Fengbei Liu

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Education

Cornell Tech, Cornell University — *New York City, NY, US*
Postdoctoral Researcher; — *Feb 2024 – Present*
Supervisor: Prof. Mert R. Sabuncu

Australian Institute for Machine Learning (AIML) — *Adelaide, Australia*
Ph.D in Computer Vision and Medical Imaging; — *Apr 2020 – Oct 2023*
Supervisor: Prof. Gustavo Carneiro, Prof. Mark Jenkinson

University of Adelaide — Adelaide, Australia
Honors in Computer Science; (First Class) — *Mar 2019 – Mar 2020*

University of Adelaide — Adelaide, Australia
Bachelor in Computer Science; — *Jul 2015 – Jul 2018*

Research Interests

Keywords: Computer Vision, Medical Image Analysis, Weakly-supervised Learning

My research interest is in computer vision and medical image anlaysis. I focus on developing weakly-supervised deep learning solutions and its application in medical imaging, including noisy label learning, semi-supervised learning, partial-label learning and active learning.

Publications

First-author Publications

Bridging Generative and Discriminative Noisy-Label Learning via Direction-Agnostic EM Formulation
Fengbei Liu, *Chong Wang, Yuanhong Chen, Yuyuan Liu, Gustavo Carneiro*
IEEE TPAMI 2026

RNED: Rotary Number Encoding and Decoding for Quantitative Medical VLM Analysis
Fengbei Liu, *Sunwoo Kwak, Nusrat Binta Nizam, Ilan Richter, Ashley Beecy, Jayant K Raikhelkar, Deborah Estrin, Mert R. Sabuncu*
CVPR 2026

HyperCT: Low-Rank Hypernet for Unified Chest CT Analysis
Fengbei Liu, *Sunwoo Kwak, Hao Phung, Nusrat Binta Nizam, Ilan Richter, Nir Uriel, Hadar Averbuch-Elor, Deborah Estrin, Mert R. Sabuncu*
MIDL 2026

BoMD: Bag of Multi-label Local Descriptors for Noisy Chest X-ray Classification
Yuanhong Chen, **Fengbei Liu***, Hu Wang, Chong Wang, Yuyuan Liu, Yu Tian, Gustavo Carneiro*
ICCV 2023

Self-supervised Multi-class Pre-training for Unsupervised Anomaly Detection and Segmentation in Medical Images
Yu Tian, **Fengbei Liu***, Guansong Pang, Yuanhong Chen, Yuyuan Liu, Johan W. Verjans, Rajvinder Singh, Gustavo Carneiro*
Medical Image Analysis 2023

NVUM: Non-volatile Unbiased Memory for Robust Medical Image Classification
Fengbei Liu, *Yuanhong Chen, Yu Tian, Yuyuan Liu, Chong Wang, Vasileios Belagiannis, Gustavo Carneiro*
MICCA 2022, Early Accept, featured in ComputerVisionNews

ACPL: Anti-curriculum Psueod-labelling for Semi-supervised Medical Image Classification
Fengbei Liu, *Yu Tian*, Yuanhong Chen, Yuyuan Liu, Vasileios Belagiannis, Gustavo Carneiro*
CVPR 2022

Self-supervised Mean-teacher for Semi-supervised Chest X-ray Classification
Fengbei Liu, *Yu Tian, Filipe R. Cordeiro, Vasileios Belagiannis, Ian Reid, Gustavo Carneiro*
MICCAI-MLMI 2021

Self-supervised Depth estimation to Regularise Semantic Segmentation in Knee Arthroscopy
Fengbei Liu, *Yaqub Jonmohamadi, Gabriel Maicas, Ajay K Pandey, Gustavo Carneiro*
MICCAI 2020

Co-author Publications

BackSplit: The Importance of Sub-dividing the Background in Biomedical Lesion Segmentation
Rachit Saluja, Asli Cihangir, Ruining Deng, Johannes C. Paetzold, ***Fengbei Liu****, Mert R. Sabuncu*
CVPR 2026

From Failure to Feedback: Group Revision Unlocks Hard Cases in Object-Level Grounding
Yuyuan Liu, Yijing Ji, Anjie Le, Jiayuan Zhu, Jiazhen Pan, Can Peng, Jiajun Deng, ***Fengbei Liu****, Junde Wu*
CVPR 2026

Beyond Machine Interpretation: Learning from Expert Over-Reads Improves ECG Diagnosis
Sunwoo Kwak, ***Fengbei Liu****, Nusrat Binta Nizam, Ilan Richter, Nir Uriel, Peter M. Okin, Mert R. Sabuncu*
MIDL 2026

X-Cardia: Phenotype-Guided Cross-Modal Alignment for Opportunistic Cardiac Screening on Routine Chest CT
Nusrat Binta Nizam, ***Fengbei Liu****, Sunwoo Kwak, Ilan Richter, Jayant K Raikhelkar, Ashley Beecy, Nir Uriel, Deborah Estrin, Mert R. Sabuncu*
MIDL 2026, Oral

Progressive Mining and Dynamic Distillation of Hierarchical Prototypes for Disease Classification and Localisation
Chong Wang, ***Fengbei Liu****, Yuanhong Chen, Gustavo Carneiro*
IEEE Journal of Biomedical and Health Informatics 2025

Cross- and Intra-image Prototypical Learning for Multi-label Disease Diagnosis and Interpretation
Chong Wang, ***Fengbei Liu****, Yuanhong Chen, Helen Frazer, Gustavo Carneiro*
IEEE Transactions on Medical Imaging 2025

Mixture of Gaussian-distributed Prototypes with Generative Modelling for Interpretable and Trustworthy Image Recognition
Chong Wang, Yuanhong Chen, ***Fengbei Liu****, Yuyuan Liu, Davis J McCarthy, Helen Frazer, Gustavo Carneiro*
IEEE Transactions on Pattern Analysis and Machine Intelligence 2025

Knockout: A Simple Way to Handle Missing Inputs
Minh Nguyen, Batuhan K. Karaman, Heejong Kim, Alan Q. Wang, ***Fengbei Liu****, Mert R. Sabuncu*
Transactions on Machine Learning Research 2025

Translation Consistent Semi-supervised Segmentation for 3D Medical Images
Yuyuan Liu, Yu Tian, Chong Wang, Yuanhong Chen, ***Fengbei Liu****, Vasileios Belagiannis, Gustavo Carneiro*
IEEE Transactions on Medical Imaging 2024

BRAIxDet: Learning to Detect Malignant Breast Lesion with Incomplete Annotations
Yuanhong Chen, Yuyuan Liu, Chong Wang, Michael Elliott, Chun Fung Kwok, Yu Tian, ***Fengbei Liu****, Helen Frazer, Davis J McCarthy, Gustavo Carneiro*
Medical Image Analysis 2024

Unraveling Instance Associations: A Closer Look for Audio-Visual Segmentation
Yuanhong Chen, Yuyuan Liu, Hu Wang, ***Fengbei Liu****, Chong Wang, Helen Frazer, Gustavo Carneiro*
CVPR 2024

Effective Segmentation of Post-Treatment Gliomas Using Simple Approaches: Artificial Sequence Generation and Ensemble Models
Heejong Kim, Léo Milecki, Mina C. Moghadam, ***Fengbei Liu****, Minh Nguyen, Eric Qiu, Abhishek Thanki, Mert R. Sabuncu*
MICCAI BraTS Challenge 2024, Oral Presentation

An Interpretable and Accurate Deep-learning Diagnosis Framework Modelled with Fully and Semi-supervised Reciprocal Learning
Chong Wang, Yuanhong Chen, ***Fengbei Liu****, Michael Elliott, Chun Fung Kwok, Carlos Peña-Solorzano, Helen Frazer, Davis James McCarthy, Gustavo Carneiro*
IEEE Transactions on Medical Imaging 2023

Learning Support and Trivial Prototypes for Interpretable Image Classification
*Chong Wang, Yuyuan Liu, Yuanhong Chen, **Fengbei Liu**, Yu Tian, Davis J McCarthy, Helen Frazer, Gustavo Carneiro*
ICCV 2023

Unsupervised anomaly detection in medical images with a memory-augmented multi-level cross-attentional masked autoencoder
*Yu Tian, Guansong Pang, Yuyuan Liu, Chong Wang, Yuanhong Chen, **Fengbei Liu**, Rajvinder Singh, Johan W Verjans, Gustavo Carneiro*
MICCAI-MLMI 2023

Knowledge Distillation to Ensemble Global and Interpretable Prototype-Based Mammogram Classification Models
*Chong Wang, Yuanhong Chen, Yuyuan Liu, Yu Tian, **Fengbei Liu** Davis J McCarthy, Michael Elliott, Helen Frazer, Gustavo Carneiro*
MICCAI, 2022, Early Accept

Multi-view Local Co-occurrence and Global Consistency Learning Improve Mammogram Classification Generalisation
*Yuanhong Chen, Hu Wang, Chong Wang, Yu Tian, **Fengbei Liu**, Yuyuan Liu, Michael Elliott, Davis J McCarthy, Helen Frazer, Gustavo Carneiro*
MICCAI 2022, Early Accept

Contrastive Transformer-based Multiple Instance Learning for Weakly Supervised Polyp Frame Detection
*Yu Tian, Guansong Pang, **Fengbei Liu**, Yuyuan Liu, Chong Wang, Yuanhong Chen, Johan W Verjans, Gustavo Carneiro*
MICCAI 2022, Early Accept

Perturbed and Strict Mean Teachers for Semi-supervised Semantic Segmentation
*Yuyuan Liu, Yu Tian, Yuanhong Chen, **Fengbei Liu**, Belagiannis Vasileios, Gustavo Carneiro*
CVPR 2022

Pixel-wise Energy-biased Abstention Learning for Anomaly Segmentation on Complex Urban Driving Scenes
Yu Tian, Yuyuan Liu*, Guansong Pang, **Fengbei Liu**, Yuanhong Chen, Gustavo Carneiro*
ECCV 2022, Oral

Constrained Contrastive Distribution Learning for Unsupervised Anomaly Detection and Localisation in Medical Images
*Yu Tian, Guansong Pang, **Fengbei Liu**, Yuanhong Chen, Seon Ho Shin, Johan W Verjans, Rajvinder Singh, Gustavo Carneiro*
MICCAI 2021

3D Semantic Mapping from Arthroscopy using Out-of-distribution Pose and Depth and In-distribution Segmentation Training
*Yaqub Jonmohamadi, Shahnewaz Ali, **Fengbei Liu**, Jonathan Roberts, Ross Crawford, Gustavo Carneiro, Ajay K Pandey*
MICCAI 2021

Preprint/Under-Review

An Artificial Intelligence Model to Detect Abnormal Ejection Fraction from Non-Contrast Chest Computed Tomography: The CT-LVEF study
*Jayant Raikhelkar, Zilong Bai, Ashley Beecy, **Fengbei Liu**, et al.*

Agentic Large-Language-Model Systems in Medicine: A Systematic Review and Taxonomy
*Abdul Mohaimen Al Radi, Xu Cao, Fanyang Yu, **Fengbei Liu**, Yu Tian, et al.*

Asymmetric Co-teaching with Multi-view Consensus for Noisy Label Learning
***Fengbei Liu**, Yuanhong Chen, Chong Wang, Yuyuan Liu, Gustavo Carneiro*

Professional Activities

Conference

Reviewer: ICCV 2021/2023, MICCAI 2021, CVPR 2022/2023/2024, ECCV 2022/2024, BMVC 2022, NeurIPS 2023/2024, ICLR 2024, ICML 2024

Journal

Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)

Awards & Achievements

Ph.D Scholarship: University of Adelaide, Apr 2020

Skills

Programming: Python & Pytorch, Slurm, Docker & Kubernetes

Language: Mandarin (native), English (professional)

References

Prof. Gustavo Carneiro
Professor of AI and Machine Learning, University of Surrey
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Prof. Vasileios Belagiannis
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Prof. Mert R. Sabuncu
Professor, Cornell University, Cornell Tech and Weill Cornell Medicine
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