Center for Inverse Problems, Imaging and Tomography

Mission

To provide a bridge for the transfer of fundamental science and technological developments into profitable commercial and industrial applications. More specifically, to develop new technologies, assist in demonstrating commercial feasibility of these new technologies, and to enhance Utah's competitiveness in technology industries by creating jobs, forming alliances, licensing technology, and creating new companies.

The Center

The Center for Inverse Problem, Imaging and Tomography (CIPIT) is the result of research efforts conducted at the University of Utah's Advanced Imaging Methods Laboratory (AIM lab). The AIM lab was developed to study medical ultrasound imaging. Further research was then introduced in advanced sonar and geographical/environmental imaging methods based on common mathematics. In 1990, the AIM lab submitted a proposal for independent support as the CIPIT and initial funding was received in February of 1991. Some of CIPIT's technical accomplishments are in the areas of:

MEDICAL ULTRASOUND

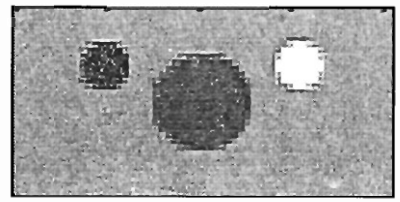
An advanced pre-clinical medical ultrasound scanner has been designed and is being constructed to detect cancer in tissue samples. Improvements have been made in the speed of basic inverse scattering algorithms. These algorithms have been ported and operated on a parallel computer which will allow commercial medical scanners to use imaging software with low cost parallel processors.

HAZARDOUS SITE IMAGING

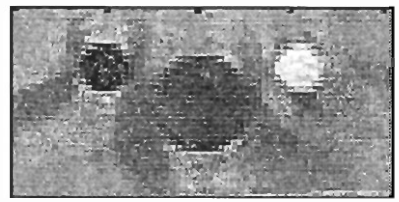
In connection with the Navy, work has been done scanning images buried in sand. This will allow Navy submarines to image objects buried in the ocean and to use acoustics for hazardous site imaging.

3-D MICROSCOPE

A 3-D, inverse scattering optical microscope was designed and the prototype has been completed. This microscope will demonstrate the first high resolution, quantitative 3-D images of microscopic test objects. Further tests will involve the use of nono-structures and human cells and chromosomes to demonstrate the commercial and medical advantages.



a. Shows the test object consisting of three rods or cylinders at left, middle and right.



b. Shows the inverse scattering of the test object that was reconstructed from synthetic scattering data generated by scattering from the test object in panel (a).

c. Shows an image made from the identical synthetic scattering used to make the image in panel (b).

For more information, please contact:

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