

María Teresa Valdivia-Mena

Personal Information

Date of birth 28.01.1995
Place of birth Las Condes, Santiago, Chile
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Education

PhD (Dr. rer. nat) in Astrophysics

September 2020 - April 2024

MAX PLANCK INSTITUTE FOR EXTRATERRESTRIAL PHYSICS AND LUDWIG-MAXIMILIANS-UNIVERSITÄT

Garching, Germany

- Graduated with summa cum laude (final grade 0.7)
- Thesis title: *Asymmetric infall beyond natal cores to protoplanetary disks: Observations and analysis of streamers toward embedded low-mass protostars*
- Completed through the International Max Planck Research School in Munich

M.Sc. in Astronomy

March 2018 - August 2020

UNIVERSIDAD DE CHILE

Santiago, Chile

- Thesis title: *Molecular Clouds in Extreme Environments of the Low-Metallicity Magellanic System*
- Graduated with maximum distinction (Grade 6.8 out of a maximum of 7.0)

B.Sc. in Astronomy

March 2014 - December 2017

UNIVERSIDAD DE CHILE

Santiago, Chile

- Obtained a Minor in Scientific Computing together with the B.Sc.
- Graduated with maximum distinction (Grade 6.2 out of a maximum of 7.0).

Work experience

Postdoctoral Researcher

May 2024 - Present

MAX PLANCK INSTITUTE FOR EXTRATERRESTRIAL PHYSICS AND LUDWIG-MAXIMILIANS-UNIVERSITÄT

Garching, Germany

- Part of the data calibration and analysis for the NOEMA large program PRODIGE (PI: P. Caselli and Th. Henning)
- Analysis of the kinematics of protostellar envelopes using interferometers (e.g. ALMA and NOEMA) and single-dish telescopes (e.g. IRAM 30m)

Publications

As first author:

- **Valdivia-Mena, M. T., Pineda, J. E., Caselli, P., et al.**, *Probing the physics of star formation (ProPStar). II. The first systematic search for streamers toward protostars*, 2024, *Astronomy & Astrophysics*, 687, A71
- **Valdivia-Mena, M. T., Pineda, J. E., Segura-Cox, D. M., et al.**, *Flow of gas detected from beyond the filaments to protostellar scales in Barnard 5*, 2023, *Astronomy & Astrophysics*, 677, A92
- **Valdivia-Mena, M. T., Pineda, J. E., Segura-Cox, D. M., et al.**, *PRODIGE - Envelope to disk with NOEMA I. A 3000 au streamer feeding a Class I protostar*, 2022, *Astronomy & Astrophysics*, 667, A12
- **Valdivia-Mena, M. T., Rubio, M., Bolatto, A. D., et al.**, *ALMA resolves molecular clouds in metal-poor Magellanic Bridge A*, 2021, *Astronomy & Astrophysics*, 641, A97

As co-author:

- **Franceschi, R. et al (incl. Valdivia-Mena, M. T.)**, *PRODIGE - Planet-forming disks in Taurus with NOEMA. II. Modeling the CO (2-1) isotopologue emission of the Class II T Tauri disks in Taurus*, 2024, *Astronomy & Astrophysics*, 687, A174
- **Pineda, J. E. et al (incl. Valdivia-Mena, M. T.)**, *Probing the physics of star formation (ProPStar). I. First resolved maps of the electron fraction and cosmic-ray ionization rate in NGC 1333*, 2024, *Astronomy & Astrophysics*, 686, A162
- **Hsieh, T. H. et al (incl. Valdivia-Mena, M. T.)**, *PRODIGE - envelope to disk with NOEMA. III. The origin of complex organic molecule emission in SVS13A*, 2024, *Astronomy & Astrophysics*, 686, A289
- **Semenov, D. et al (incl. Valdivia-Mena, M. T.)**, *PRODIGE - planet-forming disks in Taurus with NOEMA. I. Overview and first results for 12CO, 13CO, and C18O*, 2024, *Astronomy & Astrophysics*, 685, A126
- **Choudhury, S. et al (incl. Valdivia-Mena, M. T.)**, *Infall of material onto the filaments in Barnard 5*, 2024, *Astronomy & Astrophysics*, 683, A77
- **Hsieh, T. H. et al (incl. Valdivia-Mena, M. T.)**, *PRODIGE-envelope to disk with NOEMA-II. Small-scale temperature structure and streamer feeding the SVS13A protobinary based on CH3CN and DCN*, 2023, *Astronomy & Astrophysics*, 669, A137

Languages	Spanish (native), English (C1), German (A2)
Programming languages	Python (expert), C, R
Astronomy tools	Data reduction and imaging with CASA, GILDAS (CLASS, CLIC, MAPPING)
Version controlling tools	Git, Google Docs

Telescope proposals and experience

Atacama Large Millimeter/Submillimeter Array (ALMA)	PI of accepted projects 2023.1.00572.S (grade B), 2022.1.00898.S (grade C)
Northern Extended Millimetre Array (NOEMA)	PI of accepted project W22AH (grade A)
IRAM 30-m	PI of accepted project 124-21 (2022A). On-site and remote observing experience.
Green Bank Telescope (GBT)	PI and on-site observer of accepted project GBT22B-163 (2022B)
Atacama Pathfinder Explorer (APEX)	PI of accepted project C104-9709 (2019B). On-site observer for Chilean time.

Talks

SEMINARS

Nov. 29th 2023	Seminarios de Física , Title: “Rivers in the sky: Disrupting Symmetry in Star Formation Through Asymmetric Infall onto Protostars”, Departamento de Física, Universidad de Santiago de Chile	Santiago, Chile
Sep. 13th 2023	Departamento de Astronomía Seminar , Title: “Rivers in the sky: Disrupting Symmetry in Star Formation Through Asymmetric Infall onto Protostars”, Departamento de Astronomía, Universidad de Chile	Santiago, Chile
Dec. 12th 2022	Tuesday UVA / NRAO Astronomy (TUNA) Lunch Talk , Title: “Rivers in the sky: streamers discovered towards two young embedded sources in Perseus”, NRAO	Charlottesville, USA
Dec. 12th 2022	IRAM-Wisc-CAS Seminar , Title: “Rivers in the sky: streamers discovered towards two young embedded sources in Perseus”	Virtual
Nov. 8th 2022	Star and Planet Formation Seminar , Title: “Rivers in the sky: streamers discovered towards two Class I sources in Perseus”, ESO	Garching, Germany

CONFERENCES

June 28th 2024	The promises and challenges of the ALMA Wideband Sensitivity Upgrade , Title: “Rivers in the sky: streamers as catalysts for physical and chemical changes in protostars and disks”	ESO, Garching, Germany
May 15th 2024	Early Phases of Star Formation , Title: “The first systematic search for streamers toward low-mass protostars”	Ringberg Castle, Kreuth, Germany
Feb. 20th 2024	Celebrating 30 Years of Protoplanetary Disk Chemistry: past, present, and future , Title: “Streamers: catalysts for physical and chemical changes in protoplanetary disks”	Ringberg Castle, Kreuth, Germany
Aug. 4th 2022	From Clouds to Planets II: The Astrochemical Link , Title: “Rivers in the sky: streamers discovered towards two Class I sources in Perseus”	Berlin, Germany
Jun. 30th 2022	European Astronomical Society Annual Meeting 2022 , Title: “Rivers in the sky: Streamers discovered towards two embedded protostars in Perseus”	Valencia, Spain
Mar. 4th 2022	Meeting of ALMA Young Astronomers , Title: “Rivers in the sky: streamers discovered towards two Class I sources in Perseus”	Virtual
Nov. 5th 2021	12th IMPRS Students Symposium , Title: “River in the sky: A streamer feeding a Class I protostar”	Garching, Germany
Oct. 29th 2021	Gaps, Rings, Spirals, and Vortices: Structure Formation in Planet-Forming Disks , Title: “A Class I protostar with a high streamer mass infall rate”, Munich Institute for Astro- and Particle Physics	Garching, Germany
Jun. 30th 2021	European Astronomical Society Annual Meeting 2021 , Title: “River in the sky: A streamer feeding a Class I protostar”	Virtual
Nov. 8th 2019	Latin American Regional IAU Meeting 2019 , Title: “ALMA observations of molecular tracers in R136 in 30Dor: How does cold gas survive?”, Hotel Antofagasta	Antofagasta, Chile

Scholarships and Awards

July 2018	Adelina Gutierrez Grant , <i>Sociedad Chilena de Astronomía</i> . The grant funded the assistance to the Second Binational AAA-SOCHIAS Meeting	
March 2018	Scholarship for National Master Studies , <i>Comisión Nacional de Investigación en Ciencia y Tecnología (CONICYT)</i> . The scholarship funds master studies done in Chilean universities	

Workshops

Aug. 22th - 26th, 2022	17th IMPRS Heidelberg Astronomy Summer School: Astronomy, astrochemistry & the origin of life , International Max Planck Research School for Astronomy and Cosmic Physics, University of Heidelberg	Heidelberg, Germany
Aug. 3rd - 5th 2022	Green Bank Telescope (GBT) Remote Observer Training Workshop , NRAO	Virtual
Nov. 15th - 23rd 2021	10th IRAM 30-meter School on Millimeter Astronomy , Institut de Radioastronomie Millimétrique	Virtual
Mar. 14th - 19th 2021	2021 Submillimeter Array Interferometry School , Harvard & Smithsonian Center for Astrophysics, in conjunction with the ASIAA and the University of Hawaii	Virtual
Oct. 7th - 11th, 2019	European Radio Interferometry School 2019 , Onsala Space Observatory and Chalmers University of Technology	Gothenburg, Sweden
Oct. 1st - 5th 2018	II International Astrochemistry School , Universidad Autónoma de Chile	Santiago, Chile
Aug. 20th - 29th 2018	La Serena School for Data Science: Applied Tools for Data Driven Sciences , Association of Universities for Research in Astronomy, National Science Foundation (USA) and Agencia Nacional de Investigación y Desarrollo (Chile)	La Serena, Chile

Outreach

Jul. 2018 - Present	Member of “Cazadoras de Estrellas” Project , <i>DIRVEX, Universidad de Chile</i> . This outreach project is lead by a group of female graduate students and alumni from the Astronomy Department in Universidad de Chile. The goal is to give high school girls a hands-on experience with astronomical data and meet female astronomers so that they can solve any vocational doubts about this career	Chile
Aug. 30th 2022	Public Talk “Discos protoplanetarios, el origen de los mundos” , Programa Ciencia Abierta, Par Explora RM Norte. Liceo Bicentenario Provincial Santa Teresa de los Andes	Colina, Chile
Jul. 23rd 2022	Public Talk “How to feed baby stars” , <i>Soapbox Science Munich</i>	Munich, Germany
Jun. 27th, 2019	Public Talk “Eclipses: Luces y Sombras en el Universo” , <i>Municipalidad de El Bosque</i> .	Santiago, Chile
Mar. 21st 2019 - Apr. 9th 2019	Public Talk “Astroinformática para principiantes” , Done at <i>DUOC UC Puente Alto</i> and at <i>Centro de Extensión de la Universidad de Talca</i> .	Santiago, Chile
Jun. 2018 - Nov. 2018	Scientific Counselor for “Festival de Teatro y Ciencias” (FETYC) , <i>Par Explora Sur Oriente, CONICYT</i> . The FETYC is a theatre competition organized by the National Commission of Scientific and Technologic Investigation (CONICYT) where several schools prepare a play around a scientific inquiry. The Scientific Counselor guides the scientific content of the plays.	Santiago, Chile
Mar. 2018 - Aug. 2018	Tourist Guide at National Astronomical Observatory , <i>Departamento de Astronomía, Universidad de Chile</i> .	Santiago, Chile

Teaching

Sep. 2018 - Jul. 2019	Teaching Assistant for the course “Experimental Astronomy” , <i>Undergraduate course</i> , Includes giving classes, marking and supervising activities	Universidad de Chile
Mar. 2019 - Jul. 2019	Teaching Assistant for the course “Introduction to Cosmology” , <i>Undergraduate course</i> , Includes giving classes, marking and supervising activities	Universidad de Chile
Jan. 2019	Teaching Assistant for “Planetary Sciences” , <i>High School, Escuela de Verano</i>	Universidad de Chile
Mar. 2017 - Jul. 2017	Teaching Assistance for the course “Mechanics” , <i>Undergraduate course</i> , Includes giving classes, marking and supervising activities	Universidad de Chile

References

Prof. Dr. Paola Caselli, Scientific Director, Max Planck Institute for Extraterrestrial Physics,
caselli@mpe.mpg.de

Prof. Dr. Mónica Rubio, Full Professor, Departamento de Astronomía, Universidad de Chile,
mrubio@das.uchile.cl

Dr. Jaime E. Pineda, Staff Scientist, Max Planck Institute for Extraterrestrial Physics, *jpineda@mpe.mpg.de*