Helena Trent

Brooks Crossing Innovation Lab

CYSE 368

Summer 2024

Jul 29, 2024

Table of Contents

Introduction

After a thorough search for internship opportunities, I decided to complete my internship at Old Dominion University's Brooks Crossing Innovation Lab. I selected this position because the roles and responsibilities outlined in the description seemed like a good match for my interests and career goals. My primary objective for the internship was to gain practical experience in cybersecurity. Although my coursework provided a solid foundation, I believed that hands-on experience would deepen my understanding, as I learn best through real-life applications. Additionally, I aimed to develop professional networking skills, as I had never worked in a formal office setting and was eager to navigate a new work environment while building connections with supervisors and fellow interns. Lastly, I sought to familiarize myself with makerspace equipment, an area in which I had no prior experience. My goal was to learn about and work with this technology, expanding my skill set. Throughout the internship, I succeeded in meeting some of these objectives and discovered new interests along the way.

Initial Impressions

The Brooks Crossing Innovation Lab, better known as iLab was opened on August 24, 2019 in Newport News, Virginia minutes away from downtown. This outreach center for STEM learning allows people of all ages, abilities, and backgrounds to have opportunities to learn about design and creative solutions that they can transfer to the real world (*Brooks Crossing Innovation Lab*). The iLab is known for family makerspace nights held on Thursdays. Families can RSVP online to come in and participate in design activities. Newport News is classified as a low income area, so one of the goals for the iLab is to make events as cheap as possible for families to attend. This is done through grants, during my time at the iLab all of the makerspace nights have been free of charge. Additionally, the iLab and attached GoTech lab work closely with

Newport News public schools to coordinate summer camps and field trips. These camps have themes and some are open to the public, not just those within the city. Cybercrime, robotics, and the maritime industry have been a few of the themes for the camps.

The iLab is home to some quite interesting equipment including 3D printers, robots, laser cutters, garment printing machines, micro bits, and more. The GoTech lab also houses additional equipment such as microscopes and welding simulators. There is also an array of different tools available for makerspace nights and equipment repair. Majority of the equipment in the iLab has been donated to ODU for the purpose of community enrichment.

When I initially accepted the position at the iLab I did not know what to expect. Even after the zoom onboarding meeting I was still a little apprehensive. On my first day I took a tour of the lab and learned about all the equipment. I was given videos to watch so that I could get familiar. While at the time it seemed tedious the videos were very helpful and informative. Even weeks after watching the videos I was recalling the things that I had learned and applying them. From the start I could tell that the internship was meant to be self driven and that it was on me to take initiative to expand my knowledge and explore the iLab which made me very excited.

Management Environment

Overall the management environment of this internship has been very relaxed. The program manager and graduate assistant do the bulk of supervisory work for the interns. The program manager for the iLab usually sends out an email with a list of tasks or tells us what needs to be done for the day once we arrive. The team of interns that I worked with were proactive so we did not have any issues of things not getting done. We also utilized an intern task sheet that was used to keep track of machine maintenance and training activities which was very helpful. This management structure proved to be decently effective for the nature of this

internship. Allowing us to read over tasks before busy days really helped know ahead of time where I was needed and provide guidance to guests. I appreciated the management environment and that it was not overbearing.

Major Work Duties

From my first day, it was made clear to me that work duties would vary depending on the day and what was going on around the iLab. Machine maintenance was managed by the intern team, which played a crucial role in the lab's operations. During my internship, I assisted with a variety of tasks, including cleaning, troubleshooting issues, contacting manufacturer support for technical assistance, and changing parts when necessary. This hands-on experience not only enhanced my technical skills but also taught me the importance of proactive problem-solving and teamwork.

Since the machines in the iLab are used frequently for various projects, it is vital to perform regular maintenance to keep them running smoothly. Cleaning the printing plates was the most frequent task for machine maintenance. While this was a quick fix for a lot of issues, it was our job to research the proper cleaning techniques to prevent unnecessary damage to the printers. This preventative care is essential to avoid disruptions that could delay or halt important projects. In addition to maintenance, I often collaborated with other interns and staff to ensure that all equipment was functioning correctly and safely. This collaborative effort was key to maintaining a productive and efficient working environment

In addition to preventative measures, I also assisted with fixing broken machines around the iLab. I changed parts and disassembled components when necessary (see Appendix B). Since the iLab only has a small number of employees there is usually not a lot of time to spare for the program manager to fix these issues on her own. Additionally, calling out a professional for

every minor inconvenience is neither time nor cost efficient. My role in addressing these technical issues was therefore critical in ensuring the smooth operation of the lab.

By taking on these repair tasks, I not only helped maintain the functionality of the lab's equipment but also relieved some of the pressure on the program manager, allowing her to focus on higher-level responsibilities. This hands-on experience deepened my understanding of the lab's technical infrastructure and enhanced my problem-solving skills. It was particularly rewarding to see the immediate impact of my work, as fixing these machines directly contributed to the continuity of important projects.

I also played a key role in the events held at the iLab during my internship. My responsibilities included helping set up and clean up camps and makerspace nights, which were essential for creating an engaging and organized environment for participants. Setting up involved arranging equipment, preparing materials, and ensuring all technology was functioning correctly, while clean-up required careful organization and storage of tools and supplies. These events were pivotal in fostering a sense of community and collaboration among attendees, and my involvement allowed me to contribute to the iLab's mission of promoting creativity and innovation.

During the events I often led instructional sessions usually revolving around t-shirt and 3D design. I also led activities revolving around coding, micro bits, cybercrimes, robotics, and more. Due to the number of participants who attended these events it was important to be able to split up groups so that everyone could enjoy a more personalized and engaging learning experience. By leading these sessions, I was able to enhance my instructional and leadership skills, ensuring that each participant had the opportunity to fully engage with the material and gain valuable hands-on experience. When I was not leading I was expected to be available to

help participants who had questions or had fallen behind in instruction to keep the program flowing smoothly. Additionally, interns were available to the GoTech lab whenever they needed assistance with tasks.

On quiet days I focused on smaller tasks that needed to be done around the lab. My first week I inventoried everything in the storage closet in the lab and later labeled and organized. This gave me the opportunity to explore all the technology and to learn where everything was located. We were also tasked with testing all the major technology to decide what is still useful and what equipment is too outdated to be of use. I started off by testing the 3D scanner to suggest programs that could utilize them (see Appendix A). This task was crucial for maintaining the organization and efficiency of the lab, ensuring that we could quickly and easily access the tools we needed for various projects. Moreover, this experience provided me with a comprehensive understanding of the lab's technological capabilities and allowed me to contribute to optimizing the lab's resources.

Applying Cyber Security Knowledge

Applying my cybersecurity knowledge to this internship proved to be a challenging task. I was able to use my knowledge of cybercrime during the short cybercrime camp that was planned by the graduate assistant and ran almost completely by interns. Given that the graduate assistant did not have a background in cybersecurity or cybercrime, I played a role in assisting with the planning and content development for the camp. I contributed by providing input on the relevant topics to ensure that the content was accurate and engaging. During the camp, I was able to share my understanding of cybersecurity principles and cybercrime, including defining key terms and explaining types of cyber threats. I was unsure how the age group would grasp the concepts and if they would be engaged, but to my surprise everything went well. We were able to

communicate the information in a way that was understandable for middle schoolers to ensure they understood the content. It is one thing to acquire information, but I believe it requires a deeper level of understanding to effectively teach it to others. The students were interested, asked questions, and seemed to have a positive experience. This experience allowed me an opportunity to apply my academic knowledge in a practical setting and contribute meaningfully to the educational experience of the participants.

ODU Curriculum

I cannot say that the ODU curriculum fully prepared me for this internship. I used my knowledge of information systems to suggest more efficient ways to share data, such as inventory, with staff at the iLab. I also made connections with my coding courses to assist with micro bit activities. Micro bits are small pieces of hardware that were designed for computer education. At the iLab micro bits are usually used with block coding to teach students a simplified version of coding and the outcome of a successful code. I was able to use my coding skills to assist with these activities and use the micro bits for myself when I had time. Although block coding is different from python they both rely on the same foundational principles. I was also able to try out JavaScript, which I had not encountered yet. Using the micro bits proved to be a fun way to get an introduction to a new coding language. It was rewarding to be able to implement my skills and knowledge in a practical setting and see the core concepts of coding applied across different platforms.

While I also drew on knowledge from criminology, cyber criminology, and information systems to handle tasks, I found that insights from my other courses were not as applicable. Additionally, the learning style at ODU did not fully support my development for this internship. I was used to completing assignments independently and remotely, which limited my

opportunities for collaborative work. As a cybersecurity major, my chances to engage with others were minimal, and I feel I missed out on valuable team experiences. Only having technical knowledge and passing courses is not sufficient to prepare for the real world. As I explore my career path, it is becoming increasingly clear that collaboration is one of the most important skills needed in the field. Additionally, when comparing the ODU curriculum and my experience at the iLab I picked up new concepts and techniques with hands-on experience and practice a lot quicker. The hands-on nature and repetitive tasks really solidified my skills and I now know that is what I need to feel confident in learning.

Outcomes and Objectives

My first objective for this internship was to gain practical experience in cybersecurity. I anticipated that the role would offer hands-on opportunities to apply and expand my knowledge in this area. However, as the internship progressed, I found that I did not acquire new practical experience specifically related to cybersecurity. While this was somewhat disappointing, it was also understandable given the focus and scope of the iLab's work. The iLab's primary emphasis is not on cybersecurity but rather on other aspects of technology and education, which meant that my day-to-day tasks and responsibilities were not aligned with the field of cybersecurity. Although I did not engage in activities directly related to cybersecurity, I was able to leverage some of my existing knowledge to contribute meaningfully to various projects. For example, I used my understanding of information systems to suggest more efficient methods for data sharing and applied my coding skills to assist with micro bit activities. Despite the lack of new cybersecurity experience, these opportunities allowed me to see how foundational principles from my studies could be applied in different contexts. This experience highlighted the importance of aligning internship roles with career goals to ensure relevant hands-on learning. It

also underscored the need for seeking additional opportunities that offer direct engagement with the specific skills and knowledge areas pertinent to my career aspirations in cybersecurity.

My second objective was to develop professional networking skills, an area where I had little experience prior to this internship. Before starting, I had not worked in a formal office environment, so this opportunity was invaluable for gaining insight into the dynamics of a professional setting. Although the iLab is not a traditional office, it still gave me the opportunity to learn how to navigate a workplace environment. Interacting with a diverse group of colleagues, participating in team projects, and engaging in various professional activities allowed me to develop a sense of how different roles and interactions function within a work setting. This experience was instrumental in helping me acclimate to the collaborative and communicative aspects of professional environments, giving me an understanding of how to effectively network and build relationships in future roles. Additionally, my experience at the iLab gave me insight into what I would be looking for in my future job search.

My third and final objective was to learn new technology and I am pleased to say that I have fulfilled that goal. Coming from a rural county I had limited opportunities to attend technology camps and events like those held at the iLab, so I got to experience such advanced technological environments before. The internship provided me with invaluable exposure to a range of new tools and technologies that were previously unfamiliar to me. For example, I gained hands-on experience with 3D scanners, which are used to recreate objects using 3D technology, and I explored various software applications that are pivotal in the labs operations.This experience was particularly significant as it allowed me to engage with technologies that were not available in my previous educational settings. By working directly with these tools, I was able to develop new technical skills and gain a deeper understanding of

how they function in a practical context. This opportunity not only broadened my technological expertise but also provided me with a richer perspective on the field, significantly advancing my knowledge and preparing me for future challenges in technology.

Motivating Aspects

There were several motivating aspects that made the internship a rewarding experience. One of the most significant was the opportunity to connect with coworkers and visitors in the iLab. Building professional relationships with other individuals in the same field provided insights and guidance enhancing my understanding. Since I took mostly online classes while obtaining my bachelors I never had that experience and it was something that I was nervous about when coming into the internship. While working at the iLab I was able to meet people from different backgrounds and educational statuses which expanded my perspective and opened up new avenues for potential career paths. It was motivating to realize that I was able to get out of my comfort zone and talk to new people and have productive, professional conversations. I even have a newfound interest in the maritime industry after speaking with the volunteers from the career fair that was hosted by the iLab.

Connecting with students was another rewarding aspect of the internship. During my time at the iLab I worked with students ages 10-17. Engaging with them and understanding their aspirations and challenges helped me develop better communication and mentorship skills. It also solidified the things that I have been learning at the iLab since I was expected to teach those skills to students. Being able to mentor students and spark their interest in a new field is truly a unique and rewarding experience. Watching them interact with the activities designed for them was encouraging for the whole team since our success depended on students enjoying the camps and activities. I was even able to provide some of the high school camp counselors with some

insight on ODU's cybersecurity program. These interactions not only allowed me to share my knowledge but also to learn from their fresh perspectives and innovative ideas.

Moreover, learning new technology was an exciting and fulfilling part of the experience. Being exposed to cutting edge tools and software enhanced my technical skills and kept me in touch with the latest advancements in the field. After every project I felt prideful of my work. Whether it was solving a mechanical issue or simply finding ways to make the lab more efficient, the process of tackling these challenges not only reinforced my technical knowledge but also allowed me to grow personally and professionally. Each achievement, no matter how small, contributed to a sense of accomplishment and a deeper appreciation for the impact of innovation in our field. working with a diverse team of talented individuals not only broadened my perspective but also made the experience more rewarding, as we tackled problems together and celebrated our collective achievements.

Discouraging Aspects

While there were many positive experiences, there were also some discouraging aspects that stood out. One of the main challenges was that the tasks and responsibilities were not closely aligned with my major. This mismatch often left me feeling underutilized and disconnected from my academic interest especially because I was really looking forward to a cybersecurity heavy experience. Instead of gaining deeper insights and practical skills directly related to my field of study, I found myself working on tasks that, although valuable, did not contribute significantly to my professional growth in my chosen discipline. This disconnect sometimes made it difficult to stay motivated and fully engaged with the work at hand. I would often find myself worrying that I was not getting the experience that I initially expected. Additionally, I was often assigned to work with children, which posed its own set of challenges. Without prior educator training, I did

have some trouble effectively managing and engaging the children, making it difficult to create a productive environment. I was not trained on how to handle behavioral issues or what exactly was expected of me in those situations so I often felt lost which was discouraging. While I did have other people to help me along the way when I did not feel comfortable it was still a challenge. This added responsibility further highlighted the disconnect between the internship duties and my academic and career goals, sometimes making it difficult to stay motivated and fully engaged with the work at hand.

Furthermore, the ambiguity surrounding my role and responsibilities often made it challenging to understand how my contributions were valued and how I could improve. This uncertainty sometimes made it harder to gauge my progress or impact. Despite these challenges, I tried to remain adaptable and open to learning from the experiences, but the ongoing struggle to align the internship with my career aspirations occasionally overshadowed the positive aspects of the experience.

Challenging Aspects

Working at the iLab was full of challenges which were expected. I have never shown interest in engineering or design technology, partially because I thought that it was difficult to do. Learning to work with different software and hardware was definitely a learning curve but as time went on I got more comfortable with learning and trying new things. With that being said, the most challenging aspect was stepping out of my comfort zone to learn new things. I do not describe myself as a particularly creative person and adapting to a field that required innovative thinking and problem-solving was initially daunting.

However, as I engaged with the projects and collaborated with my colleagues, I found that pushing through these discomforts led to significant personal growth. Despite my initial

reservations, I began to appreciate the value of creativity in problem solving and how it could be applied even in areas outside my usual interest and started turning those challenging aspects into motivators. This experience taught me the importance of embracing new challenges and being open to different perspectives, even if they are outside of my traditional skill set. Ultimately, while the process was difficult and at times uncomfortable, it proved to be a valuable opportunity for self-discovery.

Recommendations for Future Interns

For future interns I recommend that they come into the iLab with an open mind and a willingness to learn. This internship is structured with a high degree of flexibility which can be both an advantage and challenge. This less rigid structure may not suit everyone, so it's important for prospective interns to be prepared for a dynamic and sometimes ambiguous work environment.

Before starting, I suggest taking the time to research design technology and familiarize yourself with the equipment used at the iLab. The iLab's website provides detailed information about the major equipment and includes links to resources that can offer valuable insights. Understanding the tools and technologies you will encounter can help you hit the ground running and make the most of your internship experience.

Additionally, I encourage future interns to use this opportunity to explore and experiment with new technology. The iLab offers access to a variety of advanced tools and resources that you may not have encountered before. Embracing the chance to work with different technologies can significantly broaden your skill set and provide a richer learning experience. By approaching the internship with curiosity and a proactive attitude, you can gain practical knowledge and hands-on experience that will be beneficial for your future career.

Conclusion

Overall I can confidently say that I had a positive internship experience at the iLab. The iLab provided a dynamic environment where I was able to both practice teamwork and work independently. Collaborating with a diverse group of colleagues on various projects helped me enhance my communication and collaboration skills, while also allowing me to manage tasks on my own. This balance between teamwork and individual responsibility was instrumental in my professional growth and provided a well-rounded experience.

During my remaining time at ODU I will ensure that I make time to pursue my interest and to further develop my skills beyond the classroom to ensure that I get the experience I am looking for. Recognizing the gaps between my current experience and my career goals, I plan to seek out additional opportunities that will allow me to gain practical experience in areas directly related to my field of study, such as cybersecurity. This might involve engaging in extracurricular activities or participating in relevant workshops.

For my future professional path, I aim to broaden my scope beyond my current specialization. While my focus has been on cybersecurity, the internship exposed me to a variety of technologies and roles within the tech field. As I continue to explore my career options, I am eager to expand my knowledge and skills into related areas such as technology management or design technology. This broader perspective will help me become a more versatile professional and open up new opportunities for growth and development in an ever-evolving industry. The experience at the iLab has been invaluable in shaping my career trajectory and reinforcing my commitment to ongoing learning and exploration.

References

Brooks Crossing Innovation Lab. (n.d.). Old Dominion University. Retrieved July 25, 2024, from https://www.odu.edu/brooks-crossing-innovation-lab

Appendix A

3D Scanned Dragon

This appendix consists of images of a 3D scanned dragon figurine that I made using 3D scanning technology.

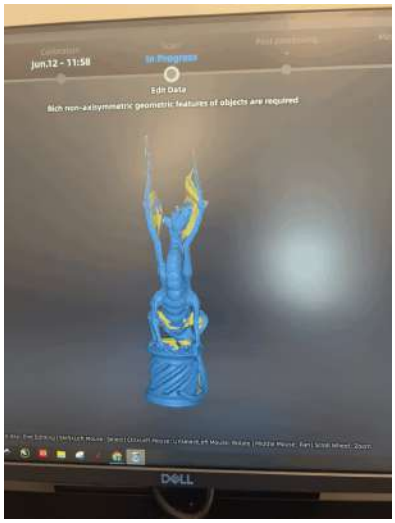

Figure A1. Shows the process of creating the scan and filling in missing pieces and supports

Figure A2. The finished product after I completed the print

Appendix B

Machine Maintenance Tasks

This appendix consists of a few tasks related to the regular maintenance of the machines in the iLab.

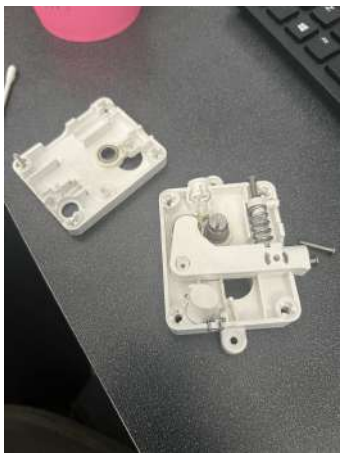

Figure B1. A disassembled material feeder from an older model MakerBot Ultimaker.

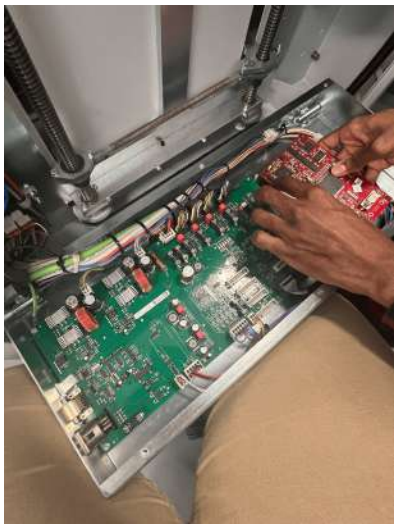

Figure B2. An open side panel of a Trotec Speedy300 laser engraving machine showing the many wires and processors inside.