Affiliation
Instituto de Fisica Teorica (IFT), CSIC

Collaborations
Euclid
LIGO
VIRGO
LISA

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Languages
Greek → Native
English → Fluent

Dr. GeorgeAlestas

Physicist - Researcher

Professional Summary

A highly motivated researcher specializing in Cosmology and Astrophysics. I am proficient in the theoretical and numerical exploration of cosmological models, including cosmological parameter inference using bayesian analysis and machine learning algorithms. I have worked on modified gravity models and several aspects of the Hubble and S_8 tensions. Part of the Euclid, LIGO, Virgo and LISA collaborations. I would describe myself as a fast learner and an excellent collaborator.

Positions & Academic Visits

2023 — **Short Academic Visit** — MIT & Harvard
Institute for Artificial Intelligence and Fundamental Interactions (IAIFI), Boston

2023 — **Short Academic Visit** — Nagoya University
Nagoya University, Japan

2022 - Now — **Postdoctoral Studies** — Universidad Autónoma de Madrid
Instituto de Fisica Teorica (IFT), Madrid

2018 - 2022 — **PhD in Cosmology** — University of Ioannina
PhD Thesis: "ΛCDM and the Implications of the Hubble Tension"
Advisor: Prof. Leandros Perivolaropoulos
Grade: Summa Cum Laude

Publication Record

Fifteen papers with a total of more than 1400 citations and **h-index = 11**, including two articles published in conference proceedings and two N-author review. The codes used in the analysis of all the papers are publicly available at **GitHub**. Click **here** for my up to date InspireHEP profile.

1. **DESI constraints on -attractor inflationary models**, G. Alestas, M. Caldarolam, S. Kuroyanagi, S. Nesseris, Preprint: https://arxiv.org/abs/2410.00827
2. **To curve, or not to curve: Is curvature-assisted quintessence observationally viable?**, G. Alestas, M. Delgado, I. Ruiz, Y. Akrami, M. Montero, S. Nesseris, Preprint: https://arxiv.org/abs/2406.09212
3. **Enhancing Cosmological Model Selection with Interpretable Machine Learning**, I. Ocampo, G. Alestas, S. Kuroyanagi, S. Nesseris, Preprint: https://arxiv.org/abs/2406.08351
4. **Applying the Viterbi Algorithm to Planetary-Mass Black Holes Searches**, G. Alestas, G. Morras, T. Yamamoto, J. Garcia-Bellido, S. Kuroyanagi, S. Nesseris, Phys.Rev.D 109 (2024) 12, 123516, DOI: 10.1103/PhysRevD.109.123516
5. **Machine learning constraints on deviations from general relativity from the large scale structure of the Universe**, G. Alestas, L. Kazantzidis and S. Nesseris, Phys.Rev.D 106 (2022) 10, 10, DOI: 10.1103/PhysRevD.106.103519
6. **Constraining a late time transition of $G_{\rm eff}$ using low-z galaxy survey data**, G. Alestas, L. Perivolaropoulos and K. Tanidis, Phys.Rev.D 106 (2022) 2, 023526, DOI: 10.1103/PhysRevD.106.023526 (More than 20 citations)

7. **Late-transition vs smooth $H(z)$ deformation models for the resolution of the Hubble crisis**, G. Alestas, D. Camarena, E. Di Valentino, L. Kazantzidis, V. Marra, S. Nesseris and L. Perivolaropoulos, Phys.Rev.D 105 (2022) 6, 063538, DOI: 10.1103/PhysRevD.105.063538 (More than 60 citations)
8. **Hints for a gravitational constant transition in Tully-Fisher data**, G. Alestas, I. Antoniou and L. Perivolaropoulos, Universe 7 (2021) 366, DOI: 10.3390/universe7100366, (More than 30 citations)
9. **Late time approaches to the Hubble tension deforming H(z), worsen the growth tension**, G. Alestas, L. Perivolaropoulos, Mon.Not.Roy.Astron.Soc. 504 (2021) 3, 3956-3962, DOI: 10.1093/mnras/stab1070, (More than 60 citations)
10. **A w–M phantom transition at zt<0.1 as a resolution of the Hubble tension**, G. Alestas, L. Kazantzidis, L. Perivolaropoulos, Phys.Rev.D 103 (2021) 8, 083517, DOI: 10.1103/PhysRevD.103.083517, (More than 70 citations)
11. **Existence and Stability of Static Spherical Fluid Shells in a Schwarzschild-Rindler-anti-de Sitter Metric**, G. Alestas, G.V. Kraniotis, L. Perivolaropoulos, Phys.Rev.D 102 (2020) 104015, DOI: 10.1103/PhysRevD.102.104015, (More than 10 citations)
12. **H_0 tension, phantom dark energy, and cosmological parameter degeneracies**, G. Alestas, L. Kazantzidis, L. Perivolaropoulos, Phys.Rev.D 101 (2020) 12, 123516, DOI: 10.1103/PhysRevD.101.123516, (More than 140 citations)
13. **Evading Derrick's theorem in curved space: Static metastable spherical domain wall**, Alestas G., Perivolaropoulos L., Phys.Rev.D 99 (2019) no.6, 064026, DOI: 10.1103/PhysRevD.99.064026, (More than 10 citations)

Articles published in conference proceedings:

1. **Stable, Spherical and Thin Fluid Shells,** G. Alestas, G. V. Kraniotis, L. Perivolaropoulos, Published in Phys.Sci.Forum 2021, 2, 24, DOI: 10.3390/ECU2021-09332
2. **An Overview of Nonstandard Signals in Cosmological Data,** G. Alestas, G. V. Kraniotis, L. Perivolaropoulos, Published in Phys.Sci.Forum 2021, 2, 28, DOI: 10.3390/ECU2021-09333

N-author articles:

1. **Euclid. I. Overview of the Euclid mission**, **Euclid Collaboration**, Y. Mellier *et al.*, Preprint: https://arxiv.org/abs/2405.13491
2. **Cosmology Intertwined: A Review of the Particle Physics, Astrophysics, and Cosmology Associated with the Cosmological Tensions and Anomalies**, E. Di Valentino *et al.*, Contribution to: 2022 Snowmass Summer Study, Published in JHEAp 34 (2022) 49-211, DOI: 10.1016/j.jheap.2022.04.002, (More than 700 citations)

Scholarships & Grants

2022-23 **Grant for IFT - Institute for Artificial Intelligence and Fundamental Interactions (IAIFI) exchange program on academic visits.**

2022-23 **Application of machine learning to new cosmological observations, Funding institution: Ministerio de Ciencia e Innovación, i-LINK 2021**

2021-22 **Fellow of the Greek State and the European Union (European Social Fund – ESF) through the Operational Programme "Competitiveness, Entrepreneurship and Innovation 2014-2020 (EPAnEK)"**

2020-21 **Fellow of the Greek State and the European Union (European Social Fund – ESF) through the Operational Programme "Human Resources Development, Education and Lifelong Learning 2014-2020"**

2020 **European Cooperation in Science & Technology (COST) grant for a short term scientific mission (STSM) in the context of the action "CA15117 - Cosmology and Astrophysics Network for Theoretical Advances and Training Actions (CANTATA)" and the project "Search for Hints of Modified Gravity in Cosmological Data"**

Conferences Attended & Talks Given

- Seminar at the Smithsonian center for astrophysics, November 2023, Harvard, **(Talk)**
- Cosmo23 - 2023 Conference in Cosmology, September 2023, Madrid, Spain, **(Co-Organizer)**
- Kickoff workshop, June 2023, Nagoya University, Japan, **(Talk)**
- i-Link workshop, June 2023, Nagoya University, Japan, **(Talk)**
- Seminar at ICF, February 2023, UNAM, Mexico, **Invited Talk**
- HEP 2020 - 38th Conference on Recent Developments in High Energy Physics and Cosmology, September 2021, Athens, Greece.
- 16th Marcel Grossmann Meeting - MG16, July 2021, Rome, Italy, **(Talk)**
- 19th online Conference in the String Phenomenology Conference Series, June 2020, Boston, United States.
- 9th Korea Institute of Advanced Study (KIAS) Workshop on Cosmology and Structure Formation webinar, November 2020, Seoul, South Korea
- Workshop on Quantum Fields and Nonlinear Phenomena, SEENET-MTP-CERN-ICTP Joint Meeting, 2020, Romania, **(Talk)**
- SEENET-MTP Balkan School on High Energy and Particle Physics: Theory and Phenomenology, 2019, Ioannina, **(Talk)**
- HEP 2019 - Recent Developments on High Energy Physics and Cosmology, 2019, Athens

Research Interests

Theoretical Cosmology, Observational Cosmology, Machine Learning, Hubble Tension, Modified Gravity, Dark Energy, Data Analysis, Gravitational waves, Soliton Physics

Programming Knowledge

- Linux, Windows
- Python, C/C++, Fortran, HTML, Tensorflow
- COSMOMC/CAMB, MontePython/Class, Mathematica, Matlab

Skills

Cosmology, Theoretical Astrophysics, Machine Learning Techniques, Computational Physics, General Relativity, Data Analysis

Teaching Experience

2021-22 **Teaching Assistant** University of Ioannina
Classical Electrodynamics I (5th Semester Core Course – 52), my duties were:
1. The tutoring of third year students.
2. The grading of weekly assignments.

2021-22 **Teaching Assistant** University of Ioannina
Gravity and General Theory of Relativity (Advanced Undergraduate Elective Course – 106), my duties were:
1. The grading of weekly assignments and reports.

2020-21 **Teaching Assistant** University of Ioannina
Cosmology (Advanced Undergraduate Elective Course – 105), my duties were:
1. The grading of weekly assignments and reports.

2020-21 **Teaching Assistant** University of Ioannina
Gravity and General Theory of Relativity (Advanced Undergraduate Elective Course – 106), my duties were:
1. The grading of weekly assignments and reports.

2019-20 **Teaching Assistant** University of Ioannina
Classical Electrodynamics I (5th Semester Core Course – 52), my duties were:
1. The grading of weekly assignments and reports.

2016-17 **Teaching Assistant** University of Patras
Astrophysics Laboratory (TAE450), my duties were:
1. The tutoring of third and fourth year students.
2. The grading of weekly assignments and reports.

2016-17 **Teaching Assistant** University of Patras
Astronomy Laboratory (TAE451), my duties were:
1. The tutoring of third and fourth year students.
2. The grading of weekly assignments and reports.
3. Demonstrating the use of Astronomical equipment.

Societies

- Student Member of the American Physical Society (APS)
- Junior Member of the Hellenic Society on Relativity, Gravitation and Cosmology

Professional References

Prof. Leandros Perivolaropoulos - **leandros@uoi.gr** (PhD Advisor)
Dr. Sachiko Kuroyanagi - **sachiko.kuroyanagi@csic.es**
Asst. Prof. Savvas Nesseris - **savvas.nesseris@csic.es**
Dr. Yashar Akrami - **yashar.akrami@csic.es**