The Frequency

A McMaster Enginering Society Publication

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Meet Our Team

Frequency Editors

Hello Everyone!
Congratulations on completing the Fall 2020 Term! I know this may have been a challenging one for many of us and I am so proud of how the Fireball community came together to support one another. No matter where you are in the world, I hope you have a safe and relaxing Winter Break and that everyone is energized for the New Year! Our team has some amazing content planned for the New Year and we are excited to share it with the Fireball family. Thank you to everyone who contributed to this edition and happy reading!

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Hey Everyone!!
I hope the fall term, despite all the challenges, was enjoyable and that you are looking forward to a relaxing break with lots of hot chocolate, moving away from screens of all sizes, and spending time with your friends and family while staying safe. It is once again my sincere pleasure to organize Frequency with my talented team, and I look forward to producing more editions in the winter term. Stay tuned and happy reading!!

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Holiday Gift and Activity Ideas for Students

By Elsa Bassi

Virtual school has proven to be challenging for many students this term given the reduced social interaction and monotony of spending significant time online. In an American study examining the mental health of college students during the pandemic, 89% reported difficulty concentrating, 86% affirmed disruptions to their sleeping patterns and 82% stated they felt an increase in concern for their academic performance. In short, if you are struggling you are not alone! More than ever, we need an extended period of time to take a break from screens and schoolwork. The holidays will be this welcome opportunity, giving everyone the chance to relax, connect with family and friends and catch up on sleep!

MES

The MES has several long-standing traditions centered around the holidays, such as the participation of the Red Suits in Hamilton's Santa Claus parade, which is unfortunately cancelled this year. There is also Santa Hog, when engineering students come out of hiding on the last Friday of fall classes to bring holiday cheer and joy to stressed students before exams. Two graduating Red Suits dress up as Santa and Mrs. Claus and lead holiday caroling as they visit engineering classes. They sing silly songs and provide students with a short break from class, while also raising money for the Women's Interval House.

Given the restrictions regarding social events this term, the MES is encouraging engineering students to start their own safe holiday traditions with each other. A Secret Santa gift-giving exchange is a fun and easy way to spread holiday cheer within a friend group. You can even mail your gifts if friends are far apart or unable to meet in person. Fun gift themes can be added, like that every item must be purchased second-hand (from thrift stores or estate sales) or home-made. There are also new iterations of Secret Santa, such as the 'Stealing' version where names are not drawn. Instead, each person purchases a gift that they feel anyone in the group would appreciate, and participants take turns either opening a new gift or stealing from someone who has already picked a gift until every present has been claimed.

Christmas Cards

A meaningful holiday activity friends can do remotely is send letters or Christmas cards to each other. Take advantage of the downtime this winter break to write to your friends or family members and tell them how much they mean to you. Anyone would be incredibly touched by such a thoughtful (and inexpensive!) gift or gesture.

Competition

Friends could also have a virtual gingerbread house competition. Every person can build their own gingerbread structure and share pictures online. Everyone rates each masterpiece based on important engineering principles such as structural integrity, effective use of materials and design creativity. This is a fun and safe way students can spread cheer this holiday season.

Gift-Giving

Many online resources have thought of innovative and inexpensive gift-giving ideas for students during the pandemic. Any loved one would appreciate a DIY relationship reminder, such as a photo book or piece of art. Houseplants make great presents since they last a long time and can brighten up any room given the sometimes dark and cold feeling of winter. Students can bake a favourite holiday-themed sweet treat recipe for their friends or family, like ginger-molasses cookies or a log cake.

Resources

Although this holiday season may be stressful due to the challenges posed by the pandemic, it is extremely important for students to take a break from the rigor of online school to de-stress and spend quality time with family and friends.

Below are some resources including a list of festive, student-friendly gift ideas and holiday baking recipes.

Resource 1
Resource 2
Resource 3

Housing at McMaster University: Tips and Tricks

By Taylan Dalkan

In this edition of The Frequency, some helpful tips and information will be shared about housing with our fellow Marauders.

One really useful tool is McMaster's housing service on McMaster's website. All you need to access many of the features of this service is your Mac ID. Using this tool, students can look for rental listings, learn about neighborhoods outside of campus, and also even learn about the technicalities that go along with the pursuit of housing. This provides upper-year students with some information regarding financing and the community around them in order for them to make the most educated decision possible. In addition, the Mac Off-Campus Rental Listings feature is a useful tool for students to look for off-campus housing. It allows landlords to list their property while providing details about cost and style of the rooms listed. This service also provides future students information about living in residence on-campus. This includes: tips about what to bring to residence, how to approach encounters with your roommate, different styles of rooms and the associated fees, and even information about dining on-campus. Following the coronavirus pandemic, residence has only been made available for students with exceptional circumstances, however this service still provides students with a useful resource if they have any questions about any of the aforementioned topics. The website also provides information about events going on in residence or on-campus and additional information about the communities and academic centres around campus.

Other Housing Boards:

There are many additional housing boards and rental listings outside McMaster's service. With a quick google search, dozens of websites can be found online that also feature housing services. Since these websites are not regulated and advertised by McMaster, it is important that students are careful and do the necessary research to uncover the best possible housing options for themselves. These external resources can be found on websites, blogs, and Facebook pages.

Other Tips and Advice:

One important process for students is choosing the roommates that they want to live with. For many students this is a concern because ideally someone wants to become roommates with people they know and are comfortable with. The best way to position yourself for this situation is to communicate with your peers and discuss your ideal price range, location, and style of housing. These same guidelines apply for first year and upper-year students. Many students go to see homes or apartment rooms together in an effort to find the best location for everyone. Communication is a very important element when selecting a room together; it is important that everyone is on the same page and in agreement with the expenses. It is also important to consider how you plan to arrive at school. Planning ahead of time by

researching public transportation routes or routes by walking/biking can better reassure you of the decision you are making. Lastly, accessibility to food and day-to-day products is a consideration that upper-year students need to make. Many students like to live near grocery stores because it makes food more accessible and conveniently allows students to purchase these items so they can continue their studies.

By Aras Siddiqui

If you are involved in any team, club, or department at Mac Eng you have probably heard of SAGM. SAGM is McMaster Engineering Societies' Semi-Annual General Meeting. It runs every semester hence the name Semi-Annual. This meeting is where the McMaster engineering community is informed about the current operations of the engineering society, announcements of Musical theme, ratification of new clubs and reports from existing clubs.

This year SAGM was conducted online given the current situation. Even in our online setting we had over 200 people who attended SAGM 1.

For this meeting, each department must have a minimum number of attendees to represent their department. This year we had great turnout from all departments and some departments had double the minimum required quorum.

At the meeting, we ratified all the appointed positions that were selected at end of winter 2020 term. We welcomed our new Computer Science rep; Victoria Robinson, six new First Years reps, Eng 1: AJ Kourabi, Darya Sadeghi, Ryan Kumar, BTech: Michael Girgis, Comp Sci; Tasneem Bint Abdul Majid and iBioMed; Rosalie Wang.

One of the big changes we had this year was the introduction of the MES Bylaws document. This change makes it easier for MES members to go through documentation by making them more organized and structured. This change was reflected in the constitution. All new changes to the constitution were presented and voted on. The motion passed with majority. Another big moment was that we recognized iBioMed society as a program Club within MES. Though in the past iBioMed society worked with MES and got funding, it was not officially recognized. Now, it is more official and an overall better step for the future. We also welcomed Leading Edge as a MES group. Leading Edge presented their accomplishments from last year as an MES affiliate along with their future plans as a MES Group.

Lastly, our MES execs gave their accountability presentations and spoke about all the new changes and initiatives they are working on. Andrew D'Elia, VP Academic, talked about academic advocacy, taking students' feedback on online learning, and bringing that feedback to the faculty. Damilola Fadiya, VP External, mentioned external organizations and their work with schools regarding proctoring software and student's mental health at these times. Emma Mandel, VP Finance, ensured us that our finances are in good standing.

She is working on a new process for mailing reimbursement cheques. Terrel Marshall, VP Communications, worked on making a more structured and cohesive brand for the MES. He introduced a new branding guideline document to help streamline branding across all platforms. Alex Moica, President, spoke on the action plans he worked on with NSBE, revisiting the MES Long Term Plan, checking in with clubs and teams during COVID times and working on policy overhaul and the creation of the new Bylaws document.

It was a productive Sunday evening and we had a great turnout, I would like to thank everyone that came out to SAGM fall 2020. If you want to know details on any of the points mentioned, you can go through the SAGM meeting minutes posted under council resources.

Lean Six Sigma Green Belt conference

by Andrew Aslanidis

From August 14th to August 16th, 2020, I was a lucky attendee of the 2020 Lean Six Sigma Green Belt conference, hosted by York University through the CFES. At first when I learned about this course, I was intrigued, having heard these terms "Lean" and "Six Sigma" before in classes and work terms, but I had never really learned about their origins and their full meaning. Knowing that they could be useful in my future career, I took advantage of the opportunity to attend.

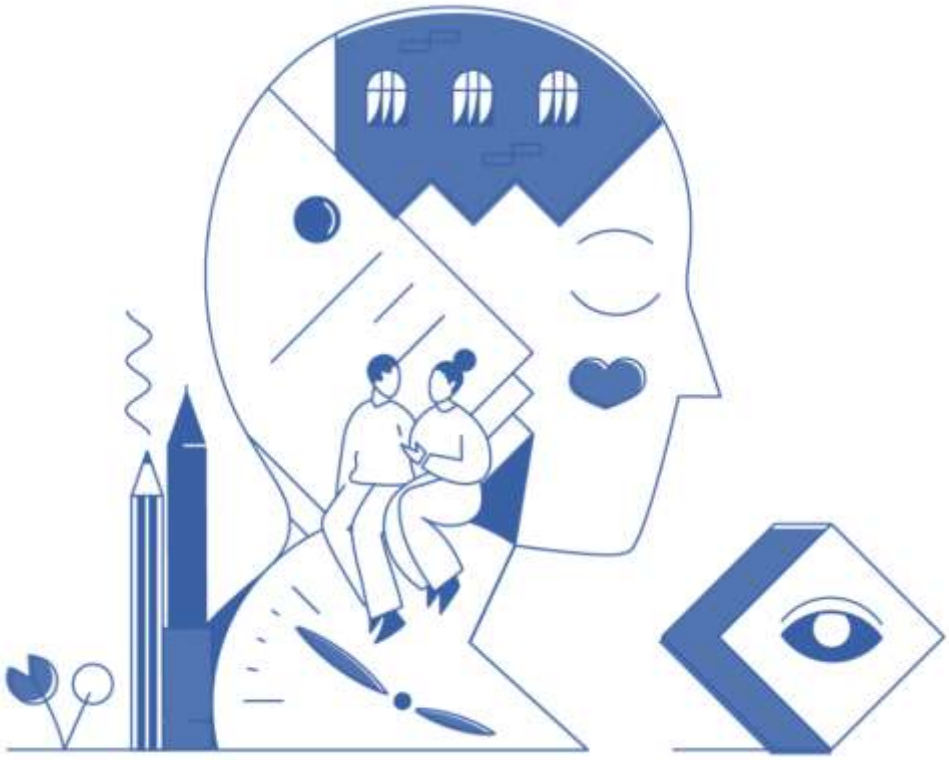
Lean Six Sigma is the combination of "Lean Principles", that focus on eliminating waste from processes, and "Six Sigma", which describes a certain quality standard. Waste can be categorized into different categories, such as waiting, over-processing, transportation, and pretty much anything else that does not add value to the customer. Quality is measured in the number of defects that occur, either counted as the number of defective results or the total number of defects (each result can have more than one defect). These are particularly important concepts in the automotive industry, where I hope to work one day, so I was very excited to learn more.

The course delivers its own framework for solving problems using Lean and Six Sigma ideologies, along with a toolbox to pull from for each step of the process. At first glance, it may not seem like it needs a whole conference for a process and some tools, but it requires intuition and careful planning when actually in use. Not all the tools need to be used for every type of problem; some can even lead you in the wrong direction if used improperly. Case studies were used to demonstrate this, and even though the conference was completely virtual, the breakout rooms worked well for collaboration and discussion. In the end, I can say that I took away a lot of useful concepts and strategies for applying the tools we were given and even solving problems in general.

Something interesting that I learned during the course is that despite having origins in automotive and manufacturing, Lean Six Sigma can be applied pretty much wherever there are processes (i.e. anywhere). This could be a doctor's office, a café kitchen, or bus station. The limitations are endless, adding value to this course and what it could do for any future career that I have!

In terms of satisfaction with the conference itself, the team over at York University did a great job of hosting this virtual conference with the tools they have available, without overcomplicating things. They even made attempts to include traditional elements of an engineering student conference, such as swag trading and social events. The Abacus team also did a great job of including resources to access and follow along with during presentations or when collaborating with other students in the breakout rooms. The template that they provided will also be valuable in the future when applying the skills learned during the course. Overall, it was a great conference, and the virtual aspect did not take away from the learning portion, only the traditional fun parts of attending a conference with other students were affected.

I am fortunate to have taken this course this year. I would recommend this course to any engineering student at McMaster, both for the resume asset, and the problem-solving techniques they can apply everywhere and anywhere.



The World of Finance,

With an Engineering Background

By Elsa Bassi

Today is the last day of my summer internship with Canada Pension Plan (CPP) Investments. This firm is one of the largest and fastest-growing pension funds in the world, with over $437 billion in assets under management and 1200 employees. Just a few short months ago, after three long zoom interviews, one of which taking place in the lobby of a hotel in Cuba, I was shocked to find out I had got the job.

The program that facilitated the internship is called Women in Capital Markets, or WCM, a non-profit focussed on encouraging girls with STEM backgrounds to pursue careers in finance. CPP Investments has been hiring WCM interns for quite some time, so they've learned over the years that us anxious science girls can sometimes need a hand to hold upon entering the finance world for the first time. To make matters even scarier, due to the ongoing pandemic the entire internship was held online.

My assigned role was in the fixed-income (bonds) sleeve of the financing department, which is responsible for acquiring cash for the firm to invest. I was appointed a manager who I reported to directly, and a mentor, whose purpose was to offer emotional support. I had never met either of them, as all my interviews were over video. Luckily, neither of them was phased by my complete and utter terror after my first department-wide meeting, where the ratio between the terms I understood and the ones I didn't was 10:90.

CPP Investments generously hired a consulting firm to teach the WCM interns the basics on finance and Excel, as well as some extra Python lessons. In addition to our regular duties, the intern cohort was tasked with a case competition, where I got to learn about other departments and practice my new commerce skills. I gradually became acquainted with the finance jargon and started to grasp more of what my peers were

saying in meetings. If you asked me three months ago what the difference between a dividend and derivative was, I wouldn't have been able to tell you, but now I can! See below if you are interested.

A dividend is an amount of money paid by a company to its shareholders regularly. A derivative is a type of financial instrument whose value is based on another 'underlying' financial instrument, like if you made a bet on the direction a rubber duck company's stock was going.

Throughout the length of my internship I worked on various projects, such as examining the firm's previous deals with large 'emerging market' or developing country investors in order to expand their non-G10 nation currency program. I was also tasked with optimizing a Python program that sourced cheaper stock prices than the firm's existing holdings from various 'brokers' or banks in order to short sell them.

The most difficult of my projects was the last one, a presentation with a topic of my choice, in front of my entire department of finance professionals with precisely two months of experience. Needless to say, I was terrified. I chose to do it on the sustainable investing practices of the top 10 largest asset managers in the world, because I have a personal interest in sustainability and wanted to learn how investment firms are incorporating it into their portfolio mandates.

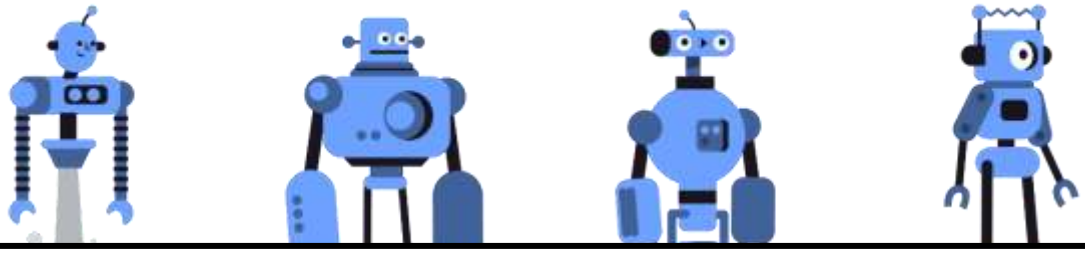
The research was an informative and compelling experience that has inspired me to continue along the sustainability path. The presentation itself was intimidating but rewarding, and greatly increased my confidence and ability to speak publicly.

So why do investment firms hire STEM students as opposed to commerce ones? I've learned that the value of a science background lies in our ability to think critically, which we learn through calculus tests and innovation projects. The problems may be very different in finance, but the way they're solved is the same. Using our brains! And many firms like that we can code too.

My final thing to note about my experience working in finance with a STEM background is that it is challenging, but ultimately what makes a job worthwhile is the people! Although I was unable to meet with most of my colleagues in person, I reached out to them for virtual coffee chats, shadowing and advice. Everyone I spoke to was incredibly kind, supportive and helpful, and these moments were among the most gratifying of my three months at CPP Investments. Somehow, the technology of this pandemic-riddled world has enabled social connection to forge onward, and I am humbled and inspired by the relationships I've built through my wonderful experience at CPP Investments. Furthermore, I can say now that by learning from my peers and the internet, I am now able to 'speak finance' and have amassed a wealth of knowledge about the Canadian market and global economy, which I know will come in handy somewhere!

In conclusion, I'd like to mention a quote that was shared by one of the firm's Senior Managing Directors in a virtual meet-and-greet because it really stuck with me:

"Smart is not innate. It means you've had time to ask questions. What really makes you stand out is intellectual curiosity without a fear of looking dumb".



The Malicious Uses of AI

by Rija Asif

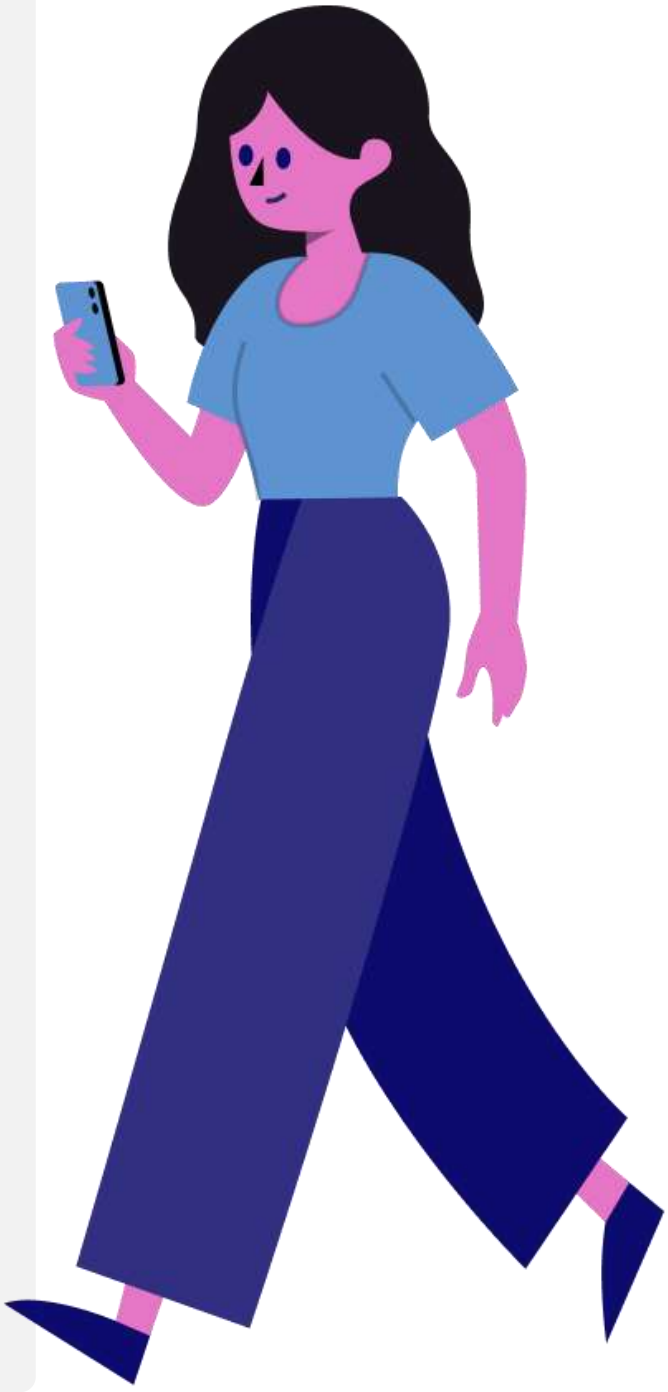
The distressing aspects of global governance and the use of artificial intelligence for evil.

In recent years, AI research and technology has vastly expanded and reached new heights. As AI capabilities become more powerful and widespread, so does the potential landscape of threats and malicious uses of AI in areas such as digital, physical and political security. According to Matthew Jordan, an AI and History of Science instructor at McMaster University, artificial intelligence is what's known as a "dual-use technology", which simply means that it can be used for both civilian and military aims (2020). When it comes to the malicious uses of AI, many seem quite worrying to me, whether it is authentic-looking spam emails or deceptive ads containing malware, the use of autonomous drones in military and non-military settings or the targeted spread of misinformation (Jordan, 2020).

Even more frightening is the fact that it doesn't have to be high-tech devices that we may not necessarily be in regular contact with, such as drones used in a military setting, for us to be worried about robots being hacked for malicious purposes. There are plenty of devices in our own homes such as smart fridges, microwaves, doorbells or house-cleaning robots that can easily be vulnerable to being held hostage by malware.

The Use of AI in Warfare

Furthermore, the AI arms race between various countries is very likely to create a shift in the power dynamics between nations, and lead to global governance amongst countries that are quicker to adopt and develop stronger AI systems. While countries such as China and the United States are leading the AI weapons arms race, there are others that oppose automated weaponry and raise many ethical concerns. However, the question still remains whether these countries will still have to invest and further develop AI warfare despite their stance, in order to defend themselves from the nations that are choosing to advance in this field. I strongly believe that there needs to be active monitoring, ethical guidelines and international policies in place to prevent AI warfare from getting beyond the scope it was originally intended for. In the United States, for example, there is an official Department of Defence directive that sets out policy for the development and use of autonomy in weapons but although such arms control and norm development processes are critical, they are unlikely to stop motivated non-state actors from conducting attacks (Brundage et al, 2018).



What Can Be Done

It is comforting to know that there are people such as AI security researchers, cybersecurity experts and companies around the world working full-time on these issues. However, more needs to be done and in order to solve the dilemmas surrounding the malicious use of AI, there definitely needs to be more government intervention to create policies, laws and values in the AI landscape.

I believe creating awareness about the negative outcomes of artificial intelligence and how to protect oneself from it is a solution that can have swift and effective outcomes. Courses need to be taught at all types of institutions to give students the opportunity to learn and reflect upon the history, ethics, and outcomes of artificial intelligence from all angles. This is something being done at McMaster through the History of AI (INNOVATE 1Z03) course that was first introduced during the Winter 2020 term. However, education about AI also needs to be provided on a larger scale to reach vulnerable individuals who might not be aware of, or able to afford, the protections that some others can, which can only be done with the help of government initiatives.

More aware users will be able to spot telltale signs of certain attacks, such as poorly crafted phishing attempts, and practice better security habits, such as using diverse and complex passwords and two-factor authentication (Brundage et al, 2018). Lastly, there needs to be more transparency and literature associated with artificial intelligence and machine learning in order to make it easier for people to understand why an algorithm has made a particular decision. Moreover, there also need to be clear guidelines in place on who would be held accountable for undesirable effects.

While the advancements in AI can be described as nothing short of miraculous and have made processes far more quicker, accurate and reliable than when they were in the hands of humans, we need to be aware of the undesirable consequences and how to protect ourselves from negative outcomes.

Co-Op Feature: Maanav Garg

By Rija Asif

Maanav Garg:
3rd Year Computer Science Student
Software Engineer Intern at Microsoft

Length of Co-Op Term: May 18th to August 7th | 12-weeks

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What is the best part about your job?

I think the best part about working as a SWE intern was that everyday felt like a new challenge and Microsoft being such a huge organization with critical internal and external stakeholders, I knew any and all contributions I made to my team and project were significant and impactful, which honestly helped fuel my motivation throughout the term.

In addition to this, I had the opportunity to work alongside and more importantly learn from a set of incredibly intelligent and hardworking professionals. I was able to not only learn from their experiences but avail their mentorship to be a successful Microsoft intern and pave my own path at the firm. I believe their guidance is definitely something that helped me thrive in my role, and it's the type of support that's definitely not common at every other company.

What's a cool fact you learned about the company that you worked for or the way it operates over the course of your coop term that most people wouldn't know?

Personally speaking, one of the biggest things I tend to look for in a company is their work culture, where thus far Microsoft's been able to shine the brightest through an amazing work-life balance and great detail to the social aspect of the role. Almost every other day, there was some sort of 'social' event happening, whether it be solely for interns, within the team, or general Microsoft events.

Additionally, even at full-capacity, I never felt overloaded or the need to work beyond the 7-8 hours I had in the day, nor was I expected to. My team was great at understanding that I had commitments outside of work, and after speaking to many other interns, that seemed to be a common theme across the organization. All in all, Microsoft's work culture is one that values their employees and keeps them happy, which was definitely not something I knew coming into the role, and was happily surprised.

How did you make meaningful connections with your coworkers and superiors at your coop? Any tips on networking?

I think one the most important things when it comes to building meaningful and strong connections with your coworkers is to be natural and transparent in any given exchange you may have. They don't want to meet someone with an artificial personality whose only interest is to discuss professional matters and try to impress them. You'll definitely find more success in connecting with someone when you're being yourself, and not worrying about the bottom line. More often than not, one

'coffee chat' or 'meeting' won't be enough, so make sure you follow-up and keep in touch throughout your term as well as after you leave the company.

Some more concrete advice would be that within your first week, make sure to set-up 1-on-1 chats with all your co-workers- trust me they'll be super excited to meet you! Be sure to come in with a few loose ideas about what you want to talk about during these chats. Asking them questions about themselves and their role is always great since it gives you the opportunity to learn more about them and who they are outside of the firm. Beyond that, make sure to listen to see what you may have in common with your coworkers, and from there just let the conversation flow naturally as if you were talking to one of your friends. Once you get this ball rolling, feel free to ask these co-workers to recommend anyone else you could chat with or anyone they could connect you with. Eventually you'll find yourself getting to know a large network across the organization.

What new skills were you able to add to your toolbox at the end of your coop? This could be soft skills like learning how to manage your time more effectively or becoming a better communicator, or technical skills like learning a new programming language or how to use a new piece of equipment.

In my experience so far, I feel that every internship comes with a unique set of learning opportunities, and they usually directly pertain to the role you're pursuing. At Deloitte, where I worked as a Consulting Analyst, I had the chance to build upon my communication, program-delivery/management and delegation skills due to the sheer nature of the role being focused on client interactions. On the other hand as a Software Engineer Intern at Microsoft, I had the chance to grow my technical skills in more ways than one.

Initially, I tackled the main barrier by getting well-acquainted with my team's technical stack, which for the most part entailed C#, ASP.NET and TypeScript. This led me to learn more

about my team's software product - Visual Studio, from a general perspective. After this, I was introduced to the concept of functional and technical specifications, which I was taught through an iterative approach for my personal deliverables. From there, I was exposed to learning how to leverage internal technologies from the Azure stack, such as 'Repos' for sharing and hosting private Git repos, Table Storage and CosmosDB for database purposes, KQL for extracting data and many more. These all became key components during my term and more specifically, for my deliverables and projects. However, this is not to say I didn't have the opportunity to work upon my soft skills- it was just that the main takeaway from the role was heavily technical.

How did you get the coop position?

1. Submitted the initial online application to the role.

2. McMaster's dedicated university recruiter reached out with further steps for scheduling the phone interview
TIP: Schedule your phone interview as early as possible, they have limited spots, not just for the position itself but for each cut they make during the interview process.

3. Had the phone interview - consisted of a mix of the following types of questions:
   - Behavioral
   - Resume and experience based
   - Theory and computational knowledge based
   - Coding

4. Recruiter followed-up with further steps for scheduling the final on-site interview.
This is where the process got a little different for me - I scheduled my on-site interview, however the Friday before I was supposed to fly out to Seattle, I was notified that my onsite will be conducted virtually instead due to severe weather conditions in Seattle.

5. Had the final set of interviews –which consisted of rounds that covered the following:
   - White-Board Coding Questions
   - Behavioral Questions
   - System Design Questions

6. Was fortunate enough to receive a follow-up from my recruiter within 48 hours with the good news!

Want to contribute?

Contact us at
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