Samei Lab
Key refereed publications with narratives:

J1. Samei E. Image quality in two phosphor-based flat panel digital radiographic detectors. *Medical Physics* 30(7): 1747-1757, 2003.

J2. Saunders RS, Samei E. A method for modifying the image quality parameters of digital radiographic images. *Medical Physics* 30: 3006-3017, 2003.

J3. Turner SR, Samei E, Hertzberg BS, Delong DM, Vargas-Voracek R, Maynor CH, Singer A, Kliewer MA. Sonography of fetal choroid plexus cysts: detection depends on cyst size and gestational age. *Journal of Ultrasound in Medicine (JUM)* 22: 1219-1227, 2003.

J4. Saunders RS, Samei E, Hoeschen C. Impact of resolution and noise characteristics of digital radiographic detectors on the detectability of lung nodules. *Medical Physics* 31: 1603-1613, 2004 (Cross-referenced in *Virtual Journal of Biological Physics Research,* June 2004, http://www.vjbio.org/).

J5. Samei E, Saunders RS, Lo JY, Dobbins III JT, Jesneck JL, Floyd Jr CE, Ravin CE. Fundamental imaging characteristics of a slot-scan digital chest radiographic system. *Medical Physics* 31(9): 2687-2698, 2004.

J6. Samei E, Wright SL. Luminance and contrast performance of liquid crystal displays for mammographic applications *(invited article)*. *Technology in Cancer Research and Treatment* 3(5): 429-436, 2004.

J7. Samei E, Rowberg A, Avraham E, Cornelius C. Towards clinically-relevant standardization of image quality *(invited article)*. *Journal of Digital Imaging* 17(4): 235-300, 2004.

J8. Saunders RS, Samei E, Jesneck JL, Lo JY. Physical characterization of a prototype selenium-based full field digital mammography detector. *Medical Physics* 32: 588-599, 2005.

J9. Samei E. Technological and psychophysical considerations for digital mammography displays *(invited article)*. *Radiographics* 25(2): 491-501, 2005.

J10. Samei E, Badano A, Chakraborty D, Compton K, Cornelius C, Corrigan K, Flynn MJ, Hemminger B, Hangiandreou N, Johnson J, Moxley-Stevens DM, Pavlicek W, Roehrig H, Rutz L, Shepard J, Uzenoff RA, Wang J, Willis CE. Assessment of display performance for medical imaging systems: Executive summary of AAPM TG18 report *(invited article)*. *Medical Physics* 32(4):1205-1225, 2005.

J11. Samei E, Lo JY, Yoshizumi TT, Dobbins III JT, Jesneck JL, Floyd Jr CE, McAdams HP, Ravin CE. Comparative scatter and dose performance of slot-scan and full-field digital chest radiographic systems. *Radiology* 235(3): 940-949, 2005.

J12. Samei E, Dobbins III JT, Lo, JY, McKinley RL, Tornai, M, A framework for optimizing the radiographic technique in digital x-ray imaging, *Radiation Protection Dosimetry* 117(1-2): 220-229, 2005.

J13. Ranger NT, Samei E, Dobbins III JT, Ravin CE. Measurement of the detective quantum efficiency in digital detectors consistent with the IEC 62220-1 standard: practical considerations regarding the choice of filter material. *Medical Physics* 37(7): 2305-2311, 2005.

J14. Samei E, Buhr E, Granfors P, Vandenbroucke D, Wang X. Comparison of edge analysis techniques for the determination of the MTF of digital radiographic systems. *Physics in Medicine and Biology* 50: 3613-3625, 2005.

J15. Hoe CL, Samei E, Frush DP, Delong DM. Simulation of liver lesions for pediatric CT. *Radiology* 238: 699-705, 2006.

J16. Saunders RS, Samei E. Resolution and noise measurements of selected commercial medical displays. *Medical Physics* 33(2): 308-319, 2006.

J17. Samei E, Wright SL. Viewing angle performance of medical liquid crystal displays. *Medical Physics* 33(3): 645-654, 2006.

J18. Boyce S, Samei E. Imaging properties of digital magnification radiography. *Medical Physics* 33(4): 984-996, 2006.

   This paper applied the concept of Fourier-based detectability index to assess the impact of detector parameters and imaging geometry on lesion detection.

J19. Samei E, Ranger NT, Dobbins III JT, Chen Y. Inter-comparison of methods for image quality characterization: 1. Modulation transfer function. *Medical Physics* 33(5): 1454-1465, 2006.

J20. Dobbins III JT, Samei E, Ranger NT, Chen Y. Inter-comparison of methods for image quality characterization: 2. Noise power spectrum. *Medical Physics* 33(5): 1466-1475, 2006.

J21. Samei E. The role of image perception in radiology *(guest editorial)*. *Journal of American College of Radiology* 3(6): 400-401, 2006.

J22. Saunders RS, Samei E, Baker JA. Simulation of mammographic lesions. *Academic Radiology* 13: 860-870, 2006.

J23. Samei E, Cleland EW, Roehrig H. In-field assessment of display resolution and noise: performance evaluation of a commercial measurement system. *Journal of the Society for Information Display (JSID)* 14: 839-845, 2006.

J24. Saunders RS, Samei E, Baker JA, Delong DM, Scott Soo M, Walsh R, Pisano E, Kuzmiak CM, Pavic D. Comparison of LCD and CRT displays based on utility for mammographic tasks. *Academic Radiology* 13: 1317-1326, 2006.

J25. Saunders RS, Samei E. Improving demographic decision accuracy by incorporating observer ratings with interpretation time *(invited article)*. *British Journal of Radiology* 79: 5117-5122, 2006.

J26. Chawla A, Samei E. Ambient illumination revisited: A new adaptation-based approach for optimizing medical imaging reading environments. *Medical Physics* 34(1): 81-90, 2007.

J27. Samei E, Saunders RS, Baker JA, Delong DM. Digital mammography: impact of reduced dose on diagnostic performance. *Radiology* 243: 396-404, 2007.

   This paper investigated the impact of dose reduction (50% and 75%) on the detection and discrimination of breast lesions with digital mammography. Results suggest that dose reduction has a measureable but modest effect on diagnostic accuracy.

J28. Samei E, Stebbins SA, Dobbins III JT, McAdams HP, Lo JY. Multiprojection correlation imaging for improved detection of pulmonary nodules. *AJR* 188: 1239-1245, 2007.

J29. Samei E, Poolla A, Ulissey MJ, Lewin J. Digital mammography: comparative performance of LCD and CRT displays. *Academic Radiology* 14(5): 539-546, 2007.

J30. Ranger NT, Dobbins III JT, Samei E, Ravin CE. Assessment of detective quantum efficiency: Inter-comparison of the recent international standard with prior methods. *Radiology* 243(3): 785-795, 2007.

J31. Chawla A, Samei E, Saunders RS, Abbey C, Delong D. Effect of dose reduction on the detection of mammographic lesions: a mathematical observer analysis. *Medical Physics* 34(8): 3385-3398, 2007.

This paper investigated the effect of dose reduction (50% and 75%) on the detectability of breast lesions and microcalcifications. Reduction in dose levels by 50% lowered the detectability of masses with borderline statistical significance. Dose reduction did not have a statistically significant effect on detection of microcalcifications.

J32. Saunders RS, Baker JA, Delong DM, Johnson JP, Samei E. Does image quality matter? Impact of resolution and noise on mammographic task performance. *Medical Physics* 34(10): 3971-3981, 2007.

J33. Chawla AS, Samei E, Lo JY, Baker JA. A mathematical model platform for optimizing a multi-projection breast imaging system. *Medical Physics* 35(4): 1337-1345, 2008.

J34. Samei E, Ranger NT, Delong DM. A comparative contrast-detail study of five medical displays. *Medical Physics* 35(4): 1358-1364. 2008.

J35. Pollard BJ, Chawla AS, Delong DM, Hashimoto N, Samei E. Object detectability at increased ambient lighting conditions. *Medical Physics* 35(6): 2204-2213, 2008.

J36. Li X, Samei E, Segars WP, Sturgeon GM, Colsher JG, Frush DP. Patient-specific dose estimation for pediatric CT. *Medical Physics* 35(12) 5821-5828, 2008.

J37. Saunders RS, Samei E. The effect of breast compression on mass conspicuity in digital mammography. *Medical Physics* (35(10): 4464-4473, 2008.

J38. Samei E, Ranger NT, Mackenzie A, Honey ID, Dobbins III JT, Ravin CE. Detector or system? Extending the concept of DQE to characterize the performance of digital radiographic systems. *Radiology* 249(3): 926-937, 2008.

J39. Pollard BJ, Samei E, Chawla AS, Baker JA, Ghate S, Kim C, Soo MS, Hashimoto N. The influence of ambient lighting on mass detection in mammograms. *Academic Radiology* 16(3): 299-304, 2009.

J40. Chawla AS, Saunders RS, Singh S, Lo JY, Samei E. Towards optimized acquisition scheme for multiprojection correlation imaging of breast cancer. *Academic Radiology* 16(4): 456-463, 2009.

J41. Li X, Samei E. Comparison of patient size-based methods for estimating quantum noise in CT images of the lung. *Medical Physics* 36(2), 541-546, 2009.

J42. Saunders RS, Samei E, Lo JY, Baker JA. Can breast compression be reduced for breast tomosynthesis? A Monte Carlo study on mass and microcalcification conspicuity in tomosynthesis. *Radiology* 251(3): 673-782, 2009.

J43. Li X, Samei E, Delong DM, Jones RP, Gaca AM, Hollingsworth CL, Maxfield CM, Carrico CW, Frush D. Three-dimensional simulation of small lung nodules for pediatric CT. *British Journal of Radiology* 82: 401-411, 2009.

The authors developed a technique for 3D modeling of small lung nodules in pediatric MDCT examinations. It was shown how mathematical lung nodule models appeared indistinguishable from real nodules.

J44. Chawla AS, Boyce S, Washington L, McAdams HP, Washington L, Samei E. Design and development of a new multi-projection x-ray system for chest imaging. *IEEE Transactions of Medical Imaging* 56(1): 36-45, 2009.

J45. Li X, Samei E, Delong DM, Jones RP, Gaca AM, Hollingsworth CL, Maxfield CM, Colsher JG, Frush DP. Pediatric MDCT: towards assessing the diagnostic influence of dose reduction on the detection of small lung nodules. *Academic Radiology* 16(7): 872-880, 2009.

The impact of reducing dose on detection of lung nodules is evaluated in this paper. The authors found that detection accuracy at 75% dose was comparable that of full dose scans.

J46. Samei E, Ranger NT, Mackenzie A, Honey ID, Dobbins III JT, Ravin CE. Effective DQE (eDQE) and speed of digital radiographic systems: an experimental methodology. *Medical Physics* 36(8): 3806–3817, 2009. This article was one of the top 10 most downloaded articles in the journal Medical Physics, August 2009.

J47. Samei E, Ranger NT, Bisset III GS, Maxfield C, Hollingsworth CL, Lo JY, Dobbins III JT, Wilson KL. Image quality and dose in digital radiography. RSNA/AAPM Educational module, RSNA Publications, 2009.

J48. Samei E, Saunders RS, Badea CT, Ghaghada KB, Hedlund LW, Qi Y, Yuan H, Bentley RC, Mukundan, Jr S. Micro-CT imaging of breast tumors in rodents using a liposomal, nanoparticle contrast agent. *International Journal of Nanomedicine* 4: 277–282 2009.

J49. Chawla AS, Lo JY, Baker JA, Samei E. Optimized image acquisition for breast tomosynthesis in projection and reconstruction space. *Medical Physics* 36(11): 4859-4869, 2009.

This paper investigated the dependency of the diagnostic quality of breast tomosynthesis on dose, number of projections, and angular span. The best performance was obtained for 15-17 projections spanning an angular of 45 degrees--the maximum tested in the study, and for an acquisition dose equal to single-view mammography.

J50. Ranger NT, Lo JY, Samei E. A technique optimization protocol and the potential for dose reduction in digital mammography. *Medical Physics* 37(3): 962-969, 2010.

J51. Richard S, Samei E Quantitative imaging in breast tomosynthesis and CT: comparison of detection and estimation task performance. *Medical Physics* 37(6): 2627-2637, 2010. This article was selected as Editor's Pick as a top article in the journal issue.

J52. Richard S, Samei E. Quantitative breast tomosynthesis: from detectability to estimability. *Medical Physics* 37(12): 6157-6165, 2010.

The authors developed an estimability index (e') to predict the quantitative precision of a CT system with respect to the systems resolution and noise properties. The estimability index correlated with theoretical precision acquired via MLE.

J53. Samei E, McAdams P. Foundations of medical image quality: contrast, sharpness, and noise. RSNA/AAPM Educational module, RSNA Publications, 2010.

J54. Samei E, McAdams P. Evaluation and derivatives of medical image quality. RSNA/AAPM Educational module, RSNA Publications, 2010.

J55. Li X, Samei E, Segars W, Sturgeon G, Colsher J, Toncheva G, Yoshizumi TT, Frush DP. Monte Carlo method for estimating patient-specific radiation dose and cancer risk in CT: development and validation. *Medical Physics* 38(1): 397-407, 2011.

J56. Li X, Samei E, Segars W, Sturgeon G, Colsher J, Toncheva G, Yoshizumi TT, Frush DP. Monte Carlo method for estimating patient-specific radiation dose and cancer risk in CT: application to patients. *Medical Physics* 38(1): 408-419, 2011. **This article was selected as Editor's Pick as a top article in the journal issue**.

The study aims to develop a method to estimate patient-specific radiation dose and cancer risk from CT examinations by combining a validated Monte Carlo program with patient-specific anatomical models. The organ dose, effective dose, and risk index (a surrogate of cancer risk) was estimated for clinical chest and abdominopelvic protocols.

J57. Chen B, Shorey J, Nolte L, Saunders RS, Thompson J, Richard S, Samei E. An anthropomorphic breast model for breast imaging simulation and optimization. *Academic Radiology* 18: 536-546, 2011. This article was selected as a featured paper as a top article in the journal issue.

J58. Webb L, Samei E, Lo JY, Baker JA, Ghate S, Kim C, Soo MS, Walsh R. Comparative performance of multi-view stereoscopic and mammographic display modalities for breast lesion detection. *Medical Physics* 38(4): 1972-1980, 2011. This article was selected as Editor's Pick as a top article in the journal issue.

J59. Li X, Samei E, Segars W, Sturgeon G, Colsher J, Frush DP. Patient-specific dose and risk estimation in pediatric chest CT. *Radiology* 259(3): 862-874, 2011.

This study aims to develop patient-specific radiation dose and risk estimation for pediatric chest CT exams. The dual aim of this study is to evaluate the dependence of dose and risk on patient size and scanning parameters. The reported relationships can be used to estimate patient-specific dose and risk in clinical practice for a given pediatric patient.

J60. Samei E, Ranger NT, Dobbins III JT, Ravin CE. Effective Dose Efficiency (eDE): an application-specific metric of quality and dose for digital radiography. *Physics in Medicine and Biology* 56: 5099–5118, 2011. This article was selected Featured Article as a top article in the journal issue.

J61. Samei E, Saunders RS. Beam optimization of dual energy contrast enhanced breast tomosynthesis. *Physics in Medicine and Biology* 56: 6359-6378, 2011.

J62. Samei E. Seibert AJ. The tenuous state of clinical medical physics in diagnostic imaging (editorial). *Medical Physics* 38(12): iii-iv, 2011.

J63. Chen B, Richard S, Barnhart H, Colsher J, Amurao M, Samei E. Quantitative CT: technique dependency of volume assessment for pulmonary nodules. *Physics in Medicine and Biology* 57: 1335–1348, 2012.

Authors examine the effect of acquisition and reconstruction parameters on the volume estimation of lung nodules in CT. The accuracy and precision of the volume estimation was found to be dependent on slice thickness but was less impacted by kVp, pitch, and reconstruction kernel.

J64. Samei E, Majdi-Nasab N, Dobbins III JT, McAdams HP. Biplane correlation imaging: Feasibility study based on phantom and human dataset. *Journal of Digital Imaging* 25: 137-147, 2012.

J65. Pollard BJ, Samei E, Chawla AS, Heyneman L, Hurwitz LM, Martinez-Jimenez S, Washington L, McAdams HP, Hashimoto N. Can ambient lighting in chest radiology reading rooms be increased? *Journal of Digital Imaging* 25(4): 520-526, 2012.

J66. Guo W, Li Q, Boyce SJ, McAdams TP, Shiraishi J, Doi K, Samei E. A computerized scheme for lung nodule detection in multi-projection chest radiography. *Medical Physics* 39(4), 2001-2012, 2012.

J67. Zhang Y, Li X, Segars WP, Samei E. Organ dose, effective dose, and risk index in adult CT: comparison of four types of reference phantoms across different protocols. *Medical Physics* 39(6), 3404-3423, 2012.

The authors assessed the uncertainties in CT dose and risk estimation associated with four types of reference computational phantoms for ten body and three neurological protocols. These reference phantoms included two sets of anthropomorphic phantoms (XCAT and ICRP 110 phantoms), and two sets of mathematical phantoms (ImPACT and CT-Expo phantoms).

J68. Richard S, Yadava G, Murphy S, Samei E. Towards task-based assessment of CT performance: system and object MTF across different reconstruction algorithms. *Medical Physics* 39(7), 4115-4121, 2012. **This article was selected as Editor's Pick as a top article in the journal issue**.

This study investigated a measurement method for evaluating the resolution properties (MTF) of CT imaging systems with iterative reconstruction algorithms. Results demonstrated that the object-specific MTF can vary as a function of dose and contrast.

J69. Solomon J, Christianson O, Samei E. Quantitative comparison of noise texture across CT scanners from different manufacturers. *Medical Physics* 39(10): 6050-6055, 2012.

This paper compares noise texture (i.e., noise power spectra) across CT systems from different manufacturers. The authors found that similar noise texture can be achieved across scanner systems for certain reconstruction kernels.

Noise power spectrum analysis was used to compare reconstruction kernels from two CT manufactures. Based on respective NPS, a matching strategy was developed which allows users to achieve similar noise texture properties between the two vendors (GE and Siemens)

J70. Li X, Samei E, Williams CH, Segars WP, Tward D, Miller MI, Ratnanather JT. Effects of protocol and obesity on dose conversion factors in adult body CT. *Medical Physics* 39(11): 6550-6571, 2012. This article received the Farrington Daniels Award for the best paper published in Medical Physics in 2012.

J71. MacCabe K, Krishnamurthy K, Chawla A, Marks D, Samei E, Brady D. Pencil beam coded aperture x-ray scatter imaging. *Optics Express* 20(15): 16310-16320, 2012.

J72. Christianson O, Li X, Frush DP, Samei E. Automated patient-specific CT dose monitoring system: assessing variability in CT dose. *Medical Physics* 39(11): 7131-7139. 2012.

J73. Lin Y, Samei E, Luo H, Dobbins III JT, McAdams HP, Wang X, Sehnert WJ, Barski L, Foos DH. A patient image-based technique to assess the image quality of clinical chest radiographs. *Medical Physics* 39(11): 7019-7031, 2012.

J74. Samei E, Li X, Chen B, Reiman R. The effect of dose heterogeneity on risk estimation in x-ray imaging. *Radiation Protection Dosimetry* 155(1): 42-58, 2013.

J75. Boyce SJ, McAdams HP, Ravin CE, Patz Jr EF, Washington L, Martinez S, Koweek L, Samei E. Preliminary evaluation of bi-plane correlation (BCI) stereographic imaging for lung nodule detection. *Journal of Digital Imaging* 26(1): 109-14, 2013.

J76. Copple C, Robertson ID, Thrall DE, Samei E. Evaluation of two objective methods to optimize kVp and personnel exposure using a digital indirect flat panel detector and simulated veterinary patients. *Veterinary Radiology & Ultrasound* 54(1): 9-16, 2013.

J77. Samei E, Murphy S, Richard S, Christianson O. Assessment of multi-directional MTF for breast tomosynthesis. *Physics in Medicine and Biology* 58: 1649–1661, 2013.

J78. Wilson JM, Christianson OI, Richard S, Samei E. A methodology for image quality evaluation of advanced CT systems. *Medical Physics* 40(3): 031908-01-09, 2013.

A new phantom and analysis methodology is presented to assess advanced CT system features such as tube current modulation and iterative reconstruction. The authors show how the resolution changes with dose and contrast for iterative reconstruction. The methodology includes the assessment in the terms of task specific transfer function, NPS, and the detectability index.

J79. Solomon JB, Li X, Samei E. Relating noise to image quality indicators in CT examinations with tube current modulation. *AJR* 200: 592–600, 2013.

The tube current modulation algorithms of two CT systems (GE and Siemens) were assessed and characterized by measuring noise in CT images of an anthropomorphic phantom.

J80. Segars WP, Bond J, Frush J, Hon S, Eckersley C, Williams CH, Feng J, Tward DJ, Ratnanather TJT, Miller MI, Frush D, Samei E. Population of anatomically variable 4D XCAT adult phantoms for imaging research and optimization. *Medical Physics* 40(4): 043701-1-11, 2013.

J81. Chen B, Marin D, Richard S, Husarik D, Nelson R, Samei E. Precision of iodine quantification in hepatic CT: effects of reconstruction (FBP, ASIR, and MBIR) and imaging parameters. *AJR* 200(5): W475-82, 2013.

J82. Samei E, Murphy S, Christianson O. DQE of wireless digital detectors: Comparative performance with differing filtration schemes. *Medical Physics* 40(8): 081910-1-9, 2013.

J83. Chen B, Barnhart H, Richard S, Robins M, Colsher J, Samei E. Volumetric quantification of lung nodules in CT with iterative reconstruction (ASiR and MBIR) *Medical Physics* 40(11): 111902 - 111202-10, 2013. **This article was selected as a featured paper as a top article in the journal issue**.

The authors look at accuracy and precision of CT lung nodule volumetry across reconstruction algorithms (FBP, ASiR, MBIR), doses, and slice thickness. Precision between FBP and iterative reconstruction was comparable with no significant difference across dose levels, slice thicknesses, or segmentation software.

J84. Boyce SJ, Choudhury KR, Samei E. Effective DQE (eDQE) for monoscopic and stereoscopic chest radiography imaging systems with the incorporation of anatomical noise. *Medical Physics* 40: 091916, 2013.

J85.   Kiarashi N, Samei E. Digital breast tomosynthesis: a concise overview *(invited article)*. *Imaging Med.* 5(5): 467-476, 2013.

J86.   Tian X, Li X, Segars WP, Frush D, Paulson E, Samei E. Dose coefficients in pediatric and adult abdominopelvic CT based on 100 patient models. *Physics in Medicine and Biology* 58(24): 8755-6, 2013.

The purpose of this work was to estimate patient-specific dose and risk across pediatric and adult population for abdominopelvic CT exam. The study addresses the limitation of current CT dose estimates of failing to accurately model the variety and complexity in patient anatomy. The estimated dose coefficients are essential for CT protocol optimization and improved patient dose recording.

J87.   Norris H, Zhang Y, Bond J, Sturgeon GM, Minhas A, Tward DJ, Ratnanather TJT, Miller MI, Frush D, Samei E, Segars WP. Set of 4D pediatric XCAT reference phantoms for multimodality research. *Medical Physics* 41(3): 033701, 2014.

Highly detailed 4D reference pediatric XCAT phantoms were extended to a series of 64 pediatric phantoms of a variety of ages and height and weight percentiles, representative of the public at large. CT data was simulated from these phantoms to demonstrate their ability to generate realistic, patient quality imaging data.

J88.   Zhang Y, Li X, Segars WP, Samei E. Comparison of patient specific dose metrics between chest radiography, tomosynthesis, and CT for adult patients of wide ranging body habitus. *Medical Physics* 41(2): 023901, 2014.

Monte Carlo simulation was conducted on 59 adult XCAT phantoms for radiography, tomosynthesis, and CT chest protocols. Relationship between radiation burden and patient sizes were established and compared across modalities.

J89.   Ikejimba LC, Kiarashi N, Ghate SV, Samei E, Lo JY. Task-based strategy for optimized contrast enhanced breast imaging: Analysis of six imaging techniques for mammography and tomosynthesis. *Medical Physics* 41(6): 061908-1-14, 2014.

J90.   Kiarashi N, Lo JY, Lin Y, Ikejimba LC, Ghate SV, Nolte LW, Dobbins III JT, Segars WP, Samei E. Development and application of a suite of 4D virtual breast phantoms for optimization and evaluation of breast imaging systems. *IEEE Transactions on Medical Imaging* PP (99), 2014.

J91.   Lin Y, Ramirez-Giraldo JC Gauthier DJ, Stierstorfer K, Samei E. An angle-dependent estimation of CT x-ray spectrum from rotational transmission measurements. *Medical Physics* 41(6): 062104-1-12, 2014. This article was selected as a featured paper as a top article in the journal issue.

J92.   Lin Y, Samei E. A fast poly-energetic iterative FBP algorithm. *Physics in Medicine and Biology* 59(7): 1655-78, 2014.

J93.   Lin Y, Samei E. An efficient poly-energetic SART (pSART) reconstruction algorithm for quantitative myocardial CT perfusion, *Medical Physics* 41(6): 021911, 2014.

J94.   Lakshmanan MN, Kapadia AJ, Sahbaee P, Wolter SD, Harrawood BP, Brady D, Samei E. An X-ray scatter system for material identification in cluttered objects: A Monte Carlo simulation study. *Nuclear Instruments and Methods in Physics Research Section B* 335: 31–38, 2014.

J95.   Chen B, Christianson O, Wilson J, Samei E. Assessment of volumetric noise and resolution performance for linear and nonlinear CT reconstruction methods. *Medical Physics* 41, 071909, 2014.

J96. Nelson J, Christianson O, Harkness B, Madsen M, Mah E, Thomas S, Zaidi H, Samei E. Nuclear medicine uniformity assessment using 2D noise power spectrum. *Journal of Nuclear Medicine* 55:169–174, 2014.

J97. Li X, Segars WP, Samei E. The impact on CT dose of the variability in tube current modulation technology: a theoretical investigation. *Physics in Medicine and Biology* 59: 4525-4548, 2014.

J98. Sahbaee P, Segars WP, Samei E. Patient-based estimation of organ dose for adult population across a wide range of protocols. *Medical Physics* 41: 072104, 2014.

This study aimed to compute patient-specific organ doses and effective dose conversion factors for a representative collection of routinely used CT protocols across a large number (58) of adult patient phantoms. Based on the findings, the work included the development of an iPhone operating system (iOS) application as a convenient calculator for providing reasonable estimation of organ and effective doses for adult patients undergoing CT examination.

J99. Samei E, Christianson O. Dose index analytics - more than a low number *(invited article)*. *Journal of American College of Radiology* 11(8): 832-4, 2014.

J100. Tian X, Li X, Segars WP, Frush D, Paulson EK, Samei E. Organ dose estimation in pediatric chest and abdominopelvic CT based on 42 patient models. *Radiology* 270(2): 535-47, 2014.

This study developed organ dose coefficients for pediatric chest and abdominopelvic CT examinations. The coefficients allow organ dose to be conveniently estimated with the knowledge of patient size and CTDIvol. Such information may aid in improved dose recording and monitoring, in dose estimation for multiplicity of CT examination protocols, and in the evaluation of dose profiles within a practice.

J101. Samei E, Richard S, Hurwitz L. Model-based CT performance assessment and optimization for iodinated and non-iodinated imaging tasks as a function of kVp and body size. *Medical Physics* 41(8): 081910i, 2014.

J102. Solomon J, Samei E. Quantum noise properties of CT images with anatomical textured backgrounds across reconstruction algorithms: FBP and SAFIRE. *Medical Physics* 41(9): 091908, 2014.

Textured phantoms based on lung and liver texture were designed and fabricated using 3D printing and used to demonstrate the unique (non-stationary) noise properties of the SAFIRE reconstruction algorithm in CT.

J103. Samei E, Tian X, Segars WP. Determining organ dose: the holy grail *(invited article)*. *Pediatric Radiology* 44(3): 460-467, 2014.

J104. Samei E. Pros and cons of organ shielding for CT imaging *(invited article)*. *Pediatric Radiology* 44(3): 495-500, 2014.

J105. Solomon J, Samei E. A generic framework to simulate realistic lung, liver and renal pathologies in CT imaging. *Physics in Medicine and Biology* 59: 6637-6657, 2014.

A method to virtually model lung, liver, and renal lesions was developed. This method can be used to create hybrid CT images–real patient images enriched with virtual lesion models– for image quality and human perception research in CT. A human perception experiment was performed to demonstrate the realism of such hybrid images. Based on ROC analysis, it was found that radiologists could not distinguish between real and simulated lesions.

J106. Samei E, Lin Y, Choudhury KR, McAdams HP. Automated characterization of perceptual quality of clinical chest radiographs: Validation and calibration to observer preference. *Medical Physics* 41: 111918, 2014.

J107. Segars WP, Norris H, Rybicki K, Frush D, Samei E. Organ localization: toward prospective patient-specific organ dosimetry in computed tomography. *Medical Physics* 41: 121908, 2014.

J108. Chen B, Ramirez Giraldo JC, Samei E. Evaluating iterative reconstruction performance in computed radiography. *Medical Physics* 41: 121913, 2014.

J109. Samei E, Richard S. Assessment of the dose reduction potential of a model-based iterative reconstruction algorithm (MBIR) using a task-based performance metrology. *Medical Physics* 42(1): 314, 2015.

J110. Christianson O, Chen J, Yang Z, Saiprasad G, Dima A, Filliben J, Peskin A, Trimble C, Siegel E, Samei E. An improved index of image quality for task-based performance of CT iterative reconstruction across three commercial implementations. *Radiology* 275(3): 725-734, 2015.

In a comprehensive study conducted in joint collaboration with University of Maryland, Duke, and NIST, the work involves an observer study the results of which are closely correlated with task-based, frequency–based assessment of d' across three vendors, 7 dose levels, and 6 reconstruction algorithms, standard and iterative.

J111. Frush DP, Samei E. CT Radiation dose monitoring: current state and new prospects *(invited article)*. *Medscape Radiology*, March 2015. (http://www.staging.medscape.org/viewarticle/839485)

J112. Solomon J, Mileto A, Ramirez Giraldo JC, Samei E. Diagnostic performance of an advanced modeled iterative reconstruction algorithm for low-contrast detectability on a third-generation dual-source MDCT scanner: potential for radiation dose reduction in a multireader study. *Radiology* 275(3): 735-745, 2015. **Featured as an article of the month in the journal issue**.

The ADMIRE reconstruction algorithm was assessed based on phantom data and a human detection experiment. The dose reduction potential of the algorithm was found to be around 50% on average.

J113. Wilson J, Samei E. Implementation of ACR dose index registry *(invited article)*. *Journal of American College of Radiology* 12(3): 312-313, 2015.

J114. Samei E, Saunders RS, Singh S, Lo JY. Effect of angular separation and correlation rule on breast tri-plane correlation imaging. *International Journal of Diagnostic Imaging* 2(2): 29-38, 2015.

J115. Tian X, Li X, Segars WP, Frush DP, Samei E. Prospective estimation of organ dose in CT under tube current modulation. *Medical Physics* 42 (4): 1575-1585, 2015.

This study developed a quantitative model to predict organ dose for clinical chest and abdominopelvic scans. Such information may aid in the design of optimized CT protocols in relation to a targeted level of image quality.

J116. Samei E, Thompson J, Richard S, Chen B, Bowsher J. A case for wide-angle breast tomosynthesis. *Academic Radiology* 22(7):860-869, 2015.

J117. Samei E. Christianson O, Zhang Y. Comment on "Comparison of patient specific dose metrics between chest radiography, tomosynthesis, and CT for adult patients of wide ranging body habitus" *Medical Physics* 42(4): 02094-2095, 2015.

Very strong agreement between Monte Carlo simulation patient dose and Duke Dose Monitoring data was shown in this letter. When plotting model based effective dose verses clinical based effective dose, the R2 of a linear fitting was as high as 0.97.

J118. Kiarashi N, Nolte AC, Sturgeon GM, Segars WP, Ghate SV, Nolte LW, Samei E, Lo JY, Development of realistic physical breast phantoms matched to virtual breast phantoms based on human subject data. *Medical Physics* 42: 4116, 2015. This article was selected as a featured paper as a top article in the journal issue.

J119. Christianson O, Winslow J, Frush DP, Samei E. Automated technique to measure noise in clinical CT examinations. *AJR* 205: W93-W99, 2015.

J120. Lakshmanan MN, Harrawood BP, Samei E, Kapadia AJ. Volumetric X-ray coherent scatter imaging of cancer in resected breast tissue: a Monte Carlo study using virtual anthropomorphic phantoms. *Physics in Medicine and Biology* 60(16): 6355–6370, 2015.

J121. Segars WP, Norris H, Sturgeon GM, Zhang Y, Bond J, Minhas A, Tward DJ, Ratnanather TJT, Miller MI, Frush DP, Samei E. The development of a population of 4D pediatric XCAT phantoms for imaging research and optimization. *Medical Physics* 42(8): 4719-4726, 2015.

High resolution PET-CT images was reviewed and segmented to construct anatomically realistic pediatric phantoms. These phantoms consisted of thousands of structures, including cardiac and respiratory motions, enables virtual clinical trials for 3D and 4D CT.

J122. Solomon JB, Wilson J, Samei E. Characteristic image quality of a third generation dual-source MDCT scanner: Noise, resolution, and detectability. Medical Physics 42(8):4941-4953, 2015.

This study performed a comprehensive physics-based assessment of a state of the art dual source CT system in terms of noise (NPS), resolution (TTF), and detectability (NPW model). The characteristics were measured as a function of radiation dose, reconstruction algorithm (ADMIRE) and patient size. The system's tube current modulation algorithm was also assessed.

J123. Zhang Y, Solomon J, Samei E. Size dependence of inherent image quality of a 2nd generation dual source CT scanner. *International Journal of Diagnostic Imaging* 3(1): 40-48, 2016.

With a size varying phantom-Mercury Phantom 3.0, this paper examined the effect of changing dose level, tube voltage, reconstruction methods and the AEC function on the CT image quality across different sizes for a dual source CT scanner.

J124. Brinkley M, Frush D, Wilson JM, Christianson O, Ramirez Giraldo JC, Frush J, Choudhury KR, Samei E. Effects of automatic tube potential selection on radiation dose index, image quality and lesion detectability in pediatric abdominopelvic CT and CTA: a phantom study. *European Radiology* 26(1):157-66, 2016.

J125. Tian X, Samei E. Accurate assessment and prediction of noise in clinical CT images. *Medical Physics* 43(1): 475-482, 2016. **This article was selected as a featured paper as a top article in the journal issue**.

This study proposed a practically applicable method to assess quantum noise in clinical images. The image-based measurement technique enables automatic quality control monitoring of image noise in clinical practice. Further, a phantom-based model can accurately predict quantum noise level in patient images. The prediction model can be used to quantitatively optimize individual protocol to achieve targeted noise level in clinical images.

J126. Solomon J, Mileto A, Nelson R, Choudhury KR, Samei E. Quantitative features of liver lesions, lung nodules, and renal stones in multidetector-row CT examinations: Dependency on radiation dose and reconstruction algorithm. *Radiology* 150892, 2016. **Recognized as a notable article reflected in the journal editorial and featured in the April 2016 webcast of Radiology.**

A series of quantitative radiomics-based imaging features, including size, shape, sharpness, and texture features, were extracted from images of patients with liver lesions, lung nodules, and kidney stones based on CT images acquired at two radiation dose levels and reconstructed with three different algorithms. It was found that radiation dose and reconstruction algorithm strongly affected many imaging features, implying that radionics-based predictive models should be careful to account for such variability.

J127. Samei E. Cutting to the chase: with so much physics "stuff," what do radiologists really need to know? (invited article) *AJR* 206 (1): W9, 2016.

J128. Ikejimba L, Lo JY, Chen Y, Oberhofer N, Kiarashi N, Samei E. A quantitative metrology for performance characterization of five breast tomosynthesis systems based on an anthropomorphic phantom. *Medical Physics* 43(4): 1627-1638, 2016.

J129. Tian X, Yin Z, De Man B, Samei E. Estimation of radiation dose in CT based on projection data. *Journal of Digital Imaging* 1-7, 2016.

J130. Sahbaee P, Segars WP, Marin D, Nelson R, Samei E. Determination of contrast media administration to achieve a targeted contrast enhancement in computed tomography. *Journal of Medical Imaging* 3(1): 013501-013501, 2016.

J131. Nelson JS, Wells JR, Baker JA, Samei E. How does c-view image quality compare with conventional 2D FFDM? *Medical Physics* 43(5): 2538-2547, 2016. This article was selected as a featured paper as a top article in the journal issue.

J132. Tian X, Yin Z, De Man B, Samei E. Estimation of radiation dose in CT based on projection data. *Journal of Digital Imaging* 1-7, 2016

J133. Marin D, Gupta S, Fu W, Stinnett SS, Mileto A, Bellini D, Patel B, Samei E, Nelson RC. Effect of a noise-optimized second-generation monoenergetic algorithm on image noise and conspicuity of hypervascular liver tumors: an in vitro and in vivo study. *AJR* 206(6): 1222-1232, 2016.

J134. Tian X, Segars WP, Dixon RL, Samei E. Convolution-based estimation of organ dose in tube current modulated CT. *Physics in Medicine and Biology* 61(10): 3935-3954, 2016.

This paper develedoped a convolution-based technique to model the heterogeneous radiation field under tube current modulated CT examinations. Results suggest that organ dose could be accurately estimated for TCM examinations by conbining such convolution technique with a validated Monte Carlo simulation and a library of computational phantoms.

J135. Lin Y, Samei E. Development and evaluation of a segmentation-free polyenergetic algorithm for dynamic perfusion computed tomography. *Journal of Medical Imaging* 3(3): 033503, 2016.

J136. Sanders J, Hurwitz L, Samei E. Patient-specific quantification of image quality: An automated method for measuring spatial resolution in clinical CT images. *Medical Physics* 43(10): 5330-5338, 2016.

In this study, a fully automated technique was developed to quantify spatial resolution in clinical CT images. The method is based on measuring the ESF across the patient's skin. The authors demonstrated that spatial resolution can vary drastically amongst clinical images reconstructed with identical reconstruction parameters.

J137. Kiarashi N, Nolte LW, Lo JY, Segars WP, Ghate SV, Solomon J, Samei E. Impact of breast structure on lesion detection in breast tomosynthesis, a simulation study. *Journal of Medical Imaging* 3(3): 035504, 2016.

J138. Ikejimba LC, Glick SJ, Choudhury KR, Samei E, Lo JY. Assessing task performance in FFDM, DBT and synthetic mammography using uniform and anthropomorphic physical phantoms. *Medical Physics* 43 (10): 5593-5602, 2016.

J139. Solomon J, Samei E. Correlation between human detection accuracy and observer model-based image quality metrics in CT. *Journal of Medical Imaging* 3(3): 035506, 2016.

This study compares a number of observer models (e.g., NPW, CHO) with human-based low-contrast detectability data for CT images. The models are compared with humans in terms of their correlation strength, practicality, and ability to properly characterize iterative reconstruction algorithms. Both the NPW and CHO models were highly correlated with human detection performance.

J140. Solomon J, Ba A, Bochud F, Samei E. Comparison of low-contrast detectability between two CT reconstruction algorithms using voxel-based 3D printed textured phantoms. *Medical Physics* 43 (12): 6497-6506, 2016. This article was selected as a featured paper as a top article in the journal issue.

This study developed and used voxel-based 3D printed textured phantoms to demonstrate that the dose reduction potential of non-linear CT iterative reconstruction algorithms is dependent on anatomical texture. It was found that the estimated dose reduction potential of the iterative algorithm was highly dependent on background texture.

J141. Fu W, Tian X, Sturgeon G, Agasthya G, Segars WP, Goodsitt MM, Kazerooni EA, Samei E. CT breast dose reduction with the use of breast positioning and organ-based tube current modulation. *Medical Physics* 44(2), 665-678, 2017.

J142. Mileto A, Samei E. Hallway conversations in physics: Ten frequently asked questions about dual-energy CT. *AJR* 208:W24-27, 2017.

J143. Solomon J, Marin D, Choudhury KR, Patel B, Samei E. Effect of radiation dose reduction and reconstruction algorithm on image noise, contrast, resolution, and detectability of subtle hypo-attenuating liver lesions multidetector CT: Filtered Back Projection versus a commercial model–based iterative reconstruction algorithm. *Radiology* 284(3): 777-787, 2017.

Human perception experiment based on clinical CT data designed to estimate the dose reduction potential of a commercial iterative reconstruction algorithm. It was found that the actual dose reduction potential of the algorithm in question (~16%) is less than what has been reported by many phantom-based and patient-based studies (~26%-80%).

J144. Sanders J, Tian X, Segars WP, Boone J, Samei E. Automated, patient-specific estimation of regional imparted energy and dose from TCM CT exams across 13 protocols. *Journal of Medical Imaging* 4(1): 013503-013503, 2017.

This study investigated a fully automated method for quantifying regional imparted energy and dose from clinical TCM CT exams. Results indicated that regional imparted energy (per DLP) increased with kV, but was unaffected by the TCM strength. The algorithm was tested on 40 clinical datasets with a 98% success rate.

J145. Ria F, Wilson J, Zhang Y, Samei E. Image noise and dose performance across a clinical population: patient size adaptation as a metric of CT performance. *Medical Physics* 44(6): 2141-2147, 2017.

J146. Sahbaee P, Segars WP, Marin D, Nelson R, Samei E. The impact of contrast material on radiation dose in CT: Part I. Incorporation of contrast medium dynamics in anthropomorphic phantoms. *Radiology* 283 (3), 739-748, 2017. Recognized as a notable article reflected in the journal editorial and featured in the May 2017 webcast of Radiology.

In this article the authors developed a technique to model the propagation of contrast material in XCAT human models was developed. The models with added contrast material propagation can be applied to simulate contrast-enhanced CT examinations.

J147. Sahbaee P, Abadi E, Segars WP, Marin D, Nelson R, Samei E. The impact of contrast medium on radiation dose in CT: Part II. A systematic evaluation across 58 patient models. *Radiology* 152852, 2017. Recognized as a notable article reflected in the journal editorial and featured in the May 2017 webcast of Radiology.

The study introduced a technique to quantify the radiation doses delivered to the patients undergoing contrast-enhanced CT examinations. The authors presented the Monte Carlo simulated radiation doses to different enhanced organs as a function of time across a population of contrast-enhanced XCAT models. Under this work, they also presented that the administration of contrast medium increases the total radiation dose.

J148. Mileto A, Nelson RC, Larson DG, Samei E, Wilson JM, Christianson O, Marin D, Boll DT. Variability in radiation dose from repeat identical CT examinations: longitudinal analysis of 2851 patients undergoing 12,635 thoracoabdominal CT scans in an academic health system. *AJR* 28:1-12. 2017.

J149. Zhang Y, Smitherman C, Samei E. Size specific optimization of CT protocols based on minimum detectability. *Medical Physics* 44 (4): 1301-1311, 2017.

J150. Hoye J, Zhang Y, Agasthya G, Sturgeon G, Kapadia A, Segars WP, Samei E. Organ dose variability and trends in tomosynthesis and radiography. *Journal of Medical Imaging* 4(3): 031207-031207, 2017.

J151. Robins M, Solomon JB, Sahbaee P, Sedlmair M, Choudhury KR, Pezeshk A, Sahiner B, Samei E. Techniques for virtual lung nodule insertion: volumetric and morphometric comparison of projection-based and image-based methods for quantitative CT. *Physics in Medicine and Biology*, 62 (18), 7280-7299, 2017.

J152. Fu W, Marin D, Ramirez-Giraldo JC, Choudhury KR, Solomon JB, Schabel C, Patel BN, Samei E. Optimizing window settings for improved presentation of virtual monoenergetic images in dual-energy computed tomography. *Medical Physics* 44(11): 5686-5696, 2017.

J153. Fu W, Sturgeon GM, Agasthya G, Segars WP, Kapadia AJ, Samei E. Breast dose reduction with organ-based, wide-angle tube current modulated CT. *Journal of Medical Imaging* 4(3): 031208-031208. 2017.

J154. Abadi E, Sanders J, Samei E. Patient-specific quantification of image quality: an automated technique for measuring the distribution of organ Hounsfield units in clinical chest CT images. *Medical Physics* 44(9): 4736-4746, 2017.

To extend CT image quality quantification to clinical images, the authors developed a fully automated algorithm for measuring HU distributions in four major organs in chest images: the lungs, liver, bone, and aorta. The automated algorithm performed comparably to manual measurements and can be utilized for patient-specific image contrast evaluations.

J155. Samei E, Li X, Frush DP. Size-based quality-informed framework for quantitative optimization of pediatric CT. *Journal of Medical Imaging* 4(3): 031209, 2017.

J156. Samei E, Tian X, Segars WP, Frush DP. Radiation risk index for pediatric CT: A patient-derived metric. *Peditaric Radiology* 47(13): 1737-1744, 2017.

J157. Winslow J, Zhang Y, Samei E. A method for characterizing and matching CT image quality across CT scanners from different manufacturers. *Medical Physics* 44(11): 5705-5717, 2017.

J158. Samei E, Hoeschen C. Visions of safety: Perspectives on radiation exposure and risk in medical imaging (Special Section Guest Editorial). *Journal of Medical Imaging* 4(3), 031201. 2017.

J159. Ria F, Bergantin A, Vai A, Bonfanti P, Martinotti AS, Redaelli I, Invernizzi M, Pedrinelli G, Bernini G, Papa S, Samei E. Awareness of medical radiation exposure among patients: A patient survey as a first step for effective communication of ionizing radiation risks. *Physica Medica* 43, 57-62, 2017.

J160. Abadi E, Sahbaee P, Samei E. Effect of iodine-based contrast material on radiation dose at CT. *Radiology* 285 (3), 1053-1054, 2017.

J161. Samei E, Robins M, Chen B, Agasthya G. Estimability index for volume quantification of homogeneous spherical lesions in computed tomography. *Journal of Medical Imaging* 5 (3), 031404, 2017.

J162. Smith TB, Solomon J, Samei E. Estimating detectability index in vivo: development and validation of an automated methodology. *Journal of Medical Imaging* 5 (3), 031403, 2017.

J163. Jaffe TA, Tian X, Bashir MR, Marin D, Patel BN, Ho LM, Samei E. Clinically acceptable optimized dose reduction in computed tomographic imaging of necrotizing pancreatitis using a noise addition software tool. *Journal of Computer Assisted Tomography*, 2017.

J164. Richards, Sturgeon GM, Ramirez-Giraldo JC, Rubin GD, Koweek LH, Segars WP, Samei E. Quantification of uncertainty in the assessment of coronary plaque in CCTA through a dynamic cardiac phantom and 3D-printed plaque model. *Journal of Medical Imaging* 5 (1), 013501, 2018.

J165. Samei E, Ikejimba LC, Harrawood BP, Rong J, Cunningham IA, Flynn MJ. Report of AAPM Task Group 162: Software for planar image quality metrology. *Medical Physics*, 45(2), 2018.

J166. Abadi E, Segars WP, Sturgeon GM, Roos JE, Ravin CE, Samei E. Modeling lung architecture in the XCAT series of phantoms: physiologically based airways, arteries and veins. *IEEE Transactions on Medical Imaging*, 37(3): 693-702, 2018.

J167. Segars WP, Tsui BMW, Cai J, Yin FF, Fung GSK, Samei E. Application of the 4-D XCAT phantoms in biomedical imaging and beyond. *IEEE Transactions on Medical Imaging* 37(3), 680-692, 2018.

J168. Segars WP, Veress AI, Sturgeon GM, Samei E. Incorporation of the Living Heart Model into the 4D XCAT Phantom for Cardiac Imaging Research *IEEE Transactions on Medical Imaging* 37(3), 680-692, 2018.

J169. Euler A, Solomon J, Marin D, Nelson RC, Samei E. A third-generation adaptive statistical iterative reconstruction technique: phantom study of image noise, spatial resolution, lesion Detectability, and dose reduction potential. *American Journal of Roentgenology*, 1-8, 2018.

J170. Samei E, Jarvinen H, Kortesniemi M, Simantirakis G, Goh C, Wallace A, Vano E, Bejan A, Rehani MM, Vassileva J. Medical imaging dose optimization from ground up: expert opinion of an international summit. *Journal of Radiological Protection* 38(3): 967-989, 2018.

J171. Samei E, Grist TM. Why physics in medicine? *Journal of American College of Radiology* (online release 5/18/18, in print 2018).

J172. Jaffe TA, Wilson J, Zhang Y, Allen BC, Choudhury KR, Samei E. Automated early identification of an excessive air-in-oil x-ray tube artifact that mimics acute cerebral infarct. *Journal of Computer Assisted Tomography* (online release 7/14/18, in print 2018).