MCEN 4151: Flow Visualization
First Team Report
4/25/14
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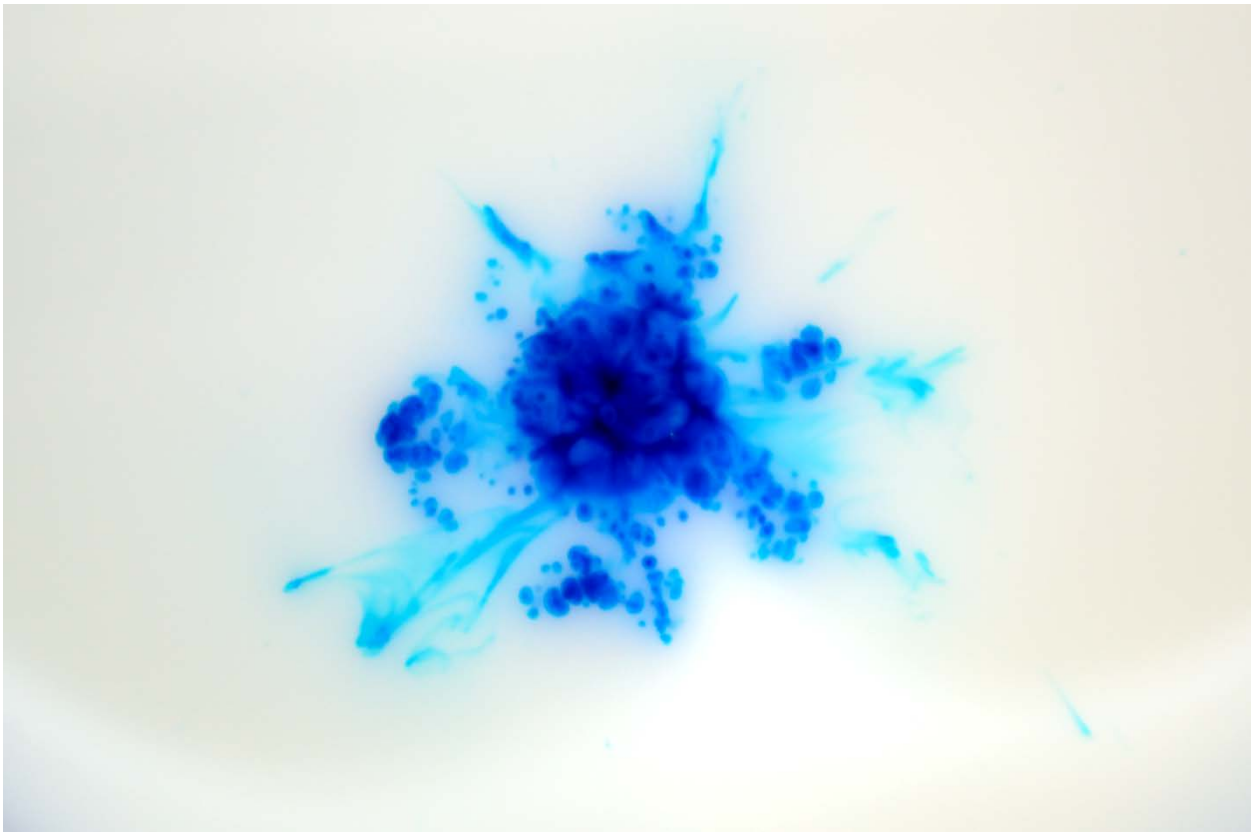

Figure 1: Final Image

This image was taken to fulfill the requirements of the second group image assignment in the course Flow Visualization at the University of Colorado. Unfortunately, due to schedule conflicts, I was not able to meet with my team and ended up taking this photo on my own. Originally, I was trying to recreate a flow I had found online. I was dropping dyed alcohol into milk to create micelles, but I was having difficulty photographing the resulting reaction. After not having luck with my first experiment I began dropping food coloring into milk to see what patterns would form. The above photo is the final image I submitted for the assignment.

In order to capture the image, I dropped blue food coloring into a 5.5" ID circular Pyrex dish. The dish contained just enough skim milk to make the milk look opaque, approximately 0.25". I dropped a single drop of food coloring from about 10". According to A.L. Yarin of the Israel Institute of Technology, drop impact dynamics and splashing are governed mainly by the fluid's Weber, Reynolds, and Ohnesorge numbers. Since I was really only experimenting and not anticipating producing an image I wanted to turn in, I didn't take the time to calculate the exact height the food coloring was dropped from and I also didn't calculate the dye drop's mass. Not knowing its mass and velocity limits me to only

making qualitative statements about my particular image. I took this photo within seconds of dropping the dye into the milk due to the rapidity of diffusion. The soft edges in the image are due to diffusion of the dye into the milk, not lack of focus.

The field of view in the final image is roughly 3”x4”. Distance from the surface of the milk to the lens was approximately 1’. The lens used was a Nikon Nikkor 55mm lens. The camera used was a Nikon D3200 DSLR. An aperture of f/5.6 was used with an exposure of 1/50 second and an ISO of 800. A 14 W compact fluorescent lamp was used for lighting. The original image was 6016x4000 pixels and is shown below in figure 2.

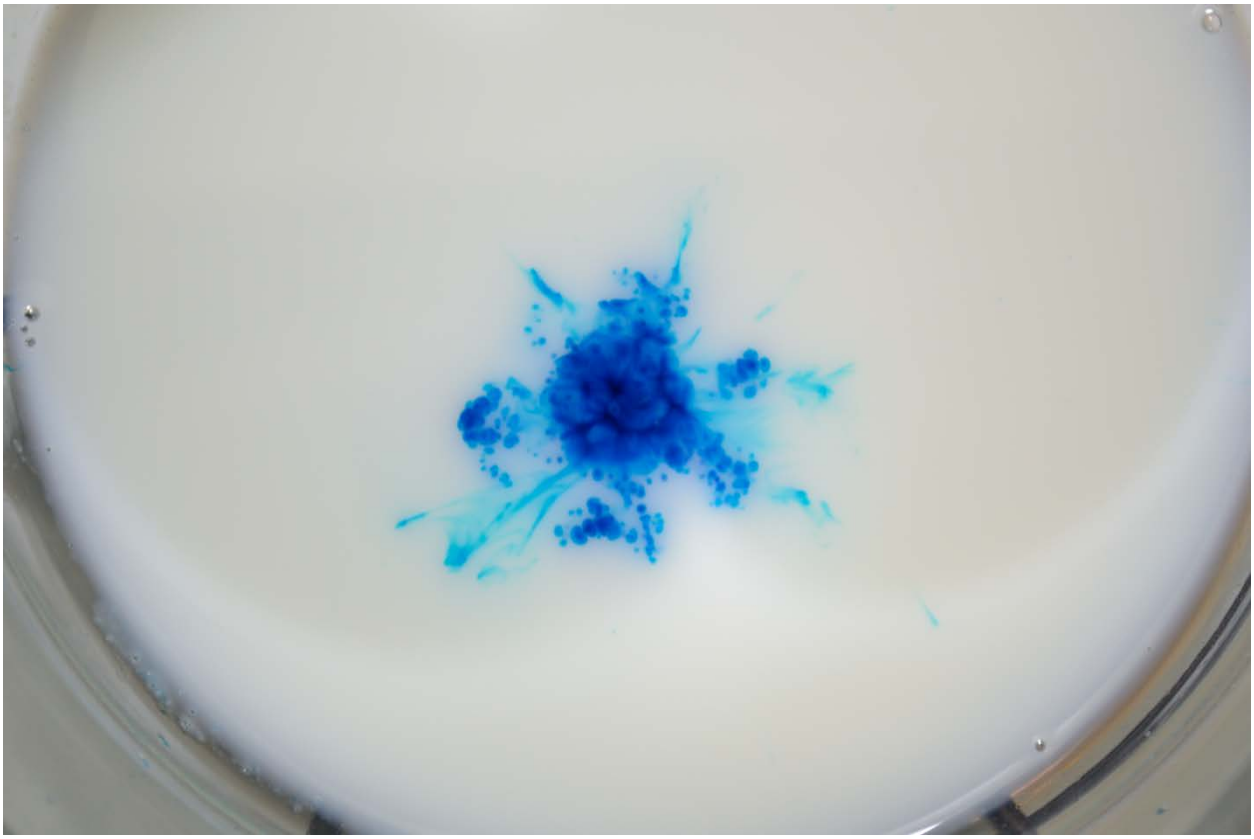

Figure 2: Original Image

The final image was cropped to 4050x2686 pixels and is shown in figure 1. PhotoScape was used to increase the contrast of the final image.

This image reveals the symmetric nature of splash patterns. I did not originally set out to show any particular fluid mechanics concept with this image. I was only looking to produce an image of artistic value. I feel I accomplished as much while also stumbling onto the well-studied field of splash dynamics. I would like to investigate splash dynamics further by investigating the effect of changing the depth of the milk that the dye was dropped into.