

# Fengbei Liu

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## EDUCATION

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### Cornell Tech, Cornell University

Postdoctoral Research Associate;

Supervisor: Prof. Mert Sabuncu

New York City, NY, US

Feb 2024 – Present

### Australian Institute for Machine Learning (AIML)

Ph.D in Computer Vision and Medical Imaging;

Supervisor: Prof. Gustavo Carneiro, Prof. Mark Jenkinson

Adelaide, Australia

Apr 2020 – Oct 2023

### University of Adelaide

Honors in Computer Science; (First Class)

Adelaide, Australia

Mar 2019 – Mar 2020

### University of Adelaide

Bachelor in Computer Science;

Adelaide, Australia

Jul 2015 – Jul 2018

## RESEARCH INTERESTS

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

My research interest is in computer vision and medical image analysis. 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

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### First-author Publications

#### 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 Pseudo-labeling 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

#### 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 2023

### **A Closer Look at Audio-Visual Semantic Segmentation**

*Yuanhong Chen, Yuyuan Liu, Hu Wang, **Fengbei Liu**, Chong Wang, Gustavo Carneiro*

CVPR 2024

### **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**

### **Asymmetric Co-teaching with Multi-view Consensus for Noisy Label Learning**

***Fengbei Liu**, Yuanhong Chen, Chong Wang, Yuyuan Liu, Gustavo Carneiro*

### **Partial Label Supervision for Agnostic Generative Noisy Label Learning**

***Fengbei Liu**, Chong Wang, Yuanhong Chen, Yuyuan Liu, Gustavo Carneiro*

## Translation consistent semi-supervised segmentation for 3d medical images

Yuyuan Liu, Yu Tian, Chong Wang, Yuanhong Chen, **Fengbei Liu**, Vasileios Belagiannis, Gustavo Carneiro

## Knockout: A simple way to handle missing inputs

Minh Nguyen, Batuhan K. Karaman, Heejong Kim, Alan Q. Wang, **Fengbei Liu**, Mert R. Sabuncu

## Mixture of Gaussian-distributed Prototypes with Generative Modelling for Interpretable and Trustworthy Image Recognition

Chong Wang, Yuanhong Chen, **Fengbei Liu**, Davis James McCarthy, Helen Frazer, Gustavo Carneiro

## PROFESSIONAL ACTIVITIES

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### 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

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**Ph.D Scholarship:** University of Adelaide, Apr 2020

## SKILLS

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**Programming:** Python & Pytorch, Slurm, Docker & Kubernetes

**Language:** Mandarin (native), English (professional)

## REFERENCES

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### Prof. Gustavo Carneiro

*Professor of AI and Machine Learning, University of Surrey*

[g.carneiro@surrey.ac.uk](mailto:g.carneiro@surrey.ac.uk)

### Prof. Vasileios Belagiannis

*Professor, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)*

[vasileios.belagiannis@fau.de](mailto:vasileios.belagiannis@fau.de)

### Prof. Mert R. Sabuncu

*Professor, Cornell University, Cornell Tech and Weill Cornell Medicine*

[msabuncu@cornell.edu](mailto:msabuncu@cornell.edu)