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# TEAM FIRST #2

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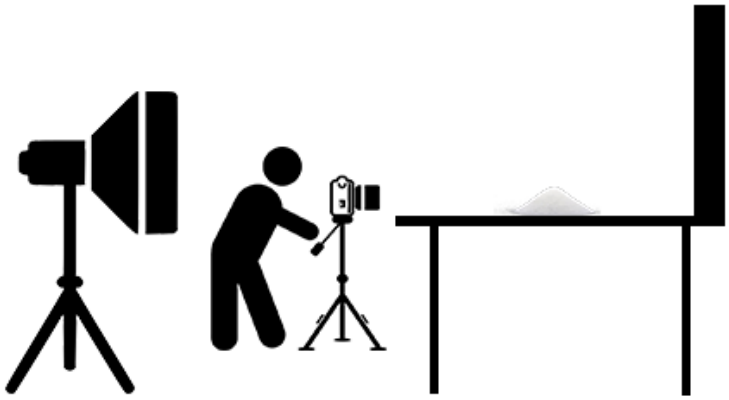
In Collaboration with Garrett Gerchar & Ivan Komodore
Flow Visualization: The Physics and Art of Fluid Flow
MCEN 4151/5151, FILM 4200

Just like the first team photo, the purpose of this experiment was to capture an image in a group manner that illustrates complex flow phenomena. Being able to work in collaboration with a team allows the members to setup a much more challenging scenario and capture a more intricate image, just like the photo seen above. During the initial planning phase, the team had contemplated over many ideas but had all came to agreement that the use of white chalk powder would be the most ideal object for this assignment due to its multi-purpose uses.

Chalk powder has many uses and could be described as being soft, white, and is a form of limestone that's composed of calcite. From blackboard chalk to gymnastics, chalk has many recreational uses. When setting up this project, the team had placed a large table against the side of the wall. One large piece of matte black cloth was placed on the table and another was placed on the wall behind it in order to create a contrast between the chalk and the surroundings, as seen in the photo below. A small pile of chalk, roughly 4 inches in diameter, was then placed at the center. To the right of the cameraman, another team member had a large textbook and dropped it on the table (to the right of the chalk powder). This outward force pushed the light massed

particles to the left creating the initial photo above. A high shutter speed was needed in order to capture the motion.



Recalling back to Physics 1, work (potential energy) is done whenever a force moves an object over a certain distance. Thus, the potential energy of the book could be described as:

$$PE = mgh$$

where m is the mass of the book, g is the gravity of Earth, and h is the height of the book. The force on to the particles due to the book could be calculated as:

$$F = -\frac{dPE}{dx}$$

This potential energy of the particles is equal to the work that you must do to move them from the initial point to the final point.

The camera that was used was again by a fellow group member's Sony A6300. Many shots were taken because of the very small timeframe that was needed to capture the exact instance when the particles were expelled due to the force of the book. The camera settings could be seen below:

| Camera | |
|---|---|
| Camera maker | SONY |
| Camera model | ILCE-6300 |
| F-stop | f/2.5 |
| Exposure time | 1/2000 sec. |
| ISO speed | ISO-6400 |
| Exposure bias | 0 step |
| Focal length | 30 mm |
| Max aperture | 0.96875 |

As seen in the two images below, there was some post processing in order to increase the brightness of the chalk.