NEAL MADRAS, York University
Random 312-Avoiding Permutations

A *pattern* of length k is simply a permutation of $\{1, .., k\}$. A permutation of $\{1, ..., N\}$ (for $N > k$) is said to avoid a specific pattern P if the (long) permutation has no subsequence of k elements that appears in the same relative order as P. (E.g. the permutation (2463175) does not avoid the pattern (312) because the permutation contains the subsequence (615).) Pattern avoidance has been extensively studied by combinatorialists.

Simulations suggest intriguing structural properties of permutations generated uniformly at random from $S_N[312]$, the subset of permutations of $\{1, .., N\}$ that avoid 312. To elucidate these properties, we obtain exact and asymptotic probabilities that the ith entry of such a permutation equals j, as well as joint probabilities of such events. We also find that for large N, a cluster of points "below the diagonal" in a graph of such a permutation looks like the trajectory of a directed random walk with infinite mean.

This is joint work with Lerna Pehlivan.