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Team Second Assignment – 2019 Fall

The purpose of the Team Second Assignment is to continue capturing complicated flows with the help of a team. Team four decided to capture bubbles and the colors these bubbles create. We formed these bubbles using a soap water mixture and used both a high-speed camera and a DSLR to capture the flow of these bubbles.

The formation and shapes of these bubbles rely on surface tension. The bubble constantly strives to take the shape of least surface area. This shape is a sphere in open air but could be deformed when using bubble wands. The rainbow colors formed within a bubble occurs when light diffracts as it hits the bubble. The bubble resembled that of a prism, as the light interacts with itself forming constructive and destructive interference. This creates the beautiful patterns we see on the bubbles surface.

The visualization technique used was the flow of a dish soap and water mixture. The materials used were a plastic tub, Dawn Dish Soap, water, a string, a wood mixing stick, outdoor construction lights, and red food coloring. First, a mixture of water, Dawn Dish Soap, and red food coloring was filled into the plastic tub and mixed using the wood mixing stick. The mixture was roughly 15% dish soap, 5% food coloring, and 80% water. Next, the string was tied into a circle and dipped into the mixture and a bubble was blown. The image was taken indoors with the lights on. In addition to the room lights, dual outdoor construction lights were shining 45

degrees from the camera pointed at the bubble. Jamie Frankel blew the bubble and held it in your hand covered in soap water mixture as I took the photo.

The image was captured using a Nikon D3500. The focal length of the lens was 48mm. The distance from the object to the lens was roughly 12 inches and the object was a sphere roughly 6 inches in diameter. The original image has a width of 6000 pixels and a height of 4000 pixels while the edited image has a width of 4351 pixels and a height of 3350 pixels. The exposure specs are as follows: F-stop – f/5.3, exposure – 1/100 sec., ISO – 100, and flash mode - active. I then manipulated the color curve and cropped the image using GIMP 2.10 software. The adjusted curve is shown in figure 1 below. The original image is compared to the edited image in figure 2. The editing enhances the colored pattern on the bubbles surface. The editing makes the image much more visually appealing without altering the scientific details of the image.

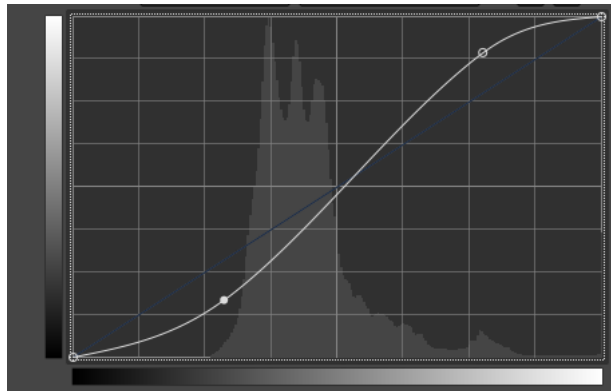


Figure 1: Adjusted color curve in GIMP 2.10



Figure 2: Original (left) vs Edited (Right)

This image of soap film bubbles shows the unique color patterns dyed soap bubbles produce. The image has a larger feel to it and the editing enhances the colors and dramatic impact of the image. Although the dye did not have a significant impact on the color formation on the bubbles surface, Team four was still able to form and capture the flow of bubbles in both high-speed and still photography.

Works Cited

- [1] “Science of Bubbles.” *The Wonders of Physics*, Board of Regents of the University of Wisconsin System, 2019, <https://wonders.physics.wisc.edu/science-of-bubbles/>.