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Practice and Experience in Advance Research Computing 2018(PEARC18) Travel Report

The Practice and Experience in Advance Research Computing Conference takes place every year during the end of July. Each year, the PEARC committee switches up their venue. Last year the conference took place in New Orleans, Louisiana. This year, the team chose downtown Pittsburgh, Pennsylvania at the Wydham Grand Hotel as their 2018 venue. Day 1 of the PEARC18 conference kicked off on July 22nd 2018 in which the students attended the Student Program Opening Activity and selected professionals were invited to the Campus Champion Leadership Team Meeting. During the Student Program Opening Activity, the students met with several members of the Student Committee in which the students are given advice on how to take full advantage of their time in Pittsburgh outside of the conference and things related to it. The event also included the presentation of two speakers, Michael J. Becich. Becich, whose research areas focus primarily on the interface between clinical informatics and bioinformatics, is a Chairman and Distinguished Professor at the Department of Biomedical Informatics at the University of Pittsburgh's School of Medicine. Becich primarily focused on the three different types of pathology: clinical, forensic, and anatomical. In relation to forensic pathologist, Becich made the statement that forensic pathologist made up only less than 5 percent of pathologist today. Becich also stressed the importance of patient's data sharing. "How can we help diagnose other patients if we do not have any prior data to compare their data to?" Becich's rhetorical question was then followed by on ways he seeks to advance pathology informatics and biomedical research. He is doing this by conducting further research from range of topics such as genomic and proteomic data mining to biosurveillance and machine learning.

Day 2 of the PEARC18 conference is known as the 'tutorial' day where tutorial sessions on multiple areas are given all day from 8:30 in the morning until roughly 5 in the evening. I had the pleasure of attending the *Programmable Cyberinfrastructure – Clusters in the Cloud* session. Throughout this tutorial, attendees were given an a basic verview of cyberinfrastructure followed by step-by-step instructions on OpenStack API. Richard Knepper , who is currently working for Cornell University's Center for Advanced Computing, took the floor give the first portion of the tutorial. From there, the group moved on to perform a series of things. First the group created a network. To do this, they use the command 'openstack network create ${OS_USERNAME} – api –net.' To ensure their network was created, they checked for it by utilizing the command 'openstack network list.' The group then moved on to create a sub network by making use of the 'openstack subnet create –network ${OS_USERNAME} --api net --subnet-range 10.0.0.0/24 ${OS_USERNAME}.' After creating bith the network and subneteork, the attendees then proceeded to do a various steps such as creating a router, adding the subnetwork created previously to that router, then adding the router to the public network. Next, Knepper showed the attendees how to start an instance and how to create an IP address once that instance was started. Once the tutorial concluded, Knepper instructed the participants to dismantle all of what they built previously by providing them with a chain of commands. After Knepper's session, Eric Coulter of Indiana University and XSEDE, took the floor to give his presentation on Elastic Computing.

First, Colture started off by demonstrating and performing the commands needed to build a headnode. Once the headnodes were built, he moved on to the next step, which was installing OpenHPC components on the attendees' computer. When all of the participants had finished installing the OpenHPC software, they went on to perform a series of steps such as setting up modules system, installing compliers and OpenMPI, and finally adding elasticity. Later that evening, the Student-Mentor Dinner was held. The point of the Student-Mentor program is to help foster the next generation of scientists and science leaders and build the confidence of students as they navigate their way to success. The program also gives the students the opportunity to interact one on one from an PEARC attendee-mentor from laboratory, industry or academia. My mentor is Dr. Hongmei Chi who currently is a cyber security associate professor at Florida A&M University. During the dinner, the two of us were able to discuss a series of thing from background to graduate school. Towards the end of the dinner, Dr.Chi enlightened me about today's struggles of not only being a minority but also a woman in the computer science field.

On Day 3 of PEARC18, myself and a good deal of other students participated in the Student Modeling Contest. The Student Modeling Contest is an event where student work in teams to build a model of a scientific phenomenon in order to better understand its behavior and simulate a range of conditions. My team consisted of 4 members, 2 from Elizabeth City State University, and 1 from Mississippi Valley State University. Our assigned problem was focused on modeling the fall of the skydiver Felix Baumgartner and his famous "Stratos" jump in 2012. To do this, we utilized the python program of a ball being thrown up into the air and falling back to Earth. Since none of team had a strong physic background, so we chose to read up on some important formulas and concepts needed when calculating freefall. After this was done, we worked on the program from roughly 1:30 that day to about 5:30 pm. We then spent the rest of the evening preparing a PowerPoint presentation on what we had managed to do in such little time frame.

On Day 4 of the conference, the Student-Mentor lunch took place, which called for the students to meet up with their assigned mentors once again and interact one last time before the official end of PEARC18. Before my mentor departed I made sure to ask her the question, "If you could give an computer science major any advice, what would it be?" Her reply, "To always keep an open mind. Don't enter any job or internship set on doing one particular thing. For example, you mentioned you're a Computer Science and Mathematics major, and but you're not against the idea of participating in a cybersecurity internship next year. And that's what I mean by having an open mind, people with an open mind go far not just in computer science but every other field as well." Following the Student-Mentor lunch, my team members and I presented our Student Modeling PowerPoint presentation to other students and professionals. After the presentation, the poster session began. There were a lot of amazing poster but my favorite one in particular happened to be titled Using Jetstream to Enable Large-Scale Text Analysis of Tweets authored by 8 students all from Indiana University. Their research aimed at using large-scale text analysis to reveal patterns, which would not be readily discernible by a human alone. To do this, they used more than 2 million tweets from OSoMe Twitter collection and then store the data on Jetstream Cloud Computing system which process the tweets with each sentiment dictionary. They then proceeded to compare bi-grams, steam graphs, word counts and similarity measures to assess the dictionary robustness. While attending

the poster session, I got the chance to chat it up with Lenovo's Senior High-Performance Computing Architect, Lerone LaTouche. Towards the middle of our conversation, I happened to ask him the same question as I did my mentor. His reply was to keep a GPA above 3.0 and to stick with the discipline. "The computer science field can be very demanding, and sometime very strenuous, if you keep the right attitude and stay on top of things like your classes, a good paying job is sure to be on the table when you graduate."

The last day of PEARC 18 was highlighted by the closing luncheon and the start of the first SGCI Hackathon. The Hackathon kicked off with each participant choosing three of the five projects: MyGeoHub I, My GeoHub II, Cosmic^2, SeaGrid, and SIMCSS. I chose Cosmic^2 and ended up being partnered up with three other undergraduate students. Our project called for us to do eleven important tasks. First, we had to create an web application launched by COSMIC2 gateway that displays a stack of 500-5000 images one at a time, allows the user to navigate forward and backward in image stack via keyboard, add points, reject images, display images in movie mode, save user's points, return list of images' points and reject images to server when user clicks on"Submit" button. For extra credit, we were asked to create a function that allows the user to zoom and pan each image. After being made clear on exactly what our assignment was, my team members and I began working vigorously to come up with the web application. After the full 24 hours, we were only able to get 6 out of the 11 task completed. Those 6 were creating a web-application, displaying a stack of images one at a time, navigate forward and backward in image stack via keyboard, allow user to add points in an image via mouse clicks, allow user to delete points, allow user to reject an image, and display images in movie mode. In the end, the COSMIC2 team won best presentation and best team.