

4 May 2011

Team Project 3 Report

Every year, in a unique spectacle provided only by the University of Colorado at Boulder, thousands of people from across the state of Colorado, and even some people from neighboring states, gather on CU Boulder's Norlin Quad to participate in one activity, smoking marijuana to celebrate Arpil 20th (4/20). This is a CU tradition highly frowned upon by the university's administrative, but I like to think of it as a great opportunity to turn the afternoon of April 20, 2011 to learn about fluid dynamics. Therefore, the smoke plumes of 4/20 because the subject of my Team Project #3 photograph. Specifically, I was attempting to display the phenomenon of the driving buoyant force causing the smoke plumes to accelerate upward.

Despite CU Boulder's best efforts to prevent the 4/20 gathering from happening, it is inevitable due to the large swarm of attendees; therefore, there will be opportunities for future students of Flow Visualization to repeat my picture. It is recommended that the photographer proceed to Norlin Quad and hour before 4:20pm in order to secure an optimal location. Norlin Quad is located in the North West corner of campus, as shown in Figure 1.

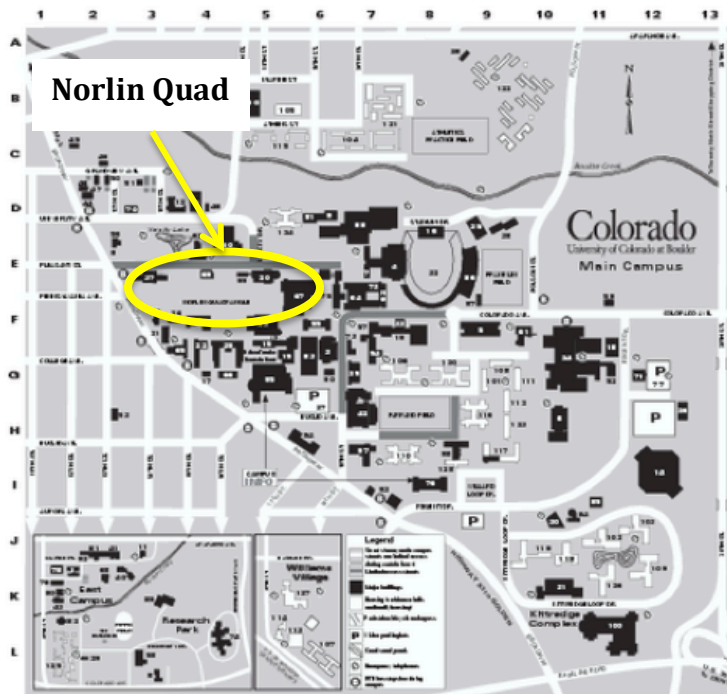


Figure 1: Map of the University of Colorado at Boulder showing location of 4/20 Gathering, Norlin Quad

In my opinion, an optimal location is one in which there is little opportunity for 4/20 participants to obstruct the frame of the picture. Therefore, a location just outside the perimeter of the quad on the south side is the best. This is because the land is raised slightly from the quad and there are cement benches that provide a level surface to stand on, to rise above the crowd even more. For this situation, a tripod is an ideal tool to use, however, if one does not have access to this device, using a grid-like display on the camera and cornering a building in one of the squares will suffice. I did not have access to a tri-pod; therefore I cornered the South West corner of the Old Main building in my camera's grid. In addition to getting to the quad approximately an hour before 4:20pm, there is opportunity to capture a great time lapse of smoke build-up, or a before and after shot like I did, and shown in Figure 2.



Figure 2: Before (3:30pm) and After (4:20pm) image of the 4/20 gathering on Norling Quad

The camera used was a Canon PowerShot SX20 IS and Adobe Photoshop was used to combine and edit the before and after shot. I did not have to crop the two pictures so that they were in line because, as described above, I cornered Old Main into one of the squares of the camera's grid display for every picture taken. Once the pictures were combined into one photograph, I increased the contrast to enhance the effect of the smoke plumes. Normally, the smoke from the 4/20 participants is clearly visible, but this year it was a cloudy day and the plumes seemed to get lost when they reached the skyline. Despite the weather, I think a good contrast was achieved, and having the before shot clearly shows the increase in smoke density over time.

The fluid flow of the smoke plumes is a result of the buoyancy effect. With regards to gases, this effect occurs when there is one gas that is less dense than another and, as a result of the unequal densities, the lighter gas will rise and the heavier gas will fall. In the scenario of the 4/20 participants' smoke, the tips of their blunts are burning at a few hundred degrees, thus the smoke is much hotter than the surrounding air. As such, the smoke rises¹.

Jones, John. "ENCS 100 Lecture 19." The School of Engineering Science. Simon Fraser University, 01 Nov. 2004. Web. 10 Feb. 2011.
<<http://www.ensc.sfu.ca/people/faculty/jones/ENSC100/Unit19/lecture1.html>>.

I was inspired to take this picture of the annual 4/20 gathering by our Flow Visualization guest lecturer who asked us the question “what is beautiful?” He then went further to describe different aspects of art, one of them being the element of shock. This was the reaction I was attempting to get out of my classmates, and judging from discussion comments such as, “I’m impressed that you were gutsy enough to do this,” I believe I achieved my objective. Despite the lack of professionalism by capturing thousands of people participating in a federally illegal act, I believe I learned the most through taking this picture. I was able to break through my engineering-minded barrier into the artistic side of this course, which is what I believe Professor Hertzberg attempts to do with this combined art and engineering course, and that is to bridge the gap between scholarly disciplines.