1162-55-173 **Henry Adams** (henry.adams@colostate.edu), **Johnathan Bush*** (johnathan.bush@colostate.edu) and **Florian Frick** (frick@cmu.edu). *Borsuk-Ulam theorems for maps into higher-dimensional codomains.*

We say a continuous map from a sphere to Euclidean space is odd if it respects the standard antipodal action. One formulation of the Borsuk-Ulam theorem states that the image of an odd map from an n-sphere to $\mathbb{R}^n$ must contain the origin. We generalize this result by increasing the dimension of the codomain, and by finding a small diameter subset of the sphere whose image contains the origin in its convex hull.

For example, given an arbitrary odd map from the circle of circumference 1 to $\mathbb{R}^{2k+1}$, there is some subset of the circle of diameter at most $\frac{k}{2k+1}$ whose image contains the origin in its convex hull. Furthermore, this diameter bound is sharp: there exists an odd map $S^1 \to \mathbb{R}^{2k+1}$ such that the convex hull of the image of $X \subset S^1$ does not contain the origin whenever $\mathrm{diam}(X) < \frac{k}{2k+1}$.

Interestingly, these Borsuk-Ulam type theorems follow from an understanding of the topology of certain simplicial complexes defined on spheres. We will outline this connection and summarize current work toward obtaining sharper bounds for arbitrary odd maps $S^n \to \mathbb{R}^k$. (Received August 31, 2020)