

Matheus Sobreira Farias

matheusfarias@g.harvard.edu | <https://www.cin.ufpe.br/~msf4>

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

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

Computing in Memory

2021–PRESENT

Harvard University

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, interconnect wire noise, sneak paths, and negative weight representation.

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

2019–2020

Federal University of Pernambuco

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.

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

2019–2020

Federal University of Pernambuco

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.

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

2017

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.

Maracatronics: Robotics Team ([link](#))

2017

Federal University of Pernambuco

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.

PUBLICATIONS

*denotes equal contribution

- [2] **M. S. Farias***, H. T. Kung*, “Permutations on Crossbar CIM Arrays: Efficient Bit-slice Matrix Multiplications”, in preparation.
- [1] **M. S. Farias***, D. M. de Almeida*, D. de F. Gomes, and E. N. Barros, “Optimization of Hardware Parameters on a Real-Time Sound Localization System”, submitted to *Expert Systems with Applications*.

CONFERENCES

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

TEACHING

ES456 – Machine Learning – Teaching Assistant <i>Federal University of Pernambuco</i> I conducted my own activities and lectures off of my own syllabus. Supported the students developing projects and graded work.	FALL 2020
MA326 – Complex Variables and Applications – Teaching Assistant <i>Federal University of Pernambuco</i> I taught once-a-week sessions to support students in their assignments.	2018–2019
FI007 – Physics II: Gravitation, Waves and Thermodynamics – Teaching Assistant <i>Federal University of Pernambuco</i> I wrote some extra assignments for students interested in Olympic-level Physics, as well as once-a-week sessions to discuss.	2017–2018
MA026 – Calculus I: Limits, Derivatives and Integrals – Teaching Assistant <i>Federal University of Pernambuco</i> I taught once-a-week sessions to support students in their assignments.	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 Professor</i> 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 professors. Taught Physics at the undergraduate level.	Recife, Brazil 2016–2018

AWARDS AND RECOGNITIONS

Behring Foundation Fellowship <i>Harvard University</i> Honored by the Behring Foundation with a fellowship to cover my first year of graduate studies at Harvard.	2021–2022
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 with 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 football 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