

Bo-Eun Choi

(she/her)

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Education

University of Washington, Seattle, Ph.D. in Astronomy	expected in Summer 2026
Sejong University, M.S. in Astronomy	2019–2021
Sejong University, B.S. in Astronomy and Physics, <i>Cum Laude</i>	2014–2019

Research Interests

Cosmic Baryon Cycle & Chemical Evolution

I study how galaxies accrete, recycle, and enrich their gas through the baryon cycle. Using UV and optical spectroscopy of metal absorption lines, I trace gas flows at the disk–halo interface and within the CGM to understand how star formation and feedback redistribute baryons and metals.

Massive Stars: Powerful Feedback Drivers

Massive stars are key agents in shaping the baryon cycle through radiative, chemical, and mechanical feedback. I investigate their late evolutionary phases and chemical signatures using stellar spectroscopy, linking stellar-scale processes to galaxy-scale gas dynamics.

Keywords: **CGM, Stellar Feedback, Stellar Evolution, Spectroscopy, Radiative Transfer**

Awards & Grants

Distinction in Research, Astronomy Department, University of Washington	Oct 2025
Jacobsen Fund (\$0.35k), Astronomy Department, University of Washington	Jul 2023
Distinction in Teaching, Astronomy Department, University of Washington	Sep 2022
Jacobsen Fund (\$1.7k), Astronomy Department, University of Washington	Apr 2022
Outstanding Research Award, Graduate School, Sejong University	Feb 2021
Best Presentation Award, Korean Physical Society	Oct 2019

Publications

Link to [ADS](#)/ [arXiv](#)

First-Author Publications:

1. **Choi, B.-E.**, Werk, J. K., Tchernyshyov, K., et al. 2025, [accepted to *ApJL*; [arXiv:2511.18607](#)]
The Plane Quasar Survey: An Ionized Extension of the Magellanic Stream on the Northern Side of the Galactic Plane
2. **Choi, B.-E.**, Werk, J. K., Tchernyshyov, K., et al. 2024, *ApJ*, 976, 222
Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk–Halo Interface
3. **Choi, B.-E.** & Lee, H.-W. 2020, *ApJL*, 903, L39
Discovery of Raman-scattered He II $\lambda 6545$ in the Planetary Nebulae NGC 6886 and NGC 6881
4. **Choi, B.-E.**, Chang, S.-J., Lee, H.-G. & Lee, H.-W. 2020, *ApJ*, 889, 2
Line Formation of Raman-scattered He II $\lambda 4851$ in an Expanding Spherical H I Shell in Young Planetary Nebulae

Co-author Publications:

1. Tran, D., Williams, B., ..., **Choi, B.-E.**, et al. 2025, [under review]
Automated Computer Vision Cluster Identification in the Fireworks Galaxy
2. Lim, J., Chang, S.-J., ..., **Choi, B.-E.**, et al. 2025, [ApJ](#), 979, 124
High-resolution BOES Spectroscopy of Raman-scattered He II λ 6545 in Young Planetary Nebulae
3. Angeloni, R., Gonçalves, D. R., ..., **Choi, B.-E.**, et al. 2019, [AJ](#), 157, 156
RAMSES II - RAMan Search for Extragalactic Symbiotic Stars: Project Concept, Commissioning, and Early Results from the Science Verification Phase

Awarded Observing Proposals**PI Programs:**

- (2025A FT) **Gemini-S 8.1 m/GMOS**, 5.04 hr, *Toward a Ca II Absorption Survey Along Milky Way Halo Star Sightlines: Constraining Magellanic Stream Mass and Formation History*
- (2023B FT) **Gemini-S 8.1 m/GHOST**, 3.75 hr, *A Comprehensive Chemical Abundance Study of Thorne-Zytkow Object Candidate HV 2112*
- (2023Q2) **APO 3.5 m/ARCES**, 4 half-nights, *Building a Spectroscopic Tool for a TZO Search: Investigation of the Chemical Abundances of Galactic RSGs Using ARCES*
- (2022Q3) **APO 3.5 m/ARCES**, 2 half-nights, *Building a Spectroscopic Tool for a TZO Search: Investigation of the Chemical Abundances of Galactic RSGs Using ARCES*

Co-I Programs:

- (*) *Listed as Co-I, but served as the primary contributor in proposal writing, observing run, and data reduction.*
- (2025Q1) **APO 3.5 m/ARCES**, 1 half-night, *Mapping Small-Scale Structure in Galactic Fountain Flows with M5*
- (*Cycle8) **TNT 2.4 m/MRES**, 5 nights, *Deep Spectroscopic Survey of Raman-scattered He II Features in Planetary Nebulae*
- (*2020B) **BOAO 1.8 m/BOES**, 6 nights, *Search for and Deep Spectroscopy of Raman He II Features in Young Planetary Nebulae*
- (*2020B) **Gemini-N 8.1 m/GRACES**, 3.2 hr, *Deep High-resolution Spectroscopy of the Planetary Nebulae NGC 6886 and NGC 6790*
- (*2020A) **BOAO 1.8 m/BOES**, 7 nights, *Search for Raman He II Features in Young Planetary Nebulae*
- (*Cycle7) **TNT 2.4 m/MRES**, 3.65 nights, *Search for Raman-Scattered He II Features in Young Planetary Nebulae*
- (*2019B) **BOAO 1.8 m/BOES**, 3 nights, *Spectropolarimetry Monitoring of Raman-Scattered O VI Features in S-type Symbiotic Stars*
- (2019A) **Gemini-N 8.1 m/GRACES**, 1.6 hr, *High-Resolution Spectroscopy of the Young and Compact Planetary Nebula J 900*
- (*2019A) **BOAO 1.8 m/BOES**, 6 nights, *Spectroscopic Survey of Raman-scattered He II Features in Planetary Nebulae*

Talks & Presentations

Invited Seminars

ESO CGM Group	Apr 2024
Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface	
RSAA of Australian National University	Jul 2023
Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface	
Korea Evolved Stars Group	Mar 2019
A New Grid-Based Monte Carlo Code for Raman-Scattered He II	

Contributed Presentations

CCA Accretion at the Disk-Halo Interface Workshop	Nov 2025
Talk: Satellite Accretion and Galactic Fountain in the Milky Way Halo	
MIAPbP - “Some Like It Hot”: A Journey from the Hot IGrM to the Multiphase CGM	Apr 2024
New Views on Feedback & the Baryon Cycle in Galaxies	Jul 2023
Talk: The Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface	
AAS 241st Meeting	Jan 2023
Talk: The Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface	
2022 IAUGA XXXI	Aug 2022
Poster: Spectral Features and Variability of the Thorne-Zytkow Object Candidates in the SMC	
Korean Astronomical Society 102nd Meeting	Oct 2020
Talk: Discovery of Raman-scattered He II $\lambda 6545$ in Planetary Nebulae NGC 6886 and NGC 6881 from BOES Spectroscopy	
Poster: Activity of Korean Young Astronomers' Meeting in 2019-2020 Season (co-author)	
2019 XVI Latin American Regional IAU Meeting	Nov 2019
Poster: A Study of Line Formation of Raman-Scattered He II $\lambda 4851$ in Young Planetary Nebulae	
Korean Physical Society 96th Meeting	Oct 2019
Poster: A New Grid-Based Radiative Transfer Simulation for Raman Scattering of He II with Atomic Hydrogen	
Korean Astronomical Society 100th Meeting	Apr 2019
Poster: A New Grid-based Monte Carlo Code for Raman Scattered He II: Preliminary Results	
2019 Korea Young Astronomers' Meeting Workshop	Feb 2019
Poster: The Emission Line Formation in an Accretion Disk of Schwarzschild Black Hole	

Research Mentoring

Annabelle Lin (Undergraduate, University of Washington)	2024–present
Project: Mapping Small-Scale Structure in Galactic Fountain Flows with M5	
Co-advisor: Jessica Werk	
Project: Mapping the Milky Way's Atmosphere	
Co-advisor: Sierra Bet	
Werk SQuAD, University of Washington	2024–2025
A collaborative group of undergraduate students working on galaxy and CGM spectroscopy, supervised by Prof. Jessica Werk.	
(Carolyn Jeung, Skye Kelly, Annabelle Lin, Samuel McCarty, Pranathi Ramesh, Cyrus Taidi, Raeven Tan)	
Abbas Jaffery (Undergraduate, University of Washington)	2022–2023
Project: Searching for Thorne–Żytkow Objects Using High-Resolution Spectroscopy	

Jimmy Fowler, Anaïs Martin & Pranathi Ramesh (Undergraduate, University of Washington) 2022
 Project: Mapping the Galactic Atmosphere with Quasar Spectroscopy
 Co-advisors: Samantha Garza, Jessica Werk

Research Work Experience

Pre-doctoral Researcher, UNIST, South Korea Mar–Jul 2021
 (Advisor: Prof. Maurice van Putten)
 Developed a three-body simulation code to investigate the orbital stability of prograde and retrograde circumbinary planets.

Teaching Experience

Teaching Assistant, University of Washington
 ASTR 480A: Introduction to Astronomical Data Analysis Spring 2022
 ASTR 101B: Astronomy Fall 2021, Winter 2022

Teaching Assistant, Sejong University
 (ASTR 300-level) Introduction to Astronomical Spectroscopy Fall 2018 & 2020
 (ASTR 300-level) Astrophysics Spring 2019 & 2020
 (PHYS 100-level) General Physics Fall 2019

Outreach

Astronomy on Tap (Seattle) Flyer Designer 2023–present
 IAUGA Staff, 2021 Busan Science Festival Apr 2019
 Volunteer Instructor, Observatory of Seoul 2014–2016
 Starry Night Festival Staff, Sejong University 2014–2016

Professional Services

UW TAC of Apache Point Observatory ARC 3.5 m 2023–2025
 Organizing committee, Korean Young Astronomers' Meeting 2020
 LOC member, 1st Korean Lyman Alpha Workshop Jan 2019
 Student staff, Korean Astronomical Society Meeting Apr 2017

Technical Skills

Programming Languages: Python, Fortran, MATLAB
 Softwares & Codes: IRAF, Cloudy, CASA (Common Astronomy Software Applications)

References

Prof. Jessica Werk

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Prof. Emily Levesque

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Dr. Andrew Fox

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Dr. Seok-Jun Chang

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