

Andrés Balaguera-Antolínez

Dr.rer.nat (Astronomy)



PHYSICIST-
ASTRONOMER
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SKILLS

PROGRAMMING

- 20+ years:
[C++/C](#). Most of my research is developed in these languages. Code in repository with ~ 80000 lines. Expertise in C++ includes structures, classes, parallelization with MPI and OpenMP. Statistical analysis of large astronomical data sets. Visualization (SuperMongo, Gnuplot). WxWidgets.
- 10+ years:
[Python](#), [Fortran](#). Basic applications (signal analysis, differential equations).
- 25+ years:
[Latex](#). Advanced knowledge in tex editing (articles, reports, books, presentations).
- 5+ years:
[HTML](#). Basic knowledge on web-page building.

SCIENCE | 20 YEARS OF RESEARCH EXPERIENCE IN PHYSICS, ASTRONOMY AND COSMOLOGY. MAIN SUBJECTS OF INTEREST

- Cosmological Physics and astrophysics:
General relativity. Evolution of the Universe.
Cosmological Probes. Cosmological parameters.
Galaxies. Stellar Evolution
- Physics:
Classical Mechanics. Celestial Mechanics. Statistical
Mechanics. Quantum Physics. Statistical methods.

TECHNOLOGY

Linux • Git/Github
UNIX • Windows • MacOS

LANGUAGES

- [Spanish](#) (mother tongue)
- [English](#) (very fluent)
- [Italian](#) (very fluent)
- [German](#) (modestly fluent)

OTHER INTERESTS/SKILLS

- Music (amateur guitar player)
- Aviation, aeronautics
- Literature and History.

EXPERIENCE

INSTITUTO DE ASTROFÍSICA DE CANARIAS (IAC) | [ADVANCED SEVERO OCHOA FELLOW](#)

June 2017 – Dec 2024 | Tenerife, Spain

- Research in the field of cosmology and large-scale structure of the Universe. Developed algorithms to produce synthetic catalogs for cosmological statistical analysis.

UNIVERSITÀ DEGLI STUDI ROMA3 |

[POST-DOCTORAL RESEARCHER](#)

Jan 2015 – Dec 2016 | Rome, Italy

- Code development for statistical analysis of galaxy redshift survey produced by the Euclid mission.

OSSERVATORIO ASTRONOMICOMI DI FRASCATI (OAF) | [POST-DOCTORAL](#)

[RESEARCHER](#)

Aug 2013 – Jan 2015 | Frascati, Italy

- Code development for statistical analysis of galaxy redshift survey produced by the Euclid mission.
- Statistical analysis of photometric redshift samples. Code development for angular clustering and the constraint of cosmological parameters.

ARGELANDER INSTITUT FÜR ASTRONOMIE (AIFA) - UNIVERSITÄT BONN |

[POST-DOCTORAL RESEARCHER](#)

Sept 2010 – Aug 2013 | Bonn, Germany

- Research in the field of cosmological parameters and probes for cosmological probes.

PROJECTS

EUCLID | [RESEARCHER](#)

Aug. 2013 – Present | ESA

Produced a prototype code (C++) to measure the power spectrum of galaxy distribution for the Euclid mission.

DESI | [RESEARCHER](#)

Jan 2021 – May 2023 | International collaboration

Lead the development of learning techniques to produce synthetic catalogs aiming at statistical analysis of n -point statistics of galaxy distributions.

MAPPING THE UNIVERSE WITH MODIFIED GRAVITY | [IP PROJECT GRANTED BY THE](#)

[GOVERNMENT OF THE CANARY ISLANDS.](#)

Jan 2022 – Jan 2023 | Tenerife, Spain

Lead the research in the field of models of modified gravity and learning techniques to produce synthetic catalogs.

EDUCATION

UNIVERSITY LUDWIG MAXIMILLIAN

DR.RER.NAT ASTRONOMY

Cum Laude Thesis

2011| Munich, Germany

IMPRS fellowship. Doctoral studies in Cosmology and the large scale structure of the Universe (see Ph.D document [here](#)) with a very intense theoretical and numerical load.

UNIVERSIDAD DE LOS ANDES

MASTER IN SCIENCE-PHYSICS

Magna Cum Laude Thesis

2005| Bogotá, Colombia

Research on theoretical cosmology.

UNIVERSIDAD NACIONAL DE COLOMBIA

BACHELOR OF PHYSICS

2002| Bogotá, Colombia

Research on solar neutrino physics.

RESEARCH

IAC | RESEARCHER IN COSMOLOGY

June 2017 – Dic 2024 | Tenerife, Spain

Main research was focused on the statistical analysis of large-scale structure, aiming at developing learning techniques to build large number of synthetic galaxy catalogues. Developments in C++ and Python.

OAF ROME, ROMA3 | POST-DOCTORAL RESEARCHER

Jan 2013 – Dec 2016 | Rome, Italy

Led the analysis of angular clustering of photometric redshift galaxy samples, leading to the construction of a public algorithm to perform tomographic analysis in cosmology.

AIFA | POST-DOCTORAL RESEARCHER

Aug 2010 – Aug 2013 | Bonn, Germany

Lead the research on new probes for cosmological analysis and the impact of baryon physics on the determination of cosmological parameters.

MAX-PLANCK INSTITUTE FOR EXTRATERRESTRIAL PHYSICS |

UNDERGRADUATED RESEARCHER

Aug 2006 – Aug 2010 | Garching, Germany

Lead the clustering analysis of the largest (to that date) X-ray galaxy cluster catalog.

UNIVERSIDAD DE LOS ANDES |

UNDERGRADUATED RESEARCHER

Jan 2003 – Dec 2005 | Bogotá, Colombia

Research in the field of theoretical cosmology and dark energy.

TEACHING

UNIVERSIDAD DE LOS ANDES | ASSISTANT

TEACHER

2003-2005 |

Classical physics.

UNIVERSIDAD DE LA LAGUNA | ASSISTANT

TEACHER

2019-2021|

Computational techniques

PUBLICATIONS

SCIENTIFIC PAPERS | COSMOLOGY AND ASTROPHYSICS

Statistics taken from the [ADS site](#):

- Number of papers: 85
- Normalized count: 9
- Total referred citations: 3538
- h-index: 28
- ORCID: [0000-0001-5028-3035](#)

Some examples of first author publications:

- [Secondary halo bias through cosmic time I. Scaling relations and the connection with the cosmic web \(2024\).](#)
- [DESI mock challenge. Halo and galaxy catalogues with the bias assignment method \(2023\)](#)
- [Extracting cosmological information from the angular power spectrum of the 2MASS Photometric Redshift catalogue \(2018\).](#)

LITERATURE | CONTEMPORARY LITERATURE

[Pasaje Bremen \(2025\).](#)

INTERVIEWS | OUTREACH

- [Coloquio Astrophysics 2021](#)
- [Interview 2022](#)
- [Press releases](#)
- [Dialogues \(2014\)](#)