Nikko J. Cleri

Eberly Postdoctoral Fellow
The Pennsylvania State University

Summary

- Research: Galaxy Evolution, High-Redshift Galaxies, Emission-Line Galaxies, Population III Stars, Active Galactic Nuclei, Black Hole Seeds, Star Formation, Dust Attenuation
- Techniques: UV/Optical/Near-IR Spectroscopy, Photoionization Modeling
- Collaborations: CEERS, NGDEEP, RUBIES, CAPERS
- Awarded Proposals: >135k USD awarded as PI from *JWST* and *HST*, >400 total hours awarded on *JWST* and Gemini
- Publications: 4 first author, 4 significant author, 48 coauthor, 2232 citations, h-index 23
- Presentations: 15 research, 9 outreach and professional development

Academic and Professional Appointments

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

Education

2021 - 2024 **Ph.D. Astronomy** Texas A&M University

- Advisor: Casey Papovich
- Thesis: *Spectroscopic Studies of Stars and Black Holes Across Cosmic Time*

2019 - 2021 **M.S. Physics** University of Connecticut

- Advisor: Jonathan R. Trump
- Thesis: *CLEAR: Paschen-β Star Formation Rates and Dust Attenuation in Low Redshift Galaxies*

2015 - 2019 **B.S. Physics | Mathematics Minor** University of Connecticut

- Advisor: Gerald V. Dunne
- Undergraduate Research: *Resurgent trans-series for generalized Hastings-McLeod solutions*

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 2

2024	***JWST* Cycle 3** - AR 5558: *A Census of Optical Diagnostics of Ionizing Sources Across Cosmic Time*	
2021	**HST Cycle 29** - AR 16609: *Peering Through the Dust: Paschen-beta Indicators of Star Formation and Dust Attenuation*	∼$136k

Co-Investigator 5

2024	**JWST Cycle 3** - GO 5407: *MEOW: The MIRI Early Obscured-AGN Wide Survey* (PI: G. Leung)	73.95 hours
2024	**JWST Cycle 3** - GO 5507: *Deep Spectroscopy of Galaxies at z=4-14: Uncovering Drivers of Early Galaxy Formation and Black Hole Growth* (PI: T. Hutchison)	23.29 hours
2024	**JWST Cycle 3** - GO 6368: *The CANDELS-Area Prism Epoch of Reionization Survey (CAPERS)* (PI: M. Dickinson)	293.21 hours
2023	**JWST Cycle 2** - GO 3703: *Breaking the z=10 barrier with MIRI: redshift confirmation and detection of rest-frame optical emission lines* (PI: J. Zavala)	24.33 hours
2023	**Gemini**: *GS-2023A-Q-136: Optical Spectroscopy of JWST ERO Galaxies* (PI: B. Backhaus)	20 hours

Honors and Awards

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

Teaching Experience

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

Service

Physics & Astronomy Community

2024-	**Referee** - Astronomy & Astrophysics (A&A)
2021-	**Referee** - Astrophysical Journal (ApJ)

Department

2023-24	**Graduate Representative** - Astronomy	TAMU
2022-24	**Organizer** - Astronomy Journal Club	TAMU

Mentoring

2022-24	**Coordinator** - Mentoring and Advising Graduates in an Inclusive Community (MAGIC)	TAMU
2022-24	**Mentor** - Mentoring and Advising Graduates in an Inclusive Community (MAGIC)	TAMU
2017-18	**Mentor** - UConn Undergraduate Peer Mentoring	UConn

Outreach

2022	**Volunteer** - Gateway to Graduate School	TAMU
2022-24	**Demonstrator** - Physics and Engineering Festival	TAMU
2022	**High School Research Reviewer** - Lumiere	TAMU
2021-24	**Presenter** - Astronomy on Tap BCS 'In the News'	TAMU
2021-22	**Treasurer** - Astronomy on Tap BCS	TAMU
2021-22	**Pen-Pal** - Letters to a Pre-Scientist	TAMU
2018	**Volunteer** - Mitchell Institute Star Party Group	TAMU

Collaborations

JWST	**CAPERS** The CANDELS-Area Prism Epoch of Reionization Survey	Co-I
JWST	**RUBIES** (not an acronym)	Member
JWST	**CEERS**: The Cosmic Evolution Early Release Science Survey	Member
JWST	**NGDEEP**: The Next Generation Deep Exploratory Public Survey	Member
HST	**CLEAR**: The CANDELS Lyα Emission at Reionization Survey	Member

Technical Skills and Programming Languages

Programming	**Fluent** - Python, LaTeX
	Familiar - SQL, Julia, C, C++, R, IDL, perl, Mathematica, MATLAB, HTML, CSS
Software	**Fluent** - Cloudy, PyNeb
	Familiar - 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

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
3. **Cleri, N. J.**, Yang, G., Papovich, C, et al. 2023, *CLEAR: High-Ionization [Ne V] λ3426 Emission-line Galaxies at* $1.4 < z < 2.3$, ApJ, 948, 112
2. **Cleri, N. J.**, Trump, J. R., Backhaus, B. E., et al. 2022, *CLEAR: Paschen-β Star Formation Rates and Dust Attenuation of Low Redshift Galaxies*, ApJ, 929, 3
1. **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
3. 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
2. 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
1. 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

33. Wang, B., et al. 2024, *RUBIES: Evolved Stellar Populations with Extended Formation Histories at* $z \sim 7-8$ *in Candidate Massive Galaxies Identified with JWST/NIRSpec*, arXiv e-prints, arXiv:2405.01473
32. 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
31. Jung, I., et al. 2023, *CEERS: Diversity of Lyman-Alpha Emitters during the Epoch of Reionization*, arXiv e-prints, arXiv:2304.05385
30. Mascia, S. et al. 2024 *New insight on the nature of cosmic reionizers from the CEERS survey* A&A, 685, A3
29. Morales, A.M., et al. 2024, *Rest-Frame UV Colors for Faint Galaxies at* $z \sim 9-16$ *with the JWST NGDEEP Survey*, ApJL, 964, L24
28. Cheng, Y., et al. 2024, *Exploring the Gas-Phase Metallicity Gradients of Star-forming Galaxies at Cosmic Noon*, ApJ, 964, 94
27. Shen, L., et al. 2024, *NGDEEP Epoch 1: Spatially Resolved Hα Observations of Disk and Bulge Growth in Star-Forming Galaxies at* $z \sim$ *0.6-2.2 from JWST NIRISS Slitless Spectroscopy*, ApJL, 963, L49
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
25. Backhaus, B.E., et al. 2023, *CEERS Key Paper. VIII. Emission-line Ratios from NIRSpec and NIRCam Wide-Field Slitless Spectroscopy at z > 2*, ApJ, 962, 195
24. 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

23. Calabró, A, et al. 2023, *Near-infrared emission line diagnostics for AGN from the local Universe to redshift 3*, A&A, 679, A80
22. 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
21. 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
20. Arrabal Haro, P., et al. 2023, *Spectroscopic confirmation of CEERS NIRCam-selected galaxies at $z \simeq 8 - 10$*, ApJL, 951, L22
19. Estrada-Carpenter, V., et al. 2023, *CLEAR: The Morphological Evolution of Galaxies in the Green Valley*, ApJ, 951, 115
18. Yang, G., et al. 2023, *CEERS Key Paper VI: JWST/MIRI Uncovers a Large Population of Obscured AGN at High Redshifts*, ApJL, 950, L5
17. 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 ~ 1 micron Imaging*, ApJL, 949, L18
16. Simons, R.C., et al. 2023, *CLEAR: Survey Overview, Data Analysis and Products*, ApJS, 266, 13
15. 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
14. Perez-Gonzalez, P.G.. et al. 2022, *CEERS Key Paper V: A triality on the nature of HST-dark galaxies*, ApJL, 946, L16
13. 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
12. 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
11. 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
10. 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
9. 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
8. Zavala, J. et al. 2023, *Dusty starbursts masquerading as ultra high redshift galaxies in JWST observations*, ApJL, 943, L9
7. Rose, C. et al. 2023, *Identifying Galaxy Mergers in Simulated CEERS NIRCam Images using Random Forests*, ApJ, 942, 54
6. 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
5. Papovich, C. et al. 2022, *CLEAR: The Ionization and Chemical-Enrichment Properties of Galaxies at* $1.1 < z < 2.3$ ApJ, 937, 22
4. Matharu, J. et al. 2022, *CLEAR: The Evolution of Spatially Resolved Star Formation in Galaxies between* $0.5 \leq z \leq 1.7$ *using Hα Emission Line Maps*, ApJ, 937, 16
3. Jung, I. et al. 2022, *CLEAR: Boosted Lyα Transmission of the Intergalactic Medium in UV bright Galaxies*, ApJ, 933, 87
2. 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

1. Estrada-Carpenter, V. et al. 2020, *CLEAR II: Evidence for Early Formation of the Most Compact Quiescent Galaxies at High Redshift*, ApJ, 880, 2

Co-Author: Submitted

15. Seille, L.-M., et al. 2024, *Physical properties of strong 1 < z < 3 Balmer and Paschen lines emitters observed with JWST*, arXiv e-prints, arXiv:2404.09659
14. de Graaff, A., et al. 2024, *Efficient formation of a massive quiescent galaxy at redshift 4.9*, arXiv e-prints, arXiv:2404.05683
13. Kocevski, D.D., et al. 2024, *The Rise of Faint, Red AGN at $z > 4$: A Sample of Little Red Dots in the JWST Extragalactic Legacy Fields*, arXiv e-prints, arXiv:2404.03576
12. Zavala, J., et al. 2024, *Detection of ionized hydrogen and oxygen from a very luminous and young galaxy 13.4 billion years ago*, arXiv e-prints, arXiv:2403.10491
11. 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
10. Wang, B., et al. 2024a, *RUBIES: JWST/NIRSpec Confirmation of an Infrared-luminous, Broad-line Little Red Dot with an Ionized Outflow*, arXiv e-prints, arXiv:2403.02304
9. Calabró, A., et al. 2024, *The evolution of the SFR and Σ_{SFR} of galaxies in cosmic morning ($4 < z < 10$)*, arXiv e-prints, arXiv:2402.17829
8. Napolitano, L., et al. 2024, *'Peering into cosmic reionization: the Lyα visibility evolution from galaxies at z = 4.5-8.5 with JWST*, arXiv e-prints, arXiv:2402.11220
7. 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
6. 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
5. 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
4. 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
3. 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
2. Ronayne, K., et al. 2023, *CEERS: 7.7 μm PAH Star Formation Rate Calibration with JWST MIRI*, arXiv e-prints, arXiv:2310.07766
1. 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

15.	Discussion Chair: *Active Galactic Nuclei and Little Red Dots*, San Lorenzo de El Escorial, Spain	13 May 2024
14.	Talk: *Diagnostics of Ionizing Sources at High-z using Models and Observations*, San Lorenzo de El Escorial, Spain	13 May 2024
13.	Talk: *Diagnostics of AGN, Black Hole Seeds, and Population III Stars with JWST* at the AAS 243rd Meeting, New Orleans, Louisiana, USA	10 January 2024
12.	Poster: *Emission Line Ratio Diagnostics of AGN, Black Hole Seeds and Population III Stars with JWST* at the First Year of JWST Science Conference, Space Telescope Science Institute, Baltimore, Maryland, USA	11 September 2023
11.	Talk: *Diagnostics of Exotic Ionizing Sources with JWST* at Texas A&M Astrosymposium, College Station, Texas, USA	17 August 2023
10.	Talk: *Diagnostics of Exotic Ionizing Sources Across Cosmic Time - High-Ionization Emission-Line Ratios: Ne53* at University of Texas, Austin, Texas, USA	10 May 2023
9.	Poster: *High-Ionization [Ne V] Emission-Line Galaxies at Cosmic Noon and the Epoch of Reionization* at AAS 241st Meeting, Seattle, Washington, USA	12 January 2023
8.	Talk: *Using [Ne V] to Constrain the Sources of Highly-Energetic Photoionization Across Cosmic Time: Exploring the "Mystery of Neon" with HST and JWST* at Texas A&M University, College Station, Texas, USA	2 December 2022
7.	Talk: *Extreme High-Ionization Emission-Line Galaxies at Cosmic Noon and the Epoch of Reionization: Exploring the "Mystery of Neon" with HST and JWST* at Texas A&M University, College Station, Texas, USA	18 August 2022
6.	Talk: *The Evolution of Spectroscopy from HST to JWST: Implications for the Epoch of Reionization* at Texas A&M University, College Station, Texas, USA	22 July 2022
5.	Poster: *HST Grism Observations of Paschen-Line Star-Formation and Dust Attenuation: A Precursor to the JWST Era* at AAS 240th Meeting, Pasadena, California, USA	14 June 2022
4.	Talk: *Paschen-β Star Formation Rates and Dust Attenuation with HST and JWST* at Texas A&M Astrosymposium, College Station, Texas, USA	27 August 2021
3.	Poster: *CLEAR: Paschen-β Star Formation Rates and Dust Attenuation in Low Redshift Galaxies* at AAS 237th Meeting, Virtual	13 January 2021
2.	Poster: *Modeling ^{8}B Solar Neutrino Detection with CEνNS* at AAS 233rd Meeting, Seattle, Washington, USA	9 January 2019
1.	Poster: *Modeling ^{8}B Solar Neutrino Detection with CEνNS* at TAMU Undergraduate Research Poster Session, College Station, Texas, USA	1 August 2018

Outreach Presentations

1.	Talk: *Beyond the Telescope: Unraveling Mysteries with AI in Astronomy* at Astronomy on Tap B/CS, Bryan, Texas, USA	24 April 2024

Professional Development Presentations

8. Panel: *GLASS Postdoc Panel* at Texas A&M University, College Station, Texas, USA — 8 March 2024
7. Talk: *How to Be A Referee* at Texas A&M University, College Station, Texas, USA — 10 November 2023
6. Panel: *How to Get Into Grad School* at Texas A&M University, College Station, Texas, USA — 28 July 2023
5. Talk: *Data Visualization in Astronomy: More Important than the Science Itself?* at Texas A&M University, College Station, Texas, USA — 11 November 2022
4. Panel: *How to Get Into Grad School* at Texas A&M University, College Station, Texas, USA — 29 July 2022
3. *Data Visualization in Astronomy: More Important than the Science Itself?* at Texas A&M University, College Station, Texas, USA — 2 June 2022
2. Workshop: *Matplotlib: The Champion of Plotting in Python* at Texas A&M University, College Station, Texas, USA — 2 June 2022
1. Workshop: *pandas: Your Best Friend for Data Analysis in Python* at Texas A&M University, College Station, Texas, USA — 1 June 2022

References

Postdoctoral Advisor **Prof. Joel Leja** Texas A&M

- Pennsylvania State University Department of Astronomy and Astrophysics
- Davey Laboratory, State College, PA, 16802
- joel.leja@psu.edu

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

- Texas A&M University Mitchell Institute for Fundamental Physics and Astronomy
- 4242 TAMU, College Station, TX 77843-4242
- papovich@tamu.edu

M.S. Advisor **Prof. Jonathan R. Trump** UConn

- University of Connecticut Department of Physics
- 196 Auditorium Road, Unit 3046, Storrs, CT, 06269-3046
- jonathan.trump@uconn.edu

PhD Mentor **Prof. Robert C. Kennicutt** Texas A&M

- Texas A&M University Mitchell Institute for Fundamental Physics and Astronomy
- 4242 TAMU, College Station, TX 77843-4242
- rck@tamu.edu