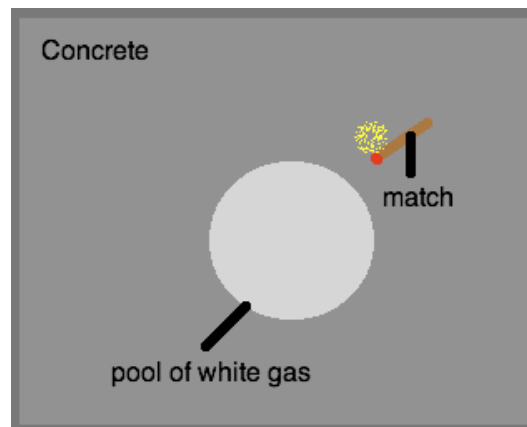


Tim Jarrell  
Flow Vis Team Project #1

The purpose of our image was to see flame behavior under windy conditions. Additionally we used this project to learn how the team interacted together. We intended on capturing the constant motion of the flame at different angles and times. To accomplish this we setup different size pools of liquid and used different photographic techniques to generate multiple images.

The apparatus or image setup we used was a simple pool of liquid on the concrete surface. We poured a sample of the white gas directly on the concrete, put aside the fuel can, readied the cameras and then ignited the pool with a match. In my image the pool was approximately 10-12 inches in diameter, which was one of our smaller pools we used. The flow in question starts as ignited liquid vapor directly above the pool. The flame propagates around the surface of the liquid in a blue flame. Then the heat of the vapor flame catches the rest of the liquid and ignites it into a normal yellow-orange flame. Investigating the flame, it has characteristics of both laminar and turbulent flow. The Reynolds Number ranges from 2500 to 100000 meaning it does in fact have both flows. When experimenting with larger pools of white gas it was clear that a larger pool would induce a more turbulent flow as to be expected. Since the pool in my photograph was relatively small it is clear that a great deal of the flame is in fact laminar in nature.



*figure 1: flame pool setup*

The flow technique used for this project was simply a calm pool of burning liquid. The liquid used is white gas fuel or Naphtha. It is a volatile liquid hydrocarbon mixture used commonly for portable camping stoves. The liquid was purchased at REI in a Coleman Camp Fuel bottle. During the night that the images were captured there was approximately 10-20 mph. Lastly, the photographs were captured at nighttime with the liquid primarily as the light source and a small overhead florescent light as the secondary source.

The field of view is approximately 2.5-3 feet in width and about 2 feet in depth. The distance of the object to lens is 5 feet at low angle to the ground. To capture the image we used a Canon EOS Digital Rebel XS with manual focus with focal length of 55mm. We used an ISO of 1600, exposure of 1/400, and aperture of 7.1 for the photograph. This yielded us an image with significantly less motion blur and a decent depth of view. The original photo had dimensions of 3888 x 2592 and the cropped image that I am using has dimensions of 3594 x 1690.

The image reveals the beautiful nature of flames and the smooth curves associated with that. The physics of the flames are represented very well in this image. I choose this particular image out of the over 300 we had as a group because of the simplicity but yet multi-faceted nature of the flames. I enjoy the blue flame on the left side of the picture since that aspect did not show up very well in other images. Additionally, I like the separation of the flame in the upper right and the orange glow that is occurring to the right of the bulk of the flame. Since our intentions were to capture the motion of the flame, I believe we did this without a doubt. I think that in the future if we were to do this again it would be nice to see a falling flaming liquid.

*figure 2: Team Project 1, Tim Jarrell*

