1068-94-155 **Armin Eftekhari**, **Justin Romberg** and **Michael B Wakin*** (mwakin@mines.edu). *Matched Filtering from Limited Frequency Samples.*

In the field of compressive sensing (CS) it is known that certain signals of high dimension but low complexity (namely, sparse signals) can be fully recovered from small numbers of random measurements. Similarly, certain low-complexity questions can be answered about possibly arbitrary signals directly from random measurements without first recovering the signal. In this talk, we discuss a simple correlation-based strategy for estimating the unknown delay and amplitude of a signal based on a small number of noisy, randomly chosen frequency-domain samples. We model the output of this "compressive matched filter" as a random process whose mean equals the scaled, shifted autocorrelation function of the template signal. Using tools from the theory of empirical processes—some of the same tools used for deriving signal recovery bounds in CS—we prove that the expected maximum deviation of this process from its mean decreases sharply as the number of measurements increases, and we also derive a probabilistic tail bound on the maximum deviation. Putting all of this together, we bound the minimum number of measurements required to guarantee that the empirical maximum of this random process occurs sufficiently close to the true peak of its mean function. (Received January 17, 2011)