1106-VN-2031 **Annette Marie Honken*** (annette-honken@uiowa.edu), Department of Mathematics, University of Iowa, 14 Maclean Hall, Iowa City, IA 52242. *Mapping Distance One Neighborhoods within Knot Distance Graphs.* Preliminary report.

A knot can be thought of as a knotted piece of string with the ends glued together. To perform a crossing change on a knot, one can imagine cutting one string, allowing the other string to pass through, and gluing the cleaved ends back together. We define the distance between two knots, K_1 and K_2, to be the minimum number of crossing changes one must perform on either K_1 or K_2 to obtain the other. Type II topoisomerases are the enzymes tasked with keeping DNA unknotted, and they act on double-stranded circular DNA by breaking the backbone of the DNA, allowing another segment of DNA to pass through, and re-sealing the break. Thus, performing a crossing change on a knot models the action of this protein.

We create a knot distance graph by letting the set of vertices be knots with up to thirteen crossings and placing an edge between any two knots of distance one. A neighborhood of a vertex, v, in a graph is the set of vertices with which v is incident via an edge. Using graph theoretical and topological tools, we examine graphs of knot distances and define a mapping of distance one neighborhoods. This idea can also be examined and visualized as Dehn surgery on the double-branched cover of a knot. (Received September 15, 2014)