CURRICULUM VITAE
The Johns Hopkins University

Junyu Chen 10/05/2023

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments

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

Personal Data

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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 Faculty Research Associate, Radiological Physics Division, Dept. of Radiology and Radiological Science, Johns Hopkins Medical Institutes

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, IF=4.506]
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. [IF=4.506]
4. **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. [IF=13.828, 109 citations to date]
5. 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. Medical Image Analysis, 102762. [IF=13.828]
6. Li, Y., Brown, J. L., Xu, J., **Chen, J.**, Ghaly, M., … & Frey, E. C. (2023). Girth-based Administered Activity for Pediatric ^{99m}Tc-DMSA SPECT. Medical Physics. [IF=4.506]
7. Li, Y., **Chen, J.**, Jang, S., Gong, K., & Li, Q. (2023). SwinCross: Cross-modal Swin Transformer for Head-and-Neck Tumor Segmentation in PET/CT Images. Medical Physics. [IF=4.506]
8. Jang, S. I., Pan, T., Li, Y., Heidari, P., **Chen, J.**, Li, Q., & Gong, K. (2023). Spach Transformer: Spatial and Channel-wise Transformer Based on Local and Global Self-attentions for PET Image Denoising. IEEE Transactions on Medical Imaging. [Accepted, IF=11.56]
9. **Chen, J.* (Co-first author)**, Liu, Y.*****, Wei, S.*****, Bian, Z., Subramanian, S., Carass, A., Prince, J. L., & Du, Y. (2023). A survey on deep learning in medical image registration: new technologies, uncertainty, evaluation metrics, and beyond. arXiv preprint arXiv:2307.15615. [Submitted to Medical Image Analysis]

10. Li, Y., Zhao, L., Amindarolzarbi, A., Mena, E., Leal, J., **Chen, J.**, …, Bai, H. X. (2023). An Automated Deep Learning-based Framework for Uptake Segmentation and Classification on PSMA PET/CT/ Imaging of Patients with Prostate Cancer. [Submitted to Journal of Nuclear Medicine]
11. Liu, Y., **Chen, J.**, Wei, S., Carass, A., & Prince, J.L. (2023). On Finite Difference Jacobian Computation in Deformable Image Registration. arXiv preprint arXiv:2212.06060. [Submitted to International Journal of Computer Vision]
12. **Chen, J.**, Liu, Y., He, Y., & Du, Y. (2023). Spatially-varying Regularization with Conditional Transformer for Unsupervised Image Registration. arXiv preprint arXiv:2303.06168.
13. Liu, Y., **Chen, J.**, Zuo, L., Du, Y., Carass, A., & Prince, J. L. (2023). Vector Field Attention for Deformable Image Registration. [Submitted to IEEE Transactions on Medical Imaging]

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, 99 citations to date]
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 Internatioal 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. Bian, Z., Wei, S., Liu, Y., **Chen, J.**, Zhuo, J., Xing, F., ... & Prince, J. L. (2023). MomentaMorph: Unsupervised Spatial-Temporal Registration with Momenta, Shooting, and Correction. In International Workshop on Time-Series Data Analytics and Learning.
13. **Chen, J.**, Liu, Y., He, Y., & Du, Y. (2023). Deformable Cross-Attention Transformer for Medical Image Registration. In 13th International Workshop on Machine Learning in Medical Imaging (MLMI). [Oral presentation]

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 99mTc-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]
8. **Chen, J.**, Leal, J., Rowe, S., Pomper, M., & Du, Y. (2023). Constructing PET/CT Atlas for PSMA Dosimetry. Journal of Nuclear Medicine 64 (supplement 1). [Oral presentation]

FUNDING

INTRAMURAL Funding

2023 Constructing Whole-body PET/CT Atlas for PSMA Therapy Dosimetry

Johns Hopkins Discovery Award
Johns Hopkins University
100,000
Junyu Chen (PI)

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 developing 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 Chan, C., **Chen, J.**, Evren, A., & Kolthammer, J. (2023).
Targeted Gadient Descent for Convolutional Neural Networks Fine-tuning and Online-learning
U.S. Patent Application No.17/469,144.

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 Transactions on Image Processing
9. IEEE Journal of Biomedical and Health Informatics

10. Medical & Biological Engineering & Computing
11. Medical Image Analysis
12. European Radiology
13. Pattern Recognition
14. Nature Biomedical Engineering

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), Member
2018 – Present Institute of Electrical and Electronics Engineers (IEEE), Member
2018 – Present Society of Photo-Optical Instrumentation Engineers (SPIE), Member
2018 – Present Association for Computing Machinery (ACM), Member
2020 – Present The Medical Image Computing and Computer Assisted Intervention Society (MICCAI), Member

RECOGNITION

Invited talks

Feb. 2022 "Deep learning for medical image analysis" @ PlenaryAI
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
Jan. 2023 "Transforming medical imaging with Transformers?" @ Cleerly Health
Apr. 2024 "Transformers for medical image registration" @ SIAT, Chinese Academy of Sciences

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
2023 IEEE NSS MIC RTSD Trainee Grant
2023 Johns Hopkins Discovery Award (PI)
2023 Honorable Mention for MICCAI 2023 Reviewer (out of 1,659 reviewers)

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
Jun. 2023 "Constructing PET/CT Atlas for PSMA Dosimetry." @ SNMMI Annual Meeting
Oct. 2023 "Deformable Cross-Attention Transformer for Medical Image Registration." @ MICCAI Workshop on MLMI