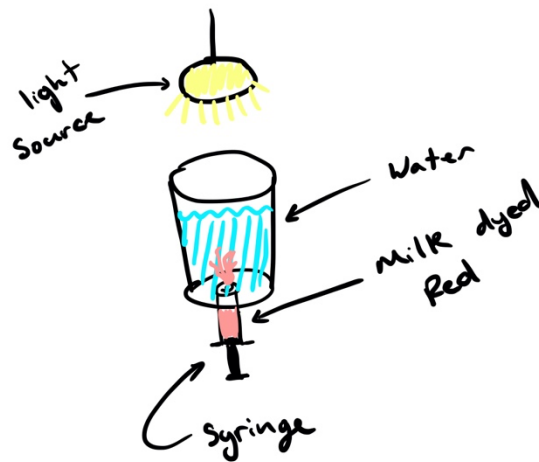


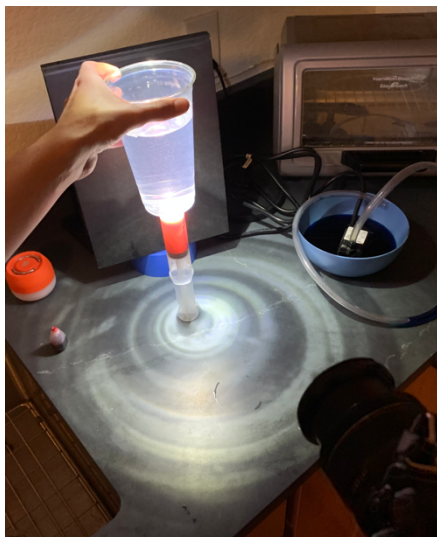
Reid Pritchard
Flow Visualization, MCEN 5051 – 001
Image Video Assignment 3 Report

For this experiment, the goal was to capture a turbulent jet created by injecting dyed milk into a cup of water. Other than aesthetics there wasn't much of a fluid phenomenon driving this interest. Turbulent jets have been studied significantly and thus everything about them has been named. Therefore, this image is more dramatic and artistic rather than documentary or scientific as there is plenty of images for that already.

This image was taken using a disposable plastic cup, a syringe (particularly Sawyer's water filter cleaning syringe), and a single light source from above. For the liquids the cup was filled with tap water, and the syringe with McCormick's red food coloring dye and 2% milk.



For the image process the syringe was first filled with dyed milk and shoved into a small hole at the bottom of the cup. Then the cup was filled with water from the tap. The whole contraption was then placed under the light source, in this case a headlamp. With one hand steadying the cup from the top and the other on the camera shutter. I slowly pushed the cup down in order for the milk to begin shooting into the water cup. While doing this the other hand was taking images. While I don't know enough about the fluid dynamics, hopefully I have described the process in enough detail to recreate the image if needed.



The lighting for this image was very simple. After a few different attempts of lighting the flow from the sides, the plastic cup reflected too much light and a single light from the top was chosen. A LED headlamp was used as it was the brightest light I could find. To darken the background a black book was also propped up behind the cup.

The photo was taken with at a focal length of 40.7mm roughly 10 inches away. The raw image captured the full cup with about two inches of room around it on all sides. The image was taken on a Fujifilm XT-2 camera at a resolution of 4000x6000 before cropping. A f-stop of 5 was chosen as I wanted the jet to be fully in focus, but the background details to be blurred. The main priority however was the shutter speed of 1/250 in hopes to freeze the flow, reducing motion

blur. Finally, a high ISO of 5000 allowed for enough sensitivity to capture enough light in the image. While this did introduce a decent amount of noise to the image, it was needed as there was only one light source. On top of this noise reduction was done in post to minimize its impact on the image quality.

A fair amount of post-processing was also done to highlight the flow in the image. Specifically, increased contrast, cropping, and dehaze effects were all added. The dehaze was used to see through the cup's reflective surface better. The dehaze function also increases the contrast which was good in crushing the blacks in the background. The color tint of the highlights and shadows were also adjusted to bring out the teals and oranges purely for aesthetics. Spot corrections of decreased exposure were done around the flow to decrease the particles from the cup, this was in order to minimize distracting dots. This also allowed for the edges of the cup to "fade" into the background making the flow seemingly stand on its own.

In all I'm pleased with the final image. While there is an emphasis on aesthetics in both the photography as well as the editing, there is still some interesting dynamics that are clearly on display. If I were to repeat this experiment, I would consider trying different milk types, 1% and whole to see if that changed the jet in any way. I would also try finding a clearer container preferably without imperfections on the sides. These ridges distort the image as you can see near the start of the jet. While it's not crucial to the image, little things like these could be improved upon. I would also consider playing with the fluid the milk is being injected into. Again, simply to observe any differences in the jet.