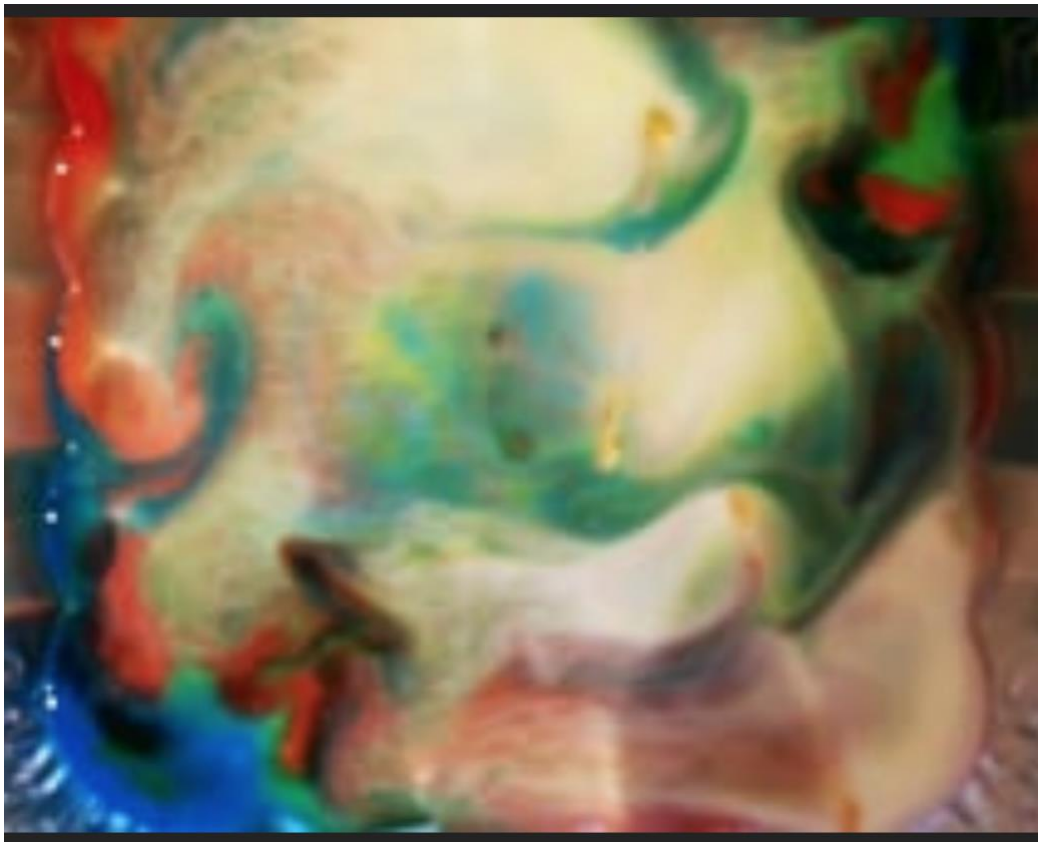

Get Wet Fall 2019
CINE 4200-001: Flow Visualization

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For this semesters *Get Wet* assignment I decided to experiment with milk and dish soap, as on the first day of class we were given this type of flow as an example of what can be done in this class and I was immediately hooked. The easy part of this assignment honestly was the science portion of it. Science is fascinating because it is a reoccurring phenomenon that usually doesn't have oscillating results. Meaning, when you conduct experiments the trends should be similar and should have some sort of correlation, occasionally you have stray data but that is usually caused by error. What was truly difficult in this assignment was using the camera to take a picture that is both professional and shows demonstrates the flow in an aesthetically pleasing way. This included using specialized computer software's to edit the pictures and get the best results possible. As previously mentioned, I decided to use dish soap and milk for my experiment because of how enlightened I was of past experiments which demonstrated Marangoni flow. I used this type of flow which demonstrates the differences in surface tension and also the polarity of different molecules. To demonstrate Marangoni flow, I put milk with food coloring scattered around a baking tin then dropped in Q-tips covered with dish soap. My friend, Memed Nurceski, aided me in the procedure of this assignment.

I dissolved gel food coloring with water and then, more or less, randomly put drops of the milk around a baking dish filled with 2% milk. I then covered the fuzzy ends of two separate que tips with dish soap. Finally, I taped my phone to the bottom of a cabinet and shone the flashlight of the phone at the apparatus. After I had everything set up, I held the camera and focused it onto the center in the best way possible. The camera and light were at the same height of about 28" to the surface which the baking tin was resting on. Once I began recording on the camera, I instructed my friend to drop in the two Q-tips. Once the two Q-tips were dropped it created this sort of alien-like effect.

The reason for this alien like effect is caused by the difference in surface tensions of the milk and dish soap. Dish soap can be referred to as a surfactant which is a substance that modifies the surface properties of a substance. Since milk in this case has a higher surface tension, the dish soap effectively lowers the surface tension of where it is dropped. Since the surrounding milk is unaffected it in turn still has a higher surface tension then the soap. With this difference in surface tension the surrounding milk pulls on the affected milk which is seen by the streaks of color.

I originally wanted to show photos of the flow but after taking about 150, I decided that a video was the better way to demonstrate this flow. I used the automatic camera settings when switched over to video mode. I also however used the manual zoom which is a feature on my lens. I used a Canon T7i with an attached Canon Zoom Lens EF-S 18-55mm to record the video. I had issues focusing in on the center as the flow was constantly moving and it never truly grasped a focal point.

I believe this image allows for a different view of science. Many people don't fully understand how soap works or even think about the science behind it, it's just an everyday

routine. However, due to this difference in surface tension it allows objects stuck to your hand to be released. I like all the streaks of color and how the music fits well with the video. I didn't like how my camera couldn't get a clear focus on the baking tin though. I wonder if I used Whole Milk as opposed to 2% if this would change the reaction. I fulfilled my intent by capturing truly a fascinating scientific phenomenon. I'd like to improve the overall video quality and use a tripod as well as a clear container. I could develop this idea further by using a clear container and testing it at different depths and seeing the way the flow reacts then.