

# Gabriel Pereira de Carvalho

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## Education

### Ecole Polytechnique

MSc in Engineering – Electrical Engineering (*Cycle ingénieur polytechnicien*)

Palaiseau, France  
Sept 2022 – Oct 2025

- **GPA: 3.79/4.00**
- Admitted through competitive entrance exams for international students.
- Relevant Coursework: Digital systems FPGA lab, Computer Networking, Machine and Deep Learning, Statistics and learning, Numerical analysis, Algorithms design and analysis, 3D computer graphics, Data analysis in C++, Analog and Digital Circuit Design, Power Electronics for Renewable Energy.

### University of São Paulo

BSc in Computer Engineering (*joined Ecole polytechnique with a double degree agreement*)

São Paulo, Brazil  
Jan 2019 – Dec 2026

- **GPA: 8.7/10.0**
  - Relevant Coursework: Digital systems FPGA lab, Microprocessors laboratory, Operating systems, Computer organization and architecture, Systems programming, Electrical circuits, Electronics.
  - In 2026, I returned from the double degree program at Ecole polytechnique to work on the thesis for my Brazilian engineering degree.
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## Internships

### Arm

CPU Verification Intern

Sophia-Antipolis, France  
April – Octobre 2025

- End of studies internship for my engineering degree at Ecole polytechnique. Worked on RAG-based assistants for automating verification tasks. I presented proof of concept solutions to two problems: generating configuration files for a constrained-random testbench and automating code documentation using Meta's DocAgent architecture.

### STMicroelectronics

Digital Design Intern (Summer 2024)

Crolles, France  
June – August 2024

- Worked with VHDL/Verilog and CAD tools (Synopsis Fusion Compiler, Synopsis RTL Architect, Cadence Xcelium).
- Worked on an automated testing feature and timing analysis for a low-power neural processing unit project.
- My project consisted of modifying the state machine for test runs, exporting Python trained models for tests on the VHDL design, testing different memory blocks, working on TCL scripts for logical synthesis and to probe critical signals in gate-level simulations.

### Ada Tech

Web Development Intern

São Paulo, Brazil  
May–Aug 2021 and Jan–Apr 2022

- Brazilian edtech proposing upskilling, reskilling and education recruitment programs to help people enter or pivot in the tech industry.
  - On my first internship at Ada Tech, I worked on an online development environment for students to practice and deliver assignments. Over the course of the internship I worked with Next.js and Amazon Web Services such as SQS, Lambda and MQ (MQTT messaging).
  - On my second internship at Ada Tech, I collaborated in the development of the company's internal management system as a front-end developer. Over the course of the internship I worked with Next.js and the .NET Framework.
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## Student experiences

### OMEGA Microelectronics Lab

Student Intern

Palaiseau, France  
Jan – Mar 2025

- Worked at IP Paris' OMEGA Microelectronics research lab as a student intern focused on the design of an ASIC for single-photon photodetector (SiPM) readout. The project involved high-speed, low-noise amplification and discrimination analog circuits to enable picosecond-level timing measurements. The ASIC was designed using Cadence Virtuoso, including layout using a library of TSMC components.

### LPICM – Laboratoire de Physique des Interfaces et des Couches Minces

Student Intern

Palaiseau, France  
Sept – Dec 2024

- Worked at IP Paris' LPICM (Laboratory of Physics of Interfaces and Thin Films) as a student intern on the fabrication of carbon nanotube-based transistors. The work involved the synthesis of carbon nanotubes using chemical vapor deposition (CVD), material characterization using scanning electron microscopy (SEM) and Raman spectroscopy and electrical characterization of the transistor devices.

### University of São Paulo

Teaching assistant – Electrical Circuits I and II

São Paulo, Brazil  
Aug 2021 – July 2022

- Worked on problem sets for recitation sessions with students. Topics included: Laplace transforms, nodal/mesh analysis in the frequency domain, magnetically coupled circuits, Bode plots and four port networks.
  - Answered student questions on the Moodle forum.
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## Projects

### Competitive Programming

- Implementations of classical algorithms in preparation for programming competitions. Includes C++ implementations of Fast Fourier Transform, Wavelet Trees, the Aho–Corasick automaton, Dynamic connectivity, Reachability Trees, Heavy–Light decomposition, Manacher’s algorithm, Li Chao Trees for the Convex Hull Optimization technique in dynamic programming problems, Merge Sort Trees, Persistent Segment Trees, Fast Kuhn algorithm for the maximum bipartite matching problem, Treaps (randomized binary search trees) and Tarjan’s algorithm for finding bridges and articulation points in trees.
- Participated in many online programming contests in Codeforces and Codechef on algorithms and data structures.
- Medals in the Brazilian Informatics Olympiad (Silver 2016, Bronze 2017, Gold 2018, Bronze 2019) and participation in the Brazilian team’s selection tests for the International Informatics Olympiad IOI 2019.

### Handwritten digit detection on FPGA [https://github.com/ArkhamKnightGPC/PHY473R]

- Project consisting on binary classification of handwritten digits on FPGA based on the MNIST dataset using VHDL. The project implements Rosenblatt’s perceptron for binary and multiclass classification and was developed on a Altera DE2–115 development board including interfaces with a VGA monitor, an LCD and a TRDB–DC2 camera.

### StepmaniaIoT – Open Electronics project [https://github.com/ArkhamKnightGPC/PHY564A-StepmaniaIoT]

- Group project for an Open Electronics course at Ecole polytechnique. The project is based on the game Stepmania and has two components: a pygame application running on a Raspberry Pi 3 Model B+, and a wireless controller based on a ESP32 microcontroller with LED buttons and a 3D case made with Autodesk Fusion. Communication between the Raspberry Pi and the controller is done via Bluetooth Low Energy using GATT notifications.

### IP Paris Swarm Rescue competition 2023–2024 [https://github.com/ArkhamKnightGPC/drone-swarm-psc]

- Group project consisting of a comparative analysis of different approaches to teach a swarm of drones how to behave to save a maximum of injured people in a minimum of time on a simulated environment.
- Worked on randomized exploration algorithms (Lévy flight, RRTs) and communication strategy based on MQTT messaging.
- Team ranked 9/43 teams of IP Paris students.

### Security system based on a rotating ultrasonic sensor and MQTT messaging

[https://github.com/ArkhamKnightGPC/sistema-seguranca]

- Group project for an FPGA lab course at the University of São Paulo developed during the pandemic.
- The project has 3 components: an Altera DE0–CV FPGA at the university lab running the system control unit and dataflow; a ESP 8266 SoC at home that collects data from the sensor and sends it to the FPGA via MQTT; and a graphical user interface made with Processing that allows the user to monitor the FPGA output signals remotely.

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### Science olympiads [https://github.com/ArkhamKnightGPC/Certificados\_Olimpiadas]

2020	<b>Honorable mention</b> Brazilian Mathematical Olympiad for University Students <b>OBM</b>
2019	<b>Bronze Medal</b> Brazilian Informatics Olympiad for first-year University Students <b>OBI</b>
2018	<b>Gold Medal</b> Brazilian Informatics Olympiad <b>OBI</b>
2018	<b>Gold Medal</b> Brazilian Astronomy and Astronautics Olympiad <b>OBA</b>
2018	<b>Silver Medal</b> International Young Physicists Tournament Brazil <b>IYPT</b>
2018	<b>Bronze Medal</b> Brazilian Mathematics Olympiad for Public Schools <b>OBMEP</b>
2018	<b>Honorable Mention</b> Brazilian National Science Olympiad <b>ONC</b>
2017	<b>Bronze Medal</b> Brazilian Informatics Olympiad <b>OBI</b>
2017	<b>Silver Medal</b> Brazilian Mathematics Olympiad for Public Schools <b>OBMEP</b>
2017	<b>Bronze Medal</b> Brazilian Chemistry Olympiad <b>OBQ</b>
2017	<b>Honorable mention</b> Brazilian Physics Olympiad <b>OBF</b>
2017	<b>Silver Medal</b> Mathematics Olympiad for the State of São Paulo <b>OPM</b>
2017	<b>Silver Medal</b> Chemistry Olympiad for the State of São Paulo <b>OQSP</b>
2017	<b>Silver Medal</b> Physics Olympiad for the State of São Paulo <b>OPF</b>
2017	<b>Silver Medal</b> Brazilian Astronomy and Astronautics Olympiad <b>OBA</b>
2016	<b>Silver Medal</b> Brazilian Informatics Olympiad <b>OBI</b>
2016	<b>Honorable mention</b> Brazilian Physics Olympiad <b>OBF</b>
2016	<b>Gold Medal</b> Brazilian Astronomy and Astronautics Olympiad <b>OBA</b>

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### Language Certifications

2023	Test de connaissance du français (tout public) – France Education International
2017	Certificate of Proficiency in English CPE – Cambridge English