

## **Reconstruction of Seismic Signals from Highly Aliased Multichannel Samples by Generalized Matching Pursuit**

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In this talk I will introduce marine seismic acquisition technologies and focus on solutions to maximize the bandwidth of the measured data. This involves detecting and removing the components of the wavefields that are reflected at the sea surface and that propagate downward: these downgoing reflections, called “ghosts” in literature, interfere with the upgoing wavefield, that is generated by subsurface reflections and is the signal of interest. The seismic ghosts impact severely the spectrum of the marine seismic data, resulting in significantly reduced resolution of the final seismic images obtained from processing.

After having shown that the ghost is a 3D problem that is very difficult to address with traditional marine measurements due to spatial aliasing across the receivers’ cables, I will introduce the multi-sensor streamer as an ideal platform to measure broadband multi-channel data.

I will introduce the joint interpolation and deghosting problem for multichannel data referring to the generalized sampling expansion theory, and propose Generalized Matching Pursuit (GMP) as a solution for this problem, showing how this technique resolves high-order alias and “deghosts” the data in 3D. I will describe the advantages and limitations of GMP, and show some field examples with a range of applications, discussing the benefits of broader bandwidth data reconstructed on finer sampling grids and their impact on the final results of processing.