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Research Positions
















- since Oct 2024  **Humboldt Fellow**, Max Planck Institute for Astrophysics, Garching - Germany.
Host: Prof. Dr. Selma de Mink.
- Mar 2023 - Sep 2024  **Postdoctoral Scientific Staff**, University of Hamburg in Hamburg, Germany.
Adviser: Prof. Dr. Stephan Rosswog.
- Oct 2019 - Feb 2023  **Postdoctoral Researcher**, Charles University in Prague, Czech Republic.
Adviser: Doc. Dr. Ondřej Pejcha.

Education

- Sep 2019  **Ph.D. in Astrophysics**, *summa cum laude*, Pontificia Universidad Católica de Chile.
Thesis: "*The Role of Interacting Stellar Winds Feeding Sagittarius A**".
Advisers: Prof. Dr. Jorge Cuadra & Dr. Marc Schartmann.
- Mar 2015  **Master in Astrophysics**, *summa cum laude*, Pontificia Universidad Católica de Chile.
Thesis: "*Thin-shell instabilities and clump formation due to colliding stellar winds in the Galactic Centre*".
Adviser: Prof. Dr. Jorge Cuadra.
- Dec 2012  **Bachelor in Astronomy**, *summa cum laude*, Universidad de Concepción, Chile.
Ranked 1 out of 35 enrolled at the Astronomy program in 2009.

Refereed Publications

Summary: 11 published (+1 submitted, +1 in press), 7 first-author papers. NASA ADS (Oct 2024): 112 citations.

- 1  Blaña, M., Burkert, A., Fellhauer, M., **Calderón, D.**, Behrendt, M., & Schartmann, M. (2024). The Milky Way satellite galaxy Leo T: a perturbed cored dwarf? *A&A*, *in press*.
- 2  Balakrishnan, M., Corrales, L., Markoff, S., Nowak, M., Haggard, D., Wang, Q. D., Neilsen, J., Russell, C. M. P., **Calderón, D.**, Cuadra, J., & Baganoff, F. (2024). Multistructured Accretion Flow of Sgr A*. I. Examination of a Radiatively Inefficient Accretion Flow Model. *ApJ*, 974(1), Article 98, 98.  <https://doi.org/10.3847/1538-4357/ad6c08>
- 3  Balakrishnan, M., Russell, C. M. P., Corrales, L., **Calderón, D.**, Cuadra, J., Haggard, D., Markoff, S., Neilsen, J., Nowak, M., Wang, Q. D., & Baganoff, F. (2024). Multistructured Accretion Flow of Sgr A*. II. Signatures of a Cool Accretion Disk in Hydrodynamic Simulations of Stellar Winds. *ApJ*, 974(1), Article 99, 99.  <https://doi.org/10.3847/1538-4357/ad6866>
- 4  **Calderón, D.**, Pejcha, O., Metzger, B. D., & Duffell, P. C. (2024). The effect of relativistic precession on light curves of tidal disruption events. *MNRAS*, 528(2), 2568–2587.  <https://doi.org/10.1093/mnras/stae194>
- 5  Pejcha, O., **Calderón, D.**, & Kurfürst, P. (2022). Supernovae in colliding-wind binaries: observational signatures in the first year. *MNRAS*, 510(3), 3276–3290.  <https://doi.org/10.1093/mnras/stab3729>
- 6  **Calderón, D.**, Pejcha, O., & Duffell, P. C. (2021). Moving-mesh radiation-hydrodynamic simulations of wind-reprocessed transients. *MNRAS*, 507(1), 1092–1105.  <https://doi.org/10.1093/mnras/stab2219>
- 7  Gómez, P. L., & **Calderón, D.** (2020). The Dynamics of the Wide-angle Tailed (WAT) Galaxy Cluster A562. *AJ*, 160(4), Article 152.  <https://doi.org/10.3847/1538-3881/aba831>
- 8  **Calderón, D.**, Cuadra, J., Schartmann, M., Burkert, A., Prieto, J., & Russell, C. M. P. (2020). Three-dimensional simulations of clump formation in stellar wind collisions. *MNRAS*, 493(1), 447–467.  <https://doi.org/10.1093/mnras/staa090>

- 9 **Calderón, D.**, Cuadra, J., Schartmann, M., Burkert, A., & Russell, C. M. P. (2020). Stellar Winds Pump the Heart of the Milky Way. *ApJL*, 888(1), Article L2. <https://doi.org/10.3847/2041-8213/ab5e81>
- 10 **Calderón, D.**, Cuadra, J., Schartmann, M., Burkert, A., Plewa, P., Eisenhauer, F., & Habibi, M. (2018). The Galactic Centre source G2 was unlikely born in any of the known massive binaries. *MNRAS*, 478(3), 3494–3505. <https://doi.org/10.1093/mnras/sty1330>
- 11 **Calderón, D.**, Bauer, F. E., Veilleux, S., Graciá-Carpio, J., Sturm, E., Lira, P., Schulze, S., & Kim, S. (2016). Searching for molecular outflows in hyperluminous infrared galaxies. *MNRAS*, 460(3), 3052–3062. <https://doi.org/10.1093/mnras/stw1210>
- 12 **Calderón, D.**, Ballone, A., Cuadra, J., Schartmann, M., Burkert, A., & Gillessen, S. (2016). Clump formation through colliding stellar winds in the Galactic Centre. *MNRAS*, 455(4), 4388–4398. <https://doi.org/10.1093/mnras/stv2644>

ADS library link

Funding and Awards

Jul 2024	■ Heraeus Fellowship , Wilhelm and Else Heraeus Foundation, Germany.
Sep 2023	■ Quantum Universe Postdoctoral Grant (10 k€), University of Hamburg, Germany.
Mar 2023	■ Humboldt Research Fellowship , Alexander von Humboldt Foundation, Germany.
Jan 2023	■ 2,210,400 CPU hours awarded , IT4Innovations Supercomputing Center, Czechia.
2022-2023	■ Cycle 24 Chandra Theory grant #24200412 as co-Investigator, USA.
Mar 2022	■ 936,000 CPU hours , IT4Innovations National Supercomputing Center, Czechia.
2021-2022	■ Cycle 23 Chandra Theory grant #23610258 as co-Investigator, USA.
2015-2019	■ Doctoral Fellowship , National Commission for Scientific and Technological Research.
Mar 2015	■ Doctoral Excellence Award , Pontificia Universidad Católica de Chile.
2014, 2016, 2018	■ Adelina Gutiérrez Travel Grant , Chilean Astronomical Society (SOCHIAS).
2013-2014	■ Master Fellowship , National Commission for Scientific and Technological Research.
2009-2012	■ Undergraduate Scholarship , Center for Excellence in Astrophysics and Associated Technologies (CATA).

Service & Skills

Coding	■ C, FORTRAN, Python, SHELL scripts.
Languages	■ Czech (B1), English (C1), German (A1), Spanish (mother tongue).
Professional	■ SOC member of the XIX Chilean Astronomical Society Annual Meeting (Nov 2024). ■ SOC member of the 2nd Workshop of Astronomy Students (March 2017).
Referee	■ Astrophysical Journal (2), Czech Science Agency, Israel Science Foundation.
Supervision	■ Anthony Kirilov (Ph.D. student at Charles University - since Oct 2021). ■ Wasif Shaqil (Master student at University of Hamburg - since Oct 2023).
Thesis Committee	■ Yelyzaveta Pulnova (Master in Physics at Charles University - Sep 2021). ■ Michal Jireš (Bachelor in Physics at Charles University - Feb 2024).

Teaching Experience

2023-2024	■ Teaching assistant at University of Hamburg in undergraduate-level course: “Introduction to Astronomy” (Spring 2023); and graduate-level course: “Astrophysical Hydrodynamics” (Fall 2023).
2019 - 2023	■ Co-organiser of Science Coffee (also as a class), Charles University.

Teaching Experience (continued)

- Oct 2021 ■ Special lecture: *"Introduction to Radiation Hydrodynamics"*, Charles University.
- 2017 ■ Science Coffee (in charge once per week), Pontificia Universidad Católica de Chile.
- 2015-2017 ■ Teaching Assistant at Pontificia Universidad Católica de Chile in undergraduate-level courses: *"Extragalactic Astrophysics"* (Fall 2017), *"Introduction to Physics"* (Spring 2015), *"Introduction to Astronomy"* (Fall 2015); and graduate-level courses: *"Galactic Centre Astrophysics"* (Spring 2016), *"Radiative Processes in Astrophysics"* (Fall 2016).
- 2011-2012 ■ Teaching Assistant at Universidad de Concepción in undergraduate-level courses: *"General Astrophysics"* (Fall 2012), *"Electromagnetic Theory"* (Spring 2011).





Research Internships, Extended Workshops, and Summer Schools

- Jul 2024 ■ Special Meeting: 73rd Lindau Nobel Laureate Meeting, Lindau – Germany
- Jul 2023 ■ School: Kavli Summer Program in Astrophysics, Garching – Germany
- Jul 2022 ■ Workshop: *"Plasma Under Strong Gravity"*, Aspen Center for Physics, Aspen – USA.
- Feb - Nov 2018 ■ **Visiting Ph.D. Student**, Max Planck Institute for Extraterrestrial Physics - Germany. Hosts: Prof. Dr. Andreas Burkert & Dr. Marc Schartmann.
- Aug 2017 ■ School: *"Astrophysical Plasmas"*, Niels Bohr Institute, Copenhagen – Denmark.
- Apr 2015 ■ School *"Scientific Writing for Young Astronomers"*, EDP Sciences, Puerto Varas – Chile.
- Jun 2014 ■ School: *"Galaxies: Near and Far, Young and Old"*, Vatican Observatory – Vatican City
- Jan - Mar 2013 ■ **Research Intern**, Cerro Tololo Inter-American Observatory - La Serena, Chile. Adviser: Dr. Percy Gómez.

















Conference Oral Contributions

- Sep 2024 ■ *"X-ray transients, theory and observational perspectives"* Conference - Warsaw, Poland.
- *"Tidal Disruption Events and Nuclear Transients"* Conference - Heraklion, Greece.
- Jul 2024 ■ **Invited Talk** at the 17th Marcel Grossmann Meeting - Pescara, Italy.
- Apr 2024 ■ RAMSES User Meeting 2024 - New York, USA.
- Dec 2023 ■ *"Fundamental Physics at the Galactic Centre"* Workshop - Porto, Portugal.
- Jul 2023 ■ *"Black-hole accretion discs 50 years on: current fortunes and new challenges"* and *"Supermassive Black Hole Transients and Their Host Galaxies"* Special Sessions at EAS - Kraków, Poland.
- Apr 2023 ■ **Invited Talk** at Galactic Center Workshop - Granada, Spain.
- *"Quantum Universe Day"* at DESY - Hamburg, Germany.
- Nov 2022 ■ 6th Users' Conference of IT4Innovations - Ostrava, Czech Republic.
- Oct 2022 ■ RAGTIME24 Workshop - Opava, Czech Republic.
- Sep 2022 ■ 31st Texas Symposium on Relativistic Astrophysics - Prague, Czech Republic.
- Nov 2021 ■ *"The Predictive Power of Computational Astrophysics as a Discovery Tool"* Symposium - Online.
- Sep 2021 ■ RAGTIME23 Workshop - Opava, Czech Republic.
- Feb 2021 ■ 43rd COSPAR Assembly - Online Symposium.
- Jan 2021 ■ XVI Chilean Astronomical Society (SOCHIAS) Annual Meeting - Online.
- Jul 2020 ■ European Astronomical Society (EAS) Annual Meeting - Online.
- Oct 2019 ■ *"Common-Envelope Evolution and Post-Common-Envelope Systems"* Workshop - London, UK.
- Sep 2018 ■ RAMSES User Meeting 2018 - Lyon, France.
- Jul 2018 ■ 42nd COSPAR Assembly - Pasadena, USA.
- Nov 2016 ■ xv Latin American Regional IAU Meeting (LARIM) - Cartagena, Colombia.











Conference Oral Contributions (continued)

- Mar 2016  XIII Chilean Astronomical Society (SOCHIAS) Annual Meeting - Antofagasta, Chile.
- Feb 2016  *"Dynamics and Accretion at the Galactic Center"* Workshop - Aspen, USA.
- Mar 2015  XII Chilean Astronomical Society (SOCHIAS) Annual Meeting - Puerto Varas, Chile.
- Jun 2014  European Week of Astronomy and Space Sciences (EWASS) - Geneva, Switzerland.










Invited Talks at Research Institutions

- Apr 2024  Astrophysics seminar at University of Delaware - Newark, USA.
- Feb 2024  Quantum Universe Postdoctoral Grant Prize talk at DESY - Hamburg, Germany.
- Jan 2024  Computational Astrophysics seminar at Ludwig Maximilian University - Munich, Germany.
- Oct 2023  Astronomy seminar at Universidad de Valparaíso - Valparaíso, Chile.
-  Astronomy seminar at Universidad Federico Santa María - Valparaíso, Chile.
- Sep 2023  Astronomy colloquium at Universidad de Concepción - Concepción, Chile.
- Jul 2023  Computational Astrophysics seminar at Ludwig Maximilian University - Munich, Germany.
- Jun 2023  Observatory Colloquium at Hamburg Observatory - Hamburg, Germany.
- Oct 2021  Relativistic Seminar at Silesian University - Opava, Czech Republic.
- Sep 2021  Astronomy seminar at Masaryk University - Brno, Czech Republic.
- Mar 2021  Stellar seminar at Czech Academy of Sciences - Online.
- Feb 2021  Relativistic seminar at Charles University - Online.
- Apr 2020  ELI Beamlines Scientific Seminar - Dolní Břežany, Czech Republic.
- Feb 2020  Numerical Mathematics Seminar at Charles University - Prague, Czech Republic.
- Oct 2019  Japan Aerospace Exploration Agency (JAXA) High-Energy Seminar - Sagami-hara, Japan.
- Aug 2019  European Southern Observatory (ESO) Seminar - Santiago, Chile.
- Oct 2018  G2G on WR140 Workshop, Royal Observatory of Edinburgh - Edinburgh, Scotland.
- Sep 2018  Centre for mathematical Plasma-Astrophysics seminar, KU Leuven - Leuven, Belgium.
- Jul 2017  High Energy Astrophysics Seminar, Max Planck Institute for Astrophysics - Germany.
- Feb 2017  IR group Tea meeting, Max Planck Institute for Extraterrestrial Physics - Germany.
- Jun 2016  Astronomy seminar at Universidad de Concepción - Concepción, Chile.

Conference Poster Contributions

- Nov 2022  *"The Impact of Binaries on Stellar Evolution"* Workshop - Garching, Germany.
- Jul 2020  European Astronomical Society (EAS) Annual Meeting - Leiden, Netherlands.
- Oct 2019  *"New Horizons in Galactic Center Astronomy and Beyond"* Workshop - Yokohama, Japan.
- Jun 2017  European Week of Astronomy and Space Sciences (EWASS) - Prague, Czech Republic.
- Oct 2016  xv Latin American Regional IAU Meeting (LARIM) - Cartagena, Colombia.
- Jul 2016  *"The Multi-Messenger Astrophysics of the Galactic Centre"* Symposium - Cairns, Australia.
- Jul 2015  International Workshop on Wolf-Rayet stars - Potsdam, Germany.
- Mar 2015  *"Unveiling the AGN-Galaxy Evolution Connection"* Workshop - Puerto Varas, Chile.
- Jul 2014  European Week of Astronomy and Space Sciences (EWASS) - Geneva, Switzerland.
- Jan 2014  223rd American Astronomical Society Meeting - Baltimore, USA.
- Nov 2013  xiv Latin American Regional IAU Meeting (LARIM) - Florianopolis, Brazil.

Outreach Efforts

- Jul 2024  Galactic Centre Virtual Reality at the “*Sternstunden Festival*”, Hamburg Observatory.
- Jun 2024  Galactic Centre Virtual Reality at the “*Quantum Universe Day*” at DESY in Hamburg.
- 2023-2024  Editor of the Hamburg Observatory Newsletter.
- Jul 2023  “*Ask an Astronomer*” and Tour Guide at the “*Sternstunden Festival*”, Hamburg Observatory.
- 2020  Interview at online newspaper “*El Contraste*” during Solar Eclipse 2020, Chile.
- 2014-2016  Quantum Physics course for high-school teachers, Pontificia Universidad Católica de Chile.
- 2015  Special lectures for students during the “*Day of Astronomy*” in Curicó, Chile.
- 2013-2014  Chemistry and Physics courses for school students, Pontificia Universidad Católica de Chile.
- 2011-2012  Guide of public astronomical observations at Universidad de Concepción, Chile.

References

Prof. Dr. Jorge Cuadra

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