

Nick Cook

Title : Large deviations for sparse random graphs

Abstract : We consider the Erdős-Rényi graph $G=G(N,p)$ on N vertices with p possibly going to zero with N . For a fixed graph H , what is the probability that G contains twice as many copies of H as we would expect? These "infamous upper tail" problems serve as a test bed for the emerging theory of *nonlinear large deviation*, and also connect with issues in extending the theory of *graph limits* to handle sparse graphs. I will discuss our approach to these problems via new versions of the classic regularity and counting lemmas from extremal combinatorics, specially tailored to the study of random graphs in the large deviations regime. This talk is based on joint work with Amir Dembo.