

AbstractID: 9857 Title: Tomosynthesis Imaging of the Chest

Tomosynthesis is a technique that allows for an arbitrary number of planar images to be produced retrospectively from an initial set of projection images acquired at different x-ray tube orientations. Tomosynthesis is a derivative of conventional geometric tomography, but it has the advantage that a full volume of data can be produced at dose less than conventional geometric tomography. Tomosynthesis produces planar images at arbitrary location by shifting and adding the constituent projection images. The tomosynthesis images produced by shifting and adding produce a plane of structures in sharp focus as well as a blurry rendition of all other planes in the object. For tomosynthesis to be most effective, a suitable method of removing the blur from overlying planes must be used. Various methods of deblurring have been evaluated, including iterative approaches and a linear algebra approach called Matrix Inversion Tomosynthesis (MITS) developed in our laboratory.

Tomosynthesis imaging has become clinically practical in recent years due to the development of flat-panel image receptors. There are currently investigations underway to explore tomosynthesis in breast and chest imaging.

This talk will discuss the mathematical principles of tomosynthesis and deblurring, as well as the various methods used to optimize the technique. Examples of human subject chest tomosynthesis images will be provided, with an emphasis on improving the detection of pulmonary nodules.

Educational objectives:

1. To learn the history of tomosynthesis
2. To understand the basic principles of image reconstruction with tomosynthesis
3. To understand the importance of deblurring algorithms, and how such algorithms work
4. To become familiar with some of the methods used to optimize tomosynthesis
5. To see applications of tomosynthesis to chest imaging, including images of human subjects with pulmonary nodules (all images were obtained with informed consent)

Statement of financial interest:

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