1014-35-904 **Margaret Cheney*** (`cheney@rpi.edu`), Dept. of Mathematical Sciences, Rensselaer Polytechnic Institute, 110 Eighth Street, Troy, NY 12180, and **Robert J. Bonneau**. *Imaging that exploits multiple scattering from point scatterers.*

This talk develops a method for making an image of an object when there are extra point-like scatterers in the environment. Once the location of these scatterers is known, they can be exploited in the imaging process: waves that scatterer from a known scatterer interrogate the target from directions that may not be directly accessible to the sensor. Here the extra point scatterers are assumed to lie between the sensor and the object of interest; a single-scattering model is used for the object itself. We use a backprojection approach for forming the image. We find that artifacts can arise in certain situations; we show how to avoid them and analyze the improvement in resolution due to the waves that reflect from the extra scatterers into the region of interest. Detailed analysis is carried out for the case of a single extra scatterer in the foreground; the extension to the case of many scatterers is expected to be similar. (Received September 26, 2005)