

# Analysis of Parenchymal Texture Properties in Breast Tomosynthesis Images

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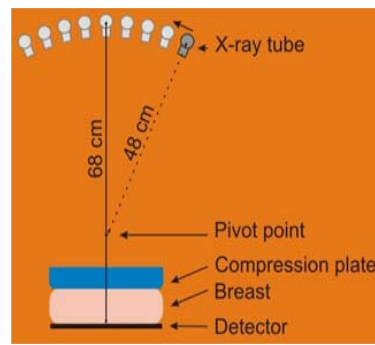
## Purpose

We are studying parenchymal texture in Digital Breast Tomosynthesis (DBT) as a measure of Cancer Risk. We compare to standard Mammography<sup>1</sup>.

**Long-term goal:** Test the hypothesis that DBT can provide more accurate measures of Cancer Risk.

## Digital Breast Tomosynthesis (DBT)

A novel 3D x-ray imaging technique in which 3D tomographic images of the breast are reconstructed from multiple 2D x-ray source projection images<sup>2</sup>.



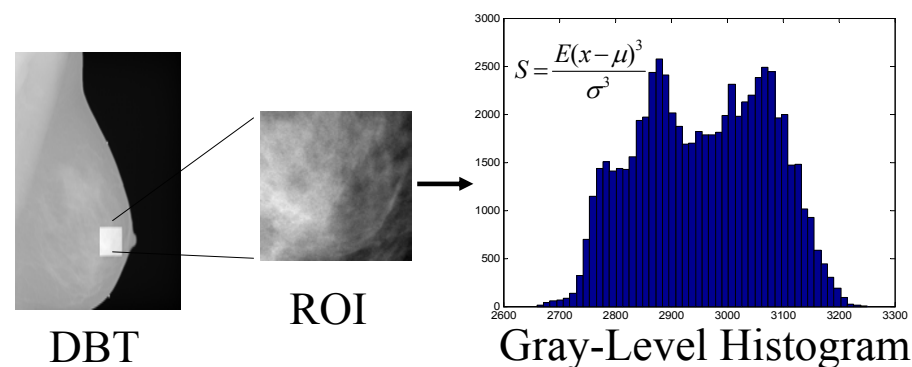
DBT geometry

**DBT advantage over projection Mammography:**

- Superior normal tissue and lesion visualization
- Superimposition of non-adjacent tissue is avoided

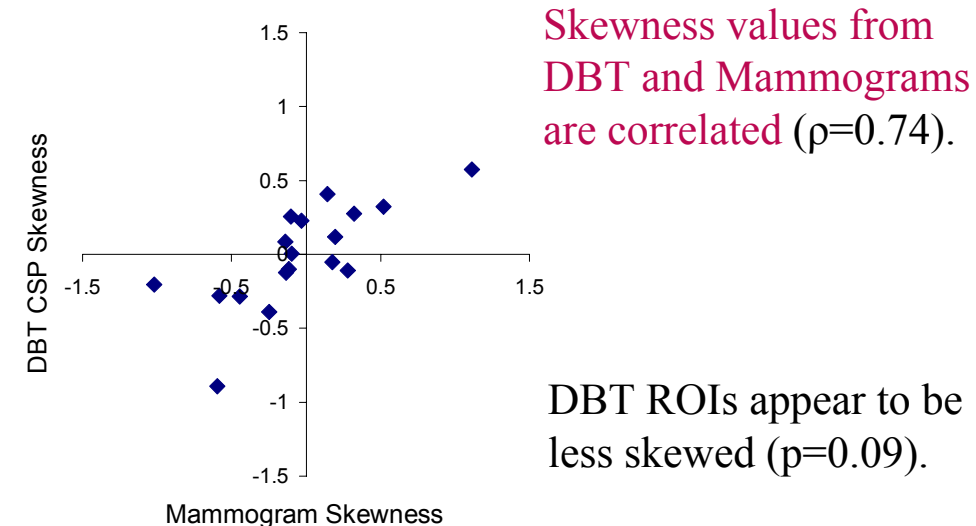
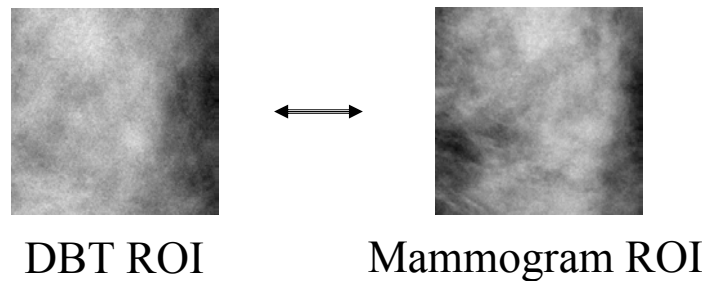
## Methods: Texture Analysis

We computed the skewness  $S$  of the gray-level histogram for 256x256 retroareolar ROIs<sup>2</sup> in the Source Projection images acquired from 9 women.



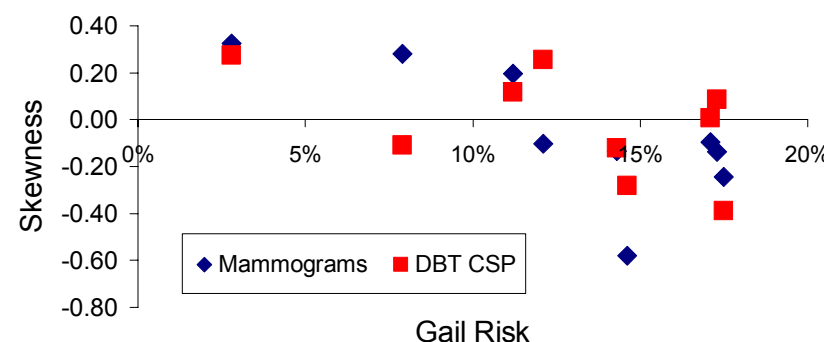
## Results: DBT comparison to Mammograms

We compared skewness from DBT Central Source Projections (CSP) and corresponding Mammograms.



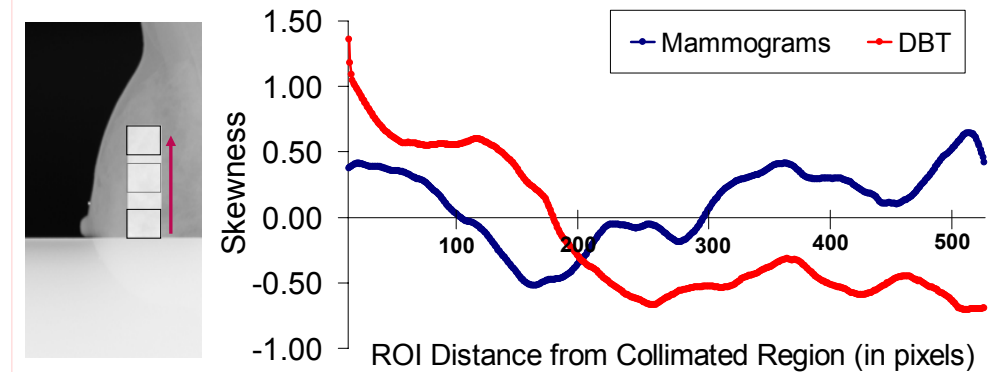
DBT ROIs appear to be less skewed ( $p=0.09$ ).

DBT skewness follows similar trends as in Mammograms when plotted versus the Gail breast cancer risk values for the contralateral breasts.



## Results: Effect of Scatter in DBT

At acute angles, our DBT geometry is such that the x-ray collimator is visualized<sup>3</sup>. We selected an ROI near the collimator and translated its position over 512 pixels.



The skewness is greater for DBT images near the collimated region due to the spatial dependence of the scatter near the boundary of the x-ray field.

## Conclusions

Texture in DBT differs from Mammograms. This can be attributed to differences in image acquisition:

- Scatter effect
- Less compression force
- Lower radiation dose

We are investigating the potential of DBT to provide **Cancer Risk biomarkers** for tailoring individual treatment and forming preventive strategies.

## Acknowledgement

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## References

1. Li H, et al, Academic Radiology 2005; 12:863-873
2. Niklason LT, et al., Radiology 1997; 205:399-406
3. Carton AK, et al, Physics of Medical Imaging SPIE 2006