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Ultrasound Computed Tomography: Historically Guided Musings

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Abstract

Computed Tomography with ultrasound waves, in both through transmission and reflection, has been investigated for over 40 years. In that time investigators have concentrated on the complex interac-tions of ultrasonic waves with the tissue of the human female breast in an effort to delineate malignant from benign lesions. Over the years the relentless improvement of both electronics and computer power has allowed the inverse solution of more and more complex mathematical models of wave propagation through complex tissue such as the breast. However, the need for complete three-dimensional acquisition of scattering waves from the tissue continues to be a difficult technological problem. In addition to the technical challenges are the challenges of finding where in the flow diagram of breast disease patients traversing the health care system to place ultrasound breast tomography to provide the most effective contribution to the efficacy and efficiency of breast disease detection, diag-nosis, and treatment. Meanwhile, other modalities are developing that provide very stiff competition to the field of computed ultrasound tomography of the breast. Historical examples and current imple-mentations will be described and discussed.

Author: GREENLEAF, James F. (Mayo Clinic)

Presenter: GREENLEAF, James F. (Mayo Clinic)

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