Imaging in disordered media using neural networks

George Papanicolaou*[1]

[1]Stanford University – United States

Abstract

When large and diverse data sets are available, as is increasingly the case today, imaging methodology must change and adapt so as to generate images with better resolution and reliability. It is now possible to image objects of interest through disordered, strongly inhomogeneous media with resolution that is better than that of the corresponding homogeneous medium, that is, with super resolution. I will describe how this is done with new methods that can estimate the properties of the ambient medium in addition to imaging. We are not trying to smooth out the distorting effects of an inhomogeneous ambient medium, a denoising process that was the previous methodology. We now estimate everything, and it is here that the need for large data sets enters. Naturally neural networks play a very interesting role here and I will compare and contrast their performance with conventional optimization methods when possible. Results of detailed numerical experiments will be shown and discussed.

*Speaker