Report: Team Project #2 Hele Shaw Cell

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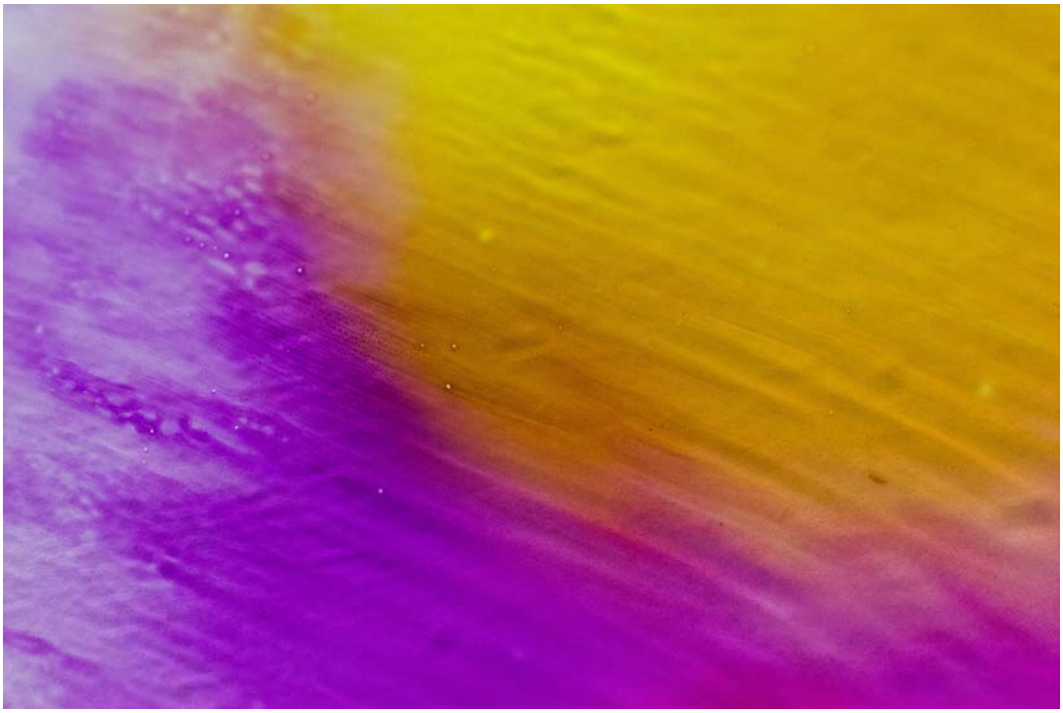

We worked with the Hele-Shaw Cell in this group project to try and visualize the micro-flows and the fingering effect in liquids.

We used an apparatus designed for visualizing hele Shaw cells in this project. It was a sheet of glass in which we put our first layer of more viscous liquid onto. This was corn syrup that was dyed yellow. We then put another piece of glass on top of this so the corn syrup was now pressed between two pieces of glass. There was a small hole under the bottom piece of glass, which allowed us to inject our less viscous fluid into the corn syrup. We had a syringe attached to a tub, which inserted into that bottom piece of glass. We injected dyed water into this, which allow the hele Shaw cell to be formed between the liquid of different densities.

For my image I used a shot after we dissembled the hele Shaw cell to bring it to the sink and clean it off.

I started to rinse the mixture of dyed fluids with water under the sink and got a series of waves running across the picture due to the surface tension combining with the force of the water. This created capillary waves.

The visualization technique used was dyed fluids of different viscosities with the less dense fluid being injected into the more dense fluid. It was just dyed water and dyed corn syrup.

The lighting used in this picture was the florescent indoor lighting from straight above, which allowed enough light to get the image. We were originally using outdoor light but then clouds rolled in and took away that option.

Size of field of view: 4 inches

Distance from object to lens: 5 inches

Lens focal length and other lens specs: 100 mm
Canon EF 100 mm f/2.8 Macro USM

Type of Camera: Canon 7D DSLR

Pixels: 5184 x 3456

Exposure Specs:

Aperture: F 5.6

Shutter Speed: 1/200

ISO: 1250

Post-processing:
Increasing saturation, contrast, and exposure in Adobe Bridge

This image reveals surface tension and the effect of capillary waves on a surface of water mixed with corn syrup. I like the colors within the image but would like more of an intricate pattern within the fluids.

The fluid physics of surface tension and capillary waves are shown well but it doesn't show the classic physics of a hele Shaw cell.

I fulfilled my intent of capturing a beautiful image but would like to improve by capturing the physics intended to a hele Shaw cell.

I could develop this idea further by trying it out with different fluids and more colors.