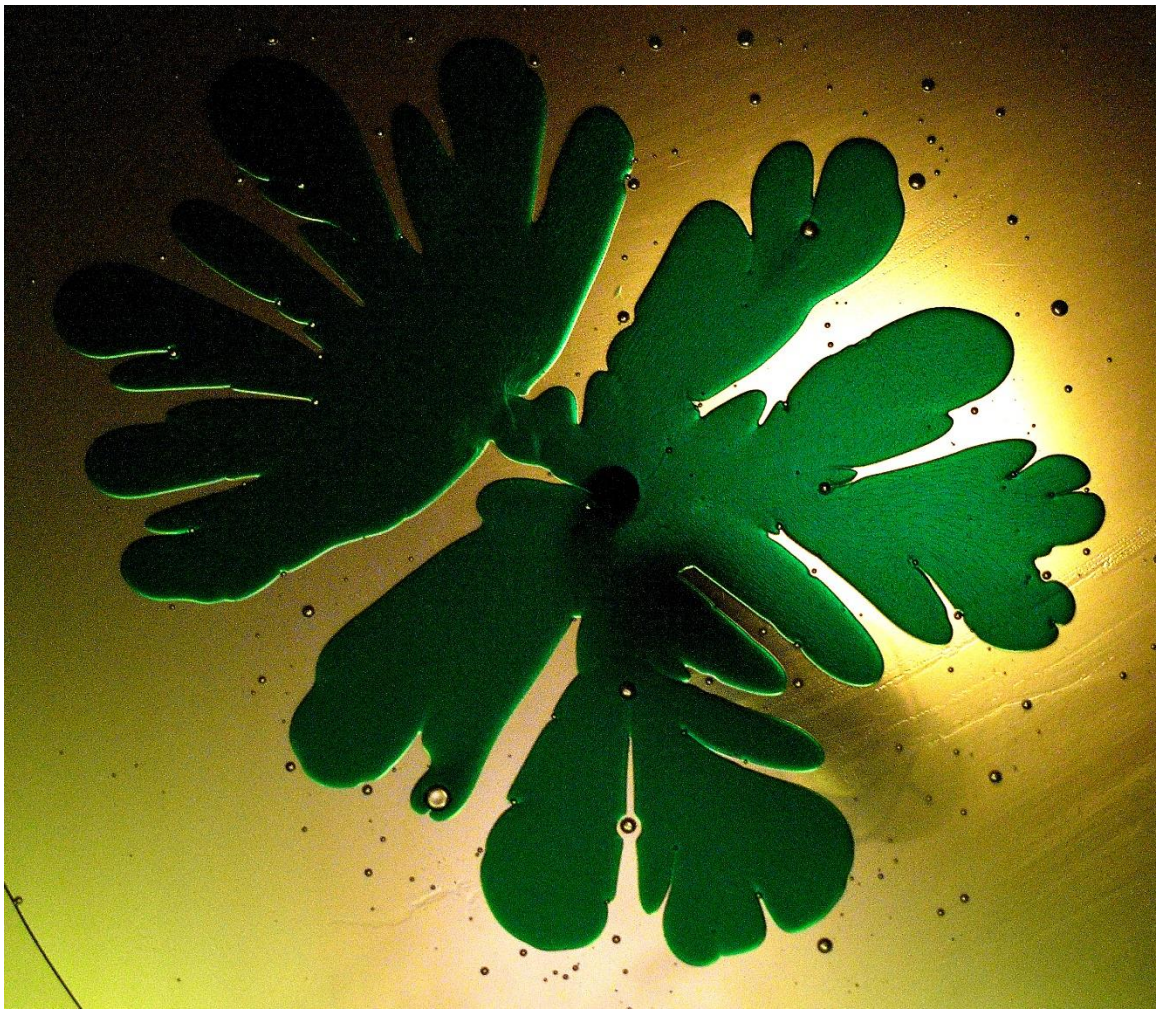

Team 2nd Report

Brian Gomez | Flow Visualization (MCEN 4151-001) | 11/11/2019

Assisted by Lucas Garcia, Nick Scott, Brooke Shade, and Abby Rinerson

This image was created for our second team assignment for the Flow visualization class. My team attempted to capture the Saffman-Taylor instability by using a Hele-Shaw cell. This instability results in the formation of liquid fingering which occurs when two liquids, of varying viscosities, interact. The intent of this image was to capture the unique patterns produced by this instability.

The equipment used for this image was the Hele-Shaw cell which was provided by professor Hertzberg and we used light corn syrup and water that was dyed with various colors to help distinguish the different fluids and visualize the flow physics. The Hele-Shaw cell is made up of two clear plates (glass or plexiglass), with a light shining up through the apparatus with another material to diffuse the light source. The water is then injected from a syringe through the bottom plate, into the more viscous fluid that has already been compressed between the two surfaces. The flow direction and pattern can be changed by adjusting the distance between the two clear surfaces. This setup is shown in **Figure 1.**

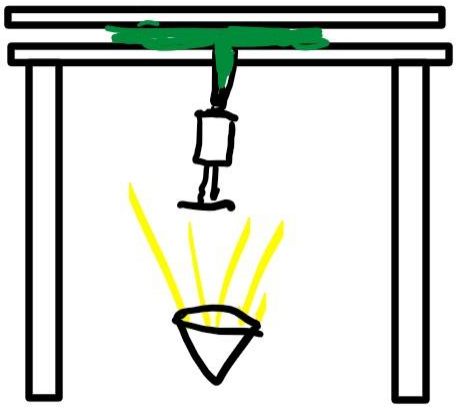

Figure 1. Hele-Shaw cell

The camera I used was a Nikon D3500. I used an ISO of 3600, the F-stop was f/5.3, and the shutter speed was 1/125. For lighting, we used multiple cellphone flashlights underneath a white, opaque sheet of acrylic. I used both Nikon's free editing software and Adobe Lightroom to make the image sharper, reorient the photo, and edit the lighting colors,

which I believe gave a nice gradient effect along the diagonal of the image and left interesting outlines of the fingering effect on the dark corner of the picture.

This image does a great job at showing the desired flow and captured great detail within the green water itself. The lighting situation could've been better with this image as I wish we were able to diffuse the phone lights a bit better. I was able to use this lighting to create a sense of balance within the image with three visual segments within the image, and I also like how the green fingers look like a shamrock. Overall, I am pleased with this image and the flow physics I was able to visualize. My original image is shown below in **Figure 2.**