

# Sebastián Pérez | CV

Dr./Professor at Universidad de Santiago – Astrophysicist, Musician and Author

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## Summary

Sebastián Pérez is Associate Professor at the Faculty of Sciences of Universidad de Santiago de Chile and **alternate director of the YEMS Millennium Nucleus** as well as **interim director of the CIRAS Center**. He holds a Ph.D. in astrophysics from Oxford University and a B.Sc. in science and astronomy from Universidad de Chile. He has authored more than 90 publications in peer-reviewed international journals with more than 5000 citations. He works in astrophysics, art-science interplay, with incursions into music and literature. His research focuses on the question of planetary origins. He presented a novel method for detecting and characterizing young forming planets (disk kinematics), as well as the discovery of signatures of a migrating mini-Neptune planet via the footprints it left in a protoplanetary disk.

Prof. Pérez wrote an engaging children's novel that promotes women in science by sharing the essentials of scientific exploration and discovery. More than seven thousand copies are read by children in public schools today. In the interplay between art-science, outreach and education, he leads projects on intercultural dialogues between scientific and indigenous communities, embodied learning applied to astrophysics (Recreo), directed the Skies Concert project (Concierto Cielos), and worked on the Charango concerto *From the Big Bang, through the fundamental laws*.

## Current positions and appointments

- **Director 2021-2024**, Alternate Director 2024-2027, Millennium Nucleus on Young Exoplanets and their Moons (YEMS)
- **Interim Director 2022-**, Center for Interdisciplinary Research in Astrophysics and Space Science (CIRAS)
- **Associate Professor**, Physics department, Universidad de Santiago de Chile (USACH)
- **Member of the board of directors**, Planetario Chile
- **Founding member**, Fundación Astrodiálogos

## Research experience and funding

<b>ANID-Gemini postdoctoral fellowship</b> <i>Main line of research: Hydrodynamics and observations of planet formation</i>	<b>Universidad de Chile</b> 2011–2019
<b>ANID-Fondecyt postdoctoral fellowship, Young researcher at MAD</b> <i>Main line of research: Modelling and observing on-going planet formation</i>	<b>Universidad de Chile</b> 2014–2017
<b>Millennium Nucleus on Protoplanetary Disks postdoctoral researcher</b> <i>Main line of research: Protoplanetary disks research with ALMA</i>	<b>MAD, U. Chile</b> 2011–2014
<b>Postdoctoral fellow (STFC PDRA)</b> <i>Main line of research: accretion disks around black holes with jets (microquasars)</i>	<b>University of Oxford</b> 2009–2011

## Education

<b>Doctor of Philosophy, PhD</b> <i>Inflow and outflow in stellar mass black holes. PhD advisor: Prof. K. M. Blundell</i>	<b>University of Oxford</b> 2006–2009
<b>Licenciatura en Ciencias mención Astronomía, BSc</b> <i>Graduated with distinction equivalent to a First-class honour (1st).</i>	<b>Universidad de Chile</b> 2002–2005

## Publications (WoS/ISI indexing, peer-reviewed)

90 publications in peer-reviewed international journals (WoS/ISI), 10 as first author, more than 40 as either 1st, 2nd or 3rd author, with a total of >5300 citations (Jan 2025). *h-index*: 40 (Google Scholar), 36 (ADS).

See publication list at the end or click on: [Smithsonian/NASA ADS](#), [ORCID](#), [Google Scholar](#).

## Synergetic projects on art, education, outreach and science

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- Director of Potenciando el diálogo entre saberes científicos y de pueblos originarios en astrofísica. Ciencia Pública 2022, ALMA-ANID 2023-2024. [www.astrodialogos.cl](http://www.astrodialogos.cl).
- Director of Concierto Cielos project on convergence between music and astronomy. [www.conciertocielos.cl](http://www.conciertocielos.cl).
- Director of Recreo Espacial an embodied learning project for education and motivation into science through experiential activities related to astrophysical concepts (2016–2019).
- Author of the children's astronomy novel *Bitácora Planetaria: Cazadores de Eclipses*, 2016, LOM Ediciones, funded via Milenio PME. 2nd edition. About 5.000 copies distributed at schools and general public so far.

**AATS 2014:** Director of the Art, Astronomy, Technology and Society initiative. In which I produced:

- Art+Astronomy Day at Contemporary Arts Museum (MAC, Santiago) for artists, educators and the public.
- Art+Astronomy Incubator initiative. Coordination of 4 projects led by pairs of artists and astronomers.

**Immersive installation AATS 2013 “El Origen del Sistema Solar”:** Scientist in residency at National Contemporary Arts museum (lead by artist Olaf Peña).

## Teaching experience, as supervisor and lecturer

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**U. de Santiago (2024a):** Astrofísica de la Formación Planetaria (pregrado)

**U. de Santiago (2023b):** Proyecto de Especialidad

**U. de Santiago (2023a):** Desarrollo de Software en Astrofísica, y Astrofísica de la Formación Planetaria (posgrado)

**U. de Santiago (2022b):** Introducción a la Astrofísica

**U. de Santiago (2022a):** Introducción a la Astrofísica

**U. de Santiago (2020-2022):** Opening and design of the bachelor degree on astrophysics and data science

**U. de Santiago (2020-2021):** Supervision of two physics education students.

**U. de Santiago (2020-2021):** Supervision of engineering student B. Monsalvez.

**U. de Chile (2016-2018):** Co-supervision of MSc students M. Barraza and F. Alarcón.

**U. de Chile (2016-2017):** Supervisor of undergraduate research projects on hydrodynamics of multiple planets, radiation hydrodynamics, and FU Ori ALMA observations.

**U. de Chile (2015-2016):** Supervisor of undergraduate research projects: C. Flores, M. Barraza and F. Alarcón.

**U. of Oxford (2007-2010):** Lecturer Stellar Evolution and Cosmology (Astro B3, 3rd year Physics undergrads).

**U. de Chile (2002-2006):** Teaching assistant for Electromagnetism and Statistical Physics.

## Grants

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### Science grants and awards.....

**2024–2027:** Alternate Director, Millennium Nucleus grant (~USD700k).

**2024–2026:** Principal Investigator, MIT Global Seed Fund. AI Applications for Planet Formation (~USD20k).

**2023–2027:** Principal Investigator, FONDECYT Regular grant (~USD270k).

**2021–2024:** Director, Millennium Nucleus grant (~USD700k).

**2019–2022:** Principal Investigator, FONDECYT Regular grant (~USD270k).

**2018:** ESO-Chile comité mixto grant for funding astrophysics professorship at USACH. Two years. ~90k USD.

**2017:** FONDECYT Regular grant (as co-investigator).

**2015:** FONDECYT grant (100k USD) for GPU Cluster for hydro 3D simulations.

**2014:** FONDECYT Postdoctoral fellowship (120k USD).

**2008:** Oxford University's St John's College special grant for research excellence.

**2006:** PPARC (STFC) PhD Studentship – Particle Physics and Astronomy Research Council (PPARC UK). I was awarded the only such studentship available for South American students.

**2005:** Outstanding Undergraduate Student at Universidad de Chile (top 10% students of Physics and Math).

### Art grants and residencies.....

**2023:** ANID-ALMA fund for astrodiálogos project “Potenciando el diálogo entre saberes científicos y de pueblos

originarios en astrofísica”.

**2022:** Concurso Nacional Ciencia Pública for “Potenciando el diálogo entre saberes científicos y Mapuche en astrofísica”.

**2018:** Fondo de la Música (Fondos de Cultura, Chile) to make a record of the charango concerto based on the fundamental laws of astronomy (composer A. Yermakova in collaboration with S. Perez). 15k USD.

**2018:** Djerassi Artist Residency for the Scientific Delirium Madness art+science program, to explore and expand how the creativity of scientists and artists are connected. San Francisco, CA, USA. June 2018.

**2016-2017:** Research grant on embodied learning applied to astronomy (20k USD) via Iniciativa Milenio (PME MAD program, along with S. Casassus, A. Yermakova).

**2015:** Grant to create, illustrate, publish and distribute a children’s book about astronomy to encourage Women in Science (20k USD) via Iniciativa Milenio (PME MAD program).

**2014:** Outreach grant to fund art+astronomy initiatives “AATS 2014” (20k USD), along with S. Casassus, via Iniciativa Milenio (PME MAD program).

## Review panel invitations and other services

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- ALMA Science Assessor (2017–2019). Reviewing ~100 proposals/year.
- Referee on major (WoS) astronomy journals ApJ, ApJ Letters, A&A and MNRAS.
- Member of astronomy review panel, FONDECYT Regular, ANID.
- Science Assessor and evaluator for graduate travel scholarships/funding at U. de Chile.
- Science Assessor and evaluator for XXI Concurso de Proyectos Explora, Conicyt.

## Recent telescope time allocated as PI (2014–2021)

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**ALMA Cycle 7 rank A:** (long baselines) Revealing planet migration with ALMA, 7h

**ALMA Cycle 7 rank B:** (long baselines) Resolving the kinematics of FU Orionis, 8h

**ALMA Cycle 6 rank A:** (long baselines) Follow up observation on circumplanetary disk discovery, 16h

**VLT/SPHERE DDT P101:** SAM observations of a candidate protoplanet, 5h

**ALMA Cycle 5 rank A:** (long baselines) Survey of TTauri disks (DARTTS-A). 10h

**SPHERE/VLT P101:** Solar asteroid belt analogue. 0.5h

**ALMA Cycle 4 rank A:** (long baselines) CPD detection. 11h

**ALMA Cycle 4 rank A:** (long baselines) Kinematics of FU Ori. 3h

**ALMA Cycle 4 rank B:** Protolunar disks II. 3h

**VLA A-config 2017:** V883 Ori’s snowline. 6h

**SPHERE/VLT P98 and P99:** Interacting protoplanetary disks Survey II. 0.9h

**SPHERE/VLT P97:** Interacting protoplanetary disks Survey I. 0.3h

**ALMA Cycle 3 rank B:** Protolunar disks. 3h

**ALMA Cycle 2 rank B:** Planet formation at a critical age. 5h

**NACO/VLT P96:** Circumstellar environ of ZCMa in high contrast polarimetry. 4h

**NACO/VLT P96:** Ionised nebula around black hole SS433. 2h in service + 4h visitor AGPM

**MagAO/Baade 2014:** Twin disks SR24, diffraction-limited imaging in Z’ and K band. 2h

## Invited seminars, conferences and workshops (selected)

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- Organizer of the “Born in Fire: Eruptive stars and planet formation” international conference, Santiago Sept 2024
- Invited talk at “Reescribiendo la historia de cómo se forman los planetas”, Centro de Astronomía, (CITEVA), U. de Antofagasta Nov 2021
- Invited talk at “Circumplanetary Disks and Satellite Formation”, Online (Nagoya/ETH Zurich). Mar 2020
- Invited talk at “Kinematics of Planet formation”, Flatiron Institute, NYC. Oct 2019
- Contributed talk at 2nd workshop “The UX Ori type stars and related topics”, St Petersburg. Oct 2019
- Invited talk at the “Great Barriers in Planet Formation”, Palm Cove, Australia. July 2019
- Contributed talk at “New Horizons in Planetary Systems”, Victoria, Canada. May 2019

- Invited seminar, “The Poladian Project: A festival of interdisciplinary research and surprising connections”, Sydney, Australia. Feb 2019
- Colloquium, Department of Physics, U. de Santiago, Chile. Jan 2019
- Colloquium, Department of Astronomy, U. de Chile. Dec 2018
- Invited seminar, Niels Bohr Institute, Copenhagen, Denmark. Oct 2018
- Invited seminar, Institute of Astronomy, Cambridge, UK. Oct 2018
- Contributed talk at “Circumplanetary Disks and Satellite Formation”, Nagoya, Japan. March 2018
- Contributed talk at “ESO Planet Formation 2016”, Santiago. March 2016
- Contributed talk at “Disc Dynamics & Planets”, Larnaka, Cyprus. June 2015
- Contributed talk at “Transition Disks and Planet Formation”, Leiden, Netherlands. March 2015
- Chair and coordinator for “Protoplanetary disks and the planets they form”, U. Chile. Nov 2014
- Contributed talk at “Characterising planetary systems across the HR diagram”, Cambridge, UK. July 2014
- Poster at “Transformational Science with ALMA: From Dust to Rocks to Planets”, Hawaii, USA. May 2014
- Contributed talk at “Herbig Ae/Be stars: the missing link in star formation”, ESO, Chile. March 2014
- Contributed talk at “ALMA Early Science conference”, Puerto Varas, Chile. Dec 2013

## Tools and technical expertise

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**Numerical Simulations:** 3D/2D hydrodynamic simulations (FARGO3D, FARGO2D-ADSG).

**Radiative Transfer:** Continuum and line emission calculations with RADMC3D.

**Image synthesis:** NRAO CASA.

**Programming languages:** Python (astropy, numpy, scipy), Perl (PDL), C, CUDA GPU, OpenGL.

## Recent outreach activity

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- Co-organizer of Space is the Place talks that blend jazz and astronomy (2023-2025).
- Organizer of Concierto Cielos talks that blend astronomy and music since 2017.
- Odessa House of Scientists, Astronomy society, Odessa, Ukraine. Oct 2018.
- Keynote speaker at “Simposio de Arte y Astronomía”, UDP, Santiago, Chile. Mar 2018
- Workshop talk on art and astronomy at UNESCO’s “Learning through Art” week. Coyhaique, Chile. 2016
- >50 outreach talks at schools since 2013, in Chile (50), UK (4), India (2), Ukraine (1) and South Africa (1).
- Invited to 7 radio shows at four major radio stations and four appearances on national TV (including S02E10 Hijos de las Estrellas, Metropolitobros).
- Invited to several “Diálogos en movimiento” by Ministry of Cultures at schools in Chile.

## Other highlights

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- Observing experience on VLT/SPHERE, ALMA, Gemini North and South, Magellan, VLA, SAAO 2m
- Advanced English and native Spanish.

## Publication list

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See list of published scientific papers here: [Smithsonian/NASA ADS](#)