On the conjectures of nonnegative k-sums and hypergraph matching

Date Tuesday, Februay 19

Time 3 pm

Location 303 Mudd

Abstract: More than twenty years ago, Manickam, Miklos, and Singhi conjectured that for any integers n, k satisfying $n \geq 4k$, every set of n real numbers with nonnegative sum has at least $\binom{n-1}{k-1}$ subsets of k elements whose sum is also nonnegative. In this talk we discuss the connection of this problem with an old conjecture of Erdős on hypergraph matchings, and with the question of estimating the probability that the sum of nonnegative independent random variables exceeds its expectation by a given amount. Using these connections together with some probabilistic techniques, we verify the conjecture for $n \geq ck^2$. This substantially improves the best previously known exponential lower bound $n \geq e^{k \log \log k}$.

This is joint work with Noga Alon and Benny Sudakov.