

JANUARY | 2023
EDITION 2

2022 MEC Recap

House Hunters: Hamilton Edition

**McMaster's Valentines
Day Rizz Guide**

THE FREQUENCY

**A McMaster Engineering Society
Publication**



Letter from the Editors

Helloooo 2023!

In this edition of the Frequency, you'll hear from many different students within our Faculty. They've been busy innovating at the McMaster Engineering Competition, building concrete toboggans, and attending conferences! We hope that these articles will give you a sense of the diverse ways you can get involved with the Mac Eng community.

We also have a couple articles for life outside engineering (what's that??). On page 5, the old folks offer their wise words of wisdom for the upcoming house hunting season. On page 10, we have some Valentine's Day ideas for all the rizzlers out there!

As always, if you have any concerns or responses to our publications, you can send us an email at frequency@macengsociety.ca.

Happy reading!

Adrienne Scott and Ansh Tiwari

What's In This Edition?

ARTICLE	PAGE
A WEEKEND OF INNOVATION AT MEC	2
HOUSE HUNTERS: HAMILTON EDITION	5
CONFERENCE RECAP: FYIC, PEO-SC, + CDE	8
VALENTINE'S RIZZ GUIDE	12
TECHNICAL TEAM FEATURE: TBOGG	14



A WEEKEND OF INNOVATION AT MEC

By Alicia Tran

The McMaster Engineering Competition kicked off on November 12, 2022, and many engineering students participated in designing and creating innovative solutions to win the competition.

BIO-ENGINEERING

Competitors in the Bio-engineering competition were tasked with developing a custom heart valve for a patient, given their medical history, and accounting for biocompatibility, durability, and cost. The winning team, consisting of Zara Khan and Ayesha Basu, created a bear trap design for a patient with rheumatic heart disease and hyperparathyroidism. Their design was naturally antimicrobial, had high strength, utilized phytic acid to prevent the body's absorption of calcium, and included heparin to reduce thrombosis.

COMMUNICATIONS

Engineers are often required to effectively explain technical processes to people of various technological backgrounds. In the Communications competition, competitors were required to investigate an issue, form an opinion, and convince a non-technical audience of the validity of that opinion, while clearly identifying the socioeconomic, technological, and environmental impacts of the topic.

Top competitor Luke Schuurman discussed the use of Field-Programmable Gate Arrays (FPGAs) to develop applications for AI. He posited that FPGAs are energy-efficient, can process data quickly, and can be reprogrammed, positioning it as the premier option over existing devices.

CONSULTING

A growing population and lack of resources on Earth has led people to suggest the idea of inhabiting Mars. However, there are many challenges associated with the notion. Competitors were tasked with tackling the following issues: housing and household needs, public infrastructure, sustainable agriculture, information technology, and human factors. Congratulations to Matthew Fernandes for tackling these hard-hitting issues and proposing a successful solution.



DEBATE

In the Debating competition, competitors are encouraged to explore different perspectives of a topic and effectively communicate their viewpoint to an audience. This year's theme was focused around "Greatest Inventions", with topics including the benefits vs. risks of social media, weapons creation and advancement, and the morality of using free textbook and supplements services such as LibGen and SciHub. The team of Lydia Pedersen and Anna De Leenheer were able to debate their way to the top and win the competition.

INNOVATIVE DESIGN

The role of an engineer is to develop innovative solutions to make a world a better place using their knowledge in science and technology. This, along with marketability/profitability, is the heart of the innovative design competition. George Fares, Sylvia Kamel, Beshoy Hezky, Luna Aljammal, and Noel Gregory created a more engaging and interactive emergency alert system. Their solution, YIKES, would help reduce costs for investigative forces by promoting crowdsourcing from the public, all while being less of a disturbance than current emergency alerts.

JUNIOR DESIGN

Junior Design competitors worked to create a proof-of-concept design for packages being dropped from the sky. Sustainability was a major criterion as well as designs that minimize material costs and total design weight, due to the high carbon emissions that would be associated with more transport trucks required for heavier materials.

Jay Botham, Elliot Evans, Kyle St. Louis, and Jasan Rubes created a winning design by using a parachute to minimize the force with which the design hit the ground and ensure the design lands in the upright position. They also minimized the force of impact that the package took by using a breaking mechanism to absorb the impact.

PROGRAMMING

Navigation of the seas has been a challenge for centuries. Risk of travel can be mitigated by providing information to ship captains and relaying crucial weather and ocean conditions to those at sea. Ahmed Khaleel, Muhammad Zaka, and Tharshigan Vithiyananthan navigated through the problem by developing a weather monitoring system to display weather data in a neat graphical user interface and identify abnormal conditions based on deviations from ideal conditions.



RE-ENGINEERING

Evby is a fictional town in which the mayor would like to maximize road safety and minimize associated costs. The layout of the town must stay the same, but competitors were urged to re-engineer any existing practices and resources already set in place. The solution developed by Connor and Graham Morrison was creative, feasible, sustainable, and had strong potential to be effective on a long-term basis, ensuring their first-place win.

SENIOR DESIGN

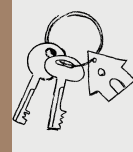
Nuclear energy is a cheap and self-reliant form of energy production that produces much less greenhouse gas emissions compared to fossil fuel energy sources. However, disposal of nuclear waste poses a large problem due to the serious health risks it presents. Competitors were tasked with autonomously disposing spent nuclear pellets into various waste bins, while ensuring minimal human contact to reduce health risks. Kabir Gupta, Kavya Sundaresan, Ethan Cavallin, and Rayhaan Datto created a prototype that had a large range and operated consistently. It edged out the competition and achieved the highest score by moving quickly and landing the pellets in the three bins.

All the winners of MEC moved on to compete for McMaster at the Ontario Engineering Competition (OEC). Special congratulations to Zara Khan and Ayesha Basu (Bio-engineering) and Jay Botham, Elliot Evans, Kyle St. Louis, and Jasan Rubes (Junior Design) for placing first in their respective categories at OEC!



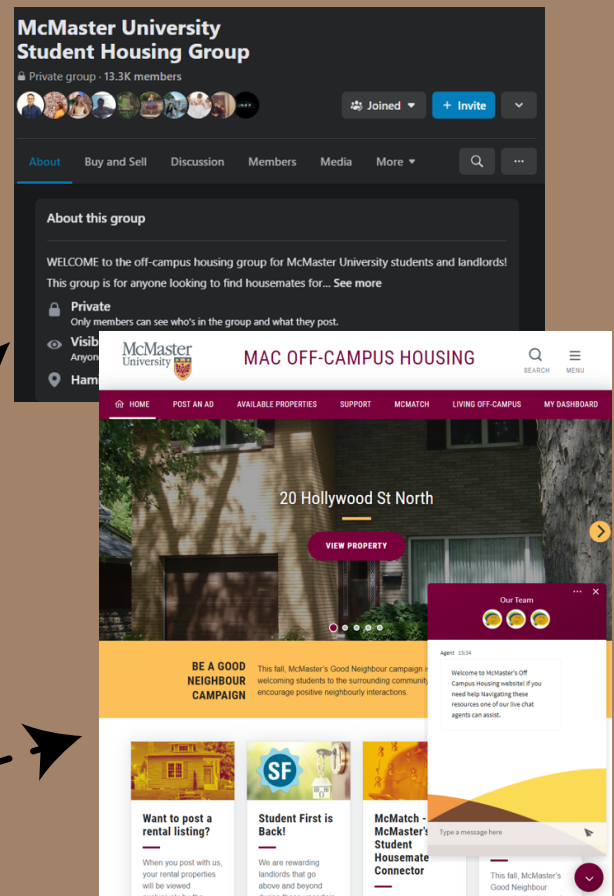
HOUSE HUNTERS: HAMILTON EDITION

By Faaria Khan



Welcome back Mac Eng! Whether you went home for the holidays or stuck around Hamilton, we're glad to have you back for the final stretch of the school year. Before we can enjoy the warmth and bliss that comes with summer, we must get through a myriad of assignments, midterms and presentations, only now, there's another element added to the mix — securing your off-campus housing for the upcoming school year. Contrary to the others, this one doesn't have to be stressful, so long as you keep in mind a couple dos and don'ts.

Unlike the campus residence lottery, you have freedom in selecting your new home away from home. You even have autonomy in selecting who your housemates are. First, establish a group of friends that you can see yourself sharing a home with – typically the most common size homes are for 5-7 individuals. If you don't have enough housemates, do not fret! There are plenty of resources you can use to meet potential housemates such as the McMaster University Off-Campus Student Housing Rentals Postboard or McMatch, – McMaster's Student Housemate Connector which can be found on offcampus.mcmaster.ca. You can also browse rental listings on these websites.





A STUDENT'S GUIDE TO FINDING YOUR NEW HOME

KEEP THE FOLLOWING TIPS IN MIND WHEN VIEWING RENTAL PROPERTIES:



PROXIMITY

How short do you want your commute to campus to be? How close is the property to bus stops and amenities like grocery stores or the pharmacy? Do you prefer a specific neighbourhood?



LEASE DURATION

Common leases range from 4 to 12 months. If you do not plan on residing in Hamilton during the summer, you may look for 8-month leases from September to April – but beware these are limited in quantity. An alternative solution to this is opting for a 12-month lease and subletting your room over the summer. Since McMaster is a research-intensive university, there are always undergrad/grad students coming from nearby and abroad. However, double check the terms of the lease to ensure that you are allowed to sublet your bedroom!



UTILITIES



Just when you think you've found a great deal on a house, you may come to find out that utilities, like electricity, hydro, parking, in-unit laundry, snow removal, internet are not included. This has the potential to put you over your budget. Read the fine print or inquire about what's included in the monthly rent. In addition, establish whether lawn mowing is your responsibility or the landlord's as this can be another unforeseen cost.



TYPES OF HOUSING

The types of housing available around campus include detached houses, apartments, duplexes, and condos. Depending on your preference you may filter through a particular house plan.



BUDGET

Crowd-source information from upper years or other listings to determine what the average rent and living cost should be for the housing type and area you are interested in. Speaking from personal experience, a bedroom could run anywhere from \$400-800 depending on the size of the room and whether it has been updated/renovated recently.



VIEWINGS

Always attend open houses and come prepared to dish out first/last month's rent if you decide the rental property is *the one*. You'll likely be attending a lot of open houses before doubling down on a property and your memory can quickly get foggy about which address matched which floor plan. Try to take notes on your phone about particulars like how many rooms are on each floor, do rooms have closets, are blinds included with windows, how old are the appliances, are there smoke detectors in each room, are there fire extinguishers, what the shower pressure is like, and if you have full control over the thermostat.



X

A STUDENTS GUIDE TO FINDING YOUR NEW HOME

X

DO NOT:



1

Sign the first house you visit

The house hunt is exhausting, I know. But do not simply settle on the first house you visit, or one that looks good in pictures. You should always tour the property to make sure you aren't being catfished, and if the previous tenants are home, talk to them about their experience living there. Ask about the house rules whether the building or appliances has had any issues, whether the landlord respects renters' rights, what the neighbours are like, etc.

2

Pay anything before touring

If anyone requests for you to send money before touring, do not comply – swiftly report them on the medium the listing is posted on to save fellow marauders from being bamboozled.



3

Live with your landlord

While living with your landlord means they can quickly respond to requests, there are a lot more cons than pros. It's similar to living with an over involved parent – where you must live by their rules, and they will be keeping track.

No

Finally, for more information you can visit <https://offcampus.mcmaster.ca/living-off-campus/> to learn about your rights and responsibilities as a renter. To speak with someone about renting issues, email macoffcampus@mcmaster.ca



CONFERENCE RECAP: FYIC, PEO-SC, AND CDE

McMaster engineering student delegates reflect on their experiences at the First Year Integration Conference (FYIC), Professional Engineers of Ontario Student Conference (PEO-SC) and the Conference on Diversity in Engineering (CDE).

FYIC

Finding Your Community in Engineering

By Bryson Carey, Engineering I

The Finding Your Community in Engineering event was my favourite experience from the conference. The session was similar to a Q&A panel consisting of Dayo Kehinde who is the Pre-Collegiate Initiatives Chair for NSBEMac, Kamaya Bosland who is Vice President of NSBEMac, Trestan Elsea who is the President of EngiQueers Canada, and Dr. Kim Jones who is the Chair of the Ontario Network of Women in Engineering. I want to note that throughout the entire presentation I was overwhelmed with the feeling of pride for how engineering has become a pillar for inclusive change while still recognizing room for growth.

A highlight to this session was Trestan Elsea's story of how she found herself in a presidential role of Engiqueers. To briefly summarize their story, they found themselves in a situation where there was no community in engineering at TMU. The lack of community inspired Trestan to get involved with EngiQueers at a university level, quickly earning a leadership role for a club that was not making an impact at the time. Now, Trestan has fostered a strong and passionate community of engineers all across Canada. Her accomplishment inspired me to make a difference.

Another key takeaway from the event was when I posed the question “How do I know if I’m being an effective and inclusive leader?”. The response from the panel really stuck with me, and taught me a lot about leadership. The answer was straightforward: you cannot know 100% because everyone is different. One guideline would be to make sure every idea is heard. If it isn’t, it is your responsibility as the leader to say it again. You can also ask one-on-one if each team member is feeling included. If you say something incorrect, make sure to accept the feedback and better yourself for next time. Overall, the key takeaway from this spectacular session was to stay true to who you are, and that everyone deserves the right to have a community.





PEO-SC

Clarifying the Path to Becoming a P. Eng in Ontario

By Sarah Sohn, iBiomed + Mechanical Engineering, Level V

The “Clarifying the Path to Becoming a P. Eng in Ontario” session was presented by Tracey Caruana (Manager, Engineering Intern Programs) of Professional Engineers Ontario (PEO). Current requirements to apply for your P. Eng include: 1. a bachelor’s degree from a Canadian Engineering Accreditation Board - certified program, or equivalent qualifications; 2. The successful completion of the National Professional Practice Examination (NPPE); 3. 48 months of acceptable engineering work.

The NPPE is a 2.5 hour long, multiple choice test, for which you get 3 attempts to pass. The NPPE is held five times a year and tests the knowledge of engineering professionalism, law, and ethics. With regards to the experience requirement, out of the 48 months of engineering work, 12 months must be completed in Canada (your internship can also count for up to 12 months of this experience, but cannot be used to satisfy the Canadian work requirement).

However, some of these requirements are subject to change due to amendments to the Fair Access to Regulated Professions and Compulsory Trades Act (FARPACTA), such as the removal of the minimum 12 months of Canadian experience requirement and the modification of Engineer In Training (EIT) programs, offered to new graduates. Therefore, these changes will be especially relevant for those graduating in the next few years!



Is Net Zero Possible by 2050?

By John Quien, Computer Engineering, Level IV

I found this session to be very inspirational and the speaker, Phil De Luna, was excellent as the host. He talked about how much of a challenge it would be to get to net zero but not an impossibility.

It is easy to say we should use renewable energies and protect the environment, but the current output of renewable energy is not enough to match non-renewable resources. Also, renewable resources cannot give a constant output, so we need to create a way to hold this energy for long periods of time. In addition, although trees are great at carbon capture, they cannot match how much carbon we output to the environment, so we need to create better capture technologies.

We currently do not have the ability to do many of these things, but that does not mean we will never be able to. Recently, technology has advanced at a rapid pace due to an increase in computing power and data analysis. What once took decades to build can now take a few years or less. We can do the same with renewable energies, batteries, and carbon capture technology. All we need is the advancement in research and development to get there, which starts with us.

I found this talk to be incredibly inspiring. It made me think about how exciting it would be to research renewable energies. Perhaps it might be something I could pursue as a Master's degree and maybe something to look into for a future career.

CDE

Engineering Education

By Sarah Cushinie, iBioMed and Materials Engineering, Level III

One session that stood out to me at CDE was "Engineering Education", hosted by Dr. Stephanie Hladik. This session was focused on increasing accessibility for outreach and education events within the scope of engineering.

Within my work on the MSE Society, I participate in many outreach events in the McMaster engineering community and in nearby high schools. At the CDE session, I learned many tips to make these events more accessible and more inclusive to ensure that everyone has an equal opportunity to enter and succeed in engineering.

The main tip was the importance of clearly defining the purpose of the event - set a target audience. From there, one must consider barriers that the target audience would face (ex: financial, time, lack of equipment) and actively plan around that. When leading the event, it's of particular importance to ensure that all attendees feel welcome and to support them when they are confused or struggling. All participants should leave feeling empowered and with a sense of belonging within the engineering community.

I learned so much at this session and I am excited to implement these practices into my work!

Decolonizing Engineering

By Runjhun Deoras, Mechanical Engineering, Level III

There were many different sessions that helped me gain knowledge on various topics, with the overarching theme of equity, diversity, and inclusion in engineering. The session that resonated with me the most was our first keynote speech called “Decolonizing Engineering.”

The speaker talked about deconstructing colonial ideologies and focusing on other sciences and not just Western engineering. Decolonizing engineering would help diversify and improve the engineering profession, since engineers will be more inclined to think about others when solving problems around the world.

Alongside this idea, a phrase that stuck with me was “just because you can do something, should you?”. I realized that engineering can be found anywhere, in any culture or community, however we are only taught Western methodology. Indigenous people have science and technology as well. For instance, they built suspension bridges long before other civilizations. They used metal and stone and invented tools and weaving techniques. They also created Parkas that inspired our current jackets.

The main idea I took away was that we should learn about colonization and then work in partnership with other communities to help learn about engineering outside Western science. This will make better engineers and better engineering solutions.



VALENTINE'S DAY RIZZ GUIDE

BY NOURA ELSABAGH

Find your match!

The Aphrodite Project

The Aphrodite project is a global initiative that aims to promote healthy and positive relationships and create a culture of consent, respect, and empathy. The project offers various resources, such as workshops, online courses, and coaching that focus on personal growth, self-awareness, communication, and emotional intelligence. They also work with schools, universities, and organizations to provide education and training on healthy relationships and consent. Their mission is to empower individuals to create fulfilling and respectful relationships, and to build a more equitable and compassionate society.

Every year, the Aphrodite project launches a university-wide Valentine's matching survey, in which students from 14 universities across the US and Canada share their personal interests and preferences. Based on the data collected, you are then matched to a person at your university who is compatible with you!

If you are interested in meeting someone new, or trying out the survey for fun you can visit <https://aphrodite.global/>.

Matchomatics

Matchomatics is a computerized dating service that uses a proprietary algorithm to match individuals based on compatibility. It is often used by schools, universities, and other organizations to match students or members based on a variety of factors, such as personality, interests, and values. The service involves participants completing a questionnaire that assesses their characteristics and preferences, and then the algorithm matches them with compatible individuals.

Every year the McMaster Engineering Community launches the Matchomatics survey for undergraduate students to make friends or even a special match. 😊

Stay tuned to the McMaster Engineering Discord Server for the upcoming Matchomatics test!



Gift Guide

Valentine's Day is approaching, and for many of us university students, it's a time to celebrate love and relationships. Whether you're in a serious relationship or just starting to date someone new, it's important to show your significant other how much you care. But, with so many options and expectations, it can be hard to know what to get your loved one. Here are a few gift ideas and tips to help you choose the perfect present for your valentine.

Subscription box

A monthly subscription box for a hobby or interest, like a book or craft, can be a fun and unique way to show that you support your loved one's passion.

Tech accessories

For the tech-savvy young adult, a new phone case, wireless headphones, or a smartwatch can be a thoughtful and practical gift.

A night out

Instead of buying a physical gift, plan a special night out for you and your loved one. This could be dinner at a fancy restaurant, tickets to a concert or show, or a weekend getaway.

Handmade gifts

If you're crafty, consider making a homemade gift for your Valentine. This could be a piece of art, a scrapbook, or a thoughtful piece of jewelry. Here are some cute examples!

Handmade painted Valentine's tote bags, this can also be made with a paper bag and paint!

Tips and Tricks

#1 Be thoughtful

Consider your loved one's interests and preferences when choosing a gift. A gift that shows you've put thought and effort into it will be more meaningful.

Be creative: Instead of going with the traditional chocolates and flowers, think outside the box and come up with a unique and creative gift.

#2 Be budget-friendly

Valentine's Day doesn't have to break the bank, and it's important to find a gift that fits your budget. Remember, it's the thought that counts.



#3 Don't forget the little things

Small gestures of love and appreciation, like a thoughtful note, can be just as special as a physical gift. Valentine's Day is a time to celebrate love and appreciation, so don't stress too much about finding the perfect gift.

Remember, the most important thing is that your gift comes from the heart. With a little thought and planning, you can find a gift that will make your Valentine's Day special and memorable.



TECHNICAL TEAM FEATURE: CONCRETE TOBOGGAN

By Adrienne Scott

The McMaster Engineering Concrete Toboggan Team (MECTT) competed at the 2023 Great National Concrete Toboggan Race (GNCTR), from January 25th to 28th in Kelowna, BC. This engineering design challenge, informally known as TBOGG, requires university teams to create a unique concrete toboggan that can steer, brake and safely carry team members down a large hill. It is one of the oldest and largest student engineering competitions in Canada, and was first held in 1975! We talked to one of the MECTT Co-Captains, Nik Bennet, before GNCTR to learn more about the team.

Are there any unique or interesting features of your design this year?

To give a quick background, the four main technical components of the sled are steering, brakes, skis, and superstructure, all of which are unique in design. Our theme this year is Scooby Doo, so we actually decorated the superstructure like the Mystery Machine. For the first time, we have investigated the properties of glass aggregate in the skis which has been very beneficial to their strength. As for the brakes, we have used a similar design to 2019 where we placed 1st in brake design, with some improvements. Lastly, we have implemented the team's first ever suspension system which was designed by our steering captain and which we are really excited for.

How long does it take for the team to put the toboggan together? What steps are involved in this process?

Every year, the team gets handed to a new pair of captains around March. From there we open sub-captain applications to the previous years' teams and pick an Exec team of about 11 people. In May, we have a meeting to kick the team off and start working on our design and determine a theme. Throughout the summer, we iteratively tweak the design, so by September we have the design finalized and materials ordered. The Fall semester is where it gets crazy. We host build sessions to get students interested in the team, get them working in the Hatch workshop and down at the Applied Dynamics Lab. This year we actually had our shipping date a week earlier than normal which meant we had to have our crate all packed up before the end of the Fall semester. We got it done though, and all that left us to do in January is wait until we go to competition at the end of the month.



Does your team have any specific goals for the 2023 GNCTR?

MECTT has been one of the top competitors at GNCTR over the years. In 2020 we placed 9th overall, in 2021 during the online competition we placed 5th, and in 2019 the team placed 2nd, which was its best ranking ever. Other than trying to come 1st - which is the goal every year - our team has the mindset of making sure that even though we've missed 2 years of in-person competition, we keep growing and improving our legacy at this event. Especially this year with how much effort we've put into innovating our designs and trying to squeeze everything we can out of the team, I think we have a pretty good shot.

What are some of the main reasons why people join the concrete toboggan team?

People always ask us why, to which we respond with "why not?". Although our design and fabrication is rather simple compared to some other teams, we do our best to teach students how to work in the workshop and design something unconventional. There aren't too many places in the real world where you get to see a 350 pound sled with concrete skis. Between getting hands-on experience to work in the shop and learning how to apply engineering principles, the team's culture is also a big reason people want to join. We do what we can to make people feel welcome and make sure they are having fun. I will say, specifically to this year, going to Kelowna may also have something to do with students wanting to join.

What role do you think MECTT serves in the broader McMaster Engineering community?

I would say just like any other team, club, or society in McMaster's engineering community, the role we serve is to be a team that embodies what it means to be an engineering student at Mac. We want to be a team that students can get excited about as well as one that they can join to try and forget about all those deadlines and midterms we have. We do what we can to support one another, as well as those outside the team. For example, over the past few years, we've been neighbours to Baja and Formula Electric in Hatch and this year we share our space with Steel Bridge. We want to do whatever we can to support them because at the end of the day, we're all representing the same school.



MECTT had a great performance at GNCTR, earning 11 awards:

**1st Place Best Braking Performance
1st Place Best Performing Toboggan
1st Place Best Frame Design
1st Place Most Aesthetically Pleasing Toboggan
1st Place Best Overall Team Spirit
1st Place Spirit Cup
2nd Place Best Technical Display
2nd Place Best Opening Performance
3rd Place Best Braking Design
3rd Place Best Theoretical Toboggan
3rd Place Best Costumes**



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