Team Second Report

Flow Visualization
MCEN4151
Dr. Hertzberg
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The image in Figure 1 below was my submission for the Team First assignment. The intent of the image is to show the difference in densities between the colored (red, orange, yellow) and Ferro fluid (black). There of number of images that were taken but this one turned out to be the best. It was difficult to capture the desired effect due to excess motion blur, but the image I submitted uses the motion blue to add an aesthetic. I extend thanks to teammates Cade Haley, Lucas Sorensen, Michael Sandoval, and Seunghwa Park who helped make this image possible.

The flow apparatus utilized for this image can be seen in the diagram (Figure 2). The yellow, red, and orange fluid was a result of mixing yellow and red pigment together. The stark black fluid is Ferro fluid. All the mixing of these fluids occurred in a small 3" in diameter petri dish. This dish was placed on a sheet of glass that was sitting about 2" above a dresser. Beneath the glass, a small bar magnet was placed against the glass to induce a magnetic field in the Ferro fluid. The magnet was then moved about in a circular pattern, changing the location of the 'spikes' in the ferro fluid, and consequently, causing the motion blue in the top left of the image. The physics in the image presented are differences in surface tension and the presence of a magnetic field, which causes the spikes in the ferro fluid.

The pigment, and petri dish used was acquired from McGuckin's hardware, and the ferro fluid was provided through check-out from class supply. Natural lighting and built in iPhone flash was used in capturing this image.

Photographic technique:

- The field of view was in macro, approximately 2"x1.5"
- The depth of the image (distance from lens) was just less than 2 inches.
- All focal/camera setting were iPhone defaults, and no metadata was able to be pulled.
- iPhone 6s camera was used in image creation.
- Saturation and contrast were boosted in photoshop to deepen blacks and enhance colors.

The image reveals the power of fluid densities/differences in surface tension, and how a magnetic field can excite ferro fluid. In the future I'd like to recreate the image with higher quality camera equipment.

Figure 1

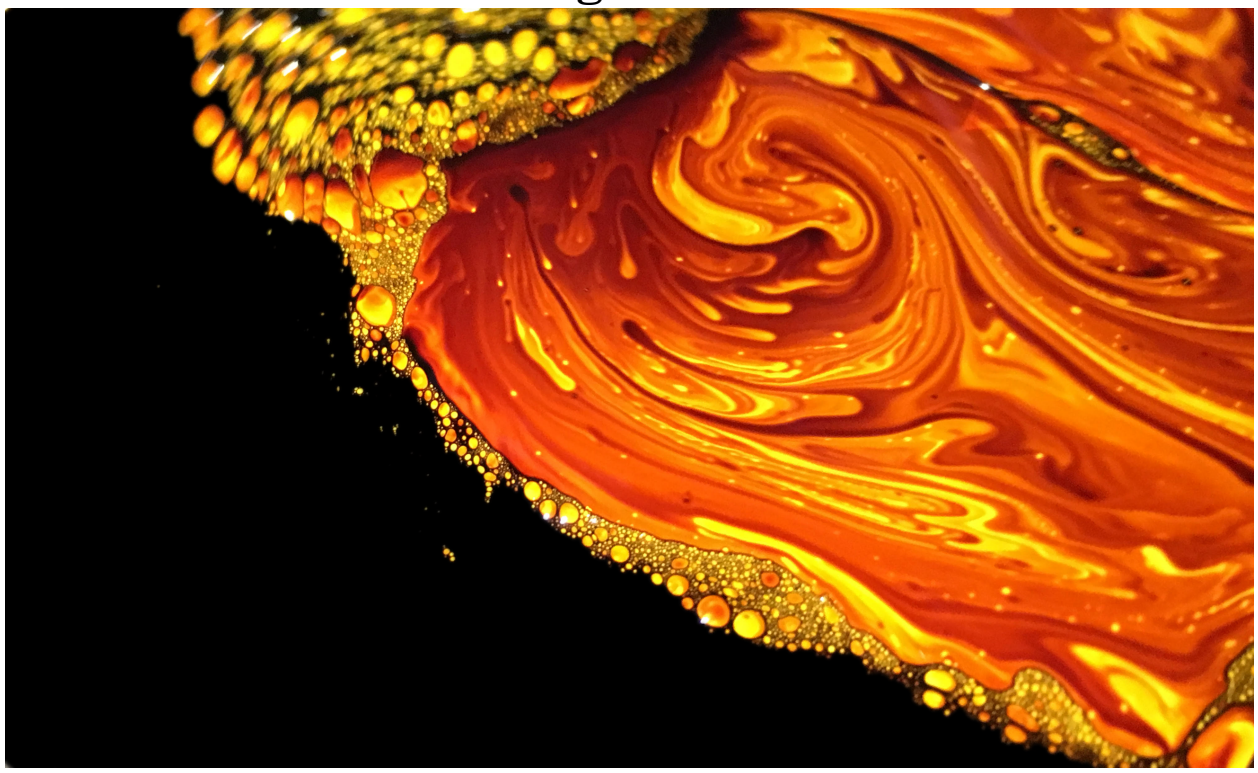

Figure 2

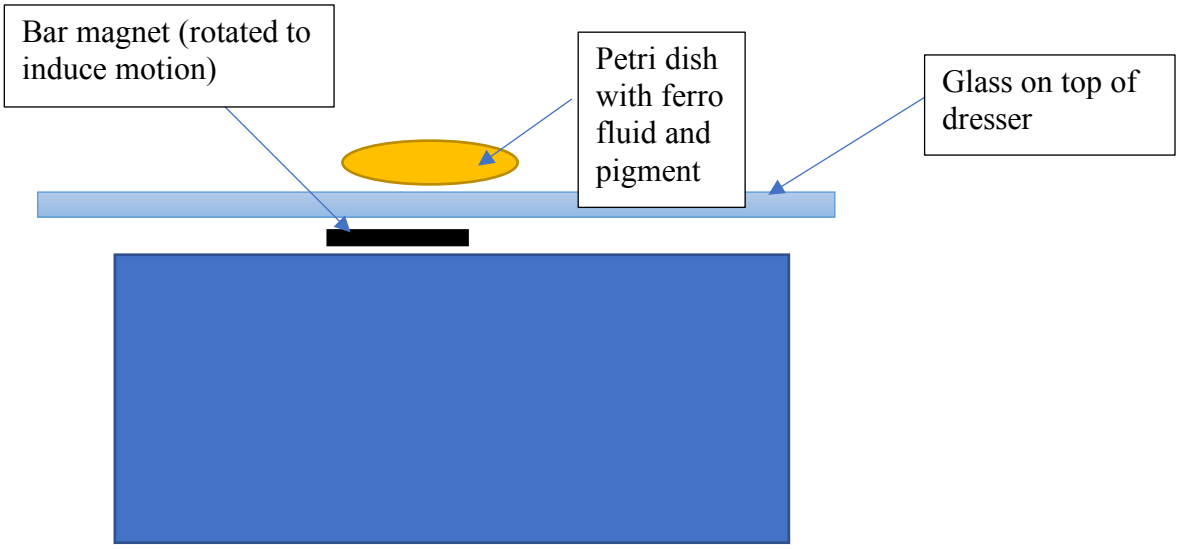

Figure 3

(unedited .jpg image)
4032x3024 px