Antón Baleato Lizancos

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Research Interests

Theoretical and data-driven cosmology. In particular, weak gravitational lensing of the cosmic microwave background and the large scale structure of the Universe as probes of fundamental physics.

Education

University of Cambridge, Institute of Astronomy, Cambridge, UK   **10/2017 - 6/2021**

PhD candidate in Cosmology supervised by Prof. Anthony Challinor.
Thesis title: *Understanding biases to CMB lensing and delensing on the road to precision science*

University of Cambridge, DAMTP, Cambridge, UK   **2016 - 2017**

MASt in Applied Mathematics & Theoretical Physics (*Part III of the Mathematical Tripos*)
Essay title: *Primordial gravitational waves from cosmic inflation*

Columbia University, New York, USA   **2012 - 2016**

B.Sc. Applied Physics, minor in Applied Mathematics. *Magna Cum Laude*

Fellowships & Awards

Isaac Newton PhD Scholarship, University of Cambridge
    Prize scholarship for graduate studies (£54,000)

Marie Sklodowska-Curie/ Inphinit La Caixa graduate fellowship (declined)
    Prize scholarship for graduate studies (€122,000)

Trinity College Cambridge Studentship in Mathematics
    Covering full cost of tuition and maintenance for M.ASt. studies

Perimeter Institute PSI scholarship (declined)
    Covering full cost of tuition and maintenance for M.Sc. studies

Columbia University Egleston Scholar
    Top 1% of applicants to School of Engineering & Applied Science ($200,000)

Davis UWC Scholar at Columbia University
    In support of undergraduate tuition costs ($40,000)

United World Colleges Scholarship
    Full scholarship for two years. Elected among 700 applicants ($60,000)

Research Positions & Collaborations

Alan Turing Institute, London, UK   **12/2019**

Data Study Group in collaboration with the World Wildlife Fund
In a team, built a pipeline to detect threats to a network of 200,000+ protected sites by applying Natural Language Processing and Machine Learning techniques to news articles. [Link to published report]

Simons Observatory   **1/2018 -**

Member of the analysis working group
Development of a pipeline to delens CMB B-mode polarisation using internal reconstructions of the lensing potential as well as external tracers.

Instituto de Astrofísica de Canarias, Tenerife, Spain   **7/2017 - 9/2017**

Summer project supervised by Dr. Claudio Dalla Vecchia
Studied the origin and evolution of massive compact relic galaxies using the EAGLE suite of cosmological simulations. [Link to summary]

Columbia University Experimental Cosmology group, NY, USA   10/2013 - 5/2016

Undergraduate research supervised by Prof Amber Miller

Developed feature-recognition and cross-correlation algorithms to study velocity field dynamics, vorticity and turbulence in Mesospheric Polar Clouds. [Link to abstract]

Oxford University Astrophysics, Radio Astronomy group, Oxford, UK   6/2014 - 8/2014

Summer project supervised by Dr Gemma Anderson and Dr Jess Broderick

Searched for Supernova remnants in LOFAR data. [Link to abstract]

Selected publications

For a complete, up-to-date list, please see my ORCID page (0000-0002-0232-6480)

- **A. Baleato Lizancos**, A. Challinor and J. Carron (2020) *Impact of internal-delensing biases on searches for primordial B-modes of CMB polarisation, submitted to JCAP (under review)*, [arXiv:2007.01622]
- **A. Baleato Lizancos**, A. Challinor and J. Carron (2020) *Limitations of CMB B-mode template delensing, to be submitted*
- **A. Baleato Lizancos**, A. Challinor, B. Sherwin and T. Namikawa (2020) *Delensing the CMB with the cosmic infrared background: the impact of foregrounds, to be submitted*
- T. Namikawa, **A. Baleato Lizancos**, N. Robertson, B. Sherwin and A. Challinor (2020) *Constraining Primordial Gravitational Waves by Delensing B-modes with the Simons Observatory, to be submitted*
- **A. Baleato Lizancos**, W. Coulton, A. Challinor and B. Sherwin *CosmoBLENDER: fast modeling of biases from galaxies and clusters to CMB lensing spectra and cross-correlations, in preparation* [Link to abstract]

Selected Talks

- *Understanding biases to CMB lensing and delensing on the road to precision science*
    - Invited talk. 11/20 (upcoming). IAP, Paris. Cosmology group meeting.
    - Invited talk. 11/20 (upcoming). University of Geneva, Switzerland. Cosmology seminar.
    - Invited talk. 10/20. ICCUB, Barcelona, Spain. Cosmology group meeting.
    - Invited talk. 10/20. University of Oxford, UK. Cosmology journal club.
    - Invited talk. 10/20. UCL, UK. Cosmology and extragalactic astrophysics seminar.
    - Online Poster. 9/20 The Royal Astronomical Society's Early Career Poster Exhibition
- *Biases to CMB B-mode delensing on large angular scales*
    - Invited talk. 4/20. University of Sussex, UK. Workshop on CMB lensing.
    - Invited talk. 10/19. CMB-S4 San Diego meeting. Delensing cross-cut session.
- *Delensing the Simons Observatory data: pipeline updates*
    - Delensing group summary talk. 11/19. Simons Observatory analysis working group zoom-day.
- *Delensing CMB B-modes: prospects & challenges for the next generation of experiments*
    - Contributed talk. 12/19. Portsmouth, UK. 30th Texas symposium on relativistic astrophysics.
    - Flash talk & poster. 9/19. University of Cambridge, UK. KICC 10th Anniversary Symposium.
    - Student talk. 9/19. DAMTP, University of Cambridge, UK. Workshop on the non-Gaussian Universe.
- *Prospects for CMB polarisation B-mode delensing with the Simons Observatory*
    - Flash talk & poster. 3/19. IAP, Paris. Cosmogold 2019 conference.
    - Wednesday seminar series. 3/19 . Institute of Astronomy, University of Cambridge, UK

Membership

- Member of the Simons Observatory and CMB-S4 collaborations
- Fellow of the Royal Astronomical Society
- Member of Trinity College, Cambridge
- Member of the sustainability committee at the Institute of Astronomy, University of Cambridge

Teaching

- Supervised Prof Pettini's *Introduction to Cosmology* undergraduate course. *10/18-1/19, U. of Cambridge.*
- Supervised Prof Efstathiou's *The Physics of Cosmology* undergraduate course. *1/20-4/20, U.of Cambridge.*

Public engagement

- "Campus de estrelas" Developed virtual reality visualisations (Galician/English) for cosmology outreach for the *Aulas Galegas* teaching platform.
- "Testigos no tempo" podcast participant. 5/20. Luis Seoane Foundation. A Coruña, Spain.
- "Gravitational lensing: a window to the invisible Universe" *2/2020 Public outreach talks series. Institute of Astronomy, Cambridge, UK.*
- "Our Utterly Wonderful Cosmos" *11/2019 Friday Night Lecture. Atlantic College UWC. Wales, UK.*
- "Telescopes as time machines" *5/2019 Public outreach talks series. Institute of Astronomy, Cambridge, UK.*
- Outreach program volunteer. 11/2017- *Institute of Astrononomy, University of Cambridge*
- "Un Universo en evolución" 11/2016. *Área de Galego. Instituto Español Cañada Blanch. London, UK*
- Volunteer STEM teacher for immigrant teenagers *7-9/2016, Ecodesarrollo Gaia NGO, A Coruña, Spain*

Additional information

Computing skills:
- High-performance computing (experience on NERSC and Cambridge clusters)
- Natural Language Processing – topic modelling, sentiment analysis
- Neural networks – basic implementations of deep learning and active learning

Languages:
- Bash (advanced), Python (advanced), Mathematica (advanced), C (elementary)
- Full professional competence in Galician, Spanish and English (TOEFL 119/120)