Yixin Chen 陈亦新

PhD candidate in Medical Imaging Technology, Peking University

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Research code: GitHub / YixinChen-AI
Publications: Google Scholar



Research profile

I develop universal segmentation and cross-modality adaptation methods for PET, CT and MRI, and use whole-body PET/CT to study multi-organ metabolic alterations.

Principal investigator of 1 National Natural Science Foundation of China (NSFC) project.

14 first/co-first-author papers + 7 others; 12 patents (5 granted); 1 sole-authored book; 3 international conference talks.

Education

Peking University, PhD in Medical Imaging Technology, expected 2027 — September 2023–present
Institute of Medical Technology, Health Science Center; Supervisor: Prof. Zhaoheng Xie

King's College London, MSc in Artificial Intelligence, with Distinction — 2019–2020

Xiamen University, BSc in Automation; second bachelor's degree in Mathematical Finance — 2015–2019

Research funding

NSFC Young Student Basic Research Project (Doctoral Student) — January 2026–December 2027

Principal investigator, grant 625B2004, RMB 300,000. Project: Multi-Organ Metabolic Information Extraction and Analysis Using Total-Body PET/CT.

Builds a total-body 18F-FDG PET/CT framework for sub-organ/tissue delineation, metabolic feature extraction, individualized multi-organ connectomes and interpretation of abnormal metabolic connections.

Selected research

Nature Communications, 2025; Co-first author [Paper] [Code]

MPUM: Modality-projection universal model for comprehensive full-body medical imaging segmentation

With Shandong Provincial Qianfoshan Hospital, MPUM maps shared anatomy to modality-specific kernels for whole-body PET, CT and MRI segmentation.

IEEE TMI, 2024; First author [Paper] [Code]

PCNet: Prior Category Network for CT Universal Segmentation Model

PCNet encodes clinical relationships among anatomical categories as prompts, a hierarchy and a consistency constraint to guide universal CT segmentation.

MICCAI, 2024; Poster; First author [Paper] [Code]

LUCIDA: Low-Dose Universal-Tissue CT Image Domain Adaptation for Medical Segmentation

It uses segmentation reconstruction and Fourier adaptation without low-dose CT labels; its ensemble recognizes **112** tissue types.

EJNMMI, 2026; Accepted; First author

Whole-Body [^{18}F]FDG PET/CT Characterizes Multi-Organ Metabolic Alterations in MASLD

With Henan Medical University First Affiliated Hospital (Xinxiang) and Shandong Provincial Qianfoshan Hospital, a two-centre study of **294** adults identified and replicated **16** MASLD-related imaging features.

Book

Deep Learning Theory and Practice Using PyTorch

深度学习理论与实战——PyTorch案例详解

Sole author. Tsinghua University Press, 2021. In Chinese. ISBN 978-7-302-56850-6.

Explains deep-learning principles through PyTorch examples that connect theory with model implementation.

Teaching experience

Teaching assistant, Peking University: Principles of Medical Imaging Equipment

Computer vision course instructor: Independently recorded introductory and intermediate courses in computer vision.

Professional experience

AirDoc, Algorithm Engineer July–September 2022

Developed ICL vault prediction and ultra-widefield fundus models for image processing, difference analysis and classification; supported device registration, yielding three Chinese patent applications and one PCT publication.

BioMind, Medical Imaging Algorithm Engineer November 2020–June 2022

Developed cardiac-ultrasound quality control, standard-view generation, atrial-septal-defect detection and quantification, and clinical integration; developed an adnexal-mass diagnostic system with the Chinese PLA General Hospital and partner hospitals. Across these projects, the work produced two co-first-author papers, one collaborative paper and four granted patents.

International conference presentations

MICCAI 2026 Oral presentation; autoPET V challenge: second place in Category 1 2026-09-27

Point or line prompts trigger neural correction and local threshold updates to refine PET/CT lesion masks.

MICCAI 2026 Oral presentation; CMR-MULTI challenge: second place 2026-10-01

Sequence-specific nnU-Net ensembles segment cardiac MRI and quantify ejection fraction and scar mass.

MICCAI 2026 Oral presentation; CHIMERA-agent challenge: Innovative Agent Solution Award 2026-10-01

Qwen agents, TabPFN and Cox models address biopsy decisions, treatment selection and five-year recurrence-risk estimation.

Academic service

Nature Communications, Early Career Co-Reviewer

Peking University news coverage

Doctoral student wins two awards in the MICCAI 2026 international challenges 2026-10-10

Yixin Chen awarded a 2025 NSFC doctoral research grant 2026-01-13

The work above demonstrates independent research capability in medical AI, from study design and algorithms to publication.

Future work plans

I plan to apply for research grants from the National Natural Science Foundation of China and provincial or ministerial programs, publish high-quality academic papers, and teach relevant courses, drawing on my research and teaching experience. I also aim to translate research findings into practical applications that support healthcare.

Publications

* Equal contribution.

2026

1. **Yixin Chen**, Chuanzhi Zhou, Lijuan Guo, et al. Whole-Body [^{18}F]FDG PET/CT Characterizes Multi-Organ Metabolic Alterations in MASLD. **EJNMMI***, 2026;* Accepted.
   Analyzes whole-body [18F]FDG PET/CT from 294 adults in two centres, identifying 16 MASLD-related metabolic imaging features and reproducing them in an independent centre.
2. Haowei Xu, **Yixin Chen**, Wanyi Fu, Hongbin Han, Zhaoheng Xie. NeuronCtrl: Geometry-Aware Safe Closed-Loop Generative Control for Neuronal Microenvironment Dynamics. **ICML***, 2026, PMLR 306:140675-140728;* Spotlight.
3. Wenrui Shao, **Yixin Chen**, Ourui Fu, Tian Li, Zhi Yang, Nan Li, Hongbin Han, Xiangxi Meng, Zhaoheng Xie. Neural Network Approximation Aided Kinetic Parameter Inference of Compartment Models in Dynamic PET. **IEEE TRPMS***, 2026.*
4. **Yixin Chen**, Yan Wang, Wenrui Shao, Zhaoheng Xie. PHATE-Net: Differentiable Pseudotime Learning for Trustworthy Disease Trajectories in PET. **CVPR Findings***, 2026, pp. 2534-2543.*
   Makes pseudotime estimation differentiable to learn continuous disease trajectories from PET, linking regional metabolic representations with an interpretable progression axis.
5. **Yixin Chen**. Diagnosis-Conditioned Retrieval for Structured Pathology Workflows. **MICCAI REG² challenge workshop***, 2026, LNCS 17252;* Poster.
   Predicts organ and diagnosis labels from whole-slide pathology images, then uses them to retrieve a compatible structured diagnostic workflow for each case.
6. **Yixin Chen**, Yizhen Peng. Acquisition-Structured nnU-Net Ensembles for Multi-Sequence Cardiac MRI Segmentation and Quantification. **MICCAI CMRSeg workshop***, 2026, LNCS 17268;* Selected for oral presentation.
   Uses acquisition-specific 2D and 3D nnU-Net ensembles with scar refinement to segment multi-sequence cardiac MRI and derive ejection fraction and scar mass.
7. **Yixin Chen**. Failure-Mode-Driven Multimodal Mitral Valve Segmentation for the MVAA 2026 Challenge. **MICCAI MVAA challenge workshop***, 2026, LNCS 17268;* Poster.
   Builds modality-specific ensembles and failure-mode-driven post-processing to segment the mitral valve across cardiac CT, 3D ultrasound and surgical video.

2025

8. **Yixin Chen**[*], Lin Gao[*], Yajuan Gao, Rui Wang, Jingge Lian, Xiangxi Meng, Yanhua Duan, Leiying Chai, Hongbin Han, Zhaoping Cheng, Zhaoheng Xie. Modality-projection universal model for comprehensive full-body medical imaging segmentation. **Nature Communications***, 2025, 16:9423.* [Code]
   Projects shared anatomical representations into modality-specific kernels, enabling one model to segment comprehensive whole-body structures across PET, CT and MRI.
9. **Yixin Chen**, Yan Wang, Zhaoheng Xie. VP-SFDA: Visual Prompt Source-Free Domain Adaptation for Cross-Modal Medical Image. **Health Data Science***, 2025, 5:0143.*
   Uses input-specific visual prompts and denoised pseudo-label adaptation to bridge MRI/CT domain gaps without access to source-domain data.
10. Wenrui Shao, Yarong Zhang, Fen Du, Fangxiao Cheng, **Yixin Chen**, Xiangxi Meng, Ying Liang, Zhaoheng Xie. Neural network-aided unsupervised input function estimation for dual-time-window PET Patlak analysis. **EJNMMI Physics***, 2025, 12(1):100.*
11. W. Shao, **Yixin Chen**, Z. Wang, R. Xu, X. Meng, Z. Xie. A Physiology-Supervised Neural Operator Framework for Kinetic Parameter Estimation in Dynamic PET. **IEEE NSS/MIC/RTSD***, 2025, p. 1.*

2024

12. **Yixin Chen**, Yajuan Gao, Lei Zhu, Wenrui Shao, Yanye Lu, Hongbin Han, Zhaoheng Xie. PCNet: Prior Category Network for CT Universal Segmentation Model. **IEEE TMI***, 2024, 43(9):3319-3330.* [Code]
    Encodes clinical relationships among anatomical categories as category prompts, a hierarchy and a consistency constraint to guide universal CT segmentation across structures.
13. **Yixin Chen**, Xiangxi Meng, Yan Wang, Shuang Zeng, Xi Liu, Zhaoheng Xie. LUCIDA: Low-Dose Universal-Tissue CT Image Domain Adaptation for Medical Segmentation. **MICCAI***, 2024, LNCS 15008:393-402;* Poster. [Code]
    Combines segmentation-reconstruction constraints with Fourier-domain adaptation to segment low-dose CT without target labels; its ensemble recognizes 112 tissue categories.
14. **Yixin Chen**[*], Yajun Gao[*], Lei Zhu, Jianan Li, Yan Wang, Jiakui Hu, Hongbin Han, Yanye Lu, Zhaoheng Xie. Structure-Enhanced Unsupervised Domain Adaptation for CT Whole-Brain Segmentation. **IEEE TRPMS***, 2024, 8(8):926-938.* [Code]
    Incorporates anatomical structure constraints into unsupervised domain adaptation to transfer whole-brain segmentation across CT acquisition domains while preserving structural consistency.
15. W. Shao, Y. Zhang, **Yixin Chen**, X. Meng, Y. Liang, Z. Xie. Neural Network-Asissted Dual-time-window Acquisition: Modeling Incomplete Input Functions for Patlak Analysis. **IEEE NSS/MIC/RTSD***, 2024, p. 1.*

2023

16. Yan Wang, Jian Cheng, **Yixin Chen**, Shuai Shao, Lanyun Zhu, Zhenzhou Wu, Tao Liu, Haogang Zhu. FVP: Fourier Visual Prompting for Source-Free Unsupervised Domain Adaptation of Medical Image Segmentation. **IEEE TMI**, *2023, 42(12):3738-3751.*
17. Yan Wang*, **Yixin Chen***, Yingying Zhang, Haogang Zhu. Rethinking Disentanglement in Unsupervised Domain Adaptation for Medical Image Segmentation. **IEEE EMBC***, 2023, pp. 1-6.*
    Separates content and style across spatial and channel dimensions with adaptive normalization, while dilated convolutions preserve anatomy for cross-modality segmentation.
18. Xixiang Lin*, Feifei Yang*, **Yixin Chen***, et al. Echocardiography-based AI for detection and quantification of atrial septal defect. **Frontiers in Cardiovascular Medicine***, 2023, 10:985657.*
    Uses colour Doppler echocardiograms for view selection, ASD detection and defect/rim measurement; external testing achieved an AUC of 0.92.

2022

19. Yan Wang*, **Yixin Chen***, Wenjun Wang, Haogang Zhu. MSGAN: Multi-Stage Generative Adversarial Networks for Cross-Modality Domain Adaptation. **IEEE EMBC***, 2022, pp. 520-524.*
    Uses parallel multi-stage adversarial translation to transfer coarse styles at low resolution and detailed textures at high resolution for CT/MRI segmentation adaptation.
20. Jianan Li*, **Yixin Chen***, Minyu Zhang, et al. A deep learning model system for diagnosis and management of adnexal masses. **Cancers***, 2022, 14(21):5291.*
    Combines detection, mass and papillary segmentation, tumour-type classification and subtype classification in a five-model ultrasound system for adnexal-mass diagnosis.
21. Xixiang Lin, Feifei Yang, **Yixin Chen**, et al. Echocardiography-based AI detection of regional wall motion abnormalities and quantification of cardiac function in myocardial infarction. **Frontiers in Cardiovascular Medicine***, 2022, 9:903660.*

Patents

12 public patent records: 5 granted Chinese invention patents, 6 published Chinese invention applications, and 1 published PCT international application.

Granted Chinese invention patents

1. Brain-region segmentation method and system for CT brain images
   Yixin Chen (陈亦新), 谢肇恒; CN117649519B (2026-09-11).
2. Method and apparatus, device, and medium for generating two-dimensional cardiac ultrasound view images
   蒲海涛, 陈晓天, 张培芳, **Yixin Chen (陈亦新)**, 叶菁, 高雨霏, 吴振洲; CN115511703B (2023-05-09).
3. Model-training method and apparatus, electronic device, and storage medium
   Yixin Chen (陈亦新), 王燄, 陈晓天, 任艺柯, 张培芳, 吴振洲; CN115099293B (2023-04-18).
4. Method and apparatus for removing artifacts from cardiac ultrasound images
   蒲海涛, 张培芳, 陈晓天, **Yixin Chen (陈亦新)**, 叶菁, 吴振洲; CN115170424B (2023-04-07).
5. Method and apparatus, electronic device, and storage medium for determining the length of an atrial septal defect
   Yixin Chen (陈亦新), 蒲海涛, 林锡祥, 陈晓天, 张培芳, 吴振洲; CN114565622B (2023-04-07).

Published Chinese invention applications

6. Method and system for analyzing metabolism in an organism
   Yixin Chen (陈亦新), 谢肇恒, 徐若妍; CN120458609A (2025-08-12).
7. Neural-network-based method for biomedical parametric imaging and pharmacokinetic analysis
   邵闻睿, 谢肇恒, 孟祥溪, **Yixin Chen (陈亦新)**; CN119811674A (2025-04-11).
8. Method for analyzing differences in fundus images and related products
   Yixin Chen (陈亦新), 赵昕; CN119379577A (2025-01-28).
9. Method for processing ultra-widefield fundus images and related products
   Yixin Chen (陈亦新), 赵昕; CN119379707A (2025-01-28).
10. Method for training an image-classification model and related products
    Yixin Chen (陈亦新), 赵昕; CN118736653A (2024-10-01).
11. Data-processing system and method
    焦文沛, 谢肇恒, **Yixin Chen (陈亦新)**; CN118039082A (2024-05-14).

Published PCT international application

12. Image-processing method and apparatus, electronic device, and storage medium
    齐秀梅, **Yixin Chen (陈亦新)**, 赵昕; WO2024216763A1 (2024-10-24).