April 4,2017

Dear Mr. Vassiliades,

It was such an honor to receive the 2017 Marilyn Jorgenson Reece Award at the 67th Annual Los Angeles County Science and Engineering Fair. This award has inspired me to continue my studies in civil engineering. This award is also important to me because as a feminist I have a great appreciation for the contribution of women who came before me.

I am a 6th grader at Charles Evans Hughes Middle School in Long Beach. I have always loved math and science. In 5th grade, my aunt took me to the California State Science and Engineering Fair as a visitor. All of the mind blowing projects inspired me to want to participate in a competitive science fair. My middle school did not participate in the LA County Science and Engineering Fair, so I helped start the first science fair team at Hughes Middle School to ever compete in the LA County Science Fair.

I was encouraged to do a project about freezing and thawing concrete because in my 4th grade science class I learned that concrete and many other rocks are greatly affected by the expansion of water when it freezes. I was so fascinated by this that I did my 4th grade science project on freezing and thawing different rocks. This topic has always been in my interest so this year I decided to do another project on freezing and thawing, this time choosing concrete because it is the basic infrastructure of our modern world.

My project is called Resistance of Concrete to Freezing and Thawing. My project was designed to see how the size of aggregate can affect the strength of concrete in a freezing and thawing condition. I made two samples each using 1 part water: 1 part portland cement : 2 parts sand: 3 parts aggregate. Sample A had ¼ inch (small) aggregate, and Sample B had ¾ inch (large) aggregate. My hypothesis was that the smaller aggregate would withstand freezing and thawing

better than the large aggregate. To simulate the freezing and thawing cycle of nature, I submerged both samples in a cup of water. The samples were put in the freezer at night, and taken out in the morning. I repeated this cycle for 21 days. On the 5th day the small sample began showing signs of damage, while on the 8th day the large sample started showing signs of damage. After 21 days I took the samples out of the water and let them dry. I removed the loose sediments by gently rolling the samples. The sediment from the large sample weighed 25.4 grams, while the sediment from the small sample weighed 37.8 grams. I also did a drop test where I dropped both samples from 10 inches, into a shoebox. When this test was done, a big chunk fell off the large sample, and the small sample split in pieces. Therefore my hypothesis that small aggregate would be stronger than large aggregate in a freezing and thawing cycle was not supported by my results.

After the completion of my experiment I realized that there is so much more to be researched about concrete and the possibilities of strengthen building materials are endless. Next year I would like to possibly research about additives that go into concrete to strengthen it and experiment with them.

Participating in the LA County Science and Engineering Fair this year has opened my eyes to the possibilities for my future. Receiving the Marilyn Jorgenson Reece Award from the Professional Engineers in California Government has been the greatest honor so far in my academic career. Presenting my project to the civil engineers at Caltrans on April 3,2017 will be a moment I will never forget. I plan to put the generous cash award toward a new computer. Once again thank you for this amazing opportunity. Presenting my project to the civil engineers at Caltrans will always be an unforgettable moment in my life!

Sincerely,

Diana Michaelson