

# XIONGCHAO CHEN

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## RESEARCH INTERESTS

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Deep learning-enabled medical imaging and imaging analysis techniques for reconstruction, registration, attenuation correction, and denoising of PET/SPECT, CT, and MRI.

## EDUCATION

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**Yale University** 2019 - Present  
Ph.D. in Biomedical Engineering, Fellowship

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

## EXPERIENCE

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**Siemens Healthineers (US)** Jun. 2022 - Sept. 2022  
Research Intern, Advisors: Dr. Zhigang Peng

**PET Center, Yale University** Dec. 2019 - Present  
Graduate Research Assistant, Advisors: Prof. Chi Liu

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

**Advanced Manufacturing Lab, Purdue University** Jun. 2018 - Nov. 2018  
Undergraduate Research Assistant, Advisors: Prof. Wenzhuo Wu

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

## AWARDS AND HONORS

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Young Investigator Award, SNMMI Annual Meeting 2022 2022  
Student Travel Award, MICCAI 2022 2022  
Young Investigator Award Finalist, 2021 ASNC Annual Meeting 2021  
Honored Undergraduate Student Awards, PRC (Top 1%) 2017  
National Scholarship, PRC (Top 1%) 2017  
Outstanding Undergraduates in Terms of Academic Performance (Top 1%) 2017  
The 1<sup>st</sup> Prize of the National Mathematics Competition, PRC 2016

## PUBLICATIONS

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- 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.
- 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.

3. 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.
4. Deep-learning-based methods of attenuation correction for SPECT and PET.  
**Xiongchao Chen**, Chi Liu.  
**Journal of Nuclear Cardiology (IF: 5.952)**, 2022.
5. 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.
6. Dual-Domain Cross-Iteration Squeeze-Excitation Network for Sparse Reconstruction of Brain MRI.  
**Xiongchao Chen**, Yoshihisa Shinagawa, Zhigang Peng, Gerardo Hermosillo Valadez.  
**arXiv preprint**, 2022.
7. 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.
8. 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.
9. 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**, 2022.
10. 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.
11. 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.
12. Adaptive super-resolution enabled on-chip contact microscopy.  
Hao Zhang\*, **Xiongchao Chen\***, Tingting Zhu, Chengqiang Yi, Peng Fei.  
**Optics Express (IF: 3.894)**, 2021.
13. 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.
14. Super-resolution generative adversarial network (SRGAN) enabled on-chip contact microscopy.  
Hao Zhang, Tingting Zhu, **Xiongchao Chen**, Lanxin Zhu, Di Jin, Peng Fei.

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\*Equal Contribution

## CONFERENCES

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1. Dual-Branch 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 Computing and Computer-Assisted Intervention (**MICCAI**) 2022.
2. 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.
3. DuDoSS: Deep-Learning-Based Dual-Domain Sinogram Synthesis from Sparsely Sampled Projections of Cardiac SPECT. (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.
4. 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.
5. 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.
6. 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.
7. 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.
8. CT-free attenuation correction for dedicated cardiac SPECT using a 3D dual squeeze-and-excitation residual dense network. (Young Investigator Award Session)  
**Xiongchao Chen**, Bo Zhou, Luyao Shi, Hui Liu, Yulei Pang, Rui Wang, Edward J Miller, Albert J Sinusas, Chi Liu.  
Annual Scientific Session and Exhibition of the American Society of Nuclear Cardiology (**ASNC**) 2021.

## UNDER REVIEW

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1. DuSFE: Dual-Channel Squeeze-Fusion-Excitation Co-Attention for Cross-Modality Registration of Cardiac SPECT and CT.  
**Xiongchao Chen\***, Bo Zhou\*, Huidong Xie, Xueqi Guo, Jiazhen Zhang, James S. Duncan, Edward J. Miller, Albert J. Sinusas, John A. Onofrey, Chi Liu.  
Under review at **Medical Image Analysis**.
2. Dual-Domain Residual Connected Framework for Joint Denoising, Few-Angle Reconstruction, and Attenuation Correction of Dedicated Cardiac SPECT.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Qiong Liu, Albert J. Sinusas, Chi Liu.  
Under review at **MICCAI (2023)**.

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\*Equal Contribution

3. Joint Denoising and Few-Angle Reconstruction for Dedicated Cardiac SPECT Using Learnable Data Consistency.  
**Xiongchao Chen**, Bo Zhou, Huidong Xie, Xueqi Guo, Qiong Liu, Albert J. Sinusas, Chi Liu.  
Under review at **MICCAI (2023)**.
4. 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.  
Under review at **IEEE Transactions on Medical Imaging**.
5. 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.  
Under review at **IEEE Transactions on Radiation and Plasma Medical Sciences**.
6.  $^{99m}\text{Tc}/^{123}\text{I}$  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.  
Under review at **IEEE Transactions on Radiation and Plasma Medical Sciences**.

## PATENTS

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1. CT-free Attenuation Correction for SPECT Using Deep learning. **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
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## PROFESSIONAL ACTIVITIES

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### Journal Review:

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

### Conference Review:

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

### Membership:

IEEE, MICCAI, SNMMI, ASNC

## SKILLS

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<b>Programming</b>	Python, MATLAB, C/C++, L <sup>A</sup> T <sub>E</sub> X.
<b>Imaging Research</b>	Pytorch, OpenCV, ITK-Snap, AMIDE, AMIRA, etc.
<b>Clinical Tools &amp; Protocols</b>	Carimas, WLCQ, etc.

## LANGUAGES

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<b>Chinese</b>	Native or bilingual proficiency.
<b>English</b>	Full professional proficiency.