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THE IRON WARRIOR

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New Engineering 7 Building To Prioritize Student Space

Dean's Office

An artist's rendition of Engineering 7 with elevated walkways connecting it to E6 (left) and a potential future E9 (right)

LEAH KRISTUFEK
3B CHEMICAL

On October 29, 2014 the University of Waterloo Board of Governors approved the construction of Engineering 7 (E7). The $88-million dollar building will vastly expand student space on campus as well as provide much needed classrooms for UW's rapidly expanding Engineering programs. With 230 000-square-feet of floor space, E7 will provide seven lecture halls, tutorial rooms, and design garage space for undergraduate students, in particular providing more space for fourth year capstone design projects.

This Monday November 10, 2014, Waterloo Engineering students voted yes to support a $25 term fee to contribute $1 million dollars towards E7. The support of students is highly valued by Pearl Sullivan, Dean of Engineering, her team, and the university, who have been working hard to raise funds from alumni and companies to reach the minimum amount required to start construction. The student donation, an optional $25 during school terms for 4-5 years, starting after the completion of the building, will be an important sign to potential sponsors that students are also in support of the new space and are willing to contribute to its construction. The positive outcome of this vote does not mean we will definitely be contributing to E7 once it has been completed. A referendum using the same question will take place among students on term in Winter 2015. Only after students on both the A and B Societies vote yes to contribute to the new building will the student donation become official.

The one million dollar student donation will allow students to name a 288 square meter quiet study space for which the true cost of construction is $ 2.3 million. Dean Sullivan shared her vision for a "space where students will be empowered to design and fill as they wish. They can name it and call it their own. In fact, while student spaces are somewhat influenced by the student body, [students] will have a direct influence on this specific new study space in E7 ...It's not about the $1 million dollars, it's about the vision."

The new building is part of an overarching vision that will see Waterloo Engineering continue to grow while continuing to provide outstanding education at the undergraduate level. "Engineering 7 is a promise of the future. The design of the infrastructure will help us realize the future of engineering education," Dean Sullivan shared with excitement. That future will eventually add as many as 1500 more engineering undergraduate students for a total enrollment of 8500. Education should inspire and support all engineering students to pursue their passion – whether in their workplace, in research or in entrepreneurship. The heart of the building is to provide a learning environment that continues to break the mold through innovation.

New spaces from E7 will be aimed at providing a learning environment where students don't just learn from books in the classroom, but also have the opportunity to apply those skills to engineering problems from the beginning. This is the idea behind the Engineering Ideas Clinic™, a new faculty teaching innovation which will be housed in E7. To facilitate more traditional class studies, E7 will feature tiered classrooms designed to hold 135 – 140 students, garage space for design projects, quiet study space, and a new expanded machine shop. A two story designated 'flight center' will even be available to students for testing aerial and autonomous robots. Many resources will be consolidated into the new building, including administration offices which will be conveniently located on the seventh floor and the Conrad Business, Entrepreneurship and Technology Centre.

Most importantly, E7 is a building focused on student needs. The intention is for E7 to serve as a new student social hub. There will be a stage for musical performances and start-up pitches, and rooms for Engineering Society Initiatives like RidgidWare. An event space will even include kitchen facilities. It was felt that space for students to learn and socialize was important to fostering strong, well rounded graduates who will be the leaders of tomorrow. There were requests for ground floor research lab space, but they were not granted so more student space would be possible. Prioritizing social areas is opposite to the current trend in many other universities, where research activities are usually held in higher priority over undergraduate student space.

The new E7 building will be constructed between E5 and E6 where there is currently a parking lot. A glass atrium and elevated pedestrian walkways will connect E5 to E7, preventing a potential wind tunnel between the two buildings. A third floor enclosed walk way will also be constructed connecting E7 to E6, creating an indoor route between all engineering buildings.

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Remember the Past, Embrace the Present

LEAH KRISTUFEK
EDITOR-IN-CHIEF

Wow, this term has gone by pretty fast! Midterms are finished and projects haven't quite reached that point where long hours are critical, not that my courses have many projects anyways. For me, the stresses of Jobmine have ended and I'll be off to adventures in Edmonton come January! Don't worry, I like cross country skiing and the cold doesn't bother me much anyways.

For those of you still on the job hunt, don't despair! There are still lots of great jobs out there just waiting to find the perfect student. Job hunting is an interesting beast in that there is no perfect formula to getting yourself employed. Specialized technical skills can get you in to the interview, but getting hired depends in part on how well the future employer can picture you in their office. Things as simple as liking unicycling or spending your free time curled up with a book are what might land you the job. Don't despair, you will find your employer!

Despite the relative lull in academics (although don't relax too much, exams aren't as far away as we'd like them to be!), November seems to be filled with excitement. I have been inundated with lots of articles that are highly relevant to Waterloo. In the past few weeks several engineering teams have made inroads into international competitions, including Suncayr, which came in as international runner up for the James Dyson Award, making it the first Canadian team to have gotten this far. Teams also represented UW at BIOMOD at Harvard, and the National Mining Competition in Saskatchewan.

In other news, Waterloo Engineering recently reported a significant increase in female engineering student enrollment. The incoming engineering class is 27% female, which is a big jump from the 15% that were coming in just 10 years ago. This means more girls in stereotypically male engineering programs like Mechanical, Mechatronics and Electrical engineering. In an article on the University of Waterloo website they cite low female enrollment in grade 12 physics as one of the major factors for less girls going into engineering. My highschool was small, so they only offered grade 12 Physics every other year. This meant that I had to decide whether I wanted to take physics in grade 10 or victory lap. Physics was that one course that everyone dreaded; I'm not sure if it was the hard teacher or the calculus, but out of two years worth of students - a pool of 300 or so - less than 30 people took the class. There was certainly a feeling that of all the courses, physics was the hardest. A lot of males took physics instead of biology, whereas many girls in the school took biology instead of physics. Personally, I thought physics was pretty cool so I made sure to fit that one grade 12 physics class into my schedule, although to do that was quite challenging. Had I not realized at 15 the importance of physics, I might not have even had the option to be here today. I always thought of physics as more of a hands-on type class compared to biology and chemistry, which might be the reason only 30% of girls take physics at a senior highschool level. It is really exciting that the gender gap is narrowing among engineering students, and I await the day when the gender of our future engineers is no longer news.

This Tuesday, Canadians marked Remembrance Day. This year, November 11 corresponds closely with the 25th anniversary of the 'Peaceful Revolution' which saw the symbolic collapse of the Berlin Wall on November 9, 1989. Germany's current Chancellor, Angela Merkel, marked the day by attending a service for victims of the former East German regime. At the time of the Peaceful Revolution, she was a 35 year old physicist living and working in East Germany, so the celebrations for victims of the regime were quite personal.

Being in a war is an experience that, luckily, I have never had to experience. However, that is not to say that my family has not been shaped by it. My two grandfathers experienced World War II in very intimate but very different ways. Their experiences were shaped by two important factors: age and location of birth.

For my maternal grandfather, Maxfield Sheppard, who was born in Ontario in 1917, his childhood took place during the depression. This was a lean time for the family since his father was an architect and no one could afford to build homes. He had to work a year to afford to go to university where his parents forced him to take business in hopes he would better weather another depression that way. When the second world war became a real concern, he was a recent graduate and was pressed into military service not just as a common soldier but a sergeant, in control of men and their lives.

My other grandfather, Eduard Kristufek, was born some time later in a small Czech town in 1925. For him it was a childhood punctuated by memories of road signs changing to German over night, and Czech soldiers being forced to lay down their weapons in town squares. He was an innocent civilian, a victim even. His dark hair and eyes and the fact that his father was the principle in their local school are the reason I'm around today. Although Nazi occupied Czechoslovakia was difficult, and my grandfather was thrown out of school, he was saved when a family friend let him work in their shoe factory. It wasn't until they were under Soviet rule and he had been kicked out of school again—but this time university—that he truly needed to flee or be pressed into the military.

During the war both men lost people. For Max it was an ambush on a wooded country road that saw his close friends killed and him badly injured. It was actually lucky for him, since his replacement was killed the next day. For my Czech grandfather it was a world that was constantly being pulled from beneath his feet. Friends disappearing or being called in to mandatory military service, rights being limited and finally, long after his escape, the knowledge that he wouldn't be able to go back for either parents' funerals.

I suspect if asked who had it worse given these descriptions of the two men's war time experiences, most people would say, hands down, that it was the Czech man. However, I beg to differ. For Eduard, although he was tossed around quite a bit, he felt no responsibility for what had happened to him. He was a victim surrounded by victims and so he dealt with his losses in the context of many other people who had lost more or experienced more. For Max, his experience was one of responsibility. Although he didn't really have much of a choice either, he experienced losses of people he was in charge of, and probably felt he could have prevented the deaths. After that ordeal, he was plunged back into a world that was virtually unscathed by the terror. No bombed out buildings, no vacant stares, and he probably spent a great deal of time wondering, 'why me?' and, 'why them?' To be a soldier is to experience enormous guilt born from that feeling of responsibility given to you. Upon returning from utter destruction it is hard to see people crying over a little spilt milk.

This is why we honor our veterans: they have subjected themselves to this split life to keep our lives so much less encumbered. Lives in which the most we cry about is a bad grade on a test or a break up. So the pain we feel remains infrequent and not commonplace. Although he had lost his home and would never see his parents again, it was the Czech boy, the innocent victim caught in the middle, who was able to live a life unencumbered. In many ways guilt is much more destructive than grief. When everything is taken away from you there is nowhere to go but up.

I hope you took a moment to honor our soldiers and their families for the unique sacrifices made by all soldiers. At the same time, war makes everyone a victim and it is important to remember that fact. Violence should always be a last resort.

Well, that's it for me this issue; see you again in two weeks for our final issue! There will be lots of goodies including the Tin Soldier to distract, ahem...motivate...you to study hard for finals!

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Send your submissions to *iwarrior@uwaterloo.ca*
Fall 2014 Publication Schedule: October 8, October 29, November 12, November 26

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The Iron Warrior encourages submissions from students, faculty and members of the university community. Submissions should reflect the concerns and intellectual standards of the university in general. The author's name and phone number should be included.

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Mail should be addressed to *The Iron Warrior*, Engineering Society, E2 2347, University of Waterloo, Waterloo, Ontario, N2L 3G1. Our phone number is (519) 888-4567 x32693. E-mail can be sent to *iwarrior@.uwaterloo.ca*

Of Moustaches and Men

A History of Movember

THOMAS DONNELLY
2A CHEMICAL

One in every seven men is affected by prostate cancer according to the Prostate Cancer Foundation. Every November, the Movember Foundation encourages men across the world to raise awareness of issues like prostate cancer that affect men's health. How? By encouraging men to grow moustaches.

Movember – a portmanteau of "mo," an Australian slang term for moustache; and "November" – has grown significantly from its humble Aussie origins. The Movember Foundation's official tagline is "changing the face of men's health," and they appear to be succeeding. Partnering with organizations across 21 countries, the Movember Foundation has raised a total of $570 million from its establishment in 2004 to last year's November. Supporters of Movember are endearingly referred to as "Mo Bros and Mo Sistas."

The funds raised during Movember go towards increasing early cancer detection and diagnosis as well as developing more effective cancer treatments. The foundation also encourages men to be aware of their families' medical histories, get tested regularly for prostate and other male cancers, and generally adopt more healthy lifestyles. Though an emphasis is placed on prostate cancer, the Movember Foundation also raises funds and awareness for mental health issues, partnering with organizations such as *beyondblue*, an Australian initiative to address issues caused by depression and anxiety.

Drunken Philanthropists: The Origin of Movember

The earliest documented use of the term "Movember" comes from a 1999 report on Seven News, known at the time as Seven Nightly News. In a pub in Adelaide, South Australia, a few men joked about growing moustaches for charity, albeit for quite a different cause. Coining the term "Movember," the joke became a mission, and the small group grew to over 80 people. This "Movember Committee" aimed to raise money for the Royal Society for the Prevention of Cruelty to Animals by selling T-shirts and "growing whiskers for whiskers," as they called it.

It wasn't until 2003 when Movember once again marked the calendar. Unrelated to the "Movember Committee", another group of friends were drinking at a bar, bemoaning how the "mo" had gone out of style, and wondering if they could bring it back. Inspired by fundraising efforts to combat breast cancer, the group agreed on a small goal: convince 30 men to grow their moustaches for the 30 days of November to raise awareness for prostate cancer. No funds were raised, but their simple success encourage the group to continue their efforts.

In 2004, the total proceeds from the year's Movember, just over $50 000, were donated to the Prostate Cancer Foundation of Australia (PCFA), despite the organization having refused partnership with the campaign beforehand. The amount was the largest single-donation that the PCFA had ever received. The next year, PCFA became Movember's first official men's health partner, and Movember raised over $1 million.

In 2006, the Movember Foundation was granted charity status in Australia, giving the mo-vement its current name. The foundation's efforts also expanded to New Zealand, partnering with the Prostate Cancer Foundation of New Zealand. It was this year that *beyondblue* became the second Australian partner of the Movember Foundation. After only four Novembers, nearly $10 million had been raised for men's health – and it all started with 30 dudes growing facial hair.

International Expansion: "Mo Man is an Island"

Moving into 2007, Movember continued to expand internationally. Under the concept "Mo man is an island: Mindset, Journey, Destination," Movember partnered with charities such as Prostate Cancer Canada and events were launched in Canada, US, UK, and Spain. Now campaigning in six countries, the Movember Foundation once again dramatically increased its success, raising a total of $21.5 million. The next year, Ireland was on board via the Irish Cancer Society.

By 2009, the foundation raised over $96 million. Meanwhile, results from these funds were beginning to become evident: through Movember funding, the University of Michigan Comprehensive Cancer Center identified over 25 different types of prostate cancer and classified them based on their aggressiveness. In 2011, Movember contributed $15 million to the Canadian Prostate Cancer Genome Network project. Projects such as these aim to explore the biology and genetics behind prostate cancer, and their results can hopefully be used to develop better methods for preventing, detecting and treating the disease.

The success of the Movember movement also began to receive widespread recognition around the same time period. In both 2011 and 2012, the Global Journal ranked the Movember Foundation in their list of the top 100 NGOs in the world. GQ Men of the Year 2013 awarded the Social Force of the Year award to the Movember Team.

Growing Forward

As of last year, there were 4 million Mo Bros and Mo Sistas, and 800 programs across the world received funding raised by the Movember Foundation. Campaigns such as Movember and the recent ALS Ice Bucket Challenge demonstrate that innovative, fun, and somewhat strange approaches to charity can be incredibly successful both in raising funds and creating awareness. The growth of Movember since 2003 speaks for itself.

So if you are in any way repulsed by a boyfriend's, friend's, co-worker's, or even stranger's recent upper lip fuzz this month, remember what it stands for. Respect that Mo Bro, and remember that mo mos, mo money. This means mo money to help address a lot of problems affecting men's health.

If you want to get involved, donate, or learn about Movember, visit *movember.ca*

UW Biotech Student Design Team Competes at Harvard

ELIZABETH SALSBERG
UWDNA RESEARCH TEAM

On Saturday November 2, the University of Waterloo Designed Nanoscale Assembly (uwDNA) team competed at BIOMOD, an annual biomolecular design competition for undergrads held at Harvard University. With 30 teams present from across the globe, including China, Japan, the U.S., and Europe, uwDNA was one of just two Canadian teams, the other coming from the University of Calgary. Overall, it was very exciting to be competing at the event. The team showed a lot of skill, passion, and mettle in what was a very interesting and innovative crowd of projects.

In just our second competition, we received a bronze project award. Our project was entirely student-motivated, though of course it would not have been possible without our mentors and supervisors, Dr. Aucoin, Dr. Siu and Dr. Park. The team would also like to thank WEEF, the Dean of Engineering, the University of Waterloo Centre for Bioengineering and Biotechnology, and the Provost for their generous support.

Our project was one of several presented which were geared towards drug delivery for the treatment of cancer. The idea was based on boron neutron capture therapy (BNCT), a well-explored option as a cancer treatment. What makes BNCT such an attractive and strongly pursued cancer treatment is its ability to selectively destroy tumour cells, something traditional cancer treatments such as chemotherapy are not capable of. The two challenges in the development of BNCT treatments have been to selectively target tumour cells to which the boron must be delivered, and to ensure that enough boron gets into the tumour cells for the treatment to be effective.

Our team was successful in designing a system that delivered on both fronts: Using a gold nanoparticle loaded with boronophenylalanine (BPA) layers and cancer-targeting folic acid, our system would selectively target tumour cells and ensure that sufficient boron got into those cells. In combination with last year's project, self-assembling DNA walkers, we would be able to attach other nanoscale cargoes for imaging functionality, such as iron oxide nanoparticles or quantum dots.

In the lab, we were able to synthesize and characterize our DNA walkers and BPA-layered gold nanoparticle. Due to time and resource constraints, the rest of the project remains a possibility for future work. Regardless, the idea was very well received by everyone at BIOMOD, and the team was encouraged to pursue the work further.

The team worked hard all year to prepare a project for this year's BIOMOD. In addition to designing and executing the project, teams were required to prepare a YouTube video, a project 'wiki' (a web-based detailed technical write-up of the project) and a 10-minute summary presentation. To address these requirements, the team is made up of research, experimental, business, software and media sub-teams, with several members involved in more than one.

The research team develops and proposes project ideas and is also instrumental in procedural development by constructing the project and characterizing every step along the way. An extension of the research team, the experimental team is responsible for carrying out procedures and executing the project in the lab. uwDNA's business team ensures that we receive adequate funding for our projects. The software team is tasked with building a creative interface for the wiki and team website, as well as modeling our nanoscale ideas in CADnano. The media team collaborates with software on the website and handles all social media updates, but their key responsibility is putting together a phenomenal YouTube video about the project.

Primarily made up of nanotechnology engineering students and science students specializing in biology-related fields, we are excited about new developments in biotechnology! We are always interested in new, enthusiastic members and encourage students from all years and faculties to join us. There is plenty of opportunity to get involved in all of our teams, so don't be shy!

All in all, it has been a very successful second year, and we look forward to building on that success at next year's BIOMOD. With new project ideas on the table already, we hope to commence lab work in the winter. See you next year Harvard—we'll be ready.

New World Trade Center Open for Business

ALLEN CHEN
2A CIVIL

13 years after the destruction of the original World Trade Center (aka the Twin Towers) on November 11, the new 1 World Trade Center, under construction since 2006, has opened for business. 1 World Trade Center is the main building in a complex of six other buildings named 2 to 7 World Trade Center respectively. Construction just finished this month and the official opening was on November 3. Magazine publisher Condé Nast moved their main headquarters to 1 World Trade Center as the building's first commercial tenants. Condé Nast is located on the 20th to 44th floors of the 104 floor tower. The New Jersey and New York Port Authority also moved into the complex, in the neighbouring 4 World Trade Center. The State of New York also plans to move staff into several offices in 1 World Trade Center. Vantone Industrial Co., a Beijing-based company, plans to have offices in 20-year lease between floors 64 and 69.

Originally named "Freedom Tower," 1 World Trade Center, as well as the other buildings in the complex, underwent the design process almost immediately after the original World Trade Center was destroyed. These were mostly in the form of preliminary designs and proposals, most of which were rejected. The final design was presented in 2005 and, after some debate over the cost and security of the project, construction began the following year.

Upon the addition of the spire in 2013, 1 World Trade Center became the fourth tallest building in the world at 546.2 metres, and the tallest building in North America and the Western Hemisphere. 1 World Trade Center is almost as tall as the CN Tower (553 metres), the tallest freestanding structure in the Western Hemisphere. For clarification on the difference between building and freestanding structure, a building is defined as a structure with continuously occupied floors, whereas a freestanding structure is a more general term that encompasses buildings and other structures, so long as they don't have external supporting structures.

The new buildings had a lot more security features implemented into their designs. 1 World Trade Center has reinforced concrete walls that are nearly 1 metre thick (93 cm) in key locations of the building including stairwells and elevator shafts. Chemical filters are also present in the ventilation system. The new tower was also constructed further away from adjacent buildings to avoid significant collateral damage should the tower be in a similar situation as during 9/11. The façade facing these buildings are actually made of blast resistant tempered plastic, which appears just like glass.

Overall, 1 World Trade Center cost approximately $3.9 billion in construction. In addition, the design and construction was hindered by several political and engineering issues that would ultimately cause more financial problems. No matter the cost, the new World Trade Center complex will be known as a symbol of perseverance and resilience in New York, and likely, all of the United States, for many years to come.

Foreign Language Signage Debate Rages in BC

ANDREW MCMAHON
4A ENVIRONMENTAL

Voters of Richmond, British Columbia (BC) will head to the polls on Saturday, November 15 to elect a mayor, eight councillors, and seven school trustees. A hot topic during the buildup of this election has been the city's controversial foreign language signs. The issue surfaced last year when two Richmond residents presented a petition which had garnered over 1000 signatures to city council in hopes of limiting the amount of foreign language (primarily Chinese) on business' signs. Council initially struck down the proposal, saying it was up to the business owners to decide what was displayed on their signs. Evelina Halsey-Brandt, a long serving councillor who is not seeking re-election, dismissed the proposal at the time but has since changed her stance on the issue. After seeing a development sign in her neighborhood which contained no English text, she said, "It's one thing for businesses to advertise only in Chinese, but on development signs that are supposed to inform me of what's going on in my neighbourhood?"

Richmond, BC is a suburb of Vancouver, and is one of the most significant Chinese communities in Canada; more than half of its population of 205 000 descend from China. As a result, companies are targeting the Chinese community through billboards and other advertisements written entirely in Chinese. Two weeks ago, at a general council meeting, city councillors unanimously agreed to a resolution directing staff to conduct a broad public consultation on the matter. This will include consulting with business owners and multicultural community groups, in addition to investigating the "effects foreign language signs have on community harmony."

We are used to seeing language debates springing from Quebec's interest in having French predominate English in the province. Quebec's "language police" have moved against companies and stores whose advertisements and signs are exclusively in English. To contrast the situation in Quebec to that in Richmond, the debate in Quebec is about mandating the province's official language (French) over English; in Richmond, the debate is about mandating one of Canada's official languages (English) be used over a growing-but-nevertheless-unofficial language.

Brad Salzberg, a online commenter on an article titled *Sign By-law Vote Could Come in 6 Months* which was published by the *Richmond Review*, points out that all of the controversy over violations to the Canadian Charter of Rights and Freedoms may be unwarranted because another Canadian suburb, coincidentally named Richmond Hill, Ontario, already has a by-law in place regarding foreign language signage. Under this by-law, signs containing less than 50% English or French are not allowed to be displayed.

The Richmond Chamber of Commerce has expressed that the city's sign issue is best left to free enterprise; it argues that if a local business wants to exclude non-Chinese speaking members of the population (nearly two million in Metro Vancouver), then that is their decision. Four years ago, Moncton, New Brunswick, which has a roughly two-thirds English speaking and one-third French speaking population, turned down a citizens request to make bilingual signage mandatory, opting instead for the gentle encouragement route to solve the issue. Solutions such as monetary incentives, city-funded workshops, and dedicated translators to help business owners develop English language signage were all proposed to try to solve the signage language issue without requiring a by-law to be put in place. To contrast, in Dieppe, a Moncton suburb, instituted a by-law which demanded that French be prominent displayed on nearly all new signage.

There appears to be two different debates at play here. The first one is whether or not small business owners and advertising agencies should be forced to display signs with at least one of the country's official languages. The second is that development signs and other public notices relating to a neighborhood should be printed in one of the country's official languages. Whether or not a by-law is introduced to address either one or both of these debate topics will not be known for at least a few months. In the meantime, the representatives involved in the upcoming municipal election are scrambling to pick the more popular side of the debate in the hopes of gathering more votes.

UW Team Victorious at National Mining Competition

NACHIKET SHERLEKAR
3B NANOTECHNOLOGY

A team of University of Waterloo students recently attended the third annual National Mining Competition hosted by the University of Saskatchewan. After a grueling couple of days, with multiple challenges and presentations, the team emerged victorious at the top. The competition began on October 30th and final presentations were held on November 2nd. The four person team of 2B Chemical Engineers was one of 16 teams from across Canada, as well as other countries including India, England, and Germany attended. Many industry experts were also present to help guide delegates and judge the presentations. These experts were comprised of engineers, consultants, managers, government officials and accountants.

The competition revolved around a fictional mining company for which each team is a consultant. The goal was to create a strategy for the development of the assets that the company owned. The first challenge placed teams in a room full of experts. The teams were given a short period of time to ask each expert questions before moving on to the next. The second challenge involved public relations – one member of each team took on the role of CEO for a mining company whose mine is in close proximity to a wild fire. Finally, the main presentation was held at the University of Saskatchewan's Edward's School of Business. Here teams were split into four different groups and presented to a panel of judges. The top presentation in each group went on to the finals, along with one wild card decided by all of the judges. The final presentations were conducted in a large hall, with the judges being senior executives from various mining companies.

Vincent Zhu, one of the team members, spoke about the team's efforts: "Our team's submission was far from perfect. Being a team of engineers, it was difficult to grasp the financials behind the case. It was very fortunate for us that we had all taken engineering economics the term before, which helped us with our economic analysis. While we were not a multi-disciplinary team, we approached the challenge from all angles. We ensured that our presentation had not only the financials (and numbers to back those financials) but also took into consideration socio-economic impacts of each action and how to mitigate them, as well as recommending new technologies that could be implemented into the company's operations."

"Coming into the competition, we were definitely not experts in mining technology or business. We placed first in the Waterloo Engineering Consulting competition last term and that's what earned us the spot to represent Waterloo. Luckily for us, the first challenge gave us the opportunity to talk to some experts and get some insight on how to work on our case. Insights such as, 'if you're going to close a mine get ready for some community backlash, because a lot of people will be losing their jobs.' A large part of the competition was finance, and we spent a good part of the weekend just coming up with some numbers to back our presentation (unbelievable that the national mining competition is so finance heavy- it's just WACC). As for the actual presentation, we were taken aback when we made the finals. While delivering our final presentation, it felt as if we were completely grilled by the judges. Nevertheless, we were elated to hear that we had won, especially considering that we thought of ourselves as being underdogs in this competition."

Vincent Zhu

Marco Chan and Seung-Youn Lee with the first place trophy

This is the first time that UW has sent a team to participate in this competition, so it is quite an achievement for the team to have emerged victorious. Congratulations to Seung-Youn Lee, Marcon Chan, Andrew Jiang and Vincent Zhu on their superb representation of Waterloo. With so many students like these it is hoped that the trend of winning continues in future years.

Making Electronics at Waterloo

JOE KINSELLA
4A MECHATRONICS

Waterloo is constantly touted as the most innovative school in Canada, at least by Maclean's and often by ourselves. We just need to keep in mind that only a small part of that has to do with the school itself. The rest comes from the students. That may sound like a cliche, but the point is that we students, as budding innovators and inventors, need to learn more than what we are taught in our courses.

One of the easiest places that this can be seen, as well as the one I am most familiar with, is in electrical design. As a 4A mechatronics student, I have learned my fair share of electrical engineering concepts and have had a few opportunities to apply these in various labs. Still, there's a huge difference between what we work on in labs and the kind of electronics projects that are so popular on hackaday, kickstarter, reddit, and wherever else people post their homemade or prototyped gadgets.

Now if you are anything like how I used to be, you might be intimidated by these gadgets. I mean, how could I possibly make a smart watch? Or an automated drink dispenser? Or a quadcopter from scratch? Well, I want to tell you that you can design these wonderful things and build them. You just need the motivation to start.

What I have found is that it turns out that being in engineering does prepare us for one thing extremely well, and that is learning. We are capable of taking on a project that we have no idea how to complete, researching the components, and learning how to do it ourselves. In electronics, for example, this could include how to program a microcontroller, how to get it to talk to some sensor over I^2C or some other protocol, and making control systems that get it to do something cool. Any one of these could be covered as a topic in a course, but it's a course where we have to be our own professor and our own TAs.

Waterloo is changing; it used to be expected that the students would just naturally decide that their courses aren't enough and that they should learn new skills on their own through personal projects. Naturally when you want to use machinery and are living in student accommodations these types of projects could be more than a little sketchy. Now we have places like velocity-especially the hardware focused foundry-as well as student teams and now Ridgidware (cough…cough you should check that out, CPH foyer, 11:30 to 1:30, Tuesday and Thursday). The goal is to help show you that you are capable of designing actual, practical things completely outside of school, regardless of whether this has to do with electronics, mechanical parts, or even other engineering disciplines. The trick is to get started and learn the necessary skills as you go along. That way, even if you don't end up finishing your project, you're still left with actual, real world applicable skills.

Algae Virus Slows Brain Function

DEVIKA KHOSLA
1A NANOTECHNOLOGY

Not feeling so smart? Could be an algae virus.

Recent research has found that a virus, ATCV-1, can affect certain cognitive functions in humans. The virus is normally found in green algae, however it can live in the throats of humans. Previously, it was unknown that the virus affected humans in any way.

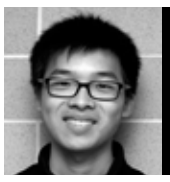
In this study, published in the *Proceedings of the National Academy of Sciences*, 92 healthy participants were given various cognitive assessments and had their throats swabbed. Forty of them were found to have the virus. When comparing the test results, the researchers found that those infected with the ATCV-1 performed about 10% worse on tasks measuring the speed and accuracy of visual processing. These tasks included things like drawing a line to connect numbers randomly placed on a page. If you have the virus, you might not be so good at video games or connect-the-dots; but it probably won't affect your scores in other tasks, like writing or doing calculus.

The results were not associated with any demographic differences, such as race, sex, age, place of birth, or education level. In fact, the virus itself may not be the cause of the impairment; it may just benefit from other things, such as heavy metals or pollutants, that affect some people's brains.

The researchers also tested the effects of the virus in mice. They injected some mice with the virus, and then put them through several tests. Mice with the virus moved as well as other mice but showed decline in recognition, spatial skills, and attention span. For example, they took longer to navigate a maze, and spent less time examining a new object than new mice.

The researchers say, "The similarity of our findings in mice and humans underscores the common mechanisms that many microbes use to affect cognitive function in both animals and people." Their findings open up new avenues of research into human health, and help us delve ever deeper into the mysterious world of the microbes which live around and in us.

MET Supercomputer



DEREK KAN
2A CIVIL

Weather forecasts are about to become a lot more precise around the world, especially in the UK where the Met Office has announced a plan to purchase what would be one of the most powerful supercomputers in the world. Folks in London will now be able to have a more accurate reading of their 364 days of rain.

This 309,000 lb, £97 million computer will likely be able to run 13 times faster than the existing IBM supercomputer, performing more than 16,000 trillion calculations per second. The extra capacity will be useful for climate scientists, who need immense amounts of computing power to run detailed models over a long period of time.

The supercomputer will have 480 000 central processing units, about 12 times as many as the current Met Office supercomputer. It marks the biggest contract that the Seattle based Cray supercomputing firm has confirmed outside the United States. The purchase would put the UK at the forefront of weather and climate science. The advance in flood warnings, less air travel disruption, and efficient planning for the impacts of climate change are estimated to deliver around £2 billion in socio-economic benefits.

To be built in Exeter, England during 2015, the system is to be operational next September and reach full capacity in 2017. It will be able to provide hourly updates and highly detailed weather information for local areas and particularly important areas that require a more accurate assessment. Forecasts of wind speeds, snow, and fog could be delivered to major airports and the public with a spatial resolution of 300 metres compared to the current 1.5 kilometre accuracy.

The weather in the UK is notoriously hard to forecast because of its topography and environmental influences from the surrounding Arctic and the Atlantic Oceans. However weather forecasts are of utmost importance, whether it be for the daily commuter, road maintenance, or runway closures at airports.

The Met Office currently receives 106 million observations per day from around the world using weather balloons, satellites, and commercial airplanes which send data as they fly between destinations. The Met computer then integrates the weather observations with broad-scale factors such as air pressure differences, solar radiation, the rotation of the Earth, and the water cycle into modeling software to predict the weather around the world.

UK weather prediction has had some major slips in forecasting in the past. These including the denial of an approaching hurricane in 1987, which killed 19 people; and the suggestion of a 2009 summer perfect for barbequing which ended up in relentless downpour. The new system is sure to raise expectations for improved forecasting accuracy and the Met Office is confident that they will deliver. This investment in computing power is just another example of how technology benefits mankind, informing and protecting the public from the ever-changing weather.

Advice from the Professional Engineers of Ontario

The Importance of Networking, Extracurricular Involvement, and Professional Development

HEATHER SMITH
VP EXTERNAL

Hey Engineers! Hopefully things are starting to wind down after the month-long whirlwind of midterms, assignments and projects, otherwise known as October. I don't know about you, but when it comes to my engineering degree, I like to take things in small steps. A lot of us might be thinking as far as the holidays, or the next work term. Thinking ahead, after 5+ years of finals, all-nighters, and frustrating assignments, we're all working towards getting our engineering degree. Some may be thinking of working towards a Master's degree or a P. Eng. Regardless, to get some insight on what the real world has in store for us, the Engineering Society ran its first ever PEO Speaker Panel. Three Professional Engineers and one Engineer in Training from the PEO Grand River Chapter were invited to come to the University of Waterloo and answer the questions of undergraduate engineers with regards to their experiences throughout university as well as during their careers.

A broad range of speakers at various points in their careers and from different engineering disciplines were in attendance. Jonathan Velasco is a Project Engineer at Nexans Canada, which offers products and solutions for a broad variety of markets ranging from aerospace to wind farms to petrochemicals and everything in between! Jonathan is an electrical engineer specializing in automation and robotics, as well as Process and Manufacturing Engineering. Adam Buggeln is a Technical Lead at L-3 WESCAM, which specializes in the designing and manufacturing of imaging and targeting sensor systems to be utilized in military, home security systems, and law enforcement agencies internationally. As a 1996 Mechanical Engineering Waterloo Alumni, Adam had a lot of knowledge to share! Another alumni in attendance was Sylvie Spraakman, who is an Engineer-in-Training at Conestoga-Rovers and Associates, an environmental consulting, construction, and information technology company. She graduated with an Environmental Engineering degree from the University of Waterloo in 2011. During her time at Waterloo, she was involved in Engineers Without Borders, Women in Engineering, and R3Design. Kevin Fergin is a Civil Engineer who supervised the construction of various residential, commercial, institutional, and industrial projects at Stantec. His projects include improvements to Victoria Park Lake in Kitchener, and the expansions of the Lutherwood Children's Mental Health facility in Waterloo and the Cambridge Memorial Hospital.

Each of these speakers offered different perspectives as a result of their experiences and areas of expertise:

Networking

- All panelists agreed on the importance of networking when it comes to finding a job and moving up in a company.
- When approaching your boss to discuss a raise or a promotion, have a "sponsor"—a colleague that is aware of your contributions to the company who would be able to speak to your supervisor on why you are an asset to the company.
- When networking, ask the other person plenty of questions about themselves. People enjoy talking about themselves and appreciate it when others take interest in their lives.

University

- Getting involved in extra-curriculars was highly recommended for developing the soft skills that are needed in the workplace, such as teamwork, communication, and time management.
- Jonathan recommended Toast Masters, a club offered at the University of Waterloo, to improve communication and public speaking skills.
- Keep contact with the people you meet in university. They might be able to help you land a job one day in the future.

Careers and Professionalism

- Working under someone that is difficult to work with requires finding a style of working that suits both you and your supervisor. If the work you do is making your boss look good, then you're doing a good job.
- Leave work at work. When you're at your job, discuss work related matters, but if you go out with colleagues after work, talk about anything but work and form deeper connections.
- Be careful what you put on the internet. This is something we were all told since middle school, but the first thing many employers do when going through prospective applicants is a quick google search.

This event ran smoothly and attendees as well as speakers were engaged. Once questions were answered, everyone had the chance to network and chat with the speakers in smaller groups. If you are interested in attending this event in the future, look out for another one in the Spring 2015 term!

Time to Enjoy the Post Midterm Lull

PUNEET NATT
VP INTERNAL

Hi everyone! Hope your weeks have been going well since my last article. It may not feel like it yet, but this term is quickly ending and the Engineering Society is also starting to wrap up for the term. Here are a few of our major events within the next couple of weeks. We hope to see you around! Be sure to check our website for more details about each of the events! If you have any questions, feel free to email me at *vpinternal.a@engsoc.uwaterloo.ca*.

Remembrance Day – November 11

The Engineering Society will be holding a small ceremony on Remembrance Day in the E5 student bay from 10:50AM to 11:20AM. Please feel free to stop by if you are able to, or ask your professors to take a moment of silence during your class that day.

Genius Bowl – November 12

The termly trivia competition is back! This event will be running from 7PM to 11PM and we are so excited to see everyone there. There will be lots of candy ready to be won. Sign your team up on the Orifice door (CPH 1327) or on the link on the event's Facebook page.

Autodesk Inventor Workshop – November 13

Interested in learning how to create, modify and improve three dimension models? Then this is the workshop for you! This workshop will be geared towards beginner and intermediate level users. This program can be beneficial to have on your resume as some employers require knowledge of Autodesk Inventor. If you are interested in volunteering for this event, please email me.

Semi-Formal – November 14

Woooooo!! Semi-Formal is happening on November 14! There are already more than 250 people who have bought their tickets and we are expecting many more to do so. This event is a joint initiative between EngSoc and Applied Health Sciences Undergraduate Members (AHSUM). There will also be architecture students joining us from the Cambridge campus. Invite your friends from any faculty. Tickets are $15 and are on sale in the Orifice and AHS Office. They will also be available at the door.

EngPlay – November 19, 20, 22

The directors, cast, and volunteers have put in so much work to produce an amazing play this term. They will be performing CrazyTown and it is going to be great! Tickets will be on sale soon in the Orifice, so look out for posters for ticket sale dates and locations.

Upcoming Events Calendar

Wednesday November 12	Thursday November 13	Friday November 14	Saturday November 15	Sunday November 16	Monday November 17	Tuesday November 18
Charity Pancakes 8:15 AM - 10:30 AM CPH Foyer Genius Bowl 7:00 PM DC 1350	AutoDesk Inventor Workshop 5:30 - 7:30 PM CPH 1346 2017 Spirit Event - Movie Night 8:00 PM - 10:00 PM POETS	Santa Clause Parade Float Decoration 3:00 PM - 6:00 PM E5 Design Bay Semi Formal 8:00 PM - 1:00 AM Turret Night Club	Santa Clause Parade 9:30 AM - 1:00 PM University and King 2018 Spirit Event - Eng Cup! 2:00 PM - 5:00 PM		Charity Grilled Cheese 12:30 PM - 2:30 PM CPH Foyer	Exchange 101 5:30 PM - 7:30 PM CPH 3607 Design Your Hardhat - First Year Mentoring 7:00 PM - 10:00 PM
Wednesday November 19	**Thursday November 20**	**Friday November 21**	**Saturday November 22**	**Sunday November 23**	**Monday November 24**	**Tuesday November 25**
Charity Pancakes 8:15 AM - 10:30 AM CPH Foyer Clothes Drive 9:00 AM - 4:00 PM EngSoc Meeting #5 - Potluck! 5:30 PM - 7:30 PM POETS EngPlay! 8:00 PM - 11:00 PM	Clothes Drive 9:00 AM - 4:00 PM 2016 Spirit Event - Christmas Movie Night 7:00 PM - 11:00 PM POETS EngPlay! 8:00 PM - 11:00 PM	Clothes Drive 9:00 AM - 4:00 PM	WiE Pre-Exam Brunch 10:30 AM - 12:30 PM EngPlay! 8:00 PM - 11:00 PM	2017 Spirit Event - Olympiad 1 PM - 3 PM	Charity Grilled Cheese 12:30 PM - 2:30 PM CPH Foyer Hockey Night in POETS 7:30 PM - 9:30 PM POETS	Colouring Contest 4:30 PM - 5:00 PM WiE Yoga 7:00 PM - 8:00 PM

Directorships, Elections and Getting Involved!

LEILA MEEMA-COLEMAN
PRESIDENT

The term is coming to an end, and this means the Society is already getting ready for the next term! I am going to take this opportunity to talk about getting involved and all the opportunities available next term. Getting involved within the Engineering Society, student teams, clubs, the Federation, or any other student organization on campus is a great way to gain valuable skills and also break up the continuous assignments. Taking on larger roles within these groups teaches leadership, communication, project management and many other soft skills that are directly transferable to classes and coop.

If you are interested in getting more involved with the Society, there are many opportunities coming up! A few main positions, as well as how to apply, are listed below. If you have any questions or want more information please e-mail me at *president.a@engsoc.uwaterloo.ca*. :)

Directorship Applications

Directors run all of the events and services for the Society. Positions include TalEng, EngPlay, athletics, Novelties, Ridgidware, POETS managers, marketing team, and technical workshops. Directors work closely with commissioners to organize every aspect of an event or service and to try to improve the Society. Applications are open right now and full position descriptions can be found on the EngSoc website, engsoc.ca. Directors will be selected based on the strength of the application.

Executive Positions

This spring term, there will be an Executive election for all of the Executive positions. Students in 1B are eligible to run for VP Internal or VP Finance, students in 2A are eligible for VP Education and VP External, and students in 2B are eligible for President. Executive are responsible for their own portfolios as well as the general vision and managing of the Society. Nominations will open in the summer term and the Executive are always happy to answer questions from potential candidates!

Chief Returning Officer

The Chief Returning officer for the Society is responsible for running the EngSoc Executive elections in the spring term. This includes advertising, setting the policies, overseeing the campaign, and setting up the voting system. This position will be elected at the last Society meeting of the term at 5:30 in POETS on Wednesday, November 19. Everyone is welcome to run for this position! Questions should be directed to the President.

Committees, Board of Directors, Officer Positions

There are numerous other ways to get involved within the Society, like sponsorship committee, board of directors, or as chief feedback officer. All of these positions will be elected during council meetings or the Joint General meeting during the spring term. Keep your eye out on the agendas for when elections are happening or ask an Exec what opportunities are coming up!

A Bit of Insight into How the University Works

JOSHUA KALPIN
VP EDUCATION

Hi everyone and welcome to yet another edition of the VP Education exec report! I'm changing things up this time due to there not being a full article's worth of updates. Instead, I'm going to give a short update on a couple things, and then I wanted to use the rest of my exec update this week to explain how one would go about making a change to an academic program and why it takes so long to complete the process. Soooooo let's do this!

First up, I wanted to thank everyone those that attended or assisted with the Career Fair. The turn out was a bit lower than we hoped for but both employers and students found value in the event. If you attended, we'll be sending out a feedback survey to ensure that we can make this a repeatable and impactful event going forward.

Second, Course Critiques have started to be conducted by professors in their classes. If you haven't done a critique yet or don't have a specific time scheduled, work with the professor to pick a pre-planned time so as many students can fill it out as possible. The more responses that are received, the more impact the results of the critiques will have.

Those are the two main updates I wanted to share with everyone this week, so let's move on to talking about how making changes to programs works. The process reaches from the departments to the university and as a result takes a long time to complete. For this we'll use the hypothetical scenario of the department of Management Sciences wanting to add a new course, MSCI 170 (this course does not actually exist).

When a department wants to propose a new course, there first needs to be a topic and an instructor willing to design the course. This instructor, along with the department, would design the content of the course and determine the assessment methods, including whether it has a final exam, tutorials, labs, the total number of lecture hours, etc. Once that has been decided we move into the land of committees.

With the development of a new course, there has to be somewhere to put it so it can be offered to students. A proposal will be presented to a committee within the department to approve where the course will go, what elective requirements it can satisfy and what the calendar description is. Once all of these things are sorted out, it can be make its way into the faculty level committees.

There are two major committees that any change like this will go through: the Faculty Undergraduate Studies Council (FUGS) and the Engineering Faculty Council (EFC). I sit on FUGS and this is where I would first see a change proposed. The President (Leila) sits on Engineering Faculty Council, which is similar to EngSoc council, except it represents the entire faculty. Before a FUGS meeting I will generally consult with the academic reps and students from the program that is experiencing changes (in this example, Management Engineering), unless the changes are trivial or housekeeping related (for example, removing a course that isn't offered anymore from an elective list). Once our new course passes through FUGS it heads on to EFC, where generally few changes are made. The rule of thumb is that once something passes FUGS in the faculty it will not drastically change before being enacted.

After making it's way through the faculty, our new MSCI course will enter the Senate Undergraduate Committee (UGC), another committee that I sit on. Generally, only minor changes are made at this level to the course (i.e. spelling mistakes) and from here it moves onto Senate. Senate is the highest body of the university, and our Senator Allyson will then take over from there. Once our changes pass at senate they will then be enacted in the next year's calendar (right now we are passing the last of the changes for the 2015/2016 calendar).

So that pretty much concludes the quest of our new course until it starts being taught. I hope you all found this interesting. As always, if you have any questions, please feel free to send me an email at *vpeducation.a@engsoc.uwaterloo.ca* at any time.

Finance Committees and Novelties Sales

KEVIN MCNAMARA
VP FINANCE

Hello Engineers! This past Tuesday, the Engineering Capital Improvements Fund (ECIF) Committee met to discuss capital purchases to help improve the Society services and facilities around campus. This term the committee had just over twelve thousand dollars to allocate, which was made up of 15% of the Engineering Society Budget plus re-allocations from past terms. The allocations can be seen on this page. A large chunk of the funding went towards finishing up the LCD screen installations that are going up around the Engineering Buildings to advertise events and provide Society updates. Money to go towards an electronic stapler for the Orifice was allocated so that you will now be able to come in and staple a large pile of sheets without having to fight with the manual industrial stapler. The basis for ECIF is student submissions, and I would encourage you to get in contact with me if you have any ideas for future purchases that could benefit your engineering experience here at Waterloo.

Another committee that met over the past few weeks was the Sponsorship Committee, which saw 14 presentations from various student teams and groups around campus. This term the committee had $9597.06 to allocate. The final allocations can be found on this page as well. Sponsorship happens every term, and if you are a part of a student group or team on campus that is seeking funding, I encourage you to keep an eye out for when proposals are open.

Lastly, I wanted to let everyone know about some awesome sales that will be happening in Novelties over the next few weeks. We have decided to mark down one item each week for the rest of the term. This upcoming week, November 10th to 14th, will be Scarf Week, and the Waterloo Engineering scarves will be 10% off, which means they are only $18. November 17th to 21st, the green How Many Days 'Til IRS t-shirts will be only $10, which is $5 in savings! Finally, from November 24th to 28th, toques will be 10% off, for a sale price of $13.50. Tax is included in all prices. As well, during the week of the 24th to 28th Novelties will be offering free gift wrap for all purchases over $10. Stop by between 11:30 and 1:30 to check it out.

That's about all I've got for this week. As always, feel free to stop by the Orifice to chat if you have any questions, or send me an email to *vpfinance.a@engsoc.uwaterloo.ca*.

Fall 2014 Engineering Capital Improvements Fund Allocations

Fall 2014 Budget	$ 9,597.06
Re-Allocations	$ 2,862.21
Total to Allocate	**$ 12,459.27**

Fall 2014 Proposed Allocations

Item	Cost
Financial Software Upgrade and Training	$ 519.19
LCD Screen Installation	$ 2,337.91
Supplies	$ 137.91
Bank Charges	$ 202.26
2 to 3 New Folding Tables	$ 300.00
New CnD Cash Chairs/Stools	$ 500.00
LCD Screens and Installation	$ 4,000.00
Computers for LCD Screens	$ 630.00
Electronic Stapler, 70-sheet	$ 500.00
Orifice Desk Upgrades	$ 3,332.00
Total Allocations	**$ 12,459.27**

Fall 2014 EngSoc Sponsorship Requests

Group	Requested	Allocated
Engineers in Medicine	$ 600.00	$ 250.00
uWaterloo Baja	$ 1,500.00	$ 1,150.00
Waterloo Hybrid	$ 2,000.00	$ 600.00
Midnight Sun	$ 607.58	$ 607.58
UW Eco Marathon	$ 19,750.00	$ 1,738.00
UW Concrete Team	$ 400.00	$ 400.00
UW Steel Bridge Design Team	$ 1,064.87	$ 1,064.87
WatSat	$ 669.61	$ 669.61
UWAFT	$ 3,000.00	$ -
iGEM	$ 880.00	$ 880.00
UWMAV	$ 1,455.00	$ -
UW Electric Motorsports	$ 630.00	$ 630.00
UW FSAE	$ 607.00	$ 607.00
Rocketry Team	$ 1,000.00	$ 1,000.00
GRAND TOTAL	**$ 34,164.06**	**$ 9,597.06**

E7 to Provide Relief as Student Body Expands

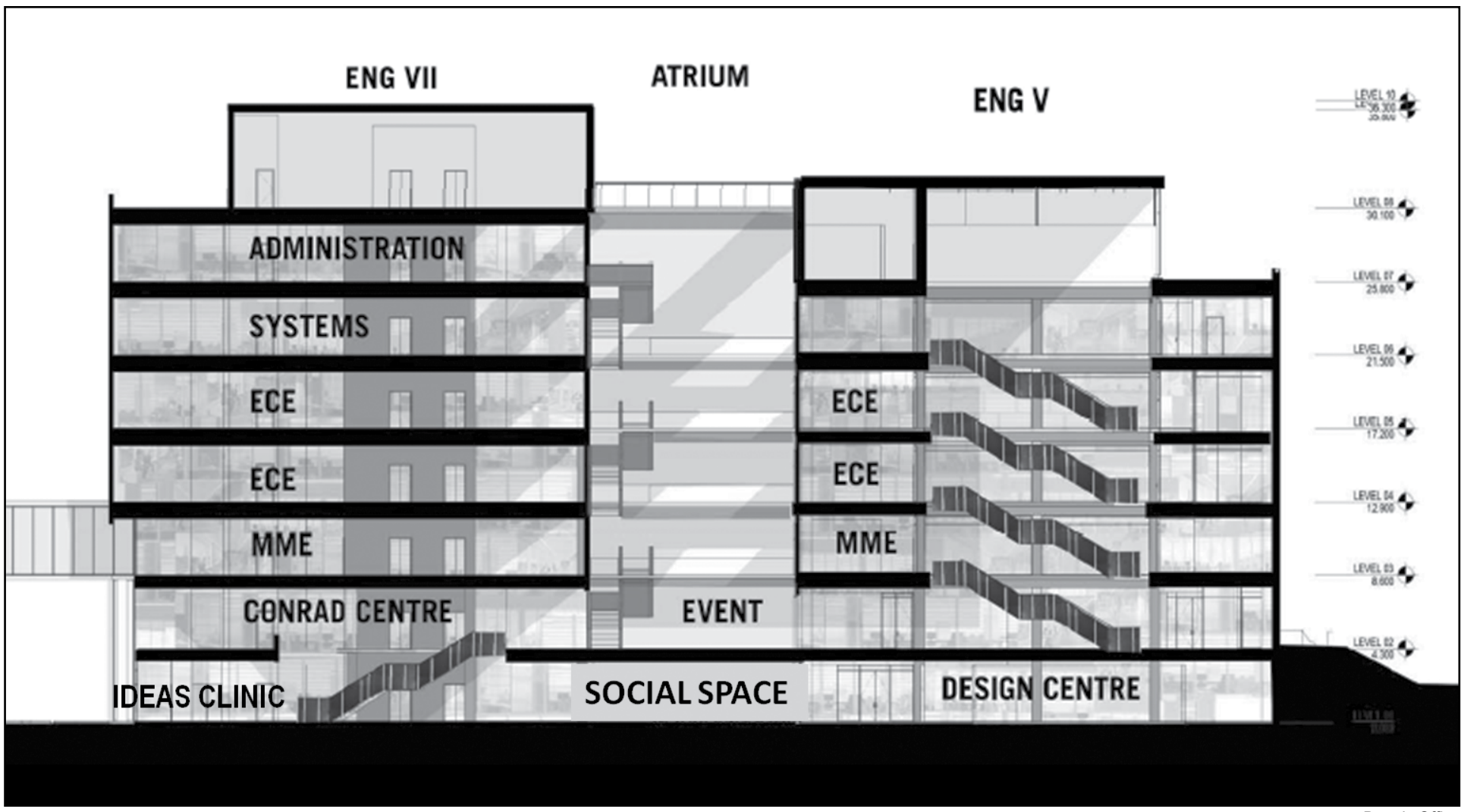
Groundbreaking Planned for October 2015, with Opening Planned for September 2018

Continued from NEW on Page 1

Groundbreaking for Engineering 7 is targeted to take place in October 2015 with the project to be fully completed by September 2018.

The past 20 years have seen considerable expansion in the size of the Engineering Faculty, but the growth of physical space seriously lagged behind undergraduate and graduate student enrollment growth. The relatively recent addition of programs like Mechatronics, Management and Biomedical, as well as the expansion of other programs to include more students have put a severe strain on resources. This necessitated the rapid addition of new buildings based on prioritized needs. Engineering 5 (E5) was constructed first because of the pressing need for additional classrooms, graduate student offices, and proper garage space for student teams. Engineering 6 was built after that because the nearly sixty-year old Doug Wright Engineering building (DWE) required extensive renovations to meet health and safety standards and provide for the needs of modern research labs (to allow for continuity as DWE was renovated after the construction of E6). With Engineering 7, the goal is to provide student space for the growing student body, namely the new Biomedical Engineering and the expanded Mechatronics Engineering programs. Consolidating classes means cohorts will be near other students in their program, lab space, and staff support for their programs. An expanded machine shop will also alleviate scheduling issues that have seen students lining up as early as 6 am because of the 30 person occupancy limit at any one time. Additionally, moving the administration offices to E7 will free up space in CPH for the Management Engineering program, while additional Engineering classrooms will allow other Faculties to use RCH.

For many of us the optional fee will not begin until after we have graduated. This building, and the ideas born within it, will be something we will only get to experience second hand. However, the vision that it represents will continue to make ripples for the next generations of undergraduates, student innovations in research and garage spaces, and co-op employers well into the future.



Dean's Office

A sectioned elevation drawing indicating planned usage of rooms in E7, which is planned to focus largely on providing social space.

Space Society to Take Part in Exoplanet Naming

BOGDAN CONSTANTINESCU
1A NANO

The University of Waterloo is known worldwide as a center for innovation, creativity, and excellence. But as of October 20. 2014, its very own Space Society is now recognized as an official naming committee of Exoplanets. The University of Waterloo's Space Society is only one of two Canadian organizations that are recognized by the International Astronomical Union, thereby giving them the right to name Exoplanets.

For those of us, like myself, who did not know what Exoplanets were before, they are simply any planets not pertaining to our Solar System. This means that any planets which orbit any star other then the sun are considered to be Exoplanets. There are over 1,800 known Exoplanets and the Space Society has been put in charge of naming 30 of them for the upcoming competition in which a general vote will decide the new names of the Exoplanets. At this point in time most Exoplanets only have catalog names and this is one of the main reasons the IAU put forth this proper naming competition. The way the competition is planned, the recognized groups will put forth candidates for the names of the planets, and then a vote will be arranged in which any person can partake. This means it is imperative that as a school we support the Space Society and make sure to vote for the names that are submitted; otherwise we leave their success up to fate. Consequently, the name with the most votes will be elected to represent that planet. The final results of the competition are announced to be released to the public around August 2015, and will see the majority of Exoplanets properly named. To be able to be in such a unique and influential position is truly remarkable and our Space Society should take great pride in what it has achieved.

On top of all this, the Space Society is simultaneously venturing into many other interesting projects and has over 200 active members working exhaustively to achieve these. One project includes creating a solar-powered high altitude balloon capable of reaching a height of 30 000 feet. As this is a very extensive project they are undertaking, there are many sub-groups working on separate portions of the project. Some of the groups include: mechanical, communications and computer architecture/hardware. When asked about his hopes for the project, the vice-president of the Space Society, Anton Bondarenko, stated, "I envision this project as a steadfast model that can serve as a template for future generations of Space Society partners. What we create this year can be used in the future as something to add to and mold into a greater mechanism". Anton is currently in his first-year here as a Nanotechnology Engineer and has had a deep passion for the great unknown since he was a mere toddler. He has many wonderful ideas on how to lead and shape the future of the Space Society into being more successful than it has ever been.

The initiative and drive of the entire Space Society is to be appreciated and once again proves the initiative and ingenuity that takes place at the University of Waterloo. If you are interested in joining or even querying about the Space Society, they have weekly meetings at RCH 103 from 5:30-6:30 pm or they can be reached at *uss.main.mail@gmail.com*. As a final thought, whether it be from something as extravagant as naming planets, to something as creative as producing a solar-powered balloon, the Space Society is definitely a driving force of innovation at Waterloo.

Leah Kristufek

The society sometimes hosts observatory nights.

Rocket Delayed, Explodes Upon Launch

RATAN VARGHESE
1A ELECTRICAL

It seems the unmanned Orbital Science's rocket that was planned to launch this week just couldn't catch a break. First the launch date was postponed from Monday to Tuesday due to space junk nearing the International Space Station. When the launch was finally attempted, the rocket promptly exploded. Thankfully, neither of these events caused any injuries... except for the wallets of those involved.

How did things go so wrong?

The Delay

The International Space Station (ISS) had to dodge a piece of space debris on Monday. Had the ISS stayed on its original path, it would have passed within just a few hundred metres of the wreckage. The aforementioned Orbital Science rocket was carrying a Cygnus module with supplies for the ISS, but its Monday launch was postponed to avoid the junk.

The 'junk' in question was the remains of the Russian Kosmos 2251 satellite, which had collided with the American Iridium 33 satellite in 2009. That had been the first accidental hypervelocity collision of two intact spacecraft. It was an eerie reminder of the fate the ISS crew had dodged that day. That collision and this subsequent near miss demonstrates how debris from collisions make future collisions more likely. This effect is called the "Kessler Syndrome" (named after NASA physicist Donald Kessler), and it ends with the creation of a debris belt around Earth. Even a fleck of paint is pretty dangerous if it orbits at Mach 8.8. You should probably buy those Virgin Galactic tickets while it's still (relatively) safe.

There are plenty of ways space junk could be cleared, in theory. Gels, foams or nets could accumulate waste, fall into the atmosphere, and burn up. Lasers are another possibility, readily available to those with both a time machine and a Get Out of International Crisis Free card. Nobody wants to see their rivals place weapons in space, or find out that a 'decommissioned' satellite was involved in a secret surveillance program. Another issue is cost; cleanup apparatus must be launched and refuelled. In some schemes (notably the "stick trash to gel" plan) the cleanup tools, expensive though they may be, must burn along with the refuse it collects.

The Explosion

Speaking of burning large sums of money, the Orbital Science rocket didn't even leave orbit before annihilating itself. It exploded mere seconds after leaving the launch pad, like a $200 million fireworks display. The explosion was actually intentional: upon noticing engine failure, the safety officer at the launch site sent commands to detonate explosives in the booster. This is standard procedure to prevent faulty rockets from reaching populated areas. The rocket was operated by the Orbital Science corporation, as part of their multi-billion dollar contract with NASA to send supplies to the International Space Station.

Orbital Science is one of the private space firms competing with Elon Musk's firm SpaceX. This of course makes it an acceptable target of Musk's mockery. According to Musk, the use of aging engines was one of the cost and risk-cutting measures often used by space corporations. Musk's SpaceX is one exception (of course), producing several dozen new Falcon 9 rockets every year. Elon Musk described the rockets used by Orbital Science to resupply the ISS in an interview with Wired in 2012. "It uses Russian rocket engines that were made in the '60s," said Musk. "I don't mean their design is from the '60s—I mean they start with engines that were literally made in the '60s and, like, packed away in Siberia somewhere." While his opinions of the rockets was unfavorable two years ago, upon learning of the explosion Musk tweeted "Hope they recover soon."

During the 1960s, deep into the space race to the moon, the Soviets built enormous rockets to try beating the US to the chase. The gargantuan rockets exploded frequently, the US reached the moon first and after several more decades the Soviet Union collapsed. There were still many leftover unused engines, which private companies have been able to purchase for relatively low prices. It was a rocket with one of these engines, the Antares AJ-26, which failed on Tuesday. Orbital Science originally defended the rocket system; executive Frank Culbert claimed the rocket was "very robust and rugged", and that the engines were "refurbished and Americanized" ... whatever that entails.

Whether the engines really were the culprit of the crash is still under investigation. It will take weeks to totally survey the crash site, according to space agency officials. One of the factors slowing the investigation is the presence of classified technology on the rocket: the cargo included "class-5 crypto" which needed to be kept out of the hands and eyes of the public.

Interesting Cargo

Top-secret tools of the police state were not the only technology lost in the inferno. One third of the payload was scientific equipment and experiments, all packed into the Cygnus module which was meant to connect to the ISS. One such piece of equipment was the Meteor high definition camera. It would've been dedicated to measure trajectories, size and composition of meteors entering Earth's atmosphere.

A San-Francisco-based firm named Planet Labs was building a network of satellites for an Earth-imaging system. 71 of there satellites (individually called Doves) are currently in orbit. The Antares rocket was carrying an additional 26 satellites. The similarly named Planetary Resources had a asteroid-seeking telescope on the rocket, a piece of its ambition for a space-mining future.

NASA planned to transport two small experiments in the Cygnus module. One was a tiny cubical satellite (measuring a mere 10 x 10 x 30 cm) to study climate change by measuring water in the atmosphere. Another was the *Drain Brain* medical device, a collar to measure the blood flow between the brain and heart. *Drain Brain* could've been used to help treat astronauts suffering neurological issues.

Several student projects were also jeopardized. A 7th grade class in Kamloops, B.C. designed an experiment to measure the growth of crystals in microgravity. Other student experiments would've monitored microgravity effects on pea shoots, mosquito eggs, seeds, chia plants and shrimp.

Crossroads of Policy

A more fundamental issue highlighted by these delays and explosions is the changing roles of governments and private entities in the exploration of space. While space-travel was once a government-dominated affair, times are changing quickly. As the space-industrial complex shifts to private hands, will Antares-style disasters become more frequent? And if they do, who's going to pay the cleaning bill?

Certainly this disaster is nothing too new. Since Sputnik graced radios with its incessant beeping, there have been a total of 453 failed space missions, both manned and unmanned. While it may be easy to blame corporate cost-cutting or Soviet engineering for the rocket failure, the fact of the matter is that sending anything into orbit is costly and difficult, regardless of the organization in charge.

As the United States reins in its government spending, it will just have to accept the growing role of developing countries and private entities in space exploration. In a world India can send a probe to Mars for less than *Gravity*'s production cost, and private companies have the ambition to assemble a flock of a hundred satellites in orbit, it is definitely beneficial to collaborate. Compromises will need to be made on all sides, whether it means adjusting trajectories to dodge space junk, pitting corporations against each other to see which one's rockets perform better, or ferrying a little government-sanctioned "extra" to orbit without telling the public.

Space is the final frontier, humankind's last great unknown. This is a fine time to get a larger slice of our society involved in its exploration.

University of British Columbia

A Land of Cars and Concrete

CAMERON SOLTYS
2A MECHANICAL

ENGINEERING TRADITIONS

From what I've heard, British Columbia is a beautiful province, filled with a diverse range of unique and pristine ecosystems including (believe it or not) a rainforest. I have never been to BC personally. Actually, that's not quite true. One time when I went skiing in Alberta, a pair of signs on the ski lift proudly announced when I entered and exited our most western province in the space of 15 metres. Despite having never set foot in the province that this nation built an entire railroad for in a courting gesture, I can say that the University of British Columbia (UBC)'s Engineering faculty has a massive amount of school spirit and tradition. Perhaps it is reflective of the expansive natural environment the students live in with much of it seeming to be centered about concrete slabs.

The centerpiece of UBC engineering is a sculpture known as "The Cairn." The Cairn, which the UBC alumni magazine, *Trek*, helpfully informed me "is [actually] a truncated obelisk, as a true cairn is made up of a number of large blocks," is a source of pride for all engineers and a constant target for defacement by other groups. In fact, the current Cairn, 8 feet tall, painted with a bright red "E," made of rebar-reinforced concrete, and allegedly filled with propane canisters to hinder any attempt to jackhammer the sculpture, is just the latest in a series of cairns, each one larger than the last.

The first and second cairns were not very particularly durable. Small and light, they were dismantled by the admiration shortly after the engineering student, or "Gears" as they are called, erected them. The third Cairn was 5 feet high, and survived for 19 years simply by being too large to be dealt with. Finally the Gears' major rivals, the Forestry faculty, rented a pneumatic drill-equipped backhoe and demolished the obelisk. This was in part, it would seem, in retaliation for the many Forestry mascot-cars—each named Omar—which the Gears had destroyed over the years. Despite the rumors that the remains of one of the multitude of Omars were buried under the cairn, none were found.

The fourth and current Cairn has proven its worth time and time again. It stands strong after an endless assault, which has apparently included: burning, tarring, ramming with a vehicle, and exploding. Undoubtedly someone will take it down eventually, but until then it stands as an iconic monument of UBC engineering tradition.

UBC differs from most other Canadian engineering schools in that the faculty color is red, the traditional purple being given to Arts. The Engineering Undergraduate Society (EUS) sells bright red leather jackets and other apparel. It should come as no surprise to any of the frequent readers of this column that EUS also sells a large variety of pins and patches to go with the jackets. Some are priced extremely steeply—$35 for a Lady Godiva/ERTW patch—but others cannot be bought at all, and must be earned. And of the latter patches, the most coveted of them all is the "Black E." It is given only to students who participate in a "stunt" which "enhances [the faculty's] already prestigious reputation on a global scale."

"Stunt," or STUdeNt projecT, is the name given to a prank pulled by UBC engineering students. They emphasize creativity and originality over vandalism and destruction, which has resulted in some spectacularly daring and impressive pranks. For instance, in 2001 a group of unidentified UBC engineers attached a nylon cord to the bottom of the Golden Gate Bridge, and then came back to fasten an "E" and maple-leaf covered Volkswagen Beetle to it, leaving the car to dangle above the water. This same stunt was also done to a Vancouver Bridge, Lion's Gate Bridge, several times both before and after the San Francisco Stunt. Most other famous pranks have also involved red-painted beetles; one of the more noteworthy ones involves placing a car on the top of the 121 foot Ladner Clock Tower on campus. So originality of the prank might be lacking, but I still give them full credit for their cultivation of the core idea.

Well friends, that is UBC. They may be obsessed with cars and over-engineered concrete pillars. But they have spirit and tradition, and they are proof, as we say, that Engineers Rule The World.

John Tory Should Choose Light Rail Transit

Will the Rob Ford legacy have a long lasting effect on transport in the GTA?

ETHAN ALTER
1A NANOTECHNOLOGY

If there's one problem Toronto's known for, it's crack-smoking mayors. If there are two problems Toronto's known for, it's crack-smoking mayors and traffic. As long as newly elected mayor John Tory stays off the crack pipe, the first problem will be solved. If Tory wants to tackle traffic, he's going to have to deal with Rob Ford's legacy.

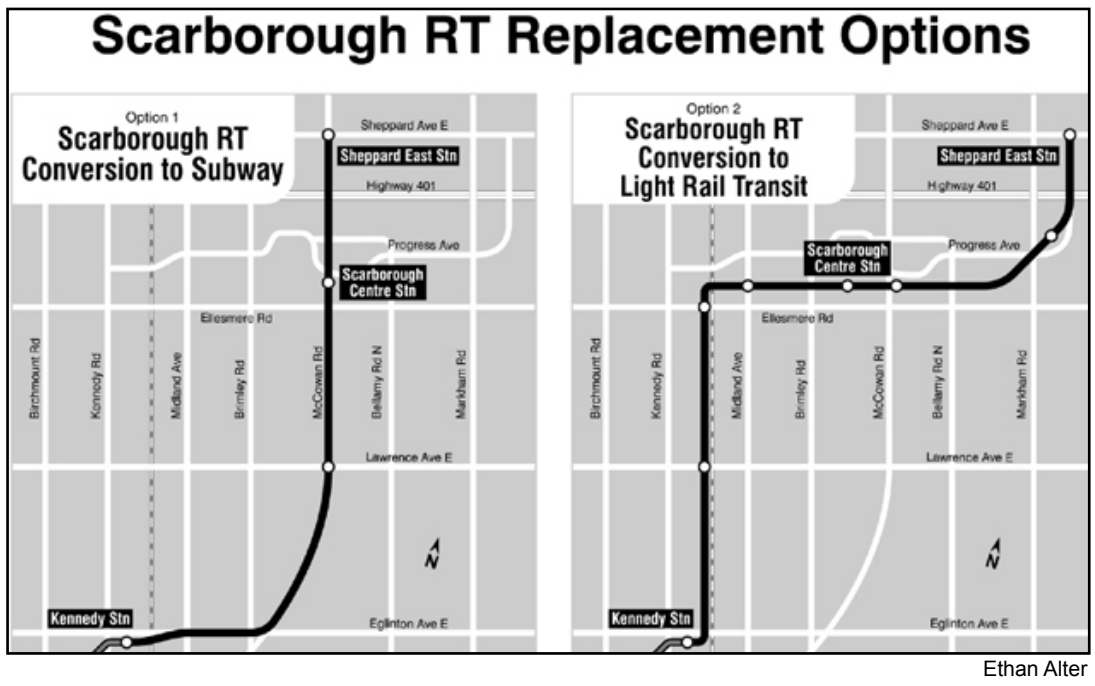
For over a decade, residents of Scarborough have been itching to replace the Scarborough RT, their aging rapid transit connection to the city. Metrolinx, a provincial agency aimed at improving public transit infrastructure throughout Ontario, made an agreement with the city two years ago to build four new LRT lines in Toronto—one of them a replacement for the Scarborough RT. Before the new line could be built, things took a turn for the worse: Rob Ford got involved. In a last minute decision, Toronto City Council, under pressure from Ford and his allies, voted against the LRT plan. Instead, they voted in favour of extending the Bloor-Danforth subway line into Scarborough.

As is often the case with Rob Ford's decisions, this one was bad. Really bad.

Time to Build

Rapid transit offers an alternative to driving for commuters. By building a Scarborough RT replacement, the city hopes to ease congestion on roads leading into the downtown core from Scarborough. The Scarborough subway extension, however, can't be built quickly enough to achieve this. Because the LRT already has an Environmental Assessment and a completed preliminary design, construction could begin at any time and would take only three years to complete. The subway extension, conversely, hasn't even been formally proposed. At the current rate things are moving, it will take four years before a detailed Environmental Assessment is completed, and at least ten before the subway is built. By the time the Scarborough subway extension is open, Toronto's population will have swelled well past the three million mark.

If you think traffic is bad now, just wait a decade or so.



Ethan Alter

Figure 1: Scarborough RT replacement options

Cost

In addition to taking a ridiculous amount of time to design and build, subways cost a ridiculous amount of money. In particular, subways cost more to construct than LRT lines—a lot more. Without even taking into account potential cost overruns and interest on debt, the current Scarborough subway plan is estimated to cost $2.8 billion. The LRT, on the other hand, would cost only $1.8 billion—a whole billion dollars less than the subway (or about 40,000 kilograms of crack cocaine, depending on who you ask). While the province previously agreed to pay for the LRT in full, including cost overruns, they're only willing to pony up half of the funds needed for the subway extension. Even with the federal government's promised contribution of $660 million, the city will be forced to come up with $740 million to have the Scarborough subway extension built—a sum that will likely be paid for by increasing property taxes.

Ridership

Public transit is meant to serve the public, regardless of cost. Owing to their size and speed, subways can transport more people at a time than the LRT. On paper, it seems like a subway might actually serve the people of Scarborough better than the LRT. Unless you consider the drastically different routes the two plans take as shown in the included picture.

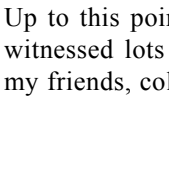
The subway extension, as proposed, would run for 7.6 kilometres under McCowan Road and have only three stops. About 24,000 people are estimated to live and work within walking distance of them. The LRT, on the other hand, would run above ground for 9.9 kilometres along the existing Scarborough RT right-of-way. With seven stops, the LRT would be within walking distance of 47,000 residents and workers.

John Tory's Stance

Tory, a self-proclaimed fiscal conservative who was elected on the promise of a responsible, intelligent government, is currently in favour of the status quo. Either unwilling to rock the boat or too afraid to lose political support from Ford's former allies on council, Tory has no plans to revert to the LRT proposal.

Ford went against expert advice to put forward a plan that would work to Toronto's detriment. If Tory wants to fix the issue of traffic in Toronto, then he must undo Ford's subway plan and build the LRT. As the Toronto Transit Commission's slogan goes, "It's the better way."

Words of Wisdom for First Years after Rankings and Midterms



SUNG EUN KIM
MASC., ELECTRICAL AND COMPUTER

Dear first year students:

"What did you get on your midterms?"

Never mind, I don't mean to ask you this question. The majority of first year students who come to engineering receive lower grades than in high school. And I'm even sure that some instructors might have warned you before distributing the marked exams. (Physics is usually the harsh one…) Let's say you have a 55% on Physics midterm and the instructor tells you, "Don't you worry" because that is only slightly lower than the median grade of the class. Despite that, a lot of students remain shocked and scared for the final exam.

I am a recent graduate of Waterloo Engineering and I have gone through countless exams and job interviews in my undergrad at UW. I also worried and asked countless times, "Should I worry about my grades? Does GPA matter?" From high school, I probably came to university thinking good marks and a good resume lead to a successful career, happy me, or something like that. Up to this point, I must say that I have witnessed lots of different cases among my friends, colleagues and co-workers – many of which proved my belief wrong. Everyone was an outlier to any kind of trend I wished to draw. Along the way, I finally could arrive at some different perspective. I would like to share it with first year students.

I have met many interviewers whose first question in interview is "What is your GPA." I have spoken to some graduate office and they asked me, "What is your GPA?" How daunting. So, there seem to be places where GPA is indeed the decision maker. These are places such as med, law, and top-tier graduate schools, to name a few.

But the field of engineering allows lots of freedom and creativity for everyone at every level to apply knowledge in practice. Whether someone has a high or low GPA, is in senior or junior level, has broad or deep scoped knowledge, has theoretical or practical experience, and has exploring or conservative traits, it is a highly cooperative environment. Everyone can be handy. It is important to find the right environment for yourself first and let it grow as your dream, rather than chasing a common goal - that you don't even know of!

To share a bit of personal experience, in my first year I did well in programming course and got a senior developer position for coop. I finished the project and gained so much experience. On the other hand, I felt like a zombie from studying every day to build foundation knowledge and my manager was not too impressed by how much time I had to put in for learning. After that I was very careful to check the level that the position requires before applying. That was the first time I realized that my GPA wasn't tied to my success. I realized a junior like me would learn more and better in an assisting position when the foundation is weak.

Lots of students share a common goal of obtaining a "developer" or "design" position for co-op even in junior years. The truth is that if someone at a junior level has a slower-paced learning environment, then his or her performance and satisfaction are higher. Wanting a high GPA could be the same thing. Maybe you are chasing the common goal and wasting so much energy for something that is not the right fit and you won't even gain much from it. Everyone is smart in different ways. Keep in mind that ranking at a school is only a specific ruler to measure someone in a very specific setting - school, class, curriculum, time, design of exam, subjective decisions on marking, etc. With change of one variable, it will be a different ruler and you might stand in a quite different ranking.

In fact, we are in UW engineering and to get here we have gone through lots of competition in high school where grades played a major role. We were all trained to fight for better grades and treat it as THE indicator and the future. However, school grades are a very specific ruler and this regime would be unfair if one's entire future relies on it. Therefore, after school, we go through the same phase of re-introducing ourselves outside the boundary of this measure. A good academic record in undergrad may or may not have a huge impact on first landing a career, but that will fade because every place has different kind of expectations.

If you screwed up in First Year, especially a midterm or even an entire course, it is a negligible glitch because there are seven more academic terms left until 4B. You will be introduced to those concepts over and over in the curriculum, as much as it is basic, important and relevant to your field – everyone gets it eventually… I am not saying a bad mark is good or helpful for future. There are even places that GPA is the only decision marker. But even a lot of GPA-oriented admissions consider the performance through senior years more important.

At least in the first year of university, I truly believe that it is the best time to make friends, meet different people, ask lots of questions and explore dreams and possibilities. I do hear lots of regrets from myself and colleagues about it and I wish that first engineering students won't repeat the same mistake.

Point Vs. Counterpoint

Should there be limits on what you can name digital devices if it causes harm to others?

POINT

RATAN VARGHESE
1A ELECTRICAL

We live in horrifying times. There are plenty of things to be frightened of. Tragedies are happening all the time, all over the world. There are even problems so great, that they bring civilization's very survival into question. WiFi network naming is not one of these problems.

Network and device names should not be limited. Firstly, because it's a violation of freedom of speech. People have the fundamental right to speak, write and otherwise express their thoughts without fear of being punished by the government. This often leads to tasteless, hateful and otherwise unintelligent speech, that is true. Yet whenever freedom of speech is limited, a heavy question arises: *who* gets to decide which speech is allowed and which speech is banned? "Common sense" offers no relief in this regard: at times it seems much rarer as its trite moniker might suggest.

Perhaps naming a WiFi network "Al Qaeda Free Terror Network[sic]" is a bit of a stretch of free speech. Isn't it dangerous? Once again, however, the question of who chooses the networks to ban become tricky. There are all sorts of objectionable names all over the place, from devices to media to haphazardly translated placards.

Airports are different of course: joking about bombs can actually land people in jail. Indeed, pilot Elwood Menear was once arrested for asking a security screener why he was "worried about tweezers when I could crash the plane?" The pilot was certainly correct, and also certainly offensive enough to prompt a later investigation by the FBI.

However passengers trading wise-cracks with security guards are in a very different position than the still-uncaught network-naming fellow. The prospect of a bomb in a suitcase is at least believable. The idea that "Al Qaeda" would not only need to create a WiFi network, but also name it after themselves, is absolutely ludicrous. There are more discreet ways of remotely activating bombs than using a public WiFi network: if terrorists ever used WiFi before, they can probably switch to whatever other tool fills their needs. Obviously, the prospect of terrorists naming a WiFi network after themselves is too self-defeating to believe: either the WiFi name was meant to be horrifying on its own, or the whole issue was a prank.

If terrorists actually needed a WiFi network for something, the response at LAX bodes badly for airport security. The person who hosted the "Al Qaeda Free Terror Nettwork" was never found, despite the fact that a flight was delayed for hours looking for the culprit. This is another obvious issue with trying to regulate device and hotspot names: such regulation will be difficult to enforce. Thousands of people pass through major airports every day, and these days the majority of them will likely carry smartphones with them. In addition, these people are squeezed into long lines and skinny economy class seats. Unlike the 2009 underpants bomber, a rogue hotspot host would probably not behave suspiciously enough to be noticed by passengers or flight attendants. How could anyone realistically be punished for an offensive hotspot name?

The ineffective search took several hours, during which passengers of United Airlines flight 136 had to keep their electronics turned off and wait quietly. They were rescreened for "derogatory information". It eventually turned out the hotspot was based in the airport and not in the plane. After that, the crew "timed out" and had to be replaced. At the end of this security theatre, the plane took flight over 13 hours after its scheduled departure time.

Did the passengers really deserve to be screened and delayed due to a WiFi network name? Of course not, because the idea that an actual terrorist attack would occur was dubious from the start. They missed out on valuable time working, travelling, and being with their families because of some moronic prankster. This is of course after all the standard security check annoyances inherent to air travel.

What is perhaps the biggest problem of limiting device names it that it is simply caving in to paranoia. If it only takes a hotspot rename to ground a flight, how much more will we let our fear disrupt us? How many safeguards will we accept? How many liberties will we sacrifice on the altar of security? How many more investigations and screenings will be run on ridiculous, possibly imaginary threats?

If we are willing to keep hundreds of people waiting for hours in an aluminum tube due to a hotspot name, it would be trivial to shut down our entire society. There's hardly a need for bombs: fear is the greatest weapon of all.

COUNTERPOINT

LEAH KRISTUFEK
3B CHEMICAL

The internet is full of stories about hilarious and sometimes offensive WiFi names. However, that does not mean that there should be no limits on what you can or cannot name your devices. When I look at the available WiFi networks from my house here in Waterloo they are a mishmash of nerdy and boring. However, what happens when people take it too far? The "Al Quida Free Terror Nettwork [sic]" that stopped the LAX flight may be an extreme example, but WiFi names are visible to the everyone. How would you feel moving into a new house only to find out that your neighbor's WiFi is named "We hate nerds" or "KKK forever!"? How would you retaliate? Would you change your own WiFi password to something like "nerds rule the world" or "all people made equal"? At some point would this rivalry escalate to more than virtual name calling to include damage of property and possibly even physical blows?

Words have great power. This is undeniable. Although the massive volume of words encountered by the average person in the information age does dampen their effects somewhat, it does not dampen the fear felt when a negative intention is made clear. "With great power comes great responsibility" were the words written by 19th century French writer Voltaire. He wrote them in response to the abuse of privilege and authority he saw while the poor suffered around him. In this case many members of the upper class were simply oblivious to the plight of those outside their social circles. Similarly the average person does not realize the power that has been bestowed upon them with the advent of the internet.

The things that are said do not only go to the intended recipient but can also be disseminated easily to people using the internet at large. Small things like using 'gay' in a derogatory sense and other rude and discriminatory terms can be perceived very differently when seen out of context. This can even create invisible boundaries between the writer and the anonymous recipients. This anonymous consumer could be as harmless as your neighbor being offended by your WiFi name, or as damaging as terrorists using your messages to further their own agendas. Don't forget that it is messages posted on the internet which are responsible for ISIS recruits from first world countries.

Freedom of speech is an important human right which is critical to any democratic society. However, there should be limitations to ensure that free speech does not result in infringement on other human rights. This is why publication bans on trials exist to ensure that the reputation of victims and witnesses are protected from potentially harmful public opinion. Similar rules, along with a very hearty dose of common sense, should be applied to our internet activities. This goes doubly for WiFi hotspots which are visible to everyone and anyone with an internet-enabled device.

When it comes to airports it should go without saying that any mention of a safety threat—such as bombs or terrorist groups—should be given a wide berth. Passengers of the American Airlines Flight 136 from LAX to London certainly weren't laughing when their flight was delayed for 17 hours. Because modern airplanes are nearly completely automated, hacking is a very real security risk. Leaving the plane grounded caused considerable inconvenience to passengers and a large financial hit for every hour the plane sat on the tarmac. However they were all considered worth it to prevent the loss of life experienced in incidents such as the 1988 Lockerbie terrorist bombing, the Air India 182 bombing, or another 9/11.

Anywhere other than an airport a WiFi called "Al Quida Free Terror Nettwork" probably wouldn't attract a lot of notice. After all we see WiFi networks called "FBI Surveillance Van" all the time and don't even give it a second thought. In this case, the WiFi name could have more sinister intentions. It could be the signal to someone with a bomb or the beginning of some sort of cyber attack. Jokes like this strike unnecessary fear into the hearts of people around the world. It is important that there be a high price for the perpetrators of these kinds of disturbances, and appropriate consequences. Just like with publication bans, there should be legal repercussions when the actions of an individual have seriously affect the well-being of the public. Although having legal repercussions won't dissuade any serious threats, it will make people think twice before choosing to name their WiFi password to something offensive.

The purpose of Freedom of speech is to allow an individual to live the life that they want while respecting the way others want to live. There should be rules and regulations for when one person has gone too far thus impeding another person's freedom to live how they like. As technologies change with ever increasing speed, related laws will also have to change more and more quickly.

Editor's Note:
Point Vs. Counterpoint is a feature meant to stimulate discussion on thought-provoking topics. The views and opinions expressed here do not necessarily reflect those of the authors, *The Iron Warrior*, or the Engineering Society.

The People Behind the Equations

SHERWIN KWAN, JESSICA KEUNG, CAMERON SOLTYS
VARIOUS PROGRAMS

We use equations every day. Some are confusing, some are simple, some are common and some are obscure. Every equation has a name, and most have no relevance to the phenomenon they describe. Instead, they are named after the person who invented them. Let us pay our respects to those who figured out the equations we use every day.

Euler

Every now and then, we encounter the names of great mathematicians, scientists, and engineers of the past. Attached to equations, constants, and even SI units, they remind us of the people who went before us. As you stay in university, you notice that some names just pop up in your course notes and formula sheets again and again, like zombies in a survival game. You can't get away from them. That's when you know you've encountered a badass genius.

Arguably the greatest mathematician ever, Leonhard Euler (1707-1783) was born in Basel, Switzerland. By the time he was fourteen, he was able to enroll in the University of Basel. The professor of mathematics at the time, Johann Bernoulli, told him he already had too many students, but if Euler *really* wanted to learn, Bernoulli could give him some books to study by himself. Undeterred, the young Euler hit the books, and once a week would visit Bernoulli's house to ask him questions. While there, he became best friends with Bernoulli's son Daniel (who was seven years older than him).

Bernoulli was very impressed with his young pupil, and after a few years, their relationship had almost become reversed, with Euler the teacher. In 1726, Euler wrote his dissertation on the subject of sound wave propagation, and started looking for work. Just a few years earlier, the Empress of Russia had opened a new academy in St. Petersburg and invited young scientists from all over Europe to do research there. Unfortunately, the only job opening in the academy was in medicine, so Euler applied for it – and somehow got the offer. He later found out that Daniel Bernoulli had actually gotten a job at the Academy a few years earlier, and had convinced the Russians that they had to hire Euler even if he didn't fit the job requirements. Clearly, personal connections were just as valuable in the 18th century as they are in the 21st.

So at the age of twenty, Euler had already gotten a doctorate and had a job in one of the world's most prestigious research academies. (Side note: *What have I been doing with my life?*) He spent the remainder of his life going between the St. Petersburg and Berlin Academies (you see, he got so famous the Germans wanted him to work for them too), often collaborating with Daniel Bernoulli on mechanics work. By the time he died in 1783, he had written so many papers about his discoveries that there was a major backlog in the St. Petersburg scientific journal, and it took another forty-eight years after his death before all his work got published.

Euler's most famous contribution came in mathematics, where he introduced the symbol *i* for the imaginary numbers and showed that they—which Descartes and Leibniz had written off as useless—actually did stuff. For example, he proved that exponential and trigonometric functions could be linked via what we now call Euler's formula. He also discovered that the natural log of x was the integral of 1/x , created a formula to calculate perfect numbers, and made contributions to differential equations. His solution method for linear homogeneous ODEs (which are today known as Cauchy-Euler equations) is still taught as the method of undetermined coefficients (and if you end up with imaginary numbers in the exponent, then the aforementioned Euler's formula can convert it into a trig function).

In solid mechanics, Euler and his pal gave us the Euler-Bernoulli beam equation, which states that the third derivative with respect to length of the beam deflection is proportional to the shear force. Euler additionally derived a formula to calculate the maximum loading on a vertical beam before it buckles.

Euler also published differential equations for continuity and conservation of momentum in inviscid fluids. A century later, Claude-Louis Navier and George Stokes would generalize these equations by adding viscosity terms. But the continuity and momentum equations – along with Bernoulli's "conservation of energy along a streamline" equation – continue to be foundational for fluid dynamics. Heck, we've even developed CFD software specifically to solve these equations.

More than two centuries after his death, Euler has left us a legacy in many different fields. I'm sure I left a lot of his discoveries out, but you get the picture. In fact, in my own field of mechanical engineering, I'm not sure how much we would even be able to study without the contributions of Euler and later generations who built on his work.

Lagrange

Lagrange multipliers, according to Wikipedia, are used in mathematical optimization as a strategy of finding local maxima and minima of a function subject to equality constraints. I learned about this in Advanced Calculus and I still have no idea what that first sentence means. Equations that are named after people rather than what they do often leaves students confused as to how to use the equation and what the heck the equation is for. Lagrange multipliers are no exception, named after the Italian Enlightenment Era mathematician and astronomer whose work plagues Advanced Calculus courses for all engineering students across the world. I still have no idea how to use Lagrange multipliers but I assume they are important, and the person who it is named after was probably important too. And that would be Joseph-Louis Lagrange, born Giuseppe Lodovico Lagrangia in Turin, Piedmont-Sardinia to an Italian and French family.

Lagrange did not show any aptitude for mathematics until the age of 17. Originally planning on pursuing a career as a lawyer, Lagrange came across a paper by Edmund Halley by accident and from then on was hooked on mathematics. During the next year, through persistence and obsessional interest in mathematics, he became an accomplished mathematician without assistance. In 1755, Charles Emmanual III appointed Lagrange as the *Sostituto del Maestro di Matematica* (Mathematics assistant professor) at the Royal Military Academic of the Theory and Practice of Artillery. He taught courses in calculus and mechanics to support ballistic theories of Leonhard Euler for the Piedmontest army. Just like many of the professors engineering students have to endure, Lagrange tended to be a problematic professor with his oblivious teaching style and abstract reasoning. Mathematician Joseph Fourier, who attended Lagrange's lectures in 1795, wrote that Lagrange did not have a very strong voice, was not popular with students, and spoke with a heavy accent, something many of us can relate to even now. Lagrange did many things other than just derive things used for calculus, it is thanks to his influence that we have adopted the standard units of measurement we have today. As one of the founding members of the *Bureau dis Longitudes*, it was Lagrange who caused the final choice of a unit system consisting of meters and kilograms, and the decimal subdivision's final wide spread acceptance.

Even today, 201 years after his death, Lagrange's name lives on in university level calculus textbooks all over the world, causing as much mental distress to students as he did when he was alive. Thanks Lagrange.

Hooke

If you've taken a first year physics course in your time at this university you've probably become acquainted with Hooke's law. If you are in a program with the grave misfortune of having a mandatory statics class, you are sure to remember this as the most confusing three-variable equation you have ever encountered. For the luckier among us, Hooke's law states that the strain of a spring or solid object is proportional to the applied stress, $\sigma=E\varepsilon$. (There being a slightly different equation for springs.) And somehow, this equation can predict everything from how much a rope stretches to the internal loadings of a curtain rod. It can also, apparently, revolutionize the field of timekeeping.

Robert Hooke was born in 1635 in England and lived to the grand age of 67. In his years, he left behind a long legacy of academic merit and scientific discovery. Hooke started his career at Oxford, where he worked under famed natural scientist and philosopher Robert Boyle. In 1665, Hooke was named *Curator of Office* of the recently-formed Royal Society. During his life, he was responsible for many discoveries and scientific advances including: doing much of the mathematics for Boyle's law, coining the biological term "cell," and of course Hooke's Law. But perhaps his greatest achievement was the development of a watch which, thanks to the use of a spring to keep more accurate time, would have solved one of the apex problems of the day; how to determine longitude while at sea. The credit for this invention goes to one of Hooke's colleagues, Christiaan Huygens, but it is though that Hooke's invention came 15 years earlier; unable to fund the patent, and secretive and jealous of other his fellow thinkers—typical for the time—Hooke hid his invention and allowed it to fade into obscurity.

Let's all take a moment, every time we check our watches, to remember this great champion of science. He may be known now for squeezing springs together and recording how much they compress, but he truly is a man deserving the presigious honour of being immortalized by a scientific equation.

Science's Greatest Honour: The IG Nobel Prize

SUCHARITA VIJAYARAGHAVAN
1A CHEMICAL

Does science always have to serious? Or can it be funny at times too?

A few years ago, some people decided it could be; when there's a parody for everything right from movies and songs to stories and what not, why not make a parody of the prestigious Nobel Prize? They put those thoughts into action and that's how the IG Nobel prizes came into the picture. The IG Nobel prizes are provided to honour achievements that make people laugh at the beginning but also make them think. These awards are given to people who produce the most absurd results from doing weird research which still manages to have the knowledge factor in it. The award is organized by the Scientific humour magazine Annals of Improbable Research (AIR) and are presented by actual Nobel laureates at a ceremony held every year at Harvard University and MIT.

Here are a few of the interesting and hilarious IG awards:

Stephen Bolliger, Steffen Ross and team - This team from the University of Bern, Switzerland were given the 2013 IG Peace Nobel prize for determining *which hurts more - being smashed over the head with a full bottle of beer or with an empty bottle?* (Imagine the condition of the person they used for running this experiment!)

Javier Morales and team - The chemistry IG Nobel prize for the year 2013 were given to them for creating *Diamonds from Tequila*. As if tequila wasn't popular enough, who would miss out on a chance to turn it into diamonds? However, there are a couple of catches; you need a temperature of about 600 degrees Fahrenheit and an involved process before you can place it on your ring!

Eric Topel, R. Califf, F. Van de Werf, P.W. Armstrong and their 972 co-authors - In 1993, they won the IG literature award *for publishing a medical research paper which has one hundred times as many authors as pages*.

Jay Schiffman - Won the IG prize in 1993 for Visionary Technology for inventing a machine called AutoVision, an image projecting device which makes it *possible to drive a car and watch television at the same time* and also for making it *legal to do so in the Michigan state!*

The Southern Baptist Church of Alabama - This was awarded in mathematics: Mathematical measures of morality, for their county-by-county estimate of *how many Alabama citizens will go to Hell if they don't repent*.

Lianne Parkin and Patricia Priest - They received the IG Nobel prize in physics for demonstrating that, on icy footpaths in wintertime, *people slip and fall less often if they wear socks on the outside of their shoes*.

W. Brian Sweeney, Brian Krafte-Jacobs, Jeffrey W. Britton, and Wayne Hansen - They received the award in Biology for their breakthrough study, "*The Constipated Serviceman: Prevalence Among Deployed US Troops*" and especially for their *numerical analysis of bowel movement frequency*. (pretty disgusting though)

John Paul Stapp, the late Edward A. Murphy, Jr., and George Nichols - This award was given for making up the *Murphy's Law*, the most fundemental of engineering principles which states that "If there are two or more ways to do something, and one of those ways can result in a catastrophe, someone will do it."

Daisuke Inoue of Hyogo PEACE, Japan - What he invented was one of the best breakthroughs of that period - *the Karaoke machine*, thereby providing an entirely new way for *people to learn to tolerate each other*!

The US Government General Accountability Office - Literature (try to get this one) : Awarded for issuing a report about reports about reports that recommends the preparation of a report about the report about reports about reports.

5 Shades of Grey

NANCY HUI
4N CIVIL

TAKE FIVE

Last weekend I finished playing *The Witcher* (2007). I thought it was brilliant in the way it handled in-game plot decisions and the consequences of neutrality. Unlike in some games, there is no truce to broker: playing Switzerland just means that everybody hates your guts. Alas, *The Witcher 2* (2011) is one of the most graphically demanding games made to date, and my poor laptop can't handle it. So instead I got to look for movies that handled moral ambiguity similarly.

Alas, it was not meant to be. Why is it so difficult for movies to portray two sides of a conflict sympathetically? Are they afraid of looking like commie-sympathizers? Is the hero not heroic enough to withstand a little bit of doubt? Must the villain not allow themselves to show an iota of kindness?

Games have a one up over movies in this case. It's much, much easier for a game to portray two sides of a conflict sympathetically, due to a less linear structure and no fixed time limit. Mass Effect's Geth/Quarian war, Dragon Age II's Mage/Templar conflict, Skyrim's Stormcloaks/Imperials war, and the whole Assassin's Creed series are good examples of developers trying to make the decisions difficult.

Here are five movies that make at least a half-assed attempt to allow the audience to sympathize with both sides of a conflict, in order of least to most successful.

V for Vendetta (2006)

In the late 2020s, the UK is the last stable country in the world, though such stability comes with a totalitarian rule by the governing party. A masked vigilante known only as V (Hugo Weaving) plots to overthrow the fascist state. Evey (Natalie Portman) is swept up in the war against terror...

According to Alan Moore, the filmmakers totally missed the point when adapting the comic to the silver screen. The comic is a comparison of anarchy and fascism, but the film is a fairy tale of overthrowing The Man. Nowhere are the consequences of anarchy acknowledged or addressed, and I'm sure that the citizens of the former UK were ignorant of that too, preferring to gape at flashy stunts.

However, *V for Vendetta* is effective in delivering its chosen message with a PG-13 rating, even if such a message is not in concordance with Moore's intended message. The ideas and motifs were powerful enough to launch Guy Fawkes masks as a sign of resistance against oppressive governments.

Rise of the Planet of the Apes (2011)

Caesar (Andy Serkis in motion capture), is the son of a chimp test subject for the Alzheimer's drug ALZ-112. Will Rodman (James Franco) rescues Caesar from euthanization after a fiasco in the animal testing facility. The drug gives Caesar incredible intelligence, but because of Caesar's innate strength Will is forced to place Caesar in a primate shelter. He comes to the bitter realization that he will never belong in human society, and so seeks to create an independent order of primates.

This is a good movie, and Caesar is a great character. His struggles against The Man are spotted with moments of triumph and jubilation as he accomplishes goals against all odds. Caesar's revolution is also spotted with blood, as his primate compatriots exact their revenge for years of abuse and confinement.

The humans, on the other hand, are less personable and less sympathetic. They would rather that hyper-intelligent primates not go out and establish an independent society in the California redwood forests, thank you very much. Apes are scary and violent. The most sympathetic of them is Will Rodman, who would just like everything to go back to the way it was and ignore Caesar's potential as an independent entity. Booo.

Maintaining grey morality in both sides of a conflict is more than making both sides have questionable means to legitimate ends. The audience must sympathize with both sides equally, and alas, Caesar is a much more compelling character than anyone else in *Rise of the Planet of the Apes*. It's hardly a fair fight.

Transcendence (2014)

Scientist Will Caster (Johnny Depp) dies of a polonium-laced bullet, courtesy of an anti-technology terrorist group, but is brought back as a powerful artificial intelligence... or is he?

Can machine ever comprehend man? Or, can man ever understand machine? Transcendence would like to say "no" to both questions. The conflict between the anti-tech terrorists and computer-Johnny-Depp is based on a lack of understanding and empathy between sides. The anti-tech terrorists fear the technological singularity that computer-Johnny-Depp's scientific advances may usher. Computer-Johnny-Depp is too deeply involved in his research to bother explaining what he's doing and why he's doing it, in a manner unthreatening to humans. As a scientist he should know how important PR is to getting research grants and not getting mugged by terrorists.

But alienation and misunderstanding are boring, boring motivations. What audience wants to sympathize with a group that can't even try to get their heads out of their asses?

Bride Wars (2009)

Two childhood friends (Anne Hathaway and Kate Hudson) share a dream of getting married at the Plaza Hotel in New York, but the wedding planner overbooks them. The friends turn on each other to free up the dates for their wedding.

How could someone make a movie this awful? My theory is that *Bride Wars* was produced by *Bride Magazine* to sell swathes of tulle and childhood dreams. It is difficult to believe that any two women could be as shallow and stupid as Anne Hathaway and Kate Hudson's characters in this movie, but utterly inconceivable to think that *Bride Wars* would find enough wedding-brained, consumption-centred viewers to make back what this film cost. Alas, *Bride Wars* grossed $114M domestically on $30M. For shame.

I was supposed to sympathize with both deuteragonists equally. Instead I hated both. In that perverse way, *Bride Wars* succeeds.

X-Men: First Class (2011)

In 1962, young mutants Charles Xavier (James McAvoy) and Erik Lensherr (Michael Fassbender) join up with the CIA to recruit fellow mutants and apprehend Sebastian Shaw, a former Nazi colonel bent on starting World War III and mutant supremacy.

Anyone with a passing familiarity with Marvel canon knows how this ends. Erik Lensherr (Magneto) somehow becomes the head of the mutant exceptionalism movement, while Xavier (Professor X) will become the wheelchair-bound headmaster of a school for mutants and advocate for peace and equality between humans and mutants.

This is the only movie of the five that truly succeeds in maintaining moral ambiguity. The two mutant philosophies are equally sympathetic, as are their champions. Erik Lensherr was in a concentration camp and rightfully distrusts humanity's ability to accept those who are different. Charles Xavier, as a result of his optimism and privileged upbringing, believes that mutants and their powers could be integrated peacefully within human society. And both are right. The world is full of good people and bad people. Individuals have good traits and bad traits. Accepting that both states could coexist within a single society, movement, or person is a key to maturity - and to making a good movie about moral ambiguity.

The Pocket Square

Style in Simplicity

VINCENT MAGAS
2A MANAGEMENT

HIT REPLAY

Since the days of King Richard II of England to the lands of 17th Century Japan, and even to the far reaches of 60s business life, the handkerchief was a common everyday item. The handkerchief has been used by all sorts of people throughout the ages, from rich to poor, both young and old. From calling forth knights in shining armor, to being a companion in tear-jerkers or simply as one stylish accessory, the story of handkerchiefs go on. In this issue we look more closely at that common handkerchief turned into an iconic accessory, the pocket square!

So what is a pocket square? Quite simply, it's a handkerchief that is used as an accessory to a suit or a jacket. Often they are made of more expensive and finer materials than your usual pocket handkerchief. The pocket square can be made of many different fabrics, the most common being cotton, synthetic fabrics, silk or linen. The more expensive of the line are usually silk or linen.

Pocket squares are used to add a bit of personalization to a suit or jacket. One is worn on the left breast pocket of a suit or jacket and aims to compliment the tie. In many cases of modern casual wear, people forgo the tie and instead accessorize with just a pocket square. It can be used to liven up an outfit and give a bit more flare to an otherwise conservative or toned down suit or jacket.

Many types of folds for the pocket square exist, but the most common are three basic folds that are easy to learn! When people think of pocket squares they often remember a simple fold with the handkerchief edge sticking out of the pocket. This is known as the Straight Fold, which is the simplest of the three. This fold reveals a small rectangle that peeks out of the suit pocket.

Another fold that people often associate with pocket squares is the One Corner Fold. The fold is named exactly for what it looks like, a simple peak that is shown on your pocket. The fold reveals the corner of the handkerchief and often provides a bit of a contrast to the lines of a suit or jacket.

Finally, there is the Puff Fold which require little to no folding at all! A pocket square is bunched up inside a pocket to produce what looks like a little puff sticking out of the suit pocket.

The history of the pocket square brings us back to the days of the original handkerchief into the land of the Ancient Greeks. The handkerchief was often used for hygienic purposes, serving the needs of a sweaty brow or a runny nose! Not much changed throughout time, until the Medieval Ages when it was common to use kerchiefs to cover the head. King Richard II of England is often credited to have invented the modern cloth handkerchief that we know today. Time saw the handkerchief travel side by side with people as a functional accessory.

Up until the 1800s handkerchiefs were often carried hidden away, tucked in a coat or jacket pocket. The 19th century saw a change as suits and ideas about hygiene changed. The handkerchief travelled from the pant pocket up to the breast pocket of people's suits and jackets. Thus the pocket handkerchief was born! In the 1920s a popular trend arose where people revealed folds of a clean (and often expensive) handkerchief tucked in their breast pockets. This trend soon became an iconic style that led to the creation of the fashion-dedicated handkerchief known as the pocket square.

The pocket square became an essential accessory to suits and jackets, sparking a mentality that a suit without one is never complete. Until about the late 60s pocket squares were sported across Europe and North America. A decline in the classic accessory occurred in the 70s and the pocket square was neglected by many and labelled as outdated. The next 3 decades saw little use of the pocket square, it wasn't until the last few years that a resurgence in the pocket square appeared.

In recent years a new found interest in pocket squares emerged from all age groups. Pocket squares have slowly become a mainstream trend once more with the general population. From casual sports jackets to business suits the pocket square has returned!

Should you ever decided to sport one yourself here are few quick go to tips:

Be creative! – Pocket squares come in all sorts of styles that fall under two categories: patterned or solid. A good rule of thumb is for you to wear a pocket square that compliments some colour on your tie if you're wearing one. It is often said that you should not wear a square that's exactly the same as your tie.

Avoid matching patterns – Try to stay away from wearing pocket squares and jackets that have identical patterns. Ideally, the pattern on a pocket square should be different from jacket, but similar. This avoids looking too busy or too plain.

Similar with the jacket, pocket square patterns should complement the tie pattern, but not match entirely.

Simplicity Goes a Long Way – Having simple, relaxed colours and patterns help in making the matching process easier. Solid colours are often the easiest to match with your entire outfit!

Paul Goyette

Do you Believe in Halloween?

RAEESA ASHIQUE
1A ELECTRICAL

I must admit that I have never been trick-or-treating. I like to use this as an excuse to claim that I was a "deprived child" – *cough cough* first world problems – but I cannot honestly say that my childhood was incomplete. Whether it was due to the neighbourhood we lived in, or my parents' personal beliefs, I am not sure. I know it may seem strange to say that some people "don't believe" in Halloween. Sorry, by that did you mean they "don't believe" in dressing up and eating candy? Maybe "don't believe" in accepting candy from strangers? Or "don't believe" in the infamous cat costume? Nowadays it may seem like there is nothing to "not believe" in with regards to Halloween, but this was not necessarily always the case. Back in the day, Halloween rituals had a real significance. And, surprisingly, many ancient traditions are still continued in Britain.

These rituals generally take place at the end of the harvest season. This time of the year is when the barrier between this world and the spirit world was believed to be at its thinnest, so people took this opportunity to pay tribute to the spirits of their ancestors, as well as to protect themselves against dark spirits.

For example, Souling is an event presently observed in Cheshire where "mummers" (cross-dressing actors) perform a play featuring King George for All Soul's Day, which is November 1, in order to protect the community from unwanted spirits. The mummers also hand out soul cakes to the audience, which comes from the tradition of handing out cakes to beggars in remembrance of the dead. Hoodening is very similar, and is practiced in Kent four days before Christmas. Villagers dress up in costumes and cart a wooden horse around to local pubs to perform a play centred around the theme of death. Apple Howling is another practice based in superstition. In Worthing, West Sussex, villagers pour apple cider over tree roots in order to encourage a plentiful crop the next year, and to ward off evil spirits.

There are numerous other examples of traditions we may find strange that they are still practiced to this day. And while Halloween is no longer practiced in its original form, the fact that a version of it still exists today makes its history more relevant.

Halloween is believed to have originated 2,000 years ago from a pagan Celtic festival referred to as either Samhain, or All Hallow's Eve. The Celts' new year began on what now corresponds to November 1. October 31, or what would have been New Years' Eve, was seen as a turning point because it marked the end of the year, and the transition from the autumn's harvest to the winter's hardship. During Samhain, the souls of the dead would begin their journey to the Underworld, and the Lord of Darkness would come out to assist them. People lit bonfires to guide these souls, and also to prevent them from interacting with the souls of the living. They would also carve out turnips and fill the insides with coals, then place them on the doorstep to ward off evil spirits. The pumpkin was adopted in lieu of the turnip when settlers moved to the new world, because pumpkins were easier to carve out and were more readily available in North America.

The shift from Samhain to modern day Halloween began when the missionaries began attempts to "save the heathens' souls," but the two religions were obviously completely different. In 602 AD, Pope Gregory I decided that a compromise was the best way to proceed, which was brilliant in theory. For example, they arbitrarily assigned Christmas to December 25 because that was when many groups had their mid-winter celebration. The Christian feast of All Saint's day was assigned to November 1, to correspond with Samhain. It was almost as if the Celts were acting Christian by accident, although they never gave up their beliefs but continued to worship their own deities. The Christians associated these pagan gods with evil spirits, and branded these people as devil worshippers. Eventually, the practice of Samhain continued, but the wandering spirits were now associated with evil, which was never the case originally. Since then, All Hallow's Eve has evolved to the very different idea of Halloween that we have today, but the customs have continued.

The colours of orange and black originated from Samhain as well. Black represented the darkness after the death of their god, and orange the dawn of his rebirth. The origins of trick-or-treating is controversial, but one theory is that it came from the distribution of soul cake. Costumes came from both Christians and Celts, as Christians would dress up as their favourite saints, and Celts would dress up and dance out of town to lead the souls of the dead. People would also wear masks when they went out at night, especially in the winter, so that the spirits would not mistake them for fellow spirits. Back in the day, people did not spend weeks deciding which outfit made them look cute. It had roots in actual belief systems.

Keno City

A Living Ghost Town

JESSICA KEUNG
2A CIVIL

SMALLEST VILLAGES

In this week's "Small Villages in Canada," we will visit, through the magic of newsprint, the Great White North: Keno City, Yukon. This small community is home to a now-closed silver-lead mining area on Keno Hill. Population levels in Keno City have fluctuated in response to the mining activity in the area after discovering rich silver and lead ore deposits on Keno Hill in 1919. Once a booming frontier mining town, Keno City was named after the popular gambling game played in North American mining camps until, in 1989, the United Keno Hill closed the mines. When that occured, the remaining citizens decided to pursue a more sustainable industry than closed mines; tourism.

Keno City is located in the Yukon found at Mile 69.1 Yukon Highway 11, at the end of the Silver Trial highway, a 7 hour drive north of Whitehorse. Now populated with approximately 15 people from two families, its residents run and maintain many tourist attractions such as its hiking trials, an alpine interpretive centre, artist studios, and their mining museum. In the summer, tourists can hike the trails, see the alpine wild life, and camp on the campgrounds run by the Keno City community.

The Keno City's Mining Museum contains an extensive collection dedicated to the history of mining in the Yukon from the early 1900s until the present. The building itself is a relic of the past, as it is Keno City's old community centre built in the 1920s. This museum displays early tools and equipment, along with photographs and memorabilia which capture the gold and silver mining history of the area. There you learn about the geological landscape and the everyday lives of a silver miner in an isolated northern mining community.

On July 10,1919 a prospector by the name of Louis Beauvette staked out a claim identified as Roulette on Sheep Hill near Mayo Lake and renamed it Keno Hill. Like many prospectors, Beauvette lacked the money to develop Keno Hill so he contacted A.K. Schellinger, an engineer, to convince the Yukon Gold Company (YGC) to invest in establishing mining operations. Once word of this deal with the Yukon Gold Company spread, 600 claims were filled in the Keno Hill area in the next year. Like most to isolated northern mines, the Keno mines were nearly inaccessible. Yukon River ships were unable to ascend the shallow and fast-running Stewart River and smaller-draught vessels were unable to proceed past Mayo, about 60 kilometres from the mines. The silver and dead ore deposits were so rich that it was enough to offset the shipping costs that would have otherwise made the entire operation unfeasible.

Only the richest of silver deposits were mined until 1924, when the company leased the mine's operations to the Treadwell Yukon Company. Treadwell assigned Livingston Wernecke, a geologist, to manage the operations of the mine. Wernecke realized the most cost effective way to run the Keno Mine would be to develop long-term strategy and operations. By deploying tractor trains from the mine in 1922, ore could be efficiently hauled to Mayo to be shipped. A concentration mill was built in 1924 to exploit milling-grade ores as well as high-grade silver. The Treadwell Yukon Company bought out surrounding mining operations and controlled most of Keno Hill's mining operations by 1930. That year, Keno Hill accounted for 14% of all Canadian silver production.

Keno City provides a glimpse into the rich history of mining operations in Canada, with its comprehensive mining museum and the stunning alpine landscape (at least according to Wikipedia). Once a thriving mining district and now a living ghost town, Keno City is one of the smallest villages in Canada. In the next issue, we will discover Hedley. Not the popular Canadian pop-rock sensation with hit songs such as "Never Too Late" and "Cha-Ching", but an unincorporated town in southern British Columbia with a population of 400.

Waterloo Falls to Zombie Horde after Week of Fierce Fighting

CAMERON SOLTYS
2A MECHANICAL

It was barely two weeks ago that the brave city of Waterloo came under threat of the zombie menace. Until they arrived, it was as though Waterloo was too far east to be threatened by this plague. But now we know differently; the hoard is not just a mindless body of flesh eating monsters. They are organized, motivated, and lead by a fearsome Necromancer. Now the survivors of the great battle have reached us in the relative safety of Windsor. Now their story can be told.

The first zombies arrived on Monday, October 27. They were brought by the Necromancer, both as her guard and as her invasion force. The zombies ran rampant through the city on the night of the 27th, while the Necromancer disguised herself and spread dissent and revolutionary thoughts through the city. The next morning, the citizenry of Waterloo awoke to find their city under attack. There were zombies on every corner, patrolling every block. Some whispered of a mole, an advisor of the King, who was a spy for the hoard. Inspired by His Highness, many citizens took up arms and formed zombie-hunting squads. Though they tried their best, the people of Waterloo could do little to stem the tide of zombies. Many died on this second day of the war.

On Wednesday, the zombies had the upper hand. Any humans who had to move about the city kept their heads down and scurried quickly. Despite the rumors that the Necromancer had unleashed a fearsome new beast known as the "tank", the King managed to organize a small militia. In the evening, the warriors who still had some hope tried their best to recapture a few of the main buildings. The King's new guards—young and inexperienced as they were—managed to keep the zombies at bay for most of the night. Unfortunately, they also enforced a curfew with such vigour and enthusiasm that they hampered the efforts of those who were trying to retake the city. By the middle of the night these two armies, which really should have been one, had expended all their strength. The next morning, Waterloo awoke to the grim reality that the entirely of the city was under the control of the Necromancer.

Thursday was quiet from sun up to sun down. The hoard patrolled the streets, larger than ever before, but everyone knew better than to venture out. A few zombies were slain, but it was little more than a token effort on the part of the defenders, proof that they would continue the fight. It wasn't till the sun set that the fate of Waterloo was truly decided. The zombies, organized into a communicative, strategic group, swept through the city, seeking out the King's advisors and throwing the few groups of fighters that were left into disarray. We can only assume that none of the advisors escaped. With that, the city was lost, and the King began to plan his exodus.

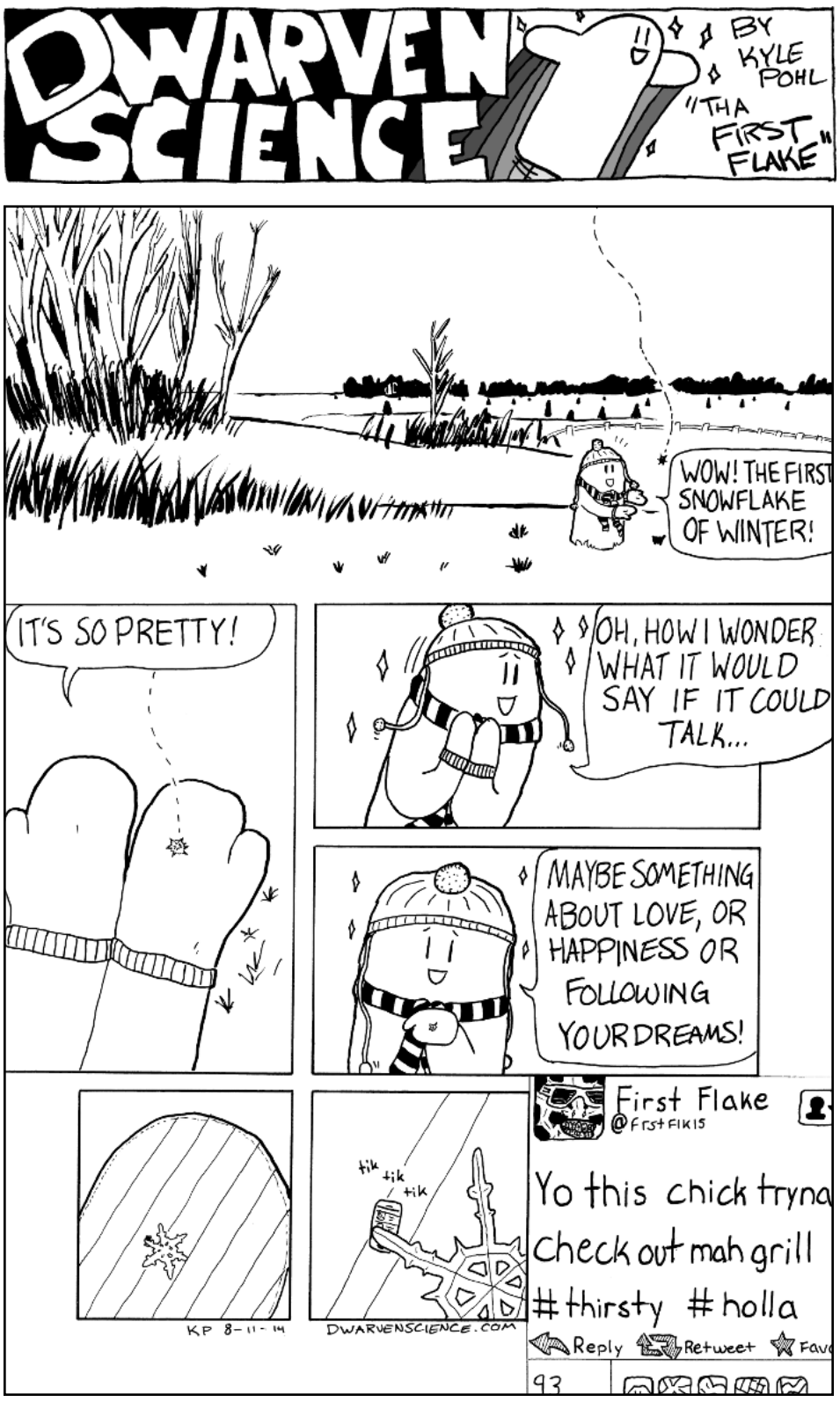
By Friday, the hoard had swelled. From the Necromancer's initial handful sprung a mass of zombies, hundreds strong. The King gathered together all of his people. They were less than 100. He offered two plans; some could flee with him, leaving the city to rot. For those that refused to give up, the King had one alternative; in the ruins of the city lay the components necessary for a particle accelerator. Could those parts be gathered, the awesome power of physics could be harnessed to form a city-destroying anti-matter bomb.

No one knows what happened to those brave souls who went back into the city to stop the zombie menace forever. It must be assumed that they perished in their noble attempt. The King himself was killed during his escape, and of all those who fled with him only 54 survived. Let us remember those brave men and women who fought for Waterloo. Let us fight like they did when the plague approaches. Let us be victorious, that those who died in Waterloo did not die in vain. Prepare, for if there is one thing the battle for Waterloo has taught us, it is that the threat is much closer than we think.

#Engineering Problems

Leah Kristufek, 3B Chemical

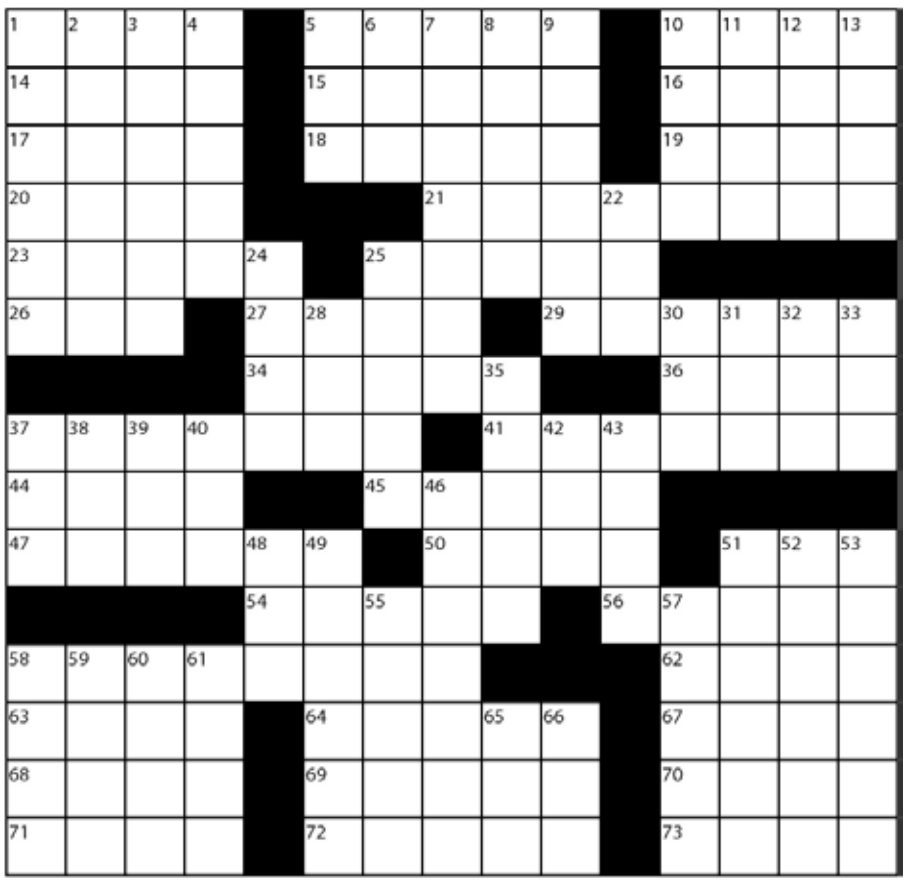
ONCE THE COFFEE IS FROZEN ALL OTHER MOLECULAR MOTION IS NOT WORTH ACCOUNTING FOR.



The Iron Crossword

I like big boats and I cannot lie

NANCY HUI
4N CIVIL



ACROSS

1. Sweet potatoes
5. Turns brown and droops
10. Pokes
14. Swear
15. Cognizant
16. Sunburn soother
17. Filly
18. Like Seneca or Trajan
19. Urn
20. On
21. Famed German warship subject to biggest British naval hunt ever
23. Candy Crush congratulations
25. Not ranged
26. Mine find
27. Impulse conductor
29. Cocooned in fabric
34. Violent torch 'n' pitchfork activity
36. ____? I hardly know'er!
37. It hit an iceberg and sank in 1912
41. American flagship sunk in Pearl Harbor attack and never recovered
44. Search a dead man's pockets for gold
45. Nunwear
47. Like the bestest kitten gif you've ever seen
50. Soviet or Quebecois
51. Pokemon protagonist
54. Awaken
56. 5/7/5 poem
58. Racing schooner that won the International Fisherman's Trophy 17 imes in a row; depicted on Canadian dime
62. Epidermis
63. Deception
64. Type of ray
67. Glacial sediment
68. First murder victim
69. Reggie Miller or Jeff Foster
70. Twiddling thumbs
71. Happy ending?
72. Cinematic commotion
73. Rubicund

DOWN

1. Biggest warship
2. Pocahontas with blue space cats
3. Gloomy
4. Hid it under a rug
5. Apparantly it's on cars and on drugs
6. ___ Jima
7. Like candlelight
8. Type of mix
9. Detects
10. Coders could use it
11. Banned insecticide
12. Tasty brown pear
13. Quest for
22. Pokemon #151
24. A tale spun
25. One who never picks up their share of the bill
28. LX/V
30. Carpenter's tool
31. Also
32. Type of party
33. End of an ____
35. A dark fur
37. Chicken soup ingredient
38. E.g. Promissory note
39. Tyke
40. Consumed
42. A few feathers short of "March of the Penguins"
43. A dermatological yearning
46. Makes the heart grow fonder... or go yonder
48. ____ Andreas Fault
49. Walks noisily
51. "The way of harmonious energy"
52. Competencies
53. The first submarine to sink a ship... before it itself sank.
55. Asimov or Newton
58. The Stark pushed off a tower
59. Coconut oil or WD-40
60. Functions
61. Momo says she can shoot them out of her crotch
65. Most common base?
66. Were now?

WE NEED YOUR HELP! The resident crossword guru will be retiring shortly and a replacement is needed! If you think you have the skills to create witty and exciting crosswords five times a term just email us at 'theironwarrior@gmail.com' !

Sudoku

#2014-14

LEAH KRISTUFEK
3B CHEMICAL

Easy

6				5	9			7
	3	5					2	
2			3				4	
	9				5			2
		2	9	7	8	1		
1			4				9	
	5				7			1
	6					2	8	
8			1	6				9

Medium

	8				5		7	
		6		2	4		9	8
				3		6		
		5		8		3		
1		2				8		9
		8		5		2		
		3		7				
5	2		1	9		7		
	7		5				2	

Hard

5				8		4		
8		1			9		6	
	7		5					2
		5	1		6	7	9	
	4	7	9		2	1		
7					4		5	
	5		2			6		1
		8		1				4

Solutions for previous crosswords can be found on *The Iron Warrior*'s website at *iwarrior.uwaterloo.ca/distractions*.

THE IRON INQUISITION
Vince Magas, 2A Management Management

"What is an exam"

"When you get tested on your knowledge"
Monika and Hannah, 1A Civil

"When your self confidence gets destroyed"
Yasser Sawadi, 1A Mechanical

"Hell"
Harjoy Bains, 1A Mechanical

"A reality check; your initiation into university life"
Gagan Kakkar, 1A Mechanical

"An excuse to drink"
Connor Dobson,
2A Nanotechnology

"The cumulation of several hell-ish nights of studying"
Deon Hua, 1A Software