Valentina Ortúzar-Garzón

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Google Scholar ◇ ORCiD

My research focuses on white dwarf atmospheres, particularly metal-polluted systems and what they can reveal about the composition of exoplanets and the long-term evolution of planetary systems. I do this by combining spectroscopic observations, synthetic atmosphere models, and machine learning techniques to study stellar and planetary remnants, to help uncover the fate of planetary material around compact stars.

EDUCATION

Pontificia Universidad Católica de Chile (PUC) *March 2025 - March 2029 (expected)*
PhD Student in Astrophysics, GPA – 6.74 (scale 1 to 7)
Supervised by Dr. Claudia Aguilera-Gómez

Universidad Técnica Federico Santa María (UTFSM) *March 2021 - January 2025*
Bachelors in Astrophysics, GPA – 6.5 (scale 1 to 7)
Awarded *Federico Santa María y Carrera* Academic Distinction for highest academic achievement

PUBLICATIONS

Ortúzar-Garzón, Valentina, Matthias R. Schreiber, and Diogo Belloni (Oct. 2024). "Suggested magnetic braking prescription derived from field complexity fails to reproduce the cataclysmic variable orbital period gap". In: *Astronomy & Astrophysics* 690, L1, p. L1. DOI: 10.1051/0004-6361/202451829. arXiv: 2409.05673 [astro-ph.SR].

COMMUNICATION

Talks

A Machine Learning Approach to Spectro-Photometric Analysis of White Dwarf Atmospheres
October 2025, SOCHIAS XX Annual Meeting, Puerto Montt, Chile

Posters

Using Machine Learning Algorithms to Measure Chemical Abundances in Metal Polluted White Dwarfs
November 2024, SOCHIAS XIX Annual Meeting, Arica, Chile

OBSERVING EXPERIENCE

Clay/MIKE at Las Campanas Observatory
2 nights, Observer

Baade/MagE at Las Campanas Observatory
1 night, Observer

Clay/WINERED at Las Campanas Observatory
3 nights, as part of the Science Support team

AWARDS AND SCHOLARSHIPS

Scholarship, *Beca Doctorado Nacional*, awarded by ANID — *2026 - (until 2029)*
Scholarship, *Beca Arancel y Manutención*, awarded by Institute of Astrophysics - PUC — *2025*
Award, *Premio al Mérito Académico 2024*, awarded by UTFSM — *2024*
Award, *Premio al Mérito Académico 2023*, awarded by UTFSM — *2023*
Scholarship, *Beca Mérito Académico*, awarded by UTFSM — *2021*

TEACHING

Teaching and Lab Assistantships as an undergraduate student at UTFSM.

Teaching Assistant, Estructura y Evolución Estelar (AST-220) 2024
Teaching Assistant, Medio Circunestelar y Sistemas Planetarios (AST-210) 2024
Teaching Assistant, Mecánica Intermedia I (FIS-210) 2023
Lab Assistant, Instrumentación Científica (FIS-110) 2022 & 2023
Lab Assistant, Fisica General I (FIS-110) 2022

SKILLS

Programming Languages	Python, Fortran, Wolfram/Mathematica, MATLAB, basic HTML
Astronomy Software	iSpec, Topcat, MESA, IRAF, GALFIT, MAGPHYS
Machine Learning Tools	Pytorch, Tensorflow, Sklearn

RESEARCH PROJECTS

Testing mass-radius relations using Gaia distances as constraints in Machine Learning algorithms July 2024 - December 2024
Supervisors: Dr. Odette Toloza and Dr. Pia Amigo UTFSM

- Implemented Machine Learning models to predict the atmospheric parameters of 262 hydrogen WDs, using ultraviolet spectroscopy from the Hubble Space Telescope
- Worked with mass-radius relations and cooling sequences of white dwarfs

Confirmation of Si IV emission in the UV spectrum of G29-38 July 2023 - December 2023
Supervisor: Dr. Odette Toloza UTFSM

- Analyzed the ultraviolet spectra of the metal polluted white dwarf G29-38
- Performed Markov Chain Monte Carlo simulations to confirm the presence and determine the significance of an emission line from Si IV.

A Machine Learning Approach to Spectro-Photometric Analysis of White Dwarf Atmospheres 2025 - present
Supervisor: Dr. Claudia Aguilera-Gómez PUC

- Developed a machine-learning based pipeline, using Extreme Gradient Boosting, to predict stellar parameters for pure-hydrogen WDs
- Worked with synthetic white dwarf atmosphere models, building interpolators for the model grids
- Analysed observed spectra from SDSS, DESI, and X-Shooter
- Paper in preparation

Can we form Super-Earths with pebble accretion? August 2025 - December 2025
Supervisor: Dr. Gijs Mulders PUC

- Simulated Super-Earth formation using a pebble accretion model (PPOLs, McCloat et al. 2025)
- Worked with N-body simulations to model growth through collisions in later evolutionary stages, to reproduce peas-in-a.pod architechtures of known multi-planet systems