Playing dice with the universe: Bayesian statistical analyses of cosmological models and new observables

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List of Publications

- *Bayesian reconstruction of the inflaton's speed of sound using CMB data*
  Guadalupe Cañas-Herrera, Jesús Torrado Cacho and Ana Achúcarro
  2020, Physical Review D 103, 12, 123531

- *Current and future constraints on single-field α-attractor models*
  Guadalupe Cañas-Herrera, Fabrizio Renzi
  2021, Physical Review D 104, 10, 103512

- *Cross-correlation of the astrophysical gravitational-wave background with galaxy clustering*
  Guadalupe Cañas-Herrera, Omar Contigiani and Valeri Vardanyan.
  2020, Physical Review D 102, 4, 043513

- *Learning how to surf: Reconstructing the propagation and origin of gravitational waves with Gaussian Processes*
  Guadalupe Cañas-Herrera, Omar Contigiani and Valeri Vardanyan.
  2021, The Astrophysical Journal, 918, 20.

Curriculum Vitae

I was born on the 8th of April 1993 in Griñón (Madrid), Spain, to Miguel Cañas Muñoz and Guadalupe Herrera Herrera. When I was three years old we moved to Cantabria. I pursued my primary education at the public school *Miguel Primo de Rivera* in Ampuero, Cantabria, and I graduated with honours in 2011 from the secondary school *IES Fuente Fresnedo*, within a French bilingual program, in Laredo, Cantabria. Since I was a child I knew I would become a scientist one day, and when I was only fourteen years old, I was determined to study physics. I combined my compulsory studies with my interest in classical music studying piano at the Regional Conservatory. I became a professional pianist graduating at Conservatory *Jesús de Monasterio* in 2013.

In 2011 I began my Bachelor's studies in Physics at *University of Cantabria*, pursuing an Erasmus exchange year at *Utrecht University*, the Netherlands, between 2013 and 2014. I completed my Bachelor's research project during a summer internship in 2015 at *Brown University*, USA, in the field of "Weak Lensing measurements". In spring 2016, after working as a research intern and a teaching assistant for the *Physics Institute of Cantabria* during the fall semester, I obtained my Bachelor's degree in Physics with a minor in "Fundamental Physics".

After graduating, I spent the summer of 2016 working as a research intern at DESY, Germany, in astroparticle physics. In September 2016, thanks to a LION scholarship, I joined *Leiden University* as a master's student in Physics to pursue the specialization in Cosmology at the *De Sitter* programme. I graduated *cum laude* in July 2018. I combined my studies with organizational positions at the educational board and intensive Dutch language courses.

Soon after, I started my PhD as a *De Sitter* fellow in both the *Lorentz Institute for Theoretical Physics* and *Leiden Observatory* under the supervision of Prof. dr. Ana Achúcarro and Dr. Alessandra Silvestri. I studied various topics in Cosmology such as inflation, gravitational waves and data analysis. During my PhD time, I was teaching assistant of the courses *Theory of General Relativity* and *Quantum Field Theory*, visited several research institutions, participated in many conferences and schools, co-organized the bi-weekly *Cosmology seminars* and the Leiden sessions of the *Theoretical Cosmology Meetings*. I organized my first ever workshop at the

Lorentz Center taking place in September 2022.

Besides, I had the opportunity to join the Euclid Consortium, which is the responsible scientific team of the European Space Agency *Euclid* mission. In this collaboration, I work as an active member of the Theory Science Working Group and as a core developer of the Inter-Science Taskforce Likelihood coding the software *Cosmological Likelihood for Observables in Euclid* (`CLOE`), which is a crucial analysis computational tool for the *Euclid* mission. I participate weekly as a consultant in the Inter-Science Taskforce Non-Linear, I co-organized the 2021 Theory Science Working Group meeting, and I chaired a plenary session of the 2022 Annual Euclid Consortium Meeting. My work within the consortium was acknowledged in 2021 with the STAR prize.

In fall 2022 I will join the European Space Agency as a postdoctoral Research Fellow at the facility location "European Space and Technology Centre" (ESTEC) in Noordwijk (Zuid-Holland, the Netherlands), where I will continue working for the *Euclid* mission.

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