



## **Gabriel Abílio Barbosa Ferreira**

Address: 65 Flôr de Fogo, Apartment 601, Block 7, Belo Horizonte

Contact: +55 (33) 984164727

Email: gabilio@ufmg.br

LinkedIn: <https://www.linkedin.com/in/g-abilio/>

### **About me**

Currently studying Information Systems at the Federal University of Minas Gerais (UFMG), I've an interrupted degree in Physics at the State University of Campinas (Unicamp), a university I entered through medals in Scientific Olympiads. During this time at Unicamp, I carried out a scientific initiation at CNPEM, working at LNLS-Sirius, in addition to participating in the electronics sector of the Unicamp-ANTARES rocketry team and monitoring experimental physics at the university. I have interests and skills in Data Science and Artificial Intelligence, using languages such as Python, Julia and R, as well as SQL, as well as in Software Engineering, using C/C++, Python and JavaScript. In Artificial Intelligence, I participated in academic collaboration at the University of Hradec Králové, researching AI vulnerabilities and ways to mitigate them. Currently, I participate in the FabNS Software team, carrying out software development in C++.

## Professional Experience

Role	Company
<b>Undergraduate Level Researcher</b> <ul style="list-style-type: none"> <li>• Construction of two-dimensional samples using techniques such as micromechanical exfoliation.</li> <li>• Characterization and analysis of two-dimensional materials, using techniques such as Scanning Near-field Optical Microscope (SNOM).</li> <li>• Construction of electronic nanodevices used for studies in nanotechnology.</li> </ul>	<b>CNPEM (2022 - 2023)</b> <ul style="list-style-type: none"> <li>• In this scientific initiation project, a detailed experimental study of the fabrication and subsequent s-SNOM characterization of 2D heterostructures based on lamellar materials (h-BN, MoO<sub>3</sub> and Talc) will be carried out, as well as their lithography in the form of resonators. The fabrication and assembly of the nanostructures will be carried out at the Laboratory of Two-Dimensional Materials (L2D) in tune with the s-SNOM instrumentation in operation at the IMBUA line of Sirius. Eventually, more sophisticated structures will be produced via nano-thinning by "Focused Ion Beam" (FIB) at the Laboratory of Micrometric Samples (LAM) at the National Synchrotron Light Laboratory (LNLS).</li> </ul>
<b>Software Engineering Internship</b> <ul style="list-style-type: none"> <li>• Development of solutions for various problems in various areas of FabNS applications. Solutions include back-end, front-end, software engineering and build systems technologies.</li> </ul>	<b>FabNS (2024 - )</b> <ul style="list-style-type: none"> <li>• FabNS - Fábrica de Nanossoluções - is an academic spin-off from the Federal University of Minas Gerais (UFMG), the result of more than a decade of high-impact research and development in nanospectroscopy. As a member of the Software team, I develop solutions for the company's applications, using technologies such as: C++, Qt Framework, Git and CMake.</li> </ul>

<p><b>Member of the electronics sector</b></p> <ul style="list-style-type: none"> <li>• Member of the electronics sector, working with AR-DUINO platform.</li> </ul>	<p><b>ANTARES rocketry team (2023 - 2024)</b></p> <ul style="list-style-type: none"> <li>• The Antares Model Rocketry Team, created in 2017, is an extracurricular activity of the State University of Campinas, Unicamp, dedicated to national and international competitions in the aerospace sector. The team, that originally emerged in 2014 within the School of Mechanical Engineering (FEM), suffered a reformulation in 2017, assuming its current name and focusing on higher-performance rocket projects at an international level. The team is formed by university students from various courses and focuses on technical development through projects and research, in order to foster interest and development in the aerospace area, in addition to developing interpersonal skills such as cooperation, leadership and organization.</li> </ul>
--	--

## Academic Education

Bachelor's degree	University
<b>Physics</b> <ul style="list-style-type: none"><li>• Unicamp's undergraduate program</li><li>• Interrupted degree.</li></ul>	<b>Unicamp - State University of Campinas (2022 - 2024)</b> <ul style="list-style-type: none"><li>• Projects, Jobs and Events:<ul style="list-style-type: none"><li>– Undergraduate Level Researche at CNPEM.</li><li>– Autumn Meeting of the Brazilian Physical Society - EOSBF 2023.</li><li>– PhenoBR 2023.</li><li>– 2nd Machine Learning School @Illum.</li><li>– ANTARES rocketry team.</li><li>– Poster presentation.</li><li>– Tutoring in Applied Physics I.</li></ul></li></ul>
<b>Information Systems</b> <ul style="list-style-type: none"><li>• Website of the Department of Computer Science at UFMG</li></ul>	<b>UFMG - Federal University of Minas Gerais (2024 - )</b> <ul style="list-style-type: none"><li>• Projects, Jobs and Events:<ul style="list-style-type: none"><li>– Software Engineering Internship at FabNS.</li><li>– Autumn Meeting of the Brazilian Physical Society - EOSBF 2023.</li><li>– Academic collaboration with UHK on Artificial Intelligence - Unigou Remote Program.</li><li>– MiniDebConf 2024 Belo Horizonte.</li></ul></li></ul>

## Skills

- Languages: Python, C++, C, JavaScript, HTML, CSS, Julia, R, ARM Assembly.
- Frameworks and Tools: Git, Qt, CMake, SQL, Linux.
- Experience with Software Engineering and Artificial Intelligence.

## Scientific Projects

- **Identification and Mitigation of Threats and Vulnerabilities of Modern Machine Learning Systems (2024 - 2024):** The work will examine various aspects of the harmful potential of artificial intelligence, that is, the approaches and procedures of artificial intelligence that can be the cause of attacks, and the possibilities of prevention and defence against them. Many of the possible approaches to prevent and defend against vulnerabilities from malicious AI applications must also be based on AI approaches and practices. The research will therefore be focused on both the aforementioned aspects of artificial intelligence applications and on solving typical problems of vulnerabilities in artificial intelligence systems.
- **Design and fabrication of nanostructures for analysis via s-SNOM in the infrared and terahertz ranges (2022 - 2023):** In this project, a detailed experimental study will be carried out on the fabrication and subsequent s-SNOM characterization of 2D heterostructures based on lamellar materials (h-BN, MoO<sub>3</sub> and Talc) as well as their lithography in the form of resonators. The fabrication and assembly of the nanostructures will be carried out in the Two-Dimensional Materials Laboratory (L2D) in tune with the s-SNOM instrumentation in operation on Sirius's IMBUA line. Eventually, more sophisticated structures will be produced via nano thinning by "Focused Ion Beam" (FIB) at the Micrometric Samples Laboratory (LAM) at the National Synchrotron Light Laboratory (LNLS).

## Scientific Production

- FERREIRA, G. A. B.; MAZZOTTI, V. ; MARTELLO FILHO, L. V. B. ; BARRETO, V. V. ; FREITAS, R. O ; BARCELOS, I. D . Exciton-polariton imaging in TMD's via s-SNOM in the visible spectrum. 2023. (Poster) - Unicamp's Physics Week
- FERREIRA, G. A. B.; FREITAS, R. O; BARCELOS, I. D. Projeto e fabricação de nano estruturas para análise via s-SNOM nas faixas de infravermelho e terahertz. 2023 - FAPESP Scientific report
- FERREIRA, G. A. B. Identification and mitigation of threats and vulnerabilities of modern machine learning systems - Unigou Remote Program Poster. 2024
- FERREIRA, G. A. B.; FERRACIOLI, G. M.. Machine Learning Forensics: Unveiling Vulnerabilities And Defense Strategies - Scientific Article - Literature Review. 2024

## Awards

- 2019 - First place overall (High School) - Colégio Losango Manhauçu. Gold Medal
- 2020 - Medalist at the Brazilian Astronomy and Astronautics Olympiad. Silver Medal
- 2021 - Medalist at the Brazilian Astronomy and Astronautics Olympiad. Gold Medal
- 2021 - \$10,000 scholarship, Minerva Schools at KGI (Minerva University)