Li Chen

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Summary

- Medical imaging and AI researcher with **13+** years of experience developing **machine learning** algorithms for **medical image** and **temporal video** analysis. Proven track record of driving the development lifecycle of **commercial pulmonary ultrasound AI applications** from algorithm design through product milestones and clinical validation. Expertise in **ultrasound video analysis**, spatiotemporal modeling, weak/self-supervised learning, graph neural networks and medical research.

Experience

Ultrasound AI group Oct. 2021 ∼ Present

Research Scientist. Managed by Dr. Alvin Chen. Philips Research / Philips Ultrasound

- Lung ultrasound AI for Philips Lumify (point of care imaging device)
  - Spearheaded the **full-cycle** medical imaging software development of commercial ultrasound AI features (consolidation and pleural effusion detection) on the Philips Lumify device, including **concept selection**, **function-proven milestones**, **clinical validation** toward **commercial deployment**.
  - Built a **teacher-student mutual-learning framework** that learns from frame-labeled, video-labeled, and/or unlabeled data, handling differences in annotation styles and reducing estimated labeling effort for 15,000 videos from 15,000 hours to about 250 hours. (*IPMI 2023*)
  - Contrastive self-supervised pretraining on 27,063 unlabeled videos from 528 patients raised test AUC from 0.65 to 0.88 with only **5% of labeled data**. (*IEEE ISBI 2023*)
  - In a multi-reader, multi-case (**MRMC**) study, AI-assisted reading met non-inferiority and superiority endpoints, improved reader-averaged AUC by 0.101/0.046 for consolidation/effusion, and reduced reading time by 16.6% (12.5 seconds).
- Graph neural networks (GNN) for ultrasound reasoning at multiple levels
  - **Detection**: A GNN-based pseudo-label selection method for **weakly semi-supervised detection**, achieving mAP@0.5 of 0.586/0.439 on breast/lung datasets with limited box labels. (*IEEE TMI*, conditionally accepted).
  - **Video**: **GADA** aggregates frame-level detections and their spatiotemporal relationships for video classification, achieving AUCs of 0.943/0.960 for consolidation/effusion on a six-site dataset of 9,900+ lung ultrasound videos. (*ICCV 2025 Workshop*).
  - **Patient**: **ZAGNet** models relationships among findings across lung zones, improving patient-level AUC from 0.677/0.815 (pooling) to 0.803/0.893 for consolidation and effusion. (*IEEE IUS 2026*).
  - Filed a series of **invention disclosures** and **patents** (12 with major contributions), strengthening Philips' intellectual property portfolio.

Vascular Imaging Lab (Radiology)& Information Processing Lab (ECE) Sep. 2016 ∼ June 2021

Research Assistant. Advised by Prof. Chun Yuan (Radiology) and Prof. Jenq-Neng Hwang (ECE) University of Washington

- Quantitative intracranial artery modeling and vascular feature extraction.
  - Developed **iCafe** (60,000+ lines of C++/Qt code) to trace and label intracranial arteries and extract quantitative vascular features, leading to **five** first-author journal papers (1 **Editor's pick**, 2, 3, 4, 5) and **seven** conference publications spanning technical development, validation and medical applications.
  - iCafe is currently used by **34+** sites in **9+** countries for various medical topics (aging, dementia, etc.).
- Automated vessel wall segmentation and quantification using **machine learning** techniques.
  - Proposed a novel vessel wall segmentation algorithm in a **polar coordinate** system using deep learning.
  - **Fully automated** processing workflow validated on **3.5 million** popliteal artery images, equivalent to **70** years of expert manual review.
  - **Winner** of the American Heart Association/Amazon Web Services Prize Competition.

Medical Imaging Lab Oct. 2013 ∼ June 2016
Undergraduate Researcher, Project lead. Advised by Dr. Huiliang Shang and Dr. Yi Guo Fudan University

- Developed algorithms for tongue image analysis and prescription data-mining. (Paper 1, 2, 3, 4)
- Capstone: Represented vasculatures as circuits for image registration (Best Fudan undergraduate thesis).

EDUCATION

University of Washington, Seattle, WA Sep. 2016 ∼ Aug. 2021
Ph.D. in Electrical Engineering, GPA: 3.89/4

Fudan University, Shanghai, China Sep. 2012 ∼ June 2016
B.S. in Electronic Engineering, GPA: 3.6/4, Ranking: 9%

SELECTED PUBLICATIONS

[1] **Li Chen**, Jiahong Ouyang, et al. Graph-Based Pseudo-Label Selection for Weakly Semi-Supervised Object Detection in Ultrasound Videos. ***IEEE Transactions on Medical Imaging***, (conditionally accepted).

[2] **Li Chen**, Shubham Patil, et al. ZAGNet: Zone-Aware Graph Aggregation Network for Patient-Level Lung Ultrasound Diagnosis. *The 2026 IEEE International Ultrasonics Symposium (**IUS**)*, 2026. (**paper**)

[3] **Li Chen**, Naveen Balaraju, et al. GADA: Graph Attention-based Detection Aggregation for Ultrasound Video Classification. ***ICCV Workshop** on Computer Vision for Automated Medical Diagnosis*, 2025. (**paper**)

[4] **Li Chen**, Jonathan Rubin, et al. Contrastive self-supervised learning for spatio-temporal analysis of lung ultrasound videos. *IEEE International Symposium on Biomedical Imaging (**ISBI**)*, 2023. (**paper**)

[5] **Li Chen**, Wenjin Liu, et al. Deep Open Snake Tracker for Vessel Tracing. *The 24th International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**)*, 2021. (early accepted **paper**)

[6] **Li Chen**, Thomas Hatsukami, et al. Automated Intracranial Artery Labeling using a Graph Neural Network and Hierarchical Refinement. *The 23rd International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**)*, 2020. (**paper**) (**code**)

[7] **Li Chen**, Mahmud Mossa-Basha, et al. Development of a quantitative intracranial vascular features extraction tool on 3DMRA using semiautomated open-curve active contour vessel tracing. ***Magnetic Resonance in Medicine***, 79(6):3229-3238, 2018. (124+ citations) (**paper**) (**web**)

For a complete list of publications, please refer to my **Curriculum Vitae** (clatfd.cn/cv#pub)

TECHNICAL SKILLS

Programming: Python, C/C++, MATLAB
Machine learning: PyTorch, TensorFlow, Keras, self-supervised learning, weak/semi-supervised learning
Computer Vision & Medical Imaging: Object detection, segmentation, tracing, OpenCV, ITK, VTK
Advanced Modeling: Graph neural networks, spatiotemporal modeling, multimodal clinical AI
Tools: Docker, Git, Linux

OTHERS

- 10+ years as a reviewer for leading conferences (MICCAI) and journals (IEEE TMI) in medical imaging and AI domain.
- Serve as the chair for the Deep Learning section in Philips' intellectual property review group.
- Organizer of the Carotid Vessel Wall Segmentation Challenge (MICCAI/SMRA 2021)
- 9 Free Apps in Windows App Store: Downloaded over 63,000 times
- Link to all publications and projects in Curriculum Vitae: **clatfd.cn/cv**