

## Medical Ultrasound Technology: From Pulse-Echo to Ultrasound Radiation Force

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*Abstract* - Traditional diagnostic ultrasound has evolved from a simple anatomical imaging tool to a sophisticated technology that involves quantifying tissue properties from molecular to organ levels. Many diseases cause microscopic changes in tissue which can manifest in alteration of tissue's mechanical properties, such as viscosity and elasticity. Ultrasonic techniques for measurement of these properties are of great interest because ultrasound is noninvasive and can be used to make measurements at sufficient depths inside the body. Here, I present 2 new modalities that use ultrasound in different ways. The first modality is for evaluation of bladder compliance in patients with neurogenic bladders. In current clinical practice, bladder compliance is assessed through an invasive procedure called *urodynamic studies* by which the internal bladder pressure is measured at different filling volumes. This procedure requires substantial hospital resources and is not well tolerated by patients. The new ultrasound technique can provide similar information noninvasively while requiring only minimal resources. The second modality is a technique for differentiation of suspicious breast masses. This technique is based on the slow deformation rate of tissue and has been tested on a group of patients and the results show high accuracy in differentiation of such masses. The talk will conclude with a discussion on possible future directions in these research areas.