

## Final Paper

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## **Introduction**

Science, technology, engineering, and mathematics, also known as STEM, is one of the most important fields of study that allows us to gain a much better understanding of the world around us. STEM also allows us to further advance society through those four aspects. The primary reason why I chose to complete my internship at the Brooks Crossing Innovation Lab in Newport News is because I felt that it would help me gain a better idea of many different areas of STEM, including Cybersecurity, which is my field of study. Before I applied for the internship at Brooks Crossing, I learned that there were a lot of machines and technology that I had never gotten my hands on before, so I figured this would be the perfect opportunity to learn about them and how to use them.

I also decided to apply for this internship because I saw it as my prime chance to jumpstart my professional career. Before starting this internship, I had absolutely zero professional experience, apart from a part-time job working as a soccer referee. While applying to numerous different internships related to my field of study, and consistently getting either rejected or not hearing back, I started to get worried that I might not get an internship. That is finally when, after months of trying, I finally got accepted to intern at Brooks Crossing.

Along with this internship giving me the opportunity to begin my professional career, I also saw it as a chance to develop my professional skills that I was not as proficient in before. Some of the skills that I value the most include communication, leadership, problem solving, and adaptability. I feel that my time at Brooks Crossing was able to help me in further developing those skills. Without further ado I would now like to tell you about my time working as an intern at Brooks Crossing Innovation Lab!

## **Beginning of Internship**

My first day of the internship at Brooks Crossing was on June 3<sup>rd</sup>. Immediately upon entering the building, I observed a wealth of technology, including machines that I had never seen before like 3D printers, direct-to-garment (DTG) printers, and laser cutters. The Brooks Crossing Innovation Lab is a building located in Newport News that recently opened in 2019 thanks to funding from the city of Newport News, the Newport News Shipbuilding, and Old Dominion University. It contains a STEM lab with a wide variety of machines and technology. Typically, the purpose of the lab is to breed collaboration of all ages and fields of study to be innovative and to solve problems in the real world. Brooks Crossing Innovation Lab also gives people the opportunity to see what it is like to work in the STEM field.

Going back to when I first arrived at Brooks Crossing Innovation Lab, I was immediately greeted by a fellow intern who had already been working there. I learned that not every day is completely busy, as the lab was rather quiet that day. Since it was my first day, I was given a tour of the building, as well as observing all the interesting machines and

technology that could be used. I learned that there are events held at the lab called open makerspaces, in which anyone can come in and learn about the technology and machines and get some hands-on experience. Also, throughout the internship, Brooks Crossing hosted numerous field trips and summer camps in which they could also utilize the machines and technology. Along with the tour of the building, I received my first task quickly, which was to see if these coding devices called micro:bits were functional so that they could be used by the students. I had never used one of these before, but it was fairly simple to learn, and I was able to get the micro:bits to work. It felt fulfilling to be put to work on my first day of the job and even more fulfilling to complete it.

My initial reaction on the first day of the internship was that I was extremely interested in being able to learn how to use all the machines and technology so I could be able to help others as well. With all the technology that is available at the Brooks Crossing Innovation Lab, it really was evident that this place does innovation. There are so many things that could be done at this place that I would be surprised if somebody came out of the building not learning something new. I was also excited to put my innovative mind to work as well as collaborating with my fellow innovative interns!

### **Management Environment, Acts of Supervision, and Effectiveness**

As I mentioned earlier, the Brooks Crossing Innovation Lab breeds innovation, and the way that the management is structured is no different. The management here is extremely well-run, and they make sure to get the most out of their interns as well as their students. At Brooks Crossing, also known as the iLab, we are given the freedom of being able to use the machines and technology in order to create what we desire. Along with that, we are also tasked with completing projects, whether that be using software to 3D print, or use the DTG printer to print shirts. The management, along with the more experienced interns, were able to give me a clear sight on what needs to be done around Brooks Crossing.

At Brooks Crossing, all the interns are well supervised by management, making sure that we complete our projects, as well as offering help to us if we are stuck. The management here also seeks active cooperation from all the interns. They are also here to answer our questions about things that we might not be sure about. At the start of the internship, we all were tasked with learning how to use certain graphic design software, like Canva, Tinkercad, Bambu Studio, and the DTG printer so that we could be able to help the students with using these machines. We were provided with a Google Doc listed with all the tasks that needed to be completed, and I filled it out as the internship went on. The management at Brooks Crossing also values the feedback of their interns, asking what improvements could be made, and what about the internship is already proficient. This allows for the improvement of not only the management, but also the interns.

Not only does the management help with the interns, but they also help with their students. They do this by hosting things such as the camps, field trips, and the open

makerspaces. The management also gave us ample opportunities to help out with all of these events. Along with that, the management at Brooks Crossing provides us with all of the resources necessary in order to be successful. While the internship at Brooks Crossing does allow us a lot of freedom and flexibility, there is still plenty of structure in order to make sure that we are working at our best.

### **Major Work Duties, Assignments**

At the Brooks Crossing Innovation Lab, my role is Program Assistant. As a Program Assistant, my job is to provide support to management, as well as the other interns. Another role of a Program Assistant is to prepare materials and resources for upcoming projects and events. My first major project as a Program Assistant at the iLab was to set up and prepare for a STEM summer camp. This camp contained over 50 students, which made for a rather busy day. For the first half of the day, I, along with another intern, gave a presentation on graphic design and how to use Canva. The campers used Canva to make their own personalized t-shirt designs, which were then printed on the DTG printer. During the second half of the day, we taught the campers a little more about graphic design. However, this time, we taught them how to use Tinkercad, which is a 3D design software. The campers followed step-by-step instructions on how to create a flowerpot that would then be printed on the 3D printer. I was able to help the campers with any questions that they had, like how to properly navigate the software. This camp lasted the full day, so it truly felt fulfilling. My helping with this camp is absolutely vital to Brooks Crossing for one major reason: it helped the students be innovative, which is the sole purpose of the iLab. The purpose of helping others be innovative will be a common theme throughout every project.



Helping students with graphic design in Canva.

That same week, there was an open makerspace which consisted of the same activities as the summer camp. The management and interns helped attendees with using Canva to make their own personal designs. Only this time, along with the t-shirts, they were also allowed to make designs for handbags and pencil pouches.

The next big event that took place was a camp centered around robotics through the Great Opportunities in Technology and Engineering Careers, also known as GO TEC. This camp lasted the whole week, and I was tasked with mentoring the campers, along with setting up and cleaning up. During this camp, the campers were able to follow step-by-step instructions on how to build VEX IQ Simple Clawbots, which are remote controlled robots. Throughout the week, the campers were tasked with using their robots to organize blocks, as well as play soccer with them.



Simple Clawbot Soccer at GO

The one task that I spent the most time doing was checking to see what technology and machines stored away were still functional. Some of the items in the closet included speakers, 3D printers, virtual reality (VR) headsets, laptops, scanners, etc. We were able to get a lot of the devices working, but there were instances where we had no luck. The most important task that I had during my time at Brooks Crossing was to ensure the safety of all the attendees. The equipment that is found at Brooks Crossing is rather expensive, and if not properly used, they could break. It was my responsibility to properly instruct guests on how to use the equipment in a safe manner.

To summarize, all of these tasks and projects that I mentioned are vital to the purpose of the Brooks Crossing Innovation Lab. Innovation allows people to go the extra mile in creating what they want in order to help better society. It was important that I learned how to use a lot of the equipment myself, and it was just as important that I was able to educate others on how to use it.

### **Use of Cybersecurity Skills, Knowledge**

While Cybersecurity was not the primary focus during my time at Brooks Crossing Innovation Lab, I feel that I was still able to implement my knowledge of the field into the internship, as well as gain some new understandings and skills. I had learned a lot about Cybersecurity during my four years at Old Dominion University, but I have never really been able to apply my knowledge to real world situations. However, when I was first able to get to know the other interns, I learned that some of them were also in the Cybersecurity field. We discussed things like Cybercrime, Artificial Intelligence (AI), real world issues with Cybersecurity, and the types of certifications needed, among other things. It was through these discussions that I decided to work towards getting my first Cybersecurity certification in CompTIA Security+. During my free time and days off, I started to watch study sessions in order to be refreshed on certain Cybersecurity topics. I have made excellent progress and I plan on taking the exam soon.

One major project that I did take part in related to Cybersecurity was a Cybercrime camp. This camp lasted three days and gave the campers an introduction to criminal investigations and digital forensics. For the first two days of camp, the campers were separated into groups and were tasked with solving criminal cases. They were provided with evidence, both physical and digital, and used what they learned to figure out the suspects. Going back to the Micro:bits, these coding devices can be used to make designs, sound meters, switches, and many other things. The code can be made through the Python programming language. On the last day of the camp, the students were tasked with creating their own criminal investigations, and they were able to use the Micro:bits.

After completing this internship at Brooks Crossing Innovation Lab, I was able to understand how much involvement Cybersecurity has with the real world, even with



professions not directly related to Cybersecurity. From making sure that the machines like the 3D printers and the laser cutters are secure, to making sure that the software is safe to use, to protecting the data that is stored on all of these devices, I now have a much better understanding of the importance of Cybersecurity.

### **How Did ODU Help Me?**

I feel that Old Dominion University was able to greatly prepare me for this internship at Brooks Crossing Innovation Lab. My role as a Program Assistant required me to recall the skills that I had developed during my four years at ODU. Some of the skills I developed that I feel contributed most to my internship were critical thinking, problem solving, and technical skills. Not only did my academics and skills at ODU help me during this internship, but their support played a major role in helping me secure the internship in the first place, since it was a long and difficult process in getting one.

As a Cybersecurity major, I was required to do a lot of hands-on work that made me put a lot of extra thought into it. For example, I was required to use a lot of Cybersecurity software and operating systems, namely Windows and Linux. Using all the different types of Cybersecurity software also helped me learn how to properly secure these systems, which is where the problem solving and critical thinking comes into play. I had to greatly use both of these skills during my internship. Learning how to use all the machines and equipment required a lot of critical thinking, as I had no familiarity with any of it. Also, with making sure that the equipment is functional, and if I ran into an issue, I would have to implement my problem-solving skills to resolve it.

When I first started the internship, I was pleasantly surprised to learn that there were some things that I was already familiar with from when I was learning at ODU. Learning how to manage software was something that I spent a lot of time doing in my curriculum. I truly enjoyed being able to observe something during my internship and then saying, “wow, I remember doing these kinds of things in my coursework!” When I was working with the Micro:bits, I had recalled my previous experience with using Python so that I could make some interesting designs.

There was one thing in particular that I viewed as a new concept, which was being able to learn about all of the new machines and equipment like the 3D printer and the laser cutter. Though not directly related to my Cybersecurity major, it was nice to learn new things and expand my horizons.

### **Fulfillment of the Internship**

- 1. Learn about the different aspects of STEM:** I feel that my time as a Program Assistant at the Brooks Crossing Innovation Lab gave me a new and improved understanding Science, Technology, Engineering, and Mathematics as a whole.

Being able to learn about all the different types of technology that I had not interacted with before gave me a lot of new ideas on how things can be done.

2. **Begin my professional experience:** I would say that interning at the Brooks Crossing Innovation Lab was an excellent way to start my professional career. I was given plenty of tasks during my time here, and even though it may have been difficult at times, I was still able to get everything done. Also, working at the iLab gave me a good idea of what a typical day of work can be like, since I have no prior experience.
3. **Develop professional skills:** I believe I was able to develop some professional skills that I already had before. However, on top of that, I also feel like I was able to learn some new skills. Adding on to my capabilities of critical thinking and problem-solving, I also feel like I gained a bit of experience in my leadership. Being a person that people can look to for help is a great thing to be capable of and being able to help with some of the camps and open makerspaces definitely helped with that. Another skill that I greatly developed while here was adaptability. Being at Brooks Crossing was a completely new experience and environment for me, so while I wasn't too sure of what was going on when I first got here, I feel that I was able to quickly adapt.

Overall, I believe that of all the learning outcomes, I was able to fulfill all of them. I set out to do all of these things and now I feel ready to expand on them once I start my first job.

### **Most Exciting Aspects of Internship**

While interning at the Brooks Crossing Innovation Lab, there were a lot of exciting things that I was able to experience. First, having access to all these new machines was something I was not expecting when I first started. I was truly excited to use these machines not only for my own personal use, but also to help others in making their own creations.

The next exciting aspect of being at Brooks Crossing was being able to collaborate with fellow interns from ODU, and more specifically those in Cybersecurity. I enjoyed learning new things from each intern, as well as being able to share some expertise of my own. It was also rather nice for us to put our innovative minds together and be able to inspire attendees to be innovative themselves.

One last aspect about completing this internship that truly excited me was to finally start my professional career and gain some experience and skills. I will always be thankful that I was able to start my career at a place like this, with so many different possibilities and ways to be innovative. It was nice to become proficient in some of the technology here, which really made me feel more skilled than I was before.

### **Most Discouraging Aspects of Internship**

While this internship was a wonderful experience and helped me learn a lot of new things, it was not always perfect. One of the most discouraging aspects of working at Brooks Crossing Innovation Lab was when I was tasked with something and had a hard time figuring it out. A lot of the tasks that I was given felt rather tedious, and I would run into a lot of issues that required me to restart. The longer that they would go on, the more stressful that they would become. There were also times when I was tasked with multiple different things at once, which added on to the stress. Typically, I like to focus on one thing at a time, so when I have a little too much on my plate, it can get a little overwhelming.

As difficult and stressful as these things were, I feel like they were able to help build my abilities, as well as personal growth, specifically with never giving up. No matter how difficult a task was, I always stayed determined and laser-focused on getting it done, no matter how long it took. I was also able to get these tedious tasks done thanks to the help of my fellow interns, who were able to help me if I had trouble with something.

### **Most Challenging Aspects of Internship**

For me, one of the most challenging aspects of being an intern at Brooks Crossing Innovation lab was having to quickly adapt. When I led the camp on graphic design, I had only been there for a short period of time, so I had to quickly learn what the presentations were about and how to help the students use Canva and Tinkercad. I am glad that I was able to develop this skill because adaptability is extremely important in any professional setting. Another challenging aspect was learning about all of the different equipment and machines. Not knowing anything about any of the equipment certainly had me worried that I would never be able to learn how to use them. Fortunately, I worked with a great group of people, so they were able to quickly and effectively teach me about all of them. The last challenge for me was having to learn about so many projects in such a short time. It was a lot to handle at first, but I feel that it is going to help me in the long run.

### **Recommendations For Future Interns**

I would like to list out a couple of things that future interns could do so they are best prepared should they also intern at Brooks Crossing Innovation Lab:

1. **Be prepared:** Should you be provided with information on what it is you doing in the internship, please make sure to look over the material. There are a lot of things that you will be learning at this internship, so it would be best to get ahead of schedule when you first start.
2. **Reach out:** If you are working on a task or a project, and you happen to have trouble making progress, do not be afraid to ask for help. There are some helpful and knowledgeable people who work here, and they would be more than delighted to help you out.
3. **Manage your time:** Since you will be given numerous tasks and projects throughout, it is important to have good time management. Sometimes the days will

go by quicker than normal, it may feel like you didn't achieve your goal of what you wanted to do that day.

## **Conclusion**

Nearing the end of my internship at Brooks Crossing Innovation Lab on August 2<sup>nd</sup>, I am super glad that I was able to do it. This internship helped me in more ways than I can count, so I'll list a couple of reasons. First, Brooks Crossing was the perfect place for me to start my professional career. With the wide variety of technology and equipment, as well as the bright minds that are around me, I feel like I was able to experience a spark of innovation. Learning a little about STEM certainly provided me with a great wealth of knowledge.

As for how this internship will influence my remaining time while at Old Dominion University, I cannot really say that I have an answer to that because this is my last semester, as I will be officially graduated in August.

Since I am graduating very soon, I will have to instantly use this experience for when I get my first job in the Cybersecurity field. I feel that completing this internship at Brooks Crossing Innovation Lab gave me a glimpse of what the professional world will be like. Also, this internship gave me some insight into what the STEM field is like as a whole. Cybersecurity can be vital in virtually any STEM field, so expanding my horizons will give me an opportunity to apply for even more jobs.