

# Matheus Sobreira Farias

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## EDUCATION

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

## RESEARCH

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

<b>Computing in Memory</b> <i>Harvard University</i> 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
<b>iOwlT: Sound Geolocalization System</b> ( <a href="#">link</a> ) <i>Federal University of Pernambuco</i> 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
<b>Lock-in: Nano-Volt Signal Amplifier</b> ( <a href="#">link</a> ) <i>Federal University of Pernambuco</i> 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
<b>iTraffic: Smart Semaphore Network</b> ( <a href="#">link</a> ) <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
<b>Maracatronics: Robotics Team</b> ( <a href="#">link</a> ) <i>Federal University of Pernambuco</i> 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

<b>Harvard University</b> CS205 – <i>High Performance Computing</i>	SPRING 2023
<b>Federal University of Pernambuco</b> ES456 – <i>Machine Learning</i>	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

<b>Neurotech</b> <i>Machine Learning Intern</i> Served as workshop instructor and collaborated adding +5 machine learning algorithms to production.	<b>Recife, Brazil</b> 2020–2021
<b>Espaço Diferencial</b> <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.	<b>Recife, Brazil</b> 2016–2018

## AWARDS AND RECOGNITIONS

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

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