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I am a recent graduate from the City University of New York's (CUNY) Graduate Center master's in astrophysics program. My current research is in studying starspots using light curve inversion techniques.

Education

2023 - Present **CUNY Graduate Center**, M.S. in Astrophysics, Thesis:*Starspot Inference Using Light Curve Inversion Techniques*.

2019 - 2022 **CUNY Baccalaureate for Unique and Interdisciplinary Studies**, B.S. in Computational Astrophysics, *cum laude*.

2017 - 2019 **Bernard M. Baruch College**.

Research Experience

August 2023 – Present **Starspot Inference with Light Curve Inversion Techniques**, Advisor: Dr. Lucy Lu, American Museum of Natural History.

May 2021 – Present **Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres**, Brown Dwarfs in New York City, Advisor: Dr. Johanna Vos, American Museum of Natural History.

- Mapping the clouds of observed brown dwarfs from existing light curve data.

May 2020 – May 2021 **Chemodynamically Characterizing the Jhelum Stellar Stream with APOGEE-2**, Sloan Digital Sky Survey Faculty And Student Team, Advisor: Dr. Allyson Sheffield, American Museum of Natural History.

- Examined the Jhelum stellar stream in order to characterize potential members using APOGEE-2. Identified one potential member of Jhelum. Resulted in publication Sheffield et al (incl. Refat), ApJ, 2021.

Aug 2018 – May 2020 **Looking at Star Formation Through Chemistry**, AstroCom NYC, Advisor: Dr. Allyson Sheffield, American Museum of Natural History.

- Analyzed the spectra of the M-Giant star Arcturus to derive stellar spectra and chemical abundances. Normalized Echelle spectra and measured equivalent widths of spectral lines.

Jun 2018 – Aug 2018 **Two-Point Statistics in the Star Forming ISM**, AstroCom NYC, Advisor: Dr. Chang-Goo Kim, Center for Computational Astrophysics (CCA).

- Performed a two-point correlation analysis to characterize metallicity correlation between stars and compared this to parameters such as velocity and star formation rate.

Refereed Publications

[1] Allyson A. Sheffield, Aidan Z. Subrahimovic, Mohammad Refat, et al. "Chemodynamically Characterizing the Jhelum Stellar Stream with APOGEE-2." In: *The Astrophysical Journal* 913.1 (May 2021), p. 39. ISSN: 1538-4357. DOI: 10.3847/1538-4357/abee93. URL: http://dx.doi.org/10.3847/1538-4357/abee93.

Teaching

Fall 2025 **Intro Physics Lecture**, Baruch College.

Fall 2025 **Intro Physics Lab**, Baruch College.

Computer Skills

Advanced

- Python, LaTeX

Intermediate

- Git, Bash

Beginner

- HTML & CSS, MATLAB, Java

Academic Presentations

2025 **Talk**, *"Starspot Inference with Light Curve Inversion Techniques"*, CUNY Masters Graduation 2025, Simons Foundation.

2025 **Poster**, *"Starspot Inference with Light Curve Inversion Techniques"*, 245th American Astronomical Society Meeting, American Astronomical Society.

2024 **Poster**, *"Star Spots with Starry"*, The 22nd Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, University of California San Diego.

2023 **Poster**, *"Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres"*, Center for Computational Astrophysics Gotham Fest 2021, Center for Computational Astrophysics.

2023 **Poster**, *"Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres"*, 241st American Astronomical Society Meeting, American Astronomical Society.

2022 **Talk**, *"Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres"*, 240th American Astronomical Society Meeting, American Astronomical Society.

2021 **Poster**, *"Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres"*, Center for Computational Astrophysics Gotham Fest 2021, Center for Computational Astrophysics.

2021 **Talk**, *"Towards Mapping Brown Dwarf and Giant Exoplanet Atmospheres"*, Center for Computational Astrophysics/City University of New York/American Museum of Natural History Symposium, Center for Computational Astrophysics.

2021 **Poster**, *"Chemodynamically Characterizing the Jhelum Stellar Stream with APOGEE-2"*, 237th American Astronomical Society Meeting, American Astronomical Society.

2020 **Talk**, *"Chemodynamically Characterizing the Jhelum Stellar Stream with APOGEE-2"*, American Museum of Natural History REU Symposium, American Museum of Natural History.

2019 **Poster**, *"Where Were Stars Born in The Milky Way?"*, New York University Astrofest, New York University.

2019 **Talk**, *"Where Were Stars Born in The Milky Way?"*, American Museum of Natural History Research Experience for Undergraduates Symposium, American Museum of Natural History.

2018 **Talk**, *"Two-Point Statistics in the Star Forming ISM"*, Center for Computational Astrophysics Research Experience for Undergraduates Symposium, Simons Foundation.

References

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