

TEAM FIRST #1

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Flow Visualization: The Physics and Art of Fluid Flow
MCEN 4151/5151, FILM 4200



The purpose of this experiment was to capture an image in a group manner that illustrates complex flow phenomena. Being able to work with a team allowed our project and setup to be much more challenging but rewarding resulting in the photo above. Once the teams were fully divided, we had all come to agreement that the use of fire would be an appropriate idea for this assignment due to the dangerous yet elegant flow of the element.

Starting this experimenting was slightly tricky as we needed to find a suitable location and be able to follow the Combustion Experiment guidelines. The team had chosen one of the group members garage that had concrete floors, open doors and windows for ventilation. Nearby was a hose and bucket of dirt just in case of unintentional fires. To begin, the project consisted of a few simple items: Isopropyl alcohol, a long barbecue lighter for ignition, and a ginger ale bottle just for the context of this image alone. In a clear area of the room, alcohol was spread out along the

concrete floor. The liquid had been dispersed no further than roughly 3-4 inches in width and length. Once poured and at a safe distance, one of the members had ignited the fluid. After a small time had passed, I had grabbed the ginger ale bottle, that was colored with a purple Sharpie, and rolled it over the flame. At this point, I had gotten on the ground and captured a horizontal shot of the motion creating the image above.

As the bottle moved over the flame you could see the flame be slightly extinguished before it is reignited by the flame. What's interesting, however; is the fact that you could see a blue hint on the bottle insinuating that some isopropyl alcohol is now on the surface. Isopropyl alcohol is a flammable and colorless compound, but it mainly used as a solvent or cleaning fluid. The color of the flame due to the liquid varies from glowing soot and from the varying temperature. The small layer of blue, near the atop the isopropyl alcohol, illustrates that there is enough oxygen for combustion allowing for the molecules to be excited and ionized.

The camera that was used was a fellow group member's Sony A6300. Many shots were taken as the flame did not stay ignited for a long period of time and there is little grain due to slightly high ISO settings. The camera settings could be seen below:

Camera	
Camera maker	SONY
Camera model	ILCE-6300
F-stop	f/3.5
Exposure time	1/1600 sec.
ISO speed	ISO-6400
Exposure bias	0 step
Focal length	16 mm
Max aperture	3.6171875

As seen in the two images below, there was some post processing in order to reduce the brightness of the flame. In the background of the original photo (Left) one could see the bottle of isopropyl alcohol in the background. This was edited and removed in photoshop to have the audience focus on just the flame and bottle.

