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Optimization Program WISO Workshop
February 8-10, 2017

Lecture: *Phase Retrieval and Analog to Digital Compression*

Speaker: Yonina Eldar

Abstract:

The problem of phase retrieval, namely – the recovery of a function given the magnitude of its Fourier transform - arises in various fields of science and engineering, including electron microscopy, crystallography, astronomy, and optical imaging. Due to the loss of Fourier phase information, this problem is generally ill-posed. In this talk we review several modern methods for treating the phase retrieval problem which are based on advanced optimization tools and statistical analysis. We then show how these concepts can be used to tackle a very different set of nonlinear problems: low-rate analog to digital conversion without assuming any structure on the signal being sampled. This is possible by careful design of the measurement scheme, together with advanced nonlinear recovery methods. We end by demonstrating our sub-Nyquist methods via several prototypes developed in our lab for cognitive radio and ultrasound imaging.