

Juan Montoya Sanchez

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Profile

Enthusiastic Physics student deeply interested in High-Energy Physics (HEP). Hands-on experience in data analysis, software development (C++, Python), and collaborative research in an academic group affiliated with the CMS experiment at CERN. Keen to apply theoretical knowledge to real-world research projects and contribute to cutting-edge scientific discoveries.

Education

Universidad de Antioquia

Bachelor of Physics

GPA: 7.9/10

2019 – *Expected* 2026

Research Experience

High-Energy Physics Group (GFIF), Universidad de Antioquia

2023 – Present

- Collaborate on low- p_T (< 30 GeV) b -jet analyses using C++ in conjunction with the CMS experiment at CERN.
- Implement data processing pipelines to study jet properties and improve event selection criteria.
- Investigate new strategies for tagging b -jets in high-luminosity collision data.

Conferences & Presentations

9th Congreso de Altas Energías de Colombia, Pasto

December 2024

- *Oral/Poster Presentation:* Preliminary results on low- p_T b -jets analysis with GFIF and CMS collaboration.

8th Congreso de Altas Energías de Colombia, Ibagué

2023

- Attended workshops and lectures focused on experimental and theoretical High-Energy Physics.

Additional Projects

United Nations Datathon 2024 – Sustainable Tourism Analysis

[GitHub Link](#)

- Analyzed large tourism datasets to highlight sustainability metrics.
- Created interactive data visualizations using Python libraries (`geopandas`, `plotly`) for global insights.

NASA Space Apps Challenge – Visualization of Climate Data

[GitHub Link](#)

- Developed data visualization techniques to represent climate patterns globally.
- Employed Python for data cleaning, manipulation, and generating geospatial plots.

Tutoring Experience

Tutor at Tutor.com

November 2024 – Present

- Provide online math and physics tutoring to students with diverse academic backgrounds.
- Tailor explanations to different learning styles, enhancing conceptual understanding.

Skills

Programming:

- C++ (HEP software, object-oriented design)
- Python (data analysis, visualization)
- Bash (basic automation, Linux environment)
- Julia (initial learning phase)

Tools:

- L^AT_EX (scientific writing)
- Linux (Debian-based systems)
- ROOT (desirable for HEP data analysis, if applicable)

Languages:

- English (B2)
- Spanish (Native)

Soft Skills:

- Problem-solving
- Teamwork & Collaboration
- Adaptability