

## EDUCATION

### B.S. Physics, Astronomy and Astrophysics

Aug 2020 - Dec 2024

Minors: Mathematics, History

Magna Cum Laude, with Research Distinction in Astronomy and Astrophysics

The Ohio State University

**Relevant courses:** *Elementary Particle Physics (Graduate), Applied Differential Geometry, Cosmology, Honors E&M I/II, Honors Quantum Mechanics I/II, Statistical Mechanics, Advanced Physics Laboratory, Big Data Analytics, Methods of Astronomical Observation & Data Analysis, Real Analysis, Applied Statistics, Python, MATLAB, Flight Vehicle Dynamics, Thermodynamics, Electrical Circuits and Electronic Devices*

## SELECTED PUBLICATIONS

- (Submitted to *AAS Journals*, March 2025) **Lenhart, C.**, Johnson, M. C., Wang, J., et al., "PEPSI Investigation, Retrieval, and Atlas of Numerous Giant Atmospheres (PIRANGA). II. Phase-Resolved Cross-Correlation Transmission Spectroscopy of KELT-20b". <https://arxiv.org/abs/2503.07719>
- (Submitted to *Monthly Notices of the Royal Astronomical Society*, March 2025) Basinger C., Johnson, M. C., Wang, J., et al. (**Lenhart, C. 7th of 9 authors**), "Composition and winds in the atmosphere of TOI-1518 b". <https://arxiv.org/abs/2503.07723>
- **Lenhart, C.**, (2024). "Phase resolved cross-correlation transmission spectroscopy of KELT-20b" (Undergraduate thesis). The Ohio State University., <https://kb.osu.edu/handle/1811/105450>
- **Lenhart, C.**, Johnson, M., Petz, S., et al., (2024) Analysis of KELT-20b's Atmospheric Dynamics Using PEPSI: Line Profiles During Transit and Velocity Offsets. *Bulletin of the AAS*, 56(2). <https://doi.org/10.3847/25c2feb.5960a460>

## PRESENTATIONS

- **Lenhart, C.**, Johnson, M. C., Wang, J., Asnodkar, A. P., Petz, S., Strassmeier, K. G., Ilyin, I. "*Analysis of KELT-20b's Atmospheric Dynamics Using PEPSI: Line Profiles During Transit and Velocity Offsets*" 2024, AAS 243, 135, 179.09
- **Lenhart, C.**, Johnson, M. C. "*Analysis of an Ultra Hot Jupiter's Atmosphere*" Ohio State Department of Astronomy Summer Undergraduate Research Program in Astrophysics Symposium 2023

## RESEARCH EXPERIENCE

- **Undergraduate Astrophysics Research** Columbus, OH  
Ohio State University, Astronomy — Dr. Marshall C. Johnson May 2023 - Present
  - Developed and optimized Python scripts for processing ultra-hot gas giant exoplanet atmospheric spectroscopy data from the PEPSI spectrograph on the Large Binocular Telescope, refactoring data reduction pipelines and automating multiple processing steps.
  - Discovered new atmospheric elements in KELT-20b using advanced signal processing and data analysis methods; resolved atmospheric dynamics at unprecedentedly high time resolution; presented the first observational constraint on the magnetic field strength of an exoplanet.
  - Presented findings at the 243rd American Astronomical Society conference; awarded scholarship to conduct research full-time; results published in undergraduate thesis and to be published in a peer-reviewed astronomy journal.
- **Undergraduate Materials Science Research** Columbus, OH  
Ohio State University, Materials Science & Engineering — Prof. Sheikh Akbar June 2022 - May 2023
  - Designed and completed hydrothermal synthesis reactions of metal oxide nanostructures to be used in next-generation gas sensors.
  - Measured electrical resistivity, response time, and selectivity of metal oxide gas sensors under exposure to toxic and non-toxic gases.
  - Contributed to development of the Open Database Of Resistive-type Sensors (ODORS) by aggregating experimental data and literature reviews, facilitating trend analysis in sensor selectivity and sensitivity.

## HONORS AND AWARDS

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Ann Slusher Tuttle Undergraduate Scholarship, Ohio State Department of Astronomy	January 2024
Undergraduate Research Scholarship, Ohio State College of Arts and Sciences	December 2023
MakeOHI/O 2023 1st Place (Intel Competition)	March 2023
Dean's List	7 semesters
Eagle Scout	July 2020
Youngstown CityScape Beautification Watch Award	November 2019

## WORK EXPERIENCE

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- **Private Tutor** Remote  
Wyzant June 2022 - May 2023
  - Created study plans for students, managed all communication and scheduling; clients ranged from middle school to college students of math, physics, standardized tests.
  - Earned a 5.0/5.0 rating across 30+ reviews, earning six unsolicited testimonials; recognized as a top tutor in Columbus, OH, and sitewide for online tutoring in calculus and physics.
- **Mathematics Tutor** Columbus, OH  
Ohio State University, Mathematics and Statistics Learning Center December 2021 - August 2022
  - Tutored calculus to over 20 students weekly, effectively communicating complex concepts and providing tailored support to enhance student comprehension and performance.
  - Managed student communications and appointment scheduling; learned and applied andragogical teaching methods.

## HIGHLIGHTED PROJECTS

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- **Machine Learning: Linking Writing Processes to Writing Quality** Kaggle  
November 2023 - December 2023
  - Developed a Histogram-based Gradient Boosting Regression Tree with Scikit-learn to predict writing quality of mock SAT essays using keystroke logs; engineered features from computational linguistics literature, tuned hyperparameters, and analyzed feature importance; placed in 63rd percentile in Kaggle competition.
- **Make OH/IO 2023 Competition** Ohio State University  
March 2023
  - Proposed an updated cleanroom garment with tear sensors, improved boot covers, and redesigned masks for use in Intel's semiconductor factories; designed a proof-of-concept using an Arduino board and cleanroom garment materials; won 1<sup>st</sup> place in the competition.
- **Buckeye Solar Racing Team** Ohio State University  
Aerodynamicist August 2021 - August 2022
  - Researched performance of various solar car geometries, designed canopy and aeroshell in SolidWorks, ran CFD with STAR-CCM+.
  - Meshed existing canopy with photogrammetry software, compared prototypes to physical model, finalized design, integrated with remainder of solar car.
- **NASA L'SPACE Mission Concept Academy** Online  
Aerospace Engineer May 2021 - August 2021
  - Collaborated with 10-person interdisciplinary team to conceptualize a mission to drill water-ice from the lunar south pole, including site selection with JMARS GIS software, rover design with SolidWorks CAD, development of Risk Management Plan, and success criteria.
  - Modeled entry, descent, and landing of a lunar rover; prototyped compact lunar regolith drill; formulated a CONOPS; budgeted instrumentation; produced a Preliminary Design Review.

## COMMUNITY SERVICE

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- **Epsilon Tau Pi, Eagle Scout Service Fraternity** Ohio State University  
Executive Board Member and General Member
  - Volunteered for 100+ hours of community service events, such as Relay for Life Columbus, assisting local Boy Scout troops located in low-income areas, and metro park cleanups.
  - Responsible for all social media channels in 2021-2022; designed merchandise and produced fraternity composite photographs.

## SKILLS AND INTERESTS

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Languages:

Python, MATLAB, Mathematica, HTML, CSS

Tools:

Bash, Linux, Git, L<sup>A</sup>T<sub>E</sub>X, High-performance Computing

Machine Learning, Deep Learning, Adobe Creative Suite

Interests:

Fine-art photographer with work shown in galleries across Ohio; solo show scheduled for 2025