Meeting: 1003, Atlanta, Georgia, SS 4A, AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, I

1003-78-1137 **David Isaacson*** (isaacd@rpi.edu), Math Department, RPI, Troy, NY 12180. *Electrical Impedance Imaging and Inverse Problems.*

Electrical Impedance Imaging Systems apply currents to a body's surface and measure the resulting voltages. From these measurements a reconstruction and display of the electrical conductivity and permittivity inside the body are made. Since hearts and lungs differ in conductivity when they are filled with blood or air from when they are depleted of blood and air the EIT images can be used to monitor ventilation and perfusion. Since breast tumors have a significantly higher conductivity than normal breast tissue EIT images may be used to diagnose breast cancer.

It will be explained how the reconstruction of images of heart and lung function require the numerical analysis of inverse problems for Maxwell's equations.

Movies of heart and lung function made by the RPI ACT systems will be shown using linearizations and direct methods from inverse scattering theory. (Received October 04, 2004)