Yusen Peng

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Education

The Ohio State University *August 2022 – May 2026*
B.S. in Computer Science and Engineering with Artificial Intelligence Specialization
graduating with Honors Research Distinction

- Undergraduate Research Scholarship 2025: awarded based on Honors Thesis proposal
- AI Coursework: Natural Language Processing, Computer Vision, Machine Learning, Data Mining
- GPA: **4.00**/4.00; Summa Cum Laude expected

Research Interest

My primary research interests lie in **vision-language models**. I always investigate different approaches to designing such models with the emphasis on the following three aspects:

1. **Capability**: design robust, generalizable vision-language models that are data-adaptive and task-versatile
2. **Efficiency**: engineer computational efficient vision-language models with good performance tradeoffs
3. **Interpretability**: develop transparent vision-language models that explain their decision-making process

Ongoing Research

DRIP: Dynamic token Reduction vIsion transformer via Pooling for efficient multimodal learning
Advisor: Dr. Sachin Kumar | May 2025 - Present; Lab summer Presentation; GitHub

- Develop DRIP, an efficient vision transformer powered by dynamic image token pooling techniques
- Pretrain DRIP under Open-CLIP framework and report both zero-shot performance and GFLOPs
- Finetune pretrained DRIP on both ImageNet Classification and LLaVA visual instruction tuning
- investigate different strategies in developing data-adaptive boundary rates for dynamic token pooling

Publications

CascadeFormer: Two-stage Cascading Transformer for Human Action Recognition
Yusen Peng, Alper Yilmaz.
Under review at AAAI 2026 Main Technical Track. Paper + Supplementary Material; GitHub

- Developed CascadeFormer, a two-stage cascading transformer for skeleton-based action recognition
- Achieved competitive results on Penn Action, N-UCLA, and NTU RGB+D 60 without graph structures
- Conducted extensive ablation studies on architecture design and pretraining/finetuning strategies
- Open-sourced all code and model checkpoints to promote reproducibility and community adoption

CE-Bench: A Contrastive Evaluation Benchmark of Interpretability with Sparse Autoencoders
Alex Gulko*, **Yusen Peng***, Sachin Kumar.
Under review at EMNLP 2025 BlackboxNLP Workshop. Paper with Appendix; GitHub

- Co-developed a contrastive, LLM-free interpretability benchmark of sparse autoencoders
- Assisted in designing evaluation metrics that consider both contrastive and independent activations
- Helped with dataset curation and human evaluation of story subjects scraped from the WikiData
- Directed extensive experiment design and detailed analysis with comprehensive ablation studies

Lower-quality public housing corresponds to elevated flood risk and social disadvantage
Woi Sok Oh, Kelsea Best, Meri Davlasheridze, **Yusen Peng**.
Under review at Earth's Future (a transdisciplinary journal). Paper

- Collaborated in analyzing public housing and flooding datasets advised by Dr. Kelsea Best
- Assisted in detailed data analysis with correlation visualization and regression model tuning

Campus Poster Presentations

SIGNAL: A Comprehensive Time Series Analysis Library
The DATUM Lab | Advisor: Dr. John Paparrizos; Poster Scan

- Adapted and integrated sklearn/PyTorch implementation for **15**/57 time series classification algorithms
- Adapted and integrated sklearn/PyTorch implementation for **11**/32 time series clustering algorithms
- Tested **33**/57 classifiers with 20 UCR datasets per classifier and verified their test results
- Tested **15**/32 clustering models with 20 UCR datasets per model and verified their test results
- Refactored **27**/94 time series forecasting neural network models with careful hyperparameter tuning
- Presented the project at the CSE Annual Research Expo 2025 at The Ohio State University

A Comparison of CSV, HDF5, Zarr, and netCDF4 in Performing Common I/O Operations
Advisor: Dr. Suren Byna; Poster Scan; GitHub

- Developed benchmarks to compare file I/O performance of 4 data formats advised by Dr. Suren Byna
- Processed and visualized timing data with CSV files and plots using Python, pandas, NumPy, matplotlib
- Designed 20 large-scale test cases and collaborated in composing a technical report of 13 pages
- Presented the project at the CSE Annual Research Expo 2024 at The Ohio State University

AI/ML Competitions

NASA Airport Throughput Prediction Challenge 2024
The DATUM Lab | October 2024 - December 2024; Leaderboard

- Collaborated on designing and implementing a pipeline to predict the number of flight arrivals
- Led data cleaning, feature extraction (flight + time), and model selection (cross-validation)
- Boosted the accuracy score to 78.7% and ranked **9th** out of 51 teams in the final/private leaderboard

Teaching

Teaching Assistant for CSE 2331: Data Structures and Algorithms *Aug 2024 – Present*

- Help students with complexity analysis, data structures, and graph algorithms in class
- Hold office hours and bi-weekly review sessions to offer additional academic support

Teaching Assistant for CSE 2221: Software Components *Aug 2023 – Dec 2023*

- Helped students with fundamental programming knowledge and data structure practice in Java

Internships

Software Engineer Intern | Next.js *San Dimas, CA (remote)*
Thaddeus Resource Center *May 2025 – Present*

- Develop, test, and maintain well-functioning, responsive, and updated Thaddeus websites

Software Engineer Intern | Microsoft Azure *Boise, ID (remote)*
Y STEM and Chess Inc *Jan 2025 – Apr 2025*

- Collaborated on renewing security certificates and deploying code base using Microsoft Azure

Website Frontend Intern | HTML, CSS, WordPress *Gloucester, MA (remote)*
National STEM Honor Society *May 2024 – Sept 2024*

- Collaborated in developing, improving, testing, and maintaining the National STEM official websites

Mobile Frontend Intern | HTML, CSS, JavaScript, React Native *Tampa, FL (remote)*
Resilience, Inc *Dec 2023 – Aug 2024*

- Collaborated in developing and testing a mobile app called AIMEE with tools to learn emotional intelligence

Extra-curriculars

Competitive Programming Club (CPC) @ The Ohio State University *Feb 2023 – Feb 2025*

- Coordinated with other club officers and helped out with weekly presentations
- Developed, tested, and reviewed coding problems for on-campus programming competitions