ALISON DUCK

EDUCATION

The Ohio State University, Columbus OH *August 2019 - Present*
Masters of Science, 2022
Astronomy Graduate Program   GPA 3.959

University of Maryland, College Park MD *August 2015 - May 2019*
Bachelor of Science
Physics, High Honors - Astronomy   GPA 3.688
Honors Thesis: "K2 and Spitzer Joint Analysis of 4 Transiting Exoplanets"

HONORS AND AWARDS

NASA ExoExplorer - 2022
National Science Foundation Graduate Research Fellowship Program Honorable Mention - 2021
George A. Snow Women in Physics Award 2018
Full Banneker Key Scholar at the University of Maryland, College Park 2015 - 2019
University of Maryland Honors College 2015 - 2019

RESEARCH PROJECTS

An Exploration of Systematic Errors in Transiting Planets and Their Host Stars Spring 2019 - Present
- Using EXOFASTv2 to fit KELT-15b with Torres Relations, Yonsei-Yale Isochrones, MIST Isochrones, and SED fitting with Gaia parallaxes
- Determining agreement between models in breaking mass-radius degeneracy
- Utilized WOTAN to flatten TESS Observations
- Retrieved TESS exoplanet transit observations through MAST database
- Utilized the Unity Super Computer to submit batch jobs
- Publication submitted to AAS Journals and supervised by Prof. Scott Gaudi

The EBLM project X. Masses, radii, and temperatures of 2 M-dwarfs near the convective transition from K2 Fall 2021 - Present
- Using EXOFASTv2 to model low mass eclipsing binaries (EBLM) as if they were planetary systems
- Explored different methods of breaking the mass radius degeneracy on these M-dwarf host stars
- Simultaneously modelled and refined stellar parameters for both M-dwarfs and their hosts
- Publication submitted to MNRAS and supervised by Dr. David Martin

Studying K2 Exoplanet Transits using EVEREST pipeline Spring 2017 - Fall 2020
- Retrieved K2 exoplanet transit data through MAST database
- The EVEREST python pipeline is used to effectively remove instrumental noise and fold transits
- Utilized BATMAN to model folded exoplanet transits
- A Markov Chain Monte Carlo is used to fit BATMAN models of planet parameters to the EVEREST detrended light curves as well as cleaned Spitzer transits
- Presented Poster at the 233rd AAS in Seattle
- Presented Honors Thesis April 2019 • Published in AJ in 2021

GROWTH PIRE REU, National Central University, Taiwan Summer 2018
Summer Student

- Created light curves for RR Lyrae stars from Zwicky • Transient Facility photometry data
- Simulated Gaussian noise and fitted model template in Python
- Used Chi Square Fit RR Lyrae stars to determine Period, Magnitude Luminosity Relation
- Virtually Presented Results at GROWTH 2018 winter meeting in India

Big Data Astronomy Surveys Spring 2018

- Used photometry data from the intermediate Palomar Transient Factory
- Determined variability of Active Galactic Nuclei (AGN)
- Used Monte Carlo Markov Chain fitting to determine the slope of the structure function of AGN
- Found significant correlation between slope of the structure function and mass of central black hole

NASA - Johns Hopkins Applied Physics REU Summer 2017
Summer Intern

- Analyzed distribution of lunar craters diameter using IDL
- Utilized lunar images from the Lunar Reconnaissance Orbital Camera
- Measured diameters of lunar craters using ArcMap
- Updated positions of dust ponds on the asteroid Eros using the Small Body Mapping Tool
- Work contributed to a European Lunar Symposium 2018 abstract "Space Weathering and The Stratigraphy of the Lunar Regolith."
- Work contributed to a Lunar and Planetary Science Conference 2019 abstract "Updated Geologic Database for 433 Eros."

Exoplanet Transits from UMD Observatory Summer - Fall 2016

- Gained skills using guided optical telescopes
- Used image analysis software using multi-aperture photometry to analyze a sequence of images
- Observed an exoplanet transit around WASP-104
- Presented Poster at Conference for Undergraduate Women in Physics hosted at Princeton

POSTERS, ABSTRACTS, AND PUBLICATIONS

- Poster "An Exploration of Systematic Errors in Transiting Planets and Their Host Stars" **Duck, A.**, Gaudi, B. S., Eastman, J D., Rodriguez, J E. 2023, AAS241, Seattle

- "An Exploration of Systematic Errors in Transiting Planets and Their Host Stars" **Duck, A.**, Gaudi, B. S., Eastman, J D., Rodriguez, J E. 2022, AAS Journals, Submitted

- "The EBLM project X. Benchmark masses, radii and temperatures for two fully convective M-dwarfs using K2" **Duck, A.**, Martin, D V., et al. 2022, MNRAS, Submitted

- "Revised Temperatures For Two Benchmark M-dwarfs – Outliers No More' Martin, D V., Armitage T., **Duck, A.**, et al. 2022, MNRAS, Submitted

- "K2, Spitzer, and TESS Transits of Four Sub-Neptune Exoplanets" **Duck, A.**, Harada, C. K., Harrell, J., et al. 2021, AJ, 162,136

- Abstract "Updated Geologic Database for 433 Eros" by Roberts, J. H.; Buczkowski, D. L.; Ernst, C. M.; Barnouin, O. S.; Gaskell, R. W.; **Duck, A.** ; Blewett, D. T.; Jozwiak, L. M.; Tagle, T.; Small Body Mapping Tool Team

<div align="right">50th Lunar and Planetary Science Conference
March, 2019</div>

- Poster "K2 and Spitzer Joint Analysis of 4 Transiting Exoplanets"

<div align="right">233rd AAS, Seattle, January 2019</div>

- Abstract "Depth of maturity in the Moon's regolith " by Denevi, B. W.; **Duck, A.**; Klem, S.; Ravi, S.; Robinson, M. S.; Speyerer, E. J.

<div align="right">American Geophysical Union, Fall Meeting 2017
abstract P41D-2852, December 2017</div>

- Poster "Observing Exoplanet Transits at the University of Maryland Observatory "

<div align="right">Conference for Undergraduate Women in Physics
Princeton University, Winter 2017</div>

PRESENTATIONS

- Great Lakes Exoplanet Area Meeting Systematic Uncertainties in the Physical Parameters of Transiting Planet Systems

<div align="right">The Ohio State University, Nov 2022</div>

- Invited Seminar Systematic Uncertainties in the Physical Parameters of Transiting Planet Systems

<div align="right">Michigan State University, Nov 2022</div>

- Great Lakes Exoplanet Area Meeting Systematic Uncertainties in the Physical Parameters of Transiting Planet Systems

<div align="right">University of Michigan, Nov 2021</div>

- JPL Exoplanet Journal Club Systematic Uncertainties in the Physical Parameters of Transiting Planet Systems

<div align="right">Virtual Jet Propulsion Lab OH, Oct 2021</div>

- Super Computing Tutorial - OSU Exoplanet Group Meeting

<div align="right">Columbus OH, Jan 2021</div>

- Honors Thesis Presentation "K2 and Spitzer Joint Analysis of 4 Transiting Exoplanets"

<div align="right">University of Maryland College Park, April 2019</div>

- Virtually presented results from summer GROWTH internship at 2018 GROWTH winter meeting

<div align="right">India, December 2018</div>

- Presented workshop "Supporting Students from Diverse Backgrounds"

<div align="right">University of Colorado Boulder, Spring 2018</div>

- Presented Observational Astronomy Course research project at Observatory Open House

<div align="right">University of Maryland Observatory, Dec 2017</div>

- Presented workshop "Impostor Syndrome"

<div align="right">Rochester Institute of Technology, Spring 2017</div>

OBSERVING EXPERIENCE

Large Binocular Telescope

- Co-Observer during 10 day observing run at University of Arizona

<div align="right">February 2020</div>

TEACHING AND MENTORSHIP

- Lead instructor for mentorship class Polaris (PHYS2050.01/.02) which pairs underrepresented Physics and Astronomy freshmen with graduate student mentors to complete a research project
  The Ohio State University, AU 2021-2022 and AU 2022-2023

- Teaching Assistant AU 2020-2021

- Co - taught and designed curriculum for early arrival program for women, under represented minorities, and first Generation incoming freshman Physics and Astronomy Majors
  The Ohio State University, Summer 2020

- OSU Polaris Peer Mentor
  The Ohio State University, Fall 2019 - Spring 2020

- University of Maryland Women in Physics Peer Mentor
  Fall 2017 - Spring 2019

- University of Maryland Astronomy department Tutor
  Spring 2018

OUTREACH ACTIVITIES

- OSU Polaris mentoring program Leadership member
  Spring 2020 - Present

- Guest speaker for Modern Physics at the University of Maryland
  Online, Spring 2022

- Guest speaker for First Light - Science class for under-served Washington DC middle-schoolers, Carnegie Academy for Science Education
  Online, Spring 2022

- Guest speaker for rural Mardela High School AP and Honors Chemistry
  Online, September 2021

- Supervised organization and planning committee for the ACCESS Network national conference for improving diversity in physics
  Online, June 2020

- Panelist at the Conference for Undergraduate Women in Physics
  University of Maryland College Park, January 2020

- Assisted in organizing ACCESS Network national conference for improving diversity in physics
  University of Colorado Boulder, Spring 2018

- Assisted in organizing ACCESS Network national conference for improving diversity in physics
  Rochester Institute of Technology, Spring 2017

- Officer of University of Maryland Women in Physics Group
  Spring 2017 - May 2019

- Observatory Staff, engaging with public and managing telescopes at Open Houses
  Spring August 2017- May 2019

- Attended Conference for Undergraduate Women in Physics
  Old Dominion University, Winter 2016

- Member of University of Maryland Astronomy Gentleladies Network
  Fall 2015 - May 2019

TECHNICAL STRENGTHS

Strong	Python, EXOFASTv2, MATLAB, AstroImageJ, SAO Image DS9, Guided Optical Telescopes
Intermediate	Bash, LaTeX, IDL