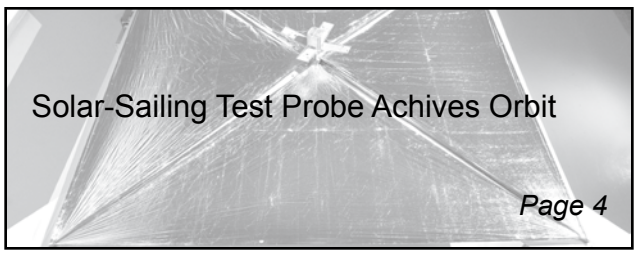
Note: This document is hosted here for archival purposes only. It does not necessarily represent the values of the Iron Warrior or Waterloo Engineering Society in the present day.

THE IRON WARRIOR

THE NEWSPAPER OF THE UNIVERSITY OF WATERLOO ENGINEERING SOCIETY

VOLUME 36 ISSUE 7 | WEDNESDAY, JUNE 10, 2015



facebook.com/TheIronWarrior twitter.com/TheIronWarrior iwarrior.uwaterloo.ca

University of Waterloo Hosts Dutch Royals

Ethan Alter

King Willem-Alexander and Queen Máxima being greeted by University President Feridun Hamdullahpur

MICHAL KONONENKO
2B NANOTECHNOLOGY

On May 28th, the University was proud to welcome the arrival of King Willem-Alexander and Queen Máxima of the Netherlands, rolling out an orange carpet outside the QNC for the royal procession. The meeting was held to strengthen research connections between the University of Waterloo and fellow institutions in the Netherlands. To that end, the King and his party held a round-table meeting to discuss higher education. In addition, 70 scholarships were awarded to outstanding students for improvement of studies here and abroad.

The visit also marked the 70th anniversary of the liberation of the Netherlands in World War II, an action to which Canadian Forces contributed greatly.

"The fact that they chose Waterloo, ... showed commitment and goodwill on their part ," commented Maaz Yasin, VP Internal at the Federation of Students. "Canada and the Netherlands have had a good relationship, but now we're going to be doing a lot more research partnerships." Indeed, once the King had departed and the festivities had ended, many of the attendees broke into more informal conversational settings, discussing difficulties and exciting new avenues of research. The most prominent discussion occured between Delft University's quantum information group, and our own Institute for Quantum Computing.

The university visit consisted of a grand introduction, followed by a round table to discuss cooperation between the University of Waterloo and TU Delft in the Netherlands. Both universities are actively involved in quantum computing research, and so could benefit significantly from each others' work. Equally as important as the King and Queen themselves are the delegation travelling with them. An economic mission was sent to Ottawa to meet with representatives from the Canadian government, and a higher education mission was sent to the University of Waterloo to focus on improving research relationships between Canada and the Netherlands. While the royal family was in Waterloo for a scant two hours, the informal dialogue between Canadian and Dutch researchers is sure to spark new research opportunities, and insights into higher education and quantum information.

To continue their economic mission, the King and Queen met in Ottawa to discuss politics. In addition, the Royal Family visited an orchid farm in Beamsville, Ontario, run by two brothers of Dutch descent. Due to the fact that one third of the Netherlands lies below sea level, the Dutch have always had to innovate in hydrological and environmental engineering, in order to maintain their way of life. By sharing our experiences with those of the Dutch, we can both work to develop our natural resources, and make them more sustainable; so that we may enjoy our natural resources for generations to come.

The stopover in Waterloo forms part of a larger tour of Canada that began on May 26th and ended on June 1st. Following this, the Royal Family went on a tour of the United States, strengthening relations between old allies.

This is not the first time that Canada has hosted Dutch Royalty. In fact, Canada hosted the Dutch royal family during their exile in World War II. Princess Margriet, the aunt of King Willem-Alexander, was born during the royal family's exile. To ensure that the Princess' citizenship was influenced solely by her mother, the maternity ward where she was born was temporarily declared extraterritorial by the Canadian government. There is a maternity ward in the Ottawa Civic Hospital that was officially "not Canada", for a few hours in 1943 while Princess Margriet was being born.

The Canadian tulip festival was born out of the tradition of the people and the Royal Family of the Netherlands sending tulips in order to commemorate their liberation.

The Myth of the Profound Quote

CAMERON SOLTYS
EDITOR-IN-CHIEF

Well we managed to get the first issue out! If you're reading this, we've gotten the second issue out too! That is to say, this term has succeeded beyond my wildest expectations, and the year is not even half over. As a side note, midterms are coming up! Best of luck to all of you. I have nothing else to add to that; I just like saying it and watching the temporary panic which shows in everyone's eyes when they hear it or, in this case, read it.

Once again, this publication has been made possible by the massive effort of all of the staff and contributors to this paper. A big thanks to Meagan, Nachi, and Jessica who showed up on Sunday to help out with layout, as well as the larger and still-incredibly-praise-worthy group that kept me company on Saturday. A special note to my writing juggernaut Sherwin, who wrote over 2500 words this issue, and to Jessica, and Leah for being around for some Sunday night copy editing. In this issue, you can look up Brian's article on page 13 to get a look at a revolutionary new law implemented by the French Government. Sam has also written an informative piece on massive political and economic challenges Nepal faces in the light of its recent earthquakes (page 5). Finally, Meagan's new column on historically important chemicals (page 11) tells the story of nitrogen fixation and the men behind it.

And now on to what I'm sure you have been eagerly awaiting: what is this Myth of the Profound Quote? Is it a newly translated fable from Ancient Greece? Is it an awesome MMO where you are the hero on a quest to fulfill the prophecy of the sacred text known as Profound Quote written by a powerful deity-figure? Alas, I am sorry to disappoint. I'm not going to talk to you today about some epic myth or wild tale. No friends, instead, let me relate my little story about how the idea of profound quotes is nonsense.

To start off with, let me define what I mean by a "profound quote." I'm sure you've seen them before. They're the quick one-liners that get hung on the walls of high schools the world round. They're the sentences that are slapped onto pictures of star fields and put on Facebook or reddit to garner responses like "I love that quote, so powerful" and "Really makes you think!" The one which stuck with me from high-school is "You miss 100% of the shots you don't take"—Wayne Gretzky. More generally, they are the single-sentence phrases—often attributed to someone famous—that might be described as powerful or inspirational.

So why don't I like profound quotes? What could I possible have against an entire class of written communications? Simply put, I really don't think that a single sentence can be legitimately described as profound, and I think that it is a tragedy whenever one is described as such. There simply isn't enough information in a single sentence to really say something powerful; all the things you interpret from it are internal to you. Truly powerful ideas may be short and succulent, but they cannot be reduced with any usefulness to the size of a single sentence.

My first feeling when I read a quote on its star field (or sometimes a mountain backdrop or a mist-covered pond) is "gee, that seems really open to interpretation." There is just so little substance to start with from the shear lack of volume of text. Anything remarkable one sees in the phrase, he or she has created using personal context. Let's take the example I gave above: "You miss 100% of the shots you don't take." The message I think I was supposed to get from it is that "You should always try, since if you don't then you can never succeed." But when I read that, I start thinking about my return on investment. "Sure, if I don't shoot I can't score, but if I do shoot I'm also giving up possession of the puck. I could instead pass the puck to someone more competent at shot-taking, thereby decreasing the risk of failure. What's the opportunity cost of taking the shot myself?"

What does this example show? It shows, first of all, that I have been listening to WAY too many Freakonomics podcasts. But it also shows that the idea of a so-called profound quote expresses is a reflection of the reader, not of the speaker. Is this a bad thing? I would say so. Everyone has their ideas and their worldviews, and there is nothing wrong with that. But if I start looking for validation of my worldview or my opinion in context-lacking short passages, I shouldn't be surprised to find the reassurance I seek. Relying on quotes to define and express yourself represents and results in a stagnation of thought. If you don't think about what you are reading, it can't affect you. But if you do stop and think about it, thereby making it a profound quote, you must be filling it in with your own pre-existing ideas, because there is not enough content there to captivate for more than a second. So a profound quote can't really change your world; it's just a mechanism for re-introducing yourself to what you already know.

The other reason that I don't like profound quotes is that they lack any of the complexity and nuance that make the world difficult and interesting. There are a lot of good ideas which can be expressed succulently and quickly. Abraham Lincoln's renowned Gettysburg address was two minutes long, scandalously short after Edward Everett's 2 hour epic that preceded it. But it is still a far leap from efficient to single-sentence.

Another profound quote is the Golden Rule: "Do unto others as you would have them do unto you." It seems like a great ethics system, and it certainly has the seeds of one. But before long, we run into our friend complexity. It may be, as my grade 9 religion teacher told me, that every major religion in the world has a similar rule. (The instance I gave above is the one used by Roman Catholics.) But despite all having this same fundamental rule, it can be noted that there are tremendous differences between the various religious ethics systems throughout the world.

Rather than launch into a massive comparative study of ethics and religion which is both beyond my knowledge and interest, I shall illustrate my point by running the Golden Rule through the Trolley Problem. The Trolley Problem goes like this: Suppose 5 people are tied to a track, and one is tied to a parallel track. A trolley heads towards the 5 people. You have a leaver which will change the trolley's path, leading it instead onto the track with the single person. Do you pull the lever? And if you do have an answer to this question, how do you handle these countless variations I could make to the problem?

Now let's see where the Golden Rule takes us. If I were one of the five, I would really appreciate the lever being pulled. Well that was easy! But what about the singleton on the other track? If I were her, I would appreciate someone not pulling the lever. What shall I do? Well, since in 5 of the 6 cases, I would have the lever-puller pull the lever, I guess I should pull it. But in following this logic, we have accidentally invoked a utilitarian perspective of ethics, and decided that the decision taken should be the one most people agree with. This is a fine perspective, but it is one which I have decided to take. I cannot definitively interpret from the Golden Rule that this is the correct response. What if I follow a deontological philosophy, in which a solution is judged by its means? In that case, by doing nothing I am not responsible for the death of the 5; I am simply letting existing conditions run their course. If, on the other hand, I do switch the lever, my action causes the death of the one; I am her murderer. Do unto others as I would have them do unto me? Well I would have them not murder me, so I should choose that action (or lack thereof) which doesn't result in me murdering someone else.

So we see that the Golden Rule, as a profound quote, fails to be all that instructive. It's fine for situations lacking complexity. (Should I punch that random person on the sidewalk? Well I reckon I wouldn't like it if they did so to me.) But when the situation gets more nuanced, you must resort to some other source to complete your ethics system. And that source will be entirely dependent upon the ethics you already subscribe to. Once again, the lack of attention to nuance present in a profound statement results in it being not an inspiring or instructive tool, but a medium for our pre-existing opinions.

So what is the big deal? What's wrong with people liking short phrases and saying that those phrases inspire them? Maybe not a whole lot. The mental adblock I've developed to ignore online banner ads seems totally adaptable to shielding me from the aforementioned real-life posters I would also like to ignore. But maybe we would be a bit better off if we didn't try to compress philosophies and worldviews and ideas into single quotes. Maybe there is just a little too much seeing the world as simple and clear, and these quotes make us a little less inclined to appreciate the validity of alternate ideas, all while providing uncritical reinforcement of the beliefs we already hold.

Issue #3 Deadline: Friday, June 19 at 6:00pm for publication on Wednesday, June 24, 2015
Send your submissions to *iwarrior@uwaterloo.ca*
Spring 2015 Publication Schedule: May 27, June 10, June 24, July 15, July 29

THE IRON WARRIOR
The Newspaper of the University of Waterloo Engineering Society

The Iron Warrior is a forum for thought-provoking and informative articles published by the Engineering Society. Views expressed in *The Iron Warrior* are those of the authors and do not necessarily reflect the opinions of the Engineering Society.

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

All submissions, unless otherwise stated, become the property of *The Iron Warrior*, which reserves the right to refuse publication of material which it deems unsuitable. *The Iron Warrior* also reserves the right to edit grammar, spelling and text that do not meet university standards. Authors will be notified of any major changes that may be required.

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

Truth and Reconciliation: Closure For the First Nations?

SHERWIN KWAN
4B MECHANICAL

Last week in Ottawa the Truth and Reconciliation Commission of Canada (TRC) completed its seven-year inquiry into residential schools for aboriginal children. After documenting the abuses which took place in these schools, the committee called for healing and released a number of recommendations to make life better for the First Nations in the future.

Background

When European settlers arrived in North America a few centuries ago, they discovered that these lands were already populated by aboriginal people, whom they referred to as "Indians" (as several early explorers incorrectly identified the land they had discovered as India). As Europe was more technologically advanced than North America at this time many Europeans believed they were within their rights to take control of these new lands—even if aboriginals had been living there for centuries—and to incorporate them into "civilization." As many aboriginal groups were nomadic, this was justified by claiming that a person with no permanent home could not possibly have ownership over a plot of land. Treaties were signed forcing aboriginals to retire to Indian Reserves, and their children were forced to be educated—by which was meant education by Europeans, with the goal of converting aboriginal societies into 'civilized' agricultural societies.

Residential Schools

In 19th-century Canada the government began funding a number of boarding schools for aboriginals called residential schools. These schools were run by various Christian groups (the Roman Catholic Church, the Anglican Church, the Methodist Church, and the Presbyterian Church). In the 1960s, the churches turned over responsibility for running the schools to the Canadian government, which in turn delegated some of the schools to be run by aboriginals themselves. All residential schools, both government-run and aboriginal-run, were closed by 1998.

Sir John A. Macdonald, first prime minister of Canada, thought that by doing so "Indian children will acquire the habits and modes of thought of white men." Once they graduated, it was intended that they would assimilate into European-Canadian culture, and within a few generations, there would be no aboriginals left. No more reserves, no more treaties. Problem solved.

Conditions in the residential schools were harsh. Buildings were often poorly maintained, and the food supplied to the students was frequently not healthy or not sufficient. Perhaps if the quality of the education was actually high, students would still have gotten something for their trials, but due to a lack of funding, this usually wasn't the case. Students were discouraged—sometimes even prohibited—from speaking their native languages, and aboriginal spiritual practices were banned in favour of Christian practices. Due to lax oversight, many students were even subject to physical or sexual abuse from the staff. There was a very real risk of death—the TRC estimates that some four thousand students died while attending a residential school.

Over the last few decades, many graduates of residential schools (hereafter referred to as the "survivors") have come forward to report being victimized, and teachers and clerics ("staff") have issued apologies. In 2008, the Canadian government issued an apology for its involvement with residential schools, and representatives from the responsible churches also apologized. The same year, the TRC was set up to hear from both sides, and document their stories, so that healing and reconciliation might be achieved. (The name is borrowed from South Africa, whose post-apartheid hearings were also run by a "Truth and Reconciliation Commission".)

Stories of the Survivors

Survivors, needless to say, do not look fondly on their time in the residential schools. Their parents were frequently forced, on pain of prosecution, to give their children to be educated far from home. Once there, male and female students were separated (the residential schools were single-gender). Uniforms were provided to the new students. Many survivors were traumatized at being separated from their family permanently and, to make matters worse, brothers and sisters were separated from each other. Several survivors report that upon being provided with school clothes they were forced to surrender the home-made clothes they had come wearing, and the latter were prompted thrown into the trash.

Due to prejudices, students were often not asked to learn difficult material. Instead of teaching concepts, they would be asked to memorize things without having it explained to them why it was important to memorize these things. Some survivors report being flat-out told that they were never going to enter a professional occupation, so there was no point even trying to get a decent education.

Due to the lack of funding, students were usually required to work to pay for their own education (or lack thereof). There were no work safety regulations whatsoever; sometimes, children would be asked to operate tractors or furnaces. Fingers were commonly lost during clothes-wringing. Despite all this, many schools did not take any responsibility for the injuries.

Nutritious food was out of the question; some students even resorted to eating their own vomit because they was nothing else to eat. Diseases, especially tuberculosis, were common; it didn't help that students slept in overcrowded dorms and any medical equipment available was of hopelessly poor quality.

Corporal punishment was the norm. Survivors reported being lashed for being in the dorms of the other gender, speaking an aboriginal language, or even just failing to understand an instruction spoken in English. Worse yet, sexual abuse from the staff was rampant. Church officials and the Department of Indian Affairs were reluctant to punish abusers; often, they would simply be asked to quit, or transfer to a different school, with no further penalty.

Many students formed "gangs", in the hopes of mutual protection. But this also led to tragedy—at some schools, older students bullied younger ones, and gang-affiliated children bullied those who were alone. Abuse was seldom reported due to fear of being stigmatized or reprisals.

Despite all the horrors, some students managed to rise above their circumstances. One residential school in Saskatchewan became known for producing hockey players, another school in BC for producing boxers, and others for producing artists. Several students went full circle and joined the clergy or became a residential school teacher.

Many survivors expressed appreciation that in recent years, they have at last been able to hear apologies from those responsible. But they are looking not only for words, but for actions to demonstrate that Canada is sincerely interested in their well-being.

Stories from the Other Side

Although one might be tempted to demonize the staff, they were not always placed in a great position either. There was an appalling lack of regulation and funding. One principal at a residential school wrote to the government asking what duties a principal had under Canadian law; the reply was that he did not have any. Salaries for teachers were very low, which meant that the best teachers would never even entertain coming to a residential school. Governments and churches often had to resort to hiring staff with little experience or competency in teaching to keep costs down.

There were definitely teachers who were sincerely interested in educating their students—one teacher in BC even taught his students arguments in favour of aboriginal land title. Some teachers were diagnosed with depression, and others quit after a year or two because they couldn't stomach the conditions anymore.

On many occasions, staff at residential schools asked the government for more funding, but adequate funding was usually not forthcoming. Residential schools were simply at the bottom of the priority list for many politicians and clerics.

What Can Be Done?

The TRC released a series of 94 recommendations last week, to help the cause of healing and reconciliation. Some of the more notable ones included:

Child welfare organizations should ensure aboriginal children are not separated from their families, and recognize the impact that residential schools have had on the aboriginal community

The Canadian government and aboriginal groups should cooperate to establish an education system which is "culturally appropriate" and adequately funded, with the goal of making aboriginals just as educated and employable as other Canadians

Professionals such as doctors, nurses, lawyers, and cops should be taught about residential schools so that they will be more sensitive to aboriginal needs and prevent future abuses

Canada should adopt the UN's Declaration on the Rights of Indigenous Peoples

Churches should recognize their responsibility for residential schools and refrain from impeding the religious freedom of aboriginals

Museums, archives, and libraries across Canada should strive to make people more aware of the injustices suffered by aboriginals

The Canadian government should launch inquiries into the deaths of aboriginal women and children; over 1000 aboriginal women have been killed in Canada in the last thirty years—a disproportionate number—and many of these crimes remain unsolved

Some of the recommendations are more workable than others, and there will surely be debate about how Canada should respond to its history of residential schools. In my interpretation, the general theme the TRC is getting at is: 'bad things happened in the residential schools. Those bad things have consequences, and are at least partially to blame for the state of aboriginal people and culture today. Therefore, Canada has a moral duty to go the extra mile to help its aboriginal people.'

Now many of us will be thinking, "We weren't around when all this happened. What does this have to do with us?" But even if we weren't part of the problem, we have an opportunity to be part of the solution. If nothing else, at least be aware of the horrors many aboriginals have went through in the past, and the dire conditions in which many still live today. Seek a better future in which inequalities in living standards are gone. Yes, we can't change yesterday, but surely we can change tomorrow!

2500 Die in Indian Heat Wave

ALEXANDER LEE
3A NANOTECHNOLOGY

India experiences a hot, dry season every year, usually between the months of March and July. This season however has been particularly deadly, as temperatures approaching 50°C have racked the country, killing thousands.

India is located in South Asia, and as such the entire country is subject to either tropical or subtropical climates. This year, temperatures rose to above 40°C across the country, reaching 46°C in Hyderabad, 44.5°C in Delhi, 36°C in Kolkata, and a record high 48°C in Khammam. The current heat wave has resulted in the highest recorded temperatures in India since 1995, and is so severe that it has melted asphalt roads in India's capital, New Delhi.

A number of factors are amplifying the severity of this year's heat wave. The pre-monsoon season rains usually have a cooling effect on the Indian climate, and also help to lower humidity. However, this year's rains have been sparse, and as a result, the temperature has only kept rising. Another contributor is El Niño, which refers to a band of warm ocean water that periodically develops in the Pacific Ocean and has a noticeable warming effect on coastal countries. El Niño has entered full effect this year and has definitely added to the sweltering temperatures. Thirdly, India is affected by a hot summer wind known as the Loo which originates in Pakistan and passes during the months of May and June.

The number of deaths attributed to the heat wave has steadily climbed since early May to over 2,500 across the country, making this year's heat wave the deadliest since 1979. The number of casualties has been concentrated in the Indian states of Andhra Pradesh and Telangana, located in southeast India. Andhra Pradesh has reported 1735 deaths, while Telangana has reported 585. No other state in India has reported more than 30 deaths. The government has committed to providing 100 000 rupees to the families of those killed due to the heat wave. Drinking water and intravenous fluids have been made available at public spaces.

India has had to deal with extreme heat in the past. In relatively recent summers, 1677 have died in 1995, 793 in 2011, 1247 in 2012, and 1216 in 2013. It remains to be seen how many more casualties will result from this heat wave, as the monsoon season that provides relief from the heat does not usually start until July, and has been predicted to start even later this year. India will not experience a true cooling down until October, after the monsoon season has passed. With a month remaining before the worst of the heat wave passes, Indian citizens are being advised to stay indoors at noontime. It remains to be seen just how much worse the heat wave will get.

Canada's Wireless Code: What It Means For Us

SHERWIN KWAN
4B MECHANICAL

On June 3, 2013, the Canadian Radio and Telecommunications Commission (CRTC) published a new regulation called the Wireless Code, with rules intended to favour consumers over mobile network providers, effective two years hence. I will not go into detail about how the Code came to be; this has already been covered by Jacob Terry in the June 12, 2013 edition of Iron Warrior, which is available online.

The 24-month grace period ended last week; and after a last-ditch effort by Bell, Rogers, and Telus to challenge the Wireless Code in court was dismissed, all Canadian mobile network providers are now required to comply with the Wireless Code.

Background

Traditionally, cell phone manufacturers (OEMs) have chosen not to sell their phones directly to consumers in Canada, preferring to sell them to mobile providers who serve as "middlemen." The providers then offer steep discounts on phones to any consumer willing to sign up for a three-year contract. For example, Telus might offer a phone with a retail price of $600 for $100 if the consumer commits to purchasing cell phone service from Telus for the next 36 months. Sometimes, providers would go so far as to not sell you a phone unless you agreed to a contract.

Often, a contract would be tied to a particular plan, so that choosing to start or stop using data would require you to cancel the contract. Another issue is that many cell phones reach obsolescence quickly. Commonly, the OEM will simply stop supplying updates to the phone's software after two to three years. And since consumers were often unaware of how quickly a phone could reach end of support, they might end up in a situation where their phone was past end of service, but they were barred from purchasing a new phone until their 3 years were up. It is questionable whether phones should become obsolete so quickly; indeed Jacob argues they shouldn't in his article from 2013. However, right or wrong, some phones simply don't have a very long service life.

The Wireless Code

I summarize a few highlights of the Wireless Code below:

All contracts shall be clearly stated in "plain language". The terms of a contract must make it clear what the monthly cost is, when it expires, which regions the provider has service in, charges for carrier unlocking, and how much of a subsidy/discount has been provided to the consumer for signing it. Also, companies are required to provide a summary of their contract for those who are too busy to read the whole being.

Providers cannot arbitrarily change the terms of a contract without the customer's permission.

Providers must warn customers whenever they are roaming (e.g. by text message) what the charges are. Data overage charges within a month must not exceed $50, or $100 if the customer is roaming, unless the customer explicitly consents to being charged more.

Providers cannot refuse to unlock a phone once 90 days have passed after the contract was signed.

Customers have the right to cancel a contract at any time, with immediate effect. Subsidy tabs must be paid off over 24 months in equal installments. After two years, customers may cancel a contract without penalty. When cancelling, a provider is allowed to charge, at most, the remainder of the tab plus $50.

Providers may not disconnect their customers until they've either racked up $50 in debt or failed to pay for two months in a row.

The Wireless Code applies retroactively, so if you signed a three-year contract between June 2012 and June 2013, you're now free to cancel it at no cost. If you signed a three-year contract since June 2013, it has now been converted into a two-year contract, and there will be no penalty to cancel once the two years are up.

If you are with Wind or Bell, the discount on your contract will be paid off in equal installments every month; Rogers and Telus have already had an "equal installments" rule for several years. Cancelling one month before your contract expires will no longer cost a few hundred.

There are quite a lot of advantages to the consumer here. The cap on overage charges will prevent horror stories from happening, like the teenager from BC who racked up $20,000 in fees during a family trip to Mexico, oblivious to the high cost of data when roaming. Also, contracts not being more than two years should reduce the risk of phones prematurely reaching end-of-service (in fact, most providers have already complied with the two-year contract rule for over a year now). If you want to cancel, you can do so right away, instead of the 30 day wait some providers forced you to do before the Code's implementation. Although Canada's mobile network industry is still an oligopoly with elevated prices, we, the consumers, are in much better shape under the Wireless Code than without it.

Producing Something from Nothing

LEAH KRISTUFEK
3T CHEMICAL

ADVENTURES WITH ARDUINOS

Hello Friends!

Did you know that a piezo buzzer can be used to produce a tone when the voltage to it is turned on and off hundreds of times a second? Different frequencies produce different tones. As someone who is pretty much tone deaf I can't quite confirm that the notes the buzzer produces are the right notes, but I did spend quite awhile trying to get it to play Fur Elise and it definitely sounds like something.

The circuit for my piezo buzzer using the arduino was probably one of the simplest so far. Three wires and the buzzer were all that were needed since the buzzer only has one positive and one negative pin. As the user, all that you need to do is to specify the frequencies, length of notes, and pauses to create a song.

So what does it mean that the buzzer is a piezo buzzer? It means that the buzzer is an electromechanical component, a device that uses an electrical signal to create mechanical movement. Piezoelectric devices create sound or vibration from an electrical signal or can create electrical signals from vibration or sound. Piezoelectric materials deform slightly when exposed to voltage across the structure or produce voltage when mechanically deformed. In the case of this buzzer, a coil of wire becomes magnetized by an applied current that causes it to pull towards a small magnet that is also in the buzzer. This causes a click which, as mentioned, creates tone if repeated hundreds of times a second.

I had never really thought about what piezoelectricity was. It turns out it is quite nifty. If you ever wondered how record players produced sound that you can hear from your speakers, wonder no more. Piezoelectricity is used to 'read' the sounds inscribed on the vinyl records. The word piezoelectricity means 'electricity resulting from pressure'. Materials that are piezoelectric have crystal structures which repeat regularly but are not uniform. When in its static form, when no electricity is applied, the positives and negatives cancel each other out. When electricity is applied, or the material is pressed on, the structures are deformed; the non symmetrical nature of the repeating patterns causes net negative and net positive charges to form on opposite faces of the material.

Piezoelectric devices can be highly accurate compared to other possible methods of doing the same thing. Quartz used in a clock or watch can convert electrical energy into predictable oscillations to run a motor that in turn rotates the gears to turn the hands on the clock. In a record player, a needle tipped with diamond bumps up and down on the grooves causing vibrations, applying different pressures to a piezoelectric crystal which outputs electrical signals. Those signals are converted back to the noise that you hear.

Only specific materials are piezoelectric. Quartz, sucrose and Topaz are some which occur naturally. Learning more about these materials and learning to synthesize them to improve their piezoelectric properties is a focus of research both academically and in industry. Piezoelectric properties are also seen within the body, in tendons, enamel, and DNA to name a few.

So in the end, the simple act of making a buzzer play a tune has led me down an interesting path of discovery. I still feel like the things I don't know are overwhelming in comparison to what I am learning but hey, anything is better than nothing. At least I have started to try and learn.

The Little Sailboat That Could

CAMERON SOLTYS
2B MECHANICAL

On May 20 of this year, a rather curious spaceship took to the sky. It was a tiny object, 10x10x30 cm and costing only $4.2 million to design and build—not much in terms of space flight. The ship had been created by the Planetary Society, the world's largest non-profit space advocacy group, and it had been funded by thousands and thousands of people via crowd-sourcing campaigns. The name of the craft is LightSail, and it is one of the most interesting and most watched objects in space right now.

Lightsail is a solar-sailing spacecraft. More accurately, it is a prototype craft that is testing the design in low-earth orbit in anticipation of a 2016 launch that will bring a nearly identical device out away from the atmosphere into the domain where the solar winds dominate. The object—a "CubeSat," which is a small standardized payload designed to fit in neatly as secondary payloads on the back of more major missions—was launched, along with ten other CubeSats, on an Atlas V that was carrying a US Air Force Payload. As a solar-sail spacecraft, LightSail is propelled using a sail, much like a sailboat on Earth; the sail reflects light from the sun, giving the spaceship momentum. When the sail is deployed, the spacecraft balloons from an object with a front profile of 100 square centimeters to 32 square meters. In this prototype vessel, the small amount of atmosphere still present at in the orbital region (as low as 355 km) means that the sail will act like a normal sail, interfering with the air and deorbiting the CubeSat so it burns up while heading back to Earth. The next LightSail will be in a higher orbit and so will experience less drag, causing it to really solar-sail. But even though this little craft won't ever solar-sail, it is still proving to be a remarkable temporary satellite. In the few weeks it has been in orbit, LightSail has gone dead and then recovered all by itself, twice. All without much support from Earth, twice.

The first time that LightSail went dead, it was a software problem. Every 15 seconds, the spacecraft transmits a telemetry packet in the hopes that someone on Earth—either an amateur astronomer or one of the professional bodies helping with the project—will receive it. These packets are also saved by the craft, and a bug in the software caused the flight system to crash after the file got to 32 MB. The team on Earth were informed of the bug and were set to update the software to avoid it, but they never got the chance; Lightsail stopped responding. After repeatedly sending "reboot" commands without success, it was decided that the best course of action was to wait; CubeSats, it turns out, are rather prone to spontaneously rebooting. The reboots occur because CubeSats are too small and light to carry shielding for their computer hardware, so they are exposed to cosmic rays that can flip bits in the computer's memory, which in turn causes malfunctions and reboots. After 8 days of no news, LightSail started transmitting again like nothing had happened. It had fixed the problem.

Much in the spirit of the first shutdown, the second time LightSail also fixed its own problem. Once it had awoken from its first slumber, LightSail deployed its solar panels. While monitoring the information it was sending back, the team noticed that the batteries were neither charging nor discharging. The current theory is that the batteries had entered a safemode because they couldn't cope with the frequent changes from direct sunlight—during which time they got too much power—to the no-power state as the satellite was repeatedly eclipsed by the Earth. The ground team got a Telemetry chrip, as they are called, on Wednesday, June 3 but not the next day when they expected to be able to pick them up again. After doing a similar routine to the first time contact was lost—issuing commands in the hopes that LightSail would react—the team decided to stop issuing commands until they knew for sure what the problem was. Fortunately for them, LightSail proved that it was really the little ship that could by checking in Saturday afternoon, albeit will still-unstable batteries.

As of Sunday, June 7, the command has been given for LightSail to deploy its sails, and the team, along with the thousands who supported them and the many more who watch on with excitement, wait to see if deployment was successful. We wait with them.

Nepal's Shaky Road to Recovery

SAM MADHAVAN
1B ENVIROMENT

The past two months have not been kind on the South Asian nation of Nepal. The region was rocked by a magnitude 8.1 about 15 km below the surface, on the 25th of April this year. Leaving over 8,800 casualties and 23,000 injured, the quake drew international attention as the worst natural disaster to strike Nepal since the 1934 Nepal-Bihar earthquake. It triggered an avalanche on Mount Everest, killing at least 19 on what would come to be known as the deadliest day on the mountain in history. Centuries old buildings at UNESCO world heritage sites and entire villages were flattened, rendering hundreds of thousands homeless. Continual aftershocks followed the initial quake, with one shock on April 26th reaching a magnitude of 6.7. A major aftershock with a magnitude of 7.3 on the Richter scale occurred on May 12 near the border of Nepal and China, to the east of the original epicenter, leaving a death toll of over 200 and injuring over 3,500 people. Although not as deeply impacted, tremors were felt in the surrounding countries of China, Bangladesh and India.

The country occupies the central sector of the Himalayas – nearly a third of the 2400 km long mountain chain. The nation of over 27 million people lies completely within the collision zone (a high risk area, prone to seismological activity) between the Indian subcontinent and the Eurasian plates; this collision, which started in the Paleogenic Period (66-23 million years ago) continues even today as the Indian plate moves north relative to Eurasia at a rate of approximately 2 inches per year – about twice the average growth rate of human fingernails. The resulting subduction of the strong Indian continental crust under the relatively weak Tibetan crust has pushed up the Himalayan Mountains and formed the Tibetan plateau over millennia.

A study of the Main Frontal Trust published in 2014 found that on average a "great" earthquake occurred every 750 and 870 years in the east Nepal region, and the notion was reinforced by a study in 2015 that found a 700 year delay between earthquakes of significant magnitude. This study suggested that tectonic stress transfer might correlate the 1934 and 2015 earthquakes – following a historic pattern: in fact, seismologists had actually declared the region to be in risk of a large earthquake long beforehand, as far back as 2013.

The developing nation, one of Asia's poorest countries, has since struggled to get back on its knees, with the world watching in concern as the affected villagers raced against time to ready crops before the onset of the monsoon rains. Economists and consultants have estimated that rebuilding the economy could exceed 20% of Nepal's GDP; combined and persistent international efforts will be required in order to transform the economy into one that attracts investment by 2020.

The Governments of Nepal and her immediate neighbor India, both initiated humanitarian rescue and relief operations via their respective armed forces. At the request of the Nepalese government China and the United States have directly provided or funded rescue helicopters; numerous charitable organizations such as Doctors Without Borders and UNICEF delivered aid on the ground, and countries including the United Kingdom, Canada and Belgium delivered financial contributions and aid in material donations. Advanced heartbeat detection, FINDER devices, and the latest in rescue technology was used to rescue people trapped under collapsed rubble. Volunteers from around the world used crisis mapping to aid emergency work by adding details to online maps, adding crucial information about passable roads, stranded people and collapsed buildings. Google and several other sites on the internet provided missing person services, utilizing experience about planning emergency aid work from earthquakes in Haiti and Indonesia.

Relief efforts, however, were hampered by the Nepalese Government's insistence on routing aid through the Prime Minister's Disaster Relief Fund and its National Emergency Operation Center in an effort to centralize the response. After concerns about the government levying import taxes and blocking consignments, it responded denying any such claims and clarifying that NGOs which already had a presence in the country could receive aid directly, bypassing the official fund. The combined bureaucratic and logistical hindrances to relief response caused many of the afflicted villagers to turn against their government's systemic corruption; one government official allegedly stated that relief distribution might make people reliant on external support for livelihood in the future. As police continued to turn away trucks carrying aid from well-wishing private individuals and institutions and financial donations from international sources dwindled due to bureaucratic bottlenecks, an increasingly irate populace began to show signs of its discontent, with 200 people protesting outside the parliament at the capital, Kathmandu, asking for more buses with aid and workers to their villages. Elsewhere, villagers blocked trucks with supplies heading to the district headquarters, demanding that the government hasten the distribution of aid. To aggravate the situation, there were reports of medicine and vital supplies being sold at twice or thrice the normal cost despite the government order that hospitals should charge no fees in the treatment of the afflicted; the government launched a report into these reports of profiteering the aftermath of the earthquake.

The government received flak from all sides for its handling of the disaster response. Several workers and volunteers criticized the government for turning away "unofficial" small scale local initiatives funded by private well-wishers that were often the first to reach distant villages, as international aid agencies faced massive logistic difficulties – on May 3, further restrictions were placed on heavy aircraft flying in with aid supplies after new cracks were noticed on the runway of Nepal's only wide-body jet airport, Tribhuvan airport (TIA). Perhaps the government's intentions behind the attempt to centralize all aid response was were well placed; however, given the sheer scale of the disaster and the challenges posed by the region's geography alone, they may have been sorely misguided in delaying and averting aid from the international community, given that every second of delay in help makes a critical difference in such a massive situation of life and death.

Waterloo Cyber-Systems Training Grant

LISA BROCK
3A MECHANICAL

Professor Krzysztof Czarnecki, of the Electrical and Computer Engineering department, has been awarded a $1.65 million grant from the Collaborative Research and Training Experience (CREATE) program by NSERC for the purpose of designing a training program on the topic of product line engineering for cyber-physical systems. The field of cyber-physical systems involves the integration of network connectivity and computational intelligence with physical processes, and is the basis of many upcoming technologies such as autonomous vehicles that network with each other. Through cyber-physical systems, there is room for innovation in many areas including the automotive, aerospace, energy, manufacturing, and healthcare industries.

"Cyber-physical systems connect the physical world—such as machines, cars, airplanes, power generation and the power grid, renewable energy systems—with the cyber world," Professor Czarnecki says. "We want to be thinking in terms of systems, not just individual computers." This requires a wide range of skills and knowledge in controls, mechanical engineering, computer engineering, and computer science. He goes on to explain the idea of the "Internet of Things," which refers to an internet for machines rather than people and is a key application of cyber-physical systems. Some examples include having computers controlling things like UAV's or drones, and autonomous cars.

The NSERC funding will be awarded over the next 6 years, during which time Professor Czarnecki will develop the training program alongside top researchers in product line engineering, as well as Canadian automotive, aerospace, and software companies. This training will include research intensive internships through industry partners, and graduate study courses in software, computer, mechatronics, and systems engineering.

It is expected that the first year of funding will be spent laying the groundwork and building up the program, and that students may be admitted as soon as next year. Students can expect to spend one-third of their time at internships and two-thirds on study terms. There are a number of industry partners already lined up, including General Motors, IBM, and many other smaller companies.

The CREATE grant program is funded by the Natural Sciences and Engineering Council of Canada (NSERC) and aims to support the development of collaborative and integrative training programs in areas of significant interest to Canadian research priorities. The programs selected will develop not only the technical skills of students, but also complementary professional skills.

The design of this new program will focus on answering "What can graduate students contribute to the economy and the development of technology and innovation while still in school, as well as after graduating?" There are a limited number of positions in academia, so the program also aims to facilitate students' transitions to the workforce and to equip them with the tools they need to continue undertaking innovative projects and developing their ideas. Professor Czarnecki explains that these graduate programs offer a unique perspective to students: there is the opportunity to research, learn to think critically, and add value to the company while acquiring skills. The industrial experience will maximize value for both the student and the company.

Part of the key motivation behind this program is to help students learn early-on to identify research problems that are relevant to society and to appreciate the value of industry – that is to say, to learn how to assess the value of ideas, the constraints, and drive towards successful innovation. This is a program that provides a unique, multifaceted learning opportunity for students who want to go into research and development.

Professor Czarnecki says automated driving is one of his favourite examples of cyber-physical systems. In the automotive industry, OEM's have promised partially autonomous car models for 2017 or 2018, which would be able to drive autonomously on highways. The autonomous capabilities will expand to include self-driving cars on city streets by 2020. While at first there will be only a small percentage of autonomous cars on the road, over time there will be more and more. This has the potential to hugely impact everyday life. The autonomous vehicle is a prime example of a disruptive technology—an innovation that helps create a new market and eventually disrupts an existing market. It has the potential to change the whole business model of the car. For example, people may eventually be able to hail a self-driving car to transport them, eliminating the need to even own a car. City infrastructure would also begin to change, as the need for parking lots and driveways diminishes, and the use of autonomous—and eventually fully electric—cars becomes more popular.

Chinese Cruise Ship Fatal Capsize

MEAGAN CARDNO
3A NANOTECHNOLOGY

Cyclone-like weather, with wind speeds up to 130 km/h, lead to the June 1 capsizing of the Eastern Star, a Chinese cruise ship travelling along the Yangtze River. The cruise in question began in Nanjing and was intended to arrive at Chongqing eleven days later, as a tour of a section of the the world's third longest river. Passenger records for the boat show that the majority of the passengers were between the ages of 50 and 80.

The Friday morning following the incident, twenty-four hours after the last survivor was rescued, authorities finally gave the orders to set aright the capsized boat. Only 14 people were found alive after the disaster, included three trapped in air pockets underneath the hull who were rescued by divers. The total confirmed dead rose to 396 after the ship was returned, with 46 passengers that were aboard at the time of the accident still unnc.

Heavy criticism surrounds the incident, as some reports suggest that the capsized ship has had records of cited safety violates in the past. In addition, the ship was not the only one present on the Yangtze River at the time of the storm, raising questions as to why this vessel in particular failed so catastrophically compared to other ships. Some media sources have suggested that the ship continued on its path down the Yangtze river even after weather warnings were given. Authorities have placed both the captain and first mate in police custody for questioning. They have offcicially described the sinking have occured very rapidly, taking heavy water and sinking within only a few minutes.

The disaster is set to be one of the deadliest maritime accidents in the country in over sixty years. The last major incident was the sinking of the SS Kiangya in 1948 off the coast of Shanghai, a passenger steamship that exploded while carrying refugees fleeing during the Chinese civil war. The death tolls were unconfirmed, as official records did not account for the numerous stowaways on board. The range is cited to be between 2750 and 4000 people.

Fighting Continues in Eastern Ukraine

BRIGITA GUBINS
1B ENVIROMENT

Ukraine's war continues after multiple failed ceasefire agreements. Refugees who had tried to return home are once again fleeing to safer ground, with fears that the front is moving west. The town of Debaltseve, located between Ukraine's major industrial centres of Luhansk and Donetsk, is experiencing heavy fighting as the rebels attempt capture this strategic rail hub. The Ukrainian government troops have promised to hold the front east of the town, despite the mounting cost of that promise. Soldiers themselves are worried as they find themselves equipped with ever fewer working vehicles and less equipment. As one soldier treated for a shrapnel wound in the Artemivsk hospital told the BBC, all the equipment is old. Much of it is broken, and nobody has the supplies to fix it.

Communities around Debalt'seve have been isolated by the fighting, preventing supplies from reaching those within and preventing refugees from getting out. Many doctors have fled to safer ground, leading to a shortage of medical personnel. Local hospitals are becoming crowded, treating the increasing number of civilian casualties as more non-military areas are being targeted. It took surgeons 4 hours to remove all the shrapnel from one woman's body; shells had hit her home while she was inside. Another, a nurse, was killed when her clinic was hit.

While most of eastern Ukraine is preoccupied with the war on their doorstep, the inmates in penal colonies, now on the land captured by the rebel independents, have been forgotten. The only supplies they receive—food or medicine—are from family members. In the previous presidency, harsh punishments for minor crimes like petty theft left prisons stuffed to, and sometimes over, capacity. The near-constant shelling around one such colony destroyed the nearby sewage treatment plant, causing half the colony to become ill from the contaminated water that resulted.

While the situation in Ukraine continues, the nearby Baltic States are becoming progressively more nervous, with Latvia and Lithuania beginning to consider re-instating the draft. The former Soviet Bloc countries have requested a full-time NATO presence in response to the Russian warships seen off their coasts and the 250+ instances of Russian military aircraft that have approached their eastern borders in the last month alone. Lithuania has already accused Russia of "chasing away" merchant vessels and interfering with the construction of power cables on the floor of the Baltic Sea.

Copyright Ліонкінг, used under license

The Ukraine conflict has destroyed residences and created a humanitarian crisis

Class Action Lawsuit Awards Smokers $15 Billion

CAMERON SOLTYS
2B MECHANICAL

A Quebec court has awarded damages of $15 billion in a class action lawsuit against three tobacco companies. The companies—Imperial Tobacco Canada, Rothmans Benson & Hedges, and JTI-MacDonald—are accused of trivializing and hiding the effects of smoking from their customers from the 1950s through to the 1990s. During this time, the research regarding smoking as a significant negative health habit grew from preliminary and non-universal until the practice became one of the best-understood activities in terms of its influence on human health.

The lawsuit was first brought forward in 1998 by Jean-Yves Blais, and seeks repayment for those that have been affected by smoking-related diseases. This represents 1 million smokers who smoked a "pack-a-day" for at least 12 years before 1998. Each smoker is entitled to $104 if they were unable to quit smoking, with further tens of thousands being rewarded to those suffering from lung cancer or emphysema. The companies intend to appeal on the grounds that the court did not consider the customers' responsibility for their own health.

In the 1950s, there were a few studies suggesting a link between smoking and cancer. One significant one had been done in Germany in 1939, and so was understandably ignored by the Canadian government during World War II. In the late 1940s and early 50s, a number of scientists made an initial correlation between smoking and cancer, particularly by observing the higher frequency of smokers hospitalized for cancer treatment. These reports too were largely ignored, causing only a small amount of turmoil which quickly subsided. In the subsequent decades, more and more research emerged which showed the dangers of smoking.

During the same period, anti-tobacco activists and the tobacco lobby jockeyed for dominance; the tobacco activists spreading the new studies and pushing for controls like advertising bans, and taxation to artificially raise tobacco prices. The tobacco companies used their influence to try to stop the legislation and, as was found by the Quebec court, did their best to hide the growing science. One company "asserted into the 1990s that there was 'scientific controversy'."

This ruling is important for other cases which are likely to be heard soon. Every province in the nation has an ongoing lawsuit with tobacco companies, so this ruling sets a precedent for the rest. The judge, Justice Brian Riordan, made clear that he was eager to punish what he saw as the unrightfully earned "billions of dollars [that came] at the expense of the lungs, the throats, and the general well-being of [the industry's] customers." While there is 1 million dollars in moral damages—that is to say, damages for the suffering that tobacco use has caused to smokers—the remainder is punitive damages. These damages are, as the judge stated, designed to act as a negative incentive "…to other industries that today or tomorrow find themselves in a similar moral conflict…"

Point Vs. Counterpoint

Are subscription-based software models better alternatives to license-based models?

POINT

MICHAL KONONENKO
2B NANOTECHNOLOGY

When you buy a piece of software, you're buying more than bits and bytes of executable code. Someone in the company had to write the code you're buying, test it, package it, and—most importantly—maintain it. As you're using the software, the company from which you bought it is providing support services to its customers, squashing bugs, and working on the next version of the product. All of this requires steady income.

Subscription-based software is a monetization scheme which enables software companies to do exactly this. By paying a monthly fee for software, a software company can re-invest the income into the product, and provide more services as a going concern.

Consider the case of Cloudera, a software company providing big data and cloud computing infrastructure to business clients. The vast majority of Cloudera's products are built under open-source licenses, meaning that after you put down this article, you can go to GitHub, check out their source code, compile it, and Bob's your uncle! You can run the same graph database that Facebook uses to analyze connections between all its users! But would you how to use it?

This knowledge mismatch powers companies like Cloudera, and provides a solid rationale for subscription-based software. Instead of hiring its own expensive experts, and take on the risk of building and maintaining Cloudera-like products, why not offload the duty to an open-core company? If the customer doesn't want to use Cloudera's services later, they are free to keep the product at the end. After all, everything is under an open-source license.

But this creates a severe disincentive for open-core companies to emerge, especially if they demand a lump-sum payment for the product? Why should I pay for something I get for free? Clearly, a subscription system needs to exist for the company to exist.

Subscription-based monetization schemes for software also improve the quality of the product. Again referring to the example of Cloudera, having a steady source of capital allows Cloudera to contribute to the open-source projects for which they provide services, giving back to the open-source software community in a big way. These are the guys squashing bugs, and contributing to new functionality in open-source products. The fact that I can incorporate their work into my code for free doesn't hurt the company either. Who better to provide maintenance services for Apache Sqoop than the guys who wrote Apache Sqoop?

So subscription-based software monetization schemes are beneficial for enterprise companies, but what about for us consumers who aren't channeling Moss from the IT Crowd? To discuss the benefits of subscription software, I think it is best to examine one of its biggest success stories, Microsoft Office.

MS Office is not released under an open-source license, but is instead owned by Microsoft. They don't let mere mortals view, much less modify, the source code of their applications. After all, why give away your special sauce to all?

In a lump sum monetization scheme, you would pay for a version of MS Office, install it, and be done with it. If another version came out three years later, you would have to pay again for another "box" (I'm generalizing this term to include digitally-distributed media), and repeat the process. Not only is this inconvenient, but it also creates a problem for Microsoft as they feel greater pressure to be backwards-compatible. By offering MS Office 365 as a subscription-based product, Microsoft gains a steady source of income on the project, and can auto-update consumers to the latest version of MS Office. The suite is easier to justify from a business perspective, keeps its customers in the loop about the latest software changes, and allows customers to spread a $400 lump sum payment for MS Office into annual $100 payments over four years.

You would think that running a closed-source product as a subscription would mean creating dependency on Microsoft, but this is not the case. Since 2007, MS Word, Excel, and Powerpoint have switched to an open file format for writing documents. Unlike the .doc format, which wrote the word doc as a binary file, The new .docx format writes word documents as a zipped archive of XML files that can be inspected in any text editor. Furthermore, parsers for XML are readily available for the vast majority of programming languages, and the open-source community has responded with OpenOffice and LibreOffice in order to read and enable basic editing of XML files. Therefore, the dependency factor has been significantly reduced, and due to the subscription-based model, Microsoft continues to run MS office profitably.

The monetization scheme of a product is as much a design decision as any piece of code in the software. Indeed, the monetization scheme cannot simply factor in the product's codebase, but must also factor in the support ecosystem, and the customer's use case for the product. If products like enterprise databases and MS Office are provided as a service, should they not be priced as a service? If a customer is going to be using a piece of software continuously for the next 5 years in their undergraduate career and beyond, is it not time to examine making a longer-term commitment with the software company providing you with the tools to enable productivity? If people are still playing an MMO 11 years after its initial release, does it not make sense to use a subscription-based model to give the developer a steady source of income to provide the consumer with added value? As an engineering student, I am a firm believer in the idea of using the right tool for the right job, and if the use case justifies a subscription-based monetization scheme, why not use it?

COUNTERPOINT

CAMERON SOLTYS
2B MECHANICAL

More and more often, software companies are switching to subscription-based software packages. There are a number of reasons for this: a subscription pricing model gives the developer a continuous steady income—as opposed to a less stable windfall every few years when they release their new software—and the company doesn't need to worry about supporting older versions because everyone is pushed the most up-to-date copy of the software. As well, the increasing popularity of internet-on-the-go and using lightweight phones and tablets for productive work is allowing developers to offer so-called "cloud subscriptions." With these cloud subscriptions, you pay not for the monthly right to download and use the software, but the right to access and manipulate an instance of the software running on an external computer.

While this all seems very interesting and useful, the truth is that, for many, the model of subscription-licensing is not superior to the old model of perpetual licensing, and might result in a less-desirable product. This is very unfortunate given the continuing trend in the industry of migrating away from perpetual licences to an exclusively subscription-based model. Subscriptions result in a higher software cost for most customers. The revenue model will not, as is suggested, improve products by putting pressure on developers to maintain customer satisfaction. And, at the end of the day, unlike with perpetual licensing, the subscription does not give you ownership of your software.

The first and probably most important metric to judge different pricing models by are their cost. Companies that have switched to subscription products claim that these products cost the consumer less than buying it up front; the subscription is a modest monthly payment, and you'll always be up-to-date with the latest software. The perpetual licence, they say, costs more because you initially pay a larger lump sum (more than the aggregate cost of a two-year subscription), and then the software you have is out of date. However, the older version of the software isn't truly out of date; most versions of popular software are only incrementally better than their predecessor.

As said by IDG Connect, "[after] usually three to four years, the subscription costs to enterprises actually begin to exceed those associated with the perpetual model…" assuming one does not purchase every new edition. And very few people need the new edition. A book publisher should probably have the newest version of Word so they can access every manuscript sent to them stably. But the writer sending them a manuscript could be using a much older version, since the publisher should have backwards compatibility. Even some industries that need a particular software do not need the latest version. Adobe, for instance, is in the process of switching its software to an exclusive subscription model. Some of their software packages, like InDesign and Photoshop, are well-recognized professional programs. But unless you really need one of the features introduced in the most recent update, chances are that the product that was being made last year with the previous edition of the software will still be perfectly acceptable using the same, supposedly "obsolete" software next year.

One argument which has been made for how subscription-based software will benefit most consumers is that it will put pressure on developers to maintain and continue developing superior products. The logic is that since customers are paying by the month or the year, they can switch to an alternate service if they are not happy with the one they are using. This is a good thing for customers using a product for which there are alternatives. Unfortunately, many popular software and software suites do not have very legitimate alternatives. The most obvious of these cases is AutoCAD. In late 2013, Forbes reports that AutoCAD had an 85% market share of its category, which it attributed to its massive price advantage over its competitors. That level of market dominance leaves AutoCAD as the industry standard, meaning that even though leaving AutoDesk may be a financially viable option in a subscription model, it will still be very disadvantageous from a compatibility standpoint. Even in markets where there is not a single dominant player, the difficulty in adopting an unfamiliar program and integrating it into the existing workflow is so high that even a sub-par product will be able to maintain customers with subscription models.

The final downside for many people in the ongoing subscription revolution is that when the subscription runs out, the asset is lost. Old copies of software retain some value even after a newer version is purchased. The old copy can be stuck on an old laptop which still has occasional use. It could be put on an outdated computer and given to a technology-illiterate relative or friend. If nothing else, it might be sold to someone else who had a similar purpose for it. Was the cost of this asset very much? Probably not. But under the subscription-based model, the options are to forgo having that software on the old hardware, or pay a comparatively exorbitant price every month to have it on there. The perpetual licence may cost more up front, but in the long term it is both cheaper and it leaves you with an asset which will remain useful for years.

There are a few cases where subscription-based software will be useful, specifically for those who absolutely need to have the latest versions. For everyone else, the transition will result in no substantial improvement to their experience, despite paying a higher price. While it is not a cataclysmic problem, the decreasing number of companies that are offering perpetual licences is unfortunate, as it removes a product model which was well suited for large numbers of the products' users.

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

General Meetings, Executive, and Elections!

LEILA MEEMA-COLEMAN
PRESIDENT

Hello engineers! As the title suggests I am here to talk about the governance side of the Society. The first topic I would like to talk about is elections; as you hopefully know, we just elected a new set of Executive to serve the Society for the next sixteen months. Unfortunately the team was incomplete with no candidates running for the position of VP Education and VP External. This means that a by-election will be held this term to try to fill these positions. Both are very important positions within the Society and if you have any interest in representing the Society either internally to Faculty members or externally to external groups I encourage you to consider running and come talk to the current Executive. There is also a post on the website which details the requirements for each Executive position.

The next topic is a very exciting one for me: the first ever Joint General Meeting will be on Sunday July 5th at 10:30AM in CPH 3607. At the Joint General Meeting every EngSoc member receives a vote, can submit motions, and can speak to issues that matter to them. This is the most important meeting of the Society of the year and it is important that we have a strong turnout of voters.

Agenda Items can be sent to David Birnbaum at *speaker.a@engsoc.uwaterloo.ca*—if you are unsure how to write a motion or what can be added to the agenda, you can read through the manual on in the document section on the website.

To get you even more excited for the meeting, current agendas items include a complete restructure of the Executive, changes to the leadership award policy, removal of the term "general meeting," and Board of Directors Elections. Lunch will be served midway through the meeting and an ice cream/dessert bar will be provided at the end of the meeting!

If you cannot attend the meeting or know someone who cannot attend the meeting, please submit a proxy form to the speaker (*speaker.a@engsoc.uwaterloo.ca*) at least 24 hours before the meeting. Proxy forms can be picked up in the EngSoc office or on the website.

The final topic of my article is the Executive Restructure mentioned above. This is an exciting committee that has been going on for the past year to investigate the current structure and see if it is the most effective for the Society. After the year of work the committee has developed a new structure which will be proposed at JAGM. The full report is available on the website but a summary of the main changes are removing VP External, moving all outreach, events, and services under a VP Student Life, and creating a VP Communications. The hope of this new structure is to increase the communication the Society can achieve, as well as to focus the VP Student Life on creating new events and services.

This was a long article with lots of information so if you would like to discuss anything more in depth or have questions please stop by the EngSoc office!

RidgidWare, Novelties, C&D, Orifice: Service or Store?

KEVIN MCNAMARA
VP FINANCE

Hello everyone! This issue I would like to provide some information and updates on a key part of the VP Finance portfolio—the Engineering Society commercial services. As you may or may not know, the Engineering Society runs a number of services in and around CPH where you can make purchases—coffee, donuts, snacks and meals at the C&D; swag and other apparel at Novelties; electronic components and parts at RidgidWare; and printing and binding at the Orifice, to name a few. The management of each of these areas is a very important part of what I do as the EngSoc VP Finance. Recently we have done a lot of brainstorming for these areas, and come up with some cool ideas on how to improve them.

A lot of people may view these as being stores, where you come, you pay money, and you leave with something. However, since the Engineering Society is here first and foremost to represent and serve you, the engineering undergraduate students, I like to think of each of these areas as a service. Sure, we take in money, but as a not-for-profit, the only place that money goes is back into the service, which means we can expand to better serve students. I think this is an important distinction, and as we look to expand and grow in future years, something that we need to keep in mind.

Why call them a service though? What makes the C&D any different than a coffee shop in the plaza? Why should I buy from RidgidWare instead of ordering the parts myself online? When you look at these questions on the surface, there isn't much of an obvious distinction. For me, the difference is what the goal of these services is. I can tell you that when it comes to EngSoc commercial operations, the goal is not to be able to say we've sold more coffees than anyone else. The goal is to offer students the best products that we can, at the best price, and make it convenient and accessible. We want to make them into more than just stores.

Are you tired of only being able to pay cash in the C&D? You're in for a surprise. Credit card is on its way! We are currently looking into different ways to accept credit in the C&D so you don't have to worry about carrying cash around. We realize that to keep the store accessible to everyone we need to get to the present when it comes to methods of payment. This won't be an overnight switch, but keep an eye out for more updates on this!

Then there's RidgidWare, which is brand new, having opened last fall. This is our biggest up and coming service, and we are continuously brainstorming ways to improve and expand. One thing that we are trying to be cognizant of is the scale of what we offer. Is it feasible to stock an entire range of electronics components in one student run store? Probably not. So this means we are looking for ways to create something that students are interested in. Things like kits with specific projects that you can build yourself to create something cool, or running small tutorial sessions for the less experienced people out there. Have a cool idea for something you would like to see? Let us know!

Then there's Novelties—one of the only places to get cool UW Engineering Swag. How can this be a service? We are looking at expanding to offer the items that students actually want, and also doing things like helping to coordinate class orders of swag. Right now almost all of the patches are on sale in Novelties. The prices range from $2.00 to $5.00, which is up to 60% off on some of the patches. Come and check them out! Patches aren't just for coveralls, and are a great way to show off your engineering pride. Once we clear some of our existing inventory in Novelties, we can start looking at cool new items you want to see.

To summarize, the Engineering Society commercial services are here to serve you. We are constantly looking at ways to improve and better serve the students at Waterloo, whether it be new methods of payment or new merchandise options. If you ever have any suggestions on what you would like to see available in any of these areas, or a question about them, please don't hesitate to ask me. Email me at *vpfinance.a@engsoc.uwaterloo.ca* or drop by the Orifice (CPH 1327) and we can chat!

Upcoming Events Calendar

Wednesday June 10	Thursday June 11	Friday June 12	Saturday June 13	Sunday June 14	Monday June 15	Tuesday June 16
Game Lunch in POETS! 11:30AM - 1:30PM, POETS EngSoc Meeting 3 5:30PM - 7:30PM, CPH 3067 **CCA** Writing CVs and Cover Letters 10:30AM - 12PM, TC 1028 Business Etiquette and Professionalism 1:30 - 3PM, TC 2218	Charity Grilled Cheese 11:30AM - 1:30PM, CPH Foyer TalEng 7 - 11PM, Wilf's (Laurier Campus) **CCA** Work Search Strategies 10:30AM - 12PM, TC 1208 Exploring Your Personality Type, Pt 1 1:30 - 3:30PM, TC 1214	**CCA** Success on the Job 10:30AM - 12PM, TC 1208	WiE Picnic 2 - 4PM			**CCA** The Who Am I? Self Assessment Game 10:30AM - 1PM, TC 2218 Careers 601 2:30 - 4PM, TC 2218
Wednesday June 17	**Thursday June 18**	**Friday June 19**	**Saturday June 20**	**Sunday June 21**	**Monday June 22**	**Tuesday June 23**
Game Lunch in POETS! 11:30AM - 1:30PM, POETS Chilling at POETS 11:30AM - 1:30PM, POETS **CCA** Kick-Start Your Career Volunteer! 2:30 - 3:30PM, TC 1208	Charity Grilled Cheese 11:30AM - 1:30PM, CPH Foyer EngSoc goes to Zumba 6 - 7PM, PAC Studio 2 **CCA** Exploring Your Personality Type Part 2 1:30 - 3:30PM, TC 1214	**CCA** Resumes for Grad Students 1:30 - 3PM, TC 1208				T-Shirt Decorating Workshop 4:30 - 6:30PM SolidWorks Workshop 5:30 - 7:30PM EngProv 6:30 - 8:30PM, POETS **CCA** Resume Tips: Think Like an Employer 10:30AM - 12PM, TC 1208

Check out up-to-the-day event postings on the EngSoc website at *engsoc.uwaterloo.ca/event-calendar*

NEW FEATURE: CCA events being offered by CECA. See *uwaterloo.ca/career-action/* for details and to register

ESSCO, How to be Involved, and What They Do For YOU!

HEATHER SMITH
VP EXTERNAL

Hey folks! Want to hear something scary? We've already finished a third of the Spring term! Where does the time go? I don't know. Anyway, last week I had the pleasure of attending the Engineering Student Societies' Council of Ontario Annual General Meeting (ESSCO AGM) hosted by the University of Windsor Engineering Society. I wanted to use this article as an opportunity to inform you what ESSCO is, what it does, and how you can get involved!

ESSCO officially started on 21 November 1987 and today has 16 member Societies across the province. ESSCO has the objectives of representing undergraduate engineering students in Ontario to professional associations, academia, industry, and government; facilitating communication between member societies on matters of student and society interest; and promoting and increasing awareness and interest in the engineering profession to elementary and high school students. There are four ESSCO conferences hosted annually: the First Year Integration Conference (FYIC), the Annual General Meeting (AGM), the President's Meeting (PM), and Professional Engineers Ontario Student Conference (PEO-SC). FYIC is hosted every winter term, with sessions geared towards empowering students to become more involved in their respective societies and meeting first years and VP Externals across Ontario. AGM is hosted every May and has sessions on professionalism, introducing the newly elected VP Externals and delegates to ESSCO, and electing a new executive team for ESSCO. PM is held in September, generally for the executive teams of Engineering Societies across Ontario to meet and share best practices and discuss strengths of weaknesses of their schools, ESSCO, and how they can improve. PEO-SC is held in the fall term, and serves the purpose of introducing delegates of member schools to PEO and the benefits of becoming a Professional Engineer after graduating.

The hosts of each of these conferences is determined by placing bids on these conferences. These bids are placed by one or two students from the members schools who are interested in chairing the conference. Each society is required to bid on any of the 4 previously mentioned conference at least once every three years. In addition, ESSCO is also responsible for facilitating the Ontario Engineering Competition (OEC), where the top teams from each schools' engineering competitions qualify to compete with students across the province. Conference and OEC bids are for the most part placed at FYIC, AGM, and PM during plenary, which is a session for the member schools to put forward motions on matters relevant to engineering students across the province and vote on these motions. Waterloo Engineering Societies A and B are two separate members of ESSCO, and as a result hold two votes at plenary.

ESSCO also runs two major events in addition to conferences: National Engineering Month (NEM) and Wonderland Math and Physics Day. These events have one ESSCO director each that is in charge of finding volunteers for the events, getting member schools motivated and involved, and ensuring the event runs as smoothly as possible. Any student from a member school can apply for a directorship on the ESSCO website, and if you are looking for a leadership and project management role, I'd strongly encourage getting involved in ESSCO through a directorship!

If you have any questions about ESSCO and how to get involved, please feel free to email me at *vpexternal.a@engsoc.uwaterloo*.ca and I'd be more than happy to chat with you about bidding on a conference, taking on a directorship, or attending a conference as a delegate! Best of luck with midterms everyone!!!

Even more Updates!!!!

JOSHUA KALPIN
VP EDUCATION

Hi everyone and welcome to another edition of my exec update. I hope the job hunting is going fairly well for everyone, and that you are having a relatively enjoyable term so far. I have a couple things to cover this time, so let's get to it.

First an update on work term reports. Expect a survey to be out by the time you are reading this exec update. The goal of this survey is to get an idea of the status of work term reports across programs on things like marking guidelines, confidential reports, etc. From the results of this survey, I'm going to be bringing a motion to council for the society to formally adopt a stance on work term reports. I hope by doing this, it will show the faculty that we want these to improve and show that students are engaged on this issue. I'll have more updates on this in coming updates.

Next another Waterloo Works update. CECA is going to be providing regular updates on the project through the new student panel Facebook page located here: *https://www.facebook.com/waterlooworks.student.panel*. I have a written commitment from them that we will be getting regular updates on the project, and I'm already starting to see results.

That's it for updates from last time, so now for something new! PD5, Project Management, is getting a refresh for upcoming offerings of the course. The core content of the course will remain unchanged, but the examples and assignments have been updated to be more relevant. If you are interested in project management or just looking for a decent PD course to take, the new offering looks to be an improvement. Expect to see this version in either the fall or winter terms.

The last little update is that the career fair is picking up steam and will be starting to contact employers in the coming weeks. We ran one of these in the fall term and based on student and employer feedback, we have expanded this to be a joint-society effort (both A and B). For this term our goal is to contact employers and get some of the initial logistics together to run career fairs in both the fall and winter terms. If you have know any employers that may be interested or want to find out some more information, feel free to send an email to *careerfair@engsoc.uwaterloo.ca*

That's all for this week. Best of luck with the rest of the first round of Jobmine and on midterms in the coming weeks. As usual, if you have any questions, comments or concerns, feel free to send me an email at *vpeducation.a@engsoc.uwaterloo.ca*

Tips on How to Stay Motivated this Summer

ADELLE VICKERY
VP INTERNAL

Hey friends! As I sat down to write this article, it was 27 degrees out and all I could think about was how much I wanted to be outside enjoying the sun. Then I realized that this has been my attitude the entire term. I'm finding myself having very little motivation to work and very little focus when I try. So, I thought I'd write this article about some tips and tricks to stay motivated, since I know I'm not the only one with this problem.

1. Make a list

Making a to-do list helps keep track of all the assignments coming up, but it can also be used as a motivational tool. For me, one of the most satisfying parts of finishing an assignment or lab is crossing it off my ever-growing to-do list. It makes me feel like I have accomplished something. Sometimes I even have multiple lists if I'm feeling extra discouraged!

2. Break down large tasks

If you have large projects, break them down into smaller specific tasks. This can give you a better sense of where you are on a big project and it also gives you more things to cross off your list!

3. Set attainable goals

If you set reasonable goals, you're likely to feel more accomplished after completing them, instead of feeling discouraged if you don't finish an unrealistic amount of work. If you're one to schedule out when you're going to work on each task, understand that it is unrealistic to finish three assignments in one afternoon.

4. Take breaks

Don't feel bad about taking a break! No one can focus for hours on end. But try to do something productive with these breaks, so you don't lose that motivation and focus. I use Zumba to take study breaks; it's great because I relieve some stress at the same time.

5. Reward yourself

Set yourself a goal and reward yourself accordingly. If you're working towards a reward at the end, you'll feel more motivated whether that reward be a night out with friends, a movie night, or an extracurricular. Just remember that a large goal should result in a large reward, and a small goal a small reward.

6. Learn to say no

During the summer term there are so many events and different opportunities available. Treat the events and opportunities as rewards for when you complete a goal.

7. Get help if you need it

If you're really struggling, don't feel embarrassed to seek help. There are many resources on campus here for support including Needles Hall, Engineering Counselling, or Student Success Office. You can even drop by the Orifice (CPH 1327) or shoot me a facebook message, and we can chat!

Those are my tips for staying motivated during the term. If you have any others that you find helpful, send me an email (*vpinternal.a@engsoc.uwaterloo.ca*) or stop by the Orifice! Good luck with the term!

Supreme Court Rules on Headscarf Discrimination

RAEESA ASHIQUE
1B ELECTRICAL

This article is an opinion piece and does not necessarily reflect the opinions of the Iron Warrior, EngSoc, or the University of Waterloo.

I do not need to emphasize the difficulty of getting hired; we are all in the co-op program here. But let me tell you, finding a minimum wage job for the summer is often no easier. I wanted to work the summer after grade 11, and started applying early before university students were out of school. After checking back twice with all the retailers I had applied to, I was told they were done hiring. I had not received a single call. I like to give people the benefit of the doubt and assume they are not being racist, but considering I did not look like the rest of the employees, I was pretty sure the only reason I had not even been contacted was because of my headscarf, although I never had any proof.

Which is why I would like to say props to this girl for doing what I never would have dreamed of.

On June 1, the Supreme Court ruled in favour of Samantha Elauf, a Muslim woman who was denied a job at an Abercrombie and Fitch because the headscarf (or hijab) she wears for religious purposes violates the company's "look policy." In an 8-1 ruling, they turned down the decision of the 10th Circuit Court of Appeals in Denver and sent the case back to the lower courts. This ruling suggests Elauf will prevail in the end.

Elauf applied in 2008, at the age of 17, and admitted she was nervous to be showing up to the interview in a headscarf. On the topic of the company's dress code, which is meant to promote its "East Coast collegiate style", the assistant manager told her not to wear too much makeup, black clothing or nail polish. Her headscarf was never mentioned. After the interview, however, the district manager said that Elauf should not be hired because employees are not allowed to wear head gear.

Title VII of the Civil Rights Act of 1964 protects employees from discrimination due to religious beliefs and practices. Abercrombie insisted that had Elauf requested special accommodation this would have been granted, and said they were unaware that her headscarf was a religious symbol. However, Title VII contains no knowledge requirement. "An applicant need show only that his need for an accommodation was a motivating factor in the employer's decision, not that the employer had knowledge of his need," wrote Justice Antonin Scalia in his opinion.

Justice Clarence Thomas was the only dissenting vote. He said that this was not a matter of religious discrimination; rather, the company has a certain look policy, which includes the ban of head gear, making their rejection religion neutral. "Abercrombie refused to create an exception to its neutral Look Policy for Samantha Elauf's religious practice of wearing a headscarf," he wrote. "In doing so, it did not treat religious practices less favorably than similar secular practices, but instead remained neutral with regard to religious practices."

The company is reviewing its policies to allow its employees to dress in a more individualistic way, and does not take "attractiveness" into account in the hiring process.

This ruling was applauded by Muslims, Jews, and Sikhs, who all face discrimination on the basis of religion wear. "We welcome this historic ruling in defence of religious freedom at a time when the American Muslim community is facing increased levels of Islamophobia," said the Council on American Islamic Relations's National Executive Director Nihad Awad.

Canadian Astronauts to be Blasted into Space by 2024

JESSICA KEUNG
2B CIVIL

On Tuesday, June 2, 2015, at the Canada Aviation and Space Museum in Ottawa, Canada's Industry Minister James Moore announced that Jeremy Hansen and David Saint-Jacques will be heading to the International Space Station by 2024. This comes with the announcement of Canada's renewed commitment to the International Space Station, with the Canadian Space Agency providing $10.5 million in support of the Canadarm2, Dextre, and the Mobile Base. One of the astronauts will be guaranteed a spot on a mission by 2019 and the other will fly by 2024. Jeremy Hansen and David Saint-Jacques were first selected to join the Canadian Astronaut Corps in May of 2009. These two have been preparing to head into space since 2009, spending years training with trips to the Arctic, caves, and living underwater. In addition to training, the two play a vital role at the CSA and NASA; they have worked in mission control, reviewed robotics procedures, and training others. Neither of these two astronauts had a doubt about their chance to head off to space. "I'm very fortunate to have this opportunity to fly in space on behalf of Canada." Hansen said. These two men may also be the first to fly the next generation spacecraft currently being built by SpaceX and Boeing. The two astronauts will spend the next decade continuing their training with NASA in Houston, preparing for their space flights by 2024. Next Thursday, Hansen will be returning to train in NASA's giant pool training in a spacesuit for a spacewalk and taking part in the development of a new training program that will simulate a week on the space station.

The Canadian Astronaut Corps was established under the management of the National Research Council of Canada in 1983. In 1989, the Canadian Space Agency was established as an independent government agency to deal will all Canadian space matters and the Canadian Astronaut Program as well. In 1992, the Canadian Space Agency recruited four more individuals to undergo astronaut training, one of those individuals being Waterloo's most well-known astronaut, Col. Chris Hadfield. In 2008, the CSA launched a new recruitment campaign and in 2009, selected Jeremy Hansen and David Saint-Jacques.

Jeremy Hansen was born on January 27, 1976 in London, Ontario and raised on a farm near Ailsa Craig, Ontario. He is married with three children. Hansen holds a Bachelor of Science in Space Science from the Royal Military College in 1999 and earned a Masters of Science in Physics in 2000. Hansen is a Lieutenant-Colonel in the Royal Canadian Air Force and has piloted the CF-18 fighter plane. Hansen served as an aquanaut aboard NASA's Aquarius underwater laboratory during the NEEMO 19 undersea exploration mission for seven days.

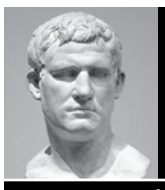
Emily

David St. Jacques and Jeremy Hansen, Canada's future astronauts

David Saint-Jacques was born on January 6, 1970 in Quebec City, Quebec and was raised in the Montreal suburb of Saint-Lambert. Saint-Jacques is married and two children. He has a wide scientific background including engineering, astrophysics and medical training. Saint-Jacques' experience includes a B.Eng. in Engineering Physics from École polytechnique de Montréal, a PhD from the University of Cambridge, postdoctoral research from the National Astronomical Observatory of Japan, a Medical Doctorate from Université of Laval, and Family medicine MD residency at McGill University. Prior to joining the Canadian Space Program, Dr. Saint-Jacques was a medical doctor and the Co-chief of Medicine at Inuulitsivik Health Centre in Puvirnituq, Quebec. Saint-Jacques served as an aquanaut abroad the Aquarius underwater laboratory during the NEEMO 15 undersea exploration mission from October 17-30, 2011.

In addition to renewed commitments to the robotic and human crews of the International Space Station, four space experiments led by researchers from Canadian Universities are planned for the station in the fall. These experiments will focus on the effects of a zero gravity environment and space travel on human health. Canada is also extending its participation in the mission of NASA's Mars Curiosity rover by two years, specifically the Alpha Particle X-Ray Spectrometer (APXS) instrument. This instrument was designed by scientists at the University of Guelph to analyze soil and rock on Mars.

Introduction and the Founding of Rome



GAIUS LUCIUS AGRIPPA
10B CONSUL

ACTA DIURNA

Salve citizens of Waterloo, I Gaius Lucius Agrippa welcome you to the Forum Romanum in the magnificent city of Rome. Rejoice citizens, for today marks the first of many, the omens as told by the augurs bring good news, as today I bring you the first article of Acta Diurna. The Actua Diurna (roughly translating to Daily Acts in English) will cover a variety of topics and subjects involving the many of aspects of Roman life, culture and long history. I, Gaius Lucius Agrippa, will guide you through different practices and observances that occur in Rome and our provinces. Once more on Behalf of the Senate and the People of Rome, I bid you welcome!

Appropriately for this first article, I present to you the beginning of our great city. We turn back the sands of time to a period predating the Republic of Rome, to a time when the Greek Poleis were at the height of their power. Citizens, I take you back to the founding of Rome.

It is told that the first kings of Rome trace their lineage back to the ancient Trojans of the fallen city of Troy. Aeneas, son of Prince Anchises and the goddess Venus was one of the few Trojans who survived and escaped after the fall of Troy. It is said, that the gods have told Aeneas to gather the other survivors of Troy, and to flee. The Aeneads—as they have come to be known—travelled far from their home city of Troy in search of a new beginning.

Six years of wandering and search led the Aeneads to the reaches of Carthage ruled by Queen Dido. It is said Queen Dido offered the Aeneads land and space to settle within her kingdom, offering Aeneas the opportunity to rule jointly over their people. It is said that Aeneas had a year-long affair with the Carthaginian Queen which was abruptly ended by the appearance of the God Mercury at the beckoning of Jupiter and Venus. Aeneas was reminded of his original intentions of his journey, and left the city with the rest of the Trojans. At the sight of their ships leaving Queen Dido cursed Aeneas and his descendants culminating in the continuous strife between Rome and Carthage which become known as the Punic Wars.

Leaving Carthage, the journey led the Aeneads north across the Tyrrhenian Sea and into Latium on the Western Coast of Italy. Latinus, King of the Latins welcomed Aeneas and let them settle in his lands. It is said that Aeneas wed Lavinia, the daughter of King Latinus who was originally betrothed to Turnus, King of the Rutuli. This sparked a war between the Latins and the Rutuli. In the course of the war Aeneas triumphed and killed Turnus, giving him and the other Aeneads the right to settle and assimilate with the local Latins. It is said that this began a line of kings which bring us to the actual founding of the City of Rome.

The founding of Rome centers around the descendants of Aeneas: Romulus and Remus. They were twin brothers born by Rhea Silvia daughter of Numitor, and the god Mars. Years earlier, Numitor was unjustly thrown from the Kingdom by his brother Amulius, and Rhea Silvia was forced to become a Vestal Virgin to prevent any challenges to Amulius' claim to the throne.

After the birth of Romulus and Remus, they were left to die at the banks of the Tiber River and Rhea Silvia was buried alive at the command of Amulius. By the will of the gods and through a series of miracles, the twins survived and were raised by a she-wolf. They were then found by a shepherd and his wife, who ended up raising them. They grew and led lives as simple shepherds. Over the course of time, they grew exhibiting leadership skills, and attracting followers all the while ignorant of their lineage. It is said that they ran across conflict with the shepherds of their great uncle Amulius. Remus, who was captured during the quarrel was brought to Amulius where he learned of his true identity. Romulus joined together with other shepherds with the intention of saving his brother, and in the process Amulius was killed.

After discovering their true identities, they were both offered the kingdom, but opted to restore their grandfather Numitor to the throne. It is said, that after this point they went onwards to start their own city with their followers. Upon discovering what became known as the Seven Hills of Rome, the brothers quarreled about the site for their future city. They argued upon whether to place the city on the Aventine Hill or the Palatine Hill. Eventually they agreed to let the matters be a decision of the gods, by way of augury.

Each of the brothers travelled to their preferred hills and prepared to take the auspices. Both brothers claimed superior auguries. Romulus, making the claim first set his supporters in building a wall around the Palatine Hill marking the boundaries of his new city. Remus, taken aback by his brother's dismissal of his claim for the Aventine Hill, insulted Romulus and leaps over the wall. It is said that Remus was murdered by Romulus after the insult, and stating 'So perish every one that shall hereafter leap over my wall'. Thus, Rome's founding began with bloodshed foreshadowing a future of war, strife, and power.

Rome gains its name from Romulus, and he became the first King of Rome. Romulus envisioned a system of government built upon a social hierarchy in a patron-client fashion; with this in mind he divided his followers into various classes. From his followers he selected the noblest, wealthiest, and those closest to him to be his council. The Patricians as he called them were known as the fathers of Rome, being the shapers, and supports of Rome's culture and social structure. The elders of the society and those who also served as advisors for Romulus became known as the Senate which became the basis for all of Roman Government. The able-bodied, and the soldiers, Romulus called legions and divided between regiments of 3000 infantry and 300 cavalry.

Situated by the Tiber River, Romulus cultivated and grew Rome's strength and size by way of trade. Soon the size of the city grew encompassing its surrounding hills. From the original perimeter around the Palatine Hill, Rome's reaches expanded to the Aventine, the Caelian, the Capitoline and Quirinal Hills. Over time, Rome continued to grow, often clashing arms against neighbouring kingdoms. Through the strength and skill of Romulus as both a warrior and a leader Rome triumphed. It is said that Romulus mysteriously vanished in a gust of wind, during a public offering on the Quirinal Hill. It is proclaimed that the city's great founder achieved divinity that day. Rome stood tall that day, and it is known that we as Romans, stand among the gods, for this great city shall be the centre of the known world.

Jean-Pol GRANDMONT

Romulus and Remus were raised by a she-wolf through the mercy of the gods

Ammonia and The Haber-Bosch Process

MEAGAN CARDNO
3A NANOTECHNOLOGY

ChemHistory

It's a well-known fact that we, as heterotrophic organisms, require food sources in order to survive. It also should be rather obvious that the current population of humans is well over 7 billion— a surmountable number of mouths to feed, even if some are more well-fed than others. The incredible scientific breakthrough that made such a large population even remotely feasible to sustain is credited to Fritz Haber and Carl Bosch, in a process that industrialized that which nature could not produce at the level we required: the production of reactive ammonia-based compounds.

The process of nitrogen fixation is one of the most fundamental processes that allows for life as we know it to exist. It converts (or 'fixes') the incredibly inert gaseous nitrogen that comprises over 70% of our atmosphere into the more reactive ammonia-group of molecules, which plants can use to biosynthesize the most fundamental molecules in life, such as nucleic acids and nucleotides. In nature, the majority of nitrogen fixation is conducted by various forms of bacteria, fungi, and legumes, with the help of an aptly named enzyme: nitrogenase. There are many biochemical quirks to this enzyme— for example, it is heavily prone to oxidative damage, and as a result nitrogen fixation is all but halted when the organism is subjected to significant oxygen levels.

In the early twentieth century, there were incredible concerns that the rapidly increasing human population could not be sustained with the plateauing agricultural growth. But this was not the only concern on people's mind, as World War I was also a large influence on worldwide affair—and is partially the reason why the Haber-Bosch Process came to fruition. Germany, the home country of both Haber and Bosch, had munitions supplies crippled when Allied forced blockaded trade routes from South America, preventing shipments of guano and saltpeter, which was the country's primary source for fixed nitrogen. Loss of access to these prevented Germany from producing any nitric acid— a primary chemical for the manufacturing of explosives. Haber and Bosch's research into industrial-level nitrogen production is suspected to be primarily motivated by this deficit of nitric acid during the war, and not the impending threat of worldwide famine.

The reaction is about as simple as they come: nitrogen and hydrogen gases are combined in a 1:3 ratio, producing two equivalents of ammonia. From a thermodynamic perspective, the process is relatively straightforward to explain through a simple analysis of the reaction's equilibria. Although the reaction does favour the ammonia products at room temperature, it has an incredibly slow rate of reaction. As a result, increasing the temperature of the reaction is required in order to have sufficient molecular collisions, but these temperatures do not favour the exothermic reaction. The final factor that allows the reaction to proceed forward, but at a sufficiently fast rate, is to increase the pressure of the reaction. As there are twice as many moles of reactants per mole of product, Le Châtelier's principle suggests that conducting the reaction under sufficiently high pressure conditions will favour products, regardless of the temperature of the reaction. These high temperature and pressures typically correspond to 500˚C and 25 MPa in industrial settings.

Thermodynamics aside, the process also requires a catalyst in order to facilitate the breaking of the incredibly stable nitrogen-nitrogen double bonds. Today, it is a cornerstone process in the world's resource consumption as a whole— it is suggested that 3-5% of natural gas produced in the world is consumed during the Haber-Bosch's steam reformation to attain the hydrogen gas needed. Were it not for this revolutionary technology, the exponential increase of human population observed in the last century would not be possible, although the long term environmental impacts of this growth are not likely to be as beneficial.

The Fall of FIFA's King: Sepp Blatter Resigns

SAM MADHAVAN
1B ENVIROMENT

Staggering allegations of corruption against FIFA related to the 2014 World Cup in Brazil has led to widely publicized demonstrations in streets of Brazil against the association's profiteering at the expense of taxpayer dollars. The executive body of la Fédération Internationale de Football Association (FIFA) or the International Federation of Association Football was brought to shame in front of its member countries.

Based on the indictments by the U.S Department of Justice of nine high-ranking officials and five corporate executives on charges including racketeering and money laundering, several officials were arrested over the past month by Swiss authorities. These arrests launched a simultaneous criminal investigation into the decision to award the 2018 and 2022 World Cups to Russia and Qatar – whose reports of human rights abuse have drawn condemnation from across the world. Following the arrest of several high profile officials, the organization has claimed that it will now comply with any evidence of bribery and corruption in the decisions to host the next two world cups; Russia and Qatar's hosting rights may be invalidate if evidence emerges of bought votes.

Although almost everybody in the world of soccer knew about the allegations against FIFA, hardly anyone was expecting or prepared for the legal consequences—least of all FIFA President Sepp Blatter, as was evidenced by the organization's initial dismissal of the widespread nature of the charges against it. Few were surprised when United States officials managed to link his top deputy to a series of payments believed to be bribes, and several officers mentioned under the condition of anonymity that they were hoping to win the cooperation of some of the officials currently under indictment in their efforts to build a case against Blatter. Backed into corner, the president of the world governing body of soccer for 17 consecutive years announced his resignation from the organization he had served in various roles for 40 years, almost half his life. Culminating a series of events that began two weeks ago with a police raid at a five-star hotel, Mr. Blatter delivered his resignation speech in French to a mostly empty room at the FIFA headquarters. He spoke his piece and left without taking any questions.

Despite having won re-election on the 29th of May, Blatter received a halfhearted response after underestimating the growing anger of FIFA's electorate and the growing discomfort of sponsors including Coco-Cola following mounting public pressure on the association's corporate sponsors to claim responsibility for its actions. This prompted him to resign at the behest of his advisers. Blatter issued a public announcement tendering his resignation as president; the aftershocks of the corruption scandal following his resignation continued to reverberate among the media; claims arose in Germany that Sepp Blatter the 2006 World Cup was influenced by a shipment of rocket-propelled grenades, and votes were "deliberately miscounted" before South Africa was awarded the right to host the 2010 world cup (allegedly Morocco was supposed to have won the ballot). The number of instances of corruption and bribery is expected to increase as whistleblowers come forward with claims that Russia and Qatar purchased the right to host the upcoming World Cups, the coming few months will play a deciding role in the fate of soccer over the next decade.

Sputniktilt

Sepp Blatter has stepped down over allegations of corruption within FIFA

John Forbes Nash Dead at 86

MICHAL KONONENKO
2B NANOTECHNOLOGY

John Nash, the famous Princeton University Mathematician, was killed in a car accident along with his wife on May 23 in New Jersey. He was on his way home after receiving a prize for mathematics from King Harald V of Norway when their taxi driver lost control of the car. He was 86. His wife Alicia de Lardé was 82.

His most famous contributions consisted of non-zero sum game theory, the study of choosing optimal strategies against a perfectly rational opponent. The concept of Nash equilibrium is an important consequence of this theory, and is a situation in which each player is assumed to know the best strategy of each other, and cannot get a better outcome by changing his choice. His contributions also involved formalizing the minimax algorithm in order to optimize the outcome of zero-sum games. Today, this work finds applications in sciences ranging from evolutionary biology to economics to political science. For this, he was awarded the 1994 Nobel Prize in Economics.

Outside of game theory, Nash also made great contributions to algebraic topology and differential geometry with the Nash embedding theorem, and contributed to the study of nonlinear partial differential equations. In particular, his contributions in connecting nonlinear PDEs to geometric analysis are especially important. For these contributions, he received the 2015 Abel Prize, offered by the Government of Norway to outstanding mathematicians. It is upon returning from accepting this prize that John and Alicia Nash were killed in the accident.

Nash accomplished this despite a long history of battling mental illness, including paranoid schizophrenia. His mental problems crossed into his professional life in 1959, and John spent much of the sixties in the New Jersey State Hospital at Trenton. Treatment was proving to be effective, as he was never committed to an institution after 1970. His struggle proved particularly difficult on his wife Alicia, with the marriage falling apart in 1963. The couple remarried in 2001.

Our condolences are sent out to the Nash family, and to John Nash's close friends and colleagues, while we mourn the loss of this great mathematician.

Pleasantville: A Retro Utopia

ANJIDA SRIPONGWORAKUL
4A MANAGEMENT

NOW PLAYING

Imagine a perfect, idealistic world, a world in black and white. No, really. Literally in black and white. The people, the shops, the houses. There is a clear line between right and wrong. There is good, and then there is evil. This palette has no grey in it. There is no in between, no middle ground.

All the *Pleasantville* (1998) universe is to David (a memorable Toby Mcguire), a teenage high school loner, is a short escape away from his life's reality—his single, absentee mother and popular, outgoing sister, Jennifer (Reese Witherspoon, before *Legally Blonde* happened). David's Pleasantville family is a group of four: Mother Betty Parker (Joan Allen), Father George Parker (William H. Macy), and their two children, Bud and Mary Sue. The 1950s' sitcom has the family happy and wholesome. George returns home to Betty's perfectly cooked dinner. Bud wins the science fair award, and they laugh and joke about simple mistakes. Life is routine. The world exists within the city: school, maltshop, library—complete with a main street that ends and begins in itself.

"Unpleasant" emotions, sex, drugs, fluctuating weather, dirty words, violence—what renders our world three-dimensional and far from black and white—are unknown to Pleasantville's citizens. The firemen save kittens from trees because there is simply no fire to battle against.

But all of that changed one stormy night.

David, the huge fan that he is, gears up for a *Pleasantville* marathon on television, at the same time as Jennifer catches up with him, demanding for the remote to watch the MTV awards airing coincidentally on the same night.

The two siblings wrestle for control of the remote, and break it in the process. The television turns out to be the latest model that requires a remote to run (The film is set against a 90's backdrop.). Both of them stare at the blank screen, distraught, when a mysterious television repair man rings the bell.

David answers the door. The man quizzes him on Pleasantville knowledge, and hands him a "special" remote, which, he claims, "has more 'oomph' in it." The man bids him good luck as he leaves, and the two siblings wrestle yet again.

The next minute, they find themselves in a black and white world, in a living room they have not seen before. Jennifer is wearing a sweater and a poodle skirt, David a crisp shirt and trousers outfit. Betty appears at the doorway and beckons them to eat breakfast.

Yes, it is what you think it is, but having a character like Jennifer in the confined, defined boundaries of Pleasantville does not promise a smooth future for either of them. As David and Jennifer navigate the seemingly "pleasant" and familiar waters of the idealistic world, they inadvertently change the citizens' lives in a way from which Pleasantville may not be able to recover from.

Part of *Pleasantville*'s magic is introducing into a bland world our world's complexities, the "unpleasantness" and witnessing changes, emotions, and actions flooding out of people the way they have not thought possible before. Pleasantville is a morality tale, a satirical social commentary about embracing life's greyness, about discovering and challenging yourselves to new ideas, concepts, and worldviews. It is a film about acknowledging certain things in yourselves that you have been afraid of changing.

While a nostalgic return to the classic black-and-white world is lovely, we exist within a mixed palette of colors. Life is real. Life is hard. Life is complex. And the truths (or the lies!) are never pleasant.

The Road to Welland

The Awesome Sport of Dragonboat Racing

KIYOSHI MORISHITA
3T NANOTECHNOLOGY

Recently I was selected to represent Canada in the under 24 mixed and open dragon boat crews, which will be competing at the World Championships, August 19-23, on home ~~soil~~ water in Welland. It was an honour to have been selected considering the number of high calibre athletes trying out. The selection process started last July with 150 paddlers from across Canada participating at camps in Montreal, Toronto and Vancouver. After training sessions in July, September, and February, 75 paddlers were chosen to compete for spots at the final selection camp in May. This four day event was held in Pickering and consisted of fitness testing, outrigger time trials, video review, and a lot of intense dragon boat practices. While I am very proud of this accomplishment, I could never have done it alone.

In high school I was actively involved in volleyball, hockey, badminton, and ultimate, but upon coming to Waterloo, my involvement in sports decreased as I devoted more time to school work. I was introduced to the sport of dragon boat racing during my first co-op term as a research assistant in a lab at the University of Waterloo. One of the graduate students (Alexander Ip, NANO 2011, MSc CHEM 2013) had recently joined the Waterloo team and had caught the dragon boat bug. After a work term with his consistent ~~nagging~~ encouragement to join, I decided to try it out. I found the veteran team members to be very friendly and I welcomed the feeling I had missed during my first year of being pushed to my physical limits.

After two summers of paddling with the high performance team while on Nano Engineering school terms, I've come to realise that this involvement has actually improved my academic performance. I've befriended upper year students who have acted as mentors and offered sweet words of encouragement during hell week. The time commitment associated with the competitive team has forced me to adapt better time management skills. The physical activity has also helped to reduce stress; when on the water, the stresses of school and of life fade away, leaving only the sounds of paddles ripping through water and punching through spray. It's a beautiful place, on the water, where pain, failure, and success are shared by all, where teammates become a family, where twenty paddlers move as one.

The University of Waterloo Dragon Boat Club has a strong connection with Waterloo Engineering. UWDBC was created in 2008 by two engineering students (Philip Wang, SYDE 2012 and George Wang, TRON 2012) and has since had engineering students as coaches, captains and paddlers. When I joined in 2012, there was one recreational and two competitive crews. That has quickly grown to include high performance, competitive, and recreational crews for students along with staff, faculty and alumni teams, and a breast cancer survivors crew. We hold dryland conditioning and pool technique practices during the Fall and Winter terms. In Spring terms we paddle at Laurel Creek, a short bus, bike, or drive north from campus. Every summer many students on co-op continue paddling with us, while working as far away as the Greater Toronto Area. The co-op program at Waterloo is a wonderful opportunity to make new connections, and you never know where they could lead you. Paddles up!

UWaterloo's Student Portal

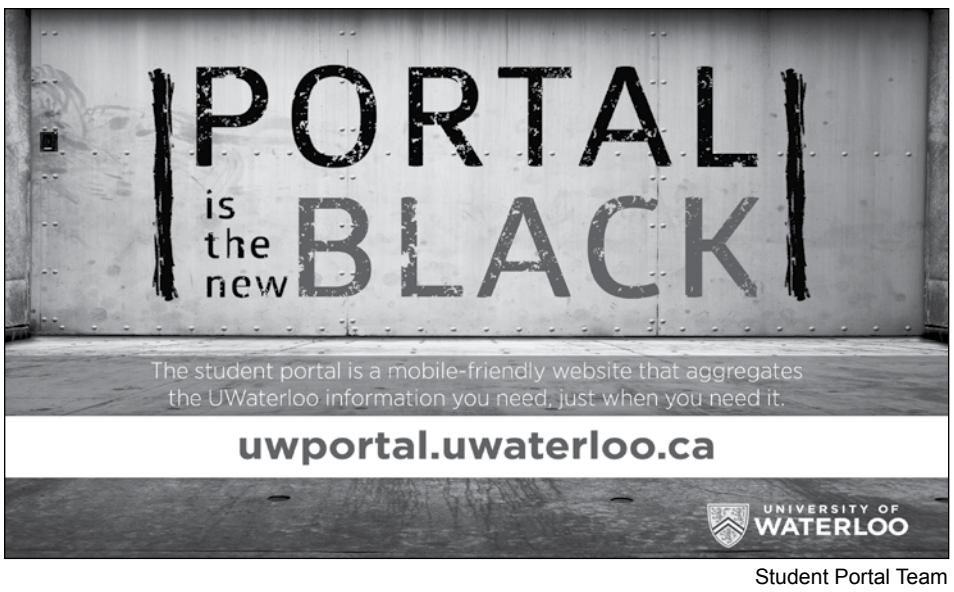
STUDENT PORTAL TEAM
UNIVERSITY OF WATERLOO

Finally, all the UWaterloo info you need to be a successful student can be found in the palm of your hand (or on your desktop) with the student portal. UWaterloo's student portal has gained positive momentum as a mobile-friendly communication tool that delivers the information you need, just when you need it. Engineering students who logged in last term said, "This is a really cool initiative. Thanks for building this all-in-one-stop shop," and "This is a great resource, I love it." The portal's fully customizable home screen delivers your personalized UWaterloo information, to make your life easier as a student. A few of the helpful and most features include:

- Clubs: your favourite club meetings or events
- Study space and campus hot spots: real-time availability and line-up reporter
- Athletics: your favourite fitness classes and varsity games, plus your personal intramural schedule
- Course materials: your personalized list of required and optional textbooks
- Food: campus food outlet hours, daily specials, vegetarian and halal options each plus nutritional facts
- GRT/GO Bus/Fed Bus schedules: real-time schedules for favourite routes to campus and out of town
- Upcoming events and academic deadlines: your preferred events and important academic deadlines
- Calendar: class, intramural and final exam schedules and can be customized with your important iCal feeds—LEARN events, Facebook, Google calendar
- Plus so much more!

Engineering students helped enhance the student portal last term in the portal's first hackathon. More than 30 students competed to develop new tools for the portal and tested the portal's student development environment. In the coming months, more student developers will have the opportunity to develop content for the portal.

For easy portal access, log into the portal using your smartphone or desktop at *uwportal.uwaterloo.ca*. You can easily pin the website to your phone's home screen so it behaves like an app.



Student Portal Team

In 1B and Want to Know About Engineering Exchanges?

PROF. RICK CULHAM
ASSOCIATE DEAN, INTERNATIONAL

If you're in 1B this term, this is THE perfect time to start planning for an academic exchange in third year!!! It's a great opportunity and privilege but you must prepare, organize, and plan! You could be among the 15% of your class who go on this once-in-a-lifetime experience! During an academic exchange you'll get to spend one or two academic terms at a partner university where you'll take courses equivalent to those your classmates will be taking at UW. It is common for engineering exchange students to stay on the same academic schedule as the rest of their cohort and graduate with their class.

The Faculty of Engineering has exchange partnerships with over 80 top-tier universities in about 30 countries around the world. You'll need to investigate which partner best suits your needs; many of our exchanges are restricted in numbers, some are open only to certain disciplines of engineering, and for others you need to learn a new language. In some cases, it's best to go for a one-term exchange; in others, two terms works out best. All this is a part of planning for your future career which could take you anywhere in the world.

To get started, visit our website (search for "Engineering Exchanges" from the UW home page) for all the details. On Facebook, look for the "UW Engineering Exchanges" group, which is specifically for outbound students and those who have been on exchange. It's moderated by the Engineering Society (EngSoc) and Cindy Howe, the Administrative Coordinator of Engineering exchanges. By the way, Cindy's office is Carl Pollock Hall, Room 3658, and she can be reached at *eng.ug.exchange.askus@uwaterloo.ca*

Don't let this opportunity pass you by!

Applications

If you'd like to do an exchange in Fall 2017 or Winter 2018, your completed exchange application must be submitted to Cindy by November 1, 2016. But you must start planning NOW!! Finally, exchange is great for fun, travel and adventure. You'll visit parts of the world that stay-at-home students may never experience. Don't take my word for it; read what previous exchangers have to say:

"I wouldn't have traded my experiences for the world. My time on exchange was great: I got to go traveling and back packing, got to meet some fantastic people from all over the world, and I graduated on time with my class and my friends! ... If you are even just considering an exchange, I recommend without the slightest reservation that you go. Waking up and looking forward to every day in a new country… that's just not a feeling that you get [if you stay at home]!" (Matthew Lee, SyDe)

"Doing an exchange was probably the best decision I have ever made. I learned so much about engineering (of course), but also about European culture and history, and simply interacting with people of an entirely different background. The time and distance away from home, and the completely different lifestyle was definitely not easy to adjust to, but these aspects made the whole experience worthwhile." (Winnie Tse, MechE)

France Law Prohibits Food Waste

BRIAN CHAN
3A NANOTECHNOLOGY

France has done it again. Being one of the world leaders of fashion and food, it has gone somewhere no other country has ventured before: it has made it illegal for grocery stores to throw away edible food.

It is well known that food being wasted and thrown away accounts for one third of all the food that is produced worldwide, making it a very serious issue. The French's love for food spurred on the unanimous support of French Parliament for the new law. Now this revolutionary decision could possibly set a precedence for many other developed countries of the world.

Essentially, the law passed forbids grocers to throw out the food, and instead forces them to donate the food to charity or use it as animal feed. One would think that would be the better choice to throwing out the food into the trash and dispose of it as waste, so why wasn't this already adopted? Apparently, people are too greedy and only think of themselves and their own conveniences. Grocers that continue to throw out the food could be slapped with a €75 000 ($82 000 CAD) fine, a far worse result than just donating it away to charities. The charities can then in turn distribute it appropriately, whether it is to the homeless people living on the streets, or to other organizations in need of it.

This is definitely a decision that will send ripples through the food industry in all developed countries. It is something so sensible, but no one had the guts to impose it on grocers. Leftover produce may have no more use at the grocery store, but it doesn't mean a more unfortunate soul couldn't use it. Finally a country has decided, with no opposition, to make the first step to rectify some of the glaring problems in the world today. Props to the French!

Stanley Cup Final

Duel of the Dynasties

ELIZABETH SALSBERG
3A NANOTECHNOLOGY

THE BENCHWARMER REPORT

The moment we've all been waiting for has finally arrived: it's June, and that means it's the Stanley Cup Final—summer hockey at its finest. After some seriously exciting playoff hockey, two are left standing: The Chicago Blackhawks and the Tampa Bay Lightning. Chicago is highly experienced in the Cup Final, winning it all twice in the past five years (2010 and 2013). Tampa is a young, dynamic team that is starting to gel into a championship-calibre contender. These two teams may not know each other all too well, but there is no doubt that this series will be absolutely phenomenal, showcasing the best the NHL has to offer.

Capping off a thrilling series against Anaheim, with a steamroll game seven led by Jonathan Toews (also known as "Captain Serious" or even "Captain Everything"), the 'Hawks are confident heading into the Final. Their big stars have stepped up at critical times all through these playoffs. Despite the sometimes-inconsistent quality of goaltending from Crawford, their depth has kept them in it the whole way. Depth forwards have regularly provided offence when needed, like in Game 1, where Vermette and Teravainen scored two goals to seal the deal for Chicago.

The Hawks' are dangerous and experienced all through the line-up. And if Duncan Keith is on the ice, forget about the puck ever going in the net no matter how poorly Crawford plays. Keith is an overwhelming favourite for this year's Conn Smythe Trophy (i.e.: Playoff MVP), for good reason: His phenomenal defensive play has carried his team through difficult games—and he plays a frankly insane number of minutes game in, game out. If Tampa is going to strike, it'll be when this man isn't on the ice.

Following a great series that also went the distance against the 2014 Cup finalists in the New York Rangers, Tampa has a tall task on its hands, facing off against the closest thing to a dynasty the present-day NHL has seen since Gretzky's Edmonton Oilers. Led by deadly sniper (and arguably still a youngster) Steven Stamkos, the Lightning are one of the youngest, fastest and offensively potent teams in the league. If you manage to contain Stamkos, good luck doing the same against the Triplets: Tyler Johnson, Ondrej Palat and Nikita Kucherov. They are so dangerous, tick-tack-toe passing apparently indicating some sort of telepathy in which they don't need to look where they pass the puck. Sports psychologists at top institutions around the world are working hard to understand this new phenomenon... (Okay I may have made that part up, but you get the idea).

The Lightning defense led by top pair Victor Hedman and Anton Stralman has been no slouch either, playing an utterly suffocating shutdown game ever since the last two games of the New York Series. They will need to keep this up to keep the 'Hawks in check. Though depth forwards are not contributing too much offensively, they have been very effective in their own end. Again, they will have their work cut out for them: Tampa coach Jon Cooper keeps re-iterating to this young depth forwards to only worry about containing the other teams big guns so that Tampa's offensive big men won't have to deal with the other team's stars when they're on the ice. Cooper will be playing the matchup game when he can, particularly when the series moves to Tampa where they'll have last change.

This is a series that could go either way. Whoever wins, expect this to go at least 6 games. It will be fast, furious and ferocious. A hard-nosed garbage goal could make all the difference—that's how close it's going to be. Chicago is the closest team to a dynasty now. But Tampa could easily become the dynasty of the future with all of their young talent, and steadily improving goaltender, Ben Bishop. Hang tight hockey fans—the duel of the dynasties has only just begun.

Sausage and Breadcrumbs

CAMERON SOLTYS
2B MECHANICAL

COOKING WITH CAM

Hello aspiring chefs,

Last issue, we went through how to make a delicious potato salad. Today, I have the second half of that meal: the main course. This time, I show you how to make a delicious dish with little more than some sausage and breadcrumbs.

And don't forget the rules:

1. If it's not in your pantry, its not needed.

2. Cooking with a measuring cup is like using calipers to construct a treehouse

3. If it doesn't taste good, you can fix it—guaranteed.

On to the recipe; this is one which I made with some severe ingredient constraints: I had sausage which was in imminent danger of spoiling, and a bag of panko that my parents had bought me - If you are unfamiliar with panko, it is a Japanese-style breadcrumb, and could easily be replaced by normal breadcrumbs or crushed potato chips - So I came into the kitchen with no idea what I was making, but that it would involve panko and sausage meat.

Step one: I turned on the oven and set the temperature to 425°F - My default temperature is 400°F, and I adjust it up or down depending on how quickly I want it done and how big the meal is: larger meals require lower temperature since you need the inside to heat up before the outside burns. I still didn't know what I was making, but I knew that it would involve the oven since I didn't have time to nurse the sausages in a pan. After assembling my ingredients, my mind immediately went to Pogos, the pre-made batter-covered hot-dog treat I used to love as a child. Reasoning that sausages were like hot dogs, and that panko and flour-batter were both made mostly of starch, I decided that I could make my own Pogos.

Step two: I poured some panko into a bowl, and rolled a sausage in it. The panko initially didn't stick but remembering that most batter have eggs, I whipped up an egg in a second bowl and tried dunking my sausage in the egg before the panko. This worked well, especially when I did it twice, going egg-panko-egg-panko-tray. After the first set of these, I noticed that I was going to have a bunch of egg batter left over after the sausages were all coated, so I perforated the remaining sausages with a fork such that some of the egg would sneak in under their casings. Once all the sausages were coated, I emptied what was left of the egg into the sausage tray, followed by the remaining panko.

Step three: As my sausages cooked away merrily in the oven, I turned my attention to the other parts of the meaf: I raided my refrigerator and found half of a green pepper and half a white onion. I chopped up some of both, then fried them with butter in a pan. I also chopped up some cheese and tomato.

Step four: I found some frozen olive bread from Valuemart and stuck them in the microwave. 30 seconds in, I had some delicious bread for making sausage sandwiches.

Step five: Once the sausages were cooked, I took them out of the oven. The panko had largely fallen off but had been sitting in the sausages' juices and made for a delicious crunchy side dish. I cut the sausage length-wise and put it on the bread, heaping ketchup and all the toppings I had chopped on top.

Final verdict? Delicious.

For future, I might try putting something like paprika in with the panko - I recommend you try it yourself. I might also try using cooked rice instead of panko, and syrup as the sticking agent - One never knows what will end up tasting absolutely fantastic!

Happy experimenting.

Punkeydoodles Corners

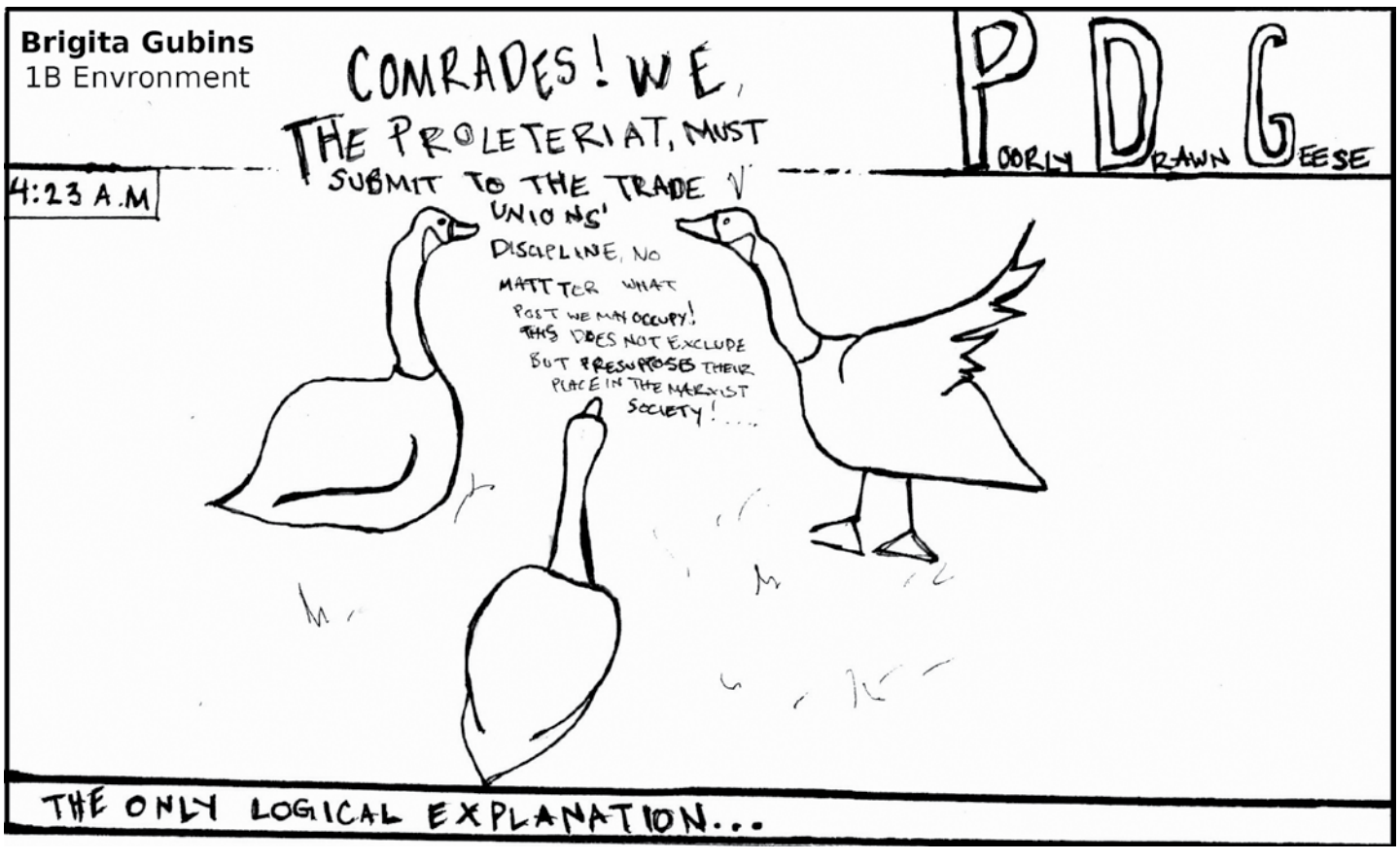
JESSICA KEUNG
2B CIVIL

SMALLEST VILLAGES

Welcome back to another issue of The Iron Warrior and another edition of this really niche column, *Canada's Smallest Villages*. Only the most avid of readers know that most of these small villages are either abandoned mining towns turned tourist attraction, current mining town that will eventually become abandoned, or just a small village at the end of a highway. Today's small village is Punkeydoodles Corners, located in southwestern Ontario. This small unincorporated hamlet with a funky name is located in the Wilmot Township and is in our very own Waterloo regional municipality. Punkeydoodles Corners is located southwest of the University of Waterloo on Road 101A, only a 25 minute drive away from campus.

The origin of this silly name is disputed. One of the many claims is that there was a tavern and inn in the town in the late nineteenth century where the innkeeper and settler, John Zurbrucken, would serenade his guests with the song 'Yankee Doodle' but it would sound more like 'Punkey Doodle'. Another story is that Punkeydoodle is related to an old Victorian word meaning to fritter away time and was a nickname given to one lazy pumpkin farmer by his irritated wife. Punkeydoodle Corners sits on the corner of where the Oxford, Perth and Waterloo regions meet. Due to its humorous name, Punkeydoodle Corners was a frequent victim to sign theft, where signs would be stolen as quickly as they were put up. The township gave up on replacing the signs a few years ago. Now the town no longer appears on the Official Road Map of Ontario and is easy to miss when driving past. One of the most eventful moments in Punkeydoodles Corners history was when former Prime Minister Joe Clark visited in 1982 on Canada Day for the festivities. This event was so prominent in the history of Punkeydoodles Corners that the town erected a pillar in honour of Joe Clark's participation in the 1982 Canada Day festivities. They even opened up a post office for one day to issue commemorative stamps.

This town now appears frequently on online lists of towns with humorous names and engineering newspaper columns on small towns. In the next issue, we will move further north in Quebec to learn more about the Inuit community of Ivujivik with a population of 370 as of 2011.



"Swatting" and Why It's A Serious Issue

ALLEN CHEN
2B CIVIL

Say you're relaxing at home one day. It's a beautiful sunny afternoon, so naturally, you decide to stay inside and play some Call of Duty multiplayer. You're tearing it up, winning every match in your lobby, when one particular player becomes especially upset at your elite FPS skills. He subsequently messages to you that you are going to be "swatted," among other profanities. Of course, you ignore this. What's swatting anyways? So you carry on without much regard to that threat. 10 minutes later there's a knock on the door. The cops are there, and according to them you shot up the block with an assault rifle and were hiding in the residence with hostages. Not even an hour after that, you find yourself in custody while the police sort out what exactly happened since they found nothing of suspicion at all at your place (hopefully). Upon your release, you hear and read of one specific term over and over as the incident circulates in the local news: swatting.

Swatting is essentially when a person, the swatter, calls the police anonymously with the goal of summoning the SWAT team to what they claim is their address. In the spirit of swatting, it is not actually their own address, but the address of someone they want to be swatted. The result of filing such a false emergency call is not always going to be the SWAT team breaking down the victim's door; you'd need a really outrageous and crazy story to tell the police for that to happen. Oftentimes, there will just be ordinary police officers coming over to investigate. Swatters don't call the SWAT team with the intention of actually getting the victim arrested for criminal charges. It's purely for pranking purposes, and a huge scare and inconvenience for the targeted victim, as well as stressing out the emergency response teams.

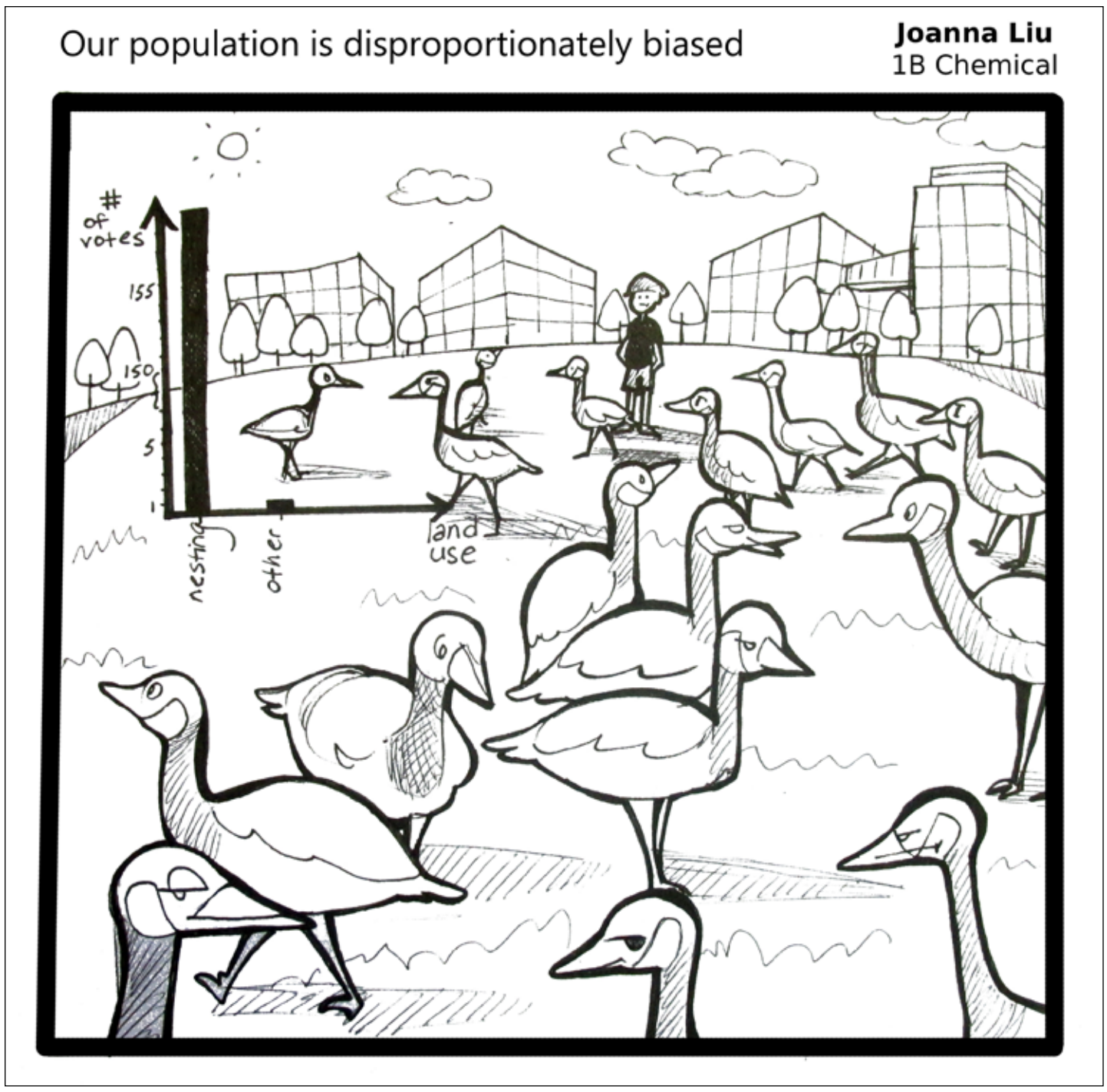
Swatting is not necessarily something new; it's been a known issue for a few years now, with 2014 being a year when it gained significant publicity with the swatting of the residences of high-profile celebrities, and several arrests being made for swatters. Today, it remains a prominent issue in the domain of cybersecurity, with incidents of swatting being reported quite frequently.

In May of 2014, a 16 year old from Ottawa pleaded guilty to 60 charges for 30 incidents of fake emergency calls, some of which included "uttering death threats, conveying false information with intent to alarm, public mischief, and false bomb threats." These 30 swatting incidents occurred all across North America. In the same year, another arrest occurred in Vancouver, where a teenager was found guilty for swatting residents as far away as Florida. One common trend with swatters, at least in Canada, is that most are minors. Although many swatters have been arrested, many more have escaped prosecution with ease. The common case with swatting calls is that the origin of the call cannot be traced, a significant hole in the cybersecurity capabilities of the police.

The recent cases of young teenagers being arrested for swatting should be a cause for major alarm for law enforcement and security in not just Canada, but on an international level as well. The fact of the matter is that people now have the capabilities and resources to cause major chaos from thousands of kilometres of away, and likely face no consequences whatsoever. It's not exactly rocket science to swat someone; anyone with the right motives could do it (don't try this at home, kids). All a swatter needs is a method of hiding their phone number, a target address, and a really crazy convincing story to tell the police. That's it. No hacking or anything of that nature involved whatsoever, despite the misconception of swatters as hackers. With the increasing accessibility of the internet, even those with very little technical knowledge can swat if they stumble upon the right information.

One of the main problems arising from the increasing number of swatting incidents is the diversion of emergency response services from actual emergencies in order to deal with these hoaxes. Legitimate crime incidents are now being sidelined, as well as any fires or medical emergencies that could have otherwise utilized the services of the firefighters and paramedics that were called to the hoax incident. As a result, some police departments are justifying the investment in more "resources," which essentially means increased spending on the militarization of police forces. This has been an issue primarily in the United States, where military tactics have been used more and more often to achieve objectives in police operations. Of course, swatting isn't the one reason enabling police forces to invest in the militarization of their operations, but it certainly is a good excuse. This is a cause for major concern as the likelihood of a miscommunication during an investigation causing injury or death is increasing.

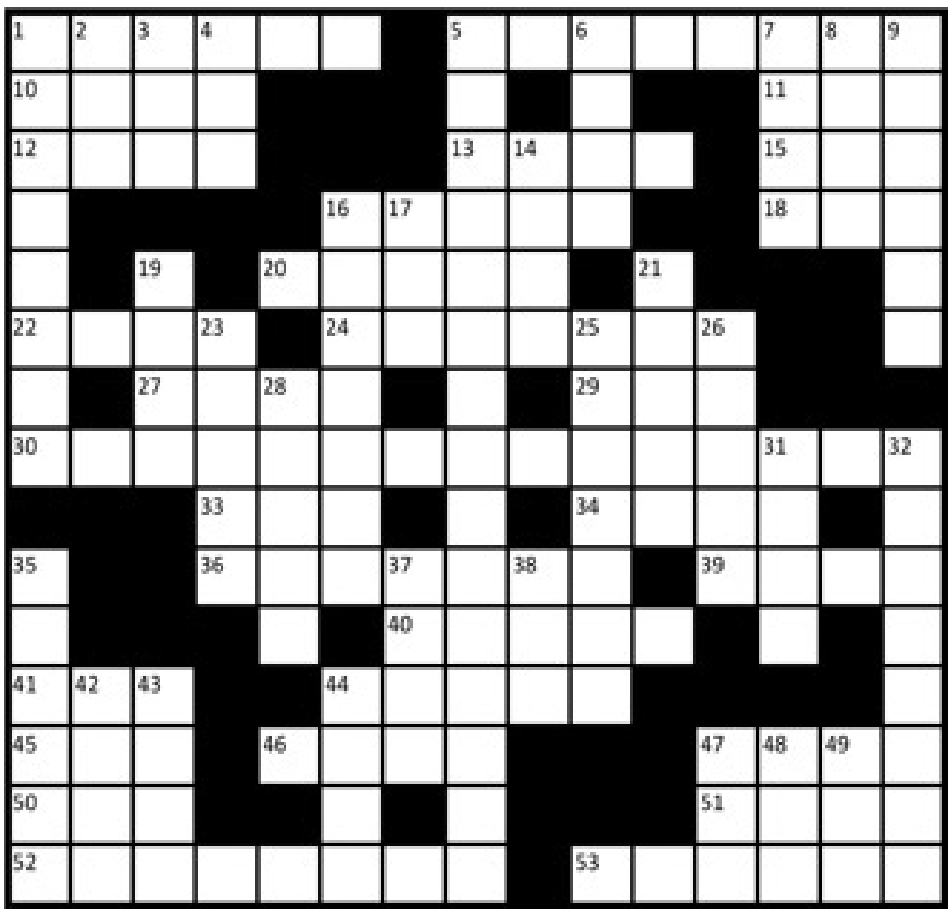
What does the future hold for swatting? One main concern about the swatting is the potential for something a lot more serious than a prank call. The possibilities of exploiting the emergency response system are quite endless. With rapid advancements in technology and the increasing role of the internet in every service conceivable, one can only hope that this recent surge of swatting kick starts an increasing investment in cybersecurity, so when the real cybercrimes come rolling in, we'll be ready.



The Iron Crossword

Super Villains and Heroes

CAMERON SOLTYS
2B MECHANICAL



ACROSS

1 A supervillain, perhaps
5 A sound no longer heard with the advent of cell phones
10 Dry place
11 A moon of Pluto
12 Dangerous fashion accessory according to Edna
13 Godfather character Corleone
15 And so forth
16 A destructive device put on 47-across
18 What 32-down can do with x-rays
20 Surname of the world's broodiest orphan
22 Sailable objects, of which there are seven
24 What one might leave after sitting in damp clothes
27 The location where Canada's pastime is performed
29 French for water
30 Apt description for cyclopes
33 Slang for a male
34 Westernmost of the Aleutian Islands
36 Lasting forever
39 I don't sing, _ ___ like Eminem (2 wds)
40 The title of Luke's father
41 Archaic contraction for "I shall"
44 "If I go there will be trouble, and if _ ___ it will be double" (2 wds)
45 Virginia's largest public university
46 Scientific organization determined to find aliens
47 A global weapon delivery system potentially armed with 16-across
50 Rogue robot onboard the spaceship Discovery
51 The chicken of the sea
52 What is done at a celebration, or a cooking technique that uses a special appliance
53 Nemesis to 32-down in an up-coming movie epic

DOWN

1 A strong or exaggerated sense of manliness
2 A geological time period
3 To bite or pinch
4 When medial treatment worsens a patient's condition (acronym)
5 The process of cleaning an object to remove harmful substances
6 A major ethnic group of Northern Africa and Middle East
7 The least significant digit before the radix point
8 Informal spelling for what follows day
9 More than is needed
14 The name of Boston's first skyscraper
16 Avenger with an ultra-low-tech weapon
17 When one team in a competition is given an automatic advancement
19 The cost of using a form of transit
21 To cook by extended exposure to heat in an oven or fire
23 A strategy employed to weaken a surrounded enemy
25 In sports, a punishment
26 A musical term indicating that all performers are to participate
28 _____ Onsen, a hot spring resort destination in Japan
31 A currency which is famously used by many neighbouring nations
32 Nemesis to 53-across in an up-coming movie epic
35 A physical property which is often mis-measured in kilograms
37 A tool to effectively test for dementia (acronym)
38 A constellation in the southern hemisphere that looks like an alter
42 An acronym meant to signify intense laughing
43 A document you presumably lied about reading
44 European Institute of International Relations (acronym)
47 Internet acronym for a phrase meaning "what is being discussed"
48 Latin word meaning "with"
49 The British colonies constituting what is now modern-day Canada and the US (acronym)

Sudoku

#2015-07

CAMERON SOLTYS
2B MECHANICAL

Easy

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

Medium

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

Hard

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

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

THE IRON INQUISITION

Jessica Keung, 2B Civil & Vince Magas, 2B Management

"What should Elon Musk invest in now?"

"Self-grilling grilled cheese."
Yamen Mouhanna, 2B Chemical

"Children"
Tara Tsang, 2B Management

"Commercial Jetpacks!"
Dhruv Datta, 1B Tron

"Real life Pokemon, I would quit school and become a Pokemon Master."
Jessica Keung, 2B Civil

"Postcards... For when the space thing takes off."
Tommy Donnelly, 2B Chemical

"Cutdle (a start-up company)"
Tulin Akdogan, 2B Management