

MARCIO DE SOUZA MATEUS JR

Physicist, PhD | Machine Learning Researcher

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EXPERIENCE

Machine Learning Researcher

São Paulo Research and Analysis Center - SPRACE

 November 2024 - present  São Paulo - SP - Brazil

- Development of deep learning methods for simulation, reconstruction, and analysis of High-Luminosity LHC data.
- Collaborated with a multidisciplinary team of physicists, computer scientists, and engineers in high-energy physics research.
- Researched and implemented models for and efficient particle detector simulation.
- Implementation and management of a Linux Cluster for high-performance scientific computing (HPC).
- Supported the deploy, validation, and interpretation of machine learning solutions in the CMS experiment context.
- Contributed to the publication of research findings in peer-reviewed journals.
- Optimized frameworks for the implementation of neural network models.
- Extraction, transform and load of large-scale datasets.
- Engaged in continuous communication with international research teams.

Data Scientist

Aquarela Advanced Analytics

 February 2022 - 2024  (remote) Florianópolis - SC - Brazil

- Time series analysis and forecasting.
- Machine Learning Data Modeling and optimization algorithms.
- Dashboards construction and project documentation.
- Experience in agile methodologies as Scrum Master and DevSec-Ops routines.
- Development of predictive models using Python and associated data science libraries.
- Data cleaning, preprocessing, and exploratory data analysis to uncover insights.
- Implementation of natural language processing (NLP) for text data analysis.
- Collaborating with cross-functional teams to understand business requirements and provide data-driven solutions.
- Automation of data pipelines and workflows using Python.
- Conducting A/B testing and statistical analysis to inform business decisions.
- Continuous learning and application of new technologies and techniques in data science and machine learning.

MY LIFE PHILOSOPHY

“For those with a strong mind, the impossible is just a matter of opinion.”

DEV SKILLS

Python

Jupyter • Pandas • SymPy • AirFlow • Streamlit • Classes • Iterators • NumPy • SciPy • Matplotlib • OOP

Machine Learning (AI)

LLM • Chatbots • Transformers • Neural Networks • PyTorch • Keras • TensorFlow • MLFlow • Scikit Learn

Server Management

SLURM • LDAP • HTCondor • HPC • Scientific Computing • Shared File Systems • HPC • Ubuntu Server

SQL Data Bases

PostgreSQL • Databases Schemas • Where clauses • Update syntax • Joins • Aggregate functions • Data Retrieval

NoSQL Databases

MongoDB • OrientDB • Graph Databases • PyOrient • Apache Gremlin

Other technologies

GIT • Linux • WSL-2 • CUDA • LaTeX • Julia • Power BI

STRENGTHS

Analytical thinking

Quick learner

Data Analysis

Problem Solver

Persistent

Self-education

Empathy

OTHER SKILLS

Advanced Calculus

Artificial Intelligence

Advanced Statistics

Data Modelling

MLOps

Pattern Recognition

Agile Methodologies

Scrum Master

LaTeX

MS Office

Wolfram Mathematica

PhD in Data Modelling for Theoretical Physics

Federal University of Rio Grande do Sul (UFRGS)

📅 March 2018 – March 2024 📍 Porto Alegre - RS - Brazil

- Theoretical physics modeling for dark matter searches.
- Python programming to support the data analysis.
- Participation in seminars, conferences and talks to present results to wider audience.
- Design and execution of experimental setups to validate theoretical models.
- Advanced computational simulations in particle physics and cosmology.
- Collaboration with international research teams to exchange knowledge and findings.
- Data acquisition and processing from experimental physics instruments.
- Use of statistical methods for data analysis in particle detection and identification.
- Writing and publishing research papers in peer-reviewed scientific journals.
- Mentoring junior researchers and students in theoretical and experimental techniques.

Physics Teacher

Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul (IFRS) - Campus Viamão

📅 April 2021 – January 2022 📍 Viamão - RS - Brazil

- Class supervision and commitment to meaningful teaching and learning.
- Distribution of periodic progress reports.
- Preparation of engaging lessons plans with active methodologies.
- Development and delivery of interactive lectures and laboratory sessions for both high school and undergraduate students.
- Assessment of student learning through tests, assignments, and practical experiments.
- Providing guidance and support to students for academic and career development.
- Staying updated with the latest developments in physics and educational methodologies.
- Encouraging critical thinking and problem-solving skills through innovative teaching strategies.
- Facilitation of student-led projects and research in physics.
- Participation in faculty meetings, curriculum development, and educational planning.
- Mentoring students for science fairs, competitions, and research opportunities.

LANGUAGES

Portuguese (native) ● ● ● ● ●

English ● ● ● ● ●

French ● ● ● ● ●

Spanish ● ● ● ● ●

EDUCATION

PhD in Computational Physics

Federal University of Rio Grande do Sul (UFRGS)

📅 March 2020 – March 2024

Thesis title: Resonant dark matter production through a new spin-1 massive mediator

MSc in Theoretical Physics

Federal University of Rio Grande do Sul (UFRGS)

📅 March 2018 – February 2020

Dissertation title: Investigation of the nature of a massive vector mediator for dark matter through ee collisions

BSc in Physics

Federal University of Uberlândia (UFU)

📅 July 2014 – August 2017

PROJECTS

Escura BrasilSM

AI Tech Startup (founder)

📅 2023 - Present 📍 Brazil

The Escura Brasil is a technology startup that offers data processing and visualization, systems management and artificial intelligence solutions for small and medium-sized companies.

Quase Física Podcast

Scientific Outreach Podcast

📅 2023 - Present

A podcast designed to discuss physics and related subjects in a relaxed and entertaining manner, consistently featuring expert guests. Our goal is to shed light on the activities and developments occurring both within and beyond the academic world, making this knowledge accessible to the general public.

PUBLICATIONS

Journal Articles

- da Silveira, G. G. [G. Gil], & Mateus, M. S. (2024). Resonant production of vector dm states characterized by monophoton isr at high-energy colliders. *Brazilian Journal of Physics*, 54(5). doi:10.1007/s13538-024-01545-4
- da Silveira, G. G. [G. Gil], & Mateus, M. S.. (2024). Investigation of scalar and fermion dark matter in mono-photon production at high-energy colliders. *Eur. Phys. J. C*, 84(2), 181. doi:10.1140/epjc/s10052-024-12528-9. arXiv: 2308.03680 [hep-ph]
- M. S. Mateus Jr, & da Silveira, G. G. [G. Gil]. (2023). Investigation of spin-dependent dark matter in mono-photon production at high-energy colliders. eprint: 2308.03680. Retrieved from <https://arxiv.org/abs/2308.03680>
- Mateus, Marcio, & da Silveira, G. G. [Gustavo Gil]. (2021). Investigation of the nature of a massive vector mediator for dark matter through e^+e^- collisions. *Astron. Nachr.*, 342(1-2), 411–415. doi:10.1002/asna.202113943

Books

- de Sousa Mateus Junior, M. (2024). *Resonant dark matter production through a new spin-1 massive mediator*. Porto Alegre, Brasil. Retrieved from <https://www.lume.ufrgs.br/handle/10183/276460>
- de Sousa Mateus Junior, M., & da Silveira, G. G. [Gustavo Gil]. (2020). *Investigação da natureza de um mediador vetorial massivo para a matéria escura por meio de colisões e^+e^-* . Porto Alegre, Brasil. Retrieved from <https://lume.ufrgs.br/handle/10183/211546>