THE IRON WARRIOR

THE NEWSPAPER OF THE UNIVERSITY OF WATERLOO ENGINEERING SOCIETY

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We Are the Engineers

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3 Minutes to Midnight

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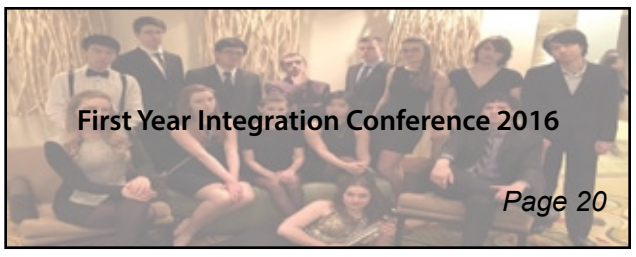
First Year Integration Conference 2016

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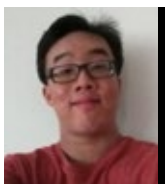
Syrian Refugee Crisis

The European Union's Split on How to Accomodate Refugees

Ggia via Wikipedia

Syrian and Iraqi Refugees arriving in Greece from Turkey



ALEXANDER LEE
3T NANOTECHNOLOGY

On Saturday, Syrian government forces—supported by Russia—assaulted the city of Aleppo, located in Northern Syria. Aleppo is the most populous city in Syria and has been a focal point of the Syrian Civil War. The city has been bitterly contested between rebel and loyalist forces since 2012. As the war has dragged on, neither side has been able to make decisive gains, and the situation was further complicated when the Islamic State became militarily involved in the war. However, Russia has intensified its support for the al-Assad regime in recent months, and this support seems to have tipped the balance in the loyalists' favour. Aleppo is expected to be completely under government control within the coming weeks if the military continues its renewed offensive.

However, this constant fighting has done nothing but aggravate the refugee situation. As the government continues its assault on rebel-occupied areas, the flow of refugees fleeing Aleppo has increased accordingly. The increase threatens to exacerbate already high tensions in Europe, where the majority of the refugees are fleeing to. So far, Turkey has received the brunt of the increased refugee wave due to its proximity to Aleppo; Turkey's foreign minister, Mevlut Cavusoglu, estimates an additional 55,000 Syrians have been displaced, and the local governor, Suleyman Tapsiz, stated that 35,000 have already reached the Oncupinar border, crossing between the two nations.

The refugee influx will most likely further sour relations between Turkey and Russia, Syria's primary supporter. Just last week, Russia accused Turkey of amassing forces on the border with the intention of invading Syria, an accusation Turkey denies. Tensions have been on edge since Turkey shot down a Russian bomber in Syrian territory last year in November.

Since the beginning of the civil war, a staggering six million Syrians are estimated to have fled their homes in search of refuge elsewhere. Of these, the largest group of around four million flee to nearby countries, such as Lebanon, Jordan, and especially Turkey. However, around a million have fled to European countries and beyond. The European Union has been split on how to accommodate the refugees. Many nations, especially those in Eastern Europe, have attempted to close their borders, having been overwhelmed by the number of refugees that have already passed. Countries like France, Germany, and Sweden have welcomed the refugees with open arms. Elsewhere in the world, other countries have stepped up their refugee commitments as well. Here in Canada, our new Prime Minister Trudeau promised to accept 25,000 refugees by the end of 2015, though so far, only around 10,000 have been settled.

Though there are destinations that are accepting of the refugees, a major problem is getting to these destinations. Most of the refugees are arriving in Europe by boat, coming from one of several routes. The most popular routes are Turkey-Greece and North Africa-Italy, though some arrive through Spain at the Strait of Gibraltar. This journey is very hazardous, due to both the sheer number of refugees and the questionable safety conditions of the boats they are traveling on. A significant number of the refugees and migrants have drowned on sinking boats on their way to safer shores.

However, integrating refugees into their new environment is not all sunshine and rainbows. Around the turn of the year, there had been a disturbing number of reports of sexual assaults coming from the German city of Cologne and elsewhere, supposedly being committed by incoming Syrian nationals. This has sparked division and unrest over the open-arms refugee policies of the affected countries, leading to political upheaval and instability. Even though Germany's Chancellor Merkel is still committed to the refugee cause, disagreement from German citizens is increasing with regards to immigration and refugee asylum. In many European countries, public opinion is turning against refugee immigration. In some countries, the refugees themselves have felt that they have not been treated with proper decency and have started their own riots and protests for better treatment. Some of the refugees are desperate to reach a better home and have attempted to illegally board ships crossing from the French port of Calais to the United Kingdom, causing significant slowdowns in shipping and commerce between the two countries.

The Syrian refugee crisis is the largest migration event in recent history, and the world is buckling under the strain. The civil war appears to be entering its final stages, but its conclusion is still unclear. Until then, and for many years after, the world will have to find a long-term solution to the plight of the Syrian refugees.

Letter from the Editor

An Exploration of Binary vs Hexadecimal Representations

RAEESA ASHIQUE
EDITOR-IN-CHIEF

At the Iron Warrior, we have successfully made it through the last two weeks and are back with issue two! I want to start with saying good luck to upper years on their midterms, and congratulations to fourth years who just got their rings! For some background, see Cameron's article on the history of the Iron Ring on page 5. We also have loads of exciting UW news to share! Learn about how we dominated at OEC on page 3, how we sent seven members of one of our design teams to a pod design competition in Texas on page 5, and how the First Year Integration Conference went on page 20. And finally, don't forget to vote in the SLC/PAC Referendum!

I fear that five editorials will not give me enough words to criticize everything in the world, but I will try to cover as many bases as possible. Get ready for round two of what my friends have aptly dubbed a classic Raeesa rant.

I would like to start with thanking Instagram, Tumblr, and Buzzfeed for making this rant possible. I have learned a lot from these stimulating forums, but what has particularly caught my attention in recent weeks is the Two Types of People phenomenon.

For example, there are two types of people: those confident individuals who set only one alarm to wake up at 7:30, and those who set multiple at five minute intervals. There are two types of people: those who pay for Netflix and those who torrent shows. There are two types of people: those who sort their M&Ms by colour, and those who don't. (Who has time to sort their M&Ms? They all taste the same anyway.) There are two types of people: those who put ketchup on the side of their plate, and those who drench their fries in it. There are two types of people: Coke drinkers, and Pepsi drinkers. There are two types of people: those who squeeze their toothpaste tube from the bottom, and those who squeeze it from the middle. And by far the most controversial, there are two types of people: those who say haha, and those who use the laughing emoji. Yes, Tumblr wants you to believe that there are two types of people. Only two. So you better fit into one category or the other.

But you know what? I set two alarms, excluding my emergency 7:40 "Get out of bed and go to class NOW so you don't fail Circuits" alarm. I won't wake up to one, but I also don't set fifteen. And you know what? I only Netflix because my parents pay for it, but pirate shows I can't watch legally. And you know what? I hate ketchup. Does that mean I don't fit into any category?

In reality, there are NOT only two types of people. The world isn't black and white. Or to put it in engineers' terms, the world isn't binary.

One of the problems is conventional thinking, which is a tendency to consider a linear relationship between only the obviously relevant variables in an equation. If we think in a linear way, we fail to see the bigger picture. It also leads to the idea of right and wrong. There does not have to be a right and a wrong answer: there is always some extent of truth in both.

Sarcasm aside, I do think this type of thinking causes bigger problems. Not regarding ketchup and toothpaste, but multiple other cases which have real world consequences. I think we inherently try to put everything, including people, into categories in order to understand what we see or (think we) know. Even when they don't fit. Even when they shouldn't be confined.

Let's take a look at more Types of People, and I hope I can impart to you why they are complete BS.

The world would have you believe that there are two types of people: gay or straight. First of all, I would like to get something straight (pun not intended): sexuality is a social construct, designed to adhere to the Two Types of People theory. Sexuality is a spectrum, which most people do not seem to understand, so you cannot confine an individual to one or the other.

Similarly, race is a spectrum. The world would have you create boxes for each race, and confine its members to this box. This leads to unfair assumptions based on unimportant stereotypes, regardless of truth or lack thereof. Racism requires you to target a specific colour range, because it's not as simple as just dark and light: people are in between. Not only that, but their skin colour does not define their personality, interests, habits, etc. While ethnicity is often a significant aspect of identity, skin colour or race itself is just a detail.

Let's move on to my personal favourite ism: sexism. The world would have you believe there are two types of people: girls and boys. I do not mean this in the physical sense, but in terms of "gender roles", whatever that means.

I had a very unfortunate run-in during frosh week. We had program-specific presentations for part of one day, and as we entered the huge lecture hall needed to house our program the guy behind me goes, "You're in ECE? But you're a girl." "Yes I am, thank you very much. To both." I really hope he was joking; I thought people didn't think like that anymore.

Gender roles and expectations still exist. Certain subjects, professions, and areas of interest are "male" and others are "female". Again, this comes down to Two Types of People. But the problem is, you cannot confine someone's interests and opportunities to fit one of two types, just because of the body they were born into.

Gender roles are most definitely a social construct. Do you really think we were born with an instruction manual telling women to make sandwiches and men to study engineering? I realize the situation is not as extreme as it was in the past, but the time it's taken to reach this point is appalling. Women were not even considered "qualified persons" until 1929. Like, really? Even today men and women are not equal. Women make less than their male counterparts in the same field. Women pay more for essentially the same product, and so many other cases. Yes, I understand that men and women are biologically different, but it is archaic to believe that societal roles should be defined by this.

Let's move on to my second favourite topic. I do not need to tell anyone that there are two types of people: Arts and Engineering. I'm sure majority of the engineers reading this paper already believe this to be true.

But you know what: no. Just no. There are not only two faculties. There are not only two programs in existence. Believe it or not, some people get degrees which aren't Arts OR Engineering. Mind-blowing, I know. Do you need a moment to let that sink in?

Stay tuned for my Arts/Engineering editorial in the next issue, which has been a long time coming, let me tell you. For now, let me impress on you the idea that Arts and Engineering are not mutually exclusive, nor are they representative of all fields.

In the context of looking at the bigger picture, so many issues come down to Two Types of People. For example, any genocide is about "us" and "them". The Holocaust was about those of the Aryan race, and those not of the Aryan race. The Rwandan genocide was about the Hutus and Tutsis. The Cold War was about the communists and the non-communists. Many cases came down to the straight white conservative property-owning males and those who were not: most notable in North America were slavery and women's (lack of) rights.

Have I made my point yet?

I really do believe that the problem is ignorance and lack of exposure: only when we realize how many different types of people there are can we become more open-minded and accepting. If we could only appreciate the spectrum, we would have fewer problems in the world. If we could only let go of Two Types of People.

I am not optimistic enough to expect to see this happen. Ever. Humans have had recurring issues for our entire existence, but I do think it helps to start small. So let me leave you with this: let's recognize that there are more than two types of people. There is more than 0's and 1's. If we can at least represent categories in hexadecimal rather than binary, we have eight times as many digits from which to choose. If we have to generalize, let's do so in hexadecimal.

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UW Engineers Take Top Prizes at the 2016 Ontario Engineering Competition

LISA BROCK
3B MECHANICAL

On the weekend of January 29th to 31st, the Engineering 5 building may not have had any classes running, but it was far from abandoned. Students flocked from far and wide (or at least, from sixteen universities across Ontario) to participate in the 37th annual Ontario Engineering Competition, which the University of Waterloo was happy to host this year. The event brings students together to compete in the areas of innovation, design, and communication.

The Ontario Engineering Competition has seven different categories of competition, which are: Junior Design, Senior Design, Parliamentary Debates, Engineering Communication, Innovative Design, Programming, and Consulting. University of Waterloo teams took home prizes in five of the seven competitions!

In the Junior and Senior Design competitions, teams must create an innovative solution to a previously undisclosed design problem and build a working prototype, all within the given time limit and budget constraints. Waterloo engineers won first place in the Junior Design category and second place in Senior Design!

For the Innovative Design category, teams present their novel engineering solutions, which were developed prior to the competition, to the panel of judges. University of Waterloo students earned both the first and second prize spots in this category!

In the Parliamentary Debate competition, Waterloo students Ambika Opal and Graham Bleaney came in third place. This competition requires students to defend or refute a previously undisclosed subject in the style of parliamentary debates.

Congratulations to all of the teams, and good luck in the 2016 Canadian Engineering Competition!

Junior Design, First place

This team was made up of 2A Mechatronics students Jackson Fisher, Colin Cooke, Michael Jonas, Mitchell Catoen (from left to right, see below).

"The Junior Design problem was to design a watercraft to carry ballast 2 meters across a pool of water, using only a limited selection of materials. The scoring was based on speed (how fast you could cross the pool), and ballast (how much weight you could carry). The solution was designed, constructed, and reported on in a time span of under 6 hours. The key challenges for this design were creating a light, fast, and dry boat while using materials very unsuited for the task (popsicle sticks, duct tape, saran wrap)".

Senior Design, Second place

This team was made up of 3B Mechatronics students Eric Shi, Kenneth Geertsema, Wesley Fisher, Daniel Lizewski (from left to right, see below).

"The Senior Design problem was to build a robot that can infiltrate a base. The twist was, the base had moving walls of different shapes that the robot must avoid. At the same time, the robot must be able to deactivate sensors on the walls by reaching targets to short out wires at different locations on the wall. There was a total of 6 hours for design, construction, and preparation for a presentation.

"Our solution featured a robotic arm that can retract into a small form to avoid obstacles and extend to deactivate sensors on the fly. One of the major challenges we encountered was when one of our motors had some of its gears stripped from testing, making the system more difficult to control."

Innovative Design, First place

This team was made up of 4B Electrical and Computer students Ryan Gibson, Stuart Alldritt, Austin Cousineau, Nicole Jiang, Ian Murray (missing) (from left to right, see below).

"Project Reservoir is an end to end agricultural water control and environmental monitoring system. It consists of low cost, distributed soil sensors that collect soil moisture, soil temperature, air humidity, air temperature, altitude and acceleration. These sensors report back to the base station, which is responsible for collecting all sensor data, as well as controlling the whole irrigation system of the farm. All data collected is displayed and analyzed by our custom server side software, allowing detailed review of all farm conditions, as well as control of irrigation of the farm. Using this cohesive mix of technologies, the aim of Project Reservoir is to allow greater insights into the farm as well as to enable reduced water usage on the farm as wasted water is minimized through the detailed monitoring of soil conditions."

Innovative Design, Second place

This team aws made up of 4B Nanotechnology students Eric Beauregard, Stuart Murray, Wenbo Cui, Laura Bahlmann (from left to right, see below).

"GraFET: Graphene Based Nano-Electronic Harmful Gas Sensor.

"With urban and industrial development at an all-time high, it is more important now than ever to monitor exposure to toxic gases. GraFET is a sensor that uses a graphene based field-effect-transistor and a dipole detection method to achieve both rapid and sensitive detection of chemical vapour molecules. With a sensing element smaller than the size of an HDTV pixel, GraFET is capable of being incorporated into smartphones or wearable electronics. Apart from providing personal exposure levels, individual devices could communicate with each other to create the first dynamic high resolution air quality map of our cities. The applications of such a technology are wide-ranging and will revolutionize how air quality is monitored. GraFET: the power for pollution change in the palm of your hand."

Photos courtesy of respective teams

Clockwise starting from top left: 2A MTE Team, 3B MTE Team, 4B EE/4B CE Team, and 4B NE Team

Hypothesized Planet X Sparks Intrigue

CAMERON SOLTYS
3A MECHANICAL

SPACE CAM

A few weeks ago, major news outlets around the world ran spectacular headlines saying, "They've Just Discovered Planet Nine." This caused some people to leap for joy that the International Astronomical Union (IAU)—the body that, among other things, handles the naming of planets and natural satellites—had finally succumbed to the pressure of thousands of complaints that Pluto was still a planet and that the IAU had no right to demote it. Others rolled their eyes, pointing out that it was common knowledge that the hidden planet Nibiru was only weeks away from swinging by Earth, at which point the alien denizens of said planet would either kill us all, destroy the Earth entirely, or help humanity reach a new stage of enlightenment (depending on which constellation in the Zodiac it came from, presumably). All this new paper showed was that the government censors had gotten complacent and allowed a scientist to report the truth officially before the pre-allotted time.

Unsurprisingly, what the actual paper said is a little bit less sensational, even if it is still very exciting. The paper, titled Evidence for a Distant Giant Planet in the Solar System and published by Konstantin Batygin and Mike Brown, analysed the motion of six bodies in the outer reaches of the solar system and found that those bodies had some remarkable similarities in their orbits. What they specifically found was that all the bodies were tilted relative to the ecliptic of the solar system, which is the plane that all the planets orbit on. Despite this, all six bodies came closest to the sun (a point known as perihelion) at around the same point in their orbit where they crossed the ecliptic. This result had already been noted in a 2014 paper, which tentatively suggested that the peculiar arrangement could be caused by a large planet in the outer solar system.

In the new paper, the astronomers noticed that not only were the perihelia all near the ecliptic, but that they were all orientated in the same direction, meaning that from the sun's perspective all of the perihelia would be scattered about one point in one region of the sky, in line with the known planets. The researchers calculated that this particular alignment had only a 0.007% change of happening by chance, and so set out to determine if an unknown planet could force these results. Using a variety of simulations, they narrowed in on a planet with an orbital period of 15,000 years and a mass of 5-10 Earth masses, making it a Neptune-sized gas giant. Its closest approach would be seven times further from the sun than Neptune. This planet would also need to have its orbit anti-aligned with the objects it shepherds, so its perihelion would be on the opposite side of the sun to the perihelia of the aforementioned six bodies.

Some scientists have celebrated the finding as rigorous, while others question it. Planetary Scientist Dave Jewitt, for instance, points out that the paper eliminates dozens of other bodies in similar orbits to the six studies since they don't have the interesting perihelion alignment. This calls the 0.007% chance of coincidence into question, and Jewitt worries that "a single new object that is not in the group would destroy the whole edifice." There is a precedent for mathematical predictions being used to hypothesize unseen bodies in the solar system. Most notably, in 1846, Urbain Le Verrie predicted an unseen planet was causing the known irregularities in Uranus' orbit. When astronomers at the Berlin Observatory received word of Verrie's work, they found Neptune almost exactly where he had predicted it after only one night of searching.

The paper has also caused a cornucopia of jokes that this new planet is coming to replace Pluto. These are caused in large part by the fact that one of the paper's authors, Mark Brown, has greatly relished (and even been a primary perpetuator of) his reputation as "the man who killed Pluto"; Brown's discovery of dwarf planet Eris was an influential piece of evidence in showing that Pluto was not a particularly special body, and instead was one of many mid-sized bodies that orbited beyond Neptune.

Many questions still remain about the possible existence of Planet Nine. For one, current models of planet formation do not allow for a large planet to form so far away from the sun. A controversial explanation is suggested in the discussion at the end of the paper: this planet formed with the other gas giants, was kicked out of the inner solar system by Jupiter or Saturn, and then found a stable orbit in the outer solar system by slowing down in the presence of copious gas hypothesized to be pervasive in the very-early stages of the solar system's formation.

A definitive answer may be forthcoming about the existence of the Planet Nine. The researchers are already using the Japanese Subaru Telescope in Hawaii to survey the sky where they most expect it to be (opposite its perihelion, since objects both move slower and have longer to travel the further away they are from the object they orbit). Of course, even if it is not found there still could be other planets out there. And until it is positively identified in a telescope, Planet Number Nine remains nothing but an interesting and potentially well-supported hypothesis.

Japan Building World's Largest Floating Solar Plant

DONOVAN MAUDSLEY
2T MECHANICAL

The creation of this groundbreaking solar plant traces its roots to the Fukushima disaster back in 2011 when a tsunami hit the island of Honshu in Japan. The tsunami was caused by an earthquake, which struck while multiple reactors were having their power cores switched out. The old cores required cooling. When the earthquake was detected, the remaining active reactors had to have their control rods inserted, meaning that they could not power their own cooling pumps. Diesel generators were started to provide power for the coolant systems. Many of these failed when the first wave of the tsunami hit, but the remaining were sufficient to power all of the pumps. The largest of the waves was able to rise over the sea wall and flood the generators, shutting them down. This lead to the total meltdown of the plant.

Since this disaster the nuclear grid in Japan hasn't been able to get going again. Prior to Fukushima, nuclear energy provided over 30% of Japan's power, but since then only three reactors have been restarted and the majority of Japanese citizens do not support nuclear power use. This has left the grid shorthanded, with fossil fuels picking up the slack. Japan even resorts to importing energy from their neighbours when their grid falls short, which is an incredibly expensive endeavour. Environmentalists have pushed for more and more renewable energy sources so that governments don't have to choose between the dangers of nuclear energy and the main sources of climate change.

The Japanese electronics company Kyocera secured the contract to build the world's largest floating solar plant. This is the fourth project of its kind that Kyocera has worked on, and by far the largest. The plant itself will cover an area of around 180,000 square meters, which is about the size of eighteen regulation soccer fields. Kyocera and their French solar partners Ciel et Terre have been working on floating solar technology since about 2006, and have made significant progress. The cells, of which there will be other 50 thousand, are metal free, recyclable, and resistant to both corrosion and the sun's ultraviolet rays.

Japan is one of the most densely populated countries in the world, and usable land is an extremely desirable resource. Building a plant of this scale on land would be far more expensive than it would be worth. However, Japan does possess abundant water sources which are necessary for both flood control and agricultural purposes. The surface selected for the project is the Yakamura Dam reservoir, about 70 km south-east of Tokyo, and the plant will be anchored down to the bottom of the reservoir itself. The top surface is mostly flat and has been designed to be resistant to everything that Japan's weather can throw at it, including typhoons.

Construction of the plant began back in 2014 and is not expected to conclude until the first quarter of 2018. Most of the work is prefabricating the enormous amount of solar cells, but installation and assembly on the scale required is still a daunting task. Once the plant is finished it will provide about 13.7 megawatts of power, which is approximately 8.5% of the energy required by Japan. For those of us that don't just know how much 13.7 megawatts of power is, it will either power close to 5,000 homes or 120,000 individual Playstation 4 systems.

Although the Yakamura Solar plant is a definite step in the right direction on the renewable energy department, it will not be anywhere close to the size of the Ivanpah Solar Power Facility. Partly owned by Google, ISPF is the world's largest solar power plant with an approximate area of 14 square kilometers. The Goliath of solar energy is located in Nevada's Mojave Desert, less that 70 km away from Las Vegas. ISPF was commissioned back in early 2014, but has had trouble producing its expected levels of power. By November 2014 it was producing approximately half of its expected output, and the California Energy Commission blamed this discrepancy on "clouds, jet contrails and weather". By 2015 however the plant was producing 170 percent more power when compared to the previous year.

This displays the temperamental nature of renewable energy in general. The Mojave Desert gets pure sun all day, nearly every day of the year. In a region like Japan with more fluctuating weather conditions than Nevada, can solar energy be a reliable source of power? Kyocera Electronics seem to think so, since they have plans for four more plants past the Yakamura Reservoir plant. Japan also has plans in place to build a large wind farm off the coast of Fukushima.

Photo used under Fair Dealing

Rendered image showing a solar plant at the Yamakura Dam Reservoir

Spacex Hyperloop Pod Design Competition

USMAN AKBAR
4B MECHANICAL

The Concept

In 2013, founder of Tesla Motors and SpaceX Elon Musk released a white paper in which he proposed a "fifth" mode of transportation called the Hyperloop. In essence, the idea comprised of pods or capsules carrying passengers at over 700 mph in overhead tubes supported on pylons. The tubes would be under near vacuum conditions, allowing for minimal drag throughout the journey, and a trip from LA to San Francisco would ideally last about 35 minutes. Incredible!

The Competition

Fast forward to summer of 2015: SpaceX announced an open competition, geared towards university students and independent engineering teams, to design and build the best Hyperloop pod. To support this competition, SpaceX is constructing a one-mile test track adjacent to their Hawthorne, California headquarters. The student team at the University of Waterloo, called Waterloop (pun intended), is participating in the main Design and Build category of the competition and recently submitted the final design package in January.

The Team: Waterloop

The Waterloop team currently has thirty active members, including several third and fourth year engineering students applying their skills and knowledge to make this concept a reality. The team is comprised of Levitation, Pod Body, Exterior Design, Braking, Embedded Systems, and Safety teams along with a Management team that deals with all the logistics, marketing, and sponsorship. Our pod is designed to be functional, manufacturable, low-cost, and competitive.

Design Weekend

SpaceX hosted the Design Weekend on Jan 29-30 at the Texas A&M University where over 1,000 students from all over the world came to showcase their pod designs. Over 180 teams representing four continents set up their individual booths open to sponsors, judges, and the public to explain their ideas and innovations that would transform the way we think about travelling. Each team also presented their design to a panel of judges (university professors and SpaceX/Tesla engineers) for technical critique. The Waterloop team had seven members that traveled to Texas to represent our team. A special thanks goes to Kik, our primary sponsor, who helped fund the trip. Our booth attracted a lot of attention from the public and sponsors alike, including CEO of Hyperloop Technologies, Rob Lloyd. The buzz and electricity of the place was incomparable – a hub of futuristic ideas – with a chance to meet and chat with so many bright students from all over the world and with engineers from SpaceX, Tesla, and Hyperloop Technologies. A celebration dinner was held at the closing of the weekend to commend everyone for their hard work and for the start of something completely revolutionary.

Results

Waterloop was one of the 22 teams selected from a total of 74 nominees to proceed to the final competition weekend in June at the SpaceX headquarters. This represents an immense achievement for everyone involved in our team and is just reward for the effort everybody has put in since the inauguration of the competition. Massachusetts Institute of Technology won the best overall design award (1st place). Teams from other universities also proceeding to the final round include TU Delft, UC Irvine, UC Berkeley, and Carnegie Mellon, to name a few [1].

Future Plans

Waterloop is inviting graduate and undergraduate students to join our team and participate in the testing and prototyping phase which begins next week! The competition is scheduled for June so the team is targeting a competition-ready pod by early May. Our marketing and sponsorship teams are working tirelessly to secure invaluable sponsorship from companies that visited our booth and other sponsors who are interested. Let's all make Waterloo and Canada proud!

[1] See the full results at: http://hyperloop.tamu.edu/news-release-january-30-2016/

Recruiting Email
info@uwhyperloop.com

Photo provided by the Waterloop Team

From left to right: Victor Qian, Brendan McGaffey, Nick Achkarian, Darian Zigante, Scott Hoefig, Usman Akbar, Jack Liu

We Are the Engineers

A History of the Iron Ring

CAMERON SOLTYS
3A MECHANICAL

Last Saturday, February 6, the fourth years at the University of Waterloo celebrated one of the most beloved milestones on the journey to becoming an engineer; The Ritual of the Calling of an Engineer. While it is not an official part of becoming an engineer, nor is it mandatory for graduation, this is a time-honoured tradition that has been shared by many Canadian engineers and engineering student for just shy of a century.

A University of Toronto Professor, Herbert Haultain, came up with the initial inspiration of an organization meant to bind together all members of the profession of engineering. In 1922, Haultain presented his proposal to a meeting of the Engineering Institute of Canada, who responded favourably to the idea. With this support, Haultain set out to create an obligation and ceremony suitable for this purpose, approaching the English poet and novelist Rudyard Kipling for help.

Kipling was a well-known poet at the time, and Haultain went to him because several of his stories and poems had featured engineers. One such story, The Bridge-Builders, contains the well-informed line: "There is no eight-hour limit to an engineer's work…" Kipling proceeded to create the ceremony and obligation that he called "The Ritual of the Calling of an Engineer." A crucial part of the ceremony is the receipt of a ring made of iron, intended to be worn by the recipient until their retirement or death.

The iron ring is a curious ornament, specifically engineered to be intrusive. Kipling's original intention was for it to be of rough, hammered construction and to be hoop shaped so as to have no start or end. Today most rings are made of stainless steel instead of iron; the camp serving Torontonian Universities alone offers both the iron and stainless steel options. The transition has come because iron rings can react with the body's chemicals, loosening the fit. The modern ring contains 12 semicircular facets on each outside edge, creating sharp angles. These angles are designed to scratch across the page as one writes or draws, reminding the wearer of its presence, and through it, an engineer's obligations to society and their profession. It is otherwise unadorned, since the ring is not so much a piece of jewelry as it is a reminder.

According to frequently-stated but unfortunately false legends, the rings are made from the metal of the collapsed first Quebec Bridge. This bridge was chosen, the legend says, because its failure in 1907 was caused by the poor planning and design on the part of its engineers. The symbolism of the ring as a token of the duty that engineers have to protect society comes from the memory of 75 construction workers who died as the bridge fell.

Congratulations fourth years: your 1608 day wait is complete. Keep the message of the ring—professional obligation and professional comradery—clear in your minds as you venture off into the fantastic new opportunities that await.

The Other Referendum

RAEESA ASHIQUE
2A ELECTRICAL

Hi everyone, and welcome to the discussion of "The Other Referendum". No we will not be publishing a highly controversial PCP about it, and this article will not have to be reviewed by the IW advisory board.

But lack of controversy does not imply lack of importance. We spent a lot of time on the Sever Ties Referendum, which I am by no means belittling because it initiated a very thought-provoking discussion. But I haven't heard much talk lately about the SLC/PAC Referendum, which will have a very direct effect on UW students.

Anyone who has bought lunch at SLC, and then tried to sit somewhere and eat it – of all things, can you imagine?! – can agree with me that we don't have enough general student space on campus. This is the reason for the current expansion project: its goal is to facilitate a greater sense of community and enhance students' university experience by increasing social, activity, dining, and recreation space. It has been driven primarily by Feds and Graduate Student Association (GSA), who are currently working with Athletics and the Administration. The University has hired architects to develop the building plans and artistic renderings, which are already available here:

https://uwaterloo.ca/associate-provost-students/slcpac-expansion-project/design-renderings

They have also allocated staff to help the students prepare their proposal.

Let's take a look at why this is so important. Every couple of years, the Council of Ontario Universities (COU) releases a space assessment of all Ontario universities in which they classify types of spaces – for example, office, athletics, etc. – and give recommendations on how much the university should have based on population. Currently, academic office space is 124.5% of what it should be, while study space is only 42%, recreation/athletic space is 48.2%, and common use/student activity space is 53.2%. Obviously, professors have much more space than necessary, while students have less than half of what we should. This is definitely a problem, which is why Feds and GSA called for this referendum.

The wording of the referendum is as follows:

"Do you support a fee of $18.00 per term for the construction of the SLC/PAC Expansion with the following conditions:
-student contributions to ongoing operating costs, determined by a committee whose membership is comprised of a majority of students
-part time students pay 30% of the fee,
-the fee will begin after completion of the project
-the fee will be indexed annually to inflation, thereafter."

The two questions most students have are, what do I have to put into this? And, what do I get out of this?

Altogether, the university will contribute $10 million to the project, and students will contribute the other $24 million. The student fee of $18.00 per term goes to the SLC expansion and PAC fitness centre renovation. The fee will not come into effect until after the new space is open and fully operational, which is projected to be fall 2018. A lot of the students on campus right now will not benefit from this new facility, but you aren't paying if you won't be here!

The proposed expansion will add 63,970 square feet to SLC and PAC, west of BMH. It will connect to the current SLC on all floors, and connect to the Red North corner of PAC. It will also link from SLC to the third floor of MC, yay! (Is it just me, or is it kind of ridiculous that SLC doesn't connect to anything? When I'm on campus late or on the weekend, I have to walk all the way to SLC in the cold just to get Tims.) There will also be a covered walkway to the AHS buildings, and a new SLC courtyard when the existing one is built over. By the way, the construction will not take away from the existing green space. See the plans for more details.

The building will consist of student spaces, as stated. This includes: fourteen bookable multipurpose rooms, bookable event space for 150 people, 525 dining seats which is a 200% increase, 4500 square feet of social lounge space which includes couches and pool and foosball tables, a graduate student lounge, and a multi-faith space in the Qibla direction (towards Mecca) to fit 100 with prayer mat storage and cleansing amenities. There will also be 11,000 square feet of fitness space added to the current PAC as a two level concept, which is a 3.5 time increase from its current size, and 3000 added square feet of recreation studio space.

Undergraduate and graduate voting are both open from February 9-11. All full-time and part-time students can participate in the referendum and will be emailed a link to the online poll. The expansion project is dependent on a successful yes vote and will be discontinued if students vote no. In the latter case, the university will likely be unwilling to participate in similar discussions in the near future.

Results of the referendum vote will be announced on Friday.

Remember, it is important to go vote! Personally, I will only benefit in my 4B term if the project finishes on time, but that's not the point. Let's invest in the next generation of UW students.

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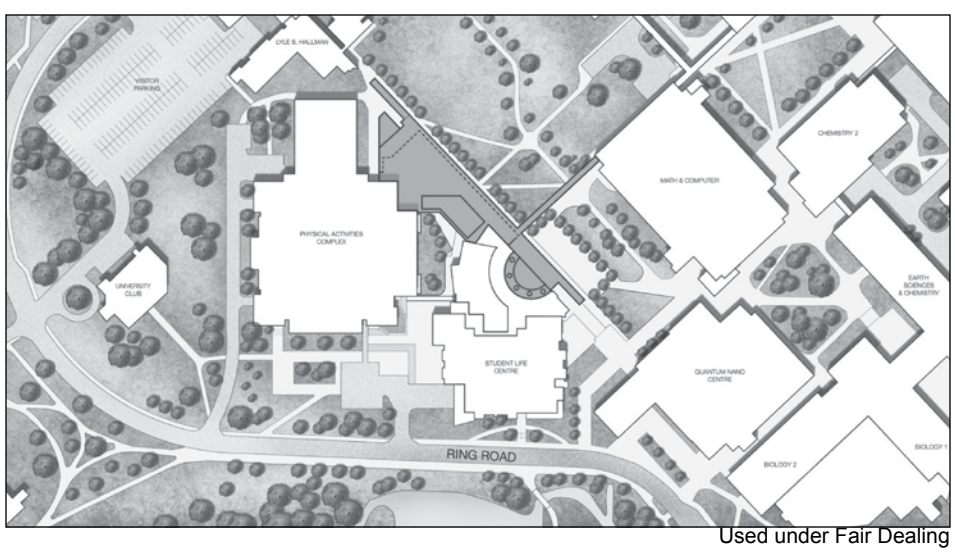
Exterior view of SLC/PAC expansion from BMH Green



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SLC/PAC expansion site plan

IRS Prank: Oversized kiddie pool in E2 (Courtesy of Civil 2016)

Down! SET! What?

DONOVAN MAUDSLEY
2T MECHANICAL

Just a few days ago was the biggest sporting event in North America. Over a billion chicken wings and a million gallons of beer were consumed. We at the Iron Warrior are not football people on average, but myself and our editor Raeesa love the game, so we decided to pick sides and debate who was going to win. Raeesa chose the Denver Broncos of the AFC, and I chose the Carolina Panthers of the NFC. I thought that Carolina trumping Denver in every way was a sure thing. Well, I was wrong. Very wrong. So irrefutably wrong that now I'm stuck writing an article about just how wrong I was. Fun times ladies and gentlemen, fun times. I want to preface this article with an apology regarding my blind faith in the power of Cam Newton and the Panthers offence. You shouldn't have listened to me if you did. As the saying goes, "defences win championships".

Super Bowl 50 was altogether underwhelming. Analysts said it had the potential to be the best football game ever, but no one delivered. I have no general hate for low scoring games, but this one was just brutal. With a final score of 24-10 in favour of the Broncos, this game honestly got a bit dull.

The Denver Broncos as #1 seed in the AFC brought their 2015 #1 ranked defence to San Francisco. They started the game on offence and marched slow and steady down the field for the first score of the game, a 34 yard field goal. It was then Carolina's time to shine, but nothing connected. The Broncos had a three and out before Carolina got the ball back for what might have been the most important drive of the game. On third and ten at his own fifteen yard line, Cam Newton got stripped of the ball by Denver linebacker Von Miller, which turned into a defensive touchdown for the Broncos. The Denver defence had stuck like glue to their assignments across the field and scored on the offence that was the most used to scoring.

The rest of the first half went by slowly, with only one dangerous drive. Carolina managed to back up the Broncos to their one yard line and Jonathan Stewart leapt over the offensive and defensive lines for a touchdown. It was 10-7 for the Broncos, but wouldn't stay that way for long. On a punt by the Panthers, punt return specialist Jordan Norwood set a new Super Bowl record with a 61-yard return, going down just 14 yards from Carolina's end zone. Denver wasn't able to get anything going and had to settle for a field goal. 13-7 was the score and it remained that way until halftime.

Neither team had spectacular offensive showings, but Carolina definitely put up the better half. Peyton Manning, Denver's veteran quarterback, wasn't able to find many holes in Carolina's defence and had only 4 first downs. Despite being regarded as one of the greatest quarterbacks ever, Manning barely made an impact. The 39-year-old was hurried out of the pocket and hit so frequently that he wasn't able to settle into his routine.

Carolina's young star, Cam Newton, did not fare that much better. He was able to make a few plays with his feet, but after losing the fumble that was returned for a touchdown, he seemed more conservative. This is why I deemed that the most important drive of the game. Newton generally takes risks throwing the ball, and scrambles out of the pocket with the best in the league. Carolina is able to use this to their advantage every time they play and as a result, build fast leads. However, the more cautious role didn't suit him. He wasn't holding onto the football for long if his receivers weren't open, and most of the time he simply threw it away. The lead was still only one play away from them, so he was likely waiting for the perfect play, which never materialized.

The halftime show was pretty good. Coldplay started everything off, and was about as underwhelming as the game itself. Bruno Mars and Beyonce were able to rile up the crowd more, but as a whole it wasn't amazing. Katy Perry's show last year was a tough act to follow, and the late afternoon sunlight meant that lasers and effects had less of an impact.

Carolina started the second half on the march, but missed what would have been a 44 yard field goal. The ball bounced unceremoniously off of the right upright and Denver got to start their next drive right near center field. Manning hit his longest throw soon after, and that along with a personal foul on a Carolina defender led to another Bronco field goal. The score read 16-7 and the Panthers had dug themselves into a 2-score hole.

I don't know if I've really emphasized how in control of this game the Denver defence was. Carolina, a team that usually has a very confident and somewhat cocky offence, was unable to get into their rhythm. Denver played their game, finished tackles, and didn't lose coverage after the first few seconds. They also brought blitzes that Newton didn't anticipate. The Panthers were finally able to gain some life in the fourth quarter when defensive end Kony Ealy sacked Peyton Manning and recovered his own forced fumble at midfield. Newton was able to get down to Denver's 21 yard line, but was stopped short of the end zone and held to a field goal. We were back to a one score game with just over ten minutes to play and all timeouts remaining. There was a comeback brewing.

After a series of three and outs, the Panthers were looking for a deep pass, but instead Cam Newton was sacked and lost another fumble to Von Miller. Denver recovered inside of the Carolina 5. Peyton and the boys rushed in a hard fought touchdown, and decided to run the 2 point conversion, putting themselves up 14 points with just over 4 minutes left. Sloppy time management by the Panthers, a long three and out by the Broncos, and a forced clock rundown after a personal foul left one second on the clock and that was game.

The nice thing about this outcome is that Peyton Manning gets to end his career on a high note. It's long been thought that he would retire after this year, and now his brother Eli can't lord his second ring over him at Christmas dinner. Peyton also passed Brett Favre's 199 win record, establishing his 200 as the number to beat. There are only a few athletes who have been as good as long as Manning has, and he revolutionized the way that quarterbacks, and football players in general, prepare for games. I wish him the best in his retirement, which is kind of self-serving considering he plays in the same division as the Chargers, but whatever.

Now that the football season is over, I can get back to wishing that it was football season. See you all next year.

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Editor's Note:

Reporting on crushing losses is an occupational hazard, and as such, the Iron Warrior waives responsibility for all negative side effects, debilitating or otherwise, after viewing such games.

Granted, this is a somewhat cruel and unusual punishment simply for poor choice in football team. Not being entirely heartless, we extend our sincerest apologies to Donovan for appreciating irony.

The Benchwarmer Report

Canadian Teams On the Limp Out of All-Star Break

ELIZABETH SALSBERG
3T NANOTECHNOLOGY

THE BENCHWARMER REPORT

Hockey fans—it's past time for a Benchwarmer's NHL update. After the excitement of the All-Star Break with John Scott and Co., it's time to get back to business. Coming out of the All-Star break, there's much work to be done all around. So without further ado, let's have a closer look at where each of our Eastern conference teams stand.

Montreal Canadiens

Arguably the biggest disappointment of all, the Habs have been on a slippery slope since losing 2015 Hart and Vezina trophy recipient Carey Price to a lower body injury on October 29, 2015. In his first appearance after his so-called "recovery" on November 20, Price left the game in some discomfort. Ever since the Canadiens have been sliding down the standings, so far in fact that it is quite likely that they will miss the playoffs this year.

In particular, this season highlights the Canadiens' inherent inability to put pucks in the net (with the exception of Brendan Gallagher of course). Coach Michel Therrien should be on the hot seat for this one—he needs to move to a strategy that will create more offence. This is hardly the first time this has been pointed out though...

Ottawa Senators

Mired in a slump, the Sens are searching for answers. Though it looks like they're about to snap their 3-game losing streak with a decisive victory over the Leafs tonight (they currently lead 4-0, we have changed over to the Pens vs. Panthers game). Nevertheless, many Ottawa fans are calling for Dave Cameron's head. A slew of injuries to key players such as Kyle Turris and Milan Michalek hasn't helped the cause. It's not like the Sens were expected to make a deep run in the playoffs, but it sure did look like they could be a playoff team. The chances are small now, but unlike Therrien, Cameron should probably be given some time to see what he can salvage from the remainder of the season.

Toronto Maple Leafs

Rebuilding mode. Pulling for first overall draft choice to join Mitch Marner. Mike Babcock coached his 1000th NHL game against the Devils, which the Leafs won 3-2 in a shootout. Nothing else worth adding here.

Western Conference bits 'n bites...

Edmonton Oilers

Drum roll please! Rookie sensation Connor McDavid made his return from injury an exciting one with a three-point night against the Columbus Blue Jackets. Optimism is back and high in Edmonton... despite the fact they will miss the playoffs for the 10th straight year. Then again, they'll be in the mix for a top-5 draft pick if they keep up their slow pace.

Vancouver Canucks

A pleasant surprise to start off the season, they were perhaps our best bet for a Canadian Western Conference team making the playoffs. This is especially true considering the relative weakness of the Pacific division this year. However, it looks like the blue-collar L.A. Kings have the division pretty much in the bag, with Sharks and Ducks duking it out for second place and only a point separating the two teams. The Canucks sit five points behind the Ducks.

Calgary Flames, Winnipeg Jets

Tied with the Leafs, Sabres, and Oilers for dead last in the league, both of these teams have been a disappointment. After an impressive showing last playoffs against the Ducks, Johnny Gaudreau's Flames have not picked up where they left off. Ditto for the Jets, who are currently shopping captain Andrew Ladd on the open market to get something good at the trade deadline. Though neither will make the playoffs, let's hope there's enough high-calibre prospects coming down the pipe in June.

Congratulations, Fourth Years!

ADELLE VICKERY
PRESIDENT

Hello again engineering students! First off, I'd like to congratulate all of the fourth years that received their Iron Rings on Saturday. I'm sure it feels great after the last five years of assignments, labs, projects and exams.

The History of the Iron Ring

Due to the events of this past weekend, I thought it would be appropriate to talk a bit about the Iron Ring, what it symbolizes, and the Ceremony in which they're given.

The Symbol

The Iron Ring is a Canadian tradition that originated in 1922. The Iron Ring is a symbol of the pride that engineers have in their profession, and it acts as a reminder of engineers' obligation to live by a high standard of professional conduct. The Iron Ring is not, however, a symbol of qualification AS an engineer; this designation is determined by provincial licensing bodies.

The Ring

The Iron Ring itself is made from either wrought iron or stainless steel, and is given to graduating students at a ceremony held at each individual university. Because iron deteriorates over time (leaving the finger black and causing it to fit more loosely,) most camps of the Corporation of the Seven Wardens have moved to only using stainless steel rings.

There are still remnants of the old legend that the rings are made from the steel of a beam used in the first Quebec Bridge, which collapsed during construction in 1907. Seventy-five workers died in the collapse of the bridge, which was attributed to poor planning and design by the overseeing engineers.

The Ring itself is small and understated - designed for its symbolic nature, not as a piece of jewelry. It is worn on the little finger of the working hand.

The Ceremony

The Ritual of the Calling of an Engineer has a history dating back to 1922, when seven former presidents of the Engineering Institute of Canada met in Montréal along with other engineers. One of the speakers, Herbert E. T. Haultain, was a professor of civil engineering at the University of Toronto. Haultain believed that an organization was needed to bind members of the engineering profession in Canada more closely together. He also believed that an obligation, or statement of ethics, should be developed to which all engineering graduates should seek to uphold. The first ceremony awarding the Ring was held in 1925, under the supervision of Professor Haultain.

The Iron Ring Ceremonies are private affairs with no publicity. Invitations to attend are extended to local engineering alumni and professional engineers by those who are scheduled to participate. Some graduating engineers choose to receive a ring passed on from a relative or mentor, giving the ceremony a personal touch. Regardless of who gives the Ring to graduating students, it is a very momentous occasion.

The Stag

The Iron Ring Stag (IRS) is a Waterloo tradition and celebration that occurs for the graduating class every year on the evening following the Iron Ring Ceremony. It is the first opportunity for the newly-ringed students to touch the Tool, the school's engineering mascot. Only graduating students with their Iron Rings are allowed to attend these celebrations. The day before IRS, it is customary for the graduating classes to gather and celebrate "one day 'till IRS". You may have seen classes showing their spirit last week!

Congratulations again to all the fourth years on achieving this milestone.

Presidential Updates

As for updates on my portfolio, the last two weeks have not been as busy as the first few of the term, but progress is being made. As I mentioned in the last issue, I am part of the Orientation Working Group that was created to re-vision Orientation Week. Since the last issue, the working group has met twice (two full days,) to start designing the week's events. We reviewed key elements and images from the first two phases, along with the Orientation missions and guiding principles. By the end of the first day, we had developed five key themes on which to focus: programming, authentic support, communication, resource use, as well as tools and measures. On the second day, we brainstormed around each focus and created a plan for action, identifying key deadlines. The final phase of this process is the ongoing operationalizing of the plan. While a lot of work was done during these meetings, there is still much more to be done. The Orientation Advisory team is currently working extremely hard with the FOC teams to start to get things ready.

If you have any questions or just want to chat, send me an email at *president.a@engsoc.uwaterloo.ca* or stop by the Orifice (CPH 1327).

The Term is Semi-Done

SARBAJOY MAJUMDAR
VP INTERNAL

Hello A Soc, it is your friendly VP Internal Sarb here. Time flies so fast when you are having fun that it is really hard to believe almost half of this term is done. Fasten your seatbelts as you get to hear about the exciting things that have developed since my last update.

Semi formal

The semi formal this term was at Turret Nightclub on January 29 and it was a blast. I had the opportunity to talk to as many attendees as I could, and everyone I talked to had a good night. More than that, I was really amazed at the two amazing first years, Soorya (2020 Management Engineering) and Farayha (2020 Mechatronics Engineering), who helped run semi formal. Their commitment towards making semi formal a success was tremendous and their efforts truly were reflected by the satisfaction of the attendees.

I am working on having a collaboration with Arts Student Union for this fall's semi formal. I hope you are as excited to collaborate with Arts as I am.

Possible Interfaculty Collaboration

The mental health directors for this term are planning to have a mental health awareness blog on the EngSoc website. The first blog post will be up sometime before the end of February. If you are keen to share your mental health story with EngSoc, you can email our Mental Health directors with your story at *engsocmha@gmail.com*. Also, we will respect your privacy.

Our Mental Health Awareness Week is happening from February 29th to March 3rd. More details about this week will be posted soon. One of the things I am working towards is getting another faculty and a Feds service to join in a collaboration with us during Mental Health Awareness week.

Event Sign-ups

For all of you amazing programmers and amazing amateur programmers who want to learn programming, our first ever Eng+Math Hackathon is happening on March 4. Registration fee is $5 and you can pay the fee at the Orifice and sign up via the online form that is available on the event page.

Genius Bowl, our termly trivia competition, is happening on March 9 and you can sign up in teams of five. Teams in first place gets $75 and they can have their names be engraved on the Genius Bowl trophy. You can sign up for Genius Bowl at the Orifice (CPH 1327).

TalEng, our termly talent show, is happening on the March 15 and will be in WILFs. We have an amazing emcee and the Tool is making an appearance. We also might have architecture students show up for TalEng. Sign up sheets for performers are available on the Facebook event page.

Carebear

Every term, the Carebear Director takes nominations from all EngSoc members for outstanding directors. One director gets to be "Director of the Month" each month and have a feature post on the EngSoc Website. Eric Shi from 2017 Mechatronics Engineering was the Director of the Month for January for his tremendous efforts in Ridgidware, Student Deals, and Career Fair.

Feel free to let us know of any outstanding EngSoc director by filling out our nominations form at: *http://bit.ly/CareBearNoms*

Find Me!

If you have any ideas for events we should have, would like to talk about what your favourite events were, or just want somebody to talk to, email me at *vpinternal.a@engsoc.uwaterloo.ca* or visit me at the Orifice (CPH 1327) on Thursdays from 9am-11am or whenever you see me in the Orifice. Also feel free to stop me and say "Hi!" whenever you see me in campus or elsewhere. I don't bite (seriously). Also, all the best for Hell Week and may you guys also have an awesome Reading Week.

Education Updates

JEFF GULBRONSON
VP EDUCATION

Hello again! First of all, congratulations to all fourth years who were ringed last weekend. After the past 5 years, it's very well deserved. To everyone else, hopefully the past two weeks have been treating you well, and you're feeling good about midterms. I'll be looking far ahead for this article, to put two events on your radar for March, (early, I know).

First, we have a WaterlooWorks demo in the CPH Foyer from 11:30 - 1:30 on March 3rd. I hope that this will give students an opportunity to talk to CECA staff about the software, have an opportunity to try using it, and give any feedback you think would be helpful. I've also inquired about getting a developer from Orbis Communications to answer more technical questions about the new software. In the meantime, if you have questions you can email: *waterlooworks@uwaterloo.ca*.

Secondly, we'll be running our EngSoc Career Fair on March 9th! It'll be taking place in E5, on the second floor. We're trying to cover as many programs as possible, to appeal to as many fourth years as we can. If you have any companies you've interned for, and would like to see them at the event, feel free to pass any contact information along to *careerfair@engsoc.uwaterloo.ca*.

Last week we opened up nominations for our Teaching Excellence Award. Each term, EngSoc "recognizes instructors, meaning professors, lecturers or laboratory instructors, that have shown outstanding contributions towards undergraduate learning." Nominations close March 1st, so there's still lots of time! You can find the nomination form on our Facebook page, and if you have any questions, you can email: *teachingaward@engsoc.uwaterloo.ca*.

One of my platform points when I ran was to organize an academic rep meeting, for all reps across all programs. I've begun reaching out to staff in each program, and have begun compiling my list of reps. If you're an academic rep this term, feel free to email me at *vpeducation.a@engsoc.uwaterloo.ca* and introduce yourself! I'm hoping to have the meeting towards the end of this month, so keep an eye out for an email from me!

On that note, one of the main agenda items at the meeting will be course critiques. This term, we're transitioning to 100% online course critiques, with a few exceptions. Students will still have time in class, about 15-20 minutes, to complete the evaluation online. Profs should be giving time at the start of the lecture, rather than the end, in order to encourage participation. A small trial was run for online critiques in the Fall term, and overall participation rates were virtually the same as handwritten critiques. I hope that this trend continues, and we can actually increase participation.

As always, if you have any questions, feel free to send me an email or stop by the Orifice! I'm usually there, or will be right back if I'm out. Enjoy Reading Week, and good luck on midterms!

Everything is FINtastic!

ABDULLAH BARAKAT
VP FINANCE

Hey everyone! Hope your term has been going well so far! With midterms just over the horizon, I know that things are starting to pick up and time is feeling a bit short, but time is money, so there's tons to talk about when it comes to the finances of EngSoc!

Novelties

We had a Novelties fire sale, which was extremely successful! A lot of people came and showed their engineering spirit by almost buying out the stock we had on sale. As a result of the success of this fire sale, there may be another one near the end of the term, so keep an eye out for that! However, since we have sold a lot of our current inventory, we need some new stuff in Novelties! So after reading week, we will be running a Novelties Design Contest to get some new and awesome Engineering Swag. So if you have any ideas about what you think Novelties should carry, we are all ears!

RidgidWare

There are tons of new supplies in RidgidWare! The amazing RidgidWare directors have been working throughout the first month of term to organize all the stock in RidgidWare and placing orders for what is needed, as well as find new items that we should stock. We hope that by the end of the term, a long-term plan for RidgidWare should be in place, and that a clearer vision for the future of RidgidWare will be developed.

Sponsorship

Every term, EngSoc offers sponsorship to student teams and any student organizations that directly affect or benefit Engineering students. Sponsorship applications are currently open and will close on Friday, February 26th, 2016 by 11:59pm. More information will be sent out once all applications are in, and have been reviewed.

That is all for now, but do come visit me in the orifice during my office hours, (Wednesdays 12:30pm - 2:30pm,) or shoot me a message at *vpfinance.a@engsoc.uwaterloo.ca* if you have any questions, comments, or concerns about anything under my portfolio, EngSoc as a whole. or if you just want to chat.

WEEF Proposals Are Open!

ERIC SHI
WEEF DIRECTOR

WEEF proposals are being accepted for the Winter 2016 term until March 2. All students (including from the school of Architecture) staff, and faculty members can submit proposals. All proposals will be considered, provided that they benefit undergraduate engineering education at UW. Elected student representatives from each class will come together on March 8 and 9 to hear all of the WEEF proposal presentations. WEEF funding is typically used for lab equipment, educational resources, and general supplies.

To learn more about how to submit a proposal, visit http://www.weef.uwaterloo.ca/funding where you will find detailed information about the mission and vision of WEEF, as well as a step by step guide on how to create a proposal.

If you would like to learn more about how WEEF allocates funds or about some projects WEEF has supported, get in touch with us at *weef@uwaterloo.ca*.

Conferences & Competitions

OLA SUCHON
WILL WILMOT
VP EXTERNAL

As February begins, it is a busy time in the world of VP-External. Two major events have already happened: the Ontario Engineering Competition and the First-Year Integration Conference. These two events both help develop leadership, networking, and teamwork qualities in Waterloo's Engineering students.

The Ontario Engineering Competition (OEC) took place from January 29-31, and was hosted right here in Waterloo. In total, the combined Waterloo Engineering Societies "A" and "B" sent forty-seven competitors to seven different competitions. The competition categories were Junior Design, Senior Design, Innovative Design, Consulting, Technical Speaking, Parliamentary Debate, and Programming. Every individual competition allows competitors to truly test the skill set of an engineering student. We would like to congratulate everyone who made it to OEC, and were happy to see the following teams the teams place in their respective competitions: Junior Design - Waterloo A (1st), Senior Design - Waterloo A (2nd), Parliamentary debate - Waterloo A (3rd), and Innovative Design - Waterloo A (1st), Waterloo B (2nd, also taking home the award for Technical Excellence). Teams that placed first or second at the Ontario Engineering Competition will move on to compete at the national level in the Canadian Engineering Competition this year, set to be held in Montreal at McGill University in March.

The First-Year Integration Conference occurred from February 5-7, and was hosted by Ryerson University in Toronto. In total, 14 representatives made the trip down the 401, arriving excited and ready to take away new leadership skills and experiences from the conference. Several development sessions took place. The first-year delegates also had the opportunity to network with students from schools across Ontario, making lifelong connections with other students. Upon returning to Waterloo, we feel we have 12 first-year students (as well as Ola and Kieran) who have acquired new skills they can use to contribute to the Engineering community in Waterloo and beyond.

Overall, February has been a great month for conferences and competitions where Waterloo showcased its talent provincially. If you have any questions about future conferences or competitions, please email us at *vpexternal.a@engsoc.uwaterloo.ca*.

Upcoming Events Calendar

Wednesday February 10	Thursday February 11	Friday February 12	Saturday February 13	Sunday February 14	Monday February 15	Tuesday February 16	Check out up-to-the-day event postings on the EngSoc website at *engsoc.uwaterloo.ca/event-calendar/*
Upper Year Hell Week	Upper Year Hell Week	Arts: Cookie Decoration 11:00 AM - 12:00 PM Romantic Pictures with the Tool 11:30 AM - 1:30 PM			Reading Week Begins Charity Pancakes 8:30 AM - 10:30 AM, CPH Foyer	Reading Week	
Wednesday February 17	**Thursday February 18**	**Friday February 19**	**Saturday February 20**	**Sunday February 21**	**Monday February 8**	**Tuesday February 9**	
Reading Week	Reading Week	Reading Week			First Year Hell Week Begins Charity Pancakes 8:30 AM - 10:30 AM, CPH Foyer	First Year Hell Week	

Celebrating Twenty Years of Pokemon

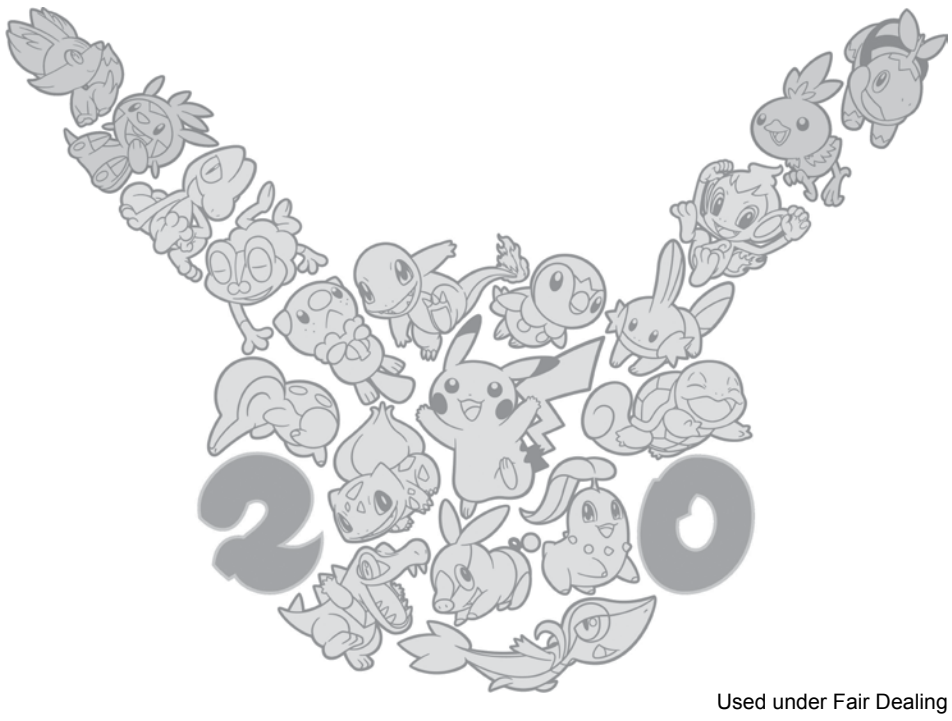
VINCE MAGAS
3A MANAGEMENT

From Kanto's Pallet Town and Route 1 all the way to Kalos' own Route 1 and Vaniville Town, the Pokémon video game franchise has come a long way. February 27, 2016 marks the twentieth anniversary of the Pokémon video games. The video-game magazine turned video-game Development Company Game Freak brought to life over 35 hand-held Pokémon games and over fifteen Pokémon console games in the course of twenty years. Pokémon has such a rich history, and they welcome the twentieth anniversary with a collection of specials, events, and products!

In February 1996, what North Americans know as "Pokémon Red Version", and "Pokémon Blue Version" debuted in Japan as Pocket Monsters: Red & Green on the Gameboy. A Japanese Blue version would be released later that year as a special edition followed by the beloved Yellow version with Pikachu following the trainer as he or she progresses through the game. The original three Pokémon games combined reached over 31.4 million sales, referred to by IGN as the "Best selling RPG on the Game Boy" and the "Best selling RPG of all time" in 2009. The games would set the stage for what would become a multibillion-dollar series, changing the world forever.

Over the course of the next twenty years, the Pokémon Game franchise would explode far beyond the gaming industry and into mainstream pop-culture. In 1997, the franchise would debut its first TV series in Japan, which still continues today, featuring the forever-young antagonist Ash Ketchum and his beloved Pikachu. By 1998, Pokémon would cross the Pacific and make its way into North America, making its first United States appearance at the Electronic Entertainment Expo in Los Angeles, California. An English version of the animated series would also find its way into North America, with the episode "Pokémon – I Choose You". Within a mere month of its release, over 1.5 million viewers would watch the weekly Saturday morning cartoon.

The following year in Pokémon history brought a whole new world to fans in the form of the well-remembered and still strong Pokémon Trading Cards. 1999 saw the beginning of the Pokémon Trading Card franchise in North America, firing with 151 cards from Generation 1 including the much sought after legendary trio: Articuno, Zapdos, and Moltres. Pokémon Trading Card tournaments and card-trade meet-ups popped up across North America, featuring major tournaments such as the Super Trainer Showdowns organized by Wizards of the Coast in the years of 2000 – 2001, and the Tropical Mega Battle in Honolulu.



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Pokemon 20th Anniversay Logo

1999 would also be forever remembered in the hearts of many budding Pokémon trainers as the year the first Pokémon movie came out, featuring the epic struggle between Mew and Mewtwo, and the heart-wrenching scene of a crying Pikachu trying to wake a petrified Ash Ketchum. The movie's showing would also be remembered for the never-ending line-ups in theatres of eager kids waiting to get their limited edition Mew trading card.

In the year 2000, the much acclaimed Pokémon Stadium for the N64 brought Pokémon in 3D for the first time on its release, with its kickoff Pokémon 2000 Stadium tour visiting twenty cities across the United States. The game quickly gained popularity, and in the very same year, the first Pokémon Stadium World Championships would be held in the United States, Australia, and Europe, culminating in a three day Championship event in Sydney, Australia. Pokémon the Movie 2000, as well as Pokémon Gold and Silver, also found its way to fans in this year.

2001 would further solidify the Pokémon legend, when Pikachu made his debut on the Nintendo GameCube in Nintendo's Super Smash Bros Melee. The famous annual Macy's Thanksgiving Day parade in New York also featured a massive Pikachu balloon for the first time.

The next fifteen years saw the Pokémon franchise expand and further gain popularity. The games themselves would feature another four generations of Pokémon, counting up to 721 Pokémon as of their last release of Pokémon X and Y. The franchise would also continue to feature a collection of spin-off games produced on various platforms, such as the DS release of Pokémon Dash and the popular Pokémon Mystery Dungeon series. Sixteen more films would also be released, running alongside the Pokémon TV Series.

Moving onto the present day, Nintendo celebrates the twentieth anniversary of Pokémon by launching a series of events, specials, and products to mark the momentous milestone. Most notably, on the day of the anniversary, a special 20th Anniversary Pokémon Nintendo 3DS Bundle will be released with faceplates featuring cover art from both Pokémon Red and Blue versions, as well as the original games pre-installed. Starting this month of February, Nintendo will also host a series of events focusing on a different Mythical Pokémon for each month of the year. February kicks off celebrating Mew, with an event card for a level 100 Mew for the Pokémon X/Y, and Pokémon Alpha Sapphire and Omega Ruby games, as well as various Mew-themed products. Similarly the following Pokémon will be featured for the next 11 months:

March 1-24: Celebi
April 1-24: Jirachi
May 1-24: Darkrai
June 1-24: Manaphy
July 1-24: Shaymin
August 1-24: Arceus
September 1-24: Victini
October 1-24: Keldeo
November 1-24: Genesect
December 1-24: Meloetta

Along with the game bundle and legendary Pokémon celebrations, various Toys 'R' Us stores will also feature special foil cards, including Pikachu and Magikarp from the recent Pokémon Trading Card Game: Generations expansion. The stores will have Pokémon activity books and posters of the original 151 Pokémon, as well as an exclusive Pokémon TCG: Generations binder for purchase to mark the anniversary. To top off the celebrations, Nintendo has marked Pokémon Day celebrations with a massive invitation to all fans to Nintendo New York at Rockefeller Center with promises of a day filled with Pokémon-themed activities.

Twenty years has seen the incredible rise of the Pokémon Game franchise, attracting millions of fans from across the globe. Spanning over six generations of games, with millions of copies sold and integration into pop-culture, it has shown no signs of slowing. This February 27th will revel in twenty years of an incredible journey that many are sure to remember.

Groundhog Day Gags

NINA FENG
4B ENVIRONMENTAL

Groundhog Day, traditionally celebrated on February 2 (around the midpoint of winter) just occurred! Here I'll attempt to sum up the verdict, and the events surrounding this traditionally baffling festivity.

For those who are still unfamiliar, Groundhog Day is the day in which the groundhogs of several North American cities are watched as they exit the holes in which they burrow. If the rodent sees its shadow, it's an indication of six more weeks of winter until spring. If it doesn't see its shadow, then there will be an early spring. Obviously a highly scientific process. They generally are not very accurate: Punxsuntawney Phil (the American groundhog) predicts at a 39% accuracy rate. Canada's groundhogs (there are a few) sit at around 37%.

This year, tragedy struck the groundhog community, especially that around which the Winnipeg festivities revolve. Winnipeg Willow of Manitoba passed away a mere day before Groundhog Day 2016. Festivities there were subsequently cancelled in mourning, as the staff of the Prairie Wildlife Rehabilitation Centre had "tears coming down [their] faces."

The three prominent remaining Canadian groundhogs, including Wiarton Willie of Ontario, Shubenacadie Sam of Nova Scotia, and Balzac Bill of Alberta, had differing opinions. Ontario's predicted six more weeks of winter, while the others predicted an early spring. It's unclear if the 2/3 prediction would hold true for all of Canada, or if Wiarton Willie was wrong. It HAS been pretty warm lately, after all… Two thirds of the US's nine other groundhogs also ended up with the early spring prediction, so those who prefer warmer weather can hope for the best. Assuming they're right.

No matter the scientific validity of such a celebration, it's a tradition and a rather amusing one too. This year, there was a death and there was controversy, spicing up the usual affairs. We'll see exactly who was right in the days to come.

A Spudtacular Purchase

EMILIA JIAO
1B MANAGEMENT

The world was thrown into shock recently as a photo of an organic Solanum tuberosum, better known as the common Irish potato, shattered the world record for the 15thmost expensive photograph ever sold.This bumped Edward Weston's "Nautilus (1927)" down the list to number 16 by just a few dollars. The work, titled "Potato #345" was officially purchased for an astonishing one million € (approx. 1.5 million USD,) by an unnamed European businessman earlier this week, making the headlines of newspapers worldwide.

The starchy Irish star was photographed by the renowned portrait photographer, Kevin Abosch, who found his fame in shooting celebrity portraits. In his past, Abosch worked with many notable figures such as actor Johnny Depp, Nobel Prize laureate Malala Yousafzai, singer Yoko Ono, and Chief Operating Officer of Facebook Sheryl Sandburg, placing his fees anywhere from $150,000 to $500,000 per portrait. "Potato #345" is a simple photo that was shot in Abosch's signature style, featuring a well-lit subject on a simple black background. The famous photograph is a part of a series comprising of two other brother photographs, one of which was donated to a Serbian museum, while the other sits in Abosch's private collection. According to Abosch himself, the piece caught the current owner's eye as they were having dinner together at Abosche's residence in Paris, which in turn lead to the purchase of this extraordinary piece of art.

"I see commonalities between humans and potatoes that speak to our relationship as individuals within a collective species. Generally, the life of a harvested potato is violent and taken for granted." Said Abosch in an interview with the Irish Times explaining his odd choice of subject. "I use the potato as a proxy for the ontological study of the human experience,".

During the interview, Abosch also disclosed that the potato arrived at his house in a batch of organic vegetables in 2010, but neglected to mention the fate of the now iconic spud.

Effects of the California Gas Leak

NINA FENG
4B ENVIRONMENTAL

On October 23 of last year, a natural gas leak began at a SoCal gas storage facility in Aliso Canyon in the suburbs of Los Angeles, California, and has since been emitting alarming amounts of methane gas into the atmosphere. This has caused problems both at a local level for the Porter Ranch community of San Fernando Valley, directly northwest of the facility, and also on a national and possibly global level.

The state of California has declared a state of emergency as attempts have been made to quickly rectify the failure. Thousands of residents of the upscale area have had to leave for health reasons, but the primary focus is on the long-term effects of the gas on the environment, especially with respect to climate change. Methane, the second-most prevalent greenhouse gas after carbon dioxide, has 80 times the insulating effect that the latter gas has, and can therefore be very dangerous on a global scale.

The Environmental Defense Fund now states that as of January, the amount of gas leaked is about equal to 2% of the methane emissions in the United States, annually. The average emission rate from the plant is just over 30,000 kilograms of the gas per hour, and the flow rate at its worst was about 85,000 cubic metres of the gas per hour, which has since gone down to about 45,000.

While the company has been ordered to cap the leak, it is not easily done. As a well that is connected to a gas reserve 2,500 metres underground, the failure point was difficult to pinpoint, but has been determined to be about 300 feet underground. Up until now, SoCal has been trying to use liquid and mud, poured into the well, in order to seal it. Evidently, these efforts have not succeeded. Another well to be used to seal and relieve the leaking one will be drilled, which will hopefully stop the flow.

The extent of the environmental effects of the leak will be determined at a later date. For now, the local effects are more obvious. Poor air quality has been an issue for residents, with air purifiers being provided for the time being. The government is also now developing new regulations for the control of oil and gas storage plants, in order to prevent more occurrences of this type.

United States Primaries: Update

CAITLIN MCLAREN
3T CHEMICAL

As you all doubtless know, in America (that's the big country a little to the south) the Democratic and Republican parties are in the process of electing their Presidential candidates for the federal election later this year. There is hot debate and close competition all around.

Iowa is the first state where the public votes. The Iowa caucuses are the first major event of the primaries, and frequently set the tone for the rest of the election. Iowa has 1,681 precincts, which elect delegates for their party's conventions in each of the 99 counties. These conventions then send delegates to the Congressional District Convention and the State Convention, where once again delegates are selected to vote in the National Conventions of both parties. At all of these steps, the delegates are chosen proportionally according to the number of supporters the different candidates have. The procedures differ between the two parties: the Democrats vote by standing in groups and taking a head count, with a minimum threshold of 15% for a candidate to receive delegates, while the Republicans vote more generally by secret ballot.

The results of this year's Iowa caucuses are surprising in several ways. In the first place, on the Republican side Ted Cruz won the largest number of delegates, having received 27.6% of the vote. This was against many predictions, as according to polls, Donald Trump had significantly more popular support. However, he only received 24.3% of the vote, with the discrepancy attributed to low turnout among his supporters. Marco Rubio was in a close third place, with 23.1%. There was some controversy after the fact, with some candidates, notably Donald Trump and Ben Carson, accusing the winner Ted Cruz of misrepresenting them to the public and spreading mistaken information. Trump accused Cruz of lying about Trump's platform, while Carson accused him of falsely spreading a rumour that Carson was dropping out of the race. Cruz claimed in response to the latter accusation that it was an honest mistake made by his campaign staff, although many are still suspicious.

Meanwhile, the Democrat candidates were even closer, with Hillary Clinton receiving 49.85% of the vote and Bernie Sanders receiving 49.65%. The results were so close that there was some controversy about the vote, with some arguing that a recount should be made. However, it seems unlikely that anything about the results will change.

After the caucuses, several candidates dropped out due to low support: among the Republicans, Rand Paul, Rick Santorum, and Mike Huckabee suspended their campaigns, leaving, besides the aforementioned Cruz, Trump, Rubio and Carson, John Kasich, Chris Christie, Jeb Bush, Carly Fiorina, and Jim Gilmore in the race. Meanwhile, the Democratic election is now a two-horse race between Clinton and Sanders, as the third candidate, Martin O'Malley, dropping out after receiving only 0.54% of the vote.

Now that Iowa is settled (and in this campaign, "settled" is a very relative term), the next state where voting will take place is New Hampshire. Trump leads in the polls, but then again he also did in Iowa, and in the crowded Republican field it is difficult to predict what will happen next. Between Sanders and Clinton, who so far are very nearly tied, it could go either way. Only time will tell, and it is still impossible to predict with any confidence who the 2016 Presidential candidates will be.

Doomsday Clock Sitting at 3 Minutes to Midnight

VINCE MAGAS
3A MANAGEMENT

Since time immemorial, people seem to like predicting the end of the world, and seem to enjoy counting the days until the end. For as long as time can remember, predictions about the catastrophic end of the world or be-all-end-all event that would change the world has been documented, reiterated, reinvented, and restated. From the Greek re-occurring theme of the world's passing of ages, to the biblical Revelations, the Norse Ragnarok to the Iranian Frashokereti, apocalyptic literature dots the world. It is only appropriate that the present day has its own story of the end, that which is called the Doomsday Clock, measuring the Minutes to Midnight.

Already inspiring a number of pop culture songs, and appearing in all sorts of creative works such as Linkin Park's 2007 Album titled "Minutes to Midnight", and the 1984 song "2 Minutes to Midnight" by Iron Maiden. This symbolic and metaphorical end of the world clock first came into existence almost 70 years ago. The Clock, which traces its roots to an international group of researchers referred to as the Chicago Atomic Scientists, has been maintained since 1947. The Clock face itself is a depiction found on the regular publishing of the "Bulletin of the Atomic Scientists" – a non-technical academic journal first published in 1945 after the increased interest and concern surrounding atomic energy and atomic weaponry caused by the bombings of Hiroshima and Nagasaki at the end of World War 2. The journal itself covered issues and topics on global security, public safety, and the dangers associated with weapons of mass destruction, emerging technologies, and – recently – climate change.

Starting in 1947, the journal started featuring what became known as the Doomsday Clock, which was featured on the front cover and depicted the number of minutes remaining until midnight. Midnight is described by the journal to be the catastrophic end of the world, and each minute to midnight was to reflect the current level of danger mankind faced in its current day and age based on world events. The clock has become a universally-recognized indicator of the world and humankind's vulnerability to catastrophe of nuclear weapons and technology, climate change, and developing technologies in the life sciences.

The clock itself has moved throughout its 60+ years of life, its furthest point from midnight, being 17 minutes, in 1991, and it closest being 2 minutes to midnight in 1953. Here is a brief break down of its changes throughout the years:

1947: Initially set at 7 minutes to midnight

1949 – 1963: Variations between 3 to 12 minutes to midnight, as both sides of the Cold War test thermonuclear devices, get involved in the Suez Canal crisis, and sign the Partial Test Ban Treaty.

1968 – 1974: Variations between 7 to 12 minutes to midnight Regional Wars; Vietnam War, Indo-Pakistani War, and the acquisition of nuclear weapons by France and China. The Nuclear Non-Proliferation Treaty, Strategic Arms Limitation Treaty as well as the Anti-Ballistic Missile treaty are signed by various countries.

1980 – 1984: From 9 minutes to midnight in 1974, the clock moves to an all-time low since 1953, going down to 3 minutes to midnight in 1984, thanks to the escalation of tensions between the United States and the Soviet Union due to the Afghanistan war.

1988 – 1991: Sees improvement going up to 6 to 10 minutes to midnight as both sides of the Cold War sign the Intermediate-Range Nuclear Forces Treaty in 1988, and the fall of the Berlin Wall in 1989/90.

1995 – 2002: These years would see another downward spiral as the clock once again reaches 7 minutes to midnight by 2002 due to the continued global military spending and additional nuclear tests held by India and Pakistan. The United States also shows intentions of withdrawing from the Anti-Ballistic Missile Treaty signed 25 years earlier, due to the increased concern of nuclear terrorist attack.

2007 – 2012: There would be little change in the doomsday clock, as it hovers back and forth between 5 and 6 minutes to midnight due to North Korea's increased missile tests and Iran's nuclear ambitions. The global effort for nuclear disarmament meets more barricades and continues to struggle as both Russia and the United States fail to further reduce nuclear stockpiles. The concern for climate change also enters the criteria and is added to the list of threats against humankind.

The year 2015 found itself down to 3 minutes to midnight as concerns continue to mount regarding the lack of global political action towards global climate, as well as the failure of the Kyoto Protocol. Modernization of nuclear weapons and the increasing problem regarding nuclear waste hound at the heel of humankind.

As of January 26, 2016, the Bulletin of the Atomic Scientists announced that the Doomsday Clock will remain at 3 minutes to midnight. Despite the progress made with Iran's nuclear agreement and the Paris climate accord, the group stated these "constitute only small bright spots in a darker world situation full of potential catastrophe" (Bulletin of the Atomic Scientists, 2016). The reasons for the clock's current time have been stated to reflect the once again rising tensions between the United States and Russia, the crisis in Syria, as well as the fresh wounds in Ukraine. On the topic of climate change, the Bulletin of Atomic Scientists have stated that the "international community has not developed coordinated plans to meet cost, safety, radioactive waste management, and proliferation challenges that large-scale nuclear expansion poses." The Bulletin has also addressed their increased concerns over the lack of an alternative pursued by global leaders to the progressively damaging fossil fuels. Once again, the group states that aside from a few positive changes, "the major challenges the Bulletin laid out for governments… [a year ago] have not been addressed, even as the overall global challenges we need to face become more urgent."

The last time the doomsday clock has been set this close to midnight was 1984. Sitting at 23:57 humankind once again sees itself close to the brink of destruction.

Hit Replay

Leathercraft – From Ancient Assyrian Footwear to Modern Day Wallets Pt.2

VINCENT MAGAS
3A MANAGEMENT

HIT REPLAY

Let's backtrack a little and get that record on the turntable spinning again! Hit Replay is back this issue to pick up where we left off last time with more trending items, fads, hobbies, and practices that will seem like déjà vu!

In the last issue we went back thousands of years to discuss a practical and versatile art form that's been gaining momentum and hitting hobbyists, enthusiasts and professionals alike. We're casting the spell once again, and looking into the arcane arts behind the omnipresent material that is leather. Last time on Hit Replay, we talked about the tanning process that transformed animal hide into the supple, flexible, and workable material that is leather. We pick up where we left off, and follow the journey of leather from the tanner's shop to a blacksmith's, artisan's or clothier's shop and see how these rolls of supple material are turned into everything from armour to satchels.

Dyeing & Colouring Leather

One of the most basic alterations that is done to leather after it has been tanned is dyeing. Dating back to the ancient Romans, substances used for dyeing leather were barks of various trees such as lotus, madder, kermes, and blue-stone. Often, the leather pieces would be moistened and the pigment carriers would be rubbed into the leather and slowly spread across the entire cut. In the present day, a similar method is still in use, but with spirit and alcohol-based dyes which can easily be absorbed by moistened leather.

Carving, Stamping, and Sewing

Leather carving and stamping is the complex and combined art of creating (often 3-D) designs and images upon the leather pieces. Often this is done to embellish various items such as satchels, cases, and belts, but may also stand alone as leather artwork. Examples of carved leather dates back thousands of years, with some of the most complex examples found on Roman leatherwork in sites across Britain (such as Vindolanda). Similarly, examples of carved leather work were prominent across Europe during the Medieval ages, where more modern tooling and impressions were done on leather pieces. On a related note, sewing leather was also commonplace for more practical items such as sandals, gauntlets, and various other clothing pieces.

A craftsman's tool kit may include hundreds of tools of various sizes for carving, cutting, punching, and creasing leather, but we break it down below to the most common and basic items.

Knives: A leather worker would have a collection of knives in his or her arsenal used for various incisions, cuts, and trims of leather among which were the:

Round/Half Moon Knife used in "clicking", cutting leather and skiving the edges

Paring Knife used to trim away excess leather, especially in places where the half-moon knife would be too large or unwieldly to use

Pattern Knife

Shears, for use in cutting leather strips and thread

Awls: Various awls, often similar to a stitching awl, and bradawls used in indenting wood were used in leather-working with the difference that most leather-working awls had an "S" shape.

Sewing Awls often had a flat oval cross section, used in very much the same way as one would use one in sewing.

Stitching Awls, having a flat rectangular cross section, used to spread open holes in the leather to take in thread.

Scratching Awl, similar to its use with marking wood, are used to mark places in the leather.

Hole-Punches: These tools are used exactly as they sound, which is to punch holes in the leather. Often these were used to make holes for buckles, eyelets, and rivets.

Rawhide Mallets: Mallets are used on leather for various purposes, the most common being to flatten sections of a leather cut and to drive various stamps into the leather.

Camouflage Tool: The tool creates an impression on the leather that resembles that of a seashell. Often, this tool is used to emphasize various areas of the leather carving. The tool is driven into the leather using a mallet.

Pear Shader: This is a tool used to indent the leather to create a curved appearance. The tool causes the indented portions of the leather to appear slightly darker, and gives it a curve akin to a pear's contour.

Seeder: Another stamp tool used in leather carving used heavily in floral and repetitive designs. The seeder produces circular indentations in the leather reminiscent of seeds at the center of a flower.

Veiner Tool: Another stamp-style tool, the veiner tool is often used to pattern leaves, or leaf-like styles such as stems and scrolls, into a piece of leather. Often coming in a variety of sizes, they create sharper edges in comparison to the pear shader and were often manipulated to produce graceful scrolls or spirals.

Using these tools, a leather craftsman can produce unparalleled works of art. From simple leather-strapped sandals of ancient antiquity to exquisite archery quivers, a craftsman's work evokes awe and wonder.

It is not difficult to see why such an age-old practice is finding a resurgence in the present day. Increased popularity in Do-It-Yourself (DIY) and handcrafted works lent a hand to the rising interest in leather work and leather crafting beyond the typical leather jacket and apparel. Hand-crafted pieces of leather art work have grown in abundance in recent years, as well as interest in the process of crafting itself!

Budget Trips on Budgeted Time

EMILIA JIAO
1B MANAGEMENT

With the Canadian dollar at an all-time low and the number of free days between exams and co-op even lower, traveling seems almost entirely out of the question. Almost being the keyword. Here are five tips to satisfy that wanderlust without sacrificing your wallet. Everyone has different interests, so take advantage of whichever appeals most to you.

1. Southeastern Asia is your new best friend

Looking for adventure? Perhaps some warm weather for a change? Then SEA countries are the answer to your prayers. They have exotic culture, fantastic food, and the change of atmosphere that we all desperately need. Although the initial flight there can be a little steep, after that you're cruising. With food averaging from $3-$7 dollars a meal, hostels starting at $10/night, and cab fare starting at $2, you can live like a king there for as little as $30 a day!

2. Stay local! Explore Canada!

As the third largest country in the world, Canada has something to offer for everyone. From coast to coast, our country is a haven for anyone who loves the great outdoors. The best part about staying local is that you can count your "transportation" time into "travel time", making the most out of the few days you have. Besides, who doesn't love a road trip?

3. U.S. hot spots offering discounts for Canadians!

The United States, being the second-most visited country in the world (after France), generates a large portion of its income from tourism. And a large portion of that comes from their wonderfully polite northern neighbours – Canadians! Because the fear of losing our business altogether due to the terrible state of our dollar, many popular tourist destinations, such as Myrtle Beach, are offering a "Canadian discount", which means they are accepting a one for one loonie to dollar exchange rate, making trips extremely affordable.

4. Don't shy away from one-city visits to Europe

There is a common misconception of "if I go to Europe, I might as well go to all the countries on the same trip so I don't waste money on airfare." Just because Europe is a different continent does not mean that it is not affordable. In fact, airfare from Toronto to Europe can sometimes cost even less than airfare to Vancouver, especially to countries like Norway, Denmark, and Sweden. Some round-trip flights start as low as $510. Aside from the all the cost benefits, Europe is known for its rich culture, good company, and even better beer, ensuring that you will always have something to do there no matter the length of your stay.

5. IF ALL FAILS – there is nothing wrong with going to resorts

After slaving away in Waterloo for the past winter, you deserve the feel of sunshine on your face and sand between your toes. Resort vacations are not only cost effective when you book your flight with the hotel, they also require minimal planning! They are also extremely versatile as they can be as action packed as you want them to be, if you are in need of some rest and relaxation, you can do that as well!

Well there you go! Next time you have a bit of time off in between terms, think about exploring somewhere new. It is definitely worth it!

On the Meaning of Work

TIFFANY CHANG
1N CHEMICAL

Ah, the wonders that a co-op term can do on my journey to recovery from 1A.

All of us at UW know how much co-op means to us and to our school. For a lot of us, co-op was the deciding factor that persuaded us to choose Waterloo over other schools, especially for engineering programs – at least this is true for my fellow froshes to whom I've posed this question.

Aside from gaining valuable work experience, co-op provides many other learning experiences along the way that you would not get in a classroom.

It has certainly taught me the value of money. Instead of looking at a price tag and concluding whether or not a product is worth buying based on my mental scale of price relativity, I measure a product's value in the number of hours that I would have to work to pay off said item. Admittedly, I've always known that my parents work hard to put food on the table, but when I'm spending money earned from using my own wits and sweating off of my own back, it hurts to splurge. Besides, living according to a less materialistic creed wouldn't be too shabby a decision either. It was a pain to have to move my plethora of belongings out of residence and into my temporary home for the winter term, let alone continuing to do this for the rest of my university career!

Another lesson I've taken away from my first couple of weeks is learning how to learn when time is limited. I had never coded or played with devices like Arduinos and breadboards before taking on this job in engineering outreach, so you can imagine my simultaneous sentiments of anxiety and thrill. To me, I liken learning these new skills to learning a new language – only with practice, persistence, and patience will I get better. Being in chemical engineering, it's highly improbable that I will have the chance to play with hardware and software again. Therefore, I might as well take advantage of any occasion to play with these toys while I still have access to them.

The most rewarding part of my job is working directly with the campers, who range from elementary to high school students. I've discovered that inspiration works reciprocally. My job is to create and lead activities that engage schoolchildren in the STEM (Science, Technology, Engineering, and Mathematics) fields, and their enthusiasm motivates me to do an even greater job.

It's astonishing how much these kids already know. The most exposure to technology I had in high school was using Microsoft Word for English and limited Excel for data management – notice how I never took computer science? However, our campers are literally born into the technological age. Some of them have already played with Scratch (software created by MIT to produce games and animations) or have even coded before – and they're only in elementary school! Outreach programs run by institutions like UW ensure that future generations are as ready as they possibly can be in terms of possessing hard skills, such as computer programming, in order to tackle imminent issues of the future.

But post-secondary institutions cannot work alone. Governments should also play a role in promoting the STEM portfolio to succeed in the 21st century, such as PM Trudeau's characterization of Canada by its "extraordinary high-tech sectors, innovative manufacturers, a really strong biotech and mostly an educated diverse work force" before the world stage in Davos, Switzerland for the annual World Economic Forum. There is also U.S. President Obama's recently proposed "Computer Science for All" campaign to prepare and engage American students from kindergarten to high school with the computer science skills that they will need to thrive in our digital world.

Above all, co-op keeps us informed about which skills employers hope that their employees possess and are able to learn on the job. By being in university for four years, it's easy to become out of touch with the demands of the "real world". To counter the side effects of the University Bubble, we have work terms to keep ourselves grounded in reality. Truth be told, we should consider ourselves lucky for having the opportunity to work under the wing of companies in all fields and sizes.

The next time your co-op term is giving you a hard time, think of at least one of the positives that come out of working as a co-op student. If that doesn't do it, think about it this way: at least you (typically) don't have to take work home with you!

Think You're Smart? Ask for Help

ELIZABETH SALSBERG
3T NANOTECHNOLOGY

Consider this...

You have been asked to take over a project that was previously managed by someone who was so important in the company that they "don't have time to work on this anymore." (Did they leave any useful information behind? Probably not.)

The prof has said, "This is going to be one long assignment, people—don't start this the day before it's due!" (Profs do say this sometimes.)

You have two midterms, two assignments, three interviews, and maybe a project as the cherry on top due this week. (Yikes.)

The equipment you need to use in the lab is usable but in questionable condition. (Merely a euphemism for something that could be much more annoying.)

What do all of these situations have in common? Perhaps the brackets might lead you to cite stress and annoyance. Though this is undoubtedly true in these and many other scenarios in which students routinely find themselves in school and at work, there is a much more important piece of the puzzle...

In some capacity, a person in any these situations needs help. Now.

Humpty Dumpty Sat on the Wall, Humpty Dumpty had a Great Fall

For most of people, when they get in to Waterloo Engineering, they feel as though they have really accomplished something. Of course, this is justifiable, even true; certainly it is important to celebrate such an accomplishment. What this does not mean, however, is that is acceptable to inflate one's ego to the point where Humpty Dumpty falls off the wall. Or anywhere close to it. Because depending on the situation, it can take a lot of work to put Humpty back together again. Seriously.

Let's take the first scenario as an example. Here you are with an unfinished project about which you've been given little useful information. You may not even know how to use the tools you need to execute the project, but you're expected to do it anyway. Many people (somewhat arrogantly) assume they can learn "as they go," or all on their own. In some cases, where the tasks are simple enough and the person is motivated enough (both are required), this strategy can work; however, excessive frustration is also imminent in these situations. Pressure to complete tasks by a specific deadline doesn't help either when you're not sure of everything you're doing. Venturing on your own in this way can lead to huge amounts of time and energy being wasted with little results. Worse, a swollen Humpty Dumpty can crash and burn when playing with new toys at the edge of the wall, potentially destroying his or her self-confidence in the process.

Staying firmly (and un-swollen) on the Wall...

So what should you do then? If possible, you should try to seek out the person who left the task, because they know the most about it. If it's a "tool" issue, such as simply not knowing that particular programming language or never having used that saw before, try to find people who do have experience in these areas and can provide some direction. This will ultimately help you accomplish the task faster, even if it ends up being slower initially. Try to convey to your supervisor or group members that you will need more time. Ask them for direction as well.

Asking for help is not a bad thing. Most people would agree that it's better not to rush and do quality work rather than trying to get things done quickly but not well.

Some people think asking for help makes them look dumb, or not-as-good-as that guy over there who started at the same time as you but appears to just know everything. That person over there is probably just doing a great job of looking like they know what they're doing. For now, they may look better with the boss, but it's critical to remember that it is the final product that matters at the end of the day. Ditto for the scenario where your classmate thinks they have the assignment in the bag, hasn't actually started yet, but can somehow verbalize all of the answers. Wow, they must be one smart cookie! Oh please. When they put the answers on the paper in the time it takes them to "talk it out" you should be impressed. Not before.

As for you? You have no bloody clue how to solve the problems on the assignment. So you go see the TA. You attend office hours. You prepare your questions before you go. Sometimes the help helps, other times not so much. You ask other classmates. You work together to come up with answers in a timely fashion. This is ultimately how things move forward-not by turning your nose up and assuming you can do everything yourself!

Next Time...

Next time the roles may be reversed-time to dip into your empathy stores. Go look up the word "empathy" if you don't know what this means... it will help you a lot. Help them out if you can. What have you got to lose? Time? Maybe. But what you gain in the long run, with most people will likely offset any "loss" the next time you find yourself on the edge of the wall.

The take home message? The smartest people ask for help when they need it—and help others when they can.

Relative Deprivation is Affecting Students' Performance

JOSH LI
1B MECHANICAL

Competition

The Ontario Engineering Competition is an annual event hosted this year at UW, bringing together the best and brightest engineering students from Ontario. Schools have their own qualifiers beforehand, and you would think with an Engineering enrollment of 7339, the competition for Waterloo qualifiers would be riddled with intensity and tons of participation. While this holds true for some of the more popular, hands-on events such as Junior Design, Senior Design, or Programming, the other categories (which are just as much a part of Engineering) such as Debate, Communication or Consulting had as few as two or three participating teams.

Winning isn't what the OECs are about, but as the "home team" and the most prestigious Engineering school in the country, you would expect Waterloo students to finish at the top and win a majority of events. Not the case, as UW only received marginally more top three finishes then UOttawa or Western, whose Engineering population combined is only half of Waterloo's.

Not only are we not winning as much as expected, we aren't participating to the extent that our population and reputation calls for; what is wrong with Waterloo Engineering?

Relative Deprivation

Let us remember that students admitted to Waterloo from high school hold incredibly high averages, in addition to tons of extracurricular participation. They were the cream of the crop, destined for engineering and enthusiastic about their passions. Yet according to the book "David and Goliath" by Malcolm Gladwell, having such rigorous academic candidates creates a school overshadowed by competitiveness, leading to a psychological effect known as Relative Deprivation.

Students at Waterloo rarely think "How amazing! I'm at the best engineering school in the country", but instead often feel like, "Man, I don't understands this at all, but that guy over there gets it so easily..." In the face of all their peers, they lose confidence in themselves and become disheartened. That is the fundamental effect of Relative Deprivation: it is human nature to compare ourselves to people around us, and when the people around us are all geniuses acing the course (many times they aren't, but they seem to be) we lose motivation to strive for excellence and seldom participate in events like Engineering Competitions.

Because we are so competitive within the school, we actually compete less outside of school.

Other Schools

"I've never felt a competitive spirit at all," says Kristina from the University of Ottawa. Her teammate Marina adds, "I love my school, I couldn't imagine going anywhere else." They were two third years from Mechanical Engineering, and the only competition they face, if any, is friendly with the University of Carleton.

Rahul is a fourth year Engineering Science student at the University of Toronto, also a very competitive program. He reminisces about his time studying at York University, when his class had less than ten people. "Although I love U of T now, in retrospect I've really appreciated York," he says, "those were my best Engineering classes."

Recall that Waterloo students could have gone to any other Ontario university; every single one meets the standards set by the PEO. What differs from one to the other are the students, culture, and environment.

Employers are noticing

The effect of competition impacts another, essential human trait in our interdependent society. Jason Lemay, a director from Hatch, the major sponsor of the competition, had some specific words of advice for UW students:

"Students at Waterloo are strong academically, that's no problem. But with that competitiveness, they lose a sense of cooperation, and with a company like Hatch not being able to work in a team is detrimental. Those individuals tend to have less successful careers."

Author's Note

This article may seem very negative, criticizing my own school. But the truth is I actually love it here (there's an entire counter argument, to be written later), and I care about our program enough to point out some negatives, and more importantly, room for improvement.

Point Vs. Counterpoint

Should We Eradicate Mosquitoes?

POINT

BRYAN MAILLOUX
2N MECHATRONICS

Mosquitoes are annoying little buggers. You've got a summer co-op term in Toronto, and you decide to take a walk through one of the parks – and BAM. Now you've got five mosquito bites on your arm that you'll be scratching for days. You didn't even see them coming. And don't even think about camping – that full tube of AfterBite you'll bring with you won't even last until the second day. So wouldn't it be great to get rid of the flying nuisances once and for all? Here are a couple of reasons why you can feel comfortable about imagining the eradication of all mosquitoes.

Because mosquitoes come into direct contact with the blood of so many different people, they are an excellent transmission vector for a variety of diseases, including yellow fever, dengue fever, West Nile fever, Zika fever, and malaria – to name a few. Most of these diseases have a low mortality rate but cause uncomfortable symptoms for those who are infected, such as fever, headache, vomiting, and rashes. The most concerning of these diseases is malaria, which does have a high mortality rate – the World Health Organization estimates that in 2015, more than 430,000 people died of malaria, with young children being the most susceptible. Because the type of mosquito that carries malaria –the genus Anopheles – thrives in sub-Saharan Africa, that is the region most affected by the disease, and for some countries, the deaths of so many people from this disease represent a significant stumbling block for economic growth. While it's difficult to know exactly how much of an effect malaria has on economic growth, some estimates for the percentage of GDP lost as a direct result of malaria are as high as 1.3% – money which could be used to develop schools and infrastructure to further development. Removing mosquitoes – and therefore malaria – from the equation would accelerate development in the most affected countries, as well as alleviating a portion of the human tragedy in the area.

So eradicating mosquitoes will be good for humans – but won't it have an effect on the ecology that they are a part of? Will getting rid of mosquitoes have some unforeseen consequence on us? We won't know for sure until it happens, but some scientists are of the opinion that the ecological gaps caused by removing mosquitoes would be filled very quickly by other organisms. Most insectivores, such as birds and bats, have so many other food options that they wouldn't mind the disappearance of mosquitoes. Furthermore, though mosquitoes are pollinators for a great number of plants, none of those plants are crops that humans depend on: Eradication of mosquitoes would not have direct consequences for human food production. Though the disappearance of mosquitoes could have an effect on the ecologies they are a part of, as far as we can see, removing them can only have beneficial direct consequences for humans.

From minor nuisances to major disease transmission vectors to ecological space fillers, mosquitoes don't have very much going for them. Wouldn't it be great to be rid of them once and for all? But while they're still around, maybe it's better to just stay inside.

COUNTERPOINT

CAMERON SOLTYS
3A MECHANICAL

Mosquitoes have a bad, and admittedly, well-deserved reputation for being an annoying and troublesome pest. Their incessant droning as they fly past your ear is a hated sound, as it the unfelt bite that quickly evolves into an annoying itchy bump. Recent advances in science, and particularly in genetics, have raised the possibility of wiping the entire Culicidae family. Perhaps more importantly, this can now be done without poisons like DDT that have adverse effects on other animals and, critically, humans.

With the apparently impending demise of the mosquito upon us, it is time to decide if the mosquito really should go. While we can eradicate mosquitoes, we do not know for certain what effect eliminating mosquitoes would have on ecosystems. There is an intrinsic importance to biodiversity, and it may not be prudent to purposefully eliminate species when so many are already dying around us.

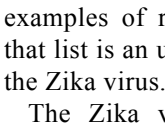
Eliminating the mosquito is not a clear and obvious decision: We do not know the full and complete effect that this will have on the environment. Mosquitoes are a part of a huge variety of ecosystems globally. It is impossible to predict how their elimination would affect each one. For instance, mosquito larvae often eat unicellular algae and are then eaten by fish. This is a critical part of the food chain, moving energy from the photosynthetic organisms to higher organisms. Perhaps there are other organisms that can take the place of mosquito larvae in some ecosystems. But this will still have knock-on effects, irrevocably changing ecosystems around the world.

Humans have a track record of negatively impacting environments that they do not understand, even when they do so with good environmental intentions. An example of this is Pinery Provincial park in Southern Ontario. This park is one of the only remaining stands of the ecosystem known as oak savanna. As the name suggests, the ecosystem looks like a savanna, with long grasses and sparse oak trees. But in the 1960s, park authorities saw the sparse trees as symptoms of an unhealthy forest and rectified the situation by planting millions of fast-growing pine trees. Today, extensive restoration activity is still ongoing to restore the natural sparse savanna. Similarly, the apparently obvious step of killing mosquitoes may affect ecosystems very negatively and in ways we could never foretell.

The final reason why the mosquito should not be genocided with impunity is that biodiversity is intrinsically important to the world and civilization. So many modern medicines originate in plants and animals. All around us, animals and plants work to do our bidding: Plants provide us with food, insects and birds clean our sewage, and bacteria and fungi make a cornucopia of new chemicals like antibiotics for us to harvest and replicate. When we eliminate a species, we eliminate our own tools. There is already a potential mass-extinction event happening as a result of human activities; can we afford to handicap ourselves even further by purposefully eliminating species?

Mosquitoes are a pest, and mosquitoes do carry disease. But like all species, mosquitoes are a lot of things. They are a part of their ecosystem, and the effect of eliminating them is unknown. There could be negative consequences to doing so that we would have to deal with for decades to come. And as we eliminate species, we impair the diversity of the world in which we live, to our own detriment.

Zika Virus Transferred by Infected Aedes Mosquitoes



EMILIA JIAO
1B MANAGEMENT

SARS, H5N1 and ebola are a few of examples of recent pandemics. Joining that list is an up and coming virus called the Zika virus.

The Zika virus is by no means a new virus. In fact, there has been one other previous outbreak in the Pacific Islands in 2007 prior to the current one which started in 2015. But due to the remoteness of the islands, the virus was contained. That is, until one traveler, presumably traveling to see the World Cup, introduced it to Brazil in May 2015. Since then, the virus has affected over one million people in or around Brazil.

According the CDC, only 20% people who contracted the Zika virus will actually become ill. The symptoms in most cases will manifest as a low grade fever, body rash, joint pains and conjunctivitis (red eyes) lasting anywhere from several days to a week. The symptoms usually appear between two to twelve days after transmission and the virus itself will leave the bloodstream after one week. In severe cases, the disease is known to cause nerve damage but it rarely ever causes death.

The reason why such a mild disease is causing such an uproar recently is not due to its effect on the initial carrier but rather on their offspring. Scientists now believe that there is a direct correlation between the Zika virus and the number of children born with a horrible genetic defect called Microcephaly. Microcephaly is a rare condition which inhibits brain growth in a fetus inside its mother's womb. It causes the babies to have a physically smaller head and many other physical and mental problems after birth such as delayed mental development, seizures and sometimes even death. Typically microcephaly is typically present in twelve babies per 10,000 live births, but since introduction of the Zika virus in Brazil more than 4,000 cases of microcephaly have been reported — a twentyfold increase from previous years. But thankfully further testing shows that the virus does seem to hinder any future pregnancies as it will leave the system of the carrier completely.

The virus is transferred through the bite of infected Aedes mosquitoes, a common breed of mosquitoes found in South and Central America and parts of the continental US. As of now, there are no vaccines available for the prevention of the virus. Even though many companies has already begun the process of developing one, the research is hitting a brick wall due to concerns regarding testing the experimental drugs on pregnant woman. The CDC's advice on the matter is for pregnant woman to refrain from traveling to areas affected by the virus and for the general public to take all preventative measures against mosquito bites.

Lest We Forget

RAEESA ASHIQUE
2A ELECTRICAL

I know, it's not the official month for remembrance. But why shouldn't we remember all year round? The truth is, there have been so many catastrophes in human history and they should all be learning opportunities rather than mistakes destined to be repeated.

Last Thursday was the thirtieth anniversary of the Challenger Space Shuttle Disaster, which killed all seven people aboard when it blew up 73 seconds after launch. NASA held a memorial service at Cape Canaveral, Florida, in honour of those who died on the fatal mission. Hundreds were in attendance, including relatives of astronauts and space workers killed on the job since NASA was founded in 1958.

President Barack Obama sent out a statement on Thursday saying, "We must never forget the courageous Americans who made the ultimate sacrifice to expand the boundaries of understanding. They knew the risks and still chose to put their lives on the line so that future generations could lead lives made better by advances in science, technology, and a deeper understanding of our universe and humanity's place therein." He also said that the United States has its current standing because of those who reached for "unbounded heights".

The Challenger was a tragedy which was arguably inevitable. It raises many questions about the role of the engineer in upholding public safety, as well as questions about management, protocol, and decision-making processes. Because of the ambiguity of all of these questions, this situation has become the basis of many case studies in university engineering courses. Last week in my Ethics course, we handed in a study and then proceeded to debate this case to death, so I can contest to the truth of that first-hand.

NASA initiated its space shuttle program in the 1980s with the launch of the STS-1 on April 12, 1981. The goal of this program was to reduce the cost of accessing space by reusing vehicles, rather than discarding old shuttles and building new ones for each mission. They were designed to fly 100 times over a ten year span, although things did not proceed as planned. After each flight, the engine and other parts had to be rebuilt more than expected – the cost of launching averaged to half a billion dollars. Having previously committed to regular flights, NASA added more vehicles and had the crew working overtime to meet deadlines. This created a culture of "go fever", which created a high pressure work environment and pretty much gave them the mindset of needing to deliver at all costs. Up until the Challenger incident, the system appeared to be working. They had flown twenty-four consecutive successful missions.

The Challenger Space Shuttle was part of this program and was about to have its tenth mission. Aboard were seven people, including civilian Christa McAuliffe. She was the selected candidate to take part in the Teacher in Space initiative, which was intended to increase student interest in STEM subjects, particularly space exploration.

The initial launch was scheduled for January 22, 1986, and was finally rescheduled to January 28 after five delays. The night before, a conference call took place between NASA and Morton Thiokol, the engineering firm contracted to design the solid rocket booster (SRB) for the space shuttles. One Thiokol engineer, Roger Boisjoly, was concerned about launching the next day because of the low predicted temperatures, but the lack of exhaustive data concerning the causal link between temperature and performance reduced their credibility. NASA management responded to concerns with "My God, Thiokol, when do you want me to launch – next April?" The majority of the officials recognized the possibility of failure but were able to overlook it when faced with a short time-frame, public expectation, and previous successes under their belt. This ended up being an issue of "go fever" and prioritizing productivity.

On January 28, 1986, NASA launched the Challenger from the Kennedy Space Centre in Cape Canaveral, Florida, with much of the American public viewing the event on live television. 73 seconds later, it blew up over the Atlantic Ocean, killing all aboard. The rubber O-rings sealing the rocket boosters were not fully functional at very low temperatures, as Thiokol had warned – they did not seal properly, causing hot gases to escape and ignite the external adjacent fuel tank.

"The whole country and the whole world were in shock when that happened, because that was the first time the United States had actually lost a space vehicle with crew on board," said former NASA astronaut Leroy Chiao.

This led to the idea that flying was too dangerous and human life should not be put in jeopardy. The families of the victims disagreed, saying that they did not want the deaths to have been in vain. A couple months after the tragedy, they founded the non-profit Challenger Center for Space Science Education to increase student interest in STEM with hands-on experience. There is currently one Center in Canada, but the majority are in the U.S., and the program has reached an estimated 4.5 million children since its inception thirty years ago.

Many attribute this disaster primarily to complacency: NASA recognized a potential problem, but considering Challenger had launched nine times and returned safely nine times, they did not see a definite reason to assume something would go wrong on this tenth occasion. By this point, launches were so commonplace and disaster-free that they did not see a reason to worry.

Was this preventable? Mike Leinbach, a former NASA shuttle launch director, argues that accidents are inevitable. "Spaceflight is like any other big engineering system," he said. "You get smart by successes. You get smart by failures. ... It's an evolution."

President Ronald Reagan agreed. In his national address the evening of the disaster, he said, "It's all part of the process of exploration and discovery. It's all part of taking a chance and expanding man's horizons. The future doesn't belong to the faint-hearted; it belongs to the brave."

The real question is, did NASA learn from their mistakes? They started by improving their design. It appears that the seven did not die from the initial explosion but rather from impact with the ocean. They may have survived if the shuttle was designed with an escape mechanism. NASA added this functionality for ejecting the crew capsule to their new shuttles. They also started to launch on top of rockets, rather than alongside them.

However, the root of the problem has more often been attributed to the culture over technical failure. We have discussed this idea of complacency. Was it eliminated?

Well, the same thing happened in 2003 with the Columbia, killing another seven people. A piece of foam punched a hole in the left wing, which allowed hot atmospheric gases to enter the wing after launch and destroy the vehicle. They had seen foam falling off earlier, but it hadn't caused any major damage and therefore they didn't expect catastrophic consequences. But again, complacency has no place in engineering.

Arguably, NASA did not learn from their mistakes.

NASA's space shuttle program led to failures in two out of five shuttles, so they finally terminated the program in July 2011. Currently, their human spaceflight program is working on sending people to Mars in the 2030s, with the development of a capsule called Orion and a rocket called the Space Launch System.

The most important thing is to learn from these experiences. As the cliché goes, it is not a mistake until you fail to correct it. Remember, this is also Einstein's definition of insanity, but we must remember that our duty as engineers is to protect public safety at all cost, even when engineering drives us insane. Therefore, let us keep this case in mind lest we become complacent again and forget the past.

Apple Cider is the (Caloric) Bomb

CAMERON SOLTYS
3A MECHANICAL

COOKING WITH CAM

Welcome back, my friends, to the table of the frugal chef. Once again, I am here to share with you a dish of superb taste made without purchase of new ingredients or measuring implements, and with total faith of its eventual success. Join me, companions, in a celebration of proteins and sugars, as we feast on the animal that has been called "the tuna of the land".

Before we get started, I would like to take a minute to express my love of apple cider. It is, pretty much, the best liquid ever. It's great for parties, aquatic-vehicle competitions, depression, binge drinking after (or before) exams, or snuggling with a dear one. It is also fabulous for use in the kitchen. Pretty much anywhere that wine, cooking sherry, or any other aromatic beverages are traditionally used, apple cider can be used instead. In fact, I'd argue that it is generally an improvement on the lesser beverages that I listed. Several times I've used wine in my cooking to make good meals, only to remake the same dish with apple cider and found myself in a foodie utopia. But anyway, if you're too cheap to pay $5 for a 1.5 L jug from the grocery store, I'm sure orange juice, grape juice, or blueberry-flavoured Kool-Aid powder would work just as well.

But enough about the elixir that is apple cider; on to the meat of the dish—literally. Gallus gallus domesticus is a medium-sized dinosaur descended from suborder Theropoda, a group that also contains the currently-extinct tyrannosaurs. With more than 19 billion animals alive today, it is the most common domestic animal. Well known for the large amount of tender white meat and succulent eggs, this chordate is a staple around the world.

And now on to the cooking part of this cooking column. I'm sure you're asking "how do I make a delicious meal out of the world's most delicious beverage and most versatile protein?" Never fear! It's quite simple. Trivial actually. That's like asking how to generate entropy when all you have is a hot gas cylinder in a cold low-pressure environment. Answer: do pretty much anything to it. Do nothing to it, for that matter (assuming a non-adiabatic cylinder).

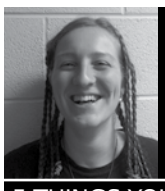
Begin by getting a roasting pan, oven-safe plate, lipped piece of steel, poorly made aluminum foil-bowl, or food-safe refractory-ceramic cup. Chop up onions, celery, peppers, and whatever other vegetables have been sitting at the back of your fridge but don't look quite dodgy enough to throw out yet. Don't chop them in the container, as it will mess up your knife; a dull knife is a deadly knife, believe it or not. Put your vegetables in the pan, spreading them around to make a flat layer of food.

Now prepare your G. g. domesticus. If you're like me, you probably forgot that you have to cook today and didn't defrost stuff ahead of time. So now you have a nice solid two kilogram block of dinosaur legs. My first suggestion is to try to pry some of the legs off using your knife as a not-at-all-safe crowbar. When this fails, I then suggest that you attempt to saw through the brick of meat. Did I mention that you don't have any serrated blades in the apartment, so you're going at it with a vegetable knife? But I digress. With this technique also evidently unsuccessful after a few minutes of sawing, I now suggest you create some more entropy by pouring boiling water onto the frozen chicken (up to 1.1 kJ/K for each kilogram of water, if you're curious). This will thaw the chicken, allowing you to tear it into pieces with only your bare hands. (Remove your hands from the meat before pouring the boiling water.)

Put the chicken in the roasting pan. Pour apple cider (6 glugs should be good) on top. Season the red junglefowl with paprika, salt, steak spice, and whatever else you have in your cupboard. Turn on the oven to 884.67° R. Flip ($n \in Z \mid n > 0$) times. Consume. Goes well with tortilla wraps, naan, sweet chili sauce, and cheese.

IRS Prank: Stud wall in E2 (Courtesy of Civil 2016)

Five Things You Really Don't Want to Know



CAITLIN MCLAREN
3T CHEMICAL

5 THINGS YOU DON'T WANT TO KNOW

Good people of Waterloo, it is again that time of the month when I cause you to lose your appetites, your minds, and quite possibly your tempers. Yes, it's the column where I accuse your ancestors of horrible, vile, and unspeakable practices! As it turns out, when you look at history, there were fewer Aristotles and Confuciuses, and more Beavises and Butt-heads. Sometimes it even turns out that our well-respected historical personages made the latter look tame.

Louis XIV Had Butt Operation, Court Followed Suit

In 1685, the King of France developed a painful swelling in his anus. It got worse and worse, and the king was in constant pain. It probably didn't help that he hated bathing, and only had two baths in his entire life. (Before you say "the poor Queen", she had the same number.) He did believe in enemas, and had a couple hundred of them, but none of them could give him any relief. Eventually, the royal court called upon the barber-surgeon Charles-Francois Felix and charged him with curing the king's fistula. After experimenting on numerous peasants, because that's what people did back then, Felix prepared some new surgical instruments and operated successfully on the king.

We are all adults here, and just because the king was suffering from a royal pain in the ass, that isn't ipso facto a reason to giggle. However, the behaviour of the French court at the time is much more amusing. It then became fashionable for the courtiers to go around wearing large bandages on their bottoms, in honour of the king. Many pretended to have fistulas themselves, because Louis XIV had made them cool. Some of the more fanatical even demanded to have the same operation, in honour of the king. Now that is some real ass-kissing.

Diogenes Believed in, Exemplified the Worst in Human Nature

You may or may not have heard of the Greek philosopher Diogenes the Cynic, but he was highly influential. It is from him that we get the word "cynical," meaning "dog-like" in ancient Greek, because he believed that humans were evil, corrupt, dishonest, and hypocritical, and would do better to behave like dogs. He lived in extreme poverty, with no possessions, and claimed to be seeking a single honest man. Legend has it that he impressed Alexander the Great.

He was also extremely disgusting. On the grounds that social conventions were wrong and should be ignored, he made a habit of pooping and peeing everywhere, in public. If someone insulted him, he did it on them. Furthermore, he engaged in public lewdness, and when criticized for this practice, he responded that he wished he could get rid of hunger by rubbing his stomach. When invited to a rich person's house, he spat in his host's mouth, for the sole purpose of being a jerk. Worst of all, he even – horror of horrors – ate breakfast in the marketplace. The ancient Greeks had… odd priorities.

Benjamin Franklin, Famous Politician, Inventor, and Womanizer

You definitely know who Benjamin Franklin was. A great Founding Father of the United States, he invented lightning and discovered bifocals. Or something like that.

He also liked sex, which is not unusual. However, he particularly recommended older women, for a whole list of reasons. In the first place, old women don't get pregnant, they also have more practice and are therefore more skilled, and finally, because of gravity. Since bodily fluids flow downwards and fill up the legs, they get old and wrinkly last. Therefore, if you cover a woman's head with a basket while doing the deed, it makes no difference how old she is. Some of those reasons are more sane than others.

He also wrote an essay entitled "Fart Proudly", wherein he strongly recommended that the best scientists of the day immediately devote their time to developing a drug that would prevent farts from smelling. According to him, offensive-smelling farts were the foremost practical problem in science at the time. No other science was "worth a Farthing." That's right, Benjamin Franklin was guilty of unusually shameless womanizing, crude humour, and bad puns.

Julius Caesar was a Bald-Headed Adulterer, Invented the Combover

Julius Caesar: the one Roman that literally everyone can name. He conquered Europe for Rome, only to be betrayed by his own friends and murdered during a government session.

He was also, not unusually for a politician, a womanizer. However, he took it a few steps farther than most. In fact, his soldiers famously sang songs about his conquests, in both senses. When he had a triumphal entry into Rome, the soldiers warned the citizens "Lock up your wives, we are bringing you the bald-headed adulterer." Whatever his morals, he was definitely bald-headed, which is why he invented the combover. (Really!) That's also why he liked to wear laurel wreaths on his head: to conceal the baldness. He didn't care too much about concealing the adultery.

However, he drew the line at being accused of affairs with men, which he was, frequently. Curio the Elder called him "Every woman's man and every man's woman." Our old friend Suetonius, ancient Rome's most notorious tabloid journalist, wrote about his soldiers singing "Caesar may have conquered the Gauls, but Nicomedes conquered Caesar." The poet Catullus wrote poems about him having an affair with his chief engineer (heyo!), but later felt bad about it and apologized. Caesar immediately invited Catullus over for dinner, in a totally not-gay way.

Theodora, Professional Prostitute and Empress of Byzantium

Theodora was a powerful and influential 6th-century Byzantine empress. She was the wife of the emperor Justinian, and among many other accomplishments, supressed a large riot, worked for religious reform, and improved the rights of women. However, she didn't get to be empress by being born into a high-class family; instead, she got Justinian to marry her by impressing him with her dancing, acting, and prostituting skills. Justinian's aunt wasn't a big fan of hers, but when she died, Justinian repealed the oddly specific law banning government officials from marrying actresses and made Theodora his empress.

According to the historian Procopius, who only published flattering things about her while he worked for her, she would have sex with dozens of men and also furniture. He also claimed that when she was an actress, she would put on the following show: she would appear on stage wearing nothing but a ribbon around her waist, and have trained geese eat grains of barley out of her *ahem*. That was what would draw a large audience and impress emperors back then. And people complain about the quality of television nowadays.

Before you appoint the goose-loving Theodora as patron saint of Waterloo, keep in mind that Procopius was the same guy who claimed that Justinian could magically send his own head flying away on secret missions, so it may not be strictly speaking true, but what's the fun in that?

Homeopathy: AKA Water Remembers

RHODODENDRON
CERTIFICATE IN HERBOLOGY

Yo Chem Engs. You think the job market is rough? Well guess what, all that "learning" you've been doing for the last decade or so is about to be displaced. There's a new, much more simple way to understand the physical world, without all of that bull about "trade-offs", "waste", and "impracticalities" you use to justify your fevered attempt to kill the environment with all of your "chemicals".

It's real simple (no wonder you're all going to hate it). Water has a memory. Like, if you throw stuff in there, it goddam remembers it. Mrs Macbeth, you think you got problems getting the blood off your hands? Washing with water won't help. All a homoeopathist has to do is shake a sample of that water like a mad-man, put a drop into a larger bucket, shake that, repeat, and you're as good as dead. It's DNA-level incontrovertible evidence, and much better understood. Hell, I figured it out by reading a two-page pamphlet while drinking herbal tea and rubbing crystals on my rash.

So like I say, homeopathy is easy. You don't need to be a doctor or an expert. Why? Because it has no side effects. It's just that good. When you put something bad in a glass of water, the water remembers. It learns how to fight it, and can teach you. No wonder big-pharma hates us. We can fight everything from cancer to male-pattern baldness with nothing more than a speck of plutonium and a piece of hair. And a MASSIVE amount of water.

Now you probably have a whole bunch of pitiful excuses about why this doesn't work "according" "to" "mainstream" "science". I'll try to address them here, but in case you don't feel that my responses are adequate, let me assure you that you are an idiot or government shill. So, your first excuse is probably related to the Avocado's number. You'll say something like you can only dilute something 10,223 times before there's less than one molecule per pill. Well then it's good that homeopathy isn't about molecules: it's about energy. And as you "scientists" yourself say, energy is matter. Energy is mass times c. And I know my math. Unless c is 0, mass is energy. So the water uses the energy to make as many molecules as it needs. Your next excuse is that this goes against everything modern chemistry knows. Modern chemistry knows nothing. Just 5 minutes ago I asked a chemist if the coffee in the pot was hot, and he said yes. Well he was wrong. If you can't even explain coffee, are you really that surprised that you can't do medicine?

Whatever. Either you can see the truth or you'll shortly die in some dangerous chemical test. If you actually took the time to understand how stuff really works you wouldn't be in any danger. But I guess you'd rather keep believing you know everything than live a healthy organic life.

Broskies on Brewskies

DONOVAN MAUDSLEY
TRISTAN KUEHN
2T MECHANICAL AND 2T SYSTEMS

Donovan and Tristan are two friends from humble beginnings in London, Ontario. Off and on roommates and general guys who like beer, the following article follows them through a journey into the sometimes overcrowded world of craft beer where they will try to find the best that Ontario has to offer.

First up, this issue is Fire In the Rye, a roasted rye pale ale from Double Trouble Brewing Company in Guelph. We ended up choosing this beer due to the label, which has a bright, fiery and eye-catching design. This ale has a very nice bitter taste to it, similar to a typical craft brewed IPA but with a much smoother taste. The beer has a nice light taste to it, which likely adds to the watery feel of it. Although it feels a little diluted, it is not overbearing like many of the pale ales we've had. Donovan felt that this beer had a little heat to it, similar to straight liquor. Overall, we give this brew a four out of five and strongly recommend it.

Next up is Trooper, a British ale from Robinsons Brewery in England. This is the beer that I've been the most excited about reviewing since we started this column, because it is an Iron Maiden brand beer. Even though it comes in a bottle instead of a can, it's the most metal beer that we've had. If I'm being completely honest, we paused Netflix to listen to the Trooper by Maiden and order a pizza while drinking this beer. It's a light and smooth beer, with hints of malts and a tinge of citrus. We disagreed on the rating for this beer, but settled on a four.

Last up is the Frankenstout from Block 3 brewing company in St Jacob's. I was actually able to go out to the brewery for the first time since we started our column. Usually, we grab one or two bottles or cans of beer, but it was decided that we were going to get a whole growler of this one. For those of you who don't know, a growler is much more than a bottle. As the name suggests, we have a stout on our hands. A nice, smooth taste complements the classic stout flavouring. Bitter and light, this is a stout that we feel all beer drinkers would enjoy. We also disagreed on the ranking of this one; Tristan is not a fan of stouts, but settled on three and a half out of five.

We had a really solid group this week. It seems to tend that good label lead to good beers. We may have been slightly swayed towards Trooper due to its origin. The purchase of Frankenstout was also kind of cheating, as we were able to taste test all of the beers from Block 3 before buying. I'd recommend trying out any of the beers from this week, as well as any you can find from Block 3, which - coincidentally - you can take the bus to out in St. Jacob's. Have a great time trying out your craft brews, and please remember to enjoy responsibly.

Valentine's Day 101

JUNO IRONWOMAN
4B RELATIONSHIPOLOGY

There are many exciting dates approaching in these next couple of weeks. February 13th, for one, is both the beginning of Reading Week and the end of midterm week for many programs. February 15th, Family Day, encourages people to take a day off work to do family activities. As such, your parents will undoubtedly use the holiday as a reason why you should socialize with them. Since the holiday was essentially a 2007 elections promise, you can fire back with something like "back in your day, you never had to spend a designated day in February socializing with your family!" And then go back to your homework/Netflix/relaxation. This brings me to that other notable date coming up. February 14th is Singles' Awareness Day, better known as Valentine's Day.

Now let's ignore the obvious historical confusions about Valentine's Day which has something to do with a martyred saint. Was he actually one guy, or two combined over time into one massive symbol? What does he actually have to do with lovers? Who knows? I certainly don't, it is all quite confusing. So, for the sake of this article, let us understand Valentines' Day to be a somewhat arbitrary Hallmark holiday, because honestly, who doesn't need a holiday by the time February rolls around?

At our age, the main focus of Valentine's Day is couples. Couples exchanging cards, couples enjoying romantic candlelit dinners, couples holding hands and wandering aimlessly. Honestly, what was so bad about just giving out candy grams to the other kids in your class? So you may be wondering, how do I migrate from being a single person needing to spread knowledge of my singleness to other single people within my network to actually being one of these happy couples? Excellent question! Here I shall present you with some tips and tricks to become either better at all your couple-y endeavours, or better at wooing that special someone in the first place.

Tipz for being a better couple

Respect your significant other's advice in regards to gift giving. Students are poor; it's not necessary to give your partner chocolates or flowers. This will leave them feeling obligated to reciprocate. Offer to spend the day with them (it's Reading Week, you can take a day off!).

If you do want to give gifts, flowers and chocolates are a go-to. Sending flowers to your partners work place can be especially sweet as it brightens up their office and reminds them of you!

Make a romantic home-cooked meal. Restaurants are nice and all, but who wants the hassle of trying to get into one on Valentine's Day?! Give your lover a nice card stating your intentions to take them out some point when it is slightly less crowded!

Take your significant other to the movies. I hear Deadpool comes out in time for Valentine's day; who doesn't want to watch an excellent movie filled with sass and senseless violence on this day filled with romance?

Give your lover a booklet of tickets redeemable for such things as 'one free back rub' or 'dish washing'.

Do something you both enjoy

Remember, one day to celebrate your love is overrated: there's 364 other days when you can also be happy mushy couples!

Tipz for becoming a couple

Make friends in Chem Eng... there's a reason it's called fem-Eng

Use your words and say hello to that person who seems cool

Be friends with the gender of your affections on a non-romantic basis: this will give you insight into how they approach romance and dating. Plus, they can introduce you to others, and vouch for your awesomeness.

Keep the Feb. 14th gift giving to a minimum. Try giving out chocolate kisses (The line "do you want a kiss" may result in some funny responses) or candy conversation hearts. (There's nothing sexier than handing someone a heart that says "fax me".)

Go watch How to Be Single in theaters. It is Hollywood, so I think it ends happily ever after? When in doubt though, Deadpool also comes out that day!

Statistically speaking, couples formed on and around Feb. 14th often have less staying power than couples formed at other times in the year. Focus on having fun and meeting people. Often, romances will develop organically over time from mutual understanding and interests. If there's been something there for awhile already, then by all means try and use the holiday to see if there might be something more.

Make small talk with strangers, go meet people; who knows what might happen!

Well there you are, hopefully you have found something reassuring or exciting from my rambling tips. Reading Week and Valentine 's Day/Singles' Awareness Day are just a small part of what promises to be an exciting week. I know if you have made it this far, you are probably an awesome person with big exciting plans. I have faith in you! Enjoy it! Also, don't forget, Feb 15th is also cheap candy day! Seriously, that's what is important in life.

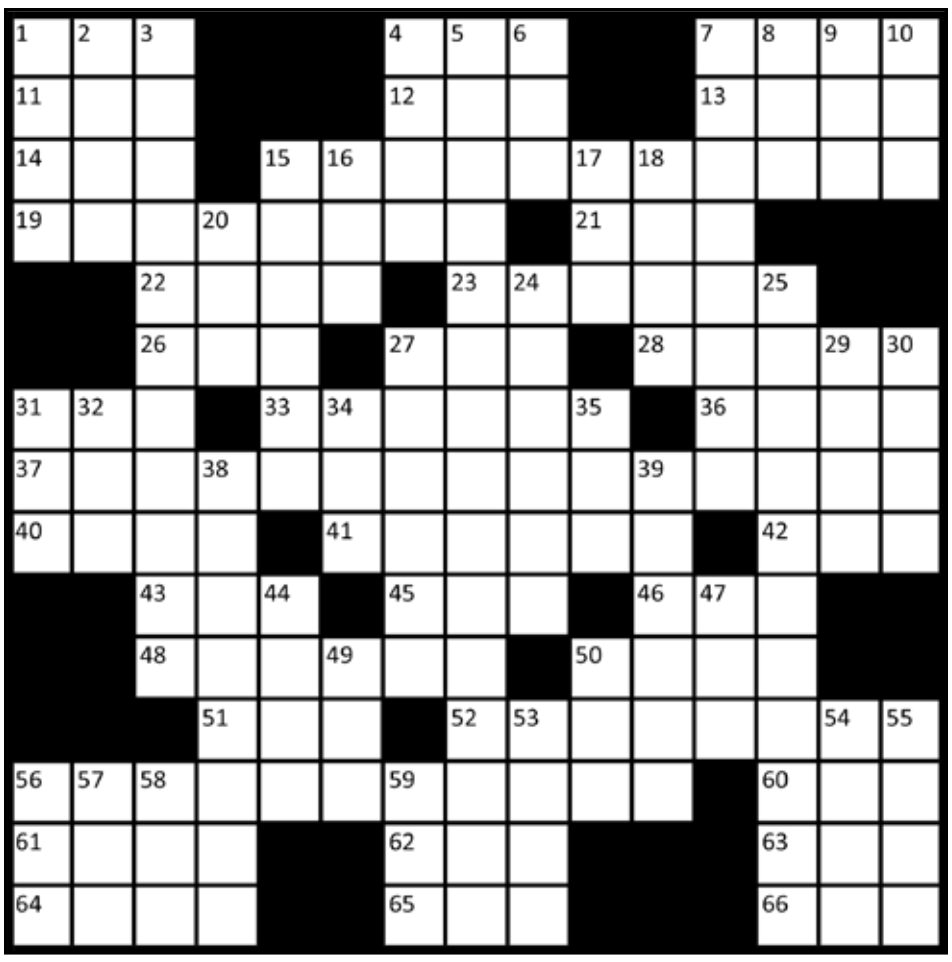
IRS Prank: Systems banner in E5 (Courtesy of Syde 2016)

IRS Prank: Robot in CPH Foyer (Courtesy of Tron 2016)

The Iron Crossword

Emperors of Rome

CAMERON SOLTYS
3A MECHANICAL



ACROSS

1: Power source for cars
4: ION, for instance (abbr)
7: Waterloo organization that helps students find jobs (abbr)
11: A compound of Indium and Oxygen
12: Flightless Australian bird
13: Second Roman Emperor in the "Year of the Four Emperors"
14: Unit of work in the English system of units (abbr)
15: Karen Russell novel about alligator wrestlers
19: Sesame Street Muppet who looks like Prairie Dawn
21: Children's summer camp hosted by Waterloo (abbr)
22: Where the heart is
23: Test to identify an acid or base
26: "A long time ___..."
27: A sport utility vehicle with truck bed (abbr)
28: Force away
31: Internet slang to express outrage and incredulity (abbr)
33: Bites a little (2 wd)
36: Creator of the PlayStation video game system
37: A machine that wastes no energy (2 wd)
40: ___ Tzu, dog with long silky hair
41: ___ Roadhouse, restaurant in Cambridge
42: Kickstarter pen that can doodle in the air
43: Hunter of mice and milk
45: Conference for game publishers (abbr,)
46: Machine that performs credit and debit transactions (abbr)
48: Pale, like ashes
50: In a blanket, perhaps
51: Code for the currency used in Greece, Germany, and others
52: Constantine and Augustus, for instance
56: Country that surrounded West Berlin after WWII
60: Previous name for local communication technology giant
61: Sound made in two successive injuries (2 wd)
62: Celibate woman of God
63: International organization for tall people (abbr)
64: Last Roman emperor of the Julio-Claudian dynasty
65: Suffix for the name of enzymes
66: A pair or whole group

DOWN

1: Old English name meaning "Son of Gilbert or "bright promise"
2: Initial bet in poker
3: Country of Cape Town and Johannesburg
4: Internet abbreviation for intense laughter
5: Mythical twin founders of Rome
6: Strike lightly
7: Territory gained through military force
8: Guessed duration till leaving (abbr)
9: Greek letter that looks like "X"
10: Acronym of girl group Ace of Angels
15: Raven-___ of "That's So Raven"
16: Largest Ohio-based railway (abbr)
17: Grant permission
18: Physical sensation sometimes called "head tingles" (abbr)
20: Australian word for "swim suit"
24: Slanted, when applied to text
25: One who ruins fun (2 wd)
27: More common name for the Euphorbia genus of plants
29: Electronic method for submitting a notice of intent (abbr)
30: Large cat that lives in northern Canada
31: Measure of typing ability (abbr)
32: Common miss-typing of the word "the"
34: Institute for professionals in transportation engineering
35: Toyota's European headquarters (abbr)
38: Stage following the first (2 wd)
39: Bird sometimes called "sea hawk"
44: Violent person
47: Used with a canoe, perhaps
49: Anger
50: Network of stores that officially offer Magic: The Gathering products and services
53: Neck hair on a horse on lion
54: Important cereal crop grown in aquatic environments
55: Dutch equivalent surname to "Smith"
56: Ten millennia
57: Shock and ___
58: List for sex offenders (abbr)
59: Single-stranded equivalent to DNA

Sudoku

#2016-02

CAMERON SOLTYS
3A MECHANICAL

Easy

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

Medium

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

Hard

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

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

THE IRON INQUISITION
Vince Magas, 3A Management

"What is your best pick-up line?"

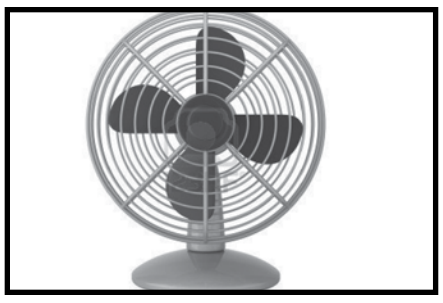
"Are you my appendix 'cause I've got a gut feeling saying I should take you out"

"I touched the butt (from Nemo)"
Tara Tsang, 3A Management

"I don't need one"
Jeff Gulbronson, 3A Software

"Wanna go out for drinks?"
Robby Kang, 3A Management

"I reference... the 50 best pick-up lines from movies and TV shows and pick one at random."
Harris from EngSoc



"Did u just fart cuz u blowin me away"
4A Irritable Bowel Syndrome

First Year Integration Conference 2016

ESSCO, Covvies, Lady Godiva, and More

GABRIELLE KLEMT
1N GEOLOGICAL

As a first year engineering student, it's fair to assume that there are a lot of traditions I have not yet experienced. This past weekend though I checked something off my to do list and went to an engineering conference. For those of you who, like me, have never been to any kind of conference, let alone an engineering conference, you probably have no idea what takes place at these events.

I was expecting some workshops and networking, maybe some fun night events and a little drinking (I'm nineteen, don't worry). What I forgot is that engineers never do anything just a little. When we do something, it's all or nothing, and this conference was just the same.

This year the First Year Integration Conference (FYIC) was hosted by Ryerson in downtown Toronto. Waterloo, thanks to its two societies, was able to send twelve eager young delegates to do their best representing our school. Accompanying us to the conference were our extraordinary VP Externals and the VP Communications for ESSCO.

Events started off Friday night when all the delegates from fourteen school across Ontario (plus McGill) trekked to Ryerson to listen to the keynote speaker, Drew Dudley, a man so famous he has even given talks to the CEO of McDonald's. His theme was all about being a leader in everyday life and what it truly means to be a leader at all. The talk was incredibly interesting, but I think the main takeaway was that leadership is a state of thinking, not a thing that you have to earn through job success or titles. I think that most of the delegates walked out of that talk feeling like we wished we had taken more notes, or any notes at all. I think DJ Khaled might consider Drew's ideas pretty great keys to success.

The rest of the night involved finger food and getting to know the other delegates at a very hip bar that was rented for our use, with all the pop on tap you could want. On our return to the hotel, we were introduced to the tradition of coveralls and patches. I must say, I had no idea the patch trade was so intense and I will most definitely be more prepared for next time. A word of advice: if you ever find yourself at an Eng event with students from other schools, you should make sure to bring all the most interesting badges from Novelties. Unfortunately, after a certain point most people have plain Waterloo patches and it takes something a little flashier to get a trade.

Waking up the next day was really easy because of the reasonable hour everyone went to bad at the night before. For most of Saturday we had group sessions with the other delegates on how to be involved in our schools and in our EngSoc, the purpose of PEO and OPSE (both organizations which you should definitely join as students right now, especially OPSE because you can get mad deals on everything from hockey games to insurance), engineering traditions like Lady Godiva's Hymn and mascots, how to write and give a good speech, crisis management, and the list goes on. We also learned about ESSCO, Engineering Student Societies' Council of Ontario, and how to get involved with them.

Photo provided by Gabrielle Klemt

Delegates in Covvies

It was a very packed day: needless to say we were all very ready to take a break and relax, but we're engineers and we like to be classy above all else, so instead we got ready for a fancy gala and dinner back at the hotel. The Gala was tons of fun, with a photo booth and an amazing dinner. We followed up the Gala with a trip to Laser Quest, something I don't frequent, but even I improved by the time we left and everyone had a great time. Back at the hotel we stayed up talking and hanging out together. It was a great opportunity to really get to know the other delegates and talk about non-engineering things for a change.

Sunday dawned bright and way too early, but we were all excited to go to the last sessions and some of us got to sit in on Plenary, a meeting in which the VPXs and the ESSCO executives to discuss future events and motions pertaining to schools across the province. After a final talk about what to do after FYIC, we all said goodbye and went our separate ways.

If any of you are considering attending an engineering conference in the future, don't hesitate, just apply. I had no idea what to expect, and if I'm being honest I thought it would be a lot of lectures and the people there would be really intimidating. Nothing could be farther from the truth: all of the sessions we had were incredibly useful and informative and the people were more than just open and friendly, they actively wanted to make friends with you no matter what. I met some amazing people and most importantly, I learned a few more verses of Lady Godiva.