We say that a permutation $\pi = \pi_1\pi_2\cdots\pi_n \in S_n$ has a peak at index $i$ if $\pi_{i-1} < \pi_i > \pi_{i+1}$. Let $P(\pi)$ denote the set of indices where $\pi$ has a peak. Given a set $S$ of positive integers, we define $P(S; n) = \{\pi \in S_n : P(\pi) = S\}$. In 2013 Billey, Burdzy, and Sagan showed that for subsets of positive integers $S$ and sufficiently large $n$, $|P(S; n)| = p_S(n)2^{n-|S|-1}$ where $p_S(x)$ is a polynomial depending on $S$ called the peak polynomial associated to $S$. In this talk we will study peak polynomials, their roots, peak positivity conjecture, as well as a combinatorial interpretation for the coefficients of $p_S(x)$ when written in a binomial basis. (Received September 25, 2018)