fall 2016 — **Make Crypto Safe Again! Detecting Bugs in API Usage Using Bounded Model Checking**
Course project supervised by Aarti Gupta.

- Libraries for secure communication such as OpenSSL expect software developers to follow well defined procedures in the API calls. We developed a system to detect incorrect use of OpenSSL and flag software vulnerabilities.

Fall 2016 — **Dolphin: Dataplane Load-balancing in Programmable Hybrid Networks**
Course project supervised by Jenifer Rexford.

- New generation network switches allow network developers to design new network management applications with high efficiency. We design a load-balancing application for a hybrid network composed by new generation and legacy switches that reaps the benefits of programmable switches without losing interoperability with legacy switches.

Universidade Federal de Itajuba

Jun 2016 — **SDN-based Mobile Cloud Computing over heterogeneous networks**
Supervised by Juliano de Almeida Monte-Mor.

- Developed a middleware architecture for computational offloading in infrastructure-less networks.

Feb 2013 — **Characterization of transitions in secondary structure elements of All-beta Proteins**
Supervised by Carlos Henrique da Silveira

- Defining the secondary structure (α-helices and β-sheets) of proteins are important in predicting their functionality. In this project, we characterize α-helices discontinuities in all-beta protein domains by extracting statistical signals from a data-set of discontinuities.

Software

Jun 2014 | University of California, San Diego
Vein – Rivers of Blood
Class Project Supervised by Geoff Voelker

- Developed a distributed, real-time, 3D, multiplayer survival race game of microorganisms in the human body using C++ and DirectX11.

Course Work

Open Problems in Algorithmic Game Theory, Theoretical Machine Learning, Advanced Cryptography, The Probabilistic Method, Advanced Algorithm Design, Probability in High Dimension, Advanced Computer Networks, Automated Reasoning about Software

Teaching

Princeton University

Spring 2018	Economics and Computation (COS 445)
Fall 2017	Computation Geometry (COS 451)

Universidade Federal de Itajuba

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

Service

Invited External Reviewing

- Innovations of Theoretical Computer Science (ITCS) 2019, 2020.
- Conference on Web and Internet Economics (WINE) 2018, 2019.

Diversity, Inclusion & Outreach

- Peer Mentor, Graduate Scholars Program, Princeton University, 2019.
- Peer Educator, LGBTQIA Peer Ed Program, Princeton University, 2019.
- Mentor, Princeton Summer Programming Experience, Princeton University, 2017
- Mentor, Princeton Women in Computer Science, Princeton University, 2016

Honors and Awards

Nov. 2019	2020 Computer Research Association-WP Grad Cohort for URMD
June. 2019	AGT Mentoring Workshop Grant, ACM
Sept 2016 - June 2021	Dean's Grant, Princeton University
Sept. 2016	First Year Fellowship, Princeton University
July 2016	Academic Accolade for best student, Universidade Federal de Itajuba
Dec. 2014	George Varghese Espresso Prize, University of California, San Diego
Jan–Dec 2014	Brazil Scientific Mobility Program, fully-funded scholarship recipient University of California, San Diego
Sept 2013	Fapemig Research Scholarship, LOTMine, UFMG, Brazil
Sept 2013	1^{st} Line Follower Robot Competition, Unifei, Brazil
Feb 2012	Fapemig Research Scholarship, Unifei, Brazil

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