1041-60-44 **Neal Madras*** (madras@mathstat.yorku.ca), Department of Mathematics and Statistics, York University, 4700 Keele Street, Toronto, Ontario M3J 1P3, Canada. *Random Pattern-Avoiding Permutations.* Preliminary report.

A pattern of length k is a permutation of $\{1, .., k\}$. This pattern is said to be contained in a permutation of $\{1, ..., N\}$ (for $N > k$) if there is a subsequence of k elements of the (long) permutation that appears in the same relative order as the pattern. (E.g. the pattern (132) is contained in the permutation (6425713) because the permutation contains the subsequence (273).) For a given pattern P, let $A_N[P]$ be the number of permutations of $\{1, .., N\}$ that do not contain P. It is known that $A_N[P]$ grows exponentially in N (rather than factorially), but little is known about the numerical value of the exponential growth rate. For example, which patterns of length 5 are easiest/hardest to avoid?

I shall describe some Monte Carlo investigations into this and related problems. The design and implementation of these investigations raise some interesting mathematical questions. The Monte Carlo results lead to some new conjectures, including a description of what a "typical" 4231-avoiding permutation looks like. Some recent rigorous progress will be mentioned. The Monte Carlo work was done by Hailong Liu as an NSERC Undergraduate Student Research Awardee. (Received July 24, 2008)