

Sierra L. Grant, Ph.D.

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Employment

Carnegie Institution for Science Earth and Planets Laboratory <i>Carnegie Postdoctoral Fellow</i>	09/2024–Present
Max Planck Institute for Extraterrestrial Physics <i>Postdoctoral Researcher</i> Supervisor: Prof. Ewine F. van Dishoeck	09/2021–09/2024

Education

Boston University <i>Ph.D.</i> Advisor: Prof. Catherine C. Espaillat “Protoplanetary Disk Evolution: From Inner Disk Accretion to Outer Disk Dust Evolution”	05/2017–08/2021
Boston University <i>M.A.</i>	09/2015–05/2017
University of Michigan <i>B.S. Astronomy & Astrophysics and B.S. Interdisciplinary Physics</i>	09/2011–05/2015

Research Interests

I study the disks of gas and dust that surround young stars and are the birthplaces of exoplanets. Specifically, I focus on the composition and structure of the inner disk and how populations of disks evolve using observations from space-based (including JWST and *Herschel*) and ground-based telescopes (including the Very Large Telescope, Lowell Discovery Telescope, Gemini South, and ALMA). Recently, I have been extending these observations down to disks around planetary-mass companions, which may be the sites of moon formation. The aim of my work is to understand the conditions where planets and moons form to understand the diversity of exoplanets and the formation of our own Solar System bodies.

Accepted Observing Proposals

As PI or Co-PI:
– VLT-MUSE (7.9 hrs, DDT in P117 for coordinated observations with JWST)
– JWST-MIRI:
– 67 hours in Cycle 4 from two programs as Co-PI (PIDs 7538 and 7792)
– 41.5 hours in Cycle 2 (PID 3886)
– ALMA (13.4 hours in Cycle 12, 15.4 hours in Cycle 11, 4.2 hours in Cycle 7)
– VLT-CRIRES+ (20.3 hours in P112, 17.1 hours in P111)
– NOEMA (18 hours, ranked “A”, Co-PI)
– Gemini South Observatory (17 hours in 2020A, 7.7 hours in 2020B)
– NASA Infrared Telescope Facility (3 half-nights each in 2019B and 2020A)
– Lowell Discovery Telescope, Lowell Observatory (10 half-nights)

As Co-I:.....

- JWST-MIRI (24.5 hours in Cycle 4, 93 hours in Cycle 5)
- JWST-NIRSpec (5.6 hours in Cycle 2)
- VLT-CRIRES+ (41 hours in P110, 25 hours in P111)
- ALMA (various programs across multiple cycles)
- *Hubble Space Telescope* (6 orbits) & *Chandra X-ray Observatory* (35ks) & VLA (9.6 hours)
- *Spitzer Space Telescope* (Proposal ID #12036)

Talks and Presentations, including planned, * indicates invited talk

07/2026*	Discs on the Exe
05/2026*	Gas Giant Planet Formation: Clues from Composition
05/2026*	Joint NRAO/UVA Colloquium
03/2026*	University of Florida Astronomy Colloquium
02/2026*	Carnegie Observatories Colloquium
11/2025*	ExoELT: Planetary Formation and Exoplanets in the ELT Era
11/2025*	University of Maryland Astronomy Colloquium
09/2025*	Carnegie Neighborhood Lecture
06/2025*	Gordon Conference on the Origins of Solar Systems
05/2025*	“Planets on the Edge” Kavli Institute for Theoretical Physics conference
03/2025*	University of Rochester Astronomy Colloquium
02/2025*	Celebrating 3 Years of JWST Observations of Planet-Forming Disks
10/2024	JWST MIRI Science Conference
09/2024*	Earth & Planets Laboratory General Seminar
06/2024*	GRAVITY+: impact on star and planet formation
04/2024*	Harvard Radcliffe Institute, Next in Science: James Webb Space Telescope
03/2024*	From Star to Planet Formation, Villa Vigoni
02/2024*	Celebrating 30 Years of Protoplanetary Disk Chemistry: past, present, and future
09/2023	The First Year of JWST Science Conference
01/2023*	MPE Center for Astrochemical Studies Seminar
10/2022*	Observing the Universe in Motion: 5 Years of GRAVITY
09/2022*	The Inner Regions of Protoplanetary Disks
05/2022*	Center for Astrophysics SMA Seminar
05/2022	MPE IR Group Tea Talk
05/2022*	ESO Star and Planet Formation Seminar
02/2022	An Infrared Bright Future for Ground-based IR Observatories in the Era of JWST
03/2021	Caltech Tea Talk
12/2020	Five years after HL Tau: a new era in planet formation
12/2018*	UMass Amherst Star and Planet Formation Lunch Talk
07/2018	Cool Stars 20 (Poster)
01/2018	The 4th MA-CT Regional Star Formation Meeting
12/2017	Boston Area Exoplanet Science Meeting
01/2017	Regional Star Formation Meeting
06/2015*	Frontiers in Star Formation: Celebrating Contributions to the Field by Nuria Calvet and Lee Hartmann
01/2015	225th American Astronomical Society Meeting (Poster)
02/2014	Scientista Symposium, Massachusetts Institute of Technology (Poster)

Honors, Awards, and Funding

2025	JWST Cycle 4 GO Awards (PIDs 7538, 7792, 7890), Co-PI and US Admin PI, \$516,000
2023	French national space agency (CNES) funding grant, Co-grant PI, \$130,000
2023	JWST Cycle 2 GO Awards (PID 3886), PI, \$126,000
2020	ALMA Student Observing Support, \$33,000
Fall 2015	Boston University Dean's Fellowship
Fall 2011, 2013, & Spring 2014	University of Michigan University Honors

Selected Press and Media

01/2026	Scientific American, JWST Spots Swirling Cradle for Exomoons
12/2025	SETI Live Podcast & Interview, Baby Moons in the Making?
09/2025	Universe Today, The JWST Spies The Raw Materials For Exomoons
09/2025	USA Today, NASA's Webb telescope gets a never-before-seen look at how moons form on exoplanets
09/2025	NASA, NASA's Webb Telescope Studies Moon-Forming Disk Around Massive Planet
06/2024	NASA, Webb Finds Plethora of Carbon Molecules Around Young Star
02/2024	Scientific American, JWST Is Tracking Down the Cosmic Origins of Earth's Water
09/2023	Nature, How worlds are born: JWST reveals exotic chemistry of planetary nurseries
04/2023	MPE, JWST peeks into the birthplaces of exoplanets
03/2014	NOAO, A Month of Personal Transformation at Kitt Peak

Publications

First-Author: The list can be accessed [here](#).....

9. "A carbon-rich disk surrounding a planetary-mass companion"
Gabriele Cugno & **Sierra L. Grant** (joint first authors)
[Cugno & Grant 2025, ApJ, 991L, 46C, ApJ Letters](#)
8. "MINDS. A transition from H_2O to C_2H_2 dominated spectra with decreasing stellar luminosity"
Sierra L. Grant, Milou Temmink, Ewine van Dishoeck, and 19 others.
[Grant et al. 2025, A&A, 702A,126G](#)
7. "MINDS. A multi-instrument investigation into the molecule-rich JWST-MIRI spectrum of the DF Tau binary system"
Sierra L. Grant, Nicolas Kurtovic, Ewine van Dishoeck, and 26 others
[Grant et al. 2024b, A&A, 689A, 85G](#)
6. "Full L- and M-band high resolution spectroscopy of the S CrA binary disks with VLT-CRIRES+ "
Sierra L. Grant, Giulio Bettoni, Andrea Banzatti, Ewine van Dishoeck, and 6 others
[Grant et al. 2024a, A&A, 684A, 213G](#)
5. "The $\dot{M}$ - M_{disk} relationship for Herbig Ae/Be stars: a lifetime problem for disks with low masses?"
Sierra L. Grant, Lucas M. Stapper, Michiel R. Hogerheijde, Ewine F. van Dishoeck, Sean Brittain, and Miguel Vioque
[Grant et al. 2023b, AJ, 166, 147G](#)
4. "MINDS. The detection of $^{13}CO_2$ with JWST-MIRI indicates abundant CO_2 in a protoplanetary disk"

- Sierra L. Grant**, Ewine F. van Dishoeck and 44 others
[Grant et al. 2023a, ApJ, 947L, 6G, ApJ Letters](#)
3. *"Accretion Properties in Herbig Ae/Be Stars as Traced by the Br γ Line"*
Sierra L. Grant, Catherine C. Espaillat, Sean Brittain, Caleb Scott-Joseph, and Nuria Calvet
[Grant et al. 2022, ApJ, 926, 229G](#)
 2. *"An ALMA Survey of Protoplanetary Disks in Lynds 1641"*
Sierra L. Grant, Catherine C. Espaillat, John Wendeborn, and 8 others
[Grant et al. 2021, ApJ, 913, 123](#)
 1. *"Herschel Observations of Protoplanetary Disks in Lynds 1641"*
Sierra L. Grant, Catherine C. Espaillat, S. Thomas Megeath, Nuria Calvet, and 6 others
[Grant et al. 2018, ApJ, 863, 13](#)

Co-Author: The list of 50+ manuscripts can be accessed [here](#).....

Leadership and Service

- Elected Representative for the Carnegie Institution Postdoctoral Association (01/2025 – 01/2026)
- Women as Leaders in Astronomy Organizer (09/2018 – 08/2021)
- Graduate Student Representative (09/2018 – 08/2019)
- Carnegie Astronomy Seminar and Journal Club organizer
- JWST Time Allocation Committee
- Panel member/reviewer for NSF, NASA, and ERC grants
- Referee for AAS and A&A Journals

Affiliations and Outreach

01/2026 – present	Full AAS Member
11/2021 – 09/2024	VLT-GRAVITY Young Stellar Object team
09/2021 – 09/2024	Planet Formation Witnesses and Probes: Transition Disks Research Unit
09/2015 – 08/2021	Women as Leaders in Astronomy (Boston University)
09/2015 – 08/2021	Boston University Astronomy Public Open Nights
09/2018 – 05/2019	Letters to a Pre-Scientist Pen Pal
09/2011 – 05/2015	Student Astronomical Society
09/2011 – 05/2012	Douglass Houghton Scholars Program
09/2011 – 05/2012	Women in Science and Engineering Residency Program
06/2010	Michigan Technological University Women in Engineering Program

Teaching and Mentoring

Spring 2026	6-week Advancing Inclusive Mentoring (AIM) program
09/2021 – 12/2022	Giulio Bettoni: Leiden University Ph.D. student analyzing JWST/MIRI and VLT/CRIRES+ observations
06/2018 – 08/2019	Caleb Scott-Joseph: BU Academy student analyzing near-infrared spectra
Spring 2016	AS 203: Principles of Astronomy II Teaching Assistant