Kadin Worthen

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Education

Ph.D., Astronomy — Expected: May, 2026
Johns Hopkins University, advisor: Christine Chen

M.S., Astronomy — 2023
Johns Hopkins University

B.S., Physics and Astrophysics — 2021
Arizona State University

Employment

Graduate Research Assistant/NASA FINESST Investigator — 2021-Present
Johns Hopkins University

NRAO Summer Research Assistant — 2020
National Radio Astronomy Observatory

NASA Space Grant Scholar/Undergraduate Research Assistant — 2018-2021
Arizona State University

Publications

Worthen, K., Chen, C., Brittain, S., et al. "Fluorescently excited CO emission in the 49 Ceti debris disk spatially resolved by JWST/NIRSpec." Nat Astron (2025). https://doi.org/10.1038/s41550-025-02664-x

Worthen, K., Svoboda, B., Meier, D., Ott, J., et al. "The Young Ages of 70-μm Dark Clouds Inferred from Carbon Chain Chemistry," The Astrophysical Journal, Volume 981, Issue 2, id.207, 16 pp., March 2025

Worthen, K., Chen, C., Law, D., et al. "MIRI MRS Observations of Beta Pictoris I. The Inner Dust, the Planet, and the Gas", The Astrophysical Journal, Volume 964, Issue 2, id.168, 20 pp., April 2024

Worthen, K., Chen, C., Brittain, S., et al. "Vertical Structure of Gas and Dust in Four Debris Disks",The Astrophysical Journal, Volume 962, Issue 2, id.166, 15 pp., February 2024

Worthen, K, Chen, C., Hughes, A. M., et al., " Probing the era of giant collisions: millimeter observations of HD 166191", ApJ, submitted

Wu, Y., **Worthen, K.**, Brandeker, A., Chen, C., "Argon in β Pictoris-Entrapment and Release of Volatiles in Disks," The Astrophysical Journal, Volume 982, Issue 2, id. 123, 14 pp., April 2025

Chai, Y., Chen, C.,**Worthen, K**. et al. "A JWST MIRI MRS View of the η Tel Debris Disk and Its Brown Dwarf Companion",The Astrophysical Journal, Volume 976, Issue 2, id.167, 22 pp., December 2024

Chen, C., Lu, C., **Worthen, K**. et al. "MIRI MRS Observations of Beta Pictoris. II. The Spectroscopic Case for a Recent Giant Collision",The Astrophysical Journal,

Volume 973, Issue 2, id.139, 13 pp., October 2024

Miles, B. E., Biller, B. A., Patapis, P., **Worthen, K**, et al. "The JWST Early-release Science Program for Direct Observations of Exoplanetary Systems II: A 1 to 20 μm Spectrum of the Planetary-mass Companion VHS 1256-1257 b", The Astrophysical Journal Letters, Volume 946, Issue 1, id.L6, 19 pp., March 2023

Hom, J., Patience, J., Esposito, T., Duchêne, G., **Worthen, K.**, and 58 co-authors. "First Resolved Scattered-light Images of Four Debris Disks in Scorpius-Centaurus with the Gemini Planet Imager," 2020, The Astronomical Journal, Volume 159, Issue 1, article id. 31, 16 pp. January 2020

Lu, C., Mittal, T., Chen, C., Li, A., **Worthen, K.,** et al., "Sequencing Silicates in the Spitzer Infrared Spectrograph Debris Disk Catalog. I. Methodology for Unsupervised Clustering", The Astrophysical Journal Supplement Series, Volume 276, Issue 2, id.65, 21 pp., February 2025

Xie, C., Chen, C., Lisse, C., +13 co-authors including **Worthen,K.**, "Water ice in the debris disk around HD 181327", Nature, Volume 641, Issue 8063, pp. 608-611, May 2025

Kammerer, J., Lawson, K., Perrin, M., + 14 co-authors including **Worthen,K.**, "JWST-TST High Contrast: JWST/NIRCam Observations of the Young Giant Planet β Pic b", AJ, Volume 168, Issue 2, id.51, 24 pp., August 2024

Rebollido, I., Stark, C., Kamerer, J., +21 co-authors including **Worthen, K**, "JWST-TST High Contrast: Asymmetries, Dust Populations, and Hints of a Collision in the β Pictoris Disk with NIRCam and MIRI", AJ, Volume 167, Issue 2, id.69, 28 pp., February 2024

Observing proposals

- "Determining the Origin of the Gas in the 49 Ceti Debris Disk"
  PI: **K. Worthen** (JWST Cycle 4 PID: 7313)
- "Are Terrestrial Planets Forming around HD 166191?"
  PI: **K. Worthen** (ALMA Cycle 10, project: 2023.1.00691.S, priority grade A)
- "Is there volatile delivery to terrestrial planets in HD 131488?"
  PI: **K. Worthen** (VLT CRIRES P114, priority grade A)
- " Investigating Terrestrial Planet Formation with the HD 166191 System"
  PI: **K. Worthen** (NASA IRTF, 2025)
- "Investigating the origin of the gas in the 49 Ceti debris disk"
  PI: **K. Worthen** (NASA IRTF, 2024)
- "Uncovering the Hidden H2 Content of the Beta Pictoris Debris Disk"
  PI: **K. Worthen** (ALMA Cycle 12, priority grade C, project: 2025.1.00689.S)
- "Probing the era of terrestrial planet formation: What is the evolutionary state of HD 166191?"
  PI: **K. Worthen** (ALMA Cycle 12, priority grade C, project: 2025.1.00770.S)
- "Determining the Origin of Water Ice in the Beta Pictoris Debris Disk"
  PI: S. Betti, CO-Is include **K. Worthen** (JWST Cycle 4)
- "HD 131488: A Unique Laboratory to Probe Volatile Transportation Mechanism in the Epoch of Terrestrial Planet Formation"
  PI: C. Lu, CO-Is include **K. Worthen** (JWST Cycle 3)

- "Testing Volatile Transportation in the Epoch of Terrestrial Planet Formation"
  PI: C. Lu, CO-Is include **K. Worthen** (HST Cycle 33)
- "Catching a cat by the tail: Tracing Dust Dynamics in the Beta Pictoris Debris Disk in the Aftermath of Giant Collisions"
  PI: M. Perrin, CO-Is include **K. Worthen** (JWST Cycle 3)

Observing Experience

Apache Point Observatory (2 nights)	2022
NASA IRTF SPEX (2 half nights)	2024-2025
NASA IRTF iSHELL (8 nights)	2022-2025

Awards and Honors

NASA FINESST Fellowship Characterizing Exoplanetary Systems with JWST	2022-2025
BUGGS Science Slam Best Overall Presentation	2025
NASA Space Grant Scholar	2018-2021
Ronald Greeley Planetary Science Scholarship	2019

Talks

"Understanding the late stages of planet formation"
April 2025
NASA Goddard Exoplanet Seminar Series, Greenbelt, MD

"JWST Spatially Resolves Fluorescently Excited CO in the 49 Ceti Debris Disk"
March 2025
National Captial Area Disks Meeting, Washington DC

"JWST Spatially Resolves Fluorescently Excited CO in the 49 Ceti Debris Disk"
March 2025
Carnegie Earth and Planetary Lab Exoplanet Seminar, Washington DC

"Characterizing Gas in Debris Disks with JWST"
November 2024
ESO Visitor Talk, Madrid, Spain

"Understanding the Late Stages of Planet Formation"
June 2024
Gemini North Talk, Hilo, HI

"A JWST MIRI MRS view of β Pictoris"
March 2024
Dust Devils in the Sonoran Desert, Tucson, AZ

"MIRI MRS Observations of Beta Pictoris."
September 2023
First Year of Science with JWST, Baltimore, MD

"The ages of 70μm dark clouds inferred from carbon chain chemistry."
January 2021
American Astronomical Society meeting 237, Virtual

Posters

"ALMA observations of the HD 166191 system"
June 2025
Gordon Research Conference: Origins of Solar Systems, South Hadely, MA

"MIRI MRS observations of β Pictoris"
June 2023
Gordon Research Conference: Origins of Solar Systems, South Hadely, MA

"High Contrast Imaging with the MIRI-MRS Instrument on JWST"
June 2022
Spirit of Lyot, Leiden, Netherlands

"Results from a Direct Imaging Search for Disks and Planets around A/F Stars in Scorpius-Centaurus"
June 2020
AAS 236th meeting, Virtual Conference

Teaching Experience

General Physics Laboratory I
- Institution: Johns Hopkins University
- Instructor: Dr. Reid Mumford — 2021

General Physics I
- Institution: Johns Hopkins University
- Instructor: Dr. Surjeet Rajendran — 2021

PHY 314 Quantum Physics 1
- Institution: Arizona State University
- Instructor: Dr. Richard Kirian — 2020

Sundial Student Mentor — 2020-2021
Arizona State University

Outreach and Service

Referee for The Astrophysical Journal	2025
Volunteer at Maryland Science Center	2025
Baltimore Underground Science Space Presenter	2025
JHU Physics Open House Volunteer	2025
Outreach Volunteer, University of Utah Astronomy	2019
NASA Space Grant Outreach, Arizona State University	2018 - 2021
LunaH-Map Outreach, Arizona State University	2019-2020