Shea Zmerzlikar
Group Project #2
Write-up
Hertzberg

For the first group project, my particular group chose to examine what is commonly referred to in the arts-and-crafts world as “boo bubbles”. “Boo bubbles” are simply soap bubbles that are filled with the vapor that occurs when dry ice reacts with warm water. The idea of the project was to gain an understanding of the reaction of bubbles to each other and other surfaces, confined and released vapor, and soap film under pressure and the mathematical problem of minimal surface. It also must be noted that Jon Horneber assisted me by holding and loading our apparatus in order for me to capture my particular footage.

The bubbles were created by using an apparatus that was constructed by myself and consisted of a plastic gallon jug with a screw-on lid and a hose that protruded from the side of the jug. The jug was filled slightly less than half with warm water then would be quickly added by a cube of dry ice, which often varied in size depending on how much pressure and vapor the particular group member desired. After the solid carbon dioxide was introduced to the water, the dry ice vapor would begin to flow out the top of the jug. As the lid of the jug was tightened, the vapor would then be forced out of the hose on the side of the jug. As vapor begins traveling through this diverted route it gains more pressure, as the point of exit is smaller. The end of the hose would then be dipped into a small bowl containing only dish soap, which is not diluted. Diluted soap did not work. The hose would then gather a very thin layer of soap film at the tip and form a bubble from the pressure of the vapor and could be detached from the hose with very careful whipping motions while containing the vapor inside. The main focus of the group was to focus on the movement and structural reaction the of the bubble and the vapor, but as I began to examine the bubbles further, I began to find more interest in the iridescent color that began to form and move on the film of the bubble that would become more visible when there was a minimal amount of visible dry ice vapor.

My visual technique then was changed from the rest of my group and I decided to focus on clearer bubbles. I took many photos with my Canon 5D MarkII of the iridescent colors and their movement. While the images were great and set me aside from my group, the still image didn’t capture the true awesomeness of what was actually happening. I then decided to shoot a video of the bubble as the dry ice was giving off less vapor and pressure (as it was fairly “melted”). As clearly illustratable in the video, the bubble is being formed on the nozzle of the hose but not longer has thick visible vapor from the dry ice. Now the focus has become the movement of the soapy residue reacting to the slight pressure, surface of the bubble, and its beautiful swirl.

The video footage was taken with camera settings 1/100 shutter, f.4 aperture, an ISO of 1600, and mounted with a Tamron 90mm prime lens. The distance from the lens to the closest outer part of the sphere was approximately 2.5 to 3 inches. This distance was not the closest I could get with my lens, but due to the

handheld use of the hose and nozzle, steady focus would've been even harder to achieve. Especially since my DOF was around only 1 to 2 centimeters. In postproduction nothing was done to alter the footage other than cutting the clip and duplicating it in order to get my preferred format for presentation.

Overall, the entire project went well and the footage clearly illustrates the movement of these iridescent colors. The colors on the bubble surface, which represent the spectrum of light, are not being formed by the process of refraction of internally reflected light, as in rainbows, but rather by the interference of reflected light waves from both inside and outside the soap bubble. Much of what determines the observable colors is the type of light interacting and the thickness of the soap bubble. In this project not only is this light and color presented but a unique approach to studying the way the soap residue and color can move from pressure around the bubble can also be observed. I really have no questions regarding the science behind the observation as it seems fairly simple and I am familiar with properties of light, but I wouldn't mind taking more imagery of light reacting to water and vice versa.