

Junyu Chen

11/28/2022

## DEMOGRAPHIC AND PERSONAL INFORMATION

### Current Appointments

Jan. 2023 – Present      Research Associate (Faculty), Radiological Physics Division, Dept. of Radiology and Radiological Science, Johns Hopkins Medical Institute

### Personal Data

601 N. Caroline St., JHOC Room 4250, Baltimore, MD, 21287  
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Website: <https://junyuchen245.github.io/> GitHub: <https://github.com/junyuchen245>

### Education and Training

Jan. 2013 – May. 2017      B.Sc., Summa Cum Laude, Computer Engineering, North Carolina State University

Jan. 2013 – May. 2017      B.Sc., Summa Cum Laude, Electrical Engineering, North Carolina State University

May. 2017 – May. 2019      M.S.E., Electrical and Computer Engineering, Johns Hopkins University,  
Advised by: Dr. Eric C. Frey

May. 2019 – Oct. 2022      Ph.D., Electrical and Computer Engineering, Johns Hopkins University,  
Advised by: Dr. Eric C. Frey and Dr. Yong Du

### Professional Experience

Jun. 2015 – Aug. 2015      Application Engineer Intern, Analog Devices, Inc.

Aug. 2016 – Dec. 2016      Undergraduate Research Fellow, The NSF Research Center for ASSIST, NC State University

May. 2016 – Jun. 2017      Undergraduate Research Assistant, ARoS Lab, NC State University,  
Advised by: Dr. Edger Lobaton

Jun. 2020 – Oct. 2021      PET Image Reconstruction and Quality Scientist Intern, Canon Medical Research USA, Inc.,  
Supervised by: Dr. Evren Asma; Mentored by: Dr. Chung Chan

Sep. 2017 – Dec. 2022      Research Associate (Faculty), Radiological Physics Division, Dept. of Radiology and Radiological Science, Johns Hopkins Medical Institute

## PUBLICATIONS ([Find Junyu Chen on Google Scholar](#))

### Original Research

1. **Chen, J.**, Li, Y., Du, Y., & Frey, E. C. (2020). Generating Anthropomorphic Phantoms Using Fully Unsupervised Deformable Image Registration with Convolutional Neural Networks. *Medical Physics*, 47: 6366-6380. [Editor's Choice]
2. Li, Y., **Chen, J.**, Brown, J. L., Treves, S. T., Cao, X., Fahey, F. H., ... & Frey, E. C. (2021). DeepAMO: a multi-slice, multi-view anthropomorphic model observer for visual detection tasks performed on volume images. *Journal of Medical Imaging*, 8(4), 041204.
3. **Chen, J.**, Li, Y., Luna, L. P., Chung, H. W., Rowe, S. P., Du, Y., Solnes, L. B., & Frey, E. C. (2021). Learning Fuzzy Clustering for SPECT/CT Segmentation via Convolutional Neural Networks. *Medical Physics*.
4. Jang, S. I., Pan, T., Li, Y., Heidari, P., **Chen, J.**, Li, Q., & Gong, K. (2022). Spach Transformer: Spatial and Channel-wise Transformer Based on Local and Global Self-attentions for PET Image Denoising. *arXiv preprint arXiv:2209.03300*. (Submitted to *IEEE Transactions on Medical Imaging*)
5. **Chen, J.**, Frey, E. C., He, Y., Segars, W. P., Li, Y., & Du, Y. (2022). Transmorph: Transformer for unsupervised medical image registration. *Medical Image Analysis*, 82, 102615.
6. Li, J.\*, **Chen, J.\* (Co-first author)**, Tang, Y.\*, Wang, C., Landman, B. A., & Zhou, S. K. (2022). Transforming medical imaging with Transformers? A comparative review of key properties, current progresses, and future perspectives. *arXiv preprint arXiv:2206.01136*. <https://arxiv.org/abs/2206.01136>. [\*: Equal contributions, submitted to *Medical Image Analysis*]
7. Li, Y., Brown, J. L., Xu, J., **Chen, J.**, Ghaly, M., ... & Frey, E. C. (2023). Girth-based Administered Activity for Pediatric <sup>99m</sup>Tc-DMSA SPECT. *Medical Physics*. [Submitted]
8. Li, Y., **Chen, J.**, Jang, S., Gong, K., & Li, Q. (2023). Multi-Modal Swin UNETR for Head-and-Neck Segmentation in PET/CT Scans. [In preparation]

### Conference Proceedings

1. Zhong, B., Qin, Z., Yang, S., **Chen, J.**, Mudrick, N., Taub, M., ... & Lobaton, E. (2017, December). Emotion recognition with facial expressions and physiological signals. In *2017 IEEE Symposium Series on Computational Intelligence (SSCI)* (pp. 1-8). IEEE.

2. Li, X., Chen, L., & **Chen, J.**, (2017, December). A visual saliency-based method for automatic lung regions extraction in chest radiographs. In 2017 14th International Computer Conference on Wavelet Active Media Technology and Information Processing (ICCWAMTIP) (pp. 162-165). IEEE.
3. Li, X., Yang, F., Cheng, H., **Chen, J.**, Guo, Y., & Chen, L. (2017, October). Multi-scale cascade network for salient object detection. In Proceedings of the 25th ACM international conference on Multimedia (pp. 439-447).
4. **Chen, J.**, Jha, A. L., & Frey, E. C. (2019). Incorporating CT prior information in the robust fuzzy C-means algorithm for QSPECT image segmentation. Proc. SPIE 10949, Medical Imaging 2019: Image Processing.
5. **Chen, J.**, & Frey, E. C. (2020, January). Medical Image Segmentation via Unsupervised Convolutional Neural Network. In Medical Imaging with Deep Learning (MIDL). [Short oral presentation]
6. **Chen, J.**, Li, Y., Du, Y., & Frey, E. (2021). Creating Anthropomorphic Phantoms via Unsupervised Convolutional Neural Networks. In Medical Imaging with Deep Learning (MIDL). [Short oral presentation]
7. **Chen, J.**, He, Y., Frey, E. C., Li, Y., & Du, Y. (2021). ViT-V-Net: Vision Transformer for Unsupervised Volumetric Medical Image Registration. In Medical Imaging with Deep Learning (MIDL). [Short oral presentation]
8. **Chen, J.**, Asma, E., & Chan, C. (2021). Targeted Gradient Descent: A Novel Method for Convolutional Neural Networks Fine-tuning and Online-learning. In International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). [Oral presentation, provisionally accepted, top 13% of 1630 papers]
9. Li, Y., Cui, J., **Chen, J.**, Zeng, G., Wollenweber, S., Jansen, F., ... & Li, Q. (2022). A Noise-level-aware Framework for PET Image Denoising. International Workshop on Machine Learning for Medical Image Reconstruction. Springer, Cham.
10. **Chen, J.**, Frey, E., & Du, Y. (2022, May). Unsupervised Learning of Diffeomorphic Image Registration via TransMorph. In 10th International Workshop on Biomedical Image Registration. [Long oral presentation]
11. Li, Y., **Chen, J.**, Jang, S., Gong, K., & Li, Q. (2022). Investigation of Network Architecture for Multimodal Head-and-Neck Tumor Segmentation. In 2022 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC). IEEE.
12. Liu, Y., **Chen, J.**, Wei, S., Carass, A., & Prince, J. (2023). Questioning Finite Differences Based Diffeomorphism in Deformable Image Registration. [In preparation]

#### Abstract Publications

1. **Chen, J.**, Frey, E. C., & Lodge, M. A. (2019). Accuracy of PET/CT quantification in bone. Journal of Nuclear Medicine 60 (supplement 1), 1201-1201.
2. Li, Y., **Chen, J.**, Brown, J., Treves, S. T., Cao, X., Fahey, F., ... & Frey, E. (2020). DeepAMO: An Anthropomorphic Model Observer for Visual Detection Tasks in Volume Images. Journal of Nuclear Medicine, 61(supplement 1), 1427-1427.
3. **Chen, J.**, Li, Y., & Frey, E. (2020). A fully unsupervised approach to create patient-like phantoms via convolutional neural networks. Journal of Nuclear Medicine, 61(supplement 1), 522-522. [Oral presentation]
4. **Chen, J.**, Li, Y., Du, Y., Luna, L., Rowe, S., & Frey, E. (2021). Semi-supervised SPECT segmentation using convolutional neural networks. Journal of Nuclear Medicine 62 (supplement 1), 1423-1423.
5. Li, Y., Brown, J., Xu, J., **Chen, J.**, Ghaly, M., Cao, X., Du, Y., Fahey, F., Bolch, W., Sgouros, G., & Frey, E. (2022). Justification for and In Silico Evaluation of a New Local-body-morphometry Based Dosing Method for Pediatric <sup>99m</sup>Tc-DMSA SPECT. Journal of Nuclear Medicine 63 (supplement 1). [Oral presentation]
6. Jang, S., Pan, T., Li, Y., **Chen, J.**, Li, Q., & Gong, K. (2022). PET image denoising based on transformer: evaluations on datasets of multiple tracers. Journal of Nuclear Medicine 63 (supplement 1). [Oral presentation]
7. **Chen, J.**, Frey, E., & Du, Y. (2022). Class-incremental learning for multi-organ segmentation. Journal of Nuclear Medicine 63 (supplement 1). [Oral presentation]

## EDUCATIONAL ACTIVITIES

### Teaching

#### Teaching Assistantship

Jan. 2017 – May. 2017	Teaching Assistant, ECE 211 Electric Circuits, NC State University
Jan. 2019 – May. 2019	Course Assistant, EN520.623 Medical Image Analysis, Johns Hopkins University, Course taught by: Dr. Jerry Prince
Aug. 2019 – Dec. 2019	Teaching Assistant, EN520.632 Medical Imaging Systems, Johns Hopkins University Course taught by: Dr. Muyinatu A. Bell
Aug. 2020 – Dec. 2020	Teaching Assistant, EN520.632 Medical Imaging Systems, Johns Hopkins University Course taught by: Dr. Muyinatu A. Bell
Aug. 2021 – Dec. 2021	Teaching Assistant, EN520.632 Medical Imaging Systems, Johns Hopkins University Course taught by: Dr. Muyinatu A. Bell
Aug. 2022 – Dec. 2022	Teaching Assistant, EN520.632 Medical Imaging Systems, Johns Hopkins University Course taught by: Dr. Muyinatu A. Bell

## RESEARCH ACTIVITIES

### Research Focus

Junyu's research focuses on image analysis and deep learning applied to nuclear medicine imaging. He is currently working on develop quantitative imaging methods for assessing the response of metastatic bone diseases to therapy.

## Research Assistantship

- Aug. 2016 – Dec. 2016 Undergraduate Research Fellow, The NSF Research Center for ASSIST, NC State University
- Developed real-time QRS-Complex detection in an Android app (Java)
- May. 2016 – Jun. 2017 Undergraduate Research Assistant, ARoS Lab, NC State University,  
Advised by: Dr. Edger Lobaton
- Developed Empirical Mode Decomposition adaptive filter for removing motion artifacts from ECG signal
- Jun. 2020 – Oct. 2021 PET Image Reconstruction and Quality Scientist Intern, Canon Medical Research USA, Inc.,  
Supervised by: Dr. Evren Asma, Mentored by: Dr. Chung Chan
- Developed novel network transfer learning techniques for PET image denoising
  - Developed deep-learning-based PET image resolution improvement methods
- Sep. 2017 – Oct. 2022 Research Assistant, Radiological Physics Division, Johns Hopkins University
- Developed image segmentation methods for prostate cancer bone metastases in SPECT/CT image
  - Developed image registration methods for generating anatomical variations of digital phantoms (XCAT phantom)
  - Developed physical phantom that mimics the attenuation and density properties of human bone
  - Assessed the quantitative accuracy of PET/CT and SPECT/CT methods for evaluating tumor response to therapy

## Patents

- Jul. 2021 Targeted gradient descent for convolutional neural networks fine-tuning and online-learning  
Chan, C., **Chen, J.**, Asma E., Kolthammer J., Canon Medical Research USA, Inc.  
Provisional patent filed, non-provisional patent in process

## ORGANIZATIONAL ACTIVITIES ([Find Junyu Chen on Publons](#))

### Journal Peer Review Activities

1. Medical Physics
2. Computer Methods and Programs in Biomedicine
3. IEEE Access
4. Quantitative Imaging in Medicine and Surgery
5. IEEE Transactions on Medical Imaging
6. IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control
7. IEEE Transactions on Radiation and Plasma Medical Sciences
8. IEEE Journal of Biomedical and Health Informatics
9. Medical & Biological Engineering & Computing

### Conference Peer Review Activities

1. International Conference on Medical Imaging with Deep Learning (MIDL)
2. International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)

### Professional Societies

- 2018 – Present Society of Nuclear Medicine and Molecular Imaging (SNMMI), Scientist-in-Training
- 2018 – Present Institute of Electrical and Electronics Engineers (IEEE), Student Member
- 2018 – Present Society of Photo-Optical Instrumentation Engineers (SPIE), Student Member
- 2018 – Present Association for Computing Machinery (ACM), Student Member
- 2020 – Present The Medical Image Computing and Computer Assisted Intervention Society (MICCAI), Student Member

## RECOGNITION

### Invited talks

- Jun. 2022 “Deep learning for medical image analysis” @ [CAMCA at Massachusetts General Hospital/Harvard Medical School](#)
- Jun. 2022 “Deep learning for medical image analysis” @ [RPD at Johns Hopkins Medical Institute](#)
- Feb. 2022 “Deep learning for medical image analysis” @ [PlenaryAI](#)

### Awards, Honors

- 2015 – 2017 Dean’s list with perfect 4.0 GPA, North Carolina State University
- 2019 – 2022 Fully Funded Graduate Assistantship, Radiological Physics Division, Johns Hopkins Medical Institute
- 2022 [SNMMI](#) Student Research Grant Award: Discovering Molecular Imaging

### In News

- Oct. 2021 Featured on the second page of [MICCAI daily](#)

## OTHER PROFESSIONAL ACCOMPLISHMENTS

### Posters

- Mar. 2019 “Incorporating CT prior information in the robust fuzzy C-means algorithm for QSPECT image segmentation” @ SPIE Medical Image
- Jun. 2019 “Accuracy of PET/CT quantification in bone” @ SNMMI Annual Meeting
- Jun. 2021 “Semi-supervised SPECT segmentation using convolutional neural networks” @ SNMMI Annual Meeting

### Oral Presentations

- Jun. 2020 “A fully unsupervised approach to create patient-like phantoms via convolutional neural networks” @ SNMMI Annual Meeting
- Jul. 2020 “Medical Image Segmentation via Unsupervised Convolutional Neural Network” @ Medical Imaging with Deep Learning
- Jul. 2021 “Creating Anthropomorphic Phantoms via Unsupervised Convolutional Neural Networks” @ Medical Imaging with Deep Learning
- Jul. 2021 “ViT-V-Net: Vision Transformer for Unsupervised Volumetric Medical Image Registration” @ Medical Imaging with Deep Learning
- Oct. 2021 “Targeted Gradient Descent: A Novel Method for Convolutional Neural Networks Fine-tuning and Online-learning.” @ International Conference on Medical Image Computing and Computer-Assisted Intervention
- Jun. 2022 “Class-incremental learning for multi-organ segmentation.” @ SNMMI Annual Meeting
- July. 2022 “Unsupervised Learning of Diffeomorphic Image Registration via TransMorph.” @ Workshop on Biomedical Image Registration
- Oct. 2022 “A Novel Decoder for Learning-based Diffeomorphic Image Registration.” @ MICCAI Workshop on Learn2Reg