

My name is Jessica Hathaway and I am from Gates County, North Carolina. I am a senior Mathematics major at Elizabeth City State University (ECSU) located in Elizabeth City, North Carolina. My interests in mathematics began with summer programs and yearly competitions during the middle and high school. My interests during my summer student research volunteer experience at National Aeronautics and Space Administration (NASA) Langley, in Hampton, Virginia in 2015.”

Today, at ECSU, I am involved in the Center of Excellence in Remote Sensing Education and Research (CERSER) program, directed by the principle investigator, Dr. Linda B. Hayden. The goal of this program is to develop and implement innovative and applicable education and research collaborations centered on ice sheets, coastal, ocean, and marine research. By being a part of the CERSER program I have been able to gain skills that I can use in future internships that I take part in.

During the academic year 2014-2015 at CERSER, the project I participated was titled “Enhancing Parent Involvement in NC-CCSS for K-5 Mathematics at P.W. Moore Elementary School” with the advisement of my mentor Dr. Darnell Johnson. In this project, a workshop was provided to assist parents with a better understanding of the homework assignments based on the North Carolina Common Core State Standards for K-2 Mathematics. Parent involvement is defined as parent participation in the educational processes and experiences of their children. A chi-square analysis was used to analyze data collected from a pre-survey and post-survey administered to participants in the workshop. The study revealed all of the individual components of parental involvement were positively and significantly related to educational goals. The study identified aspects of parent involvement that yielded statistically significant results in affirming that parent involvement attributed positively to urban student achievement. These findings were particularly helpful for indicating which kinds of parent involvement influenced academic success. Remarkably, parent expectations and styles demonstrated a strong relationship with scholastic outcomes. Parent expectations and styles created an educationally oriented ambiance that established an understanding of a certain level of support the child needed to succeed academically.

My first summer internship was the Watershed Watch at the campus of ECSU. During this internship, my mentor was Dr. Annette Schloss from the University of New Hampshire, along with the help of Dr. Barrett Rock. The project was titled: “The Effects of Campus Development Affects Forest Growth.” In this project, we learned about canopy cover. Canopy cover is the percent of a fixed area covered by layers of branches and foliage at the top of a forest's trees. It is an indicator of how healthy the trees are in an area. We hypothesized that using canopy cover would be effective to compare forested areas on campus in undeveloped areas (such as the Outdoor Classroom) and areas surrounded by roads and parking lots. We also wanted to test different methods of measuring canopy cover. Trees are important in developed and urban areas as sources of shade, and other factors. Based on earlier research we knew that trees needed room to grow and could be deprived of oxygen and water due to competition from other trees. Also, we understand that the tree's roots need a source above the ground to collect water.

After the Watershed Watch, I completed the Research Experience for Undergraduates in Ocean, Marine, and Polar Science (REU). During this summer internship, I worked with Dr. Darnell Johnson, along with the Research Experience for Teachers Team (RET). The team collected data and compiled it with data from a 2012 research project. The data was used in testing how the seventh grade students performed during the common core pre and posttests. The title of the project was Using Common Core State Standards for Seventh Grade Mathematics in the Application of NXT LEGO® Robotics for CReSIS Middle School Students. With the pre-test, the team did not give the students any instruction. The team then gave instruction to the middle school students followed by a posttest. The instruction proved to increase the student's understanding of the content.

In the summer of 2015, the next internship I participated as a student researcher, volunteer at NASA Langley Research Center (LaRC) in Hampton, Virginia. During this volunteer experience, my mentors were Dr. Gamaliel Cherry and Katrina Young. The two main projects that I participated in were NASA Langley Research Center (LARC) Day of Education and YOUth Day. I also had training on how to conduct hands-on science, technology, engineering, and mathematics (STEM) activities with K – 12 educators and students using NASA's Rockets to Race Cars program. As an education major, this experience opens a door to show different activities that can be used in and out of the classroom.

LARC's Day of Education is a program that allows LARC employees to volunteer their time and expertise to talk with students about the value of education in science, technology, engineering, mathematics (STEM) and many other fields. If invited to do so, they may also discuss their work and answer questions about

NASA's mission in aeronautics, exploration, and science. Part of my project for Day of Education was to identify potential partners and companies that offer programs like and/or similar to Day of Education and to collect data about surrounding school systems. Day of Education is a chance for K – 12 students and teachers to learn more about NASA and see that there is more to its inner workings. This event is also a way to enhance communication among educators and community leaders.

My next project was LARC's YOUth Day. It was a one-day event that allowed NASA employees to bring their youth (i.e., family members and friends aged 5 – 17 years old) to the Center in order to spend a day touring NASA facilities and participating in educational activities in the Integrated Engineering Services Building with other youth. YOUth Day is a way to inform youth about NASA and encourage them to pass on what they have learned to others during their school year. My responsibilities included getting the word out about the event through internal communications using web-based @LaRC advertisements. This is an online tool to post information about what is happening, when, and where. This is also how we gave out information to request staff and students to volunteer their time as a tour host, information booth helper and greeter/host. I also created a PowerPoint presentation that was used to share logistical information with all volunteers who were participating in the event. Lastly, I prepared materials that were to be handed out to the youth day participants during the event.

Following summer of 2016, I interned at NASA LaRC in Hampton, Virginia. During this internship experience, my mentors were Dr. Gamliel (Dan) Cherry, Dr. Erica Alston, and Mr. Michael Perri. I had three goals during that summer to research potential 360-degree videoconferencing cameras, documenting the location of the audio and video and creating a Google Maps of location that the Office of Education (OEd) visited.

My work with Mr. Perri involved documenting the location of audio and visual equipment throughout the video production area. This is done yearly as part of the Digital Learning Network (DLN)™ inventory process so that the DLN™ knows what equipment it has and where it is located. For Dr. Cherry, I worked on looking up different types of 360-degree videoconferencing cameras. By using 360-degree cameras the DLN™ can effectively use one camera in the center of the room and do video conference calls without having to mount multiple cameras.

My work with Dr. Erica Alston, included analysis of the Science, Technology, Engineering and Mathematics-Engagement (STEM-E) and Educator Professional Development (EPD) activities using Excel and Google Maps. I created summary graphs that show the frequency of the activities by name, longitude, latitude, and participation type for student, parent, teacher and public. Using this same data, I created a Google map that geographically displays STEM-E and EPD activities in the Office of Education (OEd) 5-State region. These maps showed the range of times Dr. Kim Brush visited those areas, the number of participants, and what states were visited. The purpose was to see what locations were visited and how often. This allowed for Dr. Brush to know what areas to target in the future.

Summer of 2017, I interned at Rochester Institute of Technology, in Rochester, New York. My mentors were Dr. Ben Zwickl and Dr. Anne Leak, while working with them my task was to use interview data that was taken from different optics and photonics employees to look at how the employees perceive and valued the math that was done in the workplace. This involved using a coding program called NVivo to be able to look through each interview where math was stated, what the interviewees defined as math done on the job and how previous learning helped with that. From this information we were able to see how math is used in different jobs like optics and photonics and how education learned in high school to career helps the employees fill prepared.

For the future, my goal is to further my education by obtaining a Master's and a Doctorate Degrees in Mathematics Education field. I plan to utilize the skills that I have learned from internships and mentors to spread STEM education to the next generation of youth that are coming up after me.