# **INTAE JUNG**

# Postdoctoral Fellow at the Space Telescope Science Institute

3700 San Martin Drive Baltimore, MD 21218, United States Email: ijung@stsci.edu | Webpage: https://itjung.github.io

Lyman- $\alpha$  Emitter | Reionization | High-Redshift Galaxies | Machine Learning

Academic Appointment	
Postdoctoral Researcher at the Space Telescope Science Institute	08/2022 – Present
JWST Postdoc at NASA's Goddard Space Flight Center (Sponsor: CUA)	09/2019 – 08/2022
The NASA Earth and Space Science Fellowship (NESSF) Graduate Student Fellow	09/2017 – 08/2019
Education	
Ph.D. in Astronomy, University of Texas at Austin, Texas, USA	2013 – 2019
Advisor: Prof. Steven L. Finkelstein (Thesis: Constraining the End of Reionization with Lyα Spe	
M.S. in Astronomy, Yonsei University, Seoul, South Korea (Advisor: Prof. Sukyoung K. Yi)	2010 – 2012
<b>B.S.</b> in Astronomy and Physics (double major), <b>Yonsei University</b> , Seoul, South Korea	2004 – 2010
Fellowships, Awards, and Grants	
JWST Cycle 3 Grant (\$70,278, Co-I), PID: GO-6368 (PI: Dickinson)	2024
KASI-Arizona Joint Postdoctoral Fellowship, Steward Observatory & KASI, Korea (4yrs, Declined)	2022
CRESST II Postdoc Fellow for an <i>Independent Science Program</i> at NASA GSFC, MD ( <b>3yrs</b> )	2019 - 2022
NASA/Keck Observing Grant 2021A (\$16,100)	2021 Spring
Chambliss Astronomy Achievement Student Awards, 233rd AAS Meeting, Seattle, WA	01/2019
The NASA Earth and Space Science Fellowship (NESSF) (\$45,000/year, up to 3yrs)	2017-2019
University Graduate School Continuing Fellowship, UT Austin, TX, USA (~\$25,000)	2017-2018
The Global Internship Program, The National Research Foundation of Korea (~\$21,200)	2011 - 2012
National Science & Technology Scholarship, South Korea (~\$27,100)	2004 – 2009
Awarded Telescope Time	
PI: I. Jung, NASA Keck 2021A: 2 nights of Keck + MOSFIRE	2021 Spring
Title: Probing Inhomogeneity of Reionization with a Deep and Wide Lyman-Alpha Emission Survey at z > 7	
PI: I. Jung, Gemini North + GNIRS (6.2 hr)	2021 Spring
Title: Near-infrared Spectroscopy of an Extremely-Large Equivalent-width Lyman-alpha Emitter at z=7.608	
PI: I. Jung, HET/LRS2 (~13hr) Title: A spectroscopic search for galaxies in the epoch of reionization	2017 Spring
As <b>Co-I</b> nvestigator	
JWST 9 GO programs – PIs: Chisholm (Cy1), Dunlop (Cy1), Finkelstein (Cy1), Kassin (Cy1),	Abdurro'uf (Cy2),
Zavala (Cy2), Dickinson (Cy3), Kartaltepe (Cy3), Hutchison (Cy3	3)
Keck 50+ nights with DEIMOS, LRIS, MOSFIRE – Pls: Cooper, Casey, Finkelstein, Larson, F	lutchison
HST 2 GO & 2 AR programs – Pls: Finkelstein, Jimenez-Andrade, Cleri	
<b>ALMA 1 Cycle 7</b> (24.7 hr) – PI: Hashimoto & <b>1 Cycle 8 DDT</b> (11.7hr) – PI: Yoon	
Teaching & Mentoring Experience	
Intern Student Mentoring:	
• Mentor for the STScI Space Astronomy Summer Program: Turaba Rahman (undergrad at the Kent S	State Univ.) 2023
Project: Spatially Resolved Stellar Populations of z ~ 4 - 6 Lyman-alpha-emitters with JWST imaging	3
• Mentor for the Summer Internship Program at NASA GSFC: Seonwoo Kim (Yonsei Univ. → grad stud	dent at UIUC) 2022
Project: Evolution of Lyman Alpha Line Widths at the End of Reionization	
• Mentor in the PhA Mentorship program, Physics & Astronomy, Johns Hopkins Univ.	2023 – Present
Department-wide mentorship program for all career levels (undergraduates, graduates, and posto	docs)
Training in Teaching & Mentorship: Concentration in Teaching and Mentoring Courses**, UT Austin	n, TX 08/2018
**Three courses for PhD and postdoctoral fellows for improving teaching and mentoring abilities	beyond a TA level
Guest lecture: Galaxies and the Universe class, UT Austin, TX	04/2017
TA for 7 astronomy courses at UT Austin, TX & Yonsei University, Korea	2010 – 2017

# Service Experience / Public Outreach \_\_\_\_\_

Panel Support Scientist for the JWST Cycle 3 TAC, STScI, Baltimore, MD	11/2023 - 02/2024
Subject Matter Expert* for NASA's Webb Space Telescope Community Events	2021 – 2022
*Speaker at the JWST Public Talk at Cape Fear Museum of History and Science on 10/15/2021	
Scientist Featured in a NASA JWST Astronomy Day Q&A in Social Media	05/2021
Subject-matter Expert Reviewer in a NASA peer review	2021
Proposal Review External Panel for HST (Cy 28 & 29), ALMA (Cy 8), & JWST DDT (Cy 1)	2020 – Present
Journal Referee for ApJ, A&A, MNRAS	2019 – Present
Development Team of Exemplar Key Science Programs For GMT and TMT	2018 Fall
Graduate student committee for the 2017 Dept external review self-study, UT Austin, TX	2017
Representative to the Graduate Student Assembly, UT Austin, TX	2016 – 2017
Student Representative at the Astronomy department, Yonsei University, Seoul, Korea	2007 – 2008
Military Service, the Military Police in Republic of Korea Army, Hwacheon, Korea	2005 – 2007

## Major Collaborations \_\_\_\_\_

JWST-CEERS (PI: Finkelstein), JWST-Cosmic Spring (PI: Coe), JWST-NGDEEP (Co-PIs: Finkelstein, Papovich and Pirzkal), HST-CLEAR (PI: Papovich), HST-CANDELS (Co-PIs: Faber & Ferguson), VLT-VANDELS (Co-PIs: McLure, & Pentericci)

# Colloquia/Seminar Talks \_\_\_\_\_

Colloquium, 2024 HotSci Summer Colloquium at JHU/STScI, Baltimore, MD, USA	07/2024
Colloquium, 2023 HotSci Summer Colloquium at JHU/STScI, Baltimore, MD, USA	08/2023
Seminar Talk, Arizona State University, Tempe, AZ, USA	11/2021
Seminar Talk, Georgia Tech, Atlanta, GA, USA	11/2021
EURECA Seminar Talk, University of Arizona, Tucson, AZ, USA	09/2021
Seminar Talk, Seoul National University, Seoul, Korea	07/2021
Seminar Talk, Yonsei University, Seoul, Korea	06/2021
Seminar Talk, Director's Seminar, SED, NASA GSFC, Greenbelt, MD	03/2021
Colloquium, Department of Physics and Astronomy, University of Louisville	02/2021
Seminar Talk, Galaxies & AGN Journal Club at STScI/JHU, Baltimore, MD, USA	02/2021
Colloquium, Astrophysics Science Division Colloquium, NASA GSFC, Greenbelt, MD	05/2020
Seminar Talk, University of California - Riverside, Riverside, CA	10/2018
Seminar Talk, Yonsei University, Seoul, Korea	04/2018
Best Paper Award Talk, Korean-American Scientists & Engineers Association-Austin, TX	02/2017
Seminar Talk, Korea Astronomy Space Science Institute, Daejeon, Korea	12/2016

## **Other Presentations**

Contributed Talk, The First Gigayear(s), NOIRLab Conference, Hilo, HI, USA	10/2024
Contributed Talk, Roman Science Inspired by Emerging JWST Results, STScI, MD, USA	06/2023
Contributed Talk, CEERS Team Meeting, Austin, TX, USA	05/2023
Contributed Talk, Summer All Zoom Epoch of Reionization Astronomy Conference 2.0	06/2021
Contributed Talk, Summer All Zoom Epoch of Reionization Astronomy Conference	07/2020
Contributed Talk, AAS 235th Meeting, Honolulu, HI, USA	01/2020
Contributed Talk, Extremely Big Eyes UCLA, Los Angeles, CA, USA	01/2019
Contributed Talk, Special session talk, AAS 233rd Meeting, Seattle, WA, USA	01/2019
Poster, AAS 233rd Meeting, Seattle, WA, USA	01/2019
Poster, Tokyo Spring Cosmic Lyman-Alpha Workshop, Tokyo, Japan	03/2018
Contributed Talk, The growth of galaxies in the Early Universe – IV, Sesto, Italy	01/2018
Dissertation Talk, 231st AAS Meeting, Washington DC, USA	01/2018
Poster, BashFest 2017, Austin, TX, USA	10/2017
Contributed Talk, 5 <sup>th</sup> GMT Community Science Meeting, Tarrytown, NY, USA	09/2017

07/2013

#### References

Dr. Harry Ferguson, Astronomer, Space Telescope Science Institute, MD (ferguson@stsci.edu)

Prof. Steven Finkelstein, Professor, University of Texas at Austin, TX (stevenf@astro.as.utexas.edu)

Dr. Amber Straughn, Astrophysicist, NASA's Goddard Space Flight Center, MD (amber.n.straughn@nasa.gov)

Dr. Dan Coe, ESA-AURA Astronomer, Space Telescope Science Institute, MD (dcoe@stsci.edu)

## **Publications**

73 papers in total (65 refereed), >3500 citations, H-index 32 (as of Oct 2024)

Contributed Talk, Sussing Merger Trees, Midhurst, West Sussex, UK

As 1st/2nd Author (>350 citations): 10 1st-author papers (8 published, 2 submitted)

- 1. H. Park, I. Jung, et al. 2024, submitted to ApJ, arXiv:2410.07377, Constraining Reionization with Lyman-alpha Damping-Wing Absorption in Galaxy Spectra: A Machine Learning Model Based on Reionization Simulations
- **2. Jung et al. 2024c, submitted to ApJ, arXiv:2409.11460,** Local Analogs of Potential Ionizers of the Intergalactic Medium: Compact Star-Forming Galaxies with Intense CIV λ1550 Emission
- 3. Jung et al. 2024b, ApJ, 971, 175, Constraints on the Lyman Continuum Escape from Low-mass Lensed Galaxies at  $1.3 \le z \le 3.0$
- 4. Jung et al. 2024a, ApJ, 967, 73, CEERS: Diversity of Lyman-Alpha Emitters during the Epoch of Reionization
- 5. Jung et al. 2022b, submitted to ApJ, arXiv:2212.09850, New z > 7 Lyman-alpha Emitters in EGS: Evidence of an Extended Ionized Structure at  $z \sim 7.7$
- 6. Jung et al. 2022a, ApJ, 933, 87, CLEAR: Boosted Lya Transmission of the Intergalactic Medium in UV bright Galaxies
- 7. H. Park, I. Jung, et al. 2021, ApJ, 922, 263, Crucial Factors of Lyman-alpha Transmission in the Reionizing Intergalactic Medium: Infall Motion, HII Bubble Size, and Self-shielded Systems
- 8. **Jung et al. 2020, ApJ, 904, 144**, Texas Spectroscopic Search for Ly $\alpha$  Emission at the End of Reionization III. the Ly $\alpha$  Equivalent-width Distribution and Ionized Structures at z > 7
- 9. **Jung et al. 2019, ApJ, 877, 146**, Texas Spectroscopic Search for Ly $\alpha$  Emission at the End of Reionization II. The Deepest Near-infrared Spectroscopic Observation at  $z \gtrsim 7$
- 10. **Jung et al. 2018, ApJ, 864, 103**, Texas Spectroscopic Search for Ly $\alpha$  Emission at the End of Reionization I. Constraining the Ly $\alpha$  Equivalent-width Distribution at 6.0 < z < 7.0
- 11. **Jung et al. 2017, ApJ, 834, 81,** Evidence for reduced specific star formation rates in the centers of massive galaxies at z = 4
- 12. Jung et al. 2014, ApJ, 749, 74, Effects of Large-scale Environment on the Assembly History of Central Galaxies
- 13. S. Peirani, I. Jung, J. Silk, and C. Pichon, **2012**, **MNRAS**, **427**, **2625**, *Evolution of the baryon fraction in the Local Group:* accretion versus feedback at low and high z

#### **As Contributing Author**

- 1. Gazagnes et al. (incl. I. Jung) 2024, arXiv, arXiv:2410.03337, A negligible contribution of two luminous  $z \sim 7.5$  galaxies to the ionizing photon budget of reionization
- 2. Hsiao et al. (incl. I. Jung) 2024, ApJ, 973, 81, JWST MIRI Detections of H $\alpha$  and [O III] and a Direct Metallicity Measurement of the z = 10.17 Lensed Galaxy MACS0647-JD
- 3. Abdurro'uf et al. (incl. I. Jung) 2024, ApJ, 973, 47, JWST NIRSpec High-resolution Spectroscopy of MACS0647–JD at z = 10.167: Resolved [O II] Doublet and Electron Density in an Early Galaxy

- 4. Hsiao et al. (incl. I. Jung) 2024, ApJ, 973, 8, JWST NIRSpec Spectroscopy of the Triply Lensed z = 10.17 Galaxy MACS0647-JD
- 5. Hu et al. (incl. I. Jung) 2024, ApJ, 971, 21, Characterizing the Average Interstellar Medium Conditions of Galaxies at z ~5.6–9 with Ultraviolet and Optical Nebular Lines
- 6. Napolitano et al. (incl. I. Jung) 2024, A&A, 688, A106, Peering into cosmic reionization: Ly $\alpha$  visibility evolution from galaxies at z = 4.5-8.5 with JWST
- 7. Cooper et al. (incl. I. Jung) 2024, ApJ, 970, 50, The Web Epoch of Reionization Ly $\alpha$  Survey (WERLS). I. MOSFIRE Spectroscopy of  $z \sim 7-8$  Ly $\alpha$  Emitters
- 8. Finkelstein et al. (incl. I. Jung) 2024, ApJL, 969, L2, The Complete CEERS Early Universe Galaxy Sample: A Surprisingly Slow Evolution of the Space Density of Bright Galaxies at  $z \sim 8.5-14.5$
- 9. Pirzkal et al. (incl. I. Jung) 2024, ApJ, 969, 90, The Next Generation Deep Extragalactic Exploratory Public Near-infrared Slitless Survey Epoch 1 (NGDEEP-NISS1): Extragalactic Star-formation and Active Galactic Nuclei at 0.5 < z < 3.6
- 10. Heintz et al. (incl. I. Jung) 2024, Sci, 384, 890, Strong damped Lyman-α absorption in young star-foring galaxies at redshifts 9 to 11
- 11. Mascia et al. (incl. I. Jung) 2024, A&A, 685, A3, New insight on the nature of cosmic reionizers from the CEERS survey
- 12. Bagley et al. (incl. I. Jung) 2024, ApJL, 965, L6, The Next Generation Deep Extragalactic Exploratory Public (NGDEEP)
  Survey
- 13. Zavala et al. (incl. I. Jung) 2024, arXiv:2403.10491, Detection of ionized hydrogen and oxygen from a very luminous and young galaxy 13.4 billion years ago
- 14. Urbano Stawinski et al. (incl. I. Jung) 2024, MNRAS, 528, 5624, Deeper than DEEP: a spectroscopic survey of z > 3 Ly α emitters in the Extended Groth Strip
- 15. Shen et al. (incl. I. Jung) 2024, ApJL, 963, L49, 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
- 16. Backhaus et al. (incl. I. Jung) 2024, ApJ, 962, 195, CEERS Key Paper. VIII. Emission-line Ratios from NIRSpec and NIRCam Wide-Field Slitless Spectroscopy at z > 2
- 17. Arrabal Haro et al. (incl. I. Jung) 2023, Natur, 622, 707, Confirmation and refutation of very luminous galaxies in the early Universe
- 18. Bradley et al. (incl. I. Jung) 2023, ApJ, 955, 13, High-redshift Galaxy Candidates at z = 9-10 as Revealed by JWST Observations of WHL0137-08
- 19. Leung et al. (incl. I. Jung) 2023, ApJL, 954, L46, NGDEEP Epoch 1: The Faint End of the Luminosity Function at z 9-12 from Ultradeep JWST Imaging
- 20. Napolitano et al. (incl. I. Jung) 2023, A&A, 677, A138, Identifying Lyα emitter candidates with Random Forest: Learning from galaxies in the CANDELS survey
- 21. Larson et al. (incl. I. Jung) 2023, ApJL, 953, L29, A CEERS Discovery of an Accreting Supermassive Black Hole 570 Myr after the Big Bang: Identifying a Progenitor of Massive z > 6 Quasars
- 22. Arrabal Haro et al. (incl. I. Jung) 2023, ApJL, 951, L22, Spectroscopic Confirmation of CEERS NIRCam-selected Galaxies at  $z \simeq 8-10$
- 23. Yoon et al. (incl. I. Jung) 2023, ApJ, 950, 61, ALMA Observation of a z ≥ 10 Galaxy Candidate Discovered with JWST
- 24. Hsiao et al. (incl. I. Jung) 2023, ApJL, 949, L34, JWST Reveals a Possible z 11 Galaxy Merger in Triply Lensed MACS0647-JD
- 25. Fujimoto et al. (incl. I. Jung) 2023, ApJL, 949, L25, CEERS Spectroscopic Confirmation of NIRCam-selected  $z \gtrsim 8$  Galaxy Candidates with JWST/NIRSpec: Initial Characterization of Their Properties
- 26. Hsiao et al. (incl. I. Jung) 2023, arXiv:2305.03042, JWST NIRSpec spectroscopy of the triply-lensed \$z = 10.17\$ galaxy MACS0647\$-\$JD
- 27. Simons et al. (incl. I. Jung) 2023, ApJS, 266, 13, CLEAR: Survey Overview, Data Analysis, and Products
- 28. Cleri et al. (incl. I. Jung) 2023, ApJ, 948, 112, CLEAR: High-ionization [Ne V]  $\lambda$ 3426 Emission-line Galaxies at 1.4 < z < 2.3
- 29. Kartaltepe et al. (incl. I. Jung) 2023, ApJL, 946, L15, CEERS Key Paper. III. The Diversity of Galaxy Structure and Morphology at z = 3-9 with JWST

- 30. Abdurro'uf et al. (incl. I. Jung) 2023, ApJ, 945, 117, Spatially Resolved Stellar Populations of 0.3 < z < 6.0 Galaxies in WHL 0137-08 and MACS 0647+70 Clusters as Revealed by JWST: How Do Galaxies Grow and Quench over Cosmic Time?
- 31. Trump et al. (incl. I. Jung) 2023, ApJ, 945, 35, *The Physical Conditions of Emission-line Galaxies at Cosmic Dawn from JWST/NIRSpec Spectroscopy in the SMACS 0723 Early Release Observations*
- 32. Zavala et al. (incl. I. Jung) 2023, ApJL, 943, L9, Dusty Starbursts Masquerading as Ultra-high Redshift Galaxies in JWST CEERS Observations
- 33. Backhaus et al. (incl. I. Jung) 2023, ApJ, 943, 37, CLEAR: Spatially Resolved Emission Lines and Active Galactic Nuclei at 0.6 < z < 1.3
- 34. Finkelstein et al. (incl. I. Jung) 2022, ApJL, 940, L55, A Long Time Ago in a Galaxy Far, Far Away: A Candidate  $z \sim 12$  Galaxy in Early JWST CEERS Imaging
- 35. Welch et al. (incl. I. Jung) 2022, ApJL, 940, L1, JWST Imaging of Earendel, the Extremely Magnified Star at Redshift z = 6.2
- 36. Papovich et al. (incl. I. Jung) 2022, ApJ, 937, 22, CLEAR: The Ionization and Chemical-enrichment Properties of Galaxies at 1.1 < z < 2.3
- 37. Matharu et al. (incl. I. Jung) 2022, ApJ, 937, 16, CLEAR: The Evolution of Spatially Resolved Star Formation in Galaxies between  $0.5 \le z \le 1.7$  Using H $\alpha$  Emission Line Maps
- 38. McCarron et al. (incl. I. Jung) 2022, ApJ, 936, 131, Stellar Populations of Lyα-emitting Galaxies in the HETDEX Survey. I. An Analysis of LAEs in the GOODS-N Field
- 39. Park et al. (incl. I. Jung) 2022, ApJ, 931, 126, Scattering of Lyα Photons through the Reionizing Intergalactic Medium: I. Spectral Energy Distribution
- 40. Larson et al. (incl. I. Jung) 2022, ApJ, 930, 104, Searching for Islands of Reionization: A Potential Ionized Bubble Powered by a Spectroscopic Overdensity at z = 8.7
- 41. Cleri et al. (incl. I. Jung) 2022, ApJ, 929, 3, CLEAR: Paschen-β Star Formation Rates and Dust Attenuation of Low-redshift Galaxies
- 42. Finkelstein et al. (incl. I. Jung) 2022, ApJ, 928, 52, A Census of the Bright z = 8.5-11 Universe with the Hubble and Spitzer Space Telescopes in the CANDELS Fields
- 43. Tacchella et al. (incl. I. Jung) 2022, ApJ, 927, 170, On the Stellar Populations of Galaxies at z = 9-11: The Growth of Metals and Stellar Mass at Early Times
- 44. Backhaus et al. (incl. I. Jung) 2022, ApJ, 926, 161, CLEAR: Emission-line Ratios at Cosmic High Noon
- 45. Simons et al. (incl. I. Jung) 2021, ApJ, 923, 203, CLEAR: The Gas-phase Metallicity Gradients of Star-forming Galaxies at 0.6 < z < 2.6
- 46. Garilli et al. (incl. I. Jung) 2021, A&A, 647, A150, The VANDELS ESO public spectroscopic survey. Final data release of 2087 spectra and spectroscopic measurements
- 47. Yang et al. (incl. I. Jung) 2021, ApJ, 908, 144, JWST/MIRI Simulated Imaging: Insights into Obscured Star Formation and AGNs for Distant Galaxies in Deep Surveys
- 48. Estrada-Carpenter et al. (incl. I. Jung) 2020, ApJ, 898, 171, CLEAR. II. Evidence for Early Formation of the Most Compact Quiescent Galaxies at High Redshift
- 49. Hutchison et al. (incl. I. Jung) 2019, ApJ, 879, 70, Near-infrared Spectroscopy of Galaxies During Reionization: Measuring C III] in a Galaxy at z = 7.5
- 50. Papovich et al. (incl. I. Jung) 2019, BAAS, 51, 266, *UV Diagnostics of Galaxies from the Peak of Star-Formation to the Epoch of Reionization*
- 51. Finkelstein et al. (incl. I. Jung) 2019, BAAS, 51, 221, Unveiling the Phase Transition of the Universe During the Reionization Epoch with Lyman-alpha
- 52. Hong et al. (incl. I. Jung) 2019, MNRAS, 483, 3950, Statistics of two-point correlation and network topology for Ly  $\alpha$  emitters at  $z \approx 2.67$
- 53. Broussard et al. (incl. I. Jung) 2019, ApJ, 873, 74, Star Formation Stochasticity Measured from the Distribution of Burst Indicators
- 54. McLure et al. (incl. I. Jung) 2018, MNRAS, 479, 25, The VANDELS ESO public spectroscopic survey
- 55. Pentericci et al. (incl. I. Jung) 2018, A&A, 616, A174, *The VANDELS ESO public spectroscopic survey: Observations and first data release*

Curriculum Vitae

- 56. Larson et al. (incl. I. Jung) 2018, ApJ, 858, 94, Discovery of a z = 7.452 High Equivalent Width Ly $\alpha$  Emitter from the Hubble Space Telescope Faint Infrared Grism Survey
- 57. Wang et al. (incl. I. Jung) 2016, MNRAS, 459, 1554, Sussing merger trees: stability and convergence
- 58. Lee et al. (incl. I. Jung) 2014, MNRAS, 445, 4197, Sussing merger trees: the impact of halo merger trees on galaxy properties in a semi-analytic model
- 59. Srisawat et al. (incl. I. Jung) 2013, MNRAS, 436, 150, Sussing Merger Trees: The Merger Trees Comparison Project
- 60. Yi et al. (incl. I. Jung) 2013, A&A, 554, A122, Merger relics of cluster galaxies

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