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Graduate Mathematics Seminar

Stochastic Algorithms in Signal Processing and Their Application to Medical Image Reconstruction

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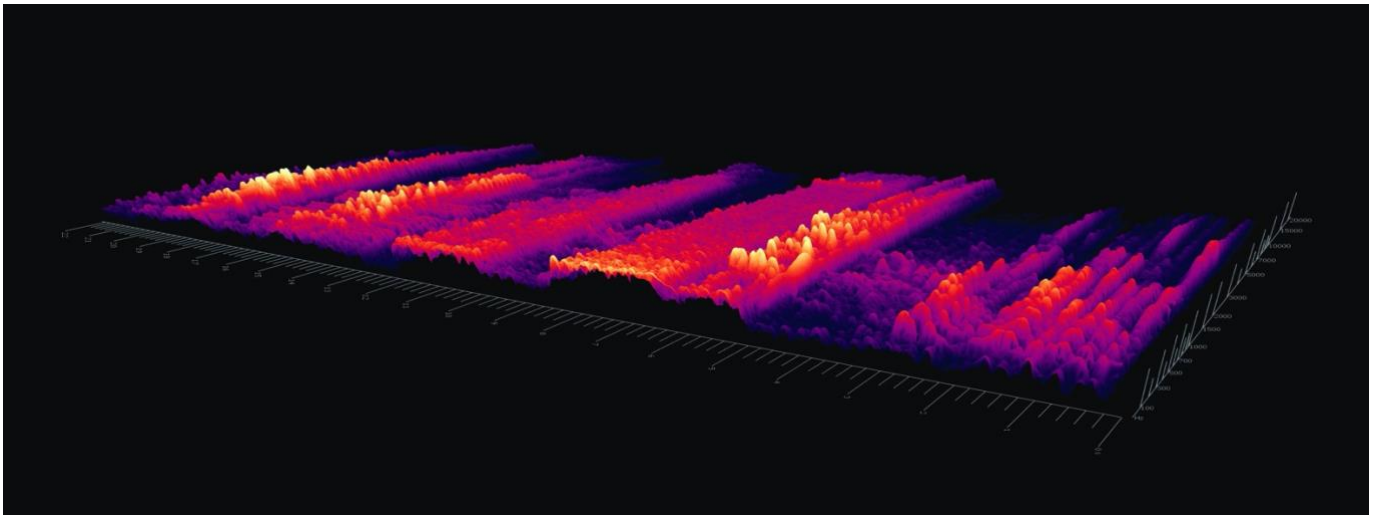
Goucher College



Abstract: The multiple measurement vector (MMV) problem has generated a growing interest in signal processing. In the MMV setting, multiple signals, with a commonality such as joint support, are to be recovered using more than one measurement vector. In this talk, I give an overview of the MMV problem and develop stochastic algorithms both to recover the joint support and reconstruct the signals in the MMV setting. I then apply these algorithms to the reconstruction problem in hyperspectral diffuse optical tomography (hyDOT), a type of medical imaging used primarily for soft tissue imaging. In this application, we consider a signal to be a vector indicating the amount of light absorption at each location in the tissue imaged for a particular wavelength. These signals can be considered sparse, where the light absorption in the healthy tissue is considered the baseline and the non-zero entries are the absorption coefficient values in cancerous cells. We find that the stochastic algorithms are effective in reconstructing and recovering the support of the signals, especially in the large-scale setting.

When: Monday, April 6, 2020, 6:00 – 7:00 pm
Where: On Zoom