Problem No. 12 (Spring 2015 Series)

What is the maximum value of $\sum_{i<j} |P_i - P_j|^2$ over all possible choices of $2n$ points on the ellipsoid $x^2 + \frac{y^2}{2^2} + \frac{z^2}{3^2} = 1$.

Remark: It is shown in POW problem 5, Fall 2009 (solution online) that for the analogous problem for the unit sphere the maximum value is attained if and only if the centroid of the $P_i$ is the origin.