Thomas **Connor**

NPP Fellow · NASA Jet Propulsion Laboratory / California Institute of Technology

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Experience

NASA Jet Propulsion Laboratory — *Pasadena, California*

NPP Fellow — *Oct. 2019 - Present*

I lead a self-directed research program studying the origins and growth of the earliest supermassive black holes, with a focus on X-ray observations. In addition, I participate in the NuSTAR Science Operations Center meetings and conduct quality assurance reviews of NuSTAR data on an approximately weekly cadence.

Observatories of the Carnegie Institution for Science — *Pasadena, California*

Postdoctoral Fellow — *Sept. 2016 - Sept. 2019*

Education

Michigan State University — *East Lansing, Michigan*

PhD, Astronomy & Astrophysics — *Awarded Aug. 2016*

Advisor: Megan Donahue

Thesis: "*Multi-Wavelength Observations of Galaxy Clusters: Population Evolution and Scaling Relations for Intermediate-Redshift Clusters*"

MS, Astronomy & Astrophysics — *Awarded May 2013*

Case Western Reserve University — *Cleveland, Ohio*

BS, Astronomy — *Awarded May 2011*

Research

High-Redshift Quasars	Discovery and Analysis of $z > 5$ Quasars
Galaxy Clusters	Characterizing the Evolutionary Pathways of Cluster Members
The Cosmic Web	X-Ray Observations of Diffuse Cosmic Structures
Multiwavelength Synergy	Leveraging Insights Across All Observational Domains

My portfolio consists of 40 refereed publications, including 11 first-author publications, with an h-index of 16. I have been directly awarded over $290,000, with accepted PI'ed observations with *Chandra*, *XMM-Newton*, the *Hubble Space Telescope*, *NuSTAR*, the Jansky Very Large Array, Gemini, both Magellans, and the Palomar Hale Telescope.

Observations Awarded

Chandra	**PI: #23700223** 82 ks to observe a high-z quasar and companion	*2021*
	PI: #23800222 92 ks to observe an AGN-rich cluster at $z > 1$	*2021*
	Co-I: #22700552 710 ks to survey quasars in the epoch of reionization	*2020*
	Co-I: #22800459 271 ks to study a high-redshift galaxy clusters	*2020*
	Co-I: #21700027 120 ks to study an obscured quasar	*2019*
	Co-I: #20700106 277 ks to study a radio-bright quasar	*2018*
XMM-Newton Observatory	**PI: #090286** Up to 195 ks to build a sample of double-lensed quasar fluxes	*2021*
	PI: #086378 186 ks to study a high-z radio-bright quasar	*2019*
	Co-I: #090420 Up to 75 ks to the ICM in high-z clusters with radio emission	*2019*
	Co-I: #086462 Up to 192 ks to study strongly-lensed quasars	*2019*
	Co-I: #084274 146 ks to study a high-z quasar companion	*2019*
Hubble Space Telescope	**PI: #15198** 5 orbits with the Cosmic Origins Spectrograph	*2017*
	Co-I: #16757 20 Primary and Parallel orbits with WFC3	*2021*
	Co-I: #16740 9 orbits with WFC	*2021*
	Co-I: #15308 6 orbits with ACS / WFC3	*2017*
JWST	**Co-I: #02234** 17.8 primary hours	*Cycle 1*
	Co-I: #02078 61.5 primary hours / 29.6 parallel hours	*Cycle 1*
	Co-I: #01764 65.5 primary hours / 8.6 parallel hours	*Cycle 1*
	Co-I: #01554 7.8 primary hours	*Cycle 1*
NuSTAR	**PI: #7291** 225 ks targeting a high-z blazar candidate	*2021*
	Co-I: #7098 75 ks targeting a low-redshift HotDOG	*2021*
	Co-I: #6236 53 ks targeting candidate subparsec SMBH binaries	*2020*
Very Large Array	**PI: #22A-319** 6.00 hours extending the depth of #21B-151	*2022*
	PI: #21B-151 6.00 hours to search for a radio signature of a high-z X-ray jet	*2021*
	Co-I: #21B-235 12.50 hours studying $z \sim 1$ galaxy clusters	*2021*
	Co-I: #21B-087 8.00 hours and 31 ks of XMM targeting a high-z quasar	*2021*
	Co-I: #21A-307 5.00 hours to investigate the lifetime of a high-z quasar jet	*2020*
Very Large Baseline Array	**Co-I: #21B-190** 12.0 hours to resolve a high-redshift quasar	*2021*
Magellan Telescopes	**PI:** 36.5 Nights Awarded	*2017-2021*
Gemini Observatory	**PI / Co-I:** 1.0 hours / 9.2 hours	*2019-2020*
Palomar Hale 200 Inch	**PI:** 11 Nights Awarded	*2020-2022*
Irénée du Pont Telescope	**PI:** 15 Nights Awarded	*2017-2020*

Publications

Primary (First or Second Author)

1 **Connor et al.** *2022, ApJ, accepted*

"Gaia GraL: Gaia DR2 Gravitational Lens Systems. VII. XMM-Newton Observations of Lensed Quasars"

2 **Connor et al.** *2021b, ApJL, 922, 24*

"X-Ray Evidence Against the Hypothesis that the Hyper-luminous $z = 6.3$ Quasar J0100+2802 is Lensed"

3 **Connor et al.** *2021a, ApJ, 911, 120*
"Enhanced X-ray Emission from the Most Radio-Powerful Quasar in the Universe's First Billion Years"

4 **Connor et al.** *2020, ApJ, 900, 189*
"X-ray Observations of a [C II]-bright, z=6.59 Quasar/Companion System"

5 **Connor et al.** *2019d, ApJ, 887, 171*
"X-ray Observations of a $z \sim 6.2$ Quasar/Galaxy Merger"

6 **Connor et al.** *2019c, ApJL, 884, 20*
"COS Observations of the Cosmic Web: A Search for the Cooler Components of a Hot, X-ray Identified Filament"

7 **Connor et al.** *2019b, ApJ, 878, 66*
"Assembling a RELIC at Redshift 1: Spectroscopic Observations of Galaxies in the RELICS Cluster SPT-CLJ0615−5746"

8 **Connor et al.** *2019a, ApJ, 875, 16*
"On the Origin of the Scatter in the Red Sequence: An Analysis of Four CLASH Clusters"

9 **Connor et al.** *2018, ApJ, 867, 25*
"Wide-Field Optical Spectroscopy of Abell 133: A Search for Filaments Reported in X-ray Observations"

10 **Bañados, Connor et al.** *2018, ApJL, 856, 25*
"Chandra X-Rays from the Redshift 7.54 Quasar ULAS J1342+0928"

11 **Connor et al.** *2017, ApJ, 848, 37*
"Crowded Field Galaxy Photometry: Precision Colors in the CLASH Clusters"

12 **Donahue, Connor et al.** *2017, ApJ, 835, 216*
"Observations of Lyα and O VI: Signatures of Cooling and Star Formation in a Massive Central Cluster Galaxy"

13 **Donahue, Connor et al.** *2015, ApJ, 805, 177*
"Ultraviolet Morphology and Unobscured UV Star Formation Rates of CLASH Brightest Cluster Galaxies"

14 **Connor et al.** *2014, ApJ, 794, 48*
"Scaling Relations and X-Ray Properties of Moderate-luminosity Galaxy Clusters from $0.3 < z < 0.6$ with XMM-Newton"

Secondary Papers

15 **Decker, B. et al. (Connor, T: 4/17)** *2022, ApJ, submitted*
"MaDCoWS XI: Stellar Mass Fractions and Luminosity Functions of MaDCoWS Clusters at $z \sim 1$."

16 **Lagattuta, D. J. et al. (Connor, T: 13/21)** *2021, MNRAS, accepted*
"Pilot-WINGS: An extended MUSE view of the structure of Abell 370."

17 **Smirnova-Pinchukova, I. et al. (Connor, T: 9/19)** *2021, A&A, accepted*
"The Close AGN Reference Survey (CARS): No obvious signature of AGN feedback on star formation, but subtle trends."

18 **Rojas-Ruiz, S. et al. (Connor, T: 4/12)** *2021, ApJ, 920, 150*
"The Impact of Powerful Jets on the Far-infrared Emission of an Extreme Radio Quasar at $z\sim6$."

19 **Gonzalez, A. et al. (Connor, T: 3/8)** *2021, MNRAS, 507, 963*
"Discovery of a Possible Splashback Feature in the Intracluster Light of MACS J1149.5+2223."

20 **Vito, F. et al. (Connor, T: 5/22)** *2021, A&A, 649, 133*
"Chandra and Magellan/FIRE follow-up observations of PSO167-13: an X-ray weak QSO at $z = 6.515$."

21 **Bañados, E. et al. (Connor, T: 7/20)** *2021, ApJ, 909, 80*
"The discovery of a highly accreting, radio-loud quasar at z = 6.82."

22 **Wang, F. et al. (Connor, T: 9/23)** *2021, ApJL, 907L, 1*
"A Luminous Quasar at Redshift 7.642."

23 **Dicker, S.R. et al. (Connor, T: 9/20)** *2020, ApJ, 902, 144*
"The Massive and Distant Clusters of WISE Survey. X. Initial Results from a Sunyaev-Zeldovich Effect Study of Massive Galaxy Clusters at z > 1 Using MUSTANG2 on the GBT."

24 **Frisbie, R.L.S. et al. (Connor, T: 4/9)** *2020, ApJ, 899, 159*
"Properties of the Hot Ambient Medium of Early-type Galaxies Hosting Powerful Radio Sources."

25 **Holoien, T. et al. (Connor, T: 18/33)** *2020, ApJ, 898, 161*
"The Rise and Fall of ASASSN-18pg: Following a TDE from Early to Late Times."

26 **Moravec, E. et al. (Connor, T: 7/21)** *2020, ApJ, 898, 145*
"The Massive and Distant Clusters of WISE Survey. IX. High Radio Activity in a Merging Cluster."

27 **Steinhardt, C.L. et al. (Connor, T: 35/95)** *2020, ApJS, 247, 64*
"The BUFFALO HST Survey."

28 **Gonzalez, E.J. et al. (Connor, T: 11/14)** *2020, MNRAS, 494, 349*
"Setting the scene for BUFFALO: a study of the matter distribution in the HFF galaxy cluster MACS J0416.1-2403 and its parallel field."

29 **Starikova, S. et al (Connor, T: 5/7)** *2020, ApJ, 892, 34*
"Stellar-mass Measurements in A133 with Magellan/IMACS ."

30 **Chen, P., et al. (Connor, T: 17/24)** *2020, ApJL, 889, L6*
"The Most Rapidly-Declining Type I Supernova 2019bkc/ATLAS19dqr."

31 **DeMaio, T., et al. (Connor, T: 7/12)** *2020, MNRAS, 491, 3751*
"The growth of brightest cluster galaxies and intracluster light over the past 10 billion years."

32 **Johnson, S.D., et al. (Connor, T: 5/14)** *2019, ApJL, 884, L31*
"The Physical Origins of the Identified and Still Missing Components of the Warm-Hot Intergalactic Medium: Insights from Deep Surveys in the Field of Blazar 1ES1553+113."

33 **Holoien, T.W.S., et al. (Connor, T: 19/24)** *2019, ApJ, 883, 111*
"Discovery and Early Evolution of ASASSN-19bt, the First TDE Detected by TESS."

34 **Grossova, R., et al. (Connor, T: 11/16)** *2019, MNRAS, 488, 1917*
"Powerful AGN jets and unbalanced cooling in the hot atmosphere of IC 4296."

35 **Husemann, B., et al. (Connor, T: 11/18)** *2019, A&A, 627, 53*
"The Close AGN Reference Survey (CARS). A massive multi-phase outflow impacting the edge-on galaxy HE1353-1917."

36 **Juráňová, A., et al. (Connor, T: 11/12)** *2019, MNRAS, 484, 2886*
"Cooling in the X-ray halo of the rotating, massive early-type galaxy NGC 7049."

37 **Lakhchaura, K., et al. (Connor, T: 7/9)** *2018, MNRAS, 481, 4472*
"Thermodynamic properties, multiphase gas and AGN feedback in a large sample of giant ellipticals."

38 **DeMaio, T., et al. (Connor, T: 5/7)** *2018, MNRAS, 474, 3009*
"Lost but not forgotten: intracluster light in galaxy groups and clusters."

39 **Morrison, H.L., et al. (Connor, T: 5/13)** *2016, AJ, 151, 7*
"Globular and Open Clusters Observed by SDSS/SEGUE: The Giant Stars."

40 **Fogarty, K., et al. (Connor, T: 3/5)** *2015, ApJ, 813, 117*
"Star Formation Activity in CLASH Brightest Cluster Galaxies."

41 **Werner, N., et al. (Connor, T: 9/15)** *2014, MNRAS, 439, 2291*
"The origin of cold gas in giant elliptical galaxies and its role in fuelling radio-mode AGN feedback"

Invited Talks

Lights at the Edge of the Universe: Exploring the Quasar Population at the Dawn of Time *Virtual*
Harvard | Smithsonian Center for Astrophysics High Energy – Astrophysics Colloquium *March 2021*

On the Nature of Galaxy Clusters as Archaeological Records *Virtual*
Observatories of the Carnegie Institution for Science – Colloquium *February 2021*

Multiwavelength Insights into the Growth and Evolution of Galaxy Clusters *Virtual*
Harvard | Smithsonian Center for Astrophysics – Galaxy Clusters Seminar *October 2020*

Building a Galaxy Cluster *Huntsville, Alabama*
University of Alabama at Huntsville – Physics Seminar *October 2018*

Teaching Experience

AST 308: Galaxies & Cosmology *Michigan State University*
Guest Instructor *2015*
- Lectured and ran in-class assessments while primary teacher was unavailable

MST@MSU: Astronomy *Michigan State University*
Instructor *2013*
- Taught a two-week intensive course for middle school students on astronomy and data analysis

ISP 205L: Visions of the Universe *Michigan State University*
Instructor *2011-2013*
- Gen Ed astronomy lab course. Responsible for lecturing, overseeing lab time, grading, responding to students, and preparing lab
- Primary instructor for one section per semester (approx. 100 students), and lab assistant for a second

ASTR 202: Galaxies & the Universe *Case Western Reserve University*
Teaching Assistant *2010, 2011*
- Held office hours, graded homework, and responded to student questions

ASTR 201: Stars & Planets *Case Western Reserve University*
Teaching Assistant *2009, 2010*

ASTR 206: Life in the Universe *Case Western Reserve University*
Teaching Assistant *2010, 2011*

ASTR 204: Einstein's Universe *Case Western Reserve University*
Teaching Assistant *2010*

Honors & Awards

Funding and Fellowships

2022	**JWST**, The JWST-legacy narrow-band survey of Hα and [OIII] emitters in the epoch of reionization	*$14,280*
2021	**Chandra**, Do $z > 6$ Quasar Companions Host AGN?	*$59,840*
2021	**Chandra**, An AGN census in a radio-active cluster merger at $z\sim1$	*$62,200*
2021	**NuSTAR**, The NuSTAR View of the Epoch of Reionization: Hard Energy Insights Into the Drivers of Early Quasar Superluminosity	*$20,000*
2019	**XMM**, Unlocking Super-Eddington Accretion with the Most Distant Radio Source	*$71,514*
2019	**Chandra**, Hunting down the first heavily obscured QSO at $z > 6$	*$5,000*
2019	**Fellowship**, NASA Postdoctoral Program Fellow	*$300,000*
2017	**HST**, UV Observation of a QSO Sightline Intersecting an X-ray Identified Filament of the Cosmic Web	*$61,543*
2016	**Fellowship**, Michigan State University College of Natural Science Dissertation Completion Fellowship	*$6,000*
2016	**Fellowship**, MSU Physics Fellowship	*$1,702*

Awards

2022	**JPL Postdoc Research Award**, Awarded for the best research poster in Astronomy & Astrophysics, one of five lab-wide categories	*JPL*
2016	**Kaplan Award**, Awarded for the best presentation of the year at the MSU Physics Grad Organization lunch talks	*MSU*
2012	**Best Graduate TA Award**, Awarded for the best graduate teaching assistant of the year in the MSU Department of Physics and Astronomy	*MSU*
2009	**Peter Witt Scholarship**, CWRU scholarship honoring students who have shown a dedication to community involvement	*CWRU*
2009	**Case Alumni Association Scholarship**, Awarded to CWRU students majoring in STEM based on merit, need, and skills	*CWRU*

Contributed Talks and Posters

X-ray Jets from the Most Radio-powerful Quasar in the Universe's First Billion Years — *Salt Lake City, Utah*

AAS Winter Meeting (Cancelled due to COVID-19) — *January 2022*

The Current Status of X-ray Observations of High-z Quasars — *Ringberg Castle, Germany*

Black Holes and Galaxies at the Edge of the Universe — *March 2020*

X-ray Observations of Quasars in the First Billion Years of the Universe: Searching for AGN Activity in Companions — *Honolulu, Hawaii*

AAS Winter Meeting — *January 2020*

X-rays from the Cosmic Web: The Case of Abell 133 — *Bologna, Italy*

X-ray Astronomy 2019 — *Sept 2019*

Taking the Red Sequence Offline — *Sexten, Italy*

Tracing Cosmic Evolution With Clusters of Galaxies 2019 — *July 2019*

Observing the Cosmic Web at the Cluster Boundary — *Washington, USA*

Winter AAS Meeting — *Jan 2019*

Building a Galaxy Cluster — *Huntsville, Alabama, USA*
University of Alabama at Huntsville Physics Seminar — *Oct 2018*

Cosmic Filaments & AXIS — *Washington, D.C., USA*
AXIS Summer Workshop — *Aug 2018*

Optical Observations of Cluster Filaments — *Alabama, USA*
Alabama WHIM 2018 — *June 2018*

Tying Clusters Onto the Cosmic Web with X-rays — *Utah, USA*
SnowCluster 2018 — *March 2018*

Observations of Infall into Abell 133 — *Washington, D.C., USA*
4th Magellan Science Symposium — *December 2016*

Multi-Wavelength Observations of Galaxy Clusters: Population Evolution and Scaling Relations for Intermediate-Redshift Clusters — *Michigan, USA*
Thesis Defense — *July 2016*

Inclusive Astronomy, Inclusive Physics: Working Toward a Better Future in our Fields — *Michigan, USA*
MSU PGO Lunch Talk — *February 2016*

Crowded Field Photometry in the CLASH Clusters: Measuring the Red Sequence of Cluster Galaxies with Robust Photometry — *Florida, USA*
Winter AAS Meeting — *January 2016*

Seeing the Trees for the Forest: An Optimized Census of Galaxy Clusters — *Michigan, USA*
MSU PGO Lunch Talk — *September 2015*

Photometry of CLASH Cluster Galaxies — *Utah, USA*
SnowCluster 2015 — *March 2015*

A Beginner's Guide to Galaxy Clusters — *Michigan, USA*
MSU PGO Lunch Talk — *October 2014*

Optimal Photometric Measurements for Determining the Stellar Masses of BCGs and Galaxy Clusters — *London, UK*
CLASH Team Science Meeting — *September 2013*

Optical Morphology of Faint Radio Sources in the GOODS-N Field — *Washington, USA*
AAS Winter Meeting — *January 2011*

Outreach Highlights

Mt. Wilson STEM Program — *Greater Los Angeles*
Astronomer — *2018 - Present*
One or two-day school visits to Mt. Wilson, possibly including observing on the 60-inch telescope with or without overnight stays. In addition to assisting with observing and answering questions during unstructured times, I also led classes on basic astronomical concepts.

Carnegie Observatories Open House — *Pasadena, California*
Station Lead — *2016 - 2019*
I led the interactive spectroscopy exhibit at the yearly Open House, including event planning, day-of public interaction and volunteer management, and participating in year-to-year event development.

Astronomy on Tap, Lansing — *Lansing, Michigan*
Volunteer — *2015 - 2016*
I ran social media engagement during events, answered questions from members of the public, and volunteered as a presenter.

Observing Experience

Observing

Magellan Baade Telescope — *Las Campanas Observatory, Chile*
IMACS, IMACS-GISMO, FIRE, MagE, FourStar — *First: 2017*

Magellan Clay Telescope — *Las Campanas Observatory, Chile*
LDSS-3 — *First: 2018*

Hale Telescope — *Palomar Observatory, USA*
DBSP, TripleSpec, WIRC — *First: 2020*

SOAR Telescope — *Cerro Tololo Inter-American Observatory, Chile*
Goodman, SOI, Spartan — *First: 2012*

Irénée du Pont Telescope — *Las Campanas Observatory, Chile*
Direct CCD, Echelle, WFCCD — *First: 2017*

Burrell Schmidt Telescope — *Kitt Peak National Observatory, USA*
Direct Imaging — *First: 2011*

Additional Data Reduced and Analyzed

Hubble Space Telescope — *UV / Optical / IR*
ACS/WFC3 Imaging, COS Spectra

Chandra X-ray Observatory — *X-Ray*
ACIS Imaging and Spectroscopy

XMM-Newton — *X-Ray*
EPIC Imaging and Spectroscopy

Keck I — *Near-IR*
MOSFIRE Imaging

Gemini-North — *Optical*
GMOS Imaging

Formal Collaborations

MaDCoWS Photometric selection and analysis of $z \gtrsim 1$ galaxy clusters
Gaia GraL Machine-learning search for gravitational lenses in *Gaia*
BUFFALO *Hubble*-based exploration of cluster outskirts

Service and Leadership

NuSTAR Member of the Science Operations Center; Quality Assurance reviewer
Review Panels NuSTAR, Chandra, NASA ADAP
Independent Reviews Gemini, Hubble, NASA FINNESST
Postdoc Representative Co-Leader of the Carnegie Observatories Postdoc Association for two years
AAS Founding Member of the Early Career Advisory Board
Chambliss Poster Judge
Habitat for Humanity President, CWRU Habitat for Humanity; Volunteer Coordinator, MSU Habitat for Humanity
Physics & Astronomy Club President (two terms), CWRU Physics and Astronomy Club

Mentoring

Sophia Torrance *CASSI*

Summer Student, presented a poster at 2020 Winter AAS: "Exploring Galaxy Quenching Mechanisms in Groups and Clusters: A Morphological Analysis of Red Sequence Galaxies" *2019*

Professional Organizations

American Astronomical Society Full Member
AAS HEAD Member

References

Dr. Daniel Stern NuSTAR Project Scientist
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Dr. John Mulchaey Crawford H. Greenewalt Chair and Director of The Observatories of the Carnegie Institution for Science
Past President, Carnegie Institution for Science
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Prof. Megan Donahue University Distinguished Professor, Michigan State University
Past President, American Astronomical Society
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