In the sixth grade, I was separated from my "normal" class and placed in a math and English class for the talented and gifted, aptly named TAG, with six of my Caucasian peers. Upset and lonely culturally, I begged my mother to put me back with my friends where I thought I belonged; the begging was in vain as I remained for two years in a class that was designed to test me academically and socially. A self-proclaimed master of math at that point, I assumed this class would be a breeze as my other classes had been; I was wrong. The class acquainted me with more challenging math at a quicker rate than before. As a student who previously finished work early and became bored quickly, I was introduced to new material that challenged me, held my attention and intrigues me until this day. Though most of my old friends despised math and would have left the class, the demanding work made me love math all the more. As a result, I began to seek challenges and desired to be different. With my love for math, coupled with an infatuation with computer technology, I sealed my fate as early as the seventh grade; I knew I would be a computer engineer. In May 2013, I received my Bachelor of Science in Computer Engineering from North Carolina Agricultural and Technical State University (NC A&T), bringing me one step closer to actualizing my twelve year-old dreams. While at NC A&T, numerous successful experiences with research and tutoring influenced my goals to grow beyond becoming an engineer to wanting more African Americans and females to share my love for math and science and to achieve their dreams in STEM fields. As a result, I decided to pursue a PhD in Human Centered Computing with the intent of increasing the quantity of African Americans and females in the STEM field by intertwining my loves of math and the arts.

I was afforded my first opportunity to help African American students as a participant in the NSF sponsored North Carolina Louis Stokes Alliance for Minority Participation (LSAMP) program. This program aims to amplify the quality and quantity of underrepresented groups in the STEM field pursuing graduate studies. Under the supervision of Dr. Christopher C. Doss, I worked during my junior and senior years with the Tutalege program. Tutalege, which began development in 2011, is designed to combat low retention rates at historically black colleges and universities (HBCUs) by using active learning that matches student learning styles to engage students and self-assess their comprehension through subject matter practice questions primarily on mobile devices. The choice to implement the system on mobile devices was to improve student engagement, interest and generate rapid feedback for instructors.

Initially, I focused on the server side of the program; we proposed to have the server send questions to the client's device using the MySQL database system. By the end of the semester, I was able to update the database on the server from the client using socket programming. During my senior year, I switched my focus to the client side of the system and used XML to transfer the data (question, answer choices, possible images/audio) to the client. We presented our progress at the NC OPT-ED Alliance Day at North Carolina State University, along with others within the NC-LSAMP program in October 2012. As an NC-LSAMP participant, I was introduced to the fundamentals of research, met with my advisor weekly and presented progress reports monthly amongst the rest of my cohorts. The weekly meetings, which may have been viewed as micro-managing and excessive by others, motivated me to meet the goals set each week and illustrated the rigor and structure required to be successful in scientific research.

I further applied my research and development skills during summer 2012 as a participant in the Summer Undergraduate Research in Engineering/Science (SURE) program at Georgia Tech and received my first big push to pursue a PhD. Along with providing a meaningful research project, the program provided multiple opportunities to network with current graduate students who gave extraordinary insight into the graduate school experience. Under the guidance

of Dr. Ayanna M. Howard in the Human-Automation Systems (HumAnS) Lab within the School of Electrical and Computer Engineering, I again found myself helping others through research. My project was to create a low cost virtual reality simulator for training medical students on the cholecystectomy, the gall bladder removal surgery, at Grady Trauma Hospital. The project was developed due to the recent rise in using virtual reality in simulating surgical procedures and the positive effects it has had in improving surgical skills. This inexpensive simulator incorporated the use of the Microsoft® Kinect for Windows' motion sensors, which monitored the user's movements, and the Nintendo® Wiimote, which generated haptic feedback. The system guided the user through five steps important to the procedure with on-screen directions and visuals, as well as haptic feedback when each task within the step was completed. Haptic feedback is vital in education and simulation tools because not only does it give the user a sense of satisfaction, but also increases the sense of reality. The Wiimote vibrated when the tasks were accomplished and also functioned as the surgical instrument, changing its image visually depending on what was needed for each stage. The simplicity and inexpensiveness of this Kinect-based simulator could potentially allow more medical students access to training for a variety of surgical procedures. The Kinect provides increased opportunities to not only engage medical students, but STEM students as well. NASA currently utilizes the Kinect in Project KEWL, which piques young students' interests in space-related science activities. My research proposal will show how I intend to use Kinect to get younger students excited about STEM by simulating a familiar dance environment and intertwining it with math concepts.

I continued to work to create technology designed to improve life experiences as I transitioned to pursing a doctoral degree at Clemson University, under the advisement of Dr. Juan E. Gilbert. I am currently a member of a project, that is partnering with a non-profit research and development consortium, which aims to study gestural interaction in order to create a television interface. This project seeks to enable a wide range of television users, especially those with limited mobility, to access their devices with the use of gestures. A user study was completed in Spring 2014 to detect the most commonly used gestures to control over 20 functions on a smart television. The study was simulated using the Wizard of Oz method. Once the study participant completed a gesture, an experimenter used a Powerpoint presentation linked to a TV monitor to simulate feedback that corresponded to that action. Our team, now at the University of Florida, is currently designing the interface as well as implementing the system. We hope to expand on the study and include participants outside of the college age group, including children, the elderly, the disabled and people from non-Western cultures. By analyzing the gestures of these other groups, we hope to create a truly universal, and perhaps multi-modal, design.

In addition to increasing my research skills as an undergraduate, I continued to develop experiences to see the importance of scientific communities and academic support in decreasing the effects of the often isolating experience of pursing STEM degrees. I developed these experiences by participating in multiple programs where I worked closely with students. The most significant experiences were as a member of the Honors Program, the assistant treasurer of the National Society of Black Engineers (NSBE), the programs chairperson of the Institute of Electrical and Electronic Engineers (IEEE), a supplemental instructor for Calculus I and as a peer tutor. My membership with NSBE allowed me to participate in a Pre-College Initiative Day. This event welcomed hundreds of middle and high school students to our campus for an all-day program that introduced them to different aspects of engineering with hands-on engineering

activities. I was fortunate to work at different activity booths, personally assisting the children in understanding how science and engineering affects the world around them.

I was also required to participate in the Honors Program as a stipulation of being a full scholarship recipient in the Lewis & Elizabeth Dowdy Scholar program. As an Honors student, I had the opportunity to volunteer with Operation Homework, a program that offers free tutoring to elementary and middle school students at a local church. For two years, I was also an on-campus mathematics and chemistry tutor for the Center of Academic Excellence. Through both tutoring experiences, the intrinsic reward that I received when a student successfully solved a problem or finally had that "Aha!" moment has motivated me to do my part to increase the presence of minorities in the STEM fields by becoming a university professor. Though there has been slight progression, the number of minorities in engineering is low. In 2010, only 4.1% of approximately 80,000 students earning bachelor's degrees in engineering were African American. This low percentage of participation could be a result of numerous factors including lack of awareness, lack of interest, poor academic preparation, and/or lack of motivation. I have also served as a tutor in a public school system, which predominantly consisted of African American students who were primarily from low-income families. The happiness and enthusiasm the students displayed when they were able to complete a simple math problem, after a little push, showed me the difference a small amount of encouragement made. After becoming a professor, I desire to establish non-profit STEM centers for underprivileged minority youth.

I plan to name my non-profit STEM centers DREA(M)^2 TEAM (Developing Richly Educated and Ambitious Minority Minds by Teaching Engineering and Mathematics). While I was the lone African American female in my gifted class, the DREA(M)^2 TEAM centers will be a home for all low-income gifted and talented students, with a focus on the underrepresented in STEM, to collectively explore and fall in love with math and science. The centers will provide homework help, in addition to offering stimulating hands-on math and science activities designed to pique interest as early as possible. Outside of the intended purpose of getting minority youth more interested in the STEM field, I also want the centers to serve as safe havens, where kids enjoy coming to rather than feel forced to attend. I intend to use these centers as beacons, within communities where the minorities are the majority, that will introduce young people to the branches of STEM and give the youth a motivating 'push' to enter the fields of science, technology, engineering and math. If successful, I would like to reach across socio-economic status lines and expand into reaching minorities in more affluent neighborhoods. While these students may have access to more technology, the cultural isolation can still exist, as it did in my case.

I believe that I am an exceptional candidate for the National Science Foundation Graduate Research Fellowship. My aspirations and objectives align with the goals of the agency. I am ardent about increasing the quantity and quality of African Americans and women interested in the STEM field. The techniques I intend to optimize will be useful in many STEM disciplines, such as computer science, math, chemistry, and physics and will be applicable to all pre-collegiate grade levels. My research aims to assist in stopping the leak in the STEM pipeline for minority students by improving academic performance and changing how concepts are reinforced in the classroom. With determination and the funding provided by NSF, I will be able to reach out to these minority groups and democratize the statistical makeup of scientists, engineers and mathematicians.