Yuyan Ge

University of Pennsylvania

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Education

University of Pennsylvania, *Doctoral of Engineering* **Aug. 2023 – May 2029 (Expected)**
Computer and Information Science GPA: 3.94/4.00
Advisor: René Vidal, Professor

Xi'an Jiaotong University, *Master of Engineering* **Sep. 2020 – June 2023**
Control Science and Engineering GPA: 3.66/4.00
Advisor: Shaoyi Du, Professor *Top 10%*

Xi'an Jiaotong University, *Bachelor of Engineering* **Aug. 2016 – June 2020**
Automation GPA: 3.70/4.30
Top 8%

Research Interests

- Machine Learning
- AI in Healthcare
- Interpretable AI
- Multi-modal Foundation Model

Research Experience

Multimodal Echo Foundation Model **July 2025 – Present**
University of Pennsylvania – Advisors: René Vidal, Professor; Julio Chirinos, Professor

- Interpret echocardiography using machine learning
- Design a multi-modal foundation model for echocardiography

Interpretable-by-design Text Modeling **Aug. 2023 – Mar. 2025**
University of Pennsylvania – Advisor: René Vidal, Professor

- Designed a framework to conduct multi-label classification of radiology reports
- Developed an interpretable-by-design algorithm based on maximum mutual information

Vision-language Models for zero-shot multi-label classification of Chest X-rays **July 2024 – Aug. 2024**
University of Pennsylvania – Advisor: René Vidal, Professor

- Designed a vision-language model to classify Chest X-ray images
- Got 1st place on MICCAI 2024 challenge CXR-LT Task3

Multi-task and Focal Region Based Deep Learning Network for Brain Parcellation **Aug. 2021 – June 2023**
ShanghaiTech IDEA Lab – Advisor: Dinggang Shen, Professor

- Designed a learning-based fine brain parcellation network for hundreds of brain ROIs
- Proposed a multi-task architecture for multi-scale brain ROIs to extract better features of voxels; Proposed a focal region based loss to focus on the parcellation of hard ROIs
- Conducted experiments on 257 T1w MRI; Improved DSC by 4.07% and 6.38% (in average) on 101 ROIs, compared to V-Net and U-Net, respectively; Improved DSC by 2.79% on left hippocampus, compared to FastSurfer

Age Estimation on Panoramic Radiographs **Nov. 2020 – July 2021**
Xi'an Jiaotong University – Advisor: Shaoyi Du, Professor

- Predicting ages from panoramic radiographs
- Collected and analysed images from 10257 subjects from 5 to 24 years old
- Investigated accuracy of age estimation by human, human-machine, and machine, respectively

Non-rigid Registration of X-ray Images for Evaluation of Orthodontic Treatment **Dec. 2019 – Sep. 2020**
Xi'an Jiaotong University – Advisor: Shaoyi Du, Professor

- Designed a framework to evaluate orthodontic treatment using feature registration
- Developed a registration algorithm based on maximum correlation criteria with bounded isotropic scale to address the influence of noise and outliers
- Registered images before and after orthodontic treatment, and achieved accurate movement estimation for four main teeth

Publications

Papers:

[1] **Yuyan Ge**, Kaleab Kinfu, Ben, Julio Chirinos*, René Vidal*, "EchoRG: Large-Scale Multi-Task Echocardiographic Prediction with Structured-Grounded Report Generation," *Submitted to MICCAI*, 2026.

[2] **Yuyan Ge**, Hamed, Mateo, Ben, René Vidal*, Julio Chirinos*, "Assessment of Cardiac Age from Echocardiography Using Deep Learning," *NAA Abstract*, 2026. (Oral)

[3] **Yuyan Ge***, Kwan Ho Ryan Chan, Pablo Messina, René Vidal*, "IP-CRR: Information Pursuit for Interpretable Classification of Chest Radiology Reports," *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2025. [Paper][arXiv]

[4] **Yuyan Ge**, Zhenyu Tang, Lei Ma, Caiwen Jiang, Feng Shi, Shaoyi Du*, Dinggang Shen*, "Multi-scale and Focal Region Based Deep Learning Network for Fine Brain Parcellation," *MICCAI Workshop on Machine Learning in Medical Imaging (MLMI)*, pp. 466-475, 2022. (Oral) [Paper]

[5] **Yuyan Ge**, Shaoyi Du*, Wenting Cui, Runzhao Yao, Jiamin Zhao, Mengqi Han, Yucheng Guo, "Evaluation of Orthodontic Treatment Based on the Registration of X-ray Image Features," in *Proc. Chinese Automation Congress (CAC)*, pp. 5516-5520, 2020.

[6] Oscar Loch, Felipe Flores, Alonso Tamayo, Pablo Messina, Diego Campanini, **Yuyan Ge**, René Vidal, Joaquín Hevia, Cecilia Besa, Denis Parra*, "PUC-CXR: A Multimodal Grounded Chest X-ray Dataset from Latin America," *Submitted to Radiology: AI*, 2026.

[7] Jiameng Liu, Feihong Liu, Kaicong Sun, Zhiming Cui, Tianyang Sun, Zehong Cao, Jiawei Huang, Shuwei Bai, Yulin Wang, Yulong Dou, Kaicheng Zhang, Caiwen Jiang, **Yuyan Ge**, Han Zhang, Feng Shi*, Dinggang Shen*, "BrainParc: unified lifespan brain parcellation from structural magnetic resonance images," *Nature Computational Science*, 2026. [Paper]

[8] Iraj Shroff, **Yuyan Ge***, René Vidal*, "SonoYOLO + MedSAM2: A Pipeline for Automatic Detection and Segmentation of Regions of Interest in Cardiac Ultrasound Videos," *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2026. (Oral)

[9] Kwan Ho Ryan Chan, **Yuyan Ge**, Edgar Dobriban, Hamed Hassani, René Vidal*, "Conformal Information Pursuit for Interactively Guiding Large Language Models," *NeurIPS*, 2025. [Paper][Project][Code][arXiv]

[10] Mingquan Lin, Gregory Holste, Song Wang, Yiliang Zhou, Yishu Wei, Imon Banerjee, Pengyi Chen, Tianjie Dai, Yuexi Du, Nicha C. Dvornek, **Yuyan Ge**, Zuwei Guo, Shouhei Hanaoka, Dongkyun Kim, Pablo Messina, Yang Lu, Denis Parra, Donghyun Son, Álvaro Soto, Aisha Urooj, René Vidal, Yosuke Yamagishi, Pingkun Yan, Zefan Yang, Ruichi Zhang, Yang Zhou, Leo Anthony Celi, Ronald M. Summers, Zhiyong Lu, Hao Chen, Adam Flanders, George Shih, Zhangyang Wang*, Yifan Peng*, "CXR-LT 2024: A MICCAI challenge on long-tailed, multi-label, and zero-shot disease classification from chest X-ray," *Medical Image Analysis*, 2025. [Paper][Dataset][arXiv]

[11] Jiaqi Hu, Zhiming Cui, Xiao Zhang, Jiadong Zhang, **Yuyan Ge**, Honghe Zhang, Yan Lu*, Dinggang Shen*, "Uncertainty-aware Refinement Framework for Ovarian Tumor Segmentation in CECT Volume," *Medical Physics*, 2024. [Paper]

[12] Jiameng Liu, Feihong Liu, Kaicong Sun, Mianxin Liu, Yuhang Sun, **Yuyan Ge**, Dinggang Shen*, "Adult-Like Phase and Multi-scale Assistance for Isointense Infant Brain Tissue Segmentation," *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2023.

[13] Dong Zhang, Jing Yang, Shaoyi Du*, Hongcheng Han, **Yuyan Ge**, Longfei Zhu, Ce Li, Meifeng Xu*, Nanning Zheng, "Coarse-to-Fine Feature Representation Based on Deformable Partition Attention for Melanoma Identification," Pattern Recognition, vol. 136, pp. 109247, 2023.

[14] Mengqi Han, Shaoyi Du*, **Yuyan Ge**, Dong Zhang, Yuting Chi, Hong Long, Jing Yang, Yang Yang, Jingmin Xin, Teng Chen, Nanning Zheng, Yucheng Guo*, "With or Without Human Interference for Precise Age Estimation Based on Machine Learning?" *International Journal of Legal Medicine (IJLM)*, vol. 136, pp. 821-831, 2022.

[15] Teng Wan, Shaoyi Du*, Wenting Cui, Runzhao Yao, **Yuyan Ge**, Yue Gao, Nanning Zheng, "RGB-D Point Cloud Registration Based on Salient Object Detection," *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*, vol. 33, no. 8, pp. 3547-3559, 2021.

[16] Nan Jia, Shan Huang, Jiangfeng Hong, Yi Wang, **Yuyan Ge**, Ye Lv, Xiaoran Yin*, "Investigation of Empathy Ability of Clinical Medical Students: Take Xi'an Jiaotong University as an Example," *Chinese Medical Ethics (CME)*, 2020.

Patents:

[1] **Yuyan Ge**, Dinggang Shen, Shaoyi Du. ShanghaiTech University. A Method for Multi-scale and Focal Region-based Fine Brain Parcellation: China, 202210923230.X. Applied: 2022.08.02.
[2] Yucheng Guo, Jiamin Zhao, Shaoyi Du, **Yuyan Ge**, Yuxia Hou, Rui Zou, Lingling Ji. Xi'an Jiaotong University. A Method and Equipment for the Registration of Lateral Skull Images Before and After Orthodontic Treatment: China, 202110222797.X. Applied: 2021.02.26, Granted: 2022.04.26.
[3] Yucheng Guo, Mengqi Han, Shaoyi Du, **Yuyan Ge**, Lingling Ji, Rui Zou. Xi'an Jiaotong University. A System and Method for Age Estimation Based on Panoramic Radiographs and Deep Learning: China, 202110729957.X. Applied: 2021.06.29.

Honors and Awards

- First Place on MICCAI Challenge CXR-LT Task3, *MICCAI Society*, 2024
- Penn Engineering Dean's Fellowship, *University of Pennsylvania*, 2023
- Special Grade Scholarship (top 10%), *Xi'an Jiaotong University*, 2022, 2021
- Outstanding Graduate Student (top 10%), *Xi'an Jiaotong University*, 2021
- Outstanding Graduate Cadre (top 8%), *Xi'an Jiaotong University*, 2020
- National Scholarship (top 1%), *Ministry of Education of the People's Republic of China*, 2019

Technical Skills

Programming: Python, Matlab, C, Bash
Developer Tools: VS Code, PyCharm, Matlab
Technologies/Frameworks: Linux, GitHub, PyTorch, HuggingFace
English Proficiency: TOEFL iBT 99 – Reading 29, Listening 26, Speaking 20, Writing 24

Relevant Coursework

- Linear Algebra
- Probability Statistics
- Digital Image Processing
- Nonlinear Optimization
- Computer Vision
- Digital Signal Processing
- Deep Learning
- Signals and Systems

Volunteer

Reviewer:
- Journal: Medical Image Analysis (MedIA)
- Conference: MICCAI 2025; MICCAI workshop MLMI 2023, 2024
Teacher: Principles of Color, 2018
Conference Volunteer: PennAI Symposium 2025; CoLLAs 2025
Seminar Volunteer: PennAI Seminar 2026

Talks

- 2025.06.26: IP-CRR: Information Pursuit for Interpretable Classification of Chest Radiology Reports. Vidal Lab, UPenn.
- 2024.11.06: Large Language Models. Professional Communication Club, UPenn.
- 2024.10.10: Vision-language Models for Zero-shot Multi-label Fine-grained Classification of Chest X-ray Images. MICCAI 2024, Morocco.

Teach Assistant

- Deep Generative Models, UPenn, 2025 Fall

Mentees

- Iraj Shroff, 2025

Last updated: March 23, 2026