

# Miguel Sabogal García

## Curriculum Vitæ

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Over the last 3 years I actively participated in many physics research that resulted in international scientific publications. These experiences allowed me to acquire strengths in leadership, creativity and perseverance, while building skills in a wide range of programming languages, developing specialized software and performing data management.

## Professional experience

05/2022 - 08/2022 **Research intern**, RECA Internship program 2022, Red de Estudiantes de Astronomía de Colombia.

Tasks performed:

- Design and development of specialized software in Python
- Statistical analysis using Markov chain Monte Carlo (MCMC)
- Writing of scientific articles
- Non-parametric reconstruction using Gaussian Processes (Machine Learning)
- Develop the end-to-end project plans with the execution team

05/2022 - 06/2022 **Supportive Mentor**, Pgm. de Apoyo a la Permanencia y Graduación estudiantil, Universidad del Atlántico

Tasks performed:

- In-person and virtual classes of Physics and Mathematics
- Academic support to students in their first semesters and mid-career.
- Mentoring colleagues providing advice and guidance on best practice and development techniques

## Education

- 2015 – 2022 **Physicist**, Bachelor's degree/ Universidad del Atlántico.

## Computational skills

Specialized software **Cosmic Linear Anisotropy Solving System (CLASS)** and **Gaussian processes (GaPP)**: Advanced

**Python**: Advanced, **C/C++**: Intermediate, **Fortran 90**: Intermediate, **MATLAB/Mathematica/Excel**: Advanced, **HTML**: Basic

**Techniques**: Process Automation, Machine Learning, Statistical analysis using MCMC, Web scraping, Object-oriented programming.

**Tools**: Selenium, BeautifulSoup, Scrapy, NumPy, SciPy, Pandas.

## Research Experience, Publications, and Projects

### Peer-Reviewed Publications

- Cardona, W., & **Sabogal, M. A.** Holographic energy density, dark energy sound speed, and tensions in cosmological parameters:  $H_0$  and  $S_8$ . Journal of Cosmology and Astroparticle Physics, 2023(02), 045. DOI 10.1088/1475-7516/2023/02/045 [arXiv:2210.13335](https://arxiv.org/abs/2210.13335).
- Oliveros, A., **Sabogal, M.A.**, & Acero, M.A. Barrow holographic dark energy with Granda–Oliveros cutoff. Eur. Phys. J. Plus 137, 783 (2022). DOI: [10.1140/epjp/s13360-022-02994-z](https://doi.org/10.1140/epjp/s13360-022-02994-z).
- **Sabogal, M. A.** , Parra, I. C. , Bandera, M. , Gallardo, J. , & Mejía-Cortés, C. (2020, May). Mobility of localized beams in non-homogeneous photonic lattices. In Journal of Physics: Conference Series (Vol. 1547, No. 1, p. 012023). IOP Publishing. DOI: [10.1088/1742-6596/1547/1/012023](https://doi.org/10.1088/1742-6596/1547/1/012023).

### In Preparation

- **Sabogal, M.A.**, & Gonzalez, J.(2022). Hubble constant estimation from BAO signals with LSST-simulated data. [Draft: zenodo.7131390](https://arxiv.org/abs/2210.13335).

## Honors and Awards

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- Funding award "**Enabling Science Program 2021 Award - 51**", granted by the Legacy Survey of Space and Time (LSST) observatory.
- **Undergraduate Honors Theses**, Universidad del Atlántico.

## Additional languages

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English (TOEFL)

Read: **C1**

Speak: **B2**

Write: **B2**

Listen: **C1**

**Test date:** Nov 2022

## Presentations and Events

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**Event:** XIV Latin American Symposium on High Energy Physics

**Type of event:** International Congress

**Type of participation:** Speaker

**Conference title:** Decoding Holographic Dark Energy in the structure formation.

**Place:** QUITO, ECUADOR - Universidad San Francisco de Quito, 14/11/2022 – 18/11/2022.

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**Event:** CoCo 2021: Cosmology in Colombia

**Type of event:** National Congress

**Type of participation:** Speaker

**Conference title:** Cosmological analysis of Barrow holographic dark energy model considering the Granda-Oliveros infrared cutoff.

**Place:** Online, 08/09/2021 – 11/09/2021.

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**Event:** 4th Colombian Meeting on High Energy Physics

**Type of event:** National Congress

**Type of participation:** Support staff and Assistant

**Place:** BARRANQUILLA - Universidad del Atlántico, 02/12/2019 – 06/12/2019.

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## Courses and certifications

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**PYTHON IN ASTRONOMY** Astropy Course(2022)

## Work references

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**Mario A. Acero Ortega, PhD in Physics.**

Associate Professor

Physics Program, Faculty of Basic Sciences, Universidad del Atlántico.

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**Javier E. Gonzalez Sanchez, PhD in Astronomy.**

Associate professor and supervisor in the *Red de Estudiantes de Astronomía de Colombia*.

Universidade Federal de Sergipe, Brazil.

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## Personal references

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**Jorge L. Navarro Estrada, PhD in Physics.**

Associate Professor

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