Calder Lenhart

✉ lenhart.106@osu.edu
🌐 calderlen.github.io
🆔 0009-0001-1459-3738
🎓 Google Scholar

EDUCATION

2020–2024   **B.S. Physics, Astronomy & Astrophysics**; Ohio State University
Minor in Mathematics, Minor in History
Magna cum laude, with Research Distinction in Astronomy & Astrophysics
Thesis: Phase-Resolved Cross-Correlation Transmission Spectroscopy of KELT-20b

Relevant Coursework: Elementary Particle Physics (Grad), Applied Differential Geometry, Quantum Mechanics I (Grad), Classical Electromagnetism I (Grad), Classical & Statistical Physics I (Grad), Cosmology, Real Analysis, Big Data Analytics in Physics, Quantum Mechanics I-II (Honors), Electricity & Magnetism I-II (Honors), Statistical Mechanics

PUBLICATIONS

Journal Articles

[1] C. Basinger, M. C. Johnson, J. Wang, A. Duck, A. Pai Asnodkar, S. Petz, **C. Lenhart**, I. Ilyin, and K. Strassmeier. "PEPSI investigation, retrieval, and atlas of numerous giant atmospheres (PIRANGA) – III. Composition and winds in the atmosphere of TOI-1518 b". In: *Monthly Notices of the Royal Astronomical Society* 543.4 (Sept. 2025), pp. 4136–4143. DOI: 10.1093/mnras/staf1648.

[2] V. Bonidie, M. C. Johnson, J. Wang, S. Petz, J. Kamen, **C. Lenhart**, A. Duck, C. Badenes, K. Strassmeier, and I. Ilyin. "PEPSI Investigation, Retrieval, and Atlas of Numerous Giant Atmospheres (PIRANGA). IV. High-resolution Phased-resolved Spectroscopy of the Ultra-hot-Jupiter KELT-20 b". In: *The Astronomical Journal* 171.1 (Dec. 2025), p. 34. DOI: 10.3847/1538-3881/ae21be.

Accepted Manuscripts

[1] **C. Lenhart**, M. C. Johnson, J. Wang, A. Pai Asnodkar, S. Petz, A. Duck, K. G. Strassmeier, and I. Ilyin. *PEPSI Investigation, Retrieval, and Atlas of Numerous Giant Atmospheres (PIRANGA). II. Phase-Resolved Cross-Correlation Transmission Spectroscopy of KELT-20b.* (Accepted to *AJ*). 2025. arXiv: 2503.07719 [astro-ph.EP].

Conference Abstracts

[1] **C. Lenhart**, M. Johnson, S. Petz, J. Wang, A. Pai Asnodkar, K. Strassmeier, and I. Ilyin. "Analysis of KELT-20b's Atmospheric Dynamics Using PEPSI: Line Profiles During Transit and Velocity Offsets". In: *American Astronomical Society Meeting Abstracts*. Vol. 243. American Astronomical Society Meeting Abstracts. Feb. 2024, 179.09, p. 179.09.

PRESENTATIONS

Talks

[1] **C. Lenhart** and M. C. Johnson. *Analysis of an Ultra-Hot Jupiter's Atmosphere*. Ohio State Department of Astronomy Summer Undergraduate Research Program Symposium (Columbus, OH, USA). July 2023.

Posters

[1] **C. Lenhart**, M. C. Johnson, J. Wang, A. P. Asnodkar, S. Petz, K. G. Strassmeier, and I. Ilyin. *Analysis of KELT-20b's Transmission Spectrum: Atmospheric Dynamics of Atomic Species*. 243rd Meeting of the American Astronomical Society (New Orleans, LA, USA). Jan. 2024.

AWARDS & GRANTS

2025	Artist Grant, Greater Columbus Arts Council
2024	Ann Slusher Tuttle Undergraduate Scholarship, Ohio State University Department of Astronomy
2023	Undergraduate Research Scholarship, Ohio State University College of Arts and Sciences
2023	1st Place, MakeOHI/O 2023
2020	Eagle Scout, Boy Scouts of America
2019	Youngstown CityScape Beautification Watch Award

RESEARCH EXPERIENCE

2025–   **ASAS-SN Analyst**, Department of Astronomy, Ohio State University
(Advisors: Prof. Christopher Kochanek, Prof. Krzysztof Stanek)

- Built a parallelized processing pipeline for > 14 million ASAS-SN light curves; searched for dimming events due circumstellar dust obscuration and brightening events due to gravitational microlensing with configurable filtering to reduce false positives.
- Implemented per-camera Gaussian Process systematics trend removal for light curves, calculated significance of residuals with respect to the modified baseline, and created a ranked scoring system to triage potential brightening and dimming events.
- Built CLI tools, documented the codebase, and wrote usage instructions to enable others to utilize the pipeline.
- Manuscript in progress.

2023–	**Exoplanet Researcher**, Department of Astronomy, Ohio State University (Advisor: Dr. Marshall C. Johnson, Co-advisor: Prof. Ji Wang)

- Developed a Python analysis pipeline for high-resolution optical spectroscopy ($R \sim 130,000$), integrating radiative transfer models to subtract stellar rotation artifacts (Doppler shadows) and extract faint signals from noisy time-series data.
- Performed phase-resolved velocity analysis to map atmospheric circulation, resolving multidimensional day-to-night wind structure and identifying limb asymmetries consistent with magnetohydrodynamic drag predictions.
- Resolved significant discrepancies in the literature by identifying and correcting reference frame calibration errors, demonstrating that prior conflicting results were driven by inconsistent system parameters.
- Established a statistical detection framework to distinguish physical signals from aliasing artifacts, yielding high-confidence confirmations of atomic iron and a novel tentative detection of chromium.

2022–2023	**Undergraduate Research Assistant**, Department of Materials Science and Engineering, Ohio State University (Advisor: Prof. Sheikh Akbar)

- Performed hydrothermal synthesis of metal-oxide nanostructures for gas sensors; characterized resistivity, response time, and selectivity of analytes.
- Cleanroom trained at Nanotech West Lab; managed safe handling of hazardous gases and materials.

WORK EXPERIENCE

2025	**Physics AI Trainer**, Mercor Intelligence, Remote (Independent Contractor)

- Trained a top AI research organization's LLM in advanced physics and mathematics concepts.

2022–2023	**Private Tutor**, Grade Potential Tutoring & Wyzant

- Created customized study plans for students ranging from middle school to college level in math, physics, and standardized test prep.
- Maintained a 5.0/5.0 rating across 30+ reviews and earned recognition as a top tutor in Columbus, OH.

2021–2022	**Math Tutor**, Ohio State University Mathematics and Statistics Learning Center

- Tutored Calculus I–III students, managing volumes of more than 20 students per week.

PROJECTS

2023   **Machine Learning: Linking Writing Processes to Writing Quality**, GitHub

- Developed a Histogram-based Gradient Boosting Regression Tree with Scikit-learn to predict writing quality of mock SAT essays using keystroke logs.
- Engineered features proposed in computational linguistics literature and tuned hyper-parameters.
- Placed in the 63rd percentile in Kaggle competition efficiency leaderboard.

2023   **Make OHI/O Makeathon (Intel Challenge)**, Submission

- 1st Place Winner: Prototyped an updated cleanroom garment with tear sensors, improved boot covers, and redesigned masks for use in Intel's semiconductor fabrication plants.
- Designed prototype using Arduino boards and authentic cleanroom garment materials.

2021–2022   **Buckeye Solar Racing**, Aerodynamics Team

- Researched solar car geometries and designed canopy/aeroshell components in SolidWorks.
- Ran CFD simulations with STAR-CCM+ and meshed existing canopy with photogrammetry software to validate physical prototypes.

2021   **NASA L'SPACE Mission Concept Academy**, Engineering Lead

- Collaborated with a 10-person interdisciplinary team to conceptualize a mission to drill water-ice from the lunar south pole.
- Modeled entry, descent, and landing of a lunar rover; prototyped a compact lunar regolith drill; and formulated the CONOPS.