Ximena Paniagua Sánchez

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About me

I am Ximena Paniagua, a PhD student at the University of Chile. My research focuses on developing computational tools to enhance data acquisition in astrophysical contexts, with a particular interest in the integration of statistical and physical processes in observational cosmology.

Education

University of Chile, PhD student — Aug 2025 – Ongoing

- **Field of investigation:** Observational cosmology.
- **PhD supervisor:** Domenico Sapone.

University of Chile, BS in Astronomy — Mar 2021 – Jul 2025

- **Coursework:** General Astronomy, Experimental Astronomy, Astrophysics of Stars, Astroinformatics, Astrophysics of galaxies
- **Ranking:** 1 / 9
- **GPA:** 6.2/7, A (Graduated with Honors)

University of Chile, BS in Physics — Mar 2021 – Jul 2025

- **Coursework:** Electrodynamics, Classical Mechanics, Quantum Mechanics, General Relativity, Cosmology
- **Ranking:** 4 / 16
- **GPA:** 6.1/7, A (Graduated with Honors)

Research Experience

Physics Research Assistantship, University of Chile – Santiago, Chile — Mar 2024 – Ongoing

- Designed a Fisher matrix to constrain cosmological parameters and enhance the utilization of the Euclid space telescope.
- Gained experience in generating data using CAMB (Code for Anisotropies in the Microwave Background).
- Github link

Astronomy Research Assistantship, University of Chile – Santiago, Chile — Mar 2025 – Jul 2025

- Simulated TeV halos emitted by blazars using the CRPropa library.
- Studied particle interactions influenced by the intergalactic magnetic field.

Physics Internship, University of Chile – Santiago, Chile — Jan 2024

- Developed and implemented a genetic algorithm to optimize function fitting for the Hubble expansion rate, $H(z)$, in the context of modern cosmological models.
- Gained in-depth understanding of the logic behind genetic algorithms.
- Investigated various cosmological models to further my understanding of the field.
- Github link

Astronomy Internship, University of Chile – Santiago, Chile — Jan 2024

- Refined fiber profiles in the Local Volume Mapper (LVM) data reduction pipeline.
- Extracted spectra using non-Gaussian profiles to improve data accuracy.
- Optimized pipeline execution time to enhance overall efficiency.

Teaching Experience

Teaching Assistant, Cosmology, University of Chile – Santiago, Chile — Aug 2025 – Ongoing

Teaching Assistant, Numerical Methods for Physics, University of Chile – Santiago, Chile — Mar 2025 – Ongoing

Teaching Assistant, Thermodynamics, University of Chile – Santiago, Chile — Aug 2024 – Dec 2024

Research schools

CECs-USS School of Theoretical Physics – Valdivia, Chile — Jan 2024

- Acquired hands-on knowledge in Physics-Informed Neural Networks (PINNs), Lie algebra, black holes, and gauge system analysis.
- Participated in discussions on the latest developments in theoretical physics.
- Link to school Website

Perimeter-SAIFR-IFT Journeys into Theoretical Physics – São Paulo, Brazil — Jul 2024 – Aug 2024

- Attended a theoretical physics school, where I gained knowledge in quantum mechanics, cosmology, De Sitter space-time, and quantum computing.

Awards, Scholarships and Fellowships

Outstanding student, University of Chile – Santiago, Chile — 2021, 2022 & 2024

CECs-USS Schools of Theoretical Physics Full Scholarship , San Sebastian University – Valdivia, Chile — 2024

Perimeter-SAIFR-IFT Journeys into Theoretical Physics Local Expenses, IFT-UNESP, Brazil — 2024

Skills

Computational languages:
Python - Proficient
Mathematica - Basic
LATEX- Proficient
Cosmology and data analysis packages: CAMB, CLASS

Languages

Spanish (Native)
English (B2)