Pamela Green

"We have to move!" hastily shouted the pilot as he quickly adjusted the helicopter's altitude by slamming both hands on the throttle. The helicopter jerked upwards, narrowly avoiding the dark claws of the pitch black Atlantic. The murky depths of the ocean was hurled by the cataclysmic repulsion of the turbulent waters. Avery, a navy aviation rescue swimmer, swung his feet into the roaring wind out the side of the helicopter. A starry display of blood red flares dimly lit the circulating waters below.

"Visibility is below 15%, I can't even see my hands out here," roared Avery.

"Time to move out!" responded the pilot. Avery swiftly slid on his goggles over his eyes and jumped into the bleeding abyss. Upon turning on the googles the world lit up, displaying enhanced images of the sinking stern of the USS Zumwalt. Despite the gloomy and turbulent conditions the adaptive optics in the goggles' nanochip displays clear images. Using millions of microscopic nanomaterials, all of the various technology and visual capabilities can be stored on portable goggles. Avery's picture perfect images can be attributed to the enhancement of current nanomaterials such as graphite. Something as small as a microscopic allotrope of carbon could give way to enhanced technology forty years in the future.

After watching Dr. Richard Ordonez's video about nanomaterials, I really became interested in the future possibilities of microscopic technology. Nanomaterials have been studied and evaluated in a wide range of applications from medical uses to photography. The possibilities seem limitless. I really enjoy the fact that these materials already exist naturally and within our bodies.

In my research in nanomaterials I discovered a very interesting study by Chinedum Osuji, a Professor at the University of Pennsylvania. In his study he leads an experimental research group who focus on structure and dynamics of soft materials and complex fluids. He mainly focused on the structure-property relationships in ordered soft materials and slow dynamics of disordered systems. In other words, Dr.Osuji is discovering new ways to normalize different nanomaterials to result in more effective and standardized materials. For an example, imagine someone had rocks, a funnel and water filled with chunks of grass. That person could easily pour the water in the rock filled funnel and hope that the grass gets removed. However, the rocks are different sizes so grass could filter through with the water. To fix this problem the individual might put more rocks and smaller rocks to better filter out the grass. Unfortunately, this makes the process considerably slower. Instead of randomly pouring the rocks into the funnel it would be much better to precisely stack identical rocks only leaving small holes that allow pure water to pass. In the same way Dr.Osuji research is discovering different ways to artificially structure nanomaterials to facilitate different functions like filtration. In application his research would make processes like water desalination economically viable. Just looking into the possibilities of nanomaterials is exciting. There is so much room for the field to grow and change based on the work of the future generations.

Despite all the vast applications in which nanomaterials can be used, the application I am most interested in is the possibilities with adaptive optics. This summer I have the amazing opportunity to work as an Science and Engineering Apprentice Program (SEAP) intern at the Naval Research Laboratory (NRL). Working on digital holography in the optics division, I learned the severe limitations of our current technology. Many optical systems are currently limited by atmospheric interference and environmental conditions. Therefore, imaging systems can not truly live up to their potential. However, nanomaterials have the possibility to allow humans to see across the entire light spectrum both visible and invisible

light. Using nanomaterials to make technical objects such as quantum dots and transistors would allow highly complex systems to be more portable for naval officers.

The only the nanomaterial field can process is with strong creative innovators such as Dr. Richard Ordonez. Dr.Ordonez inspires me because he thinks out of the box and seems to truly love what he does. The story of how he created a biodegradable nano-transistor by adding honey on a whim was hilarious. He is an amazing thinker who is free spirited and fun loving. Just by watching the Navy Horizons video of Dr.Ordonez I can really tell his passion and that he truly loves what he does. I can really see my future career goals in the work he is currently doing. My goal is to double major in biochemistry and international affairs. I hope to get my doctorate in biochemistry and travel the world and work in international laboratories and projects. I love traveling and studying science so I hope I can pursue both passions together. My final goal after researching in labs around the globe is to work with the State Department in order to implement new scientific technology in global communities. I am hopefully taking the first steps towards my goals by working at NRL and traveling on a State Department scholarship to study abroad in Germany next year.

Overall, the possibilities of nanomaterials are endless. With innovative researchers such as Dr. Ordonez the field will most definitely grow and expand into the future. No matter what challenges come next, scientists and researchers will rise to the challenge.