

Matheus Sobreira Farias

Room 3.410, Science & Engineering Complex, 150 Western Ave. Allston, MA 02134
matheusfarias@g.harvard.edu | matheussfarias.com

EDUCATION

Harvard University <i>Ph.D. in Electrical Engineering</i> Working on efficient hardware architectures for machine learning. Advised by Prof. H. T. Kung (link)	Cambridge, MA 2021–PRESENT
Federal University of Pernambuco <i>B.Sc. in Electronics Engineering</i> 1st out of 40 students, GPA 8.90/10. Senior Thesis: <i>iOwlT: Sound Geolocalization System</i> (link).	Recife, Brazil 2016–2021

RESEARCH

Current projects and other information can be found [here](#).

Computing in Memory <i>Harvard University</i> Working on the algorithmic level perspective to allow efficient deep neural networks under the crossbar architecture. Particularly interested in ways to avoid bottlenecks on the architecture such as energy consumption due to data conversions, wire resistance impact, sneak paths, and negative weight representation.	2021–PRESENT
iOwlT: Sound Geolocalization System (link) <i>Federal University of Pernambuco</i> Developed a system using neural networks, adaptive filtering and real-time processing in FPGAs to geographically track sound events and then determine the position of gun shooters on a mobile application by Bluetooth connection. Earned 3 international awards, placing Top 0.7% at InnovateFPGA competition in China.	2019–2020
Lock-in: Nano-Volt Signal Amplifier (link) <i>Federal University of Pernambuco</i> Design and optimization of a phase-sensitive lock-in amplifier circuit for the Magnetism and Magnetic Materials' group led by the former Minister of Science and Technology of Brazil Prof. Sergio Rezende to be used for investigating magnetic properties of thin films such as IrMn/Py using MOKE technique.	2019–2020
iTraffic: Smart Semaphore Network (link) <i>Federal University of Pernambuco</i> Design and proposal of an internet of things intelligent system to dynamically choose traffic lights timing to optimize vehicle flow on urban roads using genetic algorithm. Achieved 130% improvement in the average speed of cars in tested tracks.	2017
Maracatronics: Robotics Team (link) <i>Federal University of Pernambuco</i> Part of collective autonomous soccer sub-team, acting on robots control on Tiva-C microcontroller, computer vision mapping and tracking, and intelligent robots decision-making strategies.	2017

PUBLICATIONS

*denotes equal contribution

- [1] **M. S. Farias***, H. T. Kung*, “Applying Sorted Sectioning to Compute-in-Memory Crossbars for DNN Computations Reduces ADC Cost and Wire Resistance Impact”, *in submission*.

CONFERENCES

- | | |
|---|------------------|
| 2. 2019 International Conference on Field-Programmable Technology | Tianjin, China |
| 1. VII Brazilian Symposium on Computing Systems Engineering | Curitiba, Brazil |

TEACHING

Harvard University

CS205 – *High Performance Computing*

SPRING 2023

Federal University of Pernambuco

ES456 – *Machine Learning*

FALL 2020

MA326 – *Complex Variables and Applications*

2018–2019

FI007 – *Physics II: Gravitation, Waves and Thermodynamics*

2017–2018

MA026 – *Calculus I: Limits, Derivatives and Integrals*

FALL 2016

WORK EXPERIENCE

Neurotech

Recife, Brazil

Machine Learning Intern

2020–2021

Served as workshop instructor and collaborated adding +5 machine learning algorithms to production.

Espaço Diferencial

Recife, Brazil

Co-Founder and Teacher

2016–2018

Idealized the course, a non-profit school to support underprivileged students in basic engineering classes. Managed the action strategy planning that turned to impact over 200 students with a team of 10 teachers. Taught Physics at the undergraduate level.

AWARDS AND RECOGNITIONS

Bronze Medal at the Online Young Physicists' Tournament

2023

Online

8th place at the Online Young Physicists' Tournament 2023.

Silver Medal at the International Young Physicists' Tournament (Physics World Cup)

2023

Murree, Pakistan

2nd place at the 36th International Young Physicists' Tournament 2023 Pakistan.

Behring Foundation Fellowship

2021–PRESENT

Harvard University

Honored by the Behring Foundation with a fellowship to cover my graduate studies at Harvard.

Silver Award at InnovateFPGA 2019 Contest (Grand Finals)

2019

Tianjin, China

2nd out of 270 teams with iOwlT: Sound Geolocalization System.

Silver Award at InnovateFPGA 2019 Contest (Regional Finals)

2019

Americas

2nd out of 40 teams with iOwlT: Sound Geolocalization System.

Community Award at InnovateFPGA 2019 Contest

2019

Americas

Elected as best project by the community with iOwlT: Sound Geolocalization System.

PIBIC/CNPq funding to do research

2019

Brazil

Awarded by national government funding to do research for Lock-in: Nano-Volt Signal Amplifier.

5th Place at XVI Latin American Robotics Competition

2017

Latin America

In the Small Size League category of autonomous soccer with Maracatronics: Robotics Project.

1st Place at Embedded Systems Regional Contest

2017

Brazil

1st out of 14 teams with iTraffic: Smart Semaphore Network.

Honorable Mention at Brazilian Physics Olympiad

2015

Brazil

One of the 180 medalists over more than 300,000 contestants.

DIVERSITY, INCLUSION & OUTREACH

- Vice President of Brazil Conference 2024 2023-2024
- Brazilian Team Leader at the Online Young Physicists' Tournament 2023
- Brazilian Team Leader at the International Young Physicists' Tournament in Pakistan 2023
- Author of the Experimental Exam for the Brazilian selective to the International Physics Olympiad 2023
- Leader of the Diversity & Inclusion branch at the Harvard Brazilian Association 2022-2023
- Judge for the 4th Brazilian Physicists' Tournament 2021
- Officer of the School of Engineering and Applied Sciences at the Harvard Brazilian Association 2021-2023
- Judge for the International Young Physicists' Tournament Brazil 2021-2023

TALKS

Futuras Cientistas – Ministry of Science, Technology & Innovation of Brazil ([link](#))

2023

Technology and its Social Impact

Federal University of Pernambuco

2022

Journey to become a Ph.D student

PodCast Ph.D nos EUA ([part 1](#)) ([part 2](#))

2021

Journey to become a Ph.D student