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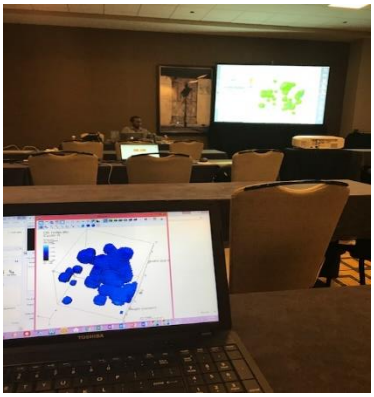
07-17-17

PEARC17 Travel Report

The first day at PEARC17 was like a normal day at a conference. You come in for a debriefing and are told your assignments for the conference and how the conference is going to be. We were given a presentation by the FBI on Cybersecurity. Agents Tracy and Tracy came and gave a very informative presentation. They informed us on the different types of cybercrime. There are six different types of cyber infraction which are: crime, the terrorist, hacktivism, the insider, warfare, and espionage. Cybercrime is any criminal activity carried out through a computer or the internet. It is becoming an increasing problem around the world. Cyber-terrorism is any politically motivated attack against information and computer systems or programs which results in violence towards an non-violent person or organization. Cyberterrorism is perfectly represented in the U.S. vs. Mitra case in 2003, where Rajib Mitra hacked and stole information from US service members and sold it to ISIS with the intent to support arranging attacks in Western US. Cyber hacktivism is hacking or breaking into a computer system without "invitation" typically associated with a political or social purpose. Hacking can range from low-grade hacktivism to extreme federal offenses which can result in arrest. An insider is a person with authorized access to certain information and intentionally misuses that authorization to negatively affect that organization. An example of an insider would be a mole, someone who sells information of one organization or company to another, while being an employee or trusted individual of that organization. Cyber-warfare is the disruption of a state, country, or organization's information systems typically pertaining strategic military practices. Cyber-espionage is the illegal access to confidential information, typically held by a government or other organization.

My first of two events for Monday was the python training. Steve Lantz from Cornell University conducted the training. I was introduced to a new integrated development environment (IDE), named Anaconda. Which contains Spyder and Jupyter. Spyder is a python IDE, where you can write code. Jupyter is a web based interactive computive notebook environment. You can write your code while in a browser. It puts all your files that are in your computer on a page in your web browser and it allows you to open them and work on them anyway you please. The second event I attended was an Introduction to Scientific Visualization and Data Sharing. Visualization was completely new to me until the seminar. Being new to visualization I had to look up what it's purpose is, the representation of an object, situation, or set of information as a chart or other image. For the tutorial we had to download a visualization software called Visit. Visit is a software that allows you to edit your data to give it visual properties that make it appealing to the eye. Along with Visit we had to download a file of data to use on Visit. For the whole tutorial we played with the data learning how to give the data different textures and colors. Also we learned how to splice the data and add layers to it. Overall it was a fun experience.



That night I met my mentor Ben Nickell, he works with high performance computers (HPC) systems manager at the University of Idaho. It was a great experience to have met such a great person that will be a benefit to my life. He explained to me how much that HPC's have grown throughout the years, and how they are important to universities.

Day 3 was spent participating in Modeling Day. This all-day event was based on using code to solve modern day problems and making a visual representation from the data. All the students were placed into groups to work on a project. There were different projects for each team to pick from. One project dealt with the physics behind the descent of a skydiver. The next project was a mathematical modeling for malaria transmission dynamics. This project focused on how malaria is spread from villager to villager. The disease is transmitted by infected female mosquitoes, because female mosquitoes are the ones that bite humans. Malaria only spread through infected villagers by the way of getting bitten by a mosquito, causing the infected mosquito to spread the disease. The team would have to create a malaria transmission dynamics model and plot the trends of the disease through the populations. The third project dealt with the moose and wolf population on Isle Royale. A team would have to create a model of the wolf and moose population, showing the nature of the two organisms and their life cycles. The last project dealt with a zombie apocalypse, the group must create a model that would simulate an apocalypse dealing with infected, uninfected, and immune humans. In the simulation humans would move around; hopefully as realistic as possible, avoiding zombies. The zombies would infect the humans if they contacted them, as seen in movies and comics. There were advancements that were asked to be made to the simulation for whichever group chose to complete the project. My group chose to complete the skydiver project, which was focused on modeling of the fall of skydiver Felix Baumgartner and his famous "Stratos" jump in 2012. The code that we were provided created a plot of the position and velocity of a ball falling. The final code used variables and equations used in physics to create all the different obstacles that Felix went through. With these assets, we could calculate the velocity of Felix and his movement. In addition, this enabled us to make a model of his descent from space. We ran into a problem in the code, the drag force would steadily increase which would not allow the program to run due to the numbers being so large. To solve the problem, we stopped calculating drag force when the acceleration was zero, and the program ran smoothly after. Later that evening I participated in the poster presentation, presenting my research for the first time. During the spring semester of 2017, I was a part of a research team consisting of Derek Morris Jr., and Austin Ivins, led by our mentor Edward Swindell. Our research dealt with Unmanned Aerial Systems(U.A.S.). Titled Measuring Shoreline Loss: Salmon Creek Case Study, the research was conducted in Edenton North Carolina. We used a DJI Phantom 2 Vision + drone to map the area. The drone flew four missions taking over 100 pictures that were used to compare to older pictures of Salmon Creek. Presenting the research was a good experience, I was given great feedback on things that I should change and do better for future work.

In conclusion PEARC17 was an amazing experience, it took me out of my comfort zone. You cannot grow as a person if you do not leave your comfort zone. Presenting my research and

meeting new people was a great thing for me. I now have contacts that can benefit my future and lead me down the right path towards what I want to be. Special thanks to Dr. Hayden and all SGCI personnel for making this trip possible.