

# Nikko J. Cleri

- » Position: Graduate Student at Texas A&M University
- » Research: Galaxy Evolution, High-Redshift Galaxies, Emission-Line Galaxies, Population III Stars, Active Galactic Nuclei, Black Hole Seeds, Star Formation, Dust Attenuation

## Summary

Nikko J. Cleri is PhD candidate in astronomy at Texas A&M University, and will be an Eberly Postdoctoral Fellow at Penn State University starting in 2024. He uses rest-frame UV, optical, and near-infrared spectroscopy from *JWST* as a part of the CEERS, NGDEEP, and RUBIES collaborations to study black hole evolution and star formation in the early Universe. He is also very active in mentoring and outreach initiatives, and currently serves as the coordinator for Texas A&M's Mentoring and Advising Graduates in an Inclusive Community (MAGIC) program.

## Academic and Professional Appointments

2024-	<b>Eberly Postdoctoral Fellow</b> (Starting July 2024)	PSU
2021-24	<b>Graduate Student</b> (Advisor: Prof. Casey Papovich)	TAMU
2021	<b>Research Technician</b> (Advisor: Prof. Jonathan Trump)	UConn
2019-21	<b>Graduate Student</b> (Advisor: Prof. Jonathan Trump)	UConn
2017-20	<b>Research Assistant</b> (Advisor: Prof. Gerald Dunne)	UConn
2018	<b>NSF REU Student</b> (Advisor: Prof. Louis Strigari)	TAMU

## Education

2021 - 2024	<b>Ph.D. Astronomy</b>	Texas A&M University
» Advisor: Casey Papovich		
» Thesis: <i>Spectroscopic Studies of Stars and Black Holes Across Cosmic Time</i>		
2019 - 2021	<b>M.S. Physics</b>	University of Connecticut
» Advisor: Jonathan R. Trump		
» Thesis: <i>CLEAR: Paschen-<math>\beta</math> Star Formation Rates and Dust Attenuation in Low Redshift Galaxies</i>		
2015 - 2019	<b>B.S. Physics   Mathematics Minor</b>	University of Connecticut
» Advisor: Gerald V. Dunne		
» Undergraduate Research: <i>Resurgent trans-series for generalized Hastings-McLeod solutions</i>		

## Awarded Proposals and Grants

### Summary

- » Observatories: *JWST*, *HST*, Gemini
- » Total Observing Time (PI + Co-I): 434.78 hours
- » Total Money Awarded to Cleri: \$136k

### Principal Investigator

- 2024 ***JWST Cycle 3 - AR 5558: A Census of Optical Diagnostics of Ionizing Sources Across Cosmic Time***

2021	<b>HST Cycle 29</b> - AR 16609: <i>Peering Through the Dust: Paschen-beta Indicators of Star Formation and Dust Attenuation</i>	~\$136k
Co-Investigator		5
2024	<b>JWST Cycle 3</b> - GO 5407: <i>MEOW: The MIRI Early Obscured-AGN Wide Survey</i> (PI: G. Leung)	73.95 hours
2024	<b>JWST Cycle 3</b> - GO 5507: <i>Deep Spectroscopy of Galaxies at z=4-14: Uncovering Drivers of Early Galaxy Formation and Black Hole Growth</i> (PI: T. Hutchison)	23.29 hours
2024	<b>JWST Cycle 3</b> - GO 6368: <i>The CANDELS-Area Prism Epoch of Reionization Survey (CAPERS)</i> (PI: M. Dickinson)	293.21 hours
2023	<b>JWST Cycle 2</b> - GO 3703: <i>Breaking the z=10 barrier with MIRI: redshift confirmation and detection of rest-frame optical emission lines</i> (PI: J. Zavala)	24.33 hours
2023	<b>Gemini</b> : GS-2023A-Q-136: <i>Optical Spectroscopy of JWST ERO Galaxies</i> (PI: B. Backhaus)	20 hours

## Honors and Awards

2022	<b>Texas Space Grant Consortium Graduate Fellow</b> - \$5K	TAMU
2018	<b>NSF REU</b> - \$5K	TAMU
2016	<b>Dean's List</b> - College of Liberal Arts and Sciences	UConn
2015-19	<b>Governor's Scholarship</b> - \$8.5K/yr	UConn
2015	<b>Community Service Scholarship</b> - \$1K	UConn

## Teaching Experience

2019-21	<b>TA</b> - PHYS 1501: Physics for Engineers I	UConn
2021	<b>TA/CA</b> - PHYS 1025: Introduction to Astronomy	UConn

## Professional Service

2021-	<b>Referee</b> - Astrophysical Journal (ApJ)
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## Mentoring

2023-24	<b>Graduate Representative</b> - TAMU Astronomy	TAMU
2022-24	<b>Coordinator</b> - Mentoring and Advising Graduates in an Inclusive Community (MAGIC)	TAMU
2022-24	<b>Mentor</b> - Mentoring and Advising Graduates in an Inclusive Community (MAGIC)	TAMU
2017-18	<b>Mentor</b> - UConn Undergraduate Peer Mentoring	UConn

## Outreach

2022-	<b>Volunteer</b> - Gateway to Graduate School	TAMU
2022-	<b>Demonstrator</b> - Physics and Engineering Festival	TAMU
2022	<b>High School Research Reviewer</b> - Lumiere	TAMU
2021-	<b>Presenter</b> - Astronomy on Tap BCS 'In the News'	TAMU
2021-22	<b>Treasurer</b> - Astronomy on Tap BCS	TAMU
2021-	<b>Pen-Pal</b> - Letters to a Pre-Scientist	TAMU
2018	<b>Volunteer</b> - Mitchell Institute Star Party Group	TAMU

2014- **Member** - Booth Memorial Astronomical Society, Stratford, CT

## Collaborations

JWST	<b>RUBIES</b> (not an acronym)	Member
JWST	<b>CEERS</b> : The Cosmic Evolution Early Release Science Survey	Member
JWST	<b>NGDEEP</b> : The Next Generation Deep Exploratory Public Survey	Member
HST	<b>CLEAR</b> : The CANDELS Ly $\alpha$ Emission at Reionization Survey	Member

## Societies and Organizations

2023	<b>LSSTC Data Science Fellowship Program</b>	Auditor
2018	<b>American Astronomical Society</b>	Member
2018	<b>American Physical Society</b>	Member
2018	<b>American Institute of Physics</b>	Member
2015	<b>Society of Physics Students</b>	Member

## Observing Experience

2023	<b>W.M. Keck Observatory</b> - LRIS	3 nights
2018	<b>McDonald Observatory</b>	4 nights

## Technical Skills and Programming Languages

Programming	<b>Fluent</b> - Python, LaTeX <b>Familiar</b> - SQL, Julia, C, C++, R, IDL, perl, Mathematica, MATLAB, HTML, CSS
Software	<b>Fluent</b> - Cloudy, PyNeb <b>Familiar</b> - grizli, DS9, IRAF, sbatch, slurm

## Website Architect

- » **Personal Website**: njcleri.github.io
- » **TAMU Astronomy** (co-author): tamu-astro.github.io/
- » **Mentoring and Advising Graduates in an Inclusive Community (MAGIC)** (co-author): tx.ag/tamumagic

# Publications

## Summary

Statistics from NASA ADS

- » Refereed: 34, Submitted: 16
- » Papers as Lead/Significant Author: 8
- » Total Citations: 1686, H-Index: 21

## Lead/Co-Lead Author

4

- » **Cleri, N. J.**, Olivier, G. M., Hutchison T. A., et al. 2023, *Using [Ne V]/[Ne III] to Understand the Nature of Extreme-Ionization Galaxies*, ApJ, 953, 10
- » **Cleri, N. J.**, Yang, G., Papovich, C, et al. 2023, *CLEAR: High-Ionization [Ne V]  $\lambda$ 3426 Emission-line Galaxies at  $1.4 < z < 2.3$* , ApJ, 948, 112
- » **Cleri, N. J.**, Trump, J. R., Backhaus, B. E., et al. 2022, *CLEAR: Paschen- $\beta$  Star Formation Rates and Dust Attenuation of Low Redshift Galaxies*, ApJ, 929, 3
- » **Cleri, N. J.**, Dunne, G. V., 2020, *Resurgent trans-series for generalized Hastings-McLeod solutions*, Journal of Physics A: Mathematical General, 53, 355203

## Significant Author

4

- » Larson, R.L., Finkelstein, S.L., Kocevski, D.D., Hutchison, T.A., Trump, J.R., Arrabal Haro, P., Bromm, V., **Cleri, N.J.**, et al. 2023, *A CEERS Discovery of an Accreting Supermassive Black Hole 570 Myr after the Big Bang: Identifying a Progenitor of Massive  $z > 6$  Quasars*, ApJL, 953, L29
- » Backhaus, B.E., Bridge J.S., Trump, J.R., **Cleri, N.J.**, et al. 2023, *CLEAR: Detecting Low-Luminosity Active Galactic Nuclei at  $0.6 < z < 1.3$  via Spatially Resolved Hubble Space Telescope Grism Emission Line Ratios*, ApJ, 943, 37.
- » Prescott, M.K.M., Finlator, K.M., **Cleri, N.J.**, et al. 2022, *Using Multiple Emission Line Ratios to Constrain the Slope of the Dust Attenuation Law*, ApJ, 928, 71
- » Backhaus, B.E., Trump, J.R., **Cleri, N.J.**, et al. 2022, *CLEAR: Emission Line Ratios at Cosmic High Noon*, ApJ, 926, 161

## Co-Author: Refereed

26

- » Barro, G., et al. 2023, *Extremely Red Galaxies at  $z = 5-9$  with MIRI and NIRSpec: Dusty Galaxies or Obscured Active Galactic Nuclei?*, ApJ, 963, 128
- » Backhaus, B.E., et al. 2023, *CEERS Key Paper. VIII. Emission-line Ratios from NIRSpec and NIRCам Wide-Field Slitless Spectroscopy at  $z > 2$* , ApJ, 962, 195
- » Kirkpatrick, A., et al. 2023, *CEERS Key Paper VII: JWST/MIRI Reveals a Faint Population of Galaxies at Cosmic Noon Unseen by Spitzer*, ApJL, 959, L7
- » Calabró, A, et al. 2023, *Near-infrared emission line diagnostics for AGN from the local Universe to redshift 3*, A&A, 679, A80
- » Fujimoto, S., et al. 2023, *ALMA FIR View of Ultra High-redshift Galaxy Candidates at  $z \sim 11-17$ : Blue Monsters or Low- $z$  Red Interlopers?*, ApJ, 955, 130
- » Kocevski, D.D., et al. 2023, *Hidden Little Monsters: Spectroscopic Identification of Low-Mass, Broad-Line AGN at  $z > 5$  with CEERS*, ApJL, 954, L4
- » Arrabal Haro, P., et al. 2023, *Spectroscopic confirmation of CEERS NIRCам-selected galaxies at  $z \simeq 8-10$* , ApJL, 951, L22

- » Estrada-Carpenter, V., et al. 2023, *CLEAR: The Morphological Evolution of Galaxies in the Green Valley*, ApJ, 951, 115
- » Yang, G., et al. 2023, *CEERS Key Paper VI: JWST/MIRI Uncovers a Large Population of Obscured AGN at High Redshifts*, ApJL, 950, L5
- » Papovich, C., et al. 2023, *CEERS Key Paper IV: Galaxies at  $4 < z < 9$  are Bluer than They Appear – Characterizing Galaxy Stellar Populations from Rest-Frame  $\sim 1$  micron Imaging*, ApJL, 949, L18
- » Simons, R.C., et al. 2023, *CLEAR: Survey Overview, Data Analysis and Products*, ApJS, 266, 13
- » Constantin, L. et al. 2023, *Expectations of the size evolution of massive galaxies at  $3 \leq z \leq 6$  from the TNG50 simulation: the CEERS/JWST view*, ApJ, 946, 71
- » Perez-Gonzalez, P.G., et al. 2022, *CEERS Key Paper V: A triality on the nature of HST-dark galaxies*, ApJL, 946, L16
- » Kocevski, D.D., et al. 2023, *CEERS Key Paper II: The Resolved Host Properties of AGN at  $3 < z < 5$  with JWST*, ApJL, 946, L14
- » Finkelstein, S.L., et al. 2023, *CEERS Key Paper I: An Early Look into the First 500 Myr of Galaxy Formation with JWST*, ApJL, 946, L13
- » Guo, Y. et al. 2023, *First Look at  $z > 1$  Bars in the Rest-Frame Near-Infrared with JWST Early CEERS Imaging*, ApJL, 945, L10
- » Trump, J.R. et al. 2023, *The Physical Conditions of Emission-Line Galaxies at Cosmic Dawn from JWST/NIRSpec Spectroscopy in the SMACS 0723 Early Release Observations*, ApJ, 945, 35
- » García-Argumánez, A. et al. 2023, *Probing the earliest phases in the formation of massive galaxies with simulated HST+JWST imaging data from Illustris*, ApJ, 944, 3
- » Zavala, J. et al. 2023, *Dusty starbursts masquerading as ultra high redshift galaxies in JWST observations*, ApJL, 943, L9
- » Rose, C. et al. 2023, *Identifying Galaxy Mergers in Simulated CEERS NIRCам Images using Random Forests*, ApJ, 942, 54
- » Finkelstein, S.L. et al. 2022, *A Long Time Ago in a Galaxy Far, Far Away: A Candidate  $z \sim 14$  Galaxy in Early JWST CEERS Imaging*, ApJL, 940, L55
- » Papovich, C. et al. 2022, *CLEAR: The Ionization and Chemical-Enrichment Properties of Galaxies at  $1.1 < z < 2.3$* , ApJ, 937, 22
- » Matharu, J. et al. 2022, *CLEAR: The Evolution of Spatially Resolved Star Formation in Galaxies between  $0.5 \leq z \leq 1.7$  using  $H\alpha$  Emission Line Maps*, ApJ, 937, 16
- » Jung, I. et al. 2022, *CLEAR: Boosted  $Ly\alpha$  Transmission of the Intergalactic Medium in UV bright Galaxies*, ApJ, 933, 87
- » Simons, R. C. et al. 2021, *CLEAR: The Gas-Phase Metallicity Gradients of Star-Forming Galaxies at  $0.6 < z < 2.6$* , ApJ, 923, 203
- » Estrada-Carpenter, V. et al. 2020, *CLEAR II: Evidence for Early Formation of the Most Compact Quiescent Galaxies at High Redshift*, ApJ, 880, 2

- » Llerena, M., et al. 2024, *Physical properties of extreme emission-line galaxies at  $z \sim 4 - 9$  from the JWST CEERS survey*, arXiv e-prints, arXiv:2403.05362
- » Wang, B., et al. 2024, *RUBIES: JWST/NIRSpec Confirmation of an Infrared-luminous, Broad-line Little Red Dot with an Ionized Outflow*, arXiv e-prints, arXiv:2403.02304
- » Calabró, A., et al. 2024, *The evolution of the SFR and  $\Sigma_{SFR}$  of galaxies in cosmic morning ( $4 < z < 10$ )*, arXiv e-prints, arXiv:2402.17829
- » Napolitano, L., et al. 2024, *'Peering into cosmic reionization: the Ly $\alpha$  visibility evolution from galaxies at  $z = 4.5-8.5$  with JWST*, arXiv e-prints, arXiv:2402.11220
- » Hu, W., et al. 2024, *Characterizing the Average Interstellar Medium Conditions of Galaxies at  $z \sim 5.6-9$  with UV and Optical Nebular Lines*, arXiv e-prints, arXiv:2401.12402
- » Cheng, Y., et al. 2024, *Exploring the Gas-Phase Metallicity Gradients of Star-forming Galaxies at Cosmic Noon*, arXiv e-prints, arXiv:2401.12319
- » Cole, J.W., et al. 2023, *CEERS: Increasing Scatter along the Star-Forming Main Sequence Indicates Early Galaxies Form in Bursts*, arXiv e-prints, arXiv:2312.10152
- » Pirzkal, K., et al. 2023, *The Next Generation Deep Extragalactic Exploratory Public Near-Infrared Slitless Survey Epoch 1 (NGDEEP-NISS1): Extra-Galactic Star-formation and Active Galactic Nuclei at  $0.5 < z < 3.6$* , arXiv e-prints, arXiv:2312.09972
- » Davis, K., et al. 2023, *A Census from JWST of Extreme Emission Line Galaxies Spanning the Epoch of Reionization in CEERS*, arXiv e-prints, arXiv:2312.07799
- » Chworowsky, K., et al. 2023, *Evidence for a Shallow Evolution in the Volume Densities of Massive Galaxies at  $z = 4$  to 8 from CEERS*, arXiv e-prints, arXiv:2311.14804
- » Morales, A.M., et al. 2023, *Rest-Frame UV Colors for Faint Galaxies at  $z \sim 9 - 16$  with the JWST NGDEEP Survey*, arXiv e-prints, arXiv:2311.04294
- » Finkelstein, S.L., et al. 2023, *The Complete CEERS Early Universe Galaxy Sample: A Surprisingly Slow Evolution of the Space Density of Bright Galaxies at  $z \sim 8.5 - 14.5$* , arXiv e-prints, arXiv:2311.04279
- » Shen, L., et al. 2023, *NGDEEP Epoch 1: Spatially Resolved H $\alpha$  Observations of Disk and Bulge Growth in Star-Forming Galaxies at  $z \sim 0.6-2.2$  from JWST NIRISS Slitless Spectroscopy*, arXiv e-prints, arXiv:2310.13745
- » Ronayne, K., et al. 2023, *CEERS: 7.7  $\mu$ m PAH Star Formation Rate Calibration with JWST MIRI*, arXiv e-prints, arXiv:2310.07766
- » Jung, I., et al. 2023, *CEERS: Diversity of Lyman-Alpha Emitters during the Epoch of Reionization*, arXiv e-prints, arXiv:2304.05385
- » Jung, I., et al. 2022, *New  $z > 7$  Lyman-alpha Emitters in EGS: Evidence of an Extended Ionized Structure at  $z \sim 7.7$* , arXiv e-prints, arXiv:2212.09850

# Presentations

Research Presentations		13
10 January 2024	<i>Diagnostics of AGN, Black Hole Seeds, and Population III Stars with JWST</i> at the AAS 243rd Meeting, New Orleans, Louisiana, USA	Talk
11 September 2023	<i>Emission Line Ratio Diagnostics of AGN, Black Hole Seeds and Population III Stars with JWST</i> at the First Year of JWST Science Conference, Space Telescope Science Institute, Baltimore, Maryland, USA	Poster
17 August 2023	<i>Diagnostics of Exotic Ionizing Sources with JWST</i> at Texas A&M Astrosymposium, College Station, Texas, USA	Talk
10 May 2023	<i>Diagnostics of Exotic Ionizing Sources Across Cosmic Time - High-Ionization Emission-Line Ratios: Ne53</i> at University of Texas, Austin, Texas, USA	Talk
12 January 2023	<i>High-Ionization [Ne V] Emission-Line Galaxies at Cosmic Noon and the Epoch of Reionization</i> at AAS 241st Meeting, Seattle, Washington, USA	Poster
2 December 2022	<i>Using [Ne V] to Constrain the Sources of Highly-Energetic Photoionization Across Cosmic Time: Exploring the “Mystery of Neon” with HST and JWST</i> at Texas A&M University, College Station, Texas, USA	Talk
18 August 2022	<i>Extreme High-Ionization Emission-Line Galaxies at Cosmic Noon and the Epoch of Reionization: Exploring the “Mystery of Neon” with HST and JWST</i> at Texas A&M University, College Station, Texas, USA	Talk
22 July 2022	<i>The Evolution of Spectroscopy from HST to JWST: Implications for the Epoch of Reionization</i> at Texas A&M University, College Station, Texas, USA	Talk
14 June 2022	<i>HST Grism Observations of Paschen-Line Star-Formation and Dust Attenuation: A Precursor to the JWST Era</i> at AAS 240th Meeting, Pasadena, California, USA	Poster
27 August 2021	<i>Paschen-<math>\beta</math> Star Formation Rates and Dust Attenuation with HST and JWST</i> at Texas A&M Astrosymposium, College Station, Texas, USA	Talk
13 January 2021	<i>CLEAR: Paschen-<math>\beta</math> Star Formation Rates and Dust Attenuation in Low Redshift Galaxies</i> at AAS 237th Meeting, Virtual	Poster
9 January 2019	<i>Modeling <math>^8\text{B}</math> Solar Neutrino Detection with CE<math>\nu</math>NS</i> at AAS 233rd Meeting, Seattle, Washington, USA	Poster
1 August 2018	<i>Modeling <math>^8\text{B}</math> Solar Neutrino Detection with CE<math>\nu</math>NS</i> at TAMU Undergraduate Research Poster Session, College Station, Texas, USA	Poster
Outreach and Professional Development Presentations		8
8 March 2024	<i>GLASS Postdoc Panel</i> at Texas A&M University, College Station, Texas, USA	Panel
10 November 2023	<i>How to Be A Referee</i> at Texas A&M University, College Station, Texas, USA	Talk
28 July 2023	<i>How to Get Into Grad School</i> at Texas A&M University, College Station, Texas, USA	Panel
11 November 2022	<i>Data Visualization in Astronomy: More Important than the Science Itself?</i> at Texas A&M University, College Station, Texas, USA	Talk
29 July 2022	<i>How to Get Into Grad School</i> at Texas A&M University, College Station, Texas, USA	Panel
2 June 2022	<i>Data Visualization in Astronomy: More Important than the Science Itself?</i> at Texas A&M University, College Station, Texas, USA	Talk
2 June 2022	<i>Matplotlib: The Champion of Plotting in Python</i> at Texas A&M University, College Station, Texas, USA	Workshop
1 June 2022	<i>pandas: Your Best Friend for Data Analysis in Python</i> at Texas A&M University, College Station, Texas, USA	Workshop

## References

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PhD Advisor      **Prof. Casey J. Papovich**      Texas A&M

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