

Sebastián Pérez | Curriculum Vitae

Associate Professor at Universidad de Santiago de Chile – Astrophysicist

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Astrophysicist specializing in planet formation, director-level research leader, and architect of institutional initiatives advancing astronomy and data science.

Summary

Associate Professor of Astrophysics at Universidad de Santiago de Chile and Director of the CIRAS Center, Pérez is an observational and theoretical astrophysicist specializing in planet formation.

Author of 100+ peer-reviewed publications (>5200 citations, *h*-index 42) and led major research initiatives combining hydrodynamics, high-resolution observations, and machine learning to study planet-forming disks. His work includes the development of novel methods for identifying embedded planets through their imprint in the gas kinematics and the discovery of signatures consistent with a migrating mini-Neptune in a protoplanetary disk.

Pérez has secured competitive national and international funding and is helping shape Chile's planet formation and exoplanet research ecosystem. Beyond academia, Pérez is a recognized science communicator who leads large-scale outreach and art-science initiatives, positioning education and public engagement as integral dimensions of contemporary astrophysics.

Research Areas

- Planet formation and protoplanetary disk evolution
- Disk substructures, embedded planets, and kinematic signatures
- Hydrodynamical simulations and radiative transfer modeling of planet-forming disks
- High-angular-resolution (sub-)mm and optical/IR observations
- Machine learning / data-driven methods for interferometric imaging and analysis

Academic Leadership

- **Director** (2021–2024), **Alternate Director** (2024–2027), Millennium Nucleus on Young Exoplanets and their Moons (YEMS)
- **Director**, CIRAS-AI (FIU-USACH institutional project), 2026–
- **Interim Director** 2022–, Center for Interdisciplinary Research in Astrophysics and Space Science (CIRAS)
- **Faculty Council Member** (elected), Faculty of Science, Universidad de Santiago de Chile (2023–)
- **Board member** (since 2023), **Vicepresident** (since 2026), Planetario Chile
- **Founding member**, Fundación Astrodiálogos

Research Funding

- **Director**, Millennium Nucleus on Young Exoplanets and their Moons (YEMS), ANID NCN2021_080.
- **Alternate Director**, Millennium Nucleus on Young Exoplanets and their Moons (YEMS), ANID NCN2024_001.

Principal Investigator.....

- **PI**, FONDECYT Regular 1231663 (2023–2027). *Dusting for the Fingerprints of Young Exoplanets*.
- **PI**, FONDECYT Regular 1191934 (2019–2023). *Revealing the Dynamics of Planet Formation*.
- **ANID-ALMA Fund**. *Potenciando el diálogo entre saberes científicos y de pueblos originarios en astrofísica*.
- **Ciencia Pública CP21-P100**. *Potenciando el diálogo entre saberes científicos y Mapuche en astrofísica*.
- **Fondo de la Música (Chile)**. *Charango Concerto based on the Fundamental Laws of Nature*.
- **FONDECYT Postdoctoral**. *Modelling and observing on-going planet formation*.

Co-Investigator / Sponsored Researchers.....

- **CAS-ANID CAS250016**. Sponsoring Camilo González — *The Language of Gas and Dust: Chronicles of Planet Formation*.
- **FONDECYT Postdoctoral 3240612**. Sponsoring James Miley.
- **FONDECYT Postdoctoral 3220399**. Sponsoring Philipp Weber.

Institutional Leadership Initiatives

- Led institutional proposals securing faculty positions and advancing strategic development at Universidad de Santiago de Chile.
- **Concept and Proposal Lead**, ESO–Government of Chile Joint Committee (2018). Creation of a faculty position in Astrophysics at Universidad de Santiago de Chile.
 - **Concept and Proposal Lead**, ESO–Government of Chile Joint Committee (2023). *Advancing Gender Equality in USACH's pioneering Astrophysics and Data Science degree*. Initiative for the creation of a faculty position aimed at improving gender balance in our astrophysics program.

Academic Positions

Current Appointment

Associate Professor

Universidad de Santiago de Chile (promoted from Assistant Professor)

2025–present

Prior Positions

Universidad de Santiago de Chile

Assistant Professor

2019–2024

Universidad de Chile

ANID-Gemini Postdoctoral Fellow

2018–2019

Universidad de Chile

FONDECYT Postdoctoral Fellow

2014–2017

Universidad de Chile

MAD Millennium Nucleus Postdoc

2011–2014

University of Oxford

Postdoctoral fellow (STFC PDRA)

2009–2011

Education

University of Oxford

D.Phil., Astrophysics

2006–2009

Universidad de Chile

B.Sc. in Astronomy

2002–2005

Publications

108 peer-reviewed publications in international journals (**WoS indexed**), 10 as first author, 45+ as either 1st, 2nd or 3rd author, with a total of >5200 citations (Feb 2026). *h*-index: 42 (GS), 40 (ADS). Find full list of publications at the end.

Selected Publications

Representative publications highlighting contributions to planet formation, eruptive stars, planet-disk interactions and observational signatures of forming planets.

- Pérez, S., Dunhill, A., et al. (2015). Planet Formation Signposts: Observability of Circumplanetary Disks via Gas Kinematics. *ApJL*.
- Pérez, S., Casassus, S., Benítez-Llambay, P. (2018). Observability of planet–disc interactions in CO kinematics. *MNRAS Letters*.
- Pérez, S., Casassus, S., Baruteau, C., Dong, R., Hales, A., Cieza, L. (2019). Dust Unveils the Formation of a Mini-Neptune Planet in a Protoplanetary Ring. *AJ*.
- Pérez, S., Hales, A., Liu, H. B., Zhu, Z., et al. (2020). Resolving the FU Orionis System with ALMA: Interacting Twin Disks?. *ApJ*.
- Pérez, S., Casassus, S., Hales, A., et al. (2020). Long Baseline Observations of the HD 100546 Protoplanetary Disk with ALMA. *ApJL*.
- Weber, P., Pérez, S., Zurlo, A., Miley, J., Hales, A., et al. (2023). Spirals and Clumps in V960 Mon: Signs of Planet Formation via Gravitational Instability around an FU Ori Star?. *ApJL*.
- Weber, P., Pérez, S., Baruteau, C., Marino, S., Castillo, F., et al. (2026). The ALMA survey to Resolve exoKuiper belt Substructures (ARKS): Gas-driven origin for the continuum arc in the debris disc of HD121617. *A&A*.
- Marino, S., Pérez, S., Casassus, S. (2015). Shadows Cast by a Warp in the HD 142527 Protoplanetary Disk. *ApJL*.

Selected Invited Talks

- Plenary Speaker, “A New Era in Astrophysics: Preparing for Early Science with the SKAO,” Görlitz, Germany (2025).
- Invited talk, “Discs on the Exe” International Conference, University of Exeter (2026).
- Invited talk, “Circumplanetary Disks and Satellite Formation,” Nagoya University / ETH Zürich (2020).

- Invited talk, "Great Barriers in Planet Formation," Palm Cove, Australia (2019).
- Invited talk, "Kinematics of Planet Formation," Flatiron Institute, New York (2019).
- Invited talk and lecture at "The Poladian Project: A festival of interdisciplinary research," University of Sydney (2019).
- Invited seminar, Institute of Astronomy, University of Cambridge (2018).
- Invited seminar, Niels Bohr Institute, University of Copenhagen (2018).
- Invited talk, Event Horizon Telescope Town Hall (2026).

Conference Leadership and Organization

- **Organizer**, "Born in Fire: Eruptive Stars and Planet Formation," international conference, Santiago (2024).
- **Co-organizer**, Exoplanets Chile workshop, Concepción (2026); 1st FARGO3D International Workshop, Santiago (2024).
- **Scientific Organizing Committee (invited)**, Workshop on Eruptive Young Stars, Konkoly Observatory, Budapest (2026).

Selected Contributed Talks

- "A New Era in Astrophysics: Preparing for Early Science with the SKAO," Görlitz, Germany (2025).
- SOCHIAS Annual Meeting, Puerto Montt, Chile (2025).
- "New Horizons in Planetary Systems", Victoria, Canada (2019).

Outreach and Interdisciplinary Leadership

- Leadership of funded initiatives connecting astrophysics, arts, education, and public engagement.
- **Director**, *Concierto Cielos*: national project integrating music and astronomy. 2014–present. www.conciertocielos.cl
- **Director**, *Potenciando el diálogo entre saberes científicos y de pueblos originarios en astrofísica*. Ciencia Pública 2022; ALMA–ANID 2023–2024. www.astrodialogos.cl
- **Scientist-in-residence**, month-long residency at Djerassi's *Scientific Delirium Madness*, San Francisco, California (2018).
- **Director**, *Recreo Espacial*: embodied learning initiative promoting science education through experiential activities (2016–2019).
- **Author**, *Bitácora Planetaria: Cazadores de Eclipses*. LOM Ediciones, 2015. 2nd edition. 7,000+ distributed to schools and general public.
- **Director**, Art, Astronomy, Technology and Society (AATS) initiative, 2014:
 - Art+Astronomy Day, Museo de Arte Contemporáneo (Santiago).
 - Art+Astronomy Incubator: coordination of four collaborative artist–astronomer projects.
- **Scientist-in-residence**, immersive installation *El Origen del Sistema Solar*, National Museum of Contemporary Art (2013).
- **Delivered 50+** public lectures across Chile, the UK, India, Ukraine, and South Africa.

Selected Awards and Honors

- 2008: St John's College Research Excellence Grant, University of Oxford.
2006: PPARC(STFC) PhD Studentship, Oxford University –nationally competitive; one award annually to a Latin American student.
2005: Outstanding Undergraduate Student, FCFM, Universidad de Chile (top 10%).

Selected Observing Programs (PI)

- Principal investigator of observing programs across ALMA, VLT/SPHERE, VLA, and Magellan facilities.
- ALMA long-baseline programs, including multiple Rank A allocations, investigating planet formation, circumplanetary disks, and eruptive stellar systems.
- VLT/SPHERE programs targeting protoplanet detection and high-contrast imaging of circumstellar environments.
- VLA A-configuration observations of snowlines in protoplanetary disks.
- Director's Discretionary Time (VLT/SPHERE) for candidate protoplanet characterization.

Student Supervision

Supervision record: 1 Ph.D. student (ongoing), 3 completed M.Sc. theses (+2 ongoing), and 8 undergraduate theses across astronomy, physics, computer science, engineering, and education.

Ph.D. Thesis.....

- **Erick Montoya** (2025–present). Doctorado en Física, Universidad de Santiago de Chile (USACH).

Master's Theses

- **Fernando Castillo** (2025). *Bridging the Gap Between Debris Disks and Protoplanetary Disks*. Magíster en Ciencias mención Física, USACH.
- Co-supervision of **Alma Vidal** (2025). *Mapping Temporal Variations in Protoplanetary Disks with Artificial Intelligence*. Magíster en Ingeniería Informática, USACH.
- Co-supervision of **Felipe Alarcón** (2019). *Physical Conditions and Kinematics in Protoplanetary Disks Through Gas and Dust Emission*. Magíster en Ciencias, mención Astronomía, Universidad de Chile.
- Co-supervision of **Marcelo Barraza** (2018). *Hydrodynamical Simulations of Dust Traps in Protoplanetary Disks*. Magíster en Ciencias, mención Astronomía, Universidad de Chile.
- Co-supervision of **Sebastián Marino** (2015). *Dust Traps and Warps in Transitional Protoplanetary Discs*. Magíster en Ciencias, mención Astronomía, Universidad de Chile. (*Co-supervised*)

Undergraduate Theses

- **Bayron Monsálvez Ceroni** (2021). *Redes Neuronales Convolucionales para Detectar Exoplanetas en Imágenes Directas*. Licenciatura en Ciencias de la Computación, USACH.
- **Belén Rickmers Blamey** (2023). *Estimación de Datos Interferométricos Utilizando Aprendizaje Profundo Aplicado a Observaciones de Discos Protoplanetarios con ALMA*. Ingeniería de Ejecución en Computación e Informática, USACH.
- **Gabriela Fica & Fabiola Contreras** (2023). *Propuesta Didáctica para el Aprendizaje Incorporado de "Estructuras Cósmicas"*. Pedagogía en Física y Matemática / Licenciatura en Educación, USACH.
- **María José Reyes, Verónica Rojo & María Ignacia Calderón** (2024). *Diseño e Implementación de una Propuesta Didáctico-Pedagógica para la Enseñanza de la Luz*. Pedagogía en Física y Matemática / Licenciatura en Educación, USACH.
- **Dennis Urrutia** (2024). *Extrapolación de Datos de Simulaciones del Punto de Vista Euleriano al Punto de Vista Lagrangiano*. Ingeniería Civil Informática, USACH.
- **Kevin Díaz** (2024). *Estimación de Parámetros Estructurales de Discos Protoplanetarios Mediante Aprendizaje Profundo*. Ingeniería Civil Informática, USACH.
- **Javiera Paterakis** (2025). *Implementación de CNNs para la Reconstrucción de Imágenes Interferométricas: Aplicación al Observatorio ALMA*. Ingeniería Física, USACH.

Several former students have continued toward doctoral studies and research careers.

Teaching and Curriculum Development

- **Program Development:** Led the opening and curricular design of the Bachelor's degree in Astrophysics and Data Science, Universidad de Santiago de Chile (2020–2022).
- Courses developed from the ground up for the new degree program.
- **Undergraduate Teaching:** Astrophysics of Planet Formation; Introduction to Astrophysics; Software Development in Astrophysics; Modeling in Astrophysics; Proyecto de Especialidad (2020–present).
- **Graduate Teaching:** Astrophysics of Planet Formation (graduate level).
- Teaching emphasizes computational methods, project-based learning, and research-integrated instruction.

Professional Service

- ALMA Observatory Science Assessor (circumstellar disk panel, 2017–2019).
- Panel Member (Grupo de Estudios), FONDECYT Regular (ANID).
- Referee for major astronomy journals, including ApJ, ApJL, A&A, and MNRAS.
- Evaluator for national research and graduate funding competitions (ANID).

Full Publication List

See full publication list on: [Smithsonian/NASA ADS](#), [SciX](#), [ORCID](#), [Google Scholar](#).