Dr. Jed McKinney

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SUMMARY

Research Interests: Charting the role of dust in the growth and evolution of galaxies from the first galaxies through today. Probing dust content and properties to constrain their physical nature, including active galactic nuclei. Using multiwavelength observations to measure baryonic properties and numerical simulations to build a complete evolutionary picture of galaxy evolution.

Grants: $992k in grant funding secured from NASA, NRAO, and Heising-Simons.

Papers: 10 first-author (131 citations), > 30 co-author.

Observing Experience: 10 PI programs on *JWST*, ALMA, VLA, IRAM 30m, LMT (230 total hours). 16 hours remote observing on Keck, 30 hours observing in-person on IRAM.

Presentations: 22 talks, 11 invited.

Leadership: IRSTIG Leadership Council, COSMOS-Web Working Group Lead, SOC/LOC for conference highlighting postdoctoral leaders in astronomy. PRIMA Mission Concept Science Working Group. chOIR co-founder.

Students: 7 undergraduate with 3 published works, 3 graduate mentees.

EDUCATION

University of Massachusetts, Astronomy PhD Advisor: Alexandra Pope	Sep 2017 – Aug 2022
Tufts University, BS Astrophysics, Math Minor Advisor: Anna Sajina	Sep 2013 – May 2017

POSITIONS HELD

NASA Hubble Fellow at The University of Texas at Austin Faculty contacts: Caitlin Casey, Julian Muñoz	Aug 2024 – Present
Postdoctoral Fellow at The University of Texas at Austin Advisor: Caitlin Casey	Sep 2022 – Aug 2024
Visiting Graduate Fellow, IPAC Advisor: Lee Armus	Feb 2020 – Aug 2020
Graduate Student at the University of Massachusetts, Amherst Advisors: Alexandra Pope (PhD), Anne Jaskot	Sep 2017 – Aug 2022
Research Assistant, Tufts University Advisor: Anna Sajina	Jan 2015 – May 2017

GRANTS, FELLOWSHIPS & AWARDS

NASA Hubble Fellowship Program Award, Hubble Fellow	**2024**
UT Austin Department of Astronomy Excellence in Service	2024
coPI Heising-Simons Conference Support funded for $70,000	2024
coPI NAASC Conference Support funded for $9,000	2024
PI *JWST* Cycle 3 AR #5213 funded for $326,500	**2024**
PI *JWST* Cycle 2 GO #3224 funded for $554,648	**2023**
NRAO Student Observing Support for $35K	2021
Caltech/IPAC Visiting Graduate Fellowship	2020
Massachusetts Space Grant Consortium Fellowship	2019

TELESCOPE PROPOSALS & OBSERVING

PI of 2 approved *JWST* programs
PI of 5 approved ALMA programs
PI of 4 more programs across the VLA, LMT, and IRAM

coI on > 10 ALMA programs (> 300 hours)
coI on 7 *JWST* programs (250 hours)
coI on several other LMT, GBT, SOFIA, SMA, VLA programs

30 hours in-person observing with IRAM
16 hours remote observing with Keck

TALKS

(=invited)*

Physical Simulations of PAH Emission in Galaxies II, Charlottesville, VA	Nov 2024
CFC-CCA Workshop, Austin, TX	Nov 2024
* University of Maryland Colloquium, College Park, MD	Oct 2024
NASA Hubble Fellowship Symposium, Pasadena, CA	Sept 2024
* Cosmic Odysseys, Crete, Greece	July 2024
The Physics and Impact of Astrophysical Dust, Aspen, CO	Mar 2024
* IA-FORTH, Crete (virtual)	Feb 2024
AAS 243, New Orleans, LA	Jan 2024
10 Years of ALMA, Chile	Dec 2023
* Texas A&M Astronomy Colloquium, College Station, TX	Sept 2023
COSMOS Team Meeting, Rochester, NY	May 2023
CEERS Team Conference, Austin, TX	May 2023
* FLASH Seminar, NOIRLab, Tucson, AZ	Mar 2023
AAS 240, Seattle, WA	Jan 2023
* Tufts Astronomy Seminar (virtual)	Dec 2022
* IRSTIG Webinar Series (virtual)	Oct 2022
IR Science and Technology Workshop, Boulder, CO	Mar 2022
* Princeton Galread Seminar (virtual)	Mar 2022
* UConn Astronomy Seminar, Storrs, CT	Feb 2022
* Caltech Tea Talk Series (virtual)	Jan 2022
* UCLA Lunch Seminar (virtual)	Nov 2021
* CCA Group Meeting Seminar (virtual)	Oct 2021
* Tufts Astronomy Seminar (virtual)	Feb 2021
* IRSTIG Webinar Series (virtual)	Feb 2021
AAS 237 (virtual)	Jan 2021
AAS 235, Hawaii	Jan 2020
IAU Symposium 352, Portugal	June 2019
Escape of Lyman Radiation from Galactic Labyrinths, Crete, Greece	Sept 2019
The Universe by the Light of CANDELS, Amherst, MA	Oct 2018

MENTORING

Olivia Cooper - UT Austin Grad (Now NSF AAPF at UC Boulder)	Jan 2023–Present
Lindsay House - UT Austin Grad	Oct 2024–Present
Miriam Eleazer - UMass Grad	Mar 2024– Present
Elaine Gammon - UT REU, Goldwater Scholar, UGA Undergrad	Jul 2023– Present
Virginia Vanicek - UT Undergrad	May 2024 – Present
Camila Silva - UT REU Scholar, UChicago Undergrad	May 2024– Present
Leo Sajkov - Tufts Undergrad	May 2024 – Present

	Meredith Stone - UMass Undergrad (now grad at U. Arizona)	Oct 2018–Jan 2022
	Rucellie Jimenez - UMass Undergrad	Jun 2021–Aug 2022
	Owen Henry - UMass Undergrad	Sep 2019–Dec 2020
	UT NSF REU Research Mentor	2022 – Present
TEACHING	Introductory Astronomy, Extragalactic Astronomy module, UT	Nov 2023
	Summer Pre-College Astronomy & Physics, UMass	2018 – 2019
	Astronomy TA, UMass	2018
	Coding for Undergrad Astronomers Workshop, UMass	2018
OUTREACH & SERVICE	Paradise City Podcast, Austin, TX	Feb 2024
	Astronomy on Tap Host and Speaker, Austin, TX	Aug 2023 – Present
	COSMOS-Web Junior Member Working Group Lead	Sep 2022 – Present
	9th New Horizons Bash Symposium LOC/SOC, Austin, TX	2023
	Telemundo Odessa TV Interview, Austin, TX	Jul 2023
	Co-chair UMass Astronomy DEI Committee	2020 – 2022
	MA High school extragalactic astronomy outreach seminars	2019 – 2020
	UMass Astronomy First Year Students Mentor	2018 – 2019
	UMass Graduate Student Recruitment Committee	2017 – 2022
MEMBERSHIP	PRIMA Science Affiliate	Feb 2025–Present
	choir, Leadership Council and Founding Member	Mar 2024–Present
	IR Science and Technology Integration Group Leadership Council	Aug 2022–Present
	PRIMA Galaxy Evolution Science Working Group	Jun 2023–Present
	New Great Observatories Science Analysis Group	May 2023–Present
	The Cosmic Evolution Survey (COSMOS), and COSMOS-Web	Aug 2022–Present
	The Cosmic Evolution Early Release Science (CEERS) Survey	Aug 2022–Present
	The Great Observatories All-sky LIRG Survey (GOALS)	Feb 2021–Present
	American Astronomical Society	Jan 2016–Present

1ST-AUTHOR PAPERS

McKinney, J.; Cooper, O; et al., *Modeling Galaxies in the Early Universe with Supernova Dust Attenuation*, 2025, submitted to ApJL, arXiv:2502.14031

McKinney, J.; Casey, C; et al., *SCUBADive I: JWST+ALMA Analysis of 289 Sub-millimeter Galaxies in COSMOS-Web*, 2024, ApJ, 979, 229

McKinney, J.; Pope, A; Kirkpatrick, A; et al., *The IR Compactness of Dusty Galaxies Set Star-formation and Dust Properties at* $z \sim 0-2$, 2023, ApJ, 955, 136

McKinney, J.; Sinclaire, M.; Cooper, O; Long, A; Akins, H; Casey, C; et al., *A Near-Infrared Faint, Far-Infrared-Luminous Dusty Galaxy at* $z \sim 5$ *in COSMOS-Web*, 2023, ApJL, 956, 72

McKinney, J.; Finnerty, L.; Casey, C.; Franco, M.; et al., *Broad Emission Lines in Optical Spectra of Hot Dust-obscured Galaxies can Contribute Significantly to JWST/NIRCam Photometry*, 2023, ApJL, 946, 39

McKinney, J.; Vandana, R.; Lee, K-S.; Pope, A.; Alberts, S.; Chiang, Y-K.; and Popescu, R.; *Measuring the Total Ultraviolet Light from Galaxy Clusters at* $z = 0.5-1.6$*: The Balance of Obscured and Unobscured Star-Formation*, 2022, ApJ, 928, 88

McKinney, J.; Hayward, C. C.; Rosenthal, L. J.; Martinez-Galarza, J. R.; Pope, A.; Sajina, A.; Smith, H. A., *Dust-Enshrouded AGN can Dominate Host-Galaxy-Scale Cold-Dust Emission*, 2021, ApJ, 921, 55

McKinney, J.; Armus, L., Pope, A., Díaz-Santos, T., Charmandaris, V., Inami, H., Song, Y., Evans, A., *Regulating Star Formation in Nearby Dusty Galaxies: Low Photoelectric Efficiencies in the Most Compact Systems*, 2021, ApJ, 908, 238.

McKinney, J.; Pope, A., Armus, L., Chary, R., Díaz-Santos, T., Dickinson, M., Kirkpatrick, A., *Measuring the Heating and Cooling of the Interstellar Medium at High Redshift: PAH and [C II] Observations of the Same Star-forming Galaxies at* $z \sim 2$, 2020, ApJ, 892, 119.

McKinney, J.; Jaskot, A. E. , Oey, M. S., Yun, M. S., Dowd, T., Lowenthal, J., *Neutral Gas and Ly*α *Escape in Extreme Green Pea Galaxies*, 2019, ApJ, 874, 52.

CO-AUTHOR PAPERS

Cooper et al., including **McKinney, J.** *RUBIES: JWST/NIRSpec resolves evolutionary phases of dusty star-forming galaxies at* $z \sim 2$, 2024, arXiv:2410.08387. **coA contribution:** Major comments on manuscript, aided in interpretation of modified attenuation laws.

Lambrides et al., including **McKinney, J.** *The Case for Super-Eddington Accretion: Connecting Weak X-ray and UV Line Emission in JWST Broad-Line AGN During the First Gyr of Cosmict Time*, 2024, arXiv:2409.13047. **coA contribution:** Major comments on manuscript.

Gentile et al., including **McKinney, J.** *Not-so-little Red Dots: Two massive and dusty starbursts at* $z \sim 5-7$ *pushing the lmits of star formation discovered by JWST in the COSMOS-Web Survey*, 2024, ApJ, 973, 2. **coA contribution:** Advised sample selection and provided major comments on manuscript.

Casey et al., including **McKinney, J.** *Dust in Little Red Dots*, 2024, 975, 4. **coA contribution:** Discussion and vetting of methods. Provided data for low$-z$ comparison samples.

Mizener et al., including **McKinney, J.** *First Constraints on the Interstellar Medium Conditions of a Low-mass, Hihgly Obscured $z = 4.27$ Main-Sequence Galaxy*, 2024, ApJ, 970, 30. **coA contribution:** Significant contribution to all aspects of the paper from data reduction and analysis to interpretation and writing.

Akins et al., including **McKinney, J.** *COSMOS-Web: The over-abundance and physical nature of "little red dots" – implications for early galaxy and SMBH assembly*, 2024, arXiv:2406.10341. **coA contribution:** Detailed discussions/feedback on scope, sample selection, and implications.

Sajkov et al., including **McKinney, J.** *Halfway to the Peak: The JWST MIRI $5.6\,\mu m$ number counts and source population*, 2024, arXiv:2406.04437. **coA contribution:** This is an undergrad paper. I provided feedback on the scope of the work and detailed comments on the manuscript.

Faisst et al., including **McKinney, J.** *COSMOS-Web: The Role of Galaxy Interactions and Disk Instabilities in Producing Starbursts at $z > 4$*, 2024, arXiv:2405.09619. **coA contribution:** Paper comments.

Zavala et al., including **McKinney, J.** *Detection of ionized hydrogen and oxygen from a very luminous and young galaxy 13.4 billion years ago*, 2024, arXiv:2403.10491. **coA contribution:** JWST MIRI/LRS data reduction.

Long et al., including **McKinney, J.** *Efficient NIRCam Selection of Quiescent Galaxies at $3 < z < 6$ in CEERS*, 2024, ApJ, 970, 68. **coA contribution:** Advised selection overlap between quiescent and dusty galaxies and helped with response to referee.

Young et al., including **McKinney, J.** *Halfway to the peak: Spatially resolved star formation and kinematics in a z=0.54 dusty galaxy with JWST/MIRI*, 2023, arXiv:2310.06900. **coA contribution:** Advised science case and interpretation of dust physics, fit opacity models to MIRI spectra.

Akins et al., including **McKinney, J.** *Two Massive, Compact, and Dust-obscured Candidate $z \approx 8$ Galaxies Discovered by JWST*, 2023, ApJ, 956, 61. **coA contribution:** Advised interpretation of ALMA FIR data and UV+IR model fits.

Fujimoto et al., including **McKinney, J.** *ALMA FIR View of Ultra-high-redshift Galaxy Candidates at $z \sim 11 - 17$: Blue Monsters or Low-z Red Interlopers?*, 2023, ApJ, 955, 130. **coA contribution:** Advisded science case related to [C II] emission line.

Casey & Kartaltepe, the COSMOS-Web collaboration, including **McKinney, J.** *COSMOS-Web: An Overview of the JWST Cosmic Origins Survey*, 2023, ApJ, 954, 31. **coA contribution:** measured MIRI F770W depths and contributed to NIRCam and MIRI data reduction and testing.

Lambrides et al., including **McKinney, J.** *Uncovering a Massive $z \sim 7.65$ Galaxy Hosting a Heavily Obscured Radio-Loud QSO Candidate in COSMOS-Web*, 2023, arXiv:2308.12823. **coA contribution:** Measured FIR photometry and upper limits.

Casey et al., including **McKinney, J.** *COSMOS-Web: Intrinsically Luminous $z > 10$ Galaxy Candidates Test Early Stellar Mass Assembly*, 2023, arXiv:2308.10932. **coA contribution:** Checked all sources for archival ALMA coverage and reduced/imaged as-needed. Advised science case and provided local reference sample data in Fig 6.

Kirkpatrick et al., including **McKinney, J.** *CEERS Key Paper VII: JWST/MIRI Reveals a Faint Population of Galaxies at Cosmic Noon Unseen by Spitzer*, 2023, arXiv:2308.09750. **coA contribution:** Advised science case, with significant contributions to Section 4.2 on PAH emission in low mass galaxies.

Franco et al., including **McKinney, J.** *Unveiling the distant Universe: Characterizing $z > 9$ Galaxies in the first epoch of COSMOS-Web*, 2023, arXiv:2308.00751. **coA contribution:** Advised science case, and vetted sources for low$-z$ contaminants.

Popescu et al., including **McKinney, J.** *Tracing the Total Stellar Mass and Star Formation of High-Redshift Protoclusters*, 2023, arXiv:2308.00745. **coA contribution:** Fit SED models to protocluster-integrated SEDs.

Bianchin et al., including **McKinney, J.** *GOALS-JWST: Gas Dynamics and Excitation in NGC7469 revealed by NIRSpec*, 2023, arXiv:2308.00209

Lai et al., including **McKinney, J.** *GOALS-JWST: Small neutral grains and enhanced 3.3 micron PAH emission in the Seyfert galaxy NGC 7469*, 2023, arXiv:2307.15169. **coA contribution:** Advised science case and interpretation relative to larger 3.3 μm PAH samples at $z = 0$.

Pope, **McKinney** et al., *ALMA Reveals a Stable Rotating Gas Disk in a Paradoxical Low-mass, Ultradusty Galaxy at $z = 4.274$*, 2023, ApJL, 951, 46. **coA contribution:** Reduced/imaged [C II] ALMA spectrum. Fit kinematic profiles to moment maps. Advised science case and discussion text.

Rich et al., including **McKinney, J.** *GOALS-JWST: Pulling Back the Curtain on the AGN and Star Formation in VV 114*, 2023, ApJ, 944, 50

Armus et al., including **McKinney, J.** *GOALS-JWST: Mid-Infrared Spectroscopy of the Nucleus of NGC 7469*, 2023, ApJ, 942, 37

Lai et al., including **McKinney, J.** *GOALS-JWST: Tracing AGN Feedback on the Star-Forming ISM in NGC 7469*, 2022, ApJL, 941, 36. **coA contribution:** Advised interpretation of mid-IR atomic lines relative to FIR diagnostics.

U et al., including **McKinney, J.** *GOALS-JWST: Resolving the Circumnuclear Gas Dynamics in NGC 7469 in the Mid-infrared*, 2022, ApJ, 940, 5 **coA contribution:** Paper comments.

Song et al., including **McKinney, J.** *Characterizing Compact $15 - 33$ GHz Radio Continuum Sources in Local U/LIRGs*, 2022, ApJ, 940, 52. **coA contribution:** Provided detailed comments on paper drafts.

Stone et al., including **McKinney, J.** *Measuring Star Formation and Black Hole Accretion Rates in Tandem Using Mid-infrared Spectra of Local Infrared Luminous Galaxies*, 2022, ApJ, 934, 27. **coA contribution:** Mentored/advised student (M. Stone, see mentoring) research project. Provided detailed technical and writing support throughout the student's project and while writing paper.

Song et al., including **McKinney, J.** *A Comparison between Nuclear Ring Star Formation in LIRGs and in Normal Galaxies with the Very Large Array*, 2021, ApJ, 916, 73. **coA contribution:** Provided detailed paper comments.

Stacey et al., including **McKinney, J.** *Measuring the total infrared light from galaxy clusters at $z = 0.5 - 1.6$: connecting stellar populations to dusty star formation*, 2021, MNRAS, 501, 1970. **coA contribution:** Provided detailed paper comments, and worked with coAs to discuss novel methedology that was also employed in **McKinney+2022, ApJ, 929, 88**.

Henry et al., including **McKinney, J.** *A Comparison of Mid-infrared Spectral Decomposition and Full Infrared Spectral Energy Distribution Modeling to Quantify AGN in Dusty Galaxies: The Necessity of Data between 6 and 14 Microns*, 2019, RNAAS, 3, 199. **coA contribution:** Mentored student (O. Henry, see mentoring) project and met frequently to discuss/advise progress.

Jaskot et al., including **McKinney, J.** *New Insights on Lyα and Lyman Continuum Radiative Transfer in the Greenest Peas*, 2019, ApJ, 885, 96. **coA contribution:** Provided detailed paper comments on cohesive narrative in parallel with results discussed in **McKinney+2019, ApJ, 874, 52.**

Bonato et al., including **McKinney, J.** *Exploring the Evolution of Star Formation and Dwarf Galaxy Properties with JWST/MIRI Serendipitous Spectroscopic Surveys*, 2017, ApJ, 836, 171. **coA contribution:** Provided technical support with semi-analytic modelling of far-IR/sub-mm galaxy populations and selection in MIRI imaging surveys.