

# Yuxuan Liang

## Curriculum Vitae

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<https://liangyuxuan1.github.io/>

## RESEARCH INTEREST

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### Multimodal Medical Image Computing

- CT-based Cardiovascular Risk Prediction (feature extraction; ontology-guided diagnosis; model interpretability)
- Photon-counting CT / Optical Tomography for anatomical–functional–molecular integration
- Volumetric Image Analysis (3D reconstruction; segmentation; multimodal fusion)

### Computational Regulatory Genomics

- Functional motif detection and regulatory effect estimation
- Deep learning for sequence-to-function prediction

### AI Reasoning & Machine Learning Methodology

- Multimodal reasoning with large language models
- Representation learning for heterogeneous biomedical data
- Deep learning, metric learning, and model generalizability

## EDUCATION

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B.S. in Physics, School of Physical Sciences, University of Science and Technology of China (USTC)	Sep 2018 – July 2022
Ph. D. Candidate, Department of Biomedical Engineering, Rensselaer Polytechnic Institute (RPI), USA	Aug 2022 – present

## WORK EXPERIENCE

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Research Associate, Department of Biomedical Engineering, RPI	Aug 2022 – present
Teaching Assistant, Modeling of Biomedical Systems, RPI	May 2025 – Aug 2025
Teaching Assistant, Programming for Biomedical Engineering, RPI	May 2025 – Aug 2025
Teaching Assistant, Engineering Graphics and CAD, RPI	Aug 2025 – Dec 2025

## PUBLICATIONS

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### JOURNAL

1. **Yuxuan Liang**, Sebastian A. Dziadowicz, Lei Wang, Gangqing Hu, Pingkun Yan, and Ge Wang, Functional Motif Detection via In Silico Ablation Using AlphaGenome, *Briefings in Bioinformatics*, under review. [[Github](#)]
2. Yongyi Shi, Chuang Niu, Wenjun Xia, **Yuxuan Liang**, Lin Fu, Bruno De Man, ZS4D: Zero-Shot Self-Similarity-Steered Denoiser for Volumetric Photon-Counting CT. *IEEE Transactions on Radiation and Plasma Medical Sciences*, 2025. [[Link](#)]
3. **Yuxuan Liang**, Chuang Niu, Pingkun Yan and Ge Wang, Flipover outperforms dropout in deep learning, *Visual Computing for Industry, Biomedicine, and Art*, 7, 4, 2024. [[Link](#)]
4. **Yuxuan Liang**, Hanqing Chao, Jiabin Zhang, Ge Wang, Pingkun Yan, Unbiasing fairness evaluation of radiology AI model, *Meta-Radiology*, 2, 3, 2024. [[Link](#)]

5. **Yuxuan Liang**, Chuang Niu, Chen Wei, Shenghan Ren, Wenxiang Cong and Ge Wang, Phase function estimation from a diffuse optical image via deep learning, *Physics in Medicine and Biology*, 67, 7, 2022. [[Link](#)]

## CONFERENCE

1. **Yuxuan Liang**, Mengzhou Li, Shuo Han, Hengyong Yu, Ge Wang, Compton camera for 3D SPECT imaging, *Proc. SPIE 13152, Developments in X-Ray Tomography XV, 1315224*, 24 October 2024. [[Link](#)]
2. Wenxuan Xue, **Yuxuan Liang**, Mengzhou Li, Shan Gao, Xavier R. Intes, Ge Wang, A 3D-printed table for hybrid x-ray CT and optical imaging of a live mouse, *Proc. SPIE 13152, Developments in X-Ray Tomography XV, 131521L*, 23 October 2024. [[Link](#)]

## RECENT PROJECTS

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- **Photon-counting X-ray and Optical Tomography for Preclinical Cancer Research** Sep 2024 – Dec 2024

The goal of this project is to develop a novel integrated imaging platform called the HOTGEM system (High-dimensional Optical Tomography Guided- by Energy-resolved Micro-computed tomography). This multimodal imaging platform has the most potential to provide anatomical, functional and molecular information of diseased tissues in pre-clinical models. The HOTGEM system will be used to image tumors by utilizing X-ray and fluorescently labeled drugs injected into mice that have human breast cancer tumors.

- **Functional Motif Detection via In Silico Ablation Using AlphaGenome** May 2025 – Dec 2025

We present a sequence-only virtual motif-perturbation framework using AlphaGenome to infer functional transcription factor motifs. In silico deletion of candidate C/EBP $\beta$  sites reveals regulatory effects validated against H3K27ac CUT&RUN data from CEBPB-knockout cells. The approach approximates true perturbation outcomes and enables scalable functional motif analysis directly from DNA sequence.

- **Multi-modal Reasoning Model for Cardiovascular Disease (CVD) Risk Prediction** May 2025 – Present

We aim to develop a cohort-level ontology induction framework for CVD risk prediction using the COPDGene and NLST cohorts. The project integrates CT-derived features, high-dimensional clinical variables, and large language models to automatically generate and refine disease-relevant diagnostic concepts through iterative hypothesis testing over the entire cohort. The goal is to build a phase-aware, multimodal representation that improves model interpretability, stability, and generalizability beyond conventional deep learning pipelines. A lightweight numerical risk model will be guided by the induced ontology to enable transparent and clinically grounded CVD risk estimation.

## REVIEWER FOR JOURNALS AND CONFERENCES

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1. Medical Physics
2. Medical Image Computing and Computer Assisted Intervention Society (MICCAI) Workshop 2025
3. International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 2025

## MENTORING

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- Undergraduate Student Mentor: Wenxuan Xue (2023-2024), Yuran Li (2023)

## REFERENCES

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Prof. **Ge Wang** (Ph. D. advisor)  
Fellow of IEEE, SPIE, OSA, AIMBE, AAPM, AAAS, and NAI

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