1116-68-1368 **Samanvitha Basole*** (s97basole@gmail.com), **Tim Hsu** (tim.hsu@sjsu.edu) and **Phyllis Lau** (phyllielau@gmail.com). *New geometries for cellular automata.* Preliminary report.

A cellular automaton is a collection of "cells" arranged in a geometric pattern (often the Cayley graph of a group) in which the state of each cell evolves according to some rule based on the current state of its immediate neighborhood. For example, Conway's well-known Game of Life is a cellular automaton on the group $\mathbf{Z} \times \mathbf{Z}$ (i.e., the square grid) that is defined by a simple rule, but can nevertheless simulate a Turing machine (universal computer).

We investigate cellular automata on the group $\langle a, b, c \mid 1 = a^2 = b^2 = c^2 \rangle$ (i.e., the infinite free trivalent tree). Specifically, using both experiments done with interactive software of our own design and theoretical methods, we describe ways in which natural generalizations of Conway's Game of Life to the infinite trivalent tree seem to be limited in their computational power by the geometry of the tree. We also describe possible future directions. (Received September 22, 2015)