SHERELYN ALEJANDRO MERCHAN

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EDUCATION

Hunter College, City University of New York   New York, NY
Major:Physics, Minors:Mathematics and Philosophy   Anticipated May 2024

GPA: 3.8/4.0 | Dean's List: 2021, 2022, 2023

RESEARCH EXPERIENCE

American Museum of Natural History, Brown Dwarfs in New York City   September 2021–Present
BDNYC Research Program Fellow
Advisors: Dr. Jackie Faherty , Prof. Kelle Cruz, Dr. Genaro Suárez

★ Creating extensive spectral energy distributions for a sample of ultracool dwarfs using the SEDkit python package to calculate fundamental parameters like effective temperature, bolometric luminosity, gravity, mass, and radius using spectroscopic and photometric observations. We are using new observations from JWST to test current evolutionary models of brown dwarfs and characterize the coldest brown dwarfs known.

   ○ Led the creation of the **most complete spectral energy distribution for an extrasolar world** (Alejandro et al. in prep) using data from Spitzer, Keck, Magellan, IRTF, Akari and JWST.

★ Analyzed a sample of 1085 sources from the SIMPLE Archive and used tangential velocity to determine outliers in the data while also finding potential candidates for binary systems under the guidance of Dr. Kelle Cruz , Dr. Jackie Faherty, Dr. Rocio Kiman.

Senior Developer of SIMPLE-Archive

★ Collaborating with scientists to ingest spectra for the SIMPLE Archive, a collaborative database of low-mass stars, brown dwarfs, and directly imaged exoplanets:My role is in code development through the ingestion of brown dwarf data from published papers, converting spectra to a standard format, and other general testing of the website. I also mentor new students on how to use and contribute data to the Archive.

Maria Mitchell Observatory, Nantucket, Massachusetts   May 2023–September 2023
National Science Foundation - REU Astronomy Internship
Advisor: Dr. Suvi Gezari - Space Telescope Science Institute

★ We found three new candidate "Changing-Look" active galactic nuclei initially classified as LINERs (low-ionization nuclear emission region) through their archival Sloan Digital Sky Survey (SDSS) spectra. I identified these candidates by crossmatching variable AGN from the Gaia catalog and archival LINER spectra. One of the three candidates, was observed with the Zwicky Transient Facility and detected as an optical transient (ZTF).

La Serena School for Data Science: Applied Tools for Data-driven Sciences   August 2022
Participant

★ Our team, the Astral Eight, researched Astronomy Transients using machine learning. Our project was focused on a large data set from the Zwicky Transient Facility, and it was our goal to use supervised machine learning to understand our data better. We focused on the ontological classes to scale down the magnitude of our data set and made other cuts based on some basic parameters.

NYU AI School, New York   January 2022

★ Participated in a week-long program where I learned about Artificial Intelligence and Machine Learning through lectures and hands-on programming labs in Python. .

LEADERSHIP EXPERIENCE

McNulty Peer Mentorship   August 2023–Present

★ As a senior, I mentor two junior undergrads part of the McNulty Scholars program at Hunter College and help with choosing their classes along with more general advice for their chosen major and desired career path.

Undergraduate Computing Community (UCC) at the Flatiron Institute   December 2022–Present
Advised by Professor Kelle Cruz and Sciware members

★ UCC is a software meeting that is focused on the undergraduate community at Flatiron and complements the existing Sciware activities. This meeting is safe for beginner questions and intends to strengthen the student experience within the scientific software community. This meeting is an opportunity to improve technical skills, build connections across the Flatiron centers, and contribute to the growth of the open source scientific software community.

Vice President, Women in Computer Science (WiCS), Hunter College   August 2021– January 2023

★ Organized events along with other board members to provide club members with more coding experience. Created and introduced club members to tech opportunities available to them while also arranging tech panels that allowed for networking. Led various events like an Intro to GitHub and Git workshop.

Member, NYC Commission on Human Rights' YES Council, New York   September 2020–July 2022

★ Planned the YES Council's Youth Symposium along with other members and led a workshop on addressing cyberbullying. Led an event focused on Gender Diversity in STEM and held a Q&A with two scientists from the Flatiron Institute that was focused on how they overcame obstacles in their respective fields.

GRANTS, AWARDS, and FELLOWSHIPS

Hunter Undergraduate STEM Research Conference Award	2023
John P. McNulty Scholars Program for Leadership in Science and Math	2022–present
CUNY AstroCom Fellowship	2021–present
Athena Honors Scholarship	2020–present

Peter V. Fallone Scholarship   2020–present
SACNAS NDiSTEm Conference 2022 Travel Scholarship   2022

COMPUTER SKILLS

Python, TOPCAT, Glue, SEDkit, SQL, SQLAlchemy3, SAOImage DS9, PyCharm, Git, Github, Aladin, HTML, JavaScript, and CSS.

PUBLICATIONS

1. [Patchy Forsterite Clouds in the Atmospheres of Two Exoplanet Analogs](#)
   Vos, J. M.; Burningham, B.; Faherty, J. K.; **Alejandro, S.**; Gonzales, E. C., Calamari, E.; Bardalez Gagliuffi, D.; Visscher, C.; Tan, X.; Morley, C. V.; Marley, M.; Gemma, M. E.; Whiteford, N.; Gaarn, J.; Park, G. *The Astrophysical Journal*, 944, 138, 2023.

2. [CWISE J105512.11+544328.3: A Nearby Y Dwarf Spectroscopically Confirmed with Keck/NIRES](#)
   Robbins, G.; Meisner, A.; Schneider, A., Burgasser, A.; Davy Kirkpatrick, J.; Gagné J., Hsu, C.; Moranta, L.; Casewell, S.; Marocco, F.; Gerasimov, R.; Faherty, J. K.; Kuchner, M. J.; Caselden, D.; Cushing, M.; **Alejandro, S**.; The Backyard Worlds: Planet 9 Collaboration, and The Backyard Worlds: Cool Neighbors Collaboration. Accepted to *The Astrophysical Journal, accepted*

3. Most Complete Spectral Energy Distribution of an Extrasolar Atmosphere using JWST.
   Alejandro Merchan et al. in prep.

4. Methane Emission From a Cool Brown Dwarf. Faherty et al.
   In press Nature.

5. High-Precision Atmospheric Constraints for a Cool T Dwarf from JWST Spectroscopy. Hood et al.
   Submitted to Nature Astronomy.

PRESENTATIONS

1. The First Year of JWST Science Conference, Space Telescope Science Institute   2023
   Most Complete Spectral Energy Distribution of an Extrasolar Atmosphere using JWST

2. Maria Mitchell Observatory Science Symposium   2023
   Finding Shapeshifting Black Holes

3. Hunter College's 2023 Undergraduate STEM Research Conference   2023
   Using JWST to Study Brown Dwarfs and Giant Exoplanets

4. Guest Lecturer, Colorado College   2023
   Rogue Objects: Creative Research and Art-Astrophysics Practice

5. Gotham Fest Poster Presentation, Center for Computational Astrophysics at the Flatiron Institute   2023
   Comprehensive SEDs and Fundamental Parameters of 113 Late - M, L, and T Ultracool Dwarfs

6. American Astronomical Association 241st Meeting, [iPoster Presentation](#)   2023
   Comprehensive SEDs and Fundamental Parameters of 113 Late - M, L, and T Ultracool Dwarfs

7. American Museum of Natural History Summer Research Symposium   2022
   Analyzing Age Indicators and Classifications of Low-Mass Stars Using Gaia

8. Gaia DR3 Fête, Center for Computational Astrophysics at the Flatiron Institute   2022

9. Guest Lecturer, Stanford University   2021