

Shun Liu

+1-716-529-8545 | shunliu@buffalo.edu | [homepage](#)

[in](#) LinkedIn | [scholar](#) Scholar | [k](#) Kaggle

Buffalo, New York, United States

OBJECTIVE

I am passionate about advancing computer science with a focus on medical AI, particularly in multimodal learning, vision-language models, and their real-world applications. My research intersects computer vision, natural language processing, and medical imaging, with an emphasis on enhancing model generalization data quality. I am keen on exploring advanced techniques such as contrastive learning, active learning for both 2D vision grounding and low-level vision tasks. Additionally, I am committed to improving the fairness, robustness, and generalization of vision and vision-language models. Pursuing a PhD will allow me to further explore these areas, contribute to innovative research, and collaborate with experts to push the boundaries of technology in medicine.

EDUCATION

- **Shanghai University of Finance and Economics (Project 211)** September 2021 - June 2025
B.E., Computer Science Shanghai, China
 - **Core Courses:** Algorithm Design and Analysis, Machine Learning, Deep Learning, Artificial Intelligence, Discrete Mathematics, Data Structure, Software Engineering, Data Visualization; (Math) Linear Algebra, Probability Theory, Statistics, Advanced Mathematics, Graph Theory, Operations Research

RESEARCH EXPERIENCES



- **A Large-scale Vision-Language Dataset for Endoscopic Surgery Understanding** March 2024 - June 2024
Outlet: [NeurIPS'24, the work is completed when serving as RA at University at Buffalo] [🔗]
Supervisor: Prof. David Doermann, Dr. Xuan Gong
 - Gathered open-sourced videos on YouTube channels of surgery fields and scrawled captions.
 - Implemented thorough dataset statistics analysis with comparison of mainstream close-ended surgical-VQA benchmarks, our dataset has the largest amount of frames/average-question-length accompanied by complex clinical-based open-ended questions in the form of multi-choice questions.
 - Finetuned MLLMs for VQA task with collected data and compare with baselines under classification-based metrics.
 - Contribution: idea drafting and discussion, paper writing, some experiments.
- **DAG-Driven Protein Sequence Representation and Function Prediction** August 2023 - December 2023
Outlet: [Gold Medal (Top 15/1625 teams)] *Competition Announcement* [🔗]
 - Developed directed acyclic graphs (DAG) for Gene Ontology (GO), for representing the biological processes, cellular components and chemical functions of protein molecules, in order to excavate the semantic association (partial attribution, significant influence).
 - Mapped the subset of DAG as a specific protein function, fused ProFun, QuickGO, SPROF proof codes for GO graph reconstruction in order to enhance its expression capability compared to sequence-based alignment methods.
 - Contribution: idea drafting, some experiments.
- **Value System and Potential Group-Dependent Bias in LLMs** August 2023 - December 2023
Outlet: [EMNLP'24, the work is completed when serving as RA at Dartmouth College] [🔗]
Supervisor: Prof. Soroush Vosoughi
 - Developed directed acyclic graphs (DAG) for Gene Ontology (GO), for representing the biological processes, cellular components and chemical functions of protein molecules, in order to excavate the semantic association (partial attribution, significant influence).
 - Mapped the subset of DAG as a specific protein function, fused ProFun, QuickGO, SPROF proof codes for GO graph reconstruction in order to enhance its expression capability compared to sequence-based alignment methods.
 - Contribution: idea drafting, some experiments.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PREPRINT, S=IN SUBMISSION, W=WORKING PAPER

- [C.1] Nguyen Minh Thao Phan*, Cong-Tinh Dao*, Chenwei Wu, Jian-Zhe Wang, **Shun Liu**, Jun-En Ding, David Restrepo, Feng Liu, Fang-Ming Hung, Wei-Chih Peng. **MedFuse: Multimodal EHR Data Fusion with Masked Lab-Test Modeling and Large Language Models**. *CIKM'24 Short Research Paper Track*.
- [S.3] Weicheng Ma, Ethan Gearey, James Quirk, **Shun Liu**, Lili Wang, Soroush Vosoughi. **Exploring Language and Model-Specific Biases in LLM Stereotyping Behaviors**. Submitted to *EMNLP'24*.
- [P.1] **Shun Liu**, Jianan Zhang, Ruocheng Song, Teik Toe Teoh. **ADA-YOLO: Dynamic Fusion of YOLOv8 and Adaptive Heads for Precise Image Detection and Diagnosis**. Preprint available at [arxiv](#).
- [P.2] **Shun Liu**. **Model-Agnostic Interpretation Framework in Machine Learning: A Comparative Study in NBA Statistics**. Preprint available at . Submitted to *Journal of Machine Learning Research (JMLR)*.




INDUSTRY EXPERIENCES

- **Cardinal Operations**  March 2024 - June 2024
Shanghai, China
Research Intern
 - Employed LLMs for tabular single-variable forecasting employed in real-world scenarios (Retail & FMCG, Manufacturing, Energy) within high-dimension heterogeneous tabular statistics.
 - Implemented semi-supervised feature engineering pipeline with arbitrary task query for different task domains.
 - Conducted comparative analysis with ML and NN models, the proposed LLM-based data-driven methods achieves the best WMAPE metric in time-series forecasting tasks among several real-world industrial datasets.
- **Zhejiang Lab**  August 2023 - January 2024
Remote
Research Intern
Supervisor: Dr.Hongsheng Wang & Prof. Shengyu Zhang
 - Contributing to the patent and academic drafting, studied the fundamental knowledge of human joint rotation distribution model(exemplar: Kinetic Tree).
 - Conducted cutting-edge researches on diffusion-guided human mesh recovery and flow-based motion reconstruction within private rehabilitation data sampled from local hospitals(exemplar work: HumaniFlow).

SKILLS

- **Programming Languages:** C/C++, Python, R, Matlab
- **Languages:** English(IELTS: 6.5, In SUFE English Debating Team, Participated SIDO Debating Championship, UM Supernova English Debate Tournament) and Mandarin(Native).
- **Miscellaneous:** Linux, Shell (Bash/Zsh), LaTeX (Overleaf/R/Markdown), Tableau, Git
- **Research Skills:** Critical Thinking, Collaboration, Project Management, Oral Presentation

CHALLENGES AND AWARDS

- **CAFA 5 Protein Function Prediction, Ranked 15/1625(Top 0.9%), Gold Medal(Solo)** 2023
Kaggle 
 - Decompose protein structures using graph representation and Gene Ontology(GO) domain knowledge, then make accurate and robust function prediction.
- **LLM Science Exam, Ranked 50/2664(Top 1.9%), Silver Medal** 2023
Kaggle 
 - Finetune small LLMs using RAG techniques to better answer STEM-related queries.
- **Linking Writing Processes to Writing Quality, Ranked 144/1876(Top 7.6%), Silver Medal** 2023
Kaggle 
 - Model and connect personal typing habits with essay quality assessment.