

JORGE

ANAIS VILCHEZ

CONTACT

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EXPERIENCE

Research **2022 - Present**
Characterization of the Sagittarius dwarf spheroidal galaxy at low Galactic latitudes | Universidad de Antofagasta

Principal investigator of the project funded by the ANID National Doctoral Scholarship (2024-2026). Detailed characterization of the structure, stellar content, and dynamics of the Sagittarius dwarf galaxy in low Galactic latitude regions, combining photometric and spectroscopic data from multiple surveys.

Instructor **2023 - Present**
Duoc UC, School of Informatics and Telecommunications | Santiago, Chile

Teaching Machine Learning and Deep Learning courses for computer engineering students.

Early Career Visitor Programme **04/2025 - 10/2025**
Characterization of new Sagittarius Dwarf Galaxy Clusters | ESO, Chile

Researcher in the project led by Dr. Elisa R. Garro combining deep HST photometry (WFC3, F555W and F814W) and FLAMES+UVES spectroscopy (98 hrs, PI: Garro) to precisely determine ages and chemical compositions of Sagittarius dwarf galaxy globular clusters. Goals include resolving the age-metallicity relation, testing formation scenarios during Sgr-Milky Way interaction, and comparing with theoretical models to reconstruct Sgr's evolutionary history.

Research **09/2024 - Present**
Variable stars in the Sagittarius dwarf spheroidal galaxy | NOIRLab

Collaboration with NOIRLab researcher Kathy Vivas to detect and classify variable stars (focus on δ Scuti and RR Lyrae stars) in the central regions of Sagittarius galaxy using multiepoch DECam data.

Data Scientist **08/2021 - 04/2022**
Grupo Kaufmann AWTO | Chile and Brasil

Design and implement machine learning models, perform exploratory data analysis, communicate insights and recommendations to stakeholders.

Research **03/2020 - 11/2020**
Principal investigator of the project: Search and characterization of star clusters in the far end of the Galactic bar | CITEVA, Universidad de Antofagasta

Development of a methodology based on unsupervised machine learning to search for young cluster candidates at the far end of the Galactic bar. This work allowed us to identify three new cluster candidates at a highly extincted and crowded region of the Milky Way. Under the supervision of Dr. Sebastián Ramírez and Dra. Karla Peña Ramírez.

Research Assistant **03/2020 - 11/2020**
Spectroscopy models for planetary atmospheres | CITEVA, UA

Study on transmission spectroscopy *in silico* models for Earth-like and Mini-Neptunes planetary atmospheres. The result of this research was used for a JWST Time Proposal (#2684, cycle 1). Under the supervision of Dr. Jeremy Tregloan-Reed.

Observer **2015 - 2025**
1M2H Project, UC Santa Cruz | *Las Campanas Observatory, Atacama, Chile*
Photometric transients follow-up using Swope Telescope. Responsible for data acquisition, data quality assurance, and system troubleshooting. Under the supervision of Dr. Ryan Foley.

Research Assistant **01/2016 - 06/2016**
Data reduction | *Instituto de Astronomía, Universidad Católica del Norte, Antofagasta, Chile*
Data reduction of VLT FORS and Magellan MagE data. Under the supervision of Dr. Christian Moni Bidin.

Observer **2014 - 2015**
Carnegie Supernova Project II | *Las Campanas Observatory, Atacama, Chile*
Observations of low-redshift supernovae using the Swope Telescope at Las Campanas Observatory. Under the supervision of Dr. Mark M. Phillips.

Research Assistant **2014 - 2015**
Sonification of medical images | *Instituto de Música, Pontificia Universidad Católica de Chile, Santiago, Chile*
Development of a sonification tool to assist radiologists in the detection of breast cancer. In collaboration with Dr. Rodrigo Cádiz and Dr. Patricio de la Cuadra.

EDUCATION

Doctorate in Astrophysics and Astroinformatics **2022 - (2025)**
Universidad de Antofagasta | *Antofagasta, Chile*
PhD candidate. Thesis: "Characterization of Sagittarius dwarf galaxy at low Galactic latitudes"

Master in Astronomy **2018 - 2020**
Universidad de Antofagasta | *Antofagasta, Chile*
Thesis: "Search and characterization of star clusters in the far end of the Galactic bar".

Licentiate in Astronomy **2008 - 2014**
Pontificia Universidad Católica de Chile | *Santiago, Chile*
Graduation activity: "A new astrometric software for the Swope Telescope", developed at Las Campanas Observatory.

SKILLS

Software Proficient in developing data analysis, reduction, and visualization using Python and its main associated modules (Astropy, Matplotlib, Numpy, Pandas, Plotly, PyTorch, Seaborn, SciPy). Astronomical software: IRAF, DS9, TOPCAT. Other technologies: Bash, Docker, Git, $\text{\LaTeX}$, PostgreSQL, R. Github repo: <https://github.com/jorgeanaïs>

Languages

- Spanish (native)
- English (professional competence)

TEACHING EXPERIENCE

Instructor **2023 - Present**
Duoc UC, School of Informatics and Telecommunications | *Santiago, Chile*
Teaching Machine Learning and Deep Learning courses for computer engineering students.

Teaching Assistant**2010 - 2014***Pontificia Universidad Católica de Chile | Santiago, Chile*

Courses: Introduction to Physics for Biological Sciences, Static and Dynamics for Civil Engineers, Thermodynamics, Optics, Astronomical Instrumentation and Electricity and Magnetism.

COURSES TAUGHT

AVY1101 Big Data, AVY1102 Fundamentals of Machine Learning, BIY7121 Data Mining	Autumn 2026
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
MLY0100 Machine Learning	Spring 2025
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
DLY0100 Deep Learning, FMY0100 Fundamentals of Machine Learning	Autumn 2025
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
MLY0100 Machine Learning	Spring 2024
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
DLY0100 Deep Learning	Autumn 2024
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
DLY0100 Deep Learning	Autumn 2023
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	
MLY0100 Machine Learning	Spring 2023
<i>Computer Engineering, Duoc UC Santiago, Chile</i>	

COURSES DEVELOPED

TLY1101 Machine Learning	2025
<i>Computer Engineering with AI specialization, Duoc UC Santiago, Chile</i>	
Course design and development	
MLT2202 Neural Networks and Deep Learning	2026
<i>Data Scientist Program online, Duoc UC Santiago, Chile</i>	
Course design and development	

**OBSERVATIONAL
EXPERIENCE**

Swope 1m Telescope	2014 - 2025
<i>Las Campanas Observatory Atacama, Chile</i>	
More than 300 nights observed.	
Chakana 0.6m Telescope	2018 - 2020
<i>UA Ckoirama Observatory Antofagasta, Chile</i>	
10 nights observed in total.	
Zeiss 1.23m Telescope	2020
<i>Calar Alto Astronomical Observatory Spain (remote)</i>	
8 nights observed in total.	
PUC 50cm Telescope / PUCHEROS Spectrograph	2013 - 2014
<i>PUC Santa Martina Observatory Santiago, Chile</i>	
10 nights observed in total.	

FURTHER STUDIES

Data Governance, Regulation, and Ethics <i>Universidad de Chile</i> <i>Santiago, Chile</i>	2026
Evolutionary Algorithms (CC66M) <i>Universidad de Chile</i> <i>Santiago, Chile</i>	2025
Transformers, use of agents, LangChain and RAG <i>Universidad de Chile</i> <i>Santiago, Chile</i>	2025
Visual Recognition with Deep Learning (CC66T) <i>Universidad de Chile</i> <i>Santiago, Chile</i>	2024
Natural Language Processing (CC66Q) <i>Universidad de Chile</i> <i>Santiago, Chile</i>	2024
Diplomature in Data Science <i>Universidad del Desarrollo</i> <i>Santiago, Chile</i>	2021
Diplomature in Software Development <i>Duoc UC</i> <i>Santiago, Chile</i>	2018
Diplomature in Astroengineering <i>Universidad de Antofagasta</i> <i>Antofagasta, Chile</i>	2016

ACHIEVEMENTS

Scholarships	• 2024-2026 Full Scholarship for advanced human capital in Chile, Agencia Nacional de Investigación y Desarrollo de Chile. • 2022-2023 Academic Excellence Scholarship for PhD students, Universidad de Antofagasta. • 2019 Full scholarship to attend La Serena School for Data Science, AURA Observatory, Chile.
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CONFERENCES & SCHOOLS

12th VVV Science Meeting: the VVX synergy with next-generation Milky Way studies <i>Conference</i> <i>Astrophysics Group at the Universidade Federal de Santa Catarina in Florianópolis, Brazil</i> Oral: <i>Unveiling the Sagittarius Dwarf Galaxy: Mapping Its Core and Streams at Low Galactic Latitudes</i>	04/2025
Summer School in Statistics for Astronomers <i>Center for Astrostatistics at The Pennsylvania State University</i>	07/2024
First LSST Latin American Meeting (LSST@LATAM): Catalyzing Research Collaborations <i>Conference</i> <i>La Serena, Chile</i>	03/2024
XVII Latin American Regional IAU Meeting <i>Conference</i> <i>Montevideo, Uruguay</i> Poster contribution: <i>Unraveling the Sagittarius Dwarf Spheroidal Galaxy at Low Galactic latitudes</i>	03/2023
First Latinamerican Virtual Observatory School <i>Spanish Virtual Observatory</i> <i>Online</i>	03/2023

Pycon Chile 2021**2021***Conference* | Online (<https://pycon.cl/2021/>)Contributed talk: *Search for star clusters using unsupervised machine learning***LARIM 2019: XVI Latin American Regional IAU Meeting****2019***Conference* | Antofagasta, Chile**Star Form Mapper 2019****2019***Conference* | York, United KingdomContributed poster: *Massive Open clusters in VVV data using unsupervised clustering algorithms***La Serena School for Data Science: Applied Tools for Data-driven Sciences****2019***AURA* | La Serena, Chile**PUBLICATIONS****Full list on ADS**<https://ui.adsabs.harvard.edu/public-libraries/veXcb7VPROqU0r03axnXkg>

- Alonso-García, et al., including **Anais, J.**, *A near-infrared stellar atlas of the Galactic plane from the VVV survey*, 2026, A&A, 706, A301, doi:10.1051/0004-6361/202557979
- Coulter, et al., including **Anais, J.**, *The Gravity Collective: A Comprehensive Analysis of the Electromagnetic Search for the Binary Neutron Star Merger GW190425*, 2025, ApJ, 988, 169, doi:10.3847/1538-4357/ade0b3
- Anais, J., Alonso-García, et. al *Unraveling the Sagittarius dwarf spheroidal galaxy at low Galactic latitudes*. Estimated submission 2025
- Anderson, et al., including **Anais, J.**, *Optical and near-infrared photometry of 94 type II supernovae from the Carnegie Supernova Project*, 2024, A&A, 692, A95, doi:10.1051/0004-6361/202244401
- Uddin, et al., including **Anais, J.**, *Carnegie Supernova Project I and II: Measurements of H_0 Using Cepheid, Tip of the Red Giant Branch, and Surface Brightness Fluctuation Distance Calibration to Type Ia Supernovae*, 2024, ApJ, 970, 72, doi:10.3847/1538-4357/ad3e63
- Morrell, et al., including **Anais, J.**, *Optical Spectroscopy of Type Ia Supernovae by the Carnegie Supernova Projects I and II*, 2024, ApJ, 967, 20, doi:10.3847/1538-4357/ad38af
- Ashall, et al., including **Anais, J.**, *Carnegie Supernova Project: The First Homogeneous Sample of Super-Chandrasekhar-mass/2003fg-like Type Ia Supernovae*, 2021, ApJ, 922, 205, doi:10.3847/1538-4357/ac19ac
- Armstrong, et al., including **Anais, J.**, *SN2017jgh: a high-cadence complete shock cooling light curve of a SN IIb with the Kepler telescope*, 2021, MNRAS, 507, 3125-3138, doi:10.1093/mnras/stab2138
- Lu, et al., including **Anais, J.**, *ASASSN-15hy: An Underluminous, Red 03fg-like Type Ia Supernova*, 2021, ApJ, 920, 107, doi:10.3847/1538-4357/ac1606
- Tregloan-Reed, et al., including **Anais, J.**, *Optical-to-NIR magnitude measurements of the Starlink LEO Darksat satellite and effectiveness of the darkening treatment*, 2021, A&A, 647, A54, doi:10.1051/0004-6361/202039364
- Anais, J., Ramírez-Alegría, Peña-Ramírez, et. al *Massive open clusters in VVV data using unsupervised clustering algorithms*. 2020
- Stritzinger, et al., including **Anais, J.**, *The Carnegie Supernova Project II. Observations of the luminous red nova AT 2014ej*, 2020, A&A, 639, A104, doi:10.1051/0004-6361/202038019
- Stritzinger, et al., including **Anais, J.**, *The Carnegie Supernova Project II. Observations of the intermediate-luminosity red transient SNhunt120*, 2020, A&A, 639, A103, doi:10.1051/0004-6361/202038018
- Tregloan-Reed, et al., including **Anais, J.**, *First observations and magnitude measurement of Starlink's Darksat*, 2020, A&A, 637, L1, doi:10.1051/0004-6361/202037958
- Holmbo, et al., including **Anais, J.**, *Discovery and progenitor constraints on the Type Ia supernova 2013gy*, 2019, A&A, 627, A174, doi:10.1051/0004-6361/201834389
- Phillips, et al., including **Anais, J.**, *Carnegie Supernova Project-II: Extending the Near-infrared Hubble Diagram for Type Ia Supernovae to $z \sim 0.1$* , 2019, PASP, 131, 014001, doi:10.1088/1538-3873/aae8bd
- Burns, et al., including **Anais, J.**, *The Carnegie Supernova Project: Absolute Calibration and the Hubble Constant*, 2018, ApJ, 869, 56, doi:10.3847/1538-4357/aae51c
- Stritzinger, et al., including **Anais, J.**, *The Carnegie Supernova Project I. Photometry data release of low-redshift stripped-envelope supernovae*, 2018, A&A, 609, A134, doi:10.1051/0004-6361/201730842

- Krisciunas, et al., including **Anais, J.**, *The Carnegie Supernova Project. I. Third Photometry Data Release of Low-redshift Type Ia Supernovae and Other White Dwarf Explosions*, 2017, AJ, 154, 211, doi:10.3847/1538-3881/aa8df0
- Coulter, et al., including **Anais, J.**, *Swope Photometric Observations of SN 2017cbv = DLT17u*, 2017, ATel, 10167, 1