

## AbstractID: 7415 Title: A comparison of anatomical noise properties between breast CT and projection breast imaging

**Purpose:** To compare the statistical properties of the anatomical noise present in breast images. Images from a dedicated breast CT scanner are compared with mammographic projection images.

**Method and Materials:** A dedicated breast CT (bCT) scanner was used to image the breasts of volunteers and patients. Twenty-five of the available 105 patient datasets were selected for analysis. Noise power spectra (NPS) calculations were performed on the datasets for the right breast of the 25 patients in order to examine the statistical nature of the anatomical background of the breast. The projection images acquired at 80 kVp during the cone beam breast CT acquisition were analyzed using NPS calculations. Approximately 50 projection images and 50 bCT slice images were analyzed per patient. Three regions of interest (ROIs) were used per image. The ROIs were randomly distributed within the boundary of the breast. The 2D NPS was calculated for each ROI and the average 2D NPS was computed and averaged radially yielding a 1D NPS. A power law expression of the form  $\alpha f^{-\beta}$  was computed from the results of the projection and bCT images, and the  $\beta$  values were compared. Theoretical development suggests that the  $\beta$  for bCT should be one less than that of the projection images, i.e.  $\beta_{\text{bCT}} = \beta_{\text{proj}} - 1$ .

**Results:** The  $\beta$  values for the bCT slice images were consistently less than those for the projection images. The difference ranged from 0.90 to 2.15, with the average difference being 1.34. The  $\beta$  values for projection images were consistent with the 2.8 value described by Burgess (2001).

**Conclusion:** Lower  $\beta$  values from the NPS results of the bCT images could quantitatively indicate potential improvement in detection ability. More work is needed to conclusively say if this is the case.

**Conflict of Interest (only if applicable):**