

Hammad Abdullah

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Summary

I am an Astrophysics major and Mathematics minor at Rutgers University New Brunswick (Class of 2026) and a McNair Scholar. My research spans both observational astronomy and computational modeling, with experience in ALMA absorption-line studies of active galaxies and numerical simulations on Earth's geochemical evolution. I intend to pursue a Ph.D. in astrophysics, followed by postdoctoral research and an academic career, where I aim to investigate the formation, fueling, and evolution of high-redshift quasars and their effects on the early universe while mentoring the next generation of scientists.

Education

Rutgers University – New Brunswick, NJ

B.S. in Astrophysics, Minor in Mathematics — *Expected May 2026*

- McNair Scholar, Ronald E. McNair Postbaccalaureate Achievement Program
- Dean's List
- Intramural soccer

Carteret High School – Carteret, NJ — *June 2022*

- Salutatorian (Ranked 2nd in class, GPA 4.59)
 - National Honor Society, Varsity Track & Field (distance) and Soccer
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Research Experience

REU Research Intern – Brigham Young University, Provo, UT

Advisor: Dr. Benjamin Boizelle | Summer 2025 – Present

- Conducted independent research on a carbon monoxide absorption-line census using archival ALMA data of active galaxies.
- Processed raw datasets with multiple CASA pipelines, applying self-calibration and cleaning routines to enhance signal-to-noise.
- Developed Gaussian fitting models to characterize absorption features, constraining molecular gas properties (CO and H₂ column densities, excitation temperatures, integrated opacities).
- Presented results in REU group meetings and poster sessions; project continuing as a senior honors thesis.

Undergraduate Research Assistant – Rutgers University, New Brunswick, NJ

Advisors: Dr. Katherine Bermingham & Dr. Charles-Édouard Boukari | Jun 2024 – May 2025

- Investigated the origin of tungsten-182 isotopic anomalies in mantle-derived rocks using geodynamic models.
- Modified Fortran codes to test alternative mantle evolution and crystallization scenarios.
- Executed large-scale numerical simulations on Cedar and Graham supercomputers
- Applied Python statistical routines to analyze results.
- Delivered oral and chalkboard presentations in weekly group meetings.
- Manuscript in development

McNair Scholar – Ronald E. McNair Postbaccalaureate Achievement Program
Rutgers University, Feb 2024 – Present

- Completed structured training in research design, grant writing, literature review, and scientific communication.
 - Presented research findings at multiple McNair conferences (oral + poster).
 - Gained professional development in leadership, communication, and mentoring.
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Presentations & Conferences

- **UMBC McNair Conference, Baltimore MD** – Oral presentation on mantle evolution simulations (Sept 2024)
 - **McNair Research Symposium, Rutgers University** – Poster presentation (Feb 2025)
 - **John Jay McNair Conference** – Poster presentation on tungsten-182 isotopic anomalies (Apr 2025)
 - **BYU REU Symposium** – Poster presentation on ALMA absorption-line analysis (Aug 2025)
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Technical Skills

- **Programming & Software:** Python (NumPy, Matplotlib, Astropy), Fortran, CASA, LaTeX, Linux/Unix, Git/GitHub
 - **Computational Methods:** High-Performance Computing (HPC), Gaussian spectral analysis, numerical modeling, statistical modeling
 - **Research Tools:** ALMA data reduction, spectral line fitting, geochemical and geodynamic modeling grant writing, poster/oral presentations
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Honors & Awards

- Ronald E. McNair Scholar (2024–Present)
- Dean's List, Rutgers University
- National Youth Science Camp Delegate (2022)
- Salutatorian, Carteret High School (2022)
- National Honor Society (2021–22)