1009-05-109 **Robert P. Boyer*** (boyerrp@drexel.edu), Department of Mathematics, Drexel University, Philadelphia, PA 19104, and **William M. Y. Goh** (wgoh@math.drexel.edu), Department of Mathematics, Drexel University, Philadelphia, PA 19104. *Asymptotic Zero Distributions for Polynomials from Combinatorics.*

Many natural sequences of polynomials from combinatorics have interesting limiting sets of zeros in the complex plane. We will discuss two problems posed by Richard Stanley and Herb Wilf.

The first is the sequence of Euler and Bernoulli polynomials. We showed that their limiting curve and zero distribution are related to the Szego curve, the limiting curve for the Taylor polynomials of the exponential.

The second is the sequence of partition polynomials where $F_n(z) = \sum_{k=1}^{n} p_k(n) z^k$ and $p_k(n)$ is the number of partitions of n with exactly k parts. In Stanley's plot for degree 200, the zeros cluster around the unit circle together with a sparse family inside the disc. Initially it was unclear what role such zeros play in the limit.

Using techniques from analytic number theory and extensive numerical computation to degree 26,000, we found that the zeros approach the unit circle as well as three curves inside the disc given implicitly in terms of $f_k(z) = \Re[\sqrt{\mathrm{Li}_2(z^k)}]/k$ where Li_2 is the dilogarithm. We will outline our attack on this problem in which we reduce the proof to a conjecture about domination among the functions f_k which we verified numerically and in special cases. (Received August 16, 2005)