Jennifer P. Lucero

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PhD student in Astrophysics with research experience in exoplanet detection and characterization with the radial velocity method and in high-resolution transmission spectroscopy.

Education

Instituto de Astrofísica e Ciências do Espaço, Universidade do Porto — 2023 – Ongoing
PhD in Astrophysics — *Porto, Portugal*

- Current GPA: 18/20
- Thesis title: Detecting exoplanet atmospheres in the presence of stellar activity
- Supervisors: Nuno C. Santos & Olivier Demangeon

Pontificia Universidad Católica de Chile — 2019 – 2022
BSc in Astronomy — *Santiago, Chile*

- GPA: 6.2/7 (transcript)
- Thesis title: Optimized routines for exoplanet detection by calculating high-precision radial velocities
- Supervisor: James S. Jenkins

Research Interests

- Search and characterization of extrasolar planets
- Habitability of extrasolar planets
- Exoplanet atmospheres (modelling and observational)
- Stellar activity

Research Experience

Project: Exploring the diversity of the most extreme exoplanetary systems — 2022 – 2023
Research Assistant — *Universidad Diego Portales*

- Supervisor: James S. Jenkins
  I developed an algorithm to measure high-precision radial velocities with the CHIRON spectrograph. Working on this algorithm would later become the main topic of my undergraduate thesis.

Projetc: Revision of the ESPRESSO calibration plan — 2023
Summer Research Intern — *European Southern Observatory, Chile*

- Supervisors: Matias Jones Elyar Sedaghati
  For this project I reduced and analyzed ESPRESSO calibration data, in order to determine the adequate validity periods for each type of calibration, based on the stability requirements of the instrument.

Projetc: Study of short-period tidal inflation of exo-Neptunes — 2022
Summer Research Intern — *Pontificia Universidad Católica de Chile*

- Supervisors: Cristobal Petrovich & Sarah Millholand
  Using the Python package Kozaipy, I analyzed the dynamic inflation of exo-Neptunes by tidal effects as a function of time, obliquity, and eccentricity.

Projetc: VLT/MUSE IFU Observations of Interacting and Active Galaxies — 2020 – 2021
Summer Research Intern — *Pontificia Universidad Católica de Chile*

- Supervisors: Ezequiel Treister & Giacomo Venturi
  I studied the kinematics and ionization mechanisms of the gas composing the galaxy NGC 17, a system in the final fusion stage, using data cubes from the Multi Unit Spectroscopic Explorer (MUSE), on the VLT.

★ Observational Experience

La Silla Observatory 2022 – 2025
On site *La Serena, Chile*

- Observing astronomer with E. Cristo (NIRPS Consortium), supporting 9 nights of NIRPS & HARPS observations during GTO Run 13 with the 3.6m telescope.

Santa Martina Observatory 2023
On site *Santiago, Chile*

- Worked as an astronomer assistant at the Observatory, where astronomy students do their cientific observations. I participated as MEADE30 and MEADE40 telescope operation.

Paranal Observatory 2023
On site *Antofagasta, Chile*

- I accompanied Dr. Matias Jones for 10 nights at the Paranal Observatory, specifically at the VLT control building for UT3 telescope operation, as part of my Summer Internship at ESO.

Teaching Experience

Pontificia Universidad Católica de Chile 2020-2023
Teaching & Outreach *Santiago, Chile*

- Teaching Assistant in undergraduate Physics & Astronomy courses, including: General Physics II (FIS1504), Electromagnetic Theory (FIZ0321), Laboratory of Thermodynamics (FIS0152), Laboratory of Waves & Optics (FIZ312L), Astronomy (AST0111), Astronomy (english version, AST0112), The Relativistic Universe of Einstein (AST102), Planets in the Universe (AST1529) and A Journey Through the Universe (AST101).
- Staff and Coordinator in the Welcome Commission for erasmus students.
- Tutor in MAIBuddy Program, helping erasmus students to get used to chilean culture and university life.
- Tutor in the Physics Faculty Mentoring Program of a group of first semester Physics students to help them integrate into university life.

Conferences & Workshops

Thirty Minute Talk (TMT) at ESO Vitacura 2025
Talk: Effect of stellar spots on high-resolution transmission spectroscopy *Santiago, Chile*

Extremely Precise Radial Velocities (EPRV 6) 2025
Poster: Effect of stellar non-occulted spots on high-resolution transmission spectroscopy *Porto, Portugal*

PLATO - ESP2025 2025
Talk: Effect of stellar spots on the high-resolution transmission spectra of an Earth-like planet in the habitable zone of a Sun-like star *Marseille, France*

PoET Workshop # 2 2024
Talk: Detecting exoplanet atmospheres in the presence of stellar activity *Porto, Portugal*

Online Seminar Series, Faculty of Physics at Pontificia Universidad Católica de Chile 2021
Poster: VLT/MUSE IFU Observations of Interacting and Active Galaxies *Santiago, Chile*

34º Encontro Nacional de Astronomia e Astrofísica 2024
Talk: Retrieving the transmission spectrum of a simulated transiting planet *Guimarães, Portugal*

ESPRESSO IOT Meeting, European Southern Observatory 2023
Talk: Revision of the ESPRESSO calibration plan *Santiago, Chile*

CATA Exoplanet Meeting, Cerro Calán Observatory 2022
Talk: An algorithm to confirm exoplanets with CHIRON spectra *Santiago, Chile*

Participation
Science & Commit, Universidad de Chile (2022), Sagan Exoplanet Summer Workshop, Caltech (2022), Writing and Communicating your Science, ESO Chile (2023)

Manuscripts & Publications

1 Dethier, W., et al. including **P. Lucero, J.**, Effect of stellar spot spectral lines in high-resolution transit spectroscopy, 2025, Astronomy & Astrophysics (*review in progress*).

2 **P. Lucero, Jennifer**, et al., Effect of stellar spots on the high-resolution transmission spectra of a giant planet around a Sun-like star, 2025, Astronomy & Astrophysics (*review in progress*).

3 Cristo, E., et al. including **P. Lucero, J.**, SOAPv4:a new step towards the modelling of stellar signatures in exoplanet research, 2025, Astronomy & Astrophysics.

4 C. Santos, Nuno, et al. including **P. Lucero, J.**, PoET: the Paranal solar ESPRESSO Telescope, 2024, ESO The Messenger.

5 Espinoza-Retamal Juan I., et al. including **P. Lucero, J.**, HATS-38 b and WASP-139 b join a growing group of hot Neptunes on polar orbits, 2024, AAS Journals.

6 Mistry, P., et al., including **P. Lucero, J.** VaTEST I: Validation of Sub-Saturn Exoplanet TOI-181b in Narrow Orbit from its Host Star, 2022, MNRAS.

Fellowships & Grants

Bécalos Undergraduate Academic Excellence Scholarship 2017-2018
ESO Summer Research Fellowship 2022
FIERCE: CIAAUP-22/2023-BI-D PhD Fellowship 2023-Ongoing

Consortia & Awarded Telescope Time

Paranal solar ESPRESSO Telescope (PoET) 2025
Member of Science Team

Planets Beyond the Milky Way: Using Extragalactic Stars to Test the Limits of Planet Formation 2023
Co-Investigator, Instruments: CHIRON, Time: 75h

Outreach

Universidade Junior 2025
I taught a class on exoplanets (in portuguese) for secondary school students at the Porto Planetarium.

Días Abertos, Faculdade de Ciências UP 2025
I took part in the Open Days event, where I worked at the astronomy stand to talk about study opportunities at the University of Porto. I presented a demonstration of how we observe transit light curves to detect and characterize exoplanets. The interaction was in Portuguese and aimed at high school students.

Ignite IAstro Armamar 2024
I participated in the Ignite IAstro session, where I presented my research (in portuguese) in a fast and demanding format: 5 minutes with 20 auto-advancing slides of 15 seconds each. I talked about exoplanet atmospheres in a simple and accessible way, adapted for a general audience.

Golden Webinars, Pontificia Universidad Católica de Chile 2021
I participated as a panelist in a talk with Dr. André Maeder from the Geneva Observatory on "Exploration of Scale Invariant Effects in Cosmology in Relation with Dark Components"

Latinas NASA 2021
I participated as a panelist in a talk with three NASA women of Latino origin: Sandra Cauffman, Farisa Morales, and Adriana Ocampo, on the role of women in STEM. Media Appearance: NASA en Español, official YouTube channel: Latinas@NASA

Organization

Exoplanets 6 2024-Ongoing
Local Organizing Committee

Extreme Precise Radial Velocity (EPRV) 6 2024-2025
Local Organizing Committee

Skills

Programming & Data Analysis: Python (Advanced), C, Octave, SQL

Fits file handling Instrumentation, Photometry, Data reduction (Python, ESORex/ESOReflex-ESPRESSO pipeline)

Astronomy Tools DS9, QFitsView, Exo-Striker, Batman, SOAPv4

Other Software Skills: LaTeX, Pack Office(Word, Excel, PowerPoint), Adobe Photoshop & Lightroom.

References

Nuno C. Santos Professor, Instituto de Astrofísica e Ciências do Espaço - nuno@astro.up.pt

Olivier Demangeon Researcher, Instituto de Astrofísica e Ciências do Espaço -olivier.demangeon@astro.up.pt

James S. Jenkins Professor, Institute of Astrophysical Studies, Universidad Diego Portales -james.jenkins@mail.udp.cl

Matias Jones Staff Astronomer, ESO Chile - mjones@eso.org

Communication

Spanish *Native* **English** *C1* **Portuguese** *C1*