1154-VO-2066 **Yuxuan Zheng*** (wendy.zheng@prismsus.org), 19 Lambert Drive, Princeton, NJ 08540, Princeton, NJ 08540. *Improved Upper Bound for Three Dimensional Universal Covering Problem.*

In 1914, Lebesgue proposed the problem about the smallest area of a universal covering in two dimensions, where universal covering is defined as a point set that can contain any subset with diameter 1. P. Gibbs made the latest progress in 2018 and he reduced the area of the universal covering to 0.8441. My research focuses on finding the smallest volume of a solid that is a universal covering in three dimensions. I have proved that a regular octagon with side length $\frac{\sqrt{6}}{2}$ is a universal covering, and its volume can be reduced to $\frac{5}{2} - \sqrt{3}$, or 0.7679 by cutting three corners off from the octahedron. Furthermore, I develop the method proposed by J. Pal in 1920 to a double-rotation method, I proved that a decahedron with opposite plane distance 1 is a universal covering. Cutting off two corners from that decahedron gives a better universal covering with volume 0.7586. I also raise a conjecture that a regular dodecahedron with side length $\frac{\sqrt{10-2\sqrt{5}}}{\sqrt{5}+3}$ and volume 0.6938 is a universal covering. (Received September 17, 2019)