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David Isaacson* (isaacd@rpi.edu), Mathematical Sciences Department, Rensselaer Polytechnic Institute, Troy, NY 12180. *Electrical Impedance Tomography*.

Electrical Impedance Tomography (EIT) systems apply patterns of currents to the surface of a body and measure the resulting patterns of voltages. From this data they reconstruct approximations to the electrical conductivity inside the body. This is of interest in monitoring heart and lung function because as blood leaves the heart its conductivity decreases, and as it enters the lungs their conductivity increases. For this reason, impedance images of the inside of the chest show how the lungs are being perfused in real time. Mathematically, reconstructing the interior conductivity is called the Calderon problem and is an inverse boundary value problem for a low frequency approximation to Maxwell's equations, where one approximates the coefficients in the conductivity equation from the Neumann to Dirichlet map measured on the boundary. This problem, and why the spectral properties of the N to D map played a significant role in the design of our adaptive current tomography systems will be explained. Movies of perfusion will be shown. (Received January 24, 2022)