

# Gaoxiang Luo

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## EDUCATION

### UNIVERSITY OF MINNESOTA

Ph.D. in Computer Science  
2024-x | Minneapolis, MN

### UNIVERSITY OF PENNSYLVANIA

Ph.D in Computer & Information  
Science (leave with a master)  
2022-2024 | Philadelphia, PA

### UNIVERSITY OF MINNESOTA

B.S. in Computer Science  
Minor in Math  
2018-2021 | Minneapolis, MN  
Graduated with High Distinction

## LINKS

Google Scholar: [z.umn.edu/gl-scholar](https://scholar.google.com/citations?user=zumn-edu-gl-scholar)  
Homepage: [gaoxiangluo.github.io](https://gaoxiangluo.github.io)  
LinkedIn: [z.umn.edu/gl-linked-in](https://www.linkedin.com/in/zumn-edu-gl-linked-in)  
GitHub: [z.umn.edu/gl-git](https://github.com/zumn-edu-gl-git)

## RESEARCH INTEREST

Generative AI  
Trustworthy ML  
Robustness  
Inverse Problem  
AI for Healthcare

## HONORS/AWARDS

2021 [Google CSRMP<sup>a</sup> Scholar](#)  
2021 [UROP Scholarship x 2](#)  
2021 [Maximillian Lando  
Scholarship](#)

## SERVICE

**SYMP.** | Organizer  
MMLS'24 (Web Chair)

**CONF.** | Reviewer  
CVPR'24(4), UAI'24(5), MICCAI'24(4)

**CONF.** | Program Committee  
AAAI'25(3)

**JOUR.** | Reviewer  
October 2020 – May 2022

Minnesota Undergraduate Research &  
Academic Journal (MURAJ) Math and  
Computer Science Reviewer

<sup>a</sup>CS Research Mentorship Program

## PUBLICATION

### ACADEMIC PAPER

- [1] Haowen Lai, Gaoxiang Luo, Yifei Liu, Mingmin Zhao. *Enabling Visual Recognition at Radio Frequency*. Accepted to MobiCom 2024. [<https://dl.acm.org/doi/10.1145/3636534.3649369>] [Project] [Code] [Data]
- [2] Le Peng, Gaoxiang Luo, Sicheng Zhou, Jiandong Chen, Ziyue Xu, Rui Zhang, Ju Sun. *An In-Depth Evaluation of Federated Learning on Biomedical Natural Language Processing*. Accepted to npj Digital Medicine. [<https://www.nature.com/articles/s41746-024-01126-4>] [Code]
- [3] Le Peng, Hengyue Liang, Gaoxiang Luo, Taihui Li, Ju Sun<sup>a</sup>. *Rethink Transfer Learning in Medical Image Classification*. Accepted to BMVC 2023 (oral). [<https://arxiv.org/abs/2106.05152>] [Code]
- [4] John Burns, Zachary Zaiman, Jack Vanschaik, Gaoxiang Luo, et al. *Ability of Artificial Intelligence to Identify Self-Reported Race in Chest X-Ray Using Pixel Intensity Counts*. Accepted to Journal of Medical Imaging (JMI). [<https://doi.org/10.1117/1.JMI.10.6.061106>]
- [5] Le Peng, Gaoxiang Luo, Andrew Walker, Ju Sun, Christopher J Tignanelli, et al. *Evaluation of Federated Learning Variations for COVID-19 Diagnosis Using Chest Radiographs from 42 US and European Hospitals*. Accepted to Journal of the American Medical Informatics Association (JAMIA). [<https://doi.org/10.1093/jamia/ocac188>]
- [6] Majid Farhadloo, Carl Molnar, Gaoxiang Luo, Yan Li, Shashi Shekhar, et al. *SAMCNet: Towards a Spatially Explainable AI Approach for Classifying MxIF Oncology Data*. Accepted to ACM SIGKDD 2022. [<https://dl.acm.org/doi/10.1145/3534678.3539168>]

## RESEARCH

**ZSCALER** | Machine Learning Engineering Intern  
May 2024 - August 2024 | San Jose, CA

- Developed a **multi-agent LLM framework** for enterprise data analysis that integrates **RAG-based QA**, **text-to-SQL**, and **text-to-visualization**, enabling highly accurate, efficient and dynamic data exploration; filed a patent (US18829858).
- In **churn analysis**, our framework reduced costly reliance on BI tools, moved past dashboards with finite permutations, and ensured **complete coverage** for smaller accounts lacking dedicated data support.
- Our solution can be extended to other business use cases (e.g., sales, customer success, HR, etc) with minimal effort needed.  
(Host: Dr. James Zhu) (Tech: AutoGen, Snowflake, AWS, DBT)

**XYLO AI** | Advisor

October 2023 - April 2024 | Remote

- Led R&D on **data/label generation** via LLM to train ML regression models for communication quadrant analyses, which was added to **the heart of beta product**. (CTO: Roger Lam) (Tools: Kubernetes, Azure ML, Langchain)
- Collaborated extensively with **cross-functional teams**, including product and engineering to prioritize R&D projects based on **strategic importance**, and incorporate R&D discoveries into feature development.

<sup>a</sup>CV Reference Contact: Prof. Ju Sun [[www.sunju.org](http://www.sunju.org)]

## SKILLS

Python • C/C++ • SQL •  $\text{\LaTeX}$   
PyTorch • NumPy • Scikit-Learn  
Apache Spark • AWS • Azure ML  
Docker • MLflow • Git  
Snowflake • DBT • Streamlit  
Transformer • Diffusion • LLM

## PATENTS

2024 US18/829858 (Zscaler)  
2024 US63/626860 (UPenn)  
2022 [US18/101620](#) (Cisco)  
2022 [US17/828582](#) (Cisco)

## COURSEWORK

### UMN

Data Structures and Algs (CSCI 4041)  
Operation System (CSCI 4061)  
Software Engineering (CSCI 5801)

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Applied Linear Algebra (MATH 4242)  
Artificial Intelligence (CSCI 4511W)  
Data Mining (CSCI 5523)  
Machine Learning (CSCI 5525)  
Spatial Data Science (CSCI 5715)  
Machine Learning Theory (CSCI 8980)  
Deep Learning (CSCI 8980)

### UPENN

Software System (CIS 5050)  
Networked System (CIS 5530)  
Big Data Analytics (CIS 5450)

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Machine Learning (CIS 5200)  
Analysis of Algorithms (CIS 5020)  
Theory of Computation (CIS 5110)

## TEACHING & TUTORING

### FIFE-PENN CS ACADEMY

K-8 Coding Instructor

Sep. 2022 - Dec. 2022 | Philadelphia, PA

- Teaching 2-5th grade students coding in Scratch in the after-school program.

### UNIVERSITY OF MINNESOTA

Undergrad Teaching Assistant<sup>a</sup>

Sep. 2020 - Dec. 2021 | Minneapolis, MN

Fall 2020 CSCI 2011 Discrete Math  
Spring 2021 CSCI 2011 Discrete Math  
Fall 2021 CSCI 2033 Comp. Lin. Alg.

Library Peer Tutor

Sep. 2020 - Dec. 2020 | Minneapolis, MN

- Tutor single-and-multivariable calculus, linear algebra, intro physics, intro stats, and some programming in Python and C.

<sup>a</sup>This is a measure by Spoken English Test for Teaching Assistants [SETTA].

### UNIVERSITY OF MINNESOTA | Research Professional I

February 2024 - May 2024 | Remote

- Contributed to **large language model (LLM)** experiments in demonstrating language models (e.g., GPT-2) trained with federated learning significantly outperform LLMs that have **1,000x** more parameters (e.g., GPT-4, PaLM2 Unicorn, Claude3 Opus) with few-shot prompting in biomedical information extraction tasks. (See publication [2]) (Skills: LLMOps)

### UNIVERSITY OF PENNSYLVANIA | CIS PhD Research Fellow

September 2022 - August 2023 | Philadelphia, PA

- Achieved **LiDAR-comparable** 3D range imaging (median absolute error=3.4cm) using radio-frequency (RF) signals, **for the first time**, enabling RF-based visual recognition tasks such as object detection and semantic segmentation. (Tools: detectron2, MMsegmentation) (Advisor: Prof. Mingmin Zhao)
  - Designed a novel **2D approach to tackle 3D learning**, significantly reducing memory footprint and FLOPs, accelerating inference speed by 5.4x.
  - Directed the creation of the **first public dataset** featuring 11,033 paired RF/LiDAR data points across 12 buildings with indoor semantic and detection labels, thereby facilitating future research in RF imaging. (See publication [1])

### CISCO RESEARCH | AI/ML Research Intern

Feb 2022 – July 2022 | Remote

- Contributed to a novel **scalable federated learning (FL) system** by implementing abstraction topologies to simplify FL deployment; filed 2 patents (US17828582 and US18101620) enhancing model convergence and communication efficiency. The system is now open-sourced at **Project Flame**. (Host: Dr. Myungjin Lee) [Slide] (Stacks: K8s, Docker, MLflow, Git)

### CISCO RESEARCH | Research Fellow

May 2021 – May 2022 | Remote

- Facilitated cross-functional collaboration between tech and medical teams to develop an automated **multi-modal** rib fracture detection system on chest X-rays for real-time deployment. This work is featured on two undergraduate research conferences [NCRC 2022](#) and [NCUR 2022](#). (Skills: data analysis, project management, communication) (Advisor: Prof. Christopher Tignanelli & Prof. Ju Sun)

### UNIVERSITY OF MINNESOTA | Undergrad Research Assistant

August 2020 – May 2022 | Minneapolis, MN

- Proposed a novel **truncated transfer learning (TL)** method in medical imaging classification under data-poor regimes, that consistently leads to superior performance compared to other TL strategies. Our method is **versatile** for various deep neural networks and **adaptable** to other tasks (e.g., segmentation). (See publication [3]) (Tools: PyTorch, NumPy) (Advisor: Prof. Ju Sun)
- Improved AUPRC of chest x-ray COVID-19 classification by 9% compared to local training, by implementing real-data federated learning with several partner institutes. The case study is featured in the white paper – **Federated Learning for Healthcare Using NVIDIA Clara** (See publication [5]) (Tools: NVFlare, MONAI) (Advisor: Prof. Ju Sun)
- Outperformed current state-of-the-art point set classifiers in terms of accuracy and F1-score on our tumor cell datasets by designing a novel **Spatial-interaction Aware Multi-Category deep neural Network (SAMCNet)**, contributing **location representation and point pair attention layers** for multi-categorical point set classification. See Publication [6]. (Advisor: Prof. Shashi Shekhar)

## SOFTWARE

2024 [MetaMate](#)

## MEDIA

- [1] [\*Interning with Cisco Research\*](#). In Cisco Emerging Tech & Incubation (ET&I) Blog. Aug. 12, 2022.
- [2] [\*First gen student chosen for Google mentorship program\*](#). In UMN CS&E Department News. Nov. 19, 2021.
- [3] [\*CSpotlight: Experiencing research as an undergrad\*](#). In UMN Department of Computer Science & Engineering spotlight program. May 12, 2021.
- [4] [\*Application of Artificial Intelligence to Help Fight COVID-19\*](#) In Minnesota Undergraduate Research & Academic Journal (MURAJ), Vol.4 No.3, 2021.