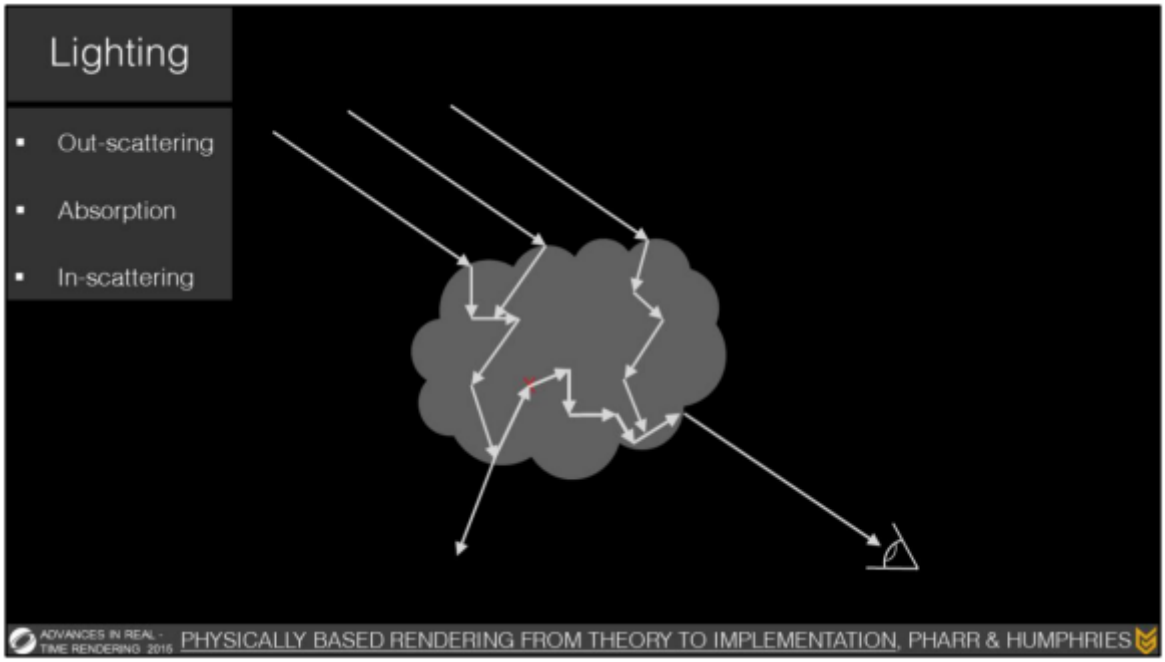
Evita Lobo- Part B Final Project

For my final project, I want to build off the project I made for HW3 where I used a noise function(Perlin) to make a cloud look like it some form of volume rendering. I also used a particle effect to create thunder when the thunder sound was there and lightning to get to make it seem like there was a thunderstorm. I would like to generate realistic clouds through volumetric rendering and I believe the way to go about it would to be to create a noise function that distorts the vertices of a shape in many forms. I also think the material would need to be transparent and overlapping with other particle effects to make a cloud, so the render trail would be continuously changing in real time to create variety in the cloud rather than just having a static shape and the noise which makes the cloud look blocky and unrealistic. I will continue to used perlin noise and add in raymarching and a height gradient to fully flesh out these clouds. Perlin Worley is used to create these billowy shapes so by using an assortment of different textures, I could create noise. If I am tracking their density, I can also build a precipitation function to let the clouds rain if it meets the threshold by using particle systems and changing the speed and density of the rain to match that of the clouds. I had a fun time creating the electricity and it looks pretty realistic when it matches the noise so I will refine that going into the final project. Trying to figure out lighting is where the difficult comes in because the light is reflected off of the water droplets in the cloud.



http://advances.realtimerendering.com/s2015/The%20Real-time%20Volumetric%20Cloudscapes%20of%20Horizon%20-%20Zero%20Dawn%20-%20ARTR.pdf

According to this link, I have to take into consideration how realistic clouds are formed. For example, denser clouds form at a lower temperatures and rain and snow are produced in higher densities. Dense regions also make round shapes as they rise and light regions diffuse like fog.

By using something like Beer's Law and Henyey-Greenstein's Model, I can predict how light scatters and apply a stretched dark gradient for the cloud edge's. By using raymarching, I can figure out the distance from the player to the clouds and apply a more detailed layer to the clouds closer to me and keep the low res clouds at a distance so it doesn't use up too much time and resources to render it. There are more pictures on the link that demonstrate the model of creating these volumetric shapes.

The members I'll be working with in my team are Kaio Barbosa, Aaron Kanehl, Wesley Smith, Wai Chun Leung and we will be building a mystical grove where we use crystals and other natural phenomena to amplify the effect of these crystals such as an electrically charged crystal.