Brian Gomez

Flow Visualization (MCEN 4151-001)

Get Wet Report

10/2/2019

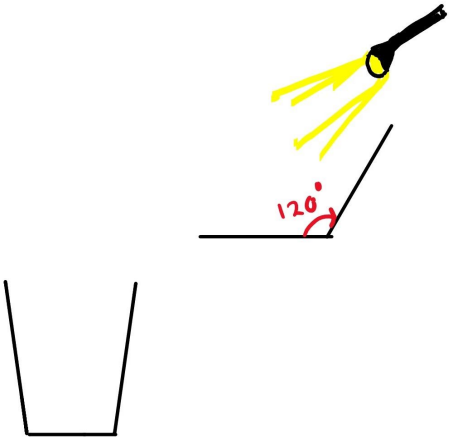
Assisted by:

Nebiyu Tadesse

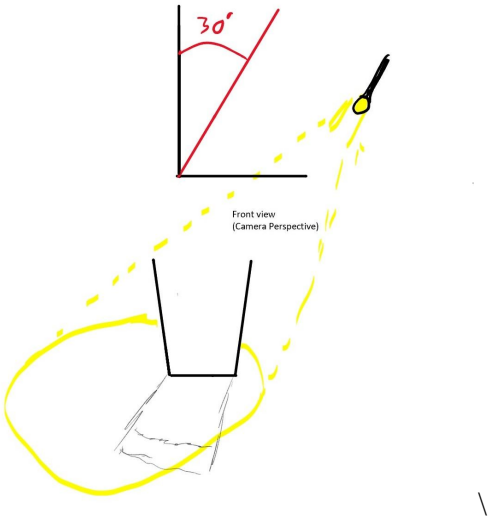
Jared Moya

This image was created for our first assignment in the Flow Visualization course. My intent was to capture the interaction between liquids of different densities and the "lava-lamp effect". It was set up on my kitchen table with my previously mentioned roommates helping with the lighting and camera angle setup. I took many photos of the setup before I began the Alka-Seltzer reaction in the water to test the lighting and focus of the image but, this was the first picture taken after the reaction began.

The picture shows the interaction between water that has been dyed blue and a large layer of vegetable oil on top. After an Alka-Seltzer tablet had been dropped into the glass, a lava-lamp effect was created from the carbon dioxide bubbles in the water rising through the oil, but never mixing due to different densities, and the colored water falling back to the bottom once the bubbles pop. The experiment was done in a pint glass set on my kitchen table, underneath which, was a white plastic table cloth that was also used as a backdrop. My roommate, Nebiyu Tadesse, was holding an LED flashlight about 120 degrees away from the camera and rotated about 30 degrees to the right (as shown below). Using the flashlight created a concentrated light source which allowed for the fluid to be clearly illuminated with no visible glare on the front of the glass while creating a shadow that allowed the colors to be shown on the white cloth in front of the glass, which was kept in the image as suggested by Jared Moya.



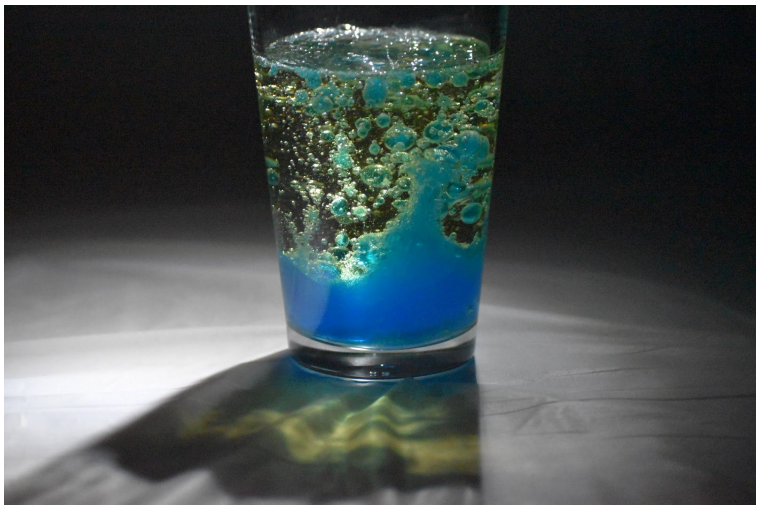
Side view (camera to the left, facing right)



View from camera perspective

To color the water blue, I used a gel food dye from safeway and the vegetable oil, Alka-Seltzer, and table cloth were purchased from a Dollar Tree store. The only lighting used in this picture was from the LED Coleman brand flashlight.

The camera was about 2 feet from the glass, elevated and angled very slightly down towards the glass. I use a Nikon D3500 DSLR camera which captured a 6000x4000 pixel image. My ISO setting was 11400, focal length was 102mm, shutter speed was 1/250, and my aperture was 4.5. For image processing, I used a free software from the Nikon website which allowed me to increase the sharpness and contrast. In the software, I also used a "color booster" effect which made the blue very vibrant and made the yellowish outline of the bubbles a clear and bright green. The original image is shown below.



Overall, I do like how my image turned out and I especially like the effects I was able to add with the editing software. The fluid physics are clearly shown and it reveals the interaction between fluids of different densities. I like how the shadow adds another dimension to the image and how the colors are projected onto the rippled table cloth. I also enjoy the contrast between the well-lit glass and the dark background. If I did this again, I would try to focus on the bubbles better and work with the shutter speed to get sharper images of the bubbles without making the image too dark. I would also like to try this with different colors for the water and potentially attempt to dye the oil with an oil-based food dye.