

# XIONGCHAO CHEN

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## RESEARCH INTERESTS

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Deep learning-enabled imaging and image analysis techniques for medical and optical images, including reconstruction, denoising, super resolution, and registration.

## EDUCATION

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**Yale University** Sept. 2019 - Jan. 2024 (Expected)  
Ph.D. in Engineering and Applied Science, Fellowship

**Huazhong University of Sci. and Tech.** Sept. 2015 - Jun. 2019  
B.S. in Opto-Electronic Engineering (Honored), GPA: 91.36/100, Top 1%

## EXPERIENCE

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**Positron Emission Tomography (PET) Center, Yale Uni., New Haven, CT** Dec. 2019 - Present  
Graduate Research Assistant, Advisors: Prof. Chi Liu

**Molecular Imaging Group, GE HealthCare** Aug. 2021 - Present  
Technical Specialist, part-time, remote

**Imaging Physics Group, Siemens HealthCare, Knoxville, TN** Jun. 2023 - Sept. 2023  
PET Physics Group Internship, Advisors: Dr. Maurizio Conti

**Image Analytics Group, Siemens Medical Solutions, Malvern, PA** Jun. 2022 - Sept. 2022  
Image Analytics Internship, Advisors: Dr. Gerardo Hermosillo Valadez

**Biomedical Imaging Lab, Yale University, New Haven, CT** Jun. 2019 - Dec. 2019  
Graduate Research Assistant, Advisors: Prof. Joerg Bewersdorf

**Electronic Materials Lab Purdue University, West Lafayette, IN** Jun. 2018 - Nov. 2018  
Undergraduate Research Assistant, Advisors: Prof. Wenzhuo Wu

**Biophotonics Lab, Huazhong Uni. of Sci. and Tech., PRC** Sept. 2017 - Jun. 2019  
Undergraduate Research Assistant, Advisors: Prof. Peng Fei

**Optical Communication Lab, Huazhong Uni. of Sci. and Tech., PRC** Jan. 2017 - Sept. 2017  
Undergraduate Research Assistant, Advisors: Prof. Changjian Ke

## AWARDS AND HONORS

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Young Investigator Award, Connecticut Area Medical Physics Society	2023
Young Investigator Award, SNMMI Annual Meeting	2022
Student Travel Award, MICCAI Society	2022
Young Investigator Award Finalist, 2021 ASNC Annual Meeting	2021
Honored Undergraduate Student Awards, PRC (Top 1%)	2019
National Scholarship, PRC (Top 1%)	2017
Outstanding Undergraduates in Terms of Academic Performance (Top 1%)	2017
The 1 <sup>st</sup> Prize of the 13 <sup>th</sup> “Challenge Cup” National Undergraduate Work Competition, PRC	2019
The 1 <sup>st</sup> Prize of the 11 <sup>th</sup> “Challenge Cup” National Undergraduate Work Competition, PRC	2017
The 1 <sup>st</sup> Prize of the 4 <sup>th</sup> “Seeking Cup” National Undergraduate Work Competition, PRC	2017
The 1 <sup>st</sup> Prize of the 8 <sup>th</sup> National Mathematics Competition, PRC	2017
Merit Students in Terms of Academic Performance (Top 5%)	2016

## PUBLICATIONS

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1. DuDoCFNet: Dual-Domain Coarse-to-Fine Progressive Network for Simultaneous Denoising, limited-View Reconstruction, and Attenuation Correction of Cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Xueqi Guo, Huidong Xie, Qiong Liu, James S. Duncan, Albert J. Sinusas, Chi Liu.  
*IEEE Transactions on Medical Imaging* (IF: 11.037), 2024.
2. DuSFE: Dual-Channel Squeeze-Fusion-Excitation Module for Cross-Modality Registration of Cardiac SPECT and CT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Jiazhen Zhang, Albert J Sinusas, John A Onofrey, Chi Liu.  
*Medical Image Analysis* (IF: 13.828), 2023.
3. Direct and indirect strategies of deep-learning-based attenuation correction for general purpose and dedicated cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Luyao Shi, Hui Liu, Wolfgang Holler, MingDe Lin, Yi-Hwa Liu, Edward J Miller, Albert J Sinusas, Chi Liu.  
*European Journal of Nuclear Medicine and Molecular Imaging* (IF: 10.057), 2022.
4. Cross-vender, cross-tracer, and cross-protocol deep transfer learning for attenuation map generation of cardiac SPECT.  
**Xiongchao Chen**, P Hendrik Pretorius, Bo Zhou, Hui Liu, Karen Johnson, Yi-Hwa Liu, Michael A King, Chi Liu.  
*Journal of Nuclear Cardiology* (IF: 5.952), 2022.
5. DuDoSS: DeepLearningBased DualDomain sinogram synthesis from Sparsely sampled projections of cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Tianshun Miao, Hui Liu, Wolfgang Holler, MingDe Lin, Edward J Miller, Richard E Carson, Albert J Sinusas, Chi Liu.  
*Medical Physics* (IF: 4.071), 2022.
6. Deep-learning-based methods of attenuation correction for SPECT and PET.  
**Xiongchao Chen**, Chi Liu.  
*Journal of Nuclear Cardiology* (IF: 5.952), 2022.
7. CT-free attenuation correction for dedicated cardiac SPECT using a 3D dual squeeze-and-excitation residual dense network.  
**Xiongchao Chen**, Bo Zhou, Luyao Shi, Hui Liu, Yulei Pang, Rui Wang, Edward J Miller, Albert J Sinusas, Chi Liu.  
*Journal of Nuclear Cardiology* (IF: 5.952), 2021.
8. FedFTN: Personalized Federated Learning with Deep Feature Transformation Network for Multi-institutional Low-count PET Denoising.  
Bo Zhou, Huidong Xie, Qiong Liu, **Xiongchao Chen**, Xueqi Guo, Zhicheng Feng, S Kevin Zhou, Biao Li, Axel Rominger, Kuangyu Shi, James S Duncan, Chi Liu  
*Medical Image Analysis* (IF: 13.828), 2023.
9. DuDoDR-Net: Dual-domain data consistent recurrent network for simultaneous sparse view and metal artifact reduction in computed tomography.  
Bo Zhou, **Xiongchao Chen**, S Kevin Zhou, James S Duncan, Chi Liu.  
*Medical Image Analysis* (IF: 13.828), 2022.
10. MCP-Net: Introducing Patlak Loss Optimization to Whole-body Dynamic PET Inter-frame Motion Correction.  
Xueqi Guo, Bo Zhou, **Xiongchao Chen**, Ming-Kai Chen, Chi Liu, Nicha C Dvornek.  
*IEEE Transactions on Medical Imaging* (IF: 11.037), 2022.

11. DuDoUFNet: Dual-domain under-to-fully-complete progressive restoration network for simultaneous metal artifact reduction and low-dose CT reconstruction.  
Bo Zhou, **Xiongchao Chen**, Huidong Xie, S Kevin Zhou, James S Duncan, Chi Liu.  
*IEEE Transactions on Medical Imaging* (IF: 11.037), 2022.
12. Generation of Whole-Body FDG Parametric Ki Images from Static PET Images Using Deep Learning.  
Tianshun Miao, Bo Zhou, Juan Liu, Xueqi Guo, **Xiongchao Chen**, Ming-Kai Chen, Jing Wu, Richard E. Carson, Chi Liu.  
*IEEE Transactions on Radiation and Plasma Medical Sciences* (IF: 4.951), 2023.
13.  $^{99m}\text{Tc}/^{123}\text{I}$  Dual-Isotope Correction for Self-Scatter, Down-Scatter, and Tailing Effect for a CZT SPECT with Varying Tracer Distributions: A Monte Carlo Simulation Study.  
Alexandre F. Velo, Peng Fan, Huidong Xie, **Xiongchao Chen**, Michael Ljungberg, and Chi Liu.  
*IEEE Transactions on Radiation and Plasma Medical Sciences* (IF: 4.951), 2023.
14. Federated Transfer Learning for Low-dose PET Denoising: A Pilot Study with Simulated Heterogeneous Data.  
Bo Zhou, Tianshun Miao, Niloufar Mirian, **Xiongchao Chen**, Huidong Xie, Zhicheng Feng, Xueqi Guo, Xiaoxiao Li, S Kevin Zhou, James S Duncan, Chi Liu.  
*IEEE Transactions on Radiation and Plasma Medical Sciences* (IF: 4.951), 2022.
15. Segmentation-free PVC for Cardiac SPECT using a Densely-connected Multi-dimensional Dynamic Network.  
Huidong Xie, Zhao Liu, Luyao Shi, Kathleen Greco, **Xiongchao Chen**, Bo Zhou, Attila Feher, John C Stendahl, Nabil Boutagy, Tassos C Kyriakides, Ge Wang, Albert J Sinusas, Chi Liu.  
*IEEE Transactions on Medical Imaging* (IF: 11.037), 2022.
16. Increasing angular sampling through deep learning for stationary cardiac SPECT image reconstruction.  
Huidong Xie, Stephanie Thorn, **Xiongchao Chen**, Bo Zhou, Hui Liu, Zhao Liu, Supum Lee, Ge Wang, Yi-Hwa Liu, Albert J Sinusas, Chi Liu.  
*Journal of Nuclear Cardiology* (IF: 5.952), 2022.
17. Adaptive super-resolution enabled on-chip contact microscopy.  
Hao Zhang, **Xiongchao Chen**, Tingting Zhu, Chengqiang Yi, Peng Fei.  
*Optics Express* (IF: 3.894), 2021.
18. MDPET: A unified motion correction and denoising adversarial network for low-dose gated PET.  
Bo Zhou, Yu-Jung Tsai, **Xiongchao Chen**, James S Duncan, Chi Liu.  
*IEEE Transactions on Medical Imaging* (IF: 11.037), 2021.
19. Super-resolution generative adversarial network (SRGAN) enabled on-chip contact microscopy.  
Hao Zhang, Tingting Zhu, **Xiongchao Chen**, Lanxin Zhu, Di Jin, Peng Fei.  
*Journal of Physics D: Applied Physics* (IF: 3.207), 2021.

## CONFERENCES

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1. DD-CISENet: Dual-Domain Cross-Iteration Squeeze and Excitation Network for Accelerated MRI Reconstruction.  
**Xiongchao Chen**, Zhigang Peng, Gerardo Hermosillo Valadez.  
*Medical Imaging with Deep Learning (MIDL)*, 2023.
2. Dual-Branch Squeeze-Fusion-Excitation Module for Cross-Modality Registration of Cardiac SPECT and CT. (*Student Travel Award*)  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Jiazhen Zhang, Albert J Sinusas, John A Onofrey, Chi Liu.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2022.

3. Cross-domain Iterative Network for Simultaneous Denoising, Limited-angle Reconstruction, and Attenuation Correction of Low-dose Cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Qiong Liu, Albert J. Sinusas, Chi Liu.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI) workshop*, 2023.
4. Joint Denoising and Few-angle Reconstruction for Low-dose Cardiac SPECT Using a Dual-domain Iterative Network with Adaptive Data Consistency.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Qiong Liu, Albert J. Sinusas, Chi Liu.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI) workshop*, 2023.
5. DuDoSS: Deep-Learning-Based Dual-Domain Sinogram Synthesis from Sparsely Sampled Projections of Cardiac SPECT. (**Young Investigator Award, Oral**)  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Tianshun Miao, Edward J. Miller, Albert J. Sinusas, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2022.
6. Investigation of Direct and Indirect Approaches of Deep-Learning-Based Attenuation Correction for General Purpose and Dedicated Cardiac SPECT Scanners. (**Oral**)  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Luyao Shi, Hui Liu, Chi Liu.  
*IEEE Nuclear Science Symposium and Medical Imaging Conference (IEEE NSS/MIC)*, 2021.
7. Attenuation Map Generation with Cross-Vendor and Cross-Tracer Transfer Learning for Cardiac SPECT.  
**Xiongchao Chen**, P Hendrik Pretorius, Bo Zhou, Hui Liu, Karen Johnson, Michael A King, Chi Liu.  
*IEEE Nuclear Science Symposium and Medical Imaging Conference (IEEE NSS/MIC)*, 2021.
8. CT-free attenuation correction for dedicated cardiac SPECT using a 3D dual squeeze-and-excitation residual dense network. (**Young Investigator Award Finalist, Oral**)  
**Xiongchao Chen**, Bo Zhou, Luyao Shi, Hui Liu, Yulei Pang, Rui Wang, Edward J Miller, Albert J Sinusas, Chi Liu.  
*Annual Meeting of the American Society of Nuclear Cardiology (ASNC)*, 2021.
9. Deep Learning-Based Attenuation Map Generation for Low-Dose and Few-Angle Dedicated Cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Qiong Liu, Albert J Sinusas, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2023.
10. Transformer-based Dual-domain Network for Few-view Dedicated Cardiac SPECT Image Reconstructions.  
Huidong Xie, Bo Zhou, **Xiongchao Chen**, Xueqi Guo, Stephanie Thorn, Yi-Hwa Liu, Ge Wang, Albert J. Sinusas, Chi Liu.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2023.
11. TAI-GAN: Temporally and Anatomically Informed GAN for early-to-late frame conversion in dynamic cardiac PET motion correction.  
Xueqi Guo, Luyao Shi, **Xiongchao Chen**, Bo Zhou, Qiong Liu, Huidong Xie, Yi-Hwa Liu, Richard Palyo, Adam Liu, Edward J. Miller, Albert J. Sinusas, Bruce Spottiswoode, Chi Liu, Nicha Dvornek.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI) workshop*, 2023.
12. Fast-MC-PET: A Novel Deep Learning-Aided Motion Correction and Reconstruction Framework for Accelerated PET.  
Bo Zhou, Yu-Jung Tsai, Jiazhen Zhang, Xueqi Guo, Huidong Xie, **Xiongchao Chen**, Tianshun Miao, Yihuan Lu, James S Duncan, Chi Liu.  
*International Conference on Information Processing in Medical Imaging (IPMI)*, 2023.
13. MCP-Net: Inter-frame Motion Correction with Patlak Regularization for Whole-body Dynamic PET.  
Xueqi Guo, Bo Zhou, **Xiongchao Chen**, Chi Liu, Nicha C Dvornek.  
*Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2022.
14. Early-to-late frame conversion using a temporally informed GAN for cardiac dynamic PET motion correction.  
Xueqi Guo, Luyao Shi, **Xiongchao Chen**, Qiong Liu, Huidong Xie, Bo Zhou, Yi-Hwa Liu, Richard Palyo,

Adam Liu, Edward J Miller, Albert J Sinusas, Bruce Spottiswoode, Chi Liu, Nicha C. Dvornek.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2023.

15. Self-supervised Positron Range Correction for Dynamic Rubidium-82 Cardiac PET Imaging.  
Huidong Xie, Alexandre Velo, Xueqi Guo, Bo Zhou, **Xiongchao Chen**, Yu-Jung Tsai, Tianshun Miao, Qiong Liu, Albert J Sinusas, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2023.
16. Dynamic Imaging and Tracer Kinetic Modeling of 18F-flutemetamol PET for ATTR Cardiac Amyloidosis Patients.  
Qiong Liu, Tiantian Shi, Paul Gravel, Ramesh Fazzone-Chettiar, Xueqi Guo, Huidong Xie, **Xiongchao Chen**, Koen Van Laere, Yi-Hwa Liu, Richard E Carson, Chi Liu, Edward J Miller *Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2023.
17. Segmentation-free Partial Volume Correction for Cardiac SPECT using Deep Learning.  
Huidong Xie, Zhao Liu, Luyao Shi, Kathleen Greco, **Xiongchao Chen**, Bo Zhou, Attila Feher, John Stendahl, Nabil Boutagy, Sinusas Albert, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2022.
18.  $^{99m}\text{Tc}/^{123}\text{I}$  Dual-Isotope Scatter and Crosstalk Correction for a CZT SPECT with Varying Tracer Distributions: A Monte Carlo Simulation Study  
Alexandre Velo, Peng Fan, Huidong Xie, **Xiongchao Chen**, Michael Ljungberg, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2022.
19. Deep learning-based direct reconstruction with attenuation and scatter corrections for SPECT  
Hui Liu, Jing Wu, Yajing Zhang, **Xiongchao Chen**, Lilei Gao, Li Cheng, Yaqiang Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2022.
20. Increasing angular sampling through deep learning for GE Alcyone dedicated cardiac SPECT.  
Huidong Xie, Stephanie Thorn, Hui Liu, Zhao Liu, **Xiongchao Chen**, Supum Lee, Ge Wang, Albert Sinusas, Chi Liu.  
*Annual Meeting of Society of Nuclear Medicine and Molecular Imaging (SNMMI)*, 2021.

## UNDER REVIEW

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1. TAI-GAN: A Temporally and Anatomically Informed Generative Adversarial Network for early-to-late frame conversion in dynamic cardiac PET inter-frame motion correction.  
Xueqi Guo, Luyao Shi, **Xiongchao Chen**, Qiong Liu, Bo Zhou, Huidong Xie, Yi-Hwa Liu, Richard Palyo, Edward J. Miller, Albert J. Sinusas, Lawrence Staib, Bruce Spottiswoode, Chi Liu, Nicha C. Dvornek.  
Under review at *Medical Image Analysis*.
2. Unified Noise-aware Network for Low-count PET Denoising.  
Huidong Xie, Qiong Liu, Bo Zhou, **Xiongchao Chen**, Xueqi Guo, Chi Liu.  
Under review at *IEEE Transactions on Radiation and Plasma Medical Sciences*.
3. Population-based Deep Image Prior for Dynamic PET Denoising: A Data-driven Approach to Improve Parametric Quantification.  
Qiong Liu, Yu-Jung Tsai, Jean-Dominique Gallezot, Xueqi Guo, Ming-Kai Chen, Darko Pucar, Colin Young, Vladimir Panin, Michael Casey, Tianshun Miao, Huidong Xie, **Xiongchao Chen**, Bo Zhou, Richard Carson, Chi Liu.  
Under review at *Medical Image Analysis*.
4. Parametric  $^{18}\text{F}$ -flutemetamol PET Imaging for Cardiac Amyloidosis.  
Qiong Liu, Tiantian Shi, Paul Gravel, Ramesh Fazzone-Chettiar, Koen Van Laere, Xueqi Guo, Liang Guo, Huidong Xie, **Xiongchao Chen**, Bo Zhou, Yi-Hwa Liu, Richard Carson, Chi Liu, Edward Miller.  
Under review at *Journal of Nuclear Medicine*.

## PATENTS

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1. CT-free Attenuation Correction for SPECT Using Deep learning with Imaging and Non-Imaging Information. **US Patent**.  
**Xiongchao Chen**, Bo Zhou, Chi Liu. 2022.
2. A Sub-Micron Lensfree Microscopic Imaging System based on Deep Neural Network.  
Peng Fei, Peiyu Liao, **Xiongchao Chen**. 2019.
3. A Sub-Pixel Displacement Image Device and its Application.  
Peng Fei, Peiyu Liao, **Xiongchao Chen**. 2019.
4. A Vision-Based Intelligent Tennis Robot.  
Junfeng Wu, Yanyu Peng, Zhuang Wang, Qi Yang, Wuyi Zhang, **Xiongchao Chen**. 2018.
5. A Circular and Quasi-Circular Visual Inspection Method and System.  
Qi Yang, Junfeng Wu, **Xiongchao Chen**, Qiansong Deng. 2018.
6. A Narrowband Optical Notch Filter.  
Changjian Ke, Yibo Zhong, **Xiongchao Chen**. 2017.

## TEACHING

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YALE ENAS 510: Physical and Chemical Basis of Bioimaging and Biosensing (TA) 2021 Fall

## PROFESSIONAL ACTIVITIES

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### Journal Review:

IEEE Transactions on Medical Imaging (TMI)

European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI) Physics

European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI) Research

Frontiers in Medicine

### Conference Review:

Medical Image Computing and Computer Assisted Intervention (MICCAI) '2023

Medical Image Computing and Computer Assisted Intervention (MICCAI) Educational Challenge '2023

Medical Image Computing and Computer Assisted Intervention (MICCAI) Educational Challenge '2022

### Membership:

IEEE, MICCAI, SNMMI, ASNC, RSNA

## SKILLS

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### Programming

Python, MATLAB, C/C++, L<sup>A</sup>T<sub>E</sub>X.

### Imaging Research

Pytorch, OpenCV, ITK-Snap, AMIDE, AMIRA, etc.

### Clinical Tools & Protocols

Carimas, WLCQ, etc.

## LANGUAGES

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**Chinese** Native or bilingual proficiency.

**English** Full professional proficiency.