962-J1-332 **Bruce W. Atkinson*** (bwatkins@samford.edu), Dept. of Math. and Comp. Sc., Samford University, Box 292249, Birmingham, AL, 35229-2249. *Computing Probability Generating Functions Using Mathematica.* Preliminary report.

At Samford the topic of this talk served as the basis for an NCUR project, an honors thesis, and an assigned project in an upper level probability course. The probability generating function (pgf) of a finite range random variable (rv) X is simply the polynomial in t (¿0) where the coefficient of the x-th power of t is P(X=x). The pgf of X completely determines the distribution of X. Also, the pgf for a sum of independent rv's is the product of the respective pgf's. The CAS (Mathematica at Samford) can symbolically multiply the pgf's and determine specific coefficients. One can use this tool, for example, to count the number of ways to achieve a certain sum where the summands are chosen from a finite list of finite sets. The CAS can also use pgf's to illustrate the Central Limit Theorem. For a large number of iid rv's, the CAS can use pgf's to compute the exact distribution of the appropriately normalized sum, and then plot a step function approximation to the standard normal density function. This method plots the actual distribution of the normalized sum rather than an approximation using a random number generator. It is easy to illustrate that the limiting standard normal distribution does not depend on the initial finite range rv. (Received September 11, 2000)