

# Harum Ahmed

Astrophysics Ph.D. Candidate, University of North Texas

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## EDUCATION

2027 (exp.)	<b>University of North Texas, Denton, TX</b> Ph.D. Candidate, Physics Advisor: Ohad Shemmer
2023-2025	<b>University of North Texas, Denton, TX</b> Master of Science, Physics
2019-2023	<b>University of North Texas, Denton, TX</b> Bachelor of Science, Physics, <i>Magna Cum Laude</i>

## WORK EXPERIENCE

2024–Present	<b>Teaching Assistant</b> , University of North Texas PHYS 1052 - Stars & Universe PHYS 1062 - Solar System
2023–2024	<b>Research Assistant</b> , University of North Texas
2022–2023	<b>Undergraduate Teaching Assistant</b> , University of North Texas PHYS 1410 - General Physics I PHYS 1710 - Mechanics

## RESEARCH EXPERIENCE

2023–Present	<b>Department of Physics, University of North Texas</b> Designing and executing observations of $z > 3.2$ quasars (active SMBHs) using the Gemini-North Telescope; Developing automated Python pipelines for full data reduction and spectral calibration; Implementing emission-line fitting routines in Python/MATLAB for quantitative spectral analysis; Extracting and interpreting optical-to-UV emission line properties of broad absorption line (BAL) quasars.
2024-2025	<b>Department of Physics &amp; Astronomy, University of Western Ontario</b> Integrated multiwavelength data from diverse ground- and space-based observatories to construct broadband spectral energy distributions for 65 BAL quasars; Synthesized comprehensive spectral profiles spanning radio to X-ray wavelengths to probe quasar emission mechanisms and outflow signatures.

## FELLOWSHIPS

July 2025–Aug 2025	<b>Establishing Multi-messenger astronomy Inclusive Training (EMIT) Program</b> , Department of Physics & Astronomy, Vanderbilt University
May 2024–July 2024	<b>Research Fellowship</b> , Department of Physics & Astronomy, University of Western Ontario

## COMMUNICATION & OUTREACH

2024–Present	<b>Astronomy Outreach Volunteer, Department of Physics</b> Facilitating public star parties and outreach events by guiding attendees through telescope observations and explaining astronomical concepts to diverse audiences; Supporting event logistics, leading educational demonstrations, and fostering community engagement to inspire interest in astronomy.
2025–Present	<b>Social Media Content Creator, Independent Initiative</b> Creating and sharing accessible astronomy content on social media, highlighting recent astrophysical research, space discoveries, and educational topics; Designing visual explainers and infographics using tools like Canva to communicate complex concepts to non-expert audiences.

## PUBLICATIONS

2026 (in-prep)	<b>Ahmed, H.;</b> Shemmer, O.; Andruchow, I.; Brandt, W. N.; Brotherton, M.; Dix, C.; Gallagher, S.; Green, R.; Lira, P.; Matthews, B.; Myers, A.; Plotkin, R.; Richards, G.; Runnoe, J.; Schneider, D.; Strauss, M. (2026). <i>Deriving Reliable Fundamental Quasar Properties with Gemini Near-Infrared Spectroscopy</i> . The Astrophysical Journal, in preparation.
2025	<b>Ahmed, H.;</b> Gallagher, S.; Shemmer, O.; Dix, C.; Brotherton, M.; Richards, G. (2025). <i>Exploring the Spectral Energy Distributions of Luminous Broad Absorption Line Quasars at High Redshifts</i> . The Astrophysical Journal, 985, 207.
2024	<b>Ahmed, H.;</b> Shemmer, O.; Matthews, B.; Dix, C.; Ha, T.; Myers, A.; Brotherton, M.; Richards, G. (2024). <i>Gemini Near Infrared Spectrograph – Distant Quasar Survey: Rest-Frame Ultraviolet–Optical Spectral Properties of Broad Absorption Line Quasars</i> . The Astrophysical Journal, 968, 77.
2022	<b>Ahmed, H.;</b> Montgomery, K.; Cheek, M. (2022). <i>Determining the Lightcurves and Rotational Periods of Five Main Belt Asteroids</i> . Minor Planet Bulletin, 49 (2), 113-116.

## PRESENTATIONS

### Oral

- July 2025 **EMIT Program at Vanderbilt University**, Nashville, TN  
“Near-Infrared Spectroscopy of High-Redshift Quasars.”
- June 2025 **American Astronomical Society 246th Meeting**, Anchorage, AK  
“Exploring the Spectral Energy Distributions of Luminous Broad Absorption Line Quasars at High Redshift.”
- March 2025 **Graduate Lightening Talk Competition** Denton, TX  
“Near-Infrared Spectroscopy of High-Redshift Quasars.”
- Nov 2022 **Texas Astronomy Undergraduate Research Symposium**, Texas A&M University, College Station, TX  
“Broad Absorption Line Quasars from the Gemini Near Infrared Spectrograph–Distant Quasar Survey.”
- Oct 2021 **Joint Meeting of the Texas Sections of APS, AAPT, and SPS Zone 13**, University of Houston–Clear Lake, Houston, TX  
“Lightcurves and Rotational Periods of Five Main Belt Asteroids.”

### Poster

- June 2025 **American Astronomical Society 246th Meeting**, Anchorage, AK  
“Gemini Near Infrared Spectrograph – Distant Quasar Survey: Tripling the  $z \sim 3$  Sample.”
- Oct 2024 **University Research Symposium**, University of North Texas, Denton, TX  
“Spectral Energy Distributions of High-Redshift Broad Absorption Line Quasars from the Gemini Near Infrared Spectrograph - Distant Quasar Survey.”
- Jan 2024 **American Astronomical Society 243rd Meeting**, New Orleans, LA  
“Gemini Near Infrared Spectrograph – Distant Quasar Survey: Rest-Frame Ultraviolet–Optical Spectral Properties of Broad Absorption Line Quasars.”
- Oct 2023 **University Research Symposium**, University of North Texas, Denton, TX  
“Gemini Near Infrared Spectrograph – Distant Quasar Survey: Rest-Frame Ultraviolet–Optical Spectral Properties of Broad Absorption Line Quasars.”

## REFERENCES

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| <b>Ohad Shemmer</b> , Ph.D.<br>Department of Physics<br>University of North Texas<br>ohad@unt.edu | <b>Sarah Gallagher</b> , Ph.D.<br>Department of Physics & Astronomy<br>University of Western Ontario<br>sgalla4@uwo.ca |
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