1077-B1-2731   **Joshua Brandon Holden*** (`holden@rose-hulman.edu`), CM #125, 5500 Wabash Ave., Terre Haute, IN 47803. *Braids, Cables, and Cells: An Interesting Intersection of Mathematics, Computer Science, and Art.* Preliminary report.

The mathematical study of braids combines aspects of topology and group theory to study mathematical representations of one-dimensional strands in three-dimensional space. These strands are also sometimes viewed as representing the movement through a time dimension of points in two-dimensional space. On the other hand, the study of cellular automata usually involves a one- or two-dimensional grid of cells which evolve through a time dimension according to specified rules. This time dimension is often represented as an extra spacial dimension. The ideas of representing both strands in space and cellular automata have also been explored in many artistic media, including drawing, sculpture, knitting, crochet, and weaving.

Previous work as been shown that rules for cellular automata can be written in order to produce depictions of braids. This talk will extend the previous system into a more flexible one which more realistically captures the behavior of strands in certain media, such as knitting. Some theorems about what can and cannot be represented with these cellular automata will be presented. (Received September 22, 2011)