Abby Rinerson
Get Wet
ATLS 4151-001
9/29/19

For the first Flow Visualization assignment, “Get Wet”, I created an image that depicts the difference between laminar and turbulent water flow. I intended to create a side-by-side comparison of each flow to best visually portray what is happening, while still creating an image that is appealing to look at. I originally tried creating images displaying the flow of water over spoons. I got some good photos, however I thought this concept was more interesting.

In order to get this image, I created a makeshift tripod using 3 small cups and a plate. I set the plate upside down over the cups and then placed my camera on top of the plate. I arranged this set up near the kitchen sink so that most of the background was the neutral black of the sink. I then began by turning the faucet handle gently, waiting a few seconds, then turning the faucet handle more abruptly. The basic flow of the image is of the water falling from the sink faucet. The faucet has a screen covering the exit point which causes the flow to become separated and aerated, as seen in the turbulent flow. The laminar flow was approximately ¼ inch in diameter and the turbulent flow was about 1 inch in diameter. The flow itself changed a great amount, as was intended. The laminar flow is more smooth and transparent whereas the turbulent flow is more rough and opaque. The change in appearance is due to the particle behavior in the water. For the laminar flow on the right of the image, the velocity, pressure and other flow properties are all constant whereas for the turbulent flow, everything is constantly changing and the properties are more chaotic (Nelson). The flow is created by turning the faucet and, in the image, the force of gravity is sending the flow into the sink.

The visualization technique used in this image was water and water alone. There were no extra materials used during this experiment and it would be easy for anyone with a camera and sink to replicate. The image was taken in the kitchen with some natural backlighting from the open window behind the sink.

In order to get the side-by-side comparison of the two flows, I used a long exposure of about 8 seconds. The faucet was set on low for about 4 seconds, then turned to high for the remaining 4 seconds. I decided to do this because I thought it would provide a good visual representation of the two flows over time. The field of view in this image included a small portion of the sink, without any other background or foreground subjects. My camera was placed about 1 foot away from the water flow and I zoomed in slightly to remove distracting objects that were not in the sink. The focal length was 42 and the camera I used was a mirrorless Olympus E-PL1. The camera recorded the date as December 31, 2009 which I couldn’t figure out how to change, however I won’t be using that same camera for any of the other assignments from here on out. The original image is 1280 x 960 pixels and the final image is 1300 x 975 pixels. The exposure was for 8 seconds, the aperture was 22 and the ISO was 200. The image appears somewhat grainy, however it is not due to the ISO, it is merely the texture of the sink. I adjusted the white balance and colors and cropped the image in Lightroom.

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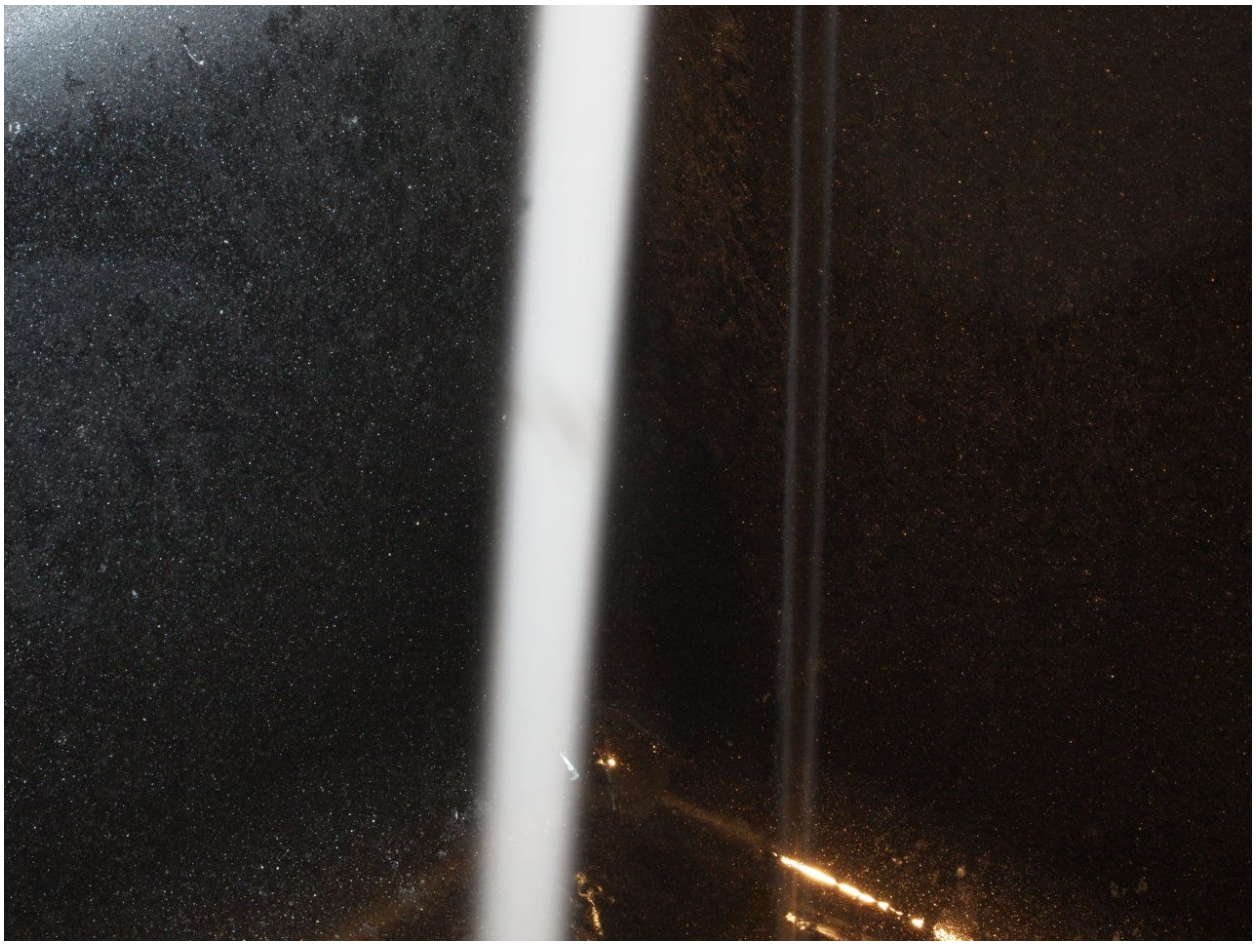
The image reveals the difference between laminar and turbulent flows in any ordinary sink. I like that the image is all one exposure, however I think it would be interesting to see two images of each respective flow overlayed together. I also think this image is a bit plain. There isn't anything especially exciting about it. I had more crisp and visually appealing images of water flowing off the spoon, however I thought I would stick with the laminar flow phenomenon instead.

I believe that fluid physics are shown quite well in this image. It is more an educational image than an artistic one in my opinion. I did achieve what I set out to do which was portray laminar and turbulent flows in one image. Overall, I would like to improve on the aesthetic. I think a more exciting flow and better composition would provide a much more interesting image. I think I could develop this idea by exploring other flows, for example fire.

Original Image:



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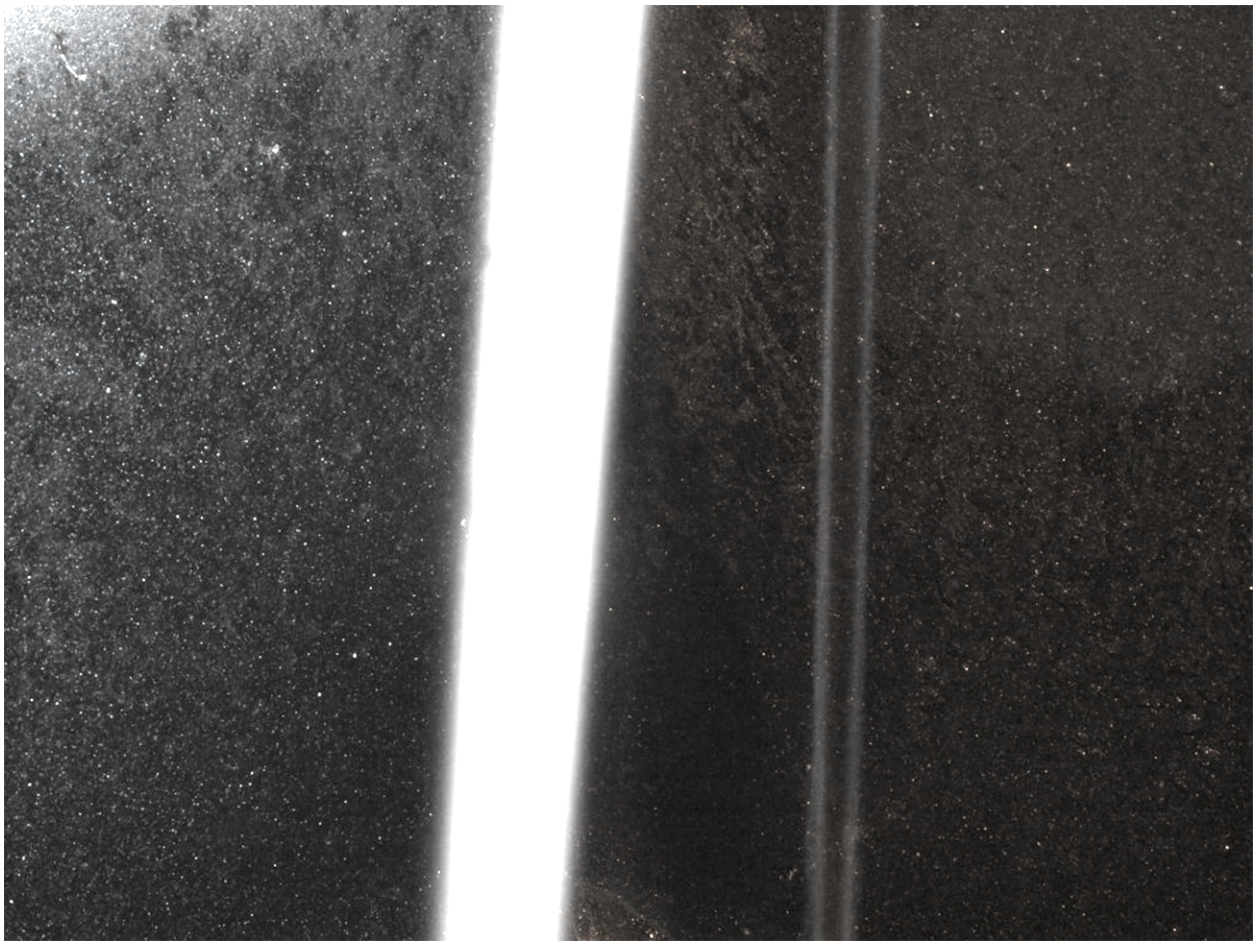
Final Image:



Citations

Nelson, Daniel. “Laminar Vs. Turbulent Flow.” Science Trends, 17 June 2019, sciencetrends.com/the-difference-between-laminar-and-turbulent-flow/.