

Natalie Allen

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EDUCATION **Johns Hopkins University** Expected Graduation: 2025
• Ph.D. in Astrophysics

University of Rochester Graduation: May 2020
• B.S. in Physics and Astronomy, Minor in Mathematics
– *Cum Laude* with Highest Distinction (GPA: 3.86/4.0)
• Senior Thesis: *A Study of the Emission Line Structure of HH 7-11 with Hubble and Spitzer*
– Advisor: Dan Watson

RESEARCH INTERESTS Exoplanets: observation, atmospheres, habitability, biosignatures, astrobiology

RESEARCH **Johns Hopkins University**
Research Assistant (Advisor - [Dr. Néstor Espinoza](#)) Fall 2020 - Present
• Disentangling stellar contamination from atmospheric signals for terrestrial planets orbiting M dwarfs through joint retrievals
• Searching for constraints on morning/evening terminator limb inhomogeneities for transiting exoplanets
• Precise ground-based transit spectroscopy of exoplanets

Research Assistant (Advisor - [Dr. David Sing](#)) Fall 2020 - Present
• Space-based UV to IR transit spectroscopy of giant planets as part of the PanCET Program
• Studying the feasibility of hot terrestrial planet transit spectroscopy around nearby stars with JWST

University of Rochester
Research Assistant (Advisor - [Dr. Dan Watson](#)) Spring 2017 - Present
• Research in star formation and outflows, primarily in nearby region NGC 1333
• Ran shock simulations using MAPPINGS V and wrote code in Python to match observational data from both the Spitzer and Hubble Space Telescopes to simulated data
• Reduced data from Hubble Space Telescope observations

Research Assistant (Advisor - [Dr. Miki Nakajima](#)) Spring 2019 - Present
• Research in terrestrial impact craters
• Ran simulations of the Vredefort crater impact in shock simulation iSALE
• Made comparisons of simulation results with geophysical evidence and compared to past studies

NASA Jet Propulsion Lab

Summer 2019

Research Intern (Advisor - [Dr. Karl Stapelfeldt](#))

- Analyzed data from a number of different telescopes to explore star formation feedback and shock physics
- Attended [Sagan Summer Workshop on Astrobiology](#)

Space Telescope Science Institute

Summer 2018

Visiting Scientist (Guest of [Dr. Joel Green](#))

- Shared star formation research results with collaborators at Johns Hopkins University and Space Telescope Science Institute
- Wrote python code to analyze data from extreme stellar outflows
- Continued collaboration after summer position finished

PUBLICATIONS [N. H. Allen, K. Stapelfeldt, D. Watson, et al. A Study of the Infrared Emission Line Structure of HH 7-11 with *Hubble* and *Spitzer*. *In Prep.*](#)

[JWST Transiting Exoplanet Community Early Release Science Team, 2022. Identification of carbon dioxide in an exoplanet atmosphere](#), Accepted in Nature.

[N. H. Allen, N. Espinoza, A. Jordn, et al. 2022. ACCESS: Tentative detection of H₂O in the ground-based optical transmission spectrum of the low-density hot Saturn HATS-5b](#), *AJ*, 164, 153.

[C. McGruder et al. incl. N. H. Allen. 2022. ACCESS: Confirmation of a Clear Atmosphere for WASP-96b and a Comparison of Light Curve Detrending Techniques](#), *AJ*, 164, 134.

[N. H. Allen, M. Nakajima, K. Wnnemann, et al. 2022. A Revision of the Formation Conditions of the Vredefort Crater](#), *JGR: Planets*, 127, 8.

**CONFERENCE
TALKS/
POSTERS**

[N. H. Allen, N. Espinoza, A. Jordn, M. Lpez-Morales, D. Apai, B. V. Rackham, D. J. Osip, I. C. Weaver, C. McGruder, H. Reggiani, R. Brahm, F. Rodler, N. K. Lewis, J. J. Fortney, J. Fraine, J. Kirk. ACCESS: Tentative detection of H₂O in the ground-based optical transmission spectrum of the low density hot-Saturn HATS-5b](#), *Emerging Researchers in Exoplanet Science*, State College, PA, August 1, 2022.

[N. H. Allen, N. Espinoza, A. Jordn, M. Lpez-Morales, D. Apai, B. V. Rackham, D. J. Osip, I. C. Weaver, C. McGruder, H. Reggiani, R. Brahm, F. Rodler, N. K. Lewis, J. J. Fortney, J. Fraine, J. Kirk. ACCESS: Tentative detection of H₂O in the ground-based optical transmission spectrum of the low density hot-Saturn HATS-5b](#), *Exoplanets IV*, Las Vegas, NV, May 1, 2022.

[N. H. Allen, M. Nakajima, S. Helhoski, K. Wnnemann, D. Trail. Simulating the Formation of Earth's Largest Impact Crater. 52nd Lunar and Planetary Science Conference](#), Virtual, March 17, 2021.

[N. H. Allen, K. Stapelfeldt, D. Watson, T. Bergin, A. Frank, T.N. Gautier. J. Green, S.T. Megeath, G. Melnick, D. Neufeld, A. Rubinstein. A Study of the Infrared Emission Line Structure of HH 7-11 with *Hubble* and *Spitzer*. American Astronomical Society, AAS Meeting #235](#), Honolulu, HI, January 6, 2020.

[N. H. Allen, T. Bergin, A. Frank, T.N. Gautier. J. Green, S.T. Megeath, G. Melnick,](#)

D. Neufeld, K. Stapelfeldt, D. Watson. [Outflows and star-formation feedback from young stellar objects in NGC1333](#). *American Astronomical Society, AAS Meeting #233*, Seattle, WA, January 7, 2019.

N. H. Allen, D. Watson. [Outflows and star-formation feedback from young stellar objects in NGC1333](#). *Maria Mitchell Women in Science Symposium*, Wellesley, MA, October 6, 2018.

N. H. Allen, T.P. Jacques. [Outflows and star-formation feedback from young stellar objects in NGC1333](#). *Conference for Undergraduate Women in Physics*, Rochester, NY, January 13, 2018.

OBSERVING

Apache Point Observatory

- PI: Confirmation of an Optical Slope in the Atmosphere of WASP-69b
 - First transit spectroscopy with APO
 - One of the first uses of the KOSMOS Instrument
- PI: Reanalysis of the Atmosphere of XO-2b in a New Epoch of KOSMOS

Hubble Space Telescope

- Co-I (PI David Sing): The HST/JWST synergy: A deep dive into the NUV with WASP-39b to answer key formation questions - 24 orbits
- Co-I (PI David Sing): Sculpting Hubble's Exoplanet Legacy: A Comprehensive Uniform Dataset of Exoplanet Transmission Spectra - Archival
- Co-I (PI David Sing): A Comparative Study of Planetary Atmospheres in Low-Metallicity Environments - 27 orbits

LEADERSHIP POSITIONS

Johns Hopkins University

Physics and Astronomy Graduate Students association Fall 2020 - Present

- Fall 2022 - Present: No-PhDs Journal Club/Wine Cheese talks co-chair
- Fall 2021 - Spring 2022: Second-year graduate student representative, Undergraduate liaison, No-PhDs Journal Club co-chair
 - Organized "Reading Program" undergraduate/graduate mentorship program
- Fall 2020 - Spring 2021: First-year graduate student representative, Undergraduate liaison co-chair
 - Helped to plan the prospective graduate student open house

University of Rochester

Society of Physics Students Fall 2017 - Spring 2020
(Secretary Fall 2017 - Spring 2018, President Fall 2018 - Spring 2019)

- Coordinated physics and astronomy intro level class tutoring
- Delegated executive board chairs and committees
- Helped plan outreach, social, and professional development events

Society of Women in Astronomy and Physics Fall 2017 - Spring 2020
(President, Fall 2017 - Spring 2019, Secretary Fall 2019 - Spring 2020)

- Co-founder, successfully proposed and accepted as official student organization

- Held social and professional development events to create a community for an underrepresented group in physics and astronomy
- Created outreach events to promote the development of women in STEM

HONORS AND AWARDS	National Science Foundation Graduate Research Fellowship	2020-2023
	Stoddard Senior Thesis Prize, U. of Rochester Physics and Astronomy	2020
	Janet Fogg Prize, U. of Rochester Physics and Astronomy	2020
	Undergraduate Teaching Award, U. of Rochester Physics and Astronomy	2020
	Barry M. Goldwater Scholarship	2019-20
	USRA Distinguished Undergraduate Award – Frederick A. Tarantino Scholarship	2019
	Outstanding Chapter Award - Society of Physics Students National	2017-18, 2018-19
	Blake Lily Prize, Society of Physics Students National	2017-18, 2018-19
	Women in Physics Grant, American Physical Society	2018
	Excellence in Cosponsorship - Society of Physics Students, U. of Rochester	2018
	Whipple Science & Research Scholarship, U. of Rochester	2016-2020

TEACHING EXPERIENCE	University of Rochester	
	<i>Department of Physics and Astronomy - Peer Advisor</i>	Fall 2019 - Spring 2020
	College Center for Advising Services	
	<ul style="list-style-type: none"> • Advise Physics and Astronomy students on classes, research opportunities, etc. • Hold office hours, coordinate events with Physics and Astronomy Department and Society of Physics Students 	
	<i>Department of Physics and Astronomy - Teaching Assistant</i>	Fall 2017 - Spring 2020
	<ul style="list-style-type: none"> • Astronomy 142: Elementary Astrophysics (Honors) Spring 2019, 2020 • Astronomy 111: The Solar System & Its Origin Fall 2017, 2018, 2019 • Astronomy 102: Relativity, Black Holes, and the Big Bang Spring 2018 	
	<i>Society of Physics Students Workshops</i>	Fall 2017 - Spring 2020
	<ul style="list-style-type: none"> • Taught workshops on Mathematica and Python to college students • Gave talks on research and college to high school students at Brighton High School 	

MEMBERSHIPS	JWST Telescope Scientist Team
	JWST Transiting Exoplanet Community Early Release Science Team
	Phi Beta Kappa (ΦBK)
	Sigma Pi Sigma ($\Sigma\Pi\Sigma$)
	American Physical Society (APS)
	American Astronomical Society (AAS)
Society of Physics Students (SPS)	

COMPUTER SKILLS	Python	Igor Pro
	UNIX shell scripting (Bash)	TheSky6
	SAOImage DS9	CCDSOFT
	Mathematica	CCDStack
	L ^A T _E X	Microsoft Office Suite