

Title of the project

Biopsy Needle Guidance Systems using Micro-acoustic Emitter

Category (translational/bioengineering/biodesign): BioDesign

Investigators

Dr. Manish Arora, IISc.

Prof. Sriram Sampath, St. John's

Statement of research:

Ultrasound guided needle biopsy have lot of difficulty in positioning of the fine needles as they can bend during procedure. Needle visualization and tracking is often challenging because of number of reasons; Even if part of needle is visualized there is doubt about the location of the needle tip; Needle could bend out the plane of imaging and needle track may remain visible even after needle is retracted. In this project we propose to evaluate a novel way of locating needle tip by embedding active acoustics emitter at the needle tip. Acoustic emitter in the biopsy needle will transmit acoustics pulses at know times when the ultrasound imaging system is not transmitting any sound pulses. These pulses when received by various elements of the diagnostics ultrasound transducer can be used to determine the position of the emitter by triangulation method. This position will be then overlaid with conventional b-mode image. MUT (Micromachined Ultrasound transducer) can be fabricated using micromachining tools where the active element can be only a few microns wide. Both capacitive and piezoelectric MUTs can be fabricated with help of national nanofabrication facilities at CeNSE, IISc.

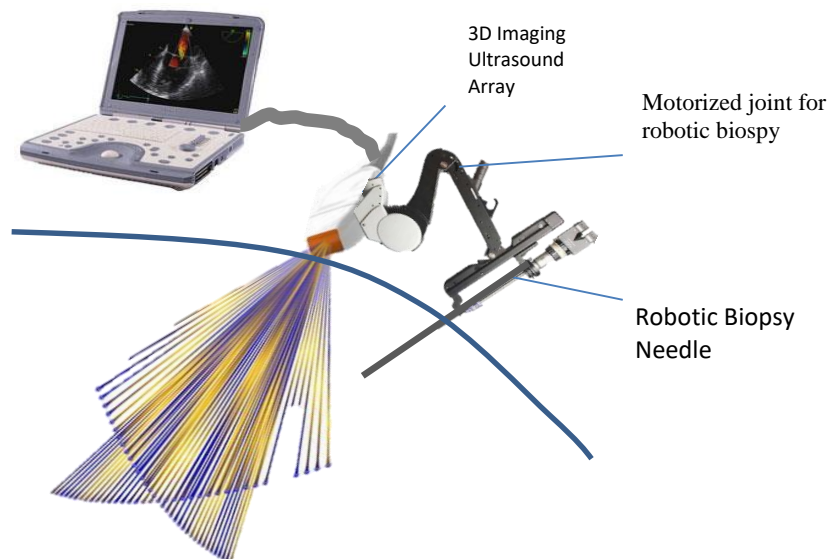


Figure 1 future embodiment of robotic biopsy system using miniature acoustic emitter technology