

JOSEFINA DERPICH BLACK

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Gravitational Lensing • Machine Learning • Spectroscopy • Observational Cosmology

RESEARCH EXPERIENCE

Research Assistant November 2024 - Present
Gravitational Lensing Research – Astrophysical Institute, Andres Bello National University *Santiago, Chile*

- Collaborated with Prof. Timo Anguita on Strongly Lensed Quasars within the context of Rubin LSST.
- Applied Machine Learning models to study multiple imaged quasar systems to deblend spectra into separate source + lens components for SED analysis using observational data from NTT-EFOSC and VLT/X-shooter.

Observational Assistant – ESO NTT Telescope March 2025
La Silla Observatory *Santiago, Chile*

- Participated in observations for lensed quasar candidates using the New Technology Telescope (NTT) with the EFOSC instrument at La Silla Observatory. Assisted in the setup, monitoring, and data acquisition process under the supervision of experienced observers. Twelve targets were observed.

EDUCATION

Astronomy Bachelor August 2020 - December 2025
Andres Bello National University *Santiago, Chile*

- *Student Society for Astronomical Research and Outreach (SEIDA) - Outreach Coordinator:*
SEIDA is a student-initiated organization that promotes Astronomical knowledge both within and beyond the university community. I am responsible for organizing and delivering talks for undergraduate audiences.
- *Thesis:* Testing Neural Network Spectral Decomposition Algorithms for Strongly Lensed Quasars.
Supervisor: Prof. Timo Anguita.
- *Relevant Courseworks:* Cosmological Numerical Simulations, Astrophysics of Gravitational Waves, Astronomy Laboratory II.

Informatics Engineering Bachelor March 2017 - July 2020
Adolfo Ibañez University *Santiago, Chile*

Scholar Student 2003 - 2016
The Grange School *Santiago, Chile*

Cambridge International Curriculum:

- IGCSE (English as First Language, Science, Mathematics and French).
- A-Levels (English as First Language, Chemistry, Mathematics and Thinking Skills).

SKILLS

Programming Languages	Python (Expert), C++, Bash, SQL, JavaScript, Semantic HTML5.
Scientific Libraries	Astropy, SciPy, Pandas, Lenstronomy, Matplotlib, NumPy.
Machine Learning	PyTorch – GRU Networks, RNNs, CNNs; neural network training and evaluation.
Data Analysis	FITS file processing, multi-band photometry, time-series analysis, SED modeling, spectral deblending, astrometry.
Simulations	TNG (IllustrisTNG), EAGLE, SEVN (Stellar Evolution).
Observational Tools	IRAF, DS9, TOPCAT, VLT/X-shooter, NTT-EFOSC.
Dev Tools	Git, VS Code, L ^A T _E X, Jupyter Notebooks.

TEACHING EXPERIENCE

Teaching Assistant – Programming Workshop and World Wide Web March 2025 - July 2025
Faculty of Civil Engineering, Federico Santa María Technical University *Santiago, Chile*

- Supported practical sessions and student projects in programming and web development, courses developed by Dr. Ernesto Vivanco.

Teaching Assistant – Calculus I, II, and III March 2023 - December 2024
Faculty of Mathematics, Andres Bello National University *Santiago, Chile*

- Served as a TA for four consecutive semesters, supporting undergraduate students in differential, integral, and multivariable calculus. These courses were organized by the Director of the Department of Mathematics Victor Cepeda at Campus Casona.

Private Physics and Math Tutor January 2022 - December 2024

- Provided personalized tutoring to high school and university-level students in physics and mathematics.

OUTREACH TALKS

“**Black Holes**” – The Grange School, 3rd grade students.

“**AGN and Gravitational Lensing**” – Andres Bello National University for Physics and Astronomy students, organized by SEIDA.

“**The Moon**” – Colegio Sagrados Corazones, Ñuñoa, 3rd grade students.

“**Nebulae**” – Andacollo’s Escuela Luis Cruz Martínez, 6th graders.

“**Telescopes of the Calán Observatory**” – University of Chile Observatory, outreach talk for 7th graders.

“**Earth, Sun, and Moon**” – The Grange School, 1st grade students.

“**The Moon**” & “**Black Holes**” – Craighouse School, 3rd grade students.

WORKSHOPS

IV Workshop de Estudiantes de Ciencias Físicas y Astronómicas August 2025

- Attended the three-day workshop organized by CECFA at the Universidad de La Serena. Presented a poster on my bachelor’s thesis: “*Testing Neural Network Spectral Decomposition Algorithms for Strongly Lensed Quasars*”. La Serena, Chile.

Rubin Community Workshop July–August 2025

- Attended the five-day workshop emphasizing Rubin LSST science. Various talks were given on specific topics such as strong lensing science, updates from science pipelines and survey strategy. This took place in Tucson, AZ at the Marriott University Park.

Academia and Industry: Strategies for a Successful Career November 2024

- Participated in the career workshop hosted by Kim Nilsson and Ole Moeller-Nilsson at the Exact Sciences Faculty at UNAB.

Galaxy Chemistry with Numerical Simulations October 2024

- Participated in the Hands-On hosted by Prof. Maria Celeste Artale at the Astrophysics Institute of UNAB.

LANGUAGES

Spanish (Native)

English (Advanced)

French (Basic)