NOTABLE PUBLICATIONS

Refereed journal publications:

1. **Samei E**, Flynn MJ, Eyler WR. Detection of subtle lung nodules: relative influence of quantum and anatomical noise on chest radiographs. *Radiology* 213: 727-734, 1999.

   This paper provided a systematic assessment of the influence of lung texture on lung nodule detection through an observer study. Furthermore, the data was correlated with non-prewhittening and Hotelling observer model results computed in the spatial frequency domain.

2. **Samei E**, Flynn MJ, Peterson E, Eyler WR. Subtle lung nodules: influence of local anatomical variations on detection. *Radiology* 228: 76–84, 2003.

   This work investigated the impact of the coincidence of local anatomical structure on lesion detection in chest radiography. No modeling was involved, but the work establishes the relevance of phase information on lesion detectability.

3. 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.

4. **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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. Li X*, **Samei E**, Segars WP, Sturgeon GM, Colsher JG, Frush DP. Patient-specific radiation dose and cancer risk for pediatric chest CT. *Radiology* Jun 259(3):862-74, 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.

11. 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.

12. 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.

13. 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).

14. 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.

15. 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)

16. 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.

17. 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.

18. 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.

19. 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.

20. 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.

21. 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.

22. 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.

23. 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.

24. 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.

25. 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.

26. 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.

27. 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.

28. 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.

29. **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.

30. 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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.

36. 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.

37. 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.

38. 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.

39. Bellini D, Ramirez Giraldo JC, Bibbey A, Solomon J, Koweek L, Farjat A, Mileto A, **Samei E**, Marin D. Dual-source single-energy MDCT to obtain multiple radiation exposure levels within the same patient: phantom development and clinical validation. *Radiology* 161233, 2016.

Combined clinical and phantom study for the development of a technique to image a single patient at multiple radiation dose levels based on a single CT acquisition.

40. Solomon J*, Marin D, Patel B, Choudhury KR, **Samei E**. Effect of radiation dose reduction and reconstruction algorithm on image noise, contrast, resolution, and detectability of subtle hypoattenuating liver lesions in MDCT: FBP vs a model based iterative reconstruction algorithm. *Radiology* (in press, 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%).

41. 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* (in press, 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.

42. 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* (accepted-in revision, 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.

43. Sahbaee P*, Segars WP, Marin D, Nelson R, Samei E. The Effect of Contrast Material on Radiation Dose at CT: Part I—Incorporation of Contrast Material Dynamics in Anthropomorphic Phantoms. *Radiology*, 2017, January 13:152851. doi:10.1148/radiol.2016152851

    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.

44. Sahbaee P*, Abadi E, Segars WP, Marin D, Nelson R, **Samei E**. The Effect of Contrast Material on Radiation Dose at CT: Part I - A systematic evaluation across 58 patient models. *Radiology* (in review, 2017).

    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.

Refereed full-length proceedings papers:

1. Richard S*, Li X, Yadava G, **Samei E**. Predictive models for observer performance in CT: Applications in protocol optimization. SPIE International Symposium on Medical Imaging, Orlando, FL, February 2011, *Proc. SPIE Medical Imaging* 7961: 79610H, 2011.

    This paper investigated the correlation between observer models and human observer performance. One of the observer models was further employed to assess the performance of iterative reconstruction, and found a 76-81% dose reduction potential.

2. Chen B*, Richard S, **Samei E**. Relevance of MTF and NPS in quantitative CT: towards developing a predictable model of quantitative performance. SPIE International Symposium on Medical Imaging, San Diego, CA, February 2012, *Proc. SPIE Medical Imaging* 8313: 83132O, 2012.

    The authors reformulated a previously developed metric, estimability index (e'), to predict the quantitative precision of a CT system. The estimability index was found to strongly correlate with experimentally measured quantitative precision across various dose levels, slice thickness, and reconstruction algorithms.

3. Chen B*, Richard S, Christianson O, Zhou X, **Samei E**. CT Performance as a variable function of resolution, noise, and task property for iterative reconstructions. SPIE International Symposium on Medical Imaging, San Diego, CA, February 2012, *Proc. SPIE Medical Imaging* 8313: 83131K, 2012.

   The authors use a task-specific detectibility index as a surrogate of image quality to compare the performance of a CT system across dose and reconstruction settings, including FBP and iterative reconstruction (SAFIRE). The iterative reconstruction algorithm had similar performance at lower (50%) dose compared to FBP.

4. Zhang Y*, Li X, Segars WP, **Samei E**. Comparative dosimetry of radiography, tomosynthesis, and CT for chest imaging across 59 adult patients. SPIE International Symposium on Medical Imaging, Orlando, FA, February 2013, *Proc. SPIE Medical Imaging* 8668: 866844, 2013.

   The impact of patient sizes on radiation dose was examined for three chest imaging modalities. It was found that patient sizes has a much greater impact on radiation dose of chest CT examinations than chest radiography and tomosynthesis.

5. Solomon J*, **Samei E**. Are uniform phantoms sufficient to characterize the performance of iterative reconstruction in CT? SPIE International Symposium on Medical Imaging, Orlando, FA, February 2013, *Proc. SPIE Medical Imaging* 8668: 86684M, 2013.

   The paper illustrates a potential pitfall in using uniform phantoms to assess the dose reduction potential of non-linear iterative reconstruction algorithms in CT. The authors show that noise is reduced significantly more in uniform phantoms compared to inhomogeneous textured phantoms for a commercially available iterative reconstruction algorithm.

6. Solomon J*, Bochud F, **Samei E**. Design of anthropomorphic textured phantoms for CT performance evaluation. SPIE International Symposium on Medical Imaging, San Diego, CA, February 2014, *Proc. SPIE Medical Imaging* 9033, 2014.

   This is version one of our textured phantoms. Version 2 was presented above in a presentation titled "Design, fabrication, and implementation of voxel-based 3D printed textured phantoms for task-based image quality assessment in CT."

7. Sahbaee P*, Lin Y, Segars WP, Marin D, Nelson R, **Samei E**. Determination of contrast media administration to achieve a targeted contrast enhancement in CT. SPIE International Symposium on Medical Imaging, Orlando, FL, February 2015, *Proc. SPIE Medical Imaging* 9412, 2015.

   The authors developed two methods, analytical inverse and iterative stripping, to determine the required contrast medium injection function to achieve a desired contrast enhancement in specific organs by the incorporation of a physiologically based compartmental model of dynamics of contrast material distribution. By combining these two methods, we could achieve a better than 12% accuracy in delivering an organ enhancement based on a predicted injection function. Such an approach can be useful in optimizing contrast medium injection functions as well as the scan timing to provide more consistency in the way that contrast enhanced CT examinations are performed

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8. Solomon J*, Mileto A, Giraldo JCR, **Samei E**. A multireader diagnostic performance study of low-contrast detectability on a third-generation dual-source CT scanner: filtered back projection versus advanced modeled iterative reconstruction. SPIE International Symposium on Medical Imaging, Orlando, FL, February 2015, *Proc. SPIE Medical Imaging* 9416, 2015.

   This is the pre-cursor to the peer reviewed paper above titled "Correlation between human detection accuracy and observer model-based image quality metrics in computed tomography."

9. Solomon J*, **Samei E**. What observer models best reflect low-contrast detectability in CT? SPIE International Symposium on Medical Imaging, Orlando, FL, February 2015, *Proc. SPIE Medical Imaging* 9416, 2015.

   This is the pre-cursor to the peer reviewed paper above titled "Correlation between human detection accuracy and observer model-based image quality metrics in computed tomography."

10. Solomon J*, Ba A, Diao A, Lo JY, Bier E, Bochud F, Gehm M, **Samei E**. Design, fabrication, and implementation of voxel-based 3D printed textured phantoms for task-based image quality assessment in CT. SPIE International Symposium on Medical Imaging, San Diego, CA, February-March 2016, *Proc. SPIE Medical Imaging* 9783, 2016.

    A method to use a 3D printer to fabricate CT phantoms with highly detailed internal textures was developed. The method uses voxel-based inputs to distribute two base materials in different proportions throughout the phantom, thus achieving a continuous scale of radiodensities. Based on this method, a series of textured phantoms were developed based on CT data of human livers. The utility of the phantoms was demonstrated by assessing detectability based on a multi-slice CHO model. This is the pre-cursor to the peer reviewed paper above titled "Comparison of low-contrast detectability between two CT reconstruction algorithms using voxel-based 3D printed textured phantoms."

11. Sahbaee P*, Abadi E, Sanders J, Becchetti M, Zhang Y, Agasthya, G, **Samei E**. A technique for multi-dimensional optimization of radiation dose, contrast dose, and image quality in CT imaging. SPIE International Symposium on Medical Imaging, San Diego, CA, February-March 2016, *Proc. SPIE Medical Imaging* 9783, 2016.

    The authors have employed a series of anatomically variable contrast enhanced phantoms which they developed in their previous studies in order to introduce a novel patient-specific strategy to investigate the interdependency of iodine concentration (IC), radiation dose, and image quality in a routine abdomen CT scan.

12. Sahbaee P*, Robins M, Solomon J, **Samei E**. Development of a Hausdorff distance based 3D quantification technique to evaluate the CT imaging system impact on depiction of lesion morphology. SPIE International Symposium on Medical Imaging, San Diego, CA, February-March 2016, *Proc. SPIE Medical Imaging* 9783, 2016.

    A distance measure technique, regional Hausdorff Distance was introduced and computed with adaptive size mesh voxels. Applying this method with the given physical synthetic nodule as the "ground truth" allowed the authors to indicate the impact of CT imaging system on lesion morphology. The RHD was successfully applied on voxelized physical nodule and segmented CT image of it. Moreover, in contrast to the volume estimation, this technique allowed the authors to study the 3D formation and topology of the imaged nodule versus the physical nodule.

13. Sanders J*, Tian X, Segars WP, Boone JM, **Samei E**. An automated technique for estimating patient-specific regional imparted energy in TCM CT exams. SPIE International Symposium on Medical Imaging, San Diego, CA, February-March 2016, *Proc. SPIE Medical Imaging* 9783, 2016.

    This was the predecessor to the above study. The beginning stages of the patient/specific regional imparted energy/dose algorithm was documented here for adult chest and abdominopelvic CT examinations.