1116-VF-2358 **Justin R Hughes*** (`jhughes@towson.edu`), 7800 York Rd Room 365, Towson, MD 21252. *A Group Action on Neighborhood Complexes of Cayley Graphs.*

Given G a group generated by $S = \{g_1, .., g_n\}$, one can construct the Cayley graph. Given a distance set D, a subset of nonnegative integers, and a Cayley graph, one can construct a D-neighborhood complex. This neighborhood complex is a simplicial complex to which we can associate a chain complex. The group G acts on this chain complex and this leads to an action on the homology of the chain complex. These group actions decompose into several representations of G. This presentation will discuss tools from group theory, representation theory, and homological algebra which are used to further our understanding of the interplay between generated groups, corresponding representations on their associated D-neighborhood complexes, and the homology of the D-neighborhood complexes. This presentation will quickly summarize known results for the case when $|S| = 2$ and will then discuss the current work on the case when $|S| > 2$. (Received September 22, 2015)