Let K be a compact convex set in the Euclidean space. It is well known that the volume of the outer parallel body $K + \rho\mathbb{B}^n$ can be expressed as a polynomial of degree the dimension n in the parameter ρ,

$$V(K + \rho\mathbb{B}^n) = \sum_{i=0}^{n} \binom{n}{i} W_i(K)\rho^i,$$

which is known as the *Steiner polynomial* of the body K. The coefficients $W_i(K)$ so defined are called the *quermassintegrals* of K. In particular, $W_0 = V$ is the volume, $nW_1 = S$ is the surface area, $nW_2 = M$ is the integral mean curvature and $W_n = \kappa_n$ is the volume of the n-dimensional unit ball. On the other hand, the *alternating Steiner polynomial* (i.e., the above polynomial in which the variable ρ is changed by $-\rho$) has been considered in some papers by Teissier, Oda, Sangwine-Yager and others.

We have studied the roots of the Steiner polynomial itself, obtaining a characterization of the family of the 3-dimensional convex bodies depending on the type of roots of their Steiner polynomial. In this talk we intend to present how this characterization provides also interesting consequences in different geometric problems: for instance, in Blaschke's problem (to find a characterization of the set of all points in $\mathbb{R}3$ of the form $\big(V(K), S(K), M(K)\big)$ as K ranges over the family of all convex bodies in $\mathbb{R}3$), or in Teissier's conjecture (about the relation between the roots of the alternating Steiner polynomial and the inradius and circumradius of K).