RANDOM PATTERN-AVOIDING PERMUTATIONS

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A permutation $\sigma = \sigma_1\sigma_2\cdots\sigma_n$ is an arrangement of the numbers in $[n] := \{1, 2, \cdots, n\}$. The set of all permutations on $[n]$ is denoted by S_n.

A *pattern of length* k is simply a permutation $\tau \in S_k$. This pattern is said to be contained in a permutation $\sigma \in S_n$ if there is a subsequence $\sigma_{i_1}\sigma_{i_2}\cdots\sigma_{i_k}$ of k elements of σ that appears in the same relative order as the pattern τ. For example, the pattern 231 is contained in the permutation 246315 because the latter contains the subsequence 463 or 261. We say that σ *avoids the pattern* τ if σ does not contain τ. For example, the permutation 5213467 avoids both 132 and 2314.

I will talk about the statistics of some random quantities such as the length of the *longest monotone* and *alternating subsequences* in classes of permutations of size n that avoid a specific pattern or set of patterns, with respect to the uniform distribution on each such class.

I will attempt to make the talk accessible to non-specialists, specifically graduate students.

The talk is based on a joint work with Neal Madras (York University, Canada).