OZGUR YILMAZ, The University of British Columbia
Sparsity and Blind Source Separation

Certain inverse problems can be solved quite efficiently if the solution is known to have a sparse decomposition with respect to some basis or frame in a Hilbert space. One particular example of such an inverse problem is the so-called cocktail party (or blind source separation) problem: Suppose we use a few microphones to record several people speaking simultaneously. How can we separate individual speech signals from these mixtures?

In this talk, I will review the algorithm DUET that addresses the blind source separation problem. In addition to being computationally efficient, one of the advantages of DUET is its ability, at least in some cases, to separate $n \geq 3$ source signals using only two mixtures. The algorithm is based on the key observation that Gabor expansions of speech signals are approximately sparse and satisfy the so-called W-disjoint orthogonality assumption which states that which states that, statistically, the windowed Fourier transforms of different source signals have disjoint supports.