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 have 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 tutoring experimental physics at the university. I have interests and skills in Data Science and Artificial Intelligence, using languages such as Python, Julia and R, combined with SQL, as well as in Software Engineering, using C/C++, Python, Java 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 work in the FabNS Software team, carrying out software development in C++.

Professional Experience

Role	Company
Undergraduate Level Researcher • Construction of two-dimensional samples using techniques such as micromechanical exfoliation. • Characterization and analysis of two-dimensional materials, using techniques such as Scanning Near-field Optical Microscope (SNOM). • Construction of electronic nanodevices used for studies in nanotechnology.	**CNPEM - Brazilian Center for Research in Energy and Materials** (2022 - 2023) • 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_3 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 IMBUIA 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).
Software Engineering Internship • Development of solutions for various problems in various areas of FabNS applications. Solutions include back-end, front-end, software engineering and build systems technologies.	**FabNS** (2024 -) • 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.

Member of the electronics sector	ANTARES rocketry team (2023 - 2024)
• Member of the eletronics sector, working with ARDUINO platform.	• 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.

Academic Education

Bachelor's degree	University
Physics • Unicamp's undergraduate program • Interrupted degree.	**Unicamp - State University of Campinas** (2022 - 2024) • Projects, Jobs and Events: – Undergraduate Level Researcher at CNPEM. – Autumn Meeting of the Brazilian Physical Society - EOSBF 2023. – PhenoBR 2023. – 2nd Machine Learning School @Ilum. – ANTARES rocketry team. – Tutoring Applied Physics I.
Information Systems • Website of the Department of Computer Science at UFMG	**UFMG - Federal University of Minas Gerais** (2024 - 12/26 (anticipated date)) • Projects, Jobs and Events: – Software Engineering Internship at FabNS. – Academic collaboration with UHK on Artificial Intelligence - Unigou Remote Program. – MiniDebConf 2024 Belo Horizonte.

Skills

- Languages: Python, C++, C, JavaScript, HTML, CSS, Julia, R, Java and ARM Assembly.

- Frameworks and Tools: Git, Qt, CMake, SQL, Linux.

- Experience with Software Engineering and Artificial Intelligence.

- Fluent in Portuguese and English. Intermediate level of French.

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, MoO3 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 IMBUIA 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 Manhuaçu. 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)

Additional Courses and Qualifications

- Cambridge First Certificate in English (Grade A, C1 Level)

- 2023 - 2024: Data Wrangling with Python at UC-Boulder

- 2023: Fundamental Tools of Data Wrangling at UC-Boulder

- 2023: Introduction to Electrical Engineering I at Federal University of Rio Grande do Sul

- 2023: Introduction to Computer Science with Python at University of São Paulo

- 2023: Scientific Communication and Writing Course at American Chemical Society

- 2024: UNIGOU Remote Program at Univerzita Hradec Králové

- 2024: Introduction to Machine Learning at Duke University

- 2024: Programming Foundations with JavaScript, HTML and CSS at Duke University

- 2024: Data Processing and Manipulation at UC-Boulder

- 2024: Data Collection and Integration at UC-Boulder

- 2024: Data Understanding and Visualization at UC-Boulder

- Completion of the Portuguese language course at Kumon

- Advanced level of the Mathematics course at Kumon