

**ANDREW MORGAN**  
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## EDUCATION

**Indiana University** Bloomington, IN  
*B.Sc. in Astronomy & Astrophysics, B.Sc. in Physics, B.Sc. in Mathematics* May, 2023

### Undergraduate Theses

- A Python-Based Machine-Learning Model of the Milky Way's Chemical Structure and Atomic Interstellar Absorption
- The Thermodynamic Effects of Metallicity on Star Formation

## RESEARCH EXPERIENCE

**NSF's NOIRLab / Astro Data Lab** Tucson, AZ  
*Research Science Intern (CosmicAI, DESI Collaboration)* Sep 2025 – Present

- Developing AEON-Flow, a deep learning framework that provides a probabilistic standard for DESI data validation, trained on 1.1M+ spectra.
- Architected Plato (~190M params), a multi-modal transformer with a spectral-similarity (CCF-defined) preserving latent space.
- Designed Aristotle (~8M params), a distilled (student) self-attention model, to provide fast, embedding-only inference for deployment in the live Redrock redshift pipeline.
- Implementing Kanon Flow, a redshift-conditioned Continuous Normalizing Flow (CNF) for probabilistic outlier detection.
- Training all models in multi-node, multi-GPU environments on the TACC Vista and NERSC Perlmutter supercomputers

## PUBLICATIONS

**AEON-Flow I: Redshift Anomaly Detection with Continuous Normalizing Flows** | Morgan, A., Juneau, S. In Prep  
• Details the AEON-Flow framework, including the 'Plato' teacher-student distillation and the resulting 'Aristotle'/'Kanon Flow' instrument for identifying redshift anomalies in DESI. First in a series.

## PRESENTATIONS & POSTERS

**AAS 247** | Abstract & Poster Presentation UPCOMING: Jan 2026  
• Presented preliminary results from the AEON-Flow suite as an e-poster and abstract at the AAS 247 in Phoenix.

**FLASH Talk** | Powerpoint Presentation UPCOMING: Dec 2025  
• Presented research updates to NOIRLab faculty as a FLASH Talk presentation.

**DESI Data Telecon** | Invited Talk Oct 2025  
• Presented preliminary work on using continuous normalizing flows for redshift prediction, redshift correction, and outlier detection to the DESI Data team.

## TECHNICAL SKILLS

**Languages:** Python, C++, SQL, CUDA

**Frameworks:** PyTorch, Scikit-Learn, Pandas, Numpy, Scipy

**Tools:** Git, LaTeX, SLURM, HDF5, Astro Data Lab, Sparcl

## ADDITIONAL EXPERIENCE

**Hendrickson Suspension** Lebanon, IN  
*Data Analyst Intern* Dec 2020 – Aug 2021

- Drove data analysis for an assembly line re-balancing project, leveraging ML to optimize workloads and achieve an 18% increase in production efficiency.
- Automated site data management and streamlined daily operational reporting for department leads.

**Merritt Contracting** Lebanon, IN  
*Site Engineer* Aug 2023 – March 2024