AbstractID: 9788 Title: What Every Medical Physicist Should Know About Breast Tomosynthesis

Digital tomosynthesis (or "tomo") is revolutionizing breast imaging. Based on modified full-field digital mammography systems, breast tomo can achieve limited-angle cone-beam CT imaging which produces 3D slice images of the breast. This addresses the problem of overlapping dense tissue which is the most common cause for unnecessary callbacks as well as missed cancers in mammography screening. Tomo can provide 3D images while remaining comparable to mammography in terms of speed, resolution, cost, and dose. For these reasons, tomo may be only imaging technique with the potential to completely replace the current role of mammography as the primary tool in breast cancer screening and diagnosis. FDA approval is imminent, so it is all the more important for medical physicists to understand this new modality's potential as well as limitations.

This presentation will cover both the hype and hope surrounding breast tomosynthesis. What do the initial clinical trials suggest about its performance? What are the on-going physics issues in terms of clinical implementation, including compression, dose, and QA? What are some of the latest results from different research groups working on optimization of radiographic techniques, acquisition modes, and reconstruction algorithms? What is coming down the road in terms of advanced applications including quantitative imaging, computer aided detection, and contrast enhanced imaging? We will explore the answers to these and other questions together.

The work discussed in this presentation was supported in part by grants from NIH/NCI, US Army Breast Cancer Research Program, Susan G. Komen for the Cure, General Electric Company, Hologic, and Siemens Medical Solutions.

Educational Objectives:
1. Understand the difference between breast tomosynthesis and dedicated breast CT.
2. Appreciate the many medical physics issues involved in the development and optimization of breast tomosynthesis.
3. Understand the clinical promise and concerns of using breast tomosynthesis.