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Flow Visualization

Team 3 Report

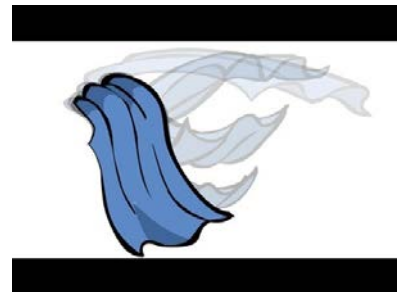
This was our third and last team project and in my mind one of my favorites for me. Once again, we were examining and artistically capturing flow of some sort. This time I decided I wanted to work with fabric in the wind. This is something I had been thinking of even before I took this class. I love seeing dance photography and other similar photography where it not only captures fabric movement but also human body movement and flow. It turns the focus away from the experiment and more to the person in the portrait yet still incorporates the science we are looking for.

To make this image work I needed to find someone with a light weight long flowy dress that would catch in the wind well. I had difficulty finding the dress I was really after, but my sister had something that would work as well as a long light weight scarf that I thought would look really good as well. Next, I had to find a place up high that would provide somewhat consistent wind but also had a good background to add to the photo. I knew of a place out on 63rd street by the power plant that was up above the rest of boulder but still had the mountains in the background. I was hoping I would be able to catch the sunset as well but unfortunately there were too many clouds due to the wind and the storm to really see much of it. I was able to stand slightly below my sister as she faced



the wind and after multiple takes I had a photo that I thought would work well.

The reason you get wakes in the fabric and a sense of flow and turbulence is because as the wind, that is already turbulent by nature because of its speed, hits the fabric and pushed it in one direction it created a low pressure zone on the other side of the fabric that the wind is draw into and pushed the fabric back the opposite direction. It becomes a constant battle between the low-pressure zones and the initial wind direction thus creating ripples and movements in the fabric. The wind is generally still stronger from its initial direction which means that the dress doesn't go in every direction and has a general flow direction away from the wind.

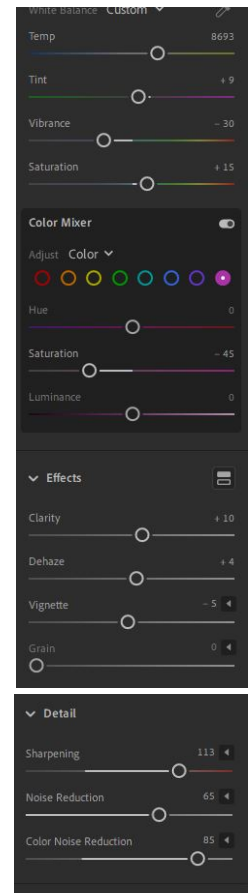


I originally wanted to work with a couple of flashes in order to really light up the subject and provide some good contrast in the fabric but unfortunately, I was unable to get the flash setup to work. This meant that my photo turned out a bit too dark in order for me to get the background details intact. This was alright as I knew I would be able to adjust this in post processing and I'd rather do that than increase the ISO and make the photo grainy as well as blow out the details in the background. I also had to have a fast shutter speed in order to not get blurring as the fabric moved. My settings ended up being ISO or 2200, Shutter speed of 1/800, F-Stop of 6.3, and a focal length of 300mm shot from afar on my Nikon D610.

As I have said, the subject was a little dark in the raw photo. So, I had to brighten things up but keep a fair amount of contrast on the fabric and fight the grain that comes from



brightening up a photo. To do this I increased the contrast, the shadows, and the sharpness to give it very defined lines and then reduced the noise a large amount. I also wanted to match colors from the hat and the dress to the background colors. I didn't have to do much and just adjusted color saturation levels thankfully. After the image processing was done I exported it and loaded it into an application called pixaloop that allowed me to create a video that mimicked movement within the photo and created a flowing dress simulation on a still photo. I could direct exactly where I wanted the pixels to meld together to give it the effect I wanted. After that I gave the video a drop shadow to make it look like it was popping out of the screen and then called it good. I was very happy with the final product.



I think the image does a great job of artistically depicting the physics of cloth blowing in the wind as the turbulent air affects the fabric. I would have loved to see what the possibilities could have been in a better controlled environment and with a longer dress but I am very happy with the result considering what we had to work with.