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Liliana Borcea* (borcea@caam.rice.edu), Computational and Applied Mathematics, Rice University, MS 134, 6100 Main St, Houston, TX 77005-1892. *Array Imaging in Random Media*.

In array imaging, we wish to find strong reflectors in a medium, given measurements of the time traces of the scattered echoes at a remote array of receivers. I will discuss array imaging in cluttered media, modeled with random processes, in regimes with significant multipathing of the waves by the inhomogeneities in the clutter. In such regimes, the traces measured at the array are noisy and exhibit a lot of delay spread. This makes imaging difficult and the usual techniques give unreliable, statistically unstable results. I will present a coherent interferometric imaging approach for random media, which exploits systematically the spatial and temporal coherence in the data to obtain statistically stable images. I will discuss the resolution of this method and its statistical stability and I will illustrate its performance with numerical simulations. I will also address the question of optimal illumination and waveform design for array imaging. (Received December 22, 2006)