Abstract:
The focus of my senior thesis is to study the gas rich volcanic glass fragments, or pumice, that were ejected from the eruption of the Yellowstone Supervolcano in Wyoming. A supervolcano is simply a volcano of massive scale, for Yellowstone, the collapsed magma chamber, or caldera, where the reservoir of magma sat until it was violently erupted out, measures over 30 miles in diameter. There were three main eruptions of the Yellowstone volcano in the last 2 million years, and my project is concerned with the oldest and largest of these three eruptions, the Huckleberry Ridge Tuff. Research suggests that the rising magma in the conduit of this eruption exhibited strange stop-start behavior. This means that there were breaks in the eruption in the order of months to years where magma and ash were not being ejected. To study this theory, a very important piece of information to obtain would be the magma ascent rate, or the rate at which the magma in the volcano's conduit was rising. This is the topic of my thesis. To find the ascent rate of this eruption, I will be studying three members of the eleven member pumice fall that was ejected during the eruption. Using computer programs and high resolution images I will be able to look at and precisely study the pumice and gather data on the character of pumices from different layers of the Huckleberry Ridge deposit. By looking at the range of vesicle sizes, shapes, and numerical densities, I will be able to calculate and estimate for how fast the magma rose during the eruption.

Methods:
Methods that will be used for this project mirror those put forth by Klug et al. in their paper "Structure and physical Characteristics of Pumice from the eruption of Mount Mazama." First the pumice grains from each of the eleven deposit members are picked and sorted and grains from three members are chosen based on their location in the overall section. To get a very good look at the vesicles of the pumice, the samples will be mounted, vacuum impregnated, then sanded down, polished and imaged using the Scanning Electron Microscope in the Lokey laboratories. Images taken will display high-resolution textures of each pumice at a few different magnifications. The images will then be processed to make them readable by a computer program that will be used to gather information from each pumice image on the vesicle size, shape, and numerical density. With this data, calculations can be made to determine ascent rate. The methods described above are the best choice for this project because they allow study and comparison of members from several select areas of the deposit, which will tell if the ascent rate changed over time, therefore supporting the theory of stop start behavior.