

Zachary Lee

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Personal Profile

PhD student in Machine Learning at Purdue University with a background in mathematics, physics-based modeling, and neuro-symbolic methods. Focused on integrating physical simulation and generative modeling, with interests in combining learning-based and structured representations. Experienced with PyTorch, CUDA, and numerical methods for physical systems.

Education

Purdue University

West Lafayette, Indiana

PhD in Computer Science (Current)

Aug 2024 - Current

- PhD research in AI: coupling 3D Gaussian splatting with differentiable fluid simulation to learn physically functional 3D objects from images
- Daily use of Python, PyTorch, CUDA, and numerical simulation methods for deep learning and physics-based modeling.
- TA for Data Science and Machine Learning course

Colorado School of Mines

Golden, Colorado

MS in Computer Science (4.0/4.0)

Aug 2022 - Dec 2023

- Thesis Topic: *Imputing Missing Soil Properties Using Machine Learning*

Colorado School of Mines

Golden, Colorado

BS in Computer Science

Aug 2019 - Dec 2022

- Data Science Focus Area
- Computational and Applied Mathematics Minor
- 3.9 GPA (4.00 Major GPA)
- Dean's List all semesters

Honors and Awards

2024 **Presidential Excellence PhD Award**, Purdue University

West Lafayette,
Indiana

Research Experience

Colorado School of Mines

Golden, Colorado

MinDS Lab

Nov 2022 - Dec 2023

- Implemented and improved deep learning methods (Generative Adversarial Imputation Networks) to impute missing orebody data
- Assisted with development and testing of novel models for out-of-distribution multi-instance learning problems

Mining Engineering Department

Oct 2022 - Dec 2023

- Developed machine learning models to identify key features relating to mine safety
- Worked with domain experts in the field to identify where previous methods have fallen short

Work Experience

Payne Institute (Earth Observation Group)

Golden, Colorado

Student Researcher/Intern

Oct 2021 - Jan 2023

- Automating the preprocessing of satellite data with Python and IDL.
- Perform data analysis on server log data using Python and SQL.
- Web scraping locations and metadata with Python and Javascript.
- **Technical Skills:** Python, SQL, Linux.
- **Soft Skills:** Time Management, Communication, Report Writing.

nou Systems

Colorado Springs, Colorado

Software Engineering Intern

May 2022 - Aug 2022

- Work on a moderately large size team using agile methodologies to develop a simulation scheduler for the Missile Defense Agency.
- Testing flight metric functions with Python.
- Developing GraphQL schemas with graphene and Python.
- Developing SQL schemas in PostgreSQL.
- Other backend work with Python and Flask.
- **Technical Skills:** Python, SQL, GraphQL
- **Soft Skills:** Agile Development, Time Management, Communication, Teamwork.

Projects

Product Recommendation System Using Deep Learning

Golden, Colorado

Field Session Project with Venvee

Aug 2022 - Dec 2022

- Using PyTorch to create a machine learning model to predict categories a user is likely to purchase.
- The model was created along with an API using AWS. A fully automated data and training pipeline was also implemented.
- The model was able to obtain a significant accuracy with respect to the balance of the dataset.
- **Technical Skills:** Python, Pandas, PyTorch, Jupyter Notebooks, AWS.