Junehyoung Jeon

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Research Interests

I am interested in how the early Universe and its components such as galaxies and black holes evolved. I am further interested in creating/using theoretical models and hydrodynamical simulations to study early structure formation.

Education

Doctor of Philosophy in Astronomy — Expected completion 2026
Astronomy Department, University of Texas at Austin, Austin, Texas

Master of Arts in Astronomy — August 2023
Astronomy Department, University of Texas at Austin, Austin, Texas

Bachelor of Science in Astrophysics, Minor in Physics — May 2021
Barrett Honors College, Arizona State University, Tempe, Arizona
Average unweighted GPA: 4.0/4.0

Publication

Jeon, J. et al. (2025). *The Emerging Black Hole Mass Function in the High-Redshift Universe.*
Submitted to the Astrophysical Journal. arXiv:2503.14703

Jeon, J. et al. (2025). *Physical Pathways for JWST-Observed Supermassive Black Holes in the Early Universe.*
The Astrophysical Journal, Volume **979**, Issue 2, id.127, 19 pp.

Taylor, A., Finkelstein, S., Kocevski, D., **Jeon, J.**, et al. (2024). *Broad-Line AGN at $3.5 < z < 6$: The Black Hole Mass Function and a Connection with Little Red Dots* .
Submitted to the Astrophysical Journal. arXiv:2409.06772

Jeon, J. et al. (2023). *Observability of Low-Luminosity AGN in the Early Universe with JWST.*
Monthly Notices of the Royal Astronomical Society, **524**, 176-187

Jeon, J. et al. (2022). *Maximal X-ray feedback in the pre-reionization Universe.*
Monthly Notices of the Royal Astronomical Society, **515**, 5568-5575

Conference Talks

Physical Pathways for JWST-Observed Supermassive Black Holes in the Early Universe
Probing the Genesis of SMBH, Kashiwa, Japan (remote) — November 2024
CCA-CFC Workshop, Austin, United States — November 2024

Conditions for Efficient Growth of Supermassive Black Holes in the Early Universe
COSPAR 2024, Busan, South Korea — July 2024
Massive Black Holes in the First Billion Years, Kinsale, Ireland — April 2024

Observability of Low-Luminosity AGN in the Early Universe with JWST.
Black Holes on Broadway, New York City, United States — December 2023
Young Astronomers on Galactic Nuclei, Palermo, Italy — October 2023

Awards and Honors

Graduate Summer Excellence Award, UT Austin	2025
Board of Visitors Graduate Student Endowment Fund, UT Austin	2023
Professional Development Award, UT Austin	2023
The College of Liberal Arts and Sciences Dean's Medal, ASU	2021
Moeur Award, ASU Alumni Association	2021
New American University Award($5000)	2018-2021
The College of Liberal Arts and Sciences Dean's List, ASU	2018-2021

Teaching

Teaching Assistant, University of Texas at Austin: Astrophysics Spring 2025

- Assisted students with assignments and projects, helping their understanding of the lecture concepts and applications.
- Prepared and taught introductory python modules designed for students who have no prior experience, introducing them to the basics of coding in astrophysics.

Teaching Assistant, University of Texas at Austin: Practical Introduction to Research Spring 2024, Fall 2021

- Guided students through in-class activities such as coding, writing resume, and making posters, providing them with introductory skills in academia.
- Prepared coding and lecture modules for the students, leading the students to understand the concepts.

Teaching Assistant, University of Texas at Austin: Cosmology Fall 2022

- Explained course topics to students after class, helping them individually to grasp lecture concepts that they might not have fully understood.
- Guided students through their homeworks, assisting them in understanding questions and steps to solve various cosmology problems.

Tutor, Arizona State University School of Earth and Space Exploration: Introduction to Astrophysics and Cosmology II Spring 2021

- Participated in the live classes to answer the questions students asked, aiding the instructor in the lectures
- Graded assignments with feedback, helping students better understand the problems and their mistakes
- Created visual figures that demonstrated important topics in cosmology, easing the students' understanding of the topics

Learning Assistant, Arizona State University Physics Department: Science of Musical Instruments, University Physics I Mechanics, University Physics II Electricity and Magnetism Fall 2019 - Spring 2021

- Participated in three physics courses as a sub-instructor
- Aided students during in-class problems, activities and questions regarding homework or exam problems

Research Experiences

Studying galaxies at z∼6 August 2019 - May 2021
Arizona State University
Dr. Rogier Windhorst

- Modeled 53 galaxies using the CIGALE code for SED modeling and determined 47 with valid models with data from previous papers and also extracted data

from SDF K-band to add flux data points to the models
- Analyzed the models to determine the fraction of high escape fraction galaxies around $z = 6$ and concluded on their significance on reionization

JWST Cycle-1 Proposed Program: NIRSpec/IFU Observations of Luminous Galaxies at $5.7 < z < 6.6$ August - October 2020
University of Arizona
Dr. Eiichi Egami

- Worked as a co-investigator and performed realistic simulations of Near Infrared Spectrograph (NIRspec) with the Exposure Time Calculator (ETC) to predict JWST observations of extremely blue galaxies that couldn't be modeled accurately so far
- Created figures showing the model and simulated spectra of the galaxies along with their images to be put in the proposal and improve the case for observing these galaxies

Skills

Programming: Python, C, Fortran, High Performance Computing
Operating systems: Windows, Linux
Software: LaTeX, Mathematica
Languages: English, Korean