CURRICULUM VITAE
The Johns Hopkins University School of Medicine

(Signature) _____ _____
(Typed Name) **Jingyan Xu** **(Date of this version)**

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments:

Jan 2013-present Assistant Professor, Department of Radiology, School of Medicine, Johns Hopkins University

Personal Data:

The Russell H. Morgan Department of Radiology and Radiological Science
Johns Hopkins University School of Medicine
601 N. Caroline Street, JHOC 4263
Baltimore, MD 21287-0859
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Education and Training:

1996	BS, Electrical Engineering, Tsinghua University, Beijing, China
1999	MS, Electrical Engineering, Stanford University, Stanford, California
2003	PhD, Electrical Engineering, Stanford University, Stanford, California

Professional Experience:

2001-2002	Research engineer, SC Solutions, Inc, Sunnyvale, CA.
2003-2004	Postdoc intern, Robert Bosch Corp., Research and Technology Center, Palo Alto, CA
Mar 2004- Jul 2005	Postdoc fellow, Department of Radiology, School of Medicine, Johns Hopkins University, Baltimore, MD
Jul 2005 – Dec 2009	Research associate, Department of Radiology, School of Medicine, Johns Hopkins University, Baltimore, MD
Jan 2010 - Dec 2012	Instructor, Department of Radiology, School of Medicine, Johns Hopkins University, Baltimore, MD

PUBLICATIONS (* indicate corresponding author)

Original Research [OR]:

1. **Xu J***, Wang Y, Liu C, Frey EC and Tsui BMW. Attenuation correction for rotating multisegment slant-hole SPECT in breast imaging." *Physica Medica*, 2006, Vol XXI, Supplement 1, pp 44-47. PMID: 17645993
2. **Xu J***, Liu C, Wang Y, Frey EC, and Tsui BMW "Quantitative Rotating Multi-Segment Slant-Hole SPECT Mammography with Attenuation and Collimator-Detector Response Compensation." *IEEE Transactions on Medical Imaging*, Vol 26, No. 7, pp 906-916, 2007. PMID: 17649904
3. **Xu J*** and Tsui BMW "Electronic noise modeling in statistical iterative reconstruction*." IEEE Transactions on Image Processing*, 2009;18(6):1228-38. PMID: 19398410, PMCID: PMC3107070
4. Huang Q, **Xu J**, Tsui BMW, and Gullberg G. "Reconstructing uniformly attenuated rotating slant-hole SPECT projection data using the DBH method." *Physics in Medicine and Biology*, 2009;54(13):4325-39. PMID: 19531850, PMCID: PMC2871256
5. **Xu J**, Mahesh M, and Tsui BMW. "Is iterative reconstruction ready for MDCT? Journal of the American College of Radiology," *JACR 2009*; 6(4):274-6. PMID: 19327661, PMCID: PMC3084008.
6. Liu C, **Xu J,** Tsui BMW. "Myocardial Perfusion SPECT using A Rotating Multi-Segment Slant-Hole Collimator." *Medical Physics*, 37 1610 (2010). PMID: 20443482, PMCID: PMC2852444.

7. **Xu J***, Taguchi K and Tsui BMW. "Statistical projection completion in X-ray CT using consistency conditions." *Medical Imaging, IEEE Transactions on*, vol.29, no.8, pp.1528-1540, Aug. 2010. PMID: 20442046, PMCID: PMC3097419.
8. Taguchi K, **Xu J**, Srivastava S, Tsui , B MW, Cammin J, and Tang Q, "Interior region-of-interest reconstruction using a small, nearly piecewise constant subregion," *Med. Phys*. 38, 1307 (2011). PMID: 21520842, PMCID: PMC3055906.
9. Meier D, Wagenaar DJ, Chen S, **Xu J**, Yu J and Tsui BMW**.** A SPECT camera for combined MRI and SPECT for small animals", *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, Volume 652, Issue 1, 1 October 2011, Pages 731-734. PMID: 21966076 PMCID: PMC3181146.
10. **Xu J*** and Tsui BMW. "Iterative Image Reconstruction in Helical Cone-Beam X-ray CT Using a Stored System Matrix Approach," *Physics in Medicine and Biology*, 57 (2012) 3477-3497. PMID: 22581218.
11. **Xu J*** and Tsui BMW. "A graphical method for determining the in-plane rotation angle in circular cone-beam geometry," *Medical Imaging, IEEE Transactions on* , vol.31, no.3, pp.825-833, March 2012. PMID: 22231693.
12. **Xu J*** and Tsui BMW. "Interior and Sparse-View Image Reconstruction Using a Mixed Region and Voxel Based ML-EM Algorithm," *Nuclear Science, IEEE Transactions on* , vol.59, no.5, pp.1997-2007, Oct. 2012. https://doi.org/10.1109/TNS.2012.2202290
13. **Xu J*** and Tsui BMW. "An analytical geometric calibration method for circular cone-beam geometry," *Medical Imaging, IEEE Transactions on* , vol.32, no.9, pp.1731-1744, Sept. 2013. PMID: 23771316.
14. **Xu J*** and Tsui BMW. "Quantifying the importance of the statistical assumption in statistical x-ray CT image reconstruction," *Medical Imaging, IEEE Transactions on*, vol.33, no.1, pp.61-73, Jan. 2014. PMID: 24001989.
15. **Xu J***, Fuld MK, Fung, GSK, Tsui BMW. "Task-based image quality evaluation of iterative reconstruction methods for low dose CT using computer simulations", *Physics in Medicine and Biology*, 60(7) 2881-2901, April 2015. PMID:25776521.
16. **Xu J*** and Tsui BMW. "Improved intrinsic motion detection using time-of-flight PET", *IEEE Transactions on Medical Imaging,* vol.34, no.10, pp.2131-2145, Oct. 2015. https://doi.org/10.1109/TMI.2015.2423976 PMID: 25897950.
17. **Xu J*** and Noo F. "A sequential solution for anisotropic total variation image denoising with interval constraints", *Physics in Medicine and Biology*, 62(18) N428-N435, Sep. 2017. https://doi.org/10.1088/1361-6560/aa837d PMID: 28862998 PMCID: PMC5779866
18. **Xu J*,** Noo F, and Tsui BMW. "A direct algorithm for optimization problems with the Huber penalty", *IEEE transactions on medical imaging.* 2018 Jan;37(1):162-72. https://doi.org/10.1109/TMI.2017.2760104 PMID: 28981412 PMCID: PMC5779867
19. **Xu J*** and Noo F. "A robust regularizer for multiphase CT", *in IEEE Transactions on Medical Imaging,* vol. 39, no. 7, pp. 2327-2338, July 2020*,* https://doi.org/10.1109/TMI.2020.2969376 PMID: 31995477 PMCID: PMC7871172
20. Taguchi K., Sauer T.J., Segars W.P., Frey E.C., **Xu J.**, Liapi E., Stayman J.W., Hong K., Hui F.K., Unberath, M. and Du, Y. (2020), Three-dimensional regions-of-interest–based intra-operative four-dimensional soft tissue perfusion imaging using a standard x-ray system with no gantry rotation: A simulation study for a proof of concept. *Med Phys*. https://doi.org/10.1002/mp.14514. PMID: 33006759 PMCID: PMC7796930
21. **Xu J*** and Noo F. "Patient-specific hyperparameter learning for optimization-based CT image reconstruction." *Physics in Medicine & Biology* 66.19 (2021): 19NT01. PMID: 34186530 PMCID: PMC8584383
22. **Xu J*** and Noo F. "Efficient gradient computation for optimization of hyperparameters." *Physics in Medicine & Biology* (2021). https://doi.org/10.1088/1361-6560/ac4442. PMID: 34920440
23. Shao W, Leung KH, **Xu J,** Coughlin JM, Pomper MG, Du Y. Generation of Digital Brain Phantom for Machine Learning Application of Dopamine Transporter Radionuclide Imaging. *Diagnostics* **2022**, *12*, 1945. https://doi.org/10.3390/diagnostics12081945 PMID: 36010295 PMCID: PMC9406894
24. **Xu J*** and Noo F, "Linearized Analysis of Noise and Resolution for DL-Based Image Generation," in *IEEE Transactions on Medical Imaging*, vol. 42, no. 3, pp. 647-660, March 2023, https://doi.org/10.1109/TMI.2022.3214475 PMID: 36227827 PMCID: PMC10132822

25. Li Y, Brown J, **Xu J**, Chen J, Ghaly M, Dugan M, Cao X, Du Y, Fahey FH, Bolch W, Sgouros G, Frey EC, "Girth-based Administered Activity for Pediatric 99mTc-DMSA SPECT", *Medical Physics*, 2023, https://doi.org/10.1002/mp.16602 PMID: 37482927 PMCID: PMC10799972
26. **Xu J**, "On the bias in the AUC variance estimate", *Pattern Recognition Letters* (178). February 2024, Pages 62-68. doi: https://doi.org/10.1016/j.patrec.2023.12.012. PMID: 38186922 PMCID: PMC10768968
27. **Xu J**, "Comparing multi-class classifier performance by multi-class ROC analysis: A nonparametric approach", *Neurocomputing*, accepted, March 2024. https://doi.org/10.1016/j.neucom.2024.127520

Review Articles [RA] (Peer-reviewed)

1. **Xu J*** and Noo F. "Convex optimization algorithms in medical image reconstruction–in the age of AI." *Physics in Medicine & Biology* (2021). https://doi.org/10.1088/1361-6560/ac3842. PMID: 34757943 PMCID: PMC10405576

Book chapters, Monographs [BC]

1. Tsui BMW, Feng T, Wang J, **Xu J**, Abraham MR, Zimmerman SL, Schindler T, "Advances in 4D Gated Cardiac PET Imaging for Image Quality Improvement and Cardiac Motion and Contractility Estimation," Perspectives on Nuclear Medicine for Molecular Diagnosis and Integrated Therapy, pp 3-16, Springer, Japan
2. Tsui BMW, **Xu J**, Rittenbach A, Hugg JW, Parnham KB, "Development of a second-generation whole-body small-animal SPECT/MR imaging system," Hybrid Imaging in Cardiovascular Medicine. 57-74, CRC Press.

Peer reviewed conference proceeding articles (4+ page conference papers)

1. Liu C, Tsui BMW, Baird WH, **Xu J**, Wang Y, Frey, EC, "Evaluation of rotating slant hole SPECT mammography with respect to planar scintimammography using Monte Carlo simulation methods", IEEE Symposium Conference Record Nuclear Science 2004., Rome, Italy, 2004, pp. 4063-4067. https://doi.org/10.1109/NSSMIC.2004.1466786
2. Liu C, Volokh L, Zhao X, **Xu J**, Lee TS, and Tsui BMW, "Performance evaluation of block-iterative algorithms for SPECT reconstruction," IEEE Nuclear Science Symposium Conference Record, 2005*, Fajardo, PR, USA, 2005, pp. 1827-1831*. https://doi.org/10.1109/NSSMIC.2005.1596676
3. **Xu J**, Liu C, Tsui BMW, "Investigation of Imaging Characteristics of Rotating Multi-segment Slant-hole SPECT Mammography Using Signal-to-Noise Ratio Criterion," IEEE Nuclear Science Symposium Conference Record, 2005, Fajardo, PR, USA, 2005, pp. 1535-1538. https://doi.org/10.1109/NSSMIC.2005.1596610
4. **Xu J**, Tsui BMW, Wang Y, Liu C, and Frey EC, "Quantitative Rotating Multi-Segment Slant-Hole SPECT Mammography with Attenuation and Collimator-Detector Response Compensation," Proceedings of the Fully 3D image reconstruction meeting in radiology and nuclear medicine, Salt Lake City, Utah, 2005, pp. 311- 315, 2005.
5. Liu C, **Xu J**, and Tsui BMW, "The Effects of Object Variability on the Channelized Hotelling Observer Performance in the Evaluation of R4SSH and PH Myocardial Perfusion SPECT," 2006 IEEE Nuclear Science Symposium Conference Record, San Diego, CA, USA, 2006, pp. 1995-1999. https://doi.org/10.1109/NSSMIC.2006.354304
6. Frey EC, Wang X, Du Y, Taguchi K, **Xu J**, and Tsui BMW. "Investigation of the use of photon counting x-ray detectors with energy discrimination capability for material decomposition in micro-computed tomography" Proc. SPIE 6510, Medical Imaging 2007: Physics of Medical Imaging, 65100A (16 March 2007); https://doi.org/10.1117/12.711711
7. Frey EC, Taguchi K, Kapusta M, **Xu J**, Orskaug T, Wagenaar D, Patt B, and Tsui, BMW, Microcomputed tomography with a photon-counting x-ray detector" Proc. SPIE 6510, Medical Imaging 2007: Physics of Medical Imaging, 65101R (15 March 2007); https://doi.org/10.1117/12.711647
8. **Xu J**, Frey EC, Taguchi K, and Tsui BMW, "A Poisson likelihood iterative reconstruction algorithm for material decomposition in CT," Proc. SPIE 6510, Medical Imaging 2007: Physics of Medical Imaging, 65101Z (16 March 2007); https://doi.org/10.1117/12.713727
9. Taguchi K, Zhang M, Frey EC, and **Xu J**. "Image-domain material decomposition using photon-counting CT", Proc. SPIE 6510, Medical Imaging 2007: Physics of Medical Imaging, 651008 (16 March 2007); https://doi.org/10.1117/12.713508

10. **Xu J** and Tsui BMW. "A compound Poisson maximum likelihood iterative reconstruction algorithm for x-ray CT." Proceedings of the Fully 3D image reconstruction meeting in radiology and nuclear medicine, 2007, pp 108 – 112, Lindau, Germany.
11. Wang X, **Xu J**, and Frey EC. "Optimization of energy window widths in basis material decomposition using a multi-window photon counting X-ray detector," *2007 IEEE Nuclear Science Symposium Conference Record*, Honolulu, HI, 2007, pp. 3826-3829, https://doi.org/10.1109/NSSMIC.2007.4436955
12. Huang Q, **Xu J**, Tsui BMW, and Gullberg G. "Reconstructing uniformly attenuated rotating slant-hole SPECT projection data using the DBH method." 2008 IEEE Nuclear Science Symposium Conference Record*, Dresden, Germany, 2008*, pp. 5438-5441, https://doi.org/10.1109/NSSMIC.2008.4774484
13. **Xu J** and Tsui BMW. "Electronic noise compensation in iterative x-ray CT reconstruction" Proceedings Volume 6913, Medical Imaging 2008: Physics of Medical Imaging; 69132H (2008) https://doi.org/10.1117/12.772843 , Feb 16-21, 2008, San Diego, California, United States
14. Wang X, **Xu J**, Taguchi K, Patt BE, Wagenaar DJ, and Frey EC. "Enhanced discrimination of calcified and soft arterial plaques using computed tomography with a multi-energy-window photon counting x-ray detector." Proc. SPIE 7258, Medical Imaging 2009: Physics of Medical Imaging, 72583W (13 March 2009); https://doi.org/10.1117/12.813877
15. **Xu J**, Taguchi K, Gullberg G, and Tsui BMW. "A dual formulation of a penalized maximum likelihood X-ray CT reconstruction problem." Proc. SPIE 7258, Medical Imaging 2009: Physics of Medical Imaging, 725828 (13 March 2009); https://doi.org/10.1117/12.813873
16. **Xu J**, Taguchi K, and Tsui BMW. Statistical projection completion in x-ray CT using consistency conditions. Proceedings of the 10th International meeting on fully 3D image reconstruction in radiology and nuclear medicine, pp 246 -- pp 250. Beijing, China, Sep 5-10, 2009.
17. **Xu J**, Liu C, and Tsui BMW. MammoSPECT using rotating slant-hole collimator designs. Proceedings of the 10th International meeting on fully 3D image reconstruction in radiology and nuclear medicine, pp 351 -- pp 353. Beijing, China, Sep 5-10, 2009.
18. **Xu J**, Chen S, Yu J, Meier D, Wagenaar DJ, Patt BE, and Tsui BMW. SPECT data acquisition and image reconstruction in a stationary small animal SPECT/MRI system. Proc. SPIE 7622, Medical Imaging 2010: Physics of Medical Imaging, 76220V (18 March 2010); https://doi.org/10.1117/12.845504
19. Tsui BMW, Hugg JW, **Xu J**, Chen S, Meier D, Edelstein W, El-Sharkawy A, Wagenaar DJ, Patt BE. "Design and development of MR-compatible SPECT systems for simultaneous SPECT-MR imaging of small animals," Proc. SPIE 7961, Medical Imaging 2011: Physics of Medical Imaging, 79611Y (16 March 2011); https://doi.org/10.1117/12.878903
20. **Xu J** and Tsui BMW. "Iterative volume of interest image reconstruction in helical cone beam X-Ray CT using a stored system matrix approach" Proceedings Volume 7961, Medical Imaging 2011: Physics of Medical Imaging; 79612O (2011) Lake Buena Vista (Orlando), Florida, United States. https://doi.org/10.1117/12.878914
21. Ismail M, Taguchi K, **Xu J**, Tsui BMW, Boctor EM. "3D-guided CT reconstruction using time-of-flight camera," Proc. SPIE 7964, Medical Imaging 2011: Visualization, Image-Guided Procedures, and Modeling, 796429 (1 March 2011); https://doi.org/10.1117/12.878881
22. Rittenbach AJ, **Xu J**, Tsui BMW, "Acquisition strategies of a dual head rotating 4-Segment Slant-Hole (R4SSH) SPECT System for Improved Myocardial Perfusion SPECT Imaging," 2011 IEEE Nuclear Science Symposium Conference Record, Valencia, Spain, 2011, pp. 3335-3338, https://doi.org/10.1109/NSSMIC.2011.6152603
23. Tsui BMW, **Xu J**, Rittenbach A, Chen S, El-Sharkaway A, Edelstein WA, Guo X, Liu A, Hugg JW. "High performance SPECT system for simultaneous SPECT-MR imaging of small animals," 2011 IEEE Nuclear Science Symposium Conference Record, Valencia, Spain, 2011, pp. 3178-3182, https://doi.org/10.1109/NSSMIC.2011.6153652
24. Rittenbach AJ, **Xu J**, Hugg JW, Tsui BMW, "The design of optimal multipinhole collimators for a seamless SPECT detector ring," 2011 IEEE Nuclear Science Symposium Conference Record, Valencia, Spain, 2011, pp. 3402-3405, https://doi.org/10.1109/NSSMIC.2011.6152618
25. **Xu J** and Tsui BMW. "An analytical geometric calibration method for circular cone-beam CT geometry" The 2nd Int. Conf. on Image Formation in x-ray Computed Tomography, Salt Lake City, USA, 24–27 June 2012, pp 399–403.
26. Rittenbach AJ, **Xu J**, El-Sharkawy AM, Edelstein WA, Parnham K, Hugg J, Tsui BMW, "Continuing evaluation of an MR compatible SPECT insert for simultaneous SPECT-MR imaging of small animals,"

2013 IEEE Nuclear Science Symposium and Medical Imaging Conference (2013 NSS/MIC), Seoul, Korea (South), 2013, https://doi.org/10.1109/NSSMIC.2013.6829143

27. **Xu J** and BWM Tsui. "C-arm CT image reconstruction from sparse projections," International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine, Lake Tahoe, California, USA, Jun 16-21, 2013, pp. 34-7.
28. **Xu J**, Elshahaby FEA Fuld MK, Fung GSK, and Tsui BMW, "Application of task-based measures of image quality to evaluation of image reconstruction methods in x-ray CT", 3rd Int. Conf. on Image Formation in x-ray Computed Tomography, (Salt Lake City, USA, 22–25 June 2014), pp 25–28.
29. Wang J, Hu L, Feng T, **Xu J**, Shao L, Tsui BMW, "Improved spatial and temporal resolution of gated myocardial perfusion PET using post reconstruction dual respiratory and cardiac motion compensation," 2014 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC), Seattle, WA, 2014, https://doi.org/10.1109/NSSMIC.2014.7430789
30. **Xu J**, Rittenbach AJ, Fabbri A, Cencelli VO, Tsui BMW. Pinhole SPECT image reconstruction using a dense system matrix, Proceedings of 2015 Fully 3-D image reconstruction in radiology and nuclear medicine, Newport beach, Rhode Island, Jun 1-5 2015. pp 375-378.
31. Wang J, Feng T, **Xu J**, Tsui BMW, "A constrained feature-based cardiac motion estimation method for cardiac PET" 2016 IEEE Nuclear Science Symposium, Medical Imaging Conference and Room-Temperature Semiconductor Detector Workshop (NSS/MIC/RTSD), Strasbourg, France, 2016, pp. 1-5, https://doi.org/10.1109/NSSMIC.2016.8069431
32. **Xu J**, Noo F, Tsui BMW, "Image registration using convex relaxation and the ADMM algorithm," Proceedings of the 2017 International Conference on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine, Xi'an, China, June 18-23, 2017, page 696-701.
33. Lee TS, Wang J, **Xu J**, Olivier P, Perkins AE, Tung CH, Tsui BMW. "Advancements in data-driven respiratory motion extraction methods for clinical list-mode 18F-FDG PET datasets acquired from a commercial PET scanner" 2017 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC), *Atlanta, G*A, 2017, pp. 1-3. https://doi.org/10.1109/NSSMIC.2017.8533107
34. Tsui BMW, Lee TS and **Xu J.** "Molecular Breast Tomosynthesis Imaging with Multi-Pinhole Collimator," Proceedings of the 2017 International Conference on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine, Xi'an, China, June 18-23, 2017, page 721-725.
35. **Xu J** and Noo F. "Model-based image reconstruction with a hybrid regularizer" Proceedings Volume 10573, Medical Imaging 2018, Houston, Texas, United States: Physics of Medical Imaging; 1057338 (2018) https://doi.org/10.1117/12.2293781
36. **Xu J**, Noo F. "Joint image reconstruction for multiphase CT," Proceedings of the 5th International Conference on Image Formation in X-ray CT, May 20-23, 2018, Salt Lake City, Utah, pp 5-9.
37. **Xu J**, Noo F. "Model based image reconstruction with concomitant scale estimation," Proceedings of the 5th International Conference on Image Formation in X-ray CT, May 20-23, 2018, Salt Lake City, Utah. pp 333-338.
38. **Xu J**, Noo F. "Adaptive smoothing algorithms for MBIR in CT applications," Proceedings Volume 11072, 15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine; 110720C (2019), Jun 2-6, 2019, Philadelphia, PA. https://doi.org/10.1117/12.2534928
39. **Xu J**, Noo F. "Multi-energy data acquisition using a stationary spatial spectral encoder (S3E)," Proceedings of the 8th International Conference on Image Formation in X-ray CT, Aug 5-9, 2024, Bamberg, Germany.

FUNDING

Extramural Funding

A. Active

07/01/21-03/31/25 Hyperspectral Single Photon Imaging of Targeted Alpha-Emitters
R01EB013558
NIBIB
Total direct: 500K/year
MPI: Du/Frey/Meng
Role: Investigator, 5% effort

09/01/21-05/31/26 High Energy and Spatial Resolution Multi-Isotope SPECT Imaging of Targeted Alpha-Emitters and their daughters
U01EB031798
NIBIB
Total direct: 680K/year
MPI: Sgouros/Du/Frey/Meng
Role: Investigator, 5% effort

03/01/22-02/28/26 Assessing brain perfusion using IPEN during intra-arterial stroke intervention
R01 NS 126256
NINDS
Total direct: 390K/year
PI: Taguchi
Role: Investigator, 5% effort

07/07/23-05/31/25 Stationary spectral encoding for multi-energy CT with energy-integrated detectors.
R21EB034337
NIBIB
Total direct: 275K
Role PI, 40% effort

09/01/23-06/30/26 DL-based CT image formation with characterization and control of resolution and noise.
R21EB033426
NIBIB
Total direct: 400K
Role PI, 40% effort

09/19/23-08/31/28 Imaging, Dosimetry and Radiobiology for α-particle Emitter Radiopharmaceutical Therapy
1P01CA272222
NCI
Total direct: 2000K/year
PI: Sgouros
Role: Investigator, 5% effort

B. Pending

N/A

C. Previous

7/1/03-6/30/11 CARDIAC SPECT W/ROTATING SLANT HOLE COLLIMATOR for 4D Clinical Gated Cardiac SPECT
R01EB001983
NIBIB
Total direct: 200 K/year
PI: Tsui
Role: Investigator, 30% effort

7/1/03-6/30/13 CORRECTIVE IMAGE RECONSTRUCTION METHODS FOR ECT
R01EB000168
NIBIB
Total direct: 330 K/year
PI: Tsui

Role: Investigator, 30% effort

6/1/08-5/31/11 TIME RESOLVED CARDIAC COMPUTED TOMOGRAPHY WITH PATIENT DOSE REDUCTION
R01HL087918
NIHLB
Total direct: 250 K/year
PI: Taguchi
Role: Investigator, 5% effort

9/1/09-8/31/12 HIGH RESOLUTION SPECT-MR FOR MOLECULAR IMAGING
R01EB008730
NIBIB
Total direct: 450 K/year
PI: Tsui
Role: Investigator, 30% effort

09/01/12-05/31/15 Evaluation of image quality improvement and radiation dose reduction of advanced image reconstruction methods in X-ray CT.
JHU-2012-CT-115-01-Xu-40624
Siemens-JHU research contract
Total direct: 50 K
Role PI, 30% effort

1/1/16-12/31/17 Respiratory Motion Correction for clinical PET
Philips Research Contract
Philips
Total direct: 150 K
PI: Tsui
Role Investigator, 15% effort

7/1/16-6/30/18 Novel Image Reconstruction and Analysis for 4D Clinical Gated Cardiac PET
Grant-in-Aid 16GRNT30970038
AHA
Total direct: 154 K
PI: Tsui
Role Investigator, 35% effort

08/01/17-07/31/20 Novel Reconstruction Paradigm for Multiphasic CT Imaging of Kidney Cancer
1R21 CA211035
NCI
Total direct: 275 K
Role: PI/MPI, 40% effort

01/22/20-11/30/21 Intra-operative 4-D soft tissue perfusion using no gantry rotation (IPEN)
R21 EB029049
NIBIB
Total direct: 275 K
PI: Taguchi
Role: Investigator, 2% effort

08/10/21-05/31/23 Brain phantom generation by generative adversarial net (GAN) for AI-based emission tomography
R03 EB030653
NIBIB
Total direct: 100 K

Role: Contact PI/MPI, 13% effort

Intramural Funding

A. Active

N/A

B. Previous

08/01/19-07/30/21 Developing a computational pancreas model for CT imaging
JHU Catalyst Award
JHU SOM
Total direct: 75 K
Role: PI 50% effort

01/01/21-12/31/21 Data-adaptive image reconstruction for improved CT imaging of pancreatic cysts
The Sol Goldman Pancreatic Cancer Research Center Award
JHU SOM
Total direct: 50 K
Role PI, 40% effort

CLINICAL ACTIVITIES

None

EDUCATIONAL ACTIVITIES

Teaching

Classroom instruction

Spring 2012,2013	Preparation and grading of three computer lab exercises. Course title: Modern Biomedical Image Instrumentation and Techniques, EN.580.472.
Spring 2017	Lectured on 2-D image reconstruction from projections. Contributed to midterm exam preparation. Course title: Modern Biomedical Image Instrumentation and Techniques, EN.580.473.

Mentoring

Pre-doctoral (co-)advisees/mentees

2011-2012	Fatma Elshahaby
2009-2015	Andrew Rittenbach
2010-2015	Tao Feng
2011-2016	Jizhe Wang

Dissertation Defense Committee

2009-2015	Andrew Rittenbach Ph.D. Thesis: Development and Initial Evaluation of an MR Compatible Preclinical SPECT Insert for Simultaneous SPECT/MR Imaging
2010-2015	Tao Feng Ph.D. Thesis: 4D Image Reconstruction with Dual Respirtary and Cardiac Motion Correction for Cardiac PET
2011-2016	Jizhe Wang Ph.D. Thesis: Development and Applications of Feature-guided Cardiac Motion Estimation Methods for 4D Cardiac PET

Educational Program Building/Leadership

2021-	Steering committee – Joint Masters Program in Medical Physics, Radiology, SOM Responsibilities include: students progress monitoring, incoming student appliations evaluation, placement of graduating students, etc

RESEARCH ACTIVITIES

Research Focus

My area of expertise lies in developing image reconstruction methods (the conventional model-based imge reconstruction, MBIR, and deep learning, DL) and task-based image quality evaluation for x-ray CT. My research employs statistical machine learning methodologies, many of which lie at the foundation of the state-of-the art DL algorithms. I have published extensively on methodology development in statistical MBIR. With the emergence of DL, many of the conventional MBIR methods have been augmented by data-driven DL models to improve performance. The confluence of DL and MBIR creates challenges and opportunities. Understanding and utilizing the synergy between them is my research focus.

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

2021 --	Steering committee Joint Masters Program in Medical Physics, Radiology, SOM
2023	BriteStar Award Review Committee Department of Radiology, JHU SOM

Editorial Board Appointments

2023 –	Medical Physics (ad-hoc Associate Editor)

Journal Reviewer

2005 –	IEEE Transactions on Medical Imaging
2015 –	IEEE Transactions on Nuclear Science
2016 –	Physics in Medicine and Biology
2016 –	Medical Physics
2016 –	IEEE Signal Processing Letters
2021 –	Journal of Medical Imaging
2021 –	IEEE Transactions on Computational Imaging
2022 –	Inverse Problems

Advisory Committees, Review Groups/Study Sections

2007 --	Abstract reviewers IEEE Medical Imaging Conference (MIC) Responsibilities: review 8-15 abstracts on topics related to x-ray CT, image reconstruction, and image quality evaluation
2009	Scientific committee 10th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine, Sept 5-10, 2009, Beijing, China Responsibilities: abstract reviewers
2018 - 2020	Scientific committee International Conference on Image Formation in X-ray CT Responsibilities: abstract submission review, session moderator
2021	Student award committee 16th (virtual) International Meeting on Fully 3D Image Reconstruction in Radiology and Nuclear Medicine, July 19-23, 2021, Leuven, Belgium. Responsibilities: score finalists and select student award winners
Jun 25-26, 2020	Study section ad-hoc member Emerging imaging technologies and applications (EITA) Imaging, Surgery, and Bioengineering (ISB) Review Branch, Center for Scientific Review National Institutes of Health
Feb 27-28, 2023	Study section ad-hoc member Imaging technology development (ITD) Imaging, Surgery, and Bioengineering (ISB) Review Branch, Center for Scientific Review

	National Institutes of Health
Feb 22-23, 2024	Study section ad-hoc member Imaging technology development (ITD) Imaging, Surgery, and Bioengineering (ISB) Review Branch, Center for Scientific Review National Institutes of Health

Conference organizer

2007	Assistant Chairs, MIC Program Committee IEEE Nuclear Science Symposium and Medical Imaging Conference, Oct 27 – Nov 3, 2007, Honolulu, Hawaii

Conference session chairs

2007	Session Chair, M10 Reconstruction: Iterative Methods IEEE Nuclear Science Symposium and Medical Imaging Conference, Oct 27 – Nov 3, 2007, Honolulu, Hawaii
2014	Session Chair, W2: Data consistency conditions and applications The 3rd International Conference on Image Formation in X-ray CT, Salt Lake City, Utah, 22–25 June 2014
2018	Session Chair, T5: Limited Data CT The 5th International Conference on Image Formation in X-ray CT, Salt Lake City, Utah, May 20-23, 2018.

RECOGNITION

Awards, Honors

1998	Pan Wen-Yuan Scholarship, Stanford University
2004	Travel award, IEEE NSS and MIC workshop on the Nuclear Radiology of Breast Cancer
2005	Honorable mention, Annual meeting of the Society of Nuclear Medicine, Computer and Instrumentation Young Investigator Symposium.
2021	Distinguished Reviewer Certificates, Bronze Level, IEEE TMI
2022	Distinguished Reviewer Certificates, Bronze Level, IEEE TMI

Invited Talks

Mar 2012	Quantitative SPECT and PET reconstruction. In Vivo Preclinical Imaging: An introductory workshop, Johns Hopkins, Baltimore, MD (JHMI/regional)
May 2012	Interior and Sparse-View Image Reconstruction Using a Mixed Region and Voxel Based ML-EM Algorithm. Department of Mathematics, The Chinese University of Hong Kong (International)
June 2022	Synergistic integration of deep learning and model-based reconstruction for CT image generation, IOP Publishing, Medical Physics webinar/virtual (International)

OTHER PROFESSIONAL ACCOMPLISHMENTS

Presentations at National and International Conferences

1. **Xu J**, Liu C, Wang, YC, Frey, EC, and Tsui BMW, "Attenuation correction for rotating multi-segment slant-hole SPECT in breast imaging," Presented at the 2004 Workshop on the Nuclear Radiology of Breast Cancer, Oct 22-23, 2004, Rome, Italy.
2. **Xu J**, Liu C, and Tsui BMW, "MammoSPECT Using Rotating Slant-Hole Collimator Designs," presented at the 2006 Workshop on the Nuclear Radiology of Breast Cancer, Nov 4-5, 2006, San Diego, CA.
3. **Xu J** and Tsui BMW, "A Maximum-Likelihood Iterative Algorithm for X-Ray CT Reconstruction," presented at the 2006 IEEE NSS and MIC, Oct 29-Nov 5, 2006, San Diego, CA.
4. **Xu J** and Tsui BMW, "A Two-Step Hilbert Transform Method for Rotating Slant-Hole SPECT Reconstruction," presented at the 2006 Annual Meeting of the Society of Nuclear Medicine, Jun 2006, San Diego, CA.

5. **Xu J**, Liu C, and Tsui BMW. "Completeness conditions in rotating multi-segment variable slant angle SPECT technique," presented at the 2007 Annual Meeting of the Society of Nuclear Medicine, Jun 2007, San Diego, CA.
6. **Xu J** and Tsui BMW. "Three dimensional limited-angle mammoSPECT reconstruction with total variation regularization," presented at the 2008 Annual Meeting of the Society of Nuclear Medicine, Jun 2008, Washington DC.
7. **Xu J** and Tsui BMW. "A multi-resolution, region-of-interest resolution compensation reconstruction approach for X-ray CT." presented at the 2008 IEEE nuclear science symposium and medical imaging conference, Dresden, Germany.
8. **Xu J**, Chen S, Yu J, Meier D, Wagenaar D, Tsui BMW, "Sparse-view image reconstruction with system response modeling for a stationary small animal pinhole SPECT system," presented at the 2010 Annual Meeting of the Society of Nuclear Medicine, June 05 - 09, 2010; Salt Lake City, Utah
9. **Xu J**, Chen S, Tsui BMW, "Application of total-variation penalized maximum likelihood image reconstruction for dynamic small animal stationary SPECT studies," presented at the 2011 Society of Nuclear Medicine Annual meeting, June 4-8, 2011, San Antonio, Texas.
10. **Xu J** and Tsui BMW, "Direct regional activity characterization in emission computed tomography (ECT) using a Gaussian mixture image representation model", presented at the 2014 Society of Nuclear Medicine Annual Meeting, Washington DC, June 10-15, 2014.
11. **Xu J**, Tsui BMW, Noo F, "A Feature-Preserving Image Reconstruction Method for Improved Pancreaticlesion Classification in Diagnostic CT Imaging," presented at the 2016 AAPM annual meeting, Washington DC. July 31- Aug 4, 2016.
12. **Xu J**, Wang J, Lee TS, Schindler TH, Valenta-Schindler I, Zimmerman SL, Abraham MR, Tsui BMW, "Cardiac strain analysis using clinical myocardial perfusion PET images," presented at the 2017 Society of Nuclear Medicine Annual Meeting, Denver, Colorado, Jun 10-14, 2017.
13. **Xu J**, Chen J, Du Y, Yusufaly T, Taguchi K, Rowe S, Sgouros G; Development of model-based biophantoms for personalized cancer care, presented at the 2023 Society of Nuclear Medicine Annual Meeting June 24-27, 2023, Chicago IL.

Peer-reviewed conference abstracts

1. Liu C, **Xu J**, and Tsui BMW. "Evaluation of rotating multi-segment slant-hole as compared to parallel-hole collimation for myocardial perfusion SPECT" Journal of Nuclear Medicine 2006; 47 (Supplement 1):63 P
2. Shilov M, Frey EC, Segars WP, **Xu J**, and Tsui BMW "Improved Monte-Carlo simulations for dynamic PET, Journal of Nuclear Medicine 2006; 47 (Supplement 1):197P
3. Liu C, **Xu J**, and Tsui BMW, "Collimator design principles for rotating multi-segment slant-hole SPECT." 2007 IEEE nuclear science symposium and medical imaging conference, Honolulu, Hawaii.
4. Zhang M, Frey EC, **Xu J**, and Taguchi K. "Material Identification and Dose Reduction with Photon Counting X-ray CT Detector using a Penalized Likelihood Method." RSNA 2008, Chicago, IL.
5. Rittenbach AJ, **Xu J**, Liu A, Hugg JW, Tsui BMW. "The design and evaluation of optimal multipinhole collimators for a SPECT-MR system," Journal of Nuclear Medicine, Vol 52, supplement 1, pages 1951-1951. 2011.
6. Yu J, **Xu J**, Wang Y, Lian B, Hugg JW, Tsui BMW. "Development and evaluation of quantitative multi-pinhole SPECT image reconstruction methods," Journal of Nuclear Medicine, Vol 52, supplement 1, pages 490-490. 2011.
7. BMW Tsui, Chen S, **Xu J**, Rittenbach A, El-Sharkawy AM, Edelstein W, Guo X, Liu A, Hugg JW. "Development and initial testing of a second-generation SPECT insert for simultaneous small animal SPECT-MR imaging," Journal of Nuclear Medicine, Vol 52, supplement 1, pages 379-379. 2011.
8. BMW Tsui, Yu J, **Xu J**, Lian B, Hugg JW. "Image reconstruction methods for a novel dual-pair multipinhole collimator set with improved small animal SPECT system performance," Journal of Nuclear Medicine, Vol 52, supplement 1, pages 264-264. 2011.
9. BMW Tsui, **Xu J**, Rittenbach AJ, El-Sharkawy AM, Edelstein W, Liu A, Parnham K, Hugg JW. "The development of a high-resolution insert for simultaneous SPECT-MR imaging of small animals," Journal of Nuclear Medicine, Vol 53, supplement 1, pages 2401 - 2401. 2012.
10. Rittenbach AJ, **Xu J**, El-Sharkawy AM, Edelstein W, Liu A, Parnham K, Hugg JW, Tsui BMW. "System calibration method for a CZT detector based ring-type small animal SPECT system," Journal of Nuclear Medicine, Vol 53, supplement 1, pages 2392 - 2392. 2012.

11. Feng T, Fung GSK, **Xu J**, Wang J, Tsui BMW. "Maximum likelihood based joint 4D motion vector field estimation and image reconstruction in 4D PET." Journal of Nuclear Medicine 54 (supplement 2), 537-537 2013.
12. BMW Tsui, **Xu J**, Rittenbach AJ, El-Sharkawy AM, Edelstein W, Parnham K, Hugg JW. "A completed SPECT/MR insert for simultaneous SPECT/MR imaging of small animals." Journal of Nuclear Medicine 54 (supplement 2), 595-595 2013.
13. Dong Y, **Xu J**, Tsui BMW. "Development and evaluation of improved collimator-detector response compensation method for multi-pinhole small animal SPECT" Journal of Nuclear Medicine 54 (supplement 2), 269-269. 2013.
14. Fabbri A, Cencelli VO, **Xu J**, Rittenbach A, Galasso M, Tsui BMW. "Sub-millimeter resolution SPECT using a low-cost compact camera based on a continuous NaI (Tl) crystal and PSPMT array" Journal of Nuclear Medicine 54 (supplement 2), 2161-2161, 2013.
15. Rittenbach AJ, **Xu J**, Liu C, Razavian M, Sadeghi M, Tsui BMW. "Application of a direct regional activity characterization approach to focal uptake activity quantification in pinhole SPECT" Journal of Nuclear Medicine 55 (supplement 1), 2119-2119. 2014.
16. Wang J, Feng T, **Xu J**, Perkins A, Tsui BMW. "An improved data-driven method for respiratory motion signal detection and magnitude estimation from noisy list-mode cardiac PET data", Journal of Nuclear Medicine 56 (supplement 3), 481-481.2015.
17. Tsui BMW, **Xu J**, Wang J, Feng T, Abraham M, Zimmerman SL, Schindler T, "Extraction of Cardiac Motion and Myocardial Contractility from 4D Cardiac PET Images", Journal of Nuclear Medicine 56 (supplement 3), 206-206. 2015.
18. Lin J, Rittenbach A, **Xu J**, Tsui BMW, "Exploiting Artifact-free Projection Overlaps in Multi-Pinhole Collimator Design for a stationary Small Animal SPECT System", Journal of Nuclear Medicine 56 (supplement 3), 1871-1871. 2015.
19. Chang Y, Chen Q, Rittenbach AJ, **Xu J**, Sun M, Tsui BMW, Yang X, "Evaluation of MR compatibility of a collimator material for simultaneous SPECT/MR imaging," Journal of Nuclear Medicine 57 (supplement 2), 1937-1937. 2016.
20. Rittenbach A, **Xu J**, Chang Y, Sun M, Yang X, Hugg JW, Tsui BMW, "Design of a Preclinical SPECT Insert using a New Generation of CZT Detector Modules for Simultaneous SPECT/MR Imaging" Journal of Nuclear Medicine 57 (supplement 2), 109-109. 2016.
21. Wang J, Feng T, **Xu J**, Tsui BMW, "A new cardiac motion vector field estimation method based on the optical-flow method with additional constraint from motion of an anatomical feature in 4D cardiac PET," Journal of Nuclear Medicine, 57 (supplement 3), 148-148, 2016.
22. Lee TS, Wang J, **Xu J**, Olivier P, Perkins AE, Tung CH, Tsui BMW. "Development and evaluation of robust data-driven respiratory motion extraction methods for clinical list-mode 18F-FDG PET" Journal of Nuclear Medicine, Vo 58. Supplement 1. Pages 1350-1350.
23. Tsui BMW, Lee TS, **Xu J**. "Cardiac motion vector field estimation from improved 4D cardiac-gated PET images with cardiac motion compensation" J Nucl Med May 1, 2018 vol. 59 no. supplement 1, 14-14.
24. Tsui BMW, **Xu J**, Lee TS, Civelek A, Valenta-Schindler I, Schindler T. "Preliminary clinical evaluation of a cardiac motion vector field estimation method from 4D cardiac-gated myocardial perfusion PET images" J Nucl Med May 1, 2019 vol. 60 no. supplement 1, 305-305.
25. Lee TS, **Xu J**, Tsui BMW. "Development of transfer learning datasets using realistic simulation of myocardial perfusion SPECT images for a deep learning model" J Nucl Med May 1, 2019 vol. 60 no. supplement 1, 404-404.
26. Noo F, Guo Z, and **Xu J**. "A globally converging Newton-Raphson approach for dual energy CT," 66th AAPM Annual Meeting, July 21-25, 2024, Los Angeles, CA.