1021-05-97 **Richard Ehrenborg** (jrge@ms.uky.edu), Department of Mathematics, University of Kentucky, Lexington, KY 40506-0027, **Sergey Kitaev** (sergey@ru.is), Reykjavik University, Ofanleiti 2, IS-103 Reykjavik, Iceland, and **Peter Perry*** (perry@ms.uky.edu), Department of Mathematics, University of Kentucky, Lexington, KY 40506-0027. *Counting Pattern-Avoiding Permutations with Perron and Frobenius.*

This talk reports on joint work with Richard Ehrenborg and Sergey Kitaev, and gives a new method for counting consecutive pattern-avoiding permutations using the spectral theory of integral operators. Let $\mathfrak{S}_n$ denote the symmetric group on n symbols; a *pattern* of length k is a subset S of $\mathfrak{S}_k$. For $x = (x_1, \ldots, x_k) \in \mathbb{R}^k$ with $x_i \neq x_j$ for $i \neq j$, let $\Pi(x)$ denote the unique permutation in $\mathfrak{S}_k$ with $\pi_i < \pi_j$ if and only if $x_i < x_j$. $1 \leq i < j \leq k$. A permutation $\pi \in \mathfrak{S}_n$ avoids the consecutive pattern S if $\Pi(\pi_j, \ldots, \pi_{j+k-1}) \notin S$ for any j with $1 \leq j \leq n-k+1$.

We express the probablity that a randomly selected $\pi \in \mathfrak{S}_n$ avoids S in terms of a positivity-preserving integral operator T_S which serves as a kind of transfer operator for the counting problem. The spectral theory of T_S determines the large-n asymptotics of this probability through Krein and Rutman's extension of the Perron-Frobenius theorem of matrix theory. We compute asymptotics in several cases of interest and represent the exponential generating function for the counting problem as a renormalized determinant of $(I - T_S)$. (Received August 29, 2006)