

Matheus Sobreira Farias

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EDUCATION

Harvard University

Ph.D. in Electrical Engineering

Working on efficient hardware architectures for machine learning. Advised by Prof. H. T. Kung ([link](#))

Cambridge, MA

2021–PRESENT

Federal University of Pernambuco

B.Sc. in Electronics Engineering

1st out of 40 students, GPA 8.90/10. Senior Thesis: *iOwlT: Sound Geolocalization System* ([link](#)).

Recife, Brazil

2016–2021

RESEARCH

Detailed information can be found [here](#).

Computing in Memory

Harvard University

Working on the algorithmic-level to improve efficiency of deep neural network deployment in the crossbar architecture. Particularly interested in reducing bottlenecks such as data conversions, nonidealities, programming time and weight mapping.

2021–PRESENT

iOwlT: Sound Geolocalization System ([link](#))

Federal University of Pernambuco

Developed a system using neural networks, adaptive filtering and real-time processing in FPGAs to recognize sound events and determine gun shooters location on a mobile application. Earned 3 international awards at InnovateFPGA 2019 in China (Top 0.7%).

2019–2020

Lock-in: Nano-Volt Signal Amplifier ([link](#))

Federal University of Pernambuco

Design and optimization of a phase-sensitive lock-in amplifier advised by the former Minister of Science and Technology of Brazil Prof. Sergio Rezende to investigate magnetic properties of IrMn/Py thin films using MOKE technique.

2019–2020

iTraffic: Smart Semaphore Network ([link](#))

Federal University of Pernambuco

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](#))

Federal University of Pernambuco

Member of the collective autonomous soccer sub-team, acting on robots control on Tiva-C microcontroller, computer vision mapping and tracking, and intelligent robots decision-making strategies. Achieved 5th Place at XVI Latin American Robotics Competition.

2017

PUBLICATIONS

- [2] **Matheus Farias**, H. T. Kung, “A Distribution-Based Efficient Programming of Sorted Compute-in-Memory Crossbars”, *in submission*.
- [1] **Matheus Farias**, H. T. Kung, “Sorted Weight Sectioning for Energy-Efficient DNNs on Compute-in-Memory Crossbars”, *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 – <i>Complex Variables and Applications</i>	2018–2019
FI007 – <i>Physics II: Gravitation, Waves and Thermodynamics</i>	2017–2018
MA026 – <i>Calculus I: Limits, Derivatives and Integrals</i>	FALL 2016

WORK EXPERIENCE

Neurotech <i>Machine Learning Intern</i> Served as workshop instructor and collaborated adding +5 machine learning algorithms to production.	Recife, Brazil 2020–2021
Espaço Diferencial <i>Co-Founder and Teacher</i> Idealized a non-profit school for underprivileged students in basic engineering classes. Managed the action strategy planning that impacted over 200 students with a team of 10 teachers. Taught Physics at the undergraduate level.	Recife, Brazil 2016–2018

AWARDS AND RECOGNITIONS

Bronze Medal at the Online Young Physicists' Tournament <i>Online</i> 8th place at the Online Young Physicists' Tournament 2023.	2023
Silver Medal at the International Young Physicists' Tournament (Physics World Cup) <i>Murree, Pakistan</i> 2nd place at the 36th International Young Physicists' Tournament 2023 Pakistan.	2023
Behring Foundation Fellowship <i>Harvard University</i> Honored by the Behring Foundation with a fellowship to cover my graduate studies at Harvard.	2021–PRESENT
Silver Award at InnovateFPGA 2019 Contest (Grand Finals) <i>Tianjin, China</i> 2nd out of 270 teams with iOwlT: Sound Geolocalization System.	2019
Silver Award at InnovateFPGA 2019 Contest (Regional Finals) <i>Americas</i> 2nd out of 40 teams with iOwlT: Sound Geolocalization System.	2019
Community Award at InnovateFPGA 2019 Contest <i>Americas</i> Elected as best project by the community with iOwlT: Sound Geolocalization System.	2019
PIBIC/CNPq funding to do research <i>Brazil</i> Awarded by national government funding to do research for Lock-in: Nano-Volt Signal Amplifier.	2019
5th Place at XVI Latin American Robotics Competition <i>Latin America</i> In the Small Size League category of autonomous soccer with Maracatronics: Robotics Project.	2017
1st Place at Embedded Systems Regional Contest <i>Brazil</i> 1st out of 14 teams with iTraffic: Smart Semaphore Network.	2017
Honorable Mention at Brazilian Physics Olympiad <i>Brazil</i> One of the 180 medalists over more than 300,000 contestants.	2015

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 at the Harvard Brazilian Association 2021–PRESENT
- Judge for the International Young Physicists' Tournament Brazil 2021–2023

TALKS

Futuras Cientistas – Ministry of Science, Technology & Innovation of Brazil (link) <i>Technology and its Social Impact</i>	2023
Federal University of Pernambuco <i>Journey to become a Ph.D student</i>	2022
PodCast Ph.D nos EUA (part 1) (part 2) <i>Journey to become a Ph.D student</i>	2021