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Move over, spider silk

Strongest natural substance found from sea snails



University of Portsmouth

Limpet teeth have a strength of 3.0-6.5 GPa. Spider silk *only* has a strength of 1.3GPa.



NINA FENG
3B ENVIRONMENTAL

Spider silk is no longer the strongest naturally-produced substance known to humans. A team of scientists at the University of Portsmouth in England has discovered that the strongest natural substance is actually found in the teeth of the limpet, a vegetarian sea snail. Tests on their tensile strength have shown that they can withstand stresses between 3.0 to 6.5 GPa, with the mineral protein within them able to endure about 4.9 GPa. This is about five times more than that of spider silk, which is merely 1.3 GPa. Comparatively, human teeth can only withstand about 0.5 GPa. Moreover, they also outperform Kevlar (3.6 GPa), titanium, and steel alloys.

Limpets, referring to a group of predominantly freshwater gastropod mollusks, have conical shells that are ap-

proximately 5 cm in diameter. While the name refers to various snails fitting that description, “true” limpets live in the intertidal zone, clinging strongly to surfaces and moving using their “foot.” The teeth consist of goethite-based nanofibres within a chitin matrix. Goethite, an iron oxyhydroxide mineral, was used as a dark brown pigment in ancient times and is used nowadays as an iron ore. Chitin is a substance most commonly found similar crustaceans, fungi, and in the beaks of octopuses and squids. The substance is comparable to keratin in humans, with which our hair and fingernails are made. The teeth of these gastropods are used to consume algae along rocks, and therefore must be resistant to prolonged contact with the rough, jagged surfaces.

It is also very notable that the material of the small, barb-like teeth does not lose strength with increased size, as often occurs with many substances. The increased number of flaws in large-scale structures makes them more prone to failure, and often too weak for practical use. This

is not the case with these typically one-millimetre long teeth, as the strength has been found to stay the same even with changing sizes. The filaments are very tiny (1/100 the diameter of human hair), creating a high mineral volume ratio, resulting the ability to withstand stress even in larger arrangements.

Already known for clearing algae and barnacles from ship’s hulls, limpets now have a new contribution to the transportation industry. Research into the structure of their teeth will result in applications in sectors such as the automotive and aerospace industries. They could possibly be used in the bodies of aircraft and vehicles (i.e. Formula One racecars), as the material is both strong and fairly light. The discovery of the properties of this material is a step forwards in the research being conducted to find naturally-derived substances that can replace steel allows in modern-day applications. The commercialization of this technology will change the safety and durability of high-performance machines.

American measles outbreak puts spotlight on vaccine controversy



SHERWIN KWAN
4B MECHANICAL

Over the last two months, a disease which had been effectively eradicated in North America made a re-appearance. Over 100 people in California were diagnosed with measles, and some cases were also reported in other western states in the USA, in Mexico, and in Ontario and Québec. After questioning those who were infected, it was discovered that many of them had visited Disneyland over the Christmas break in 2014, or had come into contact with someone who had visited Disneyland. But why is a disease which was thought to have been eradicated still causing outbreaks?

Measles, which is caused by the virus of the same name, is an illness which can cause fever, cough, runny nose, conjunctivitis (red eyes), and/or a rash. It primarily attacks the respiratory and digestive systems, and thus is spread by coughing or sneezing in the presence of other people. While the majority of people who get measles recover fairly quickly, possible complications can lead to pneumonia, diarrhea, and even death. In developed countries such as the US and the UK where good medical treatment is available, measles is rarely fatal, killing only 0.1% of infected people, but the disease is deadlier in places like Afghanistan or Ethiopia, which have reported death rates of 10-20%. Similar to chickenpox, measles primarily affects children, and once someone recovers from it, they have permanent immunity.

Measles has a long history – DNA studies suggest it evolved from rinderpest, a virus affecting cows in the Middle Ages, and it was first documented by the Persian doctor Mohammed Ar-Razi in the 9th century. It killed many in the Americas when Europeans brought the disease over during the Age of Discovery, as the natives had no previous exposure to the disease. For centuries, measles was a rite of passage – almost every child had it, and you just had to hope that the one time you got it wouldn’t be fatal. However, in the 1950s, doctors were able to isolate the virus and prepare a vaccine to protect against it. The vaccine was later combined with two other vaccines to produce an all-in-one vaccine against measles, mumps, and rubella. This MMR vaccine is currently administered in two doses to children when they are about one year old. By 2000, measles and rubella were completely eradicated in North America, and mumps had become rare. Studies have shown the MMR vaccine to be 93-99% effective, and reduce the odds of getting measles by 60-80%.

The E7 Referendum

A message from your Chief Returning Officer



JENNIFER COLDWELL
E7 REFERENDUM CRO

Hi my name is Jennifer and I am your CRO for the E7 Referendum vote for the B Society. On March 11th, voting will begin on the following question:

“Are you in favor of a one million dol-

lar student donation to the building of Engineering 7 paid through an optional fee of \$25 dollars per student per term to be collected starting once the building is open and continuing until the one million dollar contribution has been fully paid, with any collected surplus acquired after the final payment has been made going towards furnishing the undergraduate student spaces in the building?”

The yes and no committees will be

campaigning each side of this question until voting begins. This referendum affects all future engineering students and I strongly encourage everyone to vote! For any questions regarding the referendum campaign and voting period please contact me at cro.b@engsoc.uwaterloo.ca.

Statements from the YES and NO Committees are on page 7

Continued on AMERICAN on page 3

Letter from the Editor

An admonition against Sudokus



NANCY HUI
EDITOR-IN-CHIEF

Hope you all had a good reading week. I definitely did, at the expense of my assignments. But alas, it was but a brief respite from Iron Warrior production. So here's the third issue of the Iron Warrior this term!

Fun fact of the week: A team of entomologists in Nairobi have discovered a wasp and named it *Thaumatomyia tuukkaraski*, after the Boston Bruins goalie Tuukka Rask. The applicable journal article states that Rask's "glove hand is as tenacious as the raptorial fore tarsus of this dryinid species." Fancy.

Incidentally, a wasp in hockey refers to a forward skilled at "bugging" opposing players. This rarely applies to goalies but Leafs fans are probably still stung by Rask's trade to the Bruins in 2005 for Andrew Raycroft. Remember him? Me neither.

On the other hand, Rask went on to win the Vezina Trophy for being the goaltender "adjudged to be the best at this position" in the NHL in 2013. So there's that.

I'd like to thank the staff that helped assemble this publication, including Nina, who put the finishing touches on the paper while I quietly freaked out over my pavement lab report. And contributed the Sudoku. If it was up to me I wouldn't have a Sudoku at all. I'd have one of those elimination matrix problems, or a Boggle puzzle. But because of Nina, you Sudoku fans have three Sudoku problems, and this time, they're all different.

Also thanks to Bryan, who dragged himself to the office in a post-midterm haze to acquire statements and photos for the Iron Inquisition. This week's question is, "When was the last all-nighter you pulled?" I'm happy to say that I haven't done an all-nighter this term yet, though to share the words of another respondent, I have done many half-nighters.

Now, I'd like to direct you towards the statements from the "YES" and "NO" committees for the E7 referendum on page 7. Both sides make compelling points about whether or not an opt-out donation should be levied on engineering undergrads after the building is completed! Read both sides and don't forget to vote on March 11th. The Engsoc elections had a voter turnout of 8%, let's see if we can beat it!

Moving on, my favourite article this issue is Filzah and Sepehr's article on Kevin O'Leary's trip to the University of Waterloo (page 7). Love him or hate him, he is a dramatic figure along the lines of Donald Trump, and is most famous for

his role on CBC's Dragon's Den. His speech to students at Waterloo was also quite divisive.

And, to toot my own horn, on page 6 I have a writeup of Bill C-51, which is currently being debated in the House of Commons. It is of my opinion that the bill is dangerously sloppy, just like workplace safety violations, changing lanes without signalling, or the houses of hoarders. Please read it through and take a few minutes yourself to determine whether or not Bill C-51 is a law you would like to see enacted in Canada (Hint: it really isn't.)

Anyways, why am I so anti-Sudoku? It's not so much anti-Sudoku as... pro everything else. a computer can generate and solve a puzzle with such native ease. There isn't any creativity of interpretation required in Sudokus. You'll never do a Sudoku and be struck by the beauty of a number cluster, the ingenuity of a sequence, or expect to see 867-5309 hidden in a diagonal. The most individuality one can infuse into creating a Sudoku is figuring out how to idiosyncratically name the difficulty level of each one.

The best type of puzzles are the ones that take serious lateral thinking - cryptic crosswords come to mind. Sadly I'm crap at them, so I do regular crosswords instead. Not the generic ones in the Toronto Metro or 24 Hours or the Star (especially since the 24 has since switched to gross newsprint like everybody else. They used to have this thin, semi-glossy paper that didn't transfer ink onto your hand, but have since switched. A pity, since that was the only reason one might read the 24 over the Metro). They have to be themed. They need some punny clues: the more facepalms, the better.

I used to set the crossword for the Iron Warrior and the Imprint. At some point I was doing crosswords for both papers. Nowadays I don't serve as the cruciverbalist for either paper, so I can go and enjoy the crosswords like a normal person again. It is a nice feeling.

This logophilia could be traced back to my fifth grade teacher, Mr. Billingham. Mr. B, for whatever reason, was fond of words. Every morning we had a Boggle puzzle, and sometimes also a logic puzzle. Weekly, we had a dictionary-vocabulary worksheet to fill out, where I learned words such as "brouhaha" (speaking of brouhaha, check out page 3 for my favourite article title this issue!) and "garb".

It was part of the points system that Mr. B used to make us behave in class. Points off for rowdiness, points to for lining up quickly, the works. And points for the morning Boggle, including bonus points for the longest words. One also got points for reading books outside class.

But, after around grade 5, life doesn't award points. Nobody really notices the

bulk of the work you put into something. Boggle and logic puzzles faded. But reading and words stayed.

My own tastes in reading haven't changed much. I still prefer sci-fi and fantasy stories, more plot than an author ruminating over the meaning or the meaninglessness of it all, or where the characters are a metaphor for hope or AIDS or something. Also I like reading about magic and interstellar exploration. Sometimes, if I feel adventurous, I read horror novels and medical thrillers, but that's not particularly important right now.

Science fiction and fantasy are commonly used as an analogical setting for problems in the present. Want to write about racism but can't bear to touch the oppression of the Roma in Europe? Set your story in 2183 and have a bunch of characters racist against the fictional alien race of Quarrians. Want to sympathetically portray both rebels and an institution, but too depressed to set it against humans? Pit humans against dwarves and elves in the quasi-medieval country of Temeria. And, particularly in recent movies, the mutant gene in X-Men is clearly a metaphor for homosexuality.

The forerunner of this all was Star Trek (the original series). It is considered visionary in scope, if a bit cheesy in production. Despite its short run (1966 to 1969!) it was hugely influential and spawned five successor series and twelve movies, and was a forerunner in using futuristic scenarios to illustrate problems of the present. Yes, "The Trouble with Tribbles" is definitely a tract on the Malthusian dangers of reproduction without restraint. "City on the Edge of Tomorrow" is a parable about destiny and, in the event of time travel, not messing with the past. On the other hand I am really not sure what the moral of "Amok Time" is, unless it's "bros before hos."

Anyways, Leonard Nimoy, who played Spock, died last Friday. To me he actually seemed to be the TOS cast member most likely to live forever. It was probably also his ongoing prog-rock explorations, cameo in the 2009 Star Trek film reboot, peaceable demeanor, and general determination not to rest his laurels on pointy Vulcan ears and live off the royalties of playing Spock. One can learn from that example.

But, for all you readers, what IS the moral of this particular letter from the editor?

There isn't one, unless one counts "I like crosswords" and "science fiction is good." Those are highly subjective statements anyways, much unlike cramming numbers in a grid.

Live long and prosper.

And thanks for reading this issue of the Iron Warrior. Until next time,
--Nancy Hui

THE IRON WARRIOR

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Send your submissions to iwarrior@uwaterloo.ca

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

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.

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Brewhaha Bubbles Over Beer Store Monopoly



LEAH KRISTUFEK
3T CHEMICAL

Beer is to Canada what wine is to France. The image of a plaid-shirted outdoorsman pounding back a Molson Canadian after a hard day out in the cold is essential to our Canadian identity. Drinking good old strong Canadian beer is just as important to us as our perceived politeness relative to our American neighbours, our ability to work long hours in our cold northern climate and the frequency of epic beards.

I grew up with four-time world champion curling great Glen Howard working at my local Beer Store. Every year he maxed out his holiday time attending competitions around Canada and the world. Surely if a world class curler was a Beer Store employee then that was the most patriotic of employers.

We may be Canadian (or honorary Canadians), but your local Ontario beer store isn't. It may be a shock to some readers, but The Beer Store, unlike the LCBO, is *not* owned by our government. In a 2013 survey it was found that only 13% of Canadians knew that The Beer Store monopoly was not a government owned enterprise. The ability for The Beer Store to hold a monopoly on the Ontario beer market is not the only issue. The Beer Store operates much like Walmart, going for a 'one size fits all' ap-

proach, one which makes it nearly impossible for small craft brewers from Ontario to break into the Ontario market.

Just like Molson Canadian which merged with US company Coors in 2005, The Beer Store is mainly owned by non-Canadian entities. Shares for The Beer Store are owned by three companies; The Labatt arm of Anheuser-Busch InBev of Belgium and Molson Coors Brewing Company both own 49% of company shares while Sleeman Breweries, an arm of Sapporo of Japan owns the remaining 2%. Only Molson Coors Brewing Company has partial Canadian ownership.

A lot has changed since a consortium of Ontario brewers founded The Beer Store in 1927 under the trading name of "Brewers Retail". At that time it was established by Ontario's Liquor Control Act that the Beer Store, The Liquor Control Board of Ontario (LCBO) and stores on the site of breweries would be allowed to sell alcoholic beverages for offsite consumption. The idea of tightly controlled alcohol retailers appealed to the temperance regime and 1927 marked a move forwards from the Prohibition which had been ongoing since 1916.

These days the attitude towards alcohol is not nearly so polarizing and many people are looking for novel flavours, preferably from somewhere near home. It has always been challenging for Ontario craft brewers to sell their products and this has really been stirring the pot in recent years. I am currently on co-op in Al-

berta where alcohol stores vary considerably in what they sell and what they call themselves. Although there is no alcohol in grocery stores like you would see in Quebec it is still a very open market where small craft brewers can choose to sell to as many or as few retailers as they want. In Ontario, small breweries and wineries are hindered by high volumes of product required to sell to The Beer Store and the LCBO, poor promotions for their products and high costs to get the right to sell through those institutions.

Even for consumers, the price of beer is steeper in Ontario. The Beer Store is supposed to operate as a not-for-profit entity. However, a 2013 study by Waterloo's own Anindya Sen concluded that The Beer Store captures as much

as \$700 million in profits every year. He found that 24's of the same beer type could often be found cheaper in Quebec grocery stores than in Ontario.

Next time you go to pick up some alcohol take a moment and give some thought to where the profits from your purchase are going. Does it matter that our beer, like so many other products, is sold by a mainly foreign owned company which takes the profits outside our border? It is a global marketplace after all. If you prefer the idea of an Ontario Owned and Operated organization maybe it's time to check out the beer selection at your local LCBO.

Enjoy your beverages, but remember, drink responsibly, arrive alive eh?



Derek Thompson

A mere fraction of the beer selection in a beer store in Alberta.

American Measles Outbreak

Continued from AMERICAN on page 1

However, there have been several hiccups in the drive to eradicate measles. In 1998, the medical journal The Lancet published an article by several British scientists, which suggested a link between the MMR vaccine and increased rates of autism. The study's lead author, Andrew Wakefield, recommended that parents should have their children vaccinated with three separate shots for measles, mumps, and rubella instead of taking the all-in-one vaccine. It was later discovered that Wakefield had a conflict of interest, as he had been paid £400,000 by a legal firm which was preparing a lawsuit against a vaccine manufacturer, and in fact had applied for a patent for a new measles vaccine. The UK's General Medical Council eventually concluded that Wakefield had taken a bribe and fudged the numbers in order to support a false conclusion, and banned him from practicing medicine. No legitimate evidence has been found to suggest a link between the MMR vaccine and autism.

However, the damage was done. The alleged autism link caused many parents not to vaccinate their children at all, and there was an increase in the incidence of measles in Britain after 1998. There are also some parents who refuse on principle to vaccinate their children. Objections may result from a refusal to carry out any task promoted by the government to demonstrate personal, a misunderstanding of what vaccines do, or due to membership in a vaccine-discouraging religious group such as the Christian Science movement. However, objecting parents are rather few, and a recent study by the Center for Disease Control (CDC) showed that 91% of American children had been given at least one dose of the MMR vaccination.

The Center for Disease Control (CDC) is now hypothesizing that an infected tourist from a country where measles is still in the wild took the virus to Disneyland and started the outbreak. However, the outbreak has spread primarily among unvaccinated children within North America. This suggests that it could have been prevented if vaccination rates were higher. In an interview with NBC News, President Obama, who in his 2008 election campaign had called for "further research" into possible vaccine-autism links, now stated "the science is clear" and recommended that every parent vaccinate their

kids. Unfortunately, the issue quickly became politicized. Gov. Chris Christie and Sen. Rand Paul, both campaigning for President in 2016, spoke in support of parental freedom to choose whether to get their children vaccinated. While this view appeals to libertarians, proponents of vaccination point out that failing to get a child vaccinated not only affects the child, but also those around them.

If you were born in Canada after 1980, provided your parents didn't exempt you, you should have received two doses of the MMR vaccine already. If you are unsure whether or not you have immunity to measles, ask your doctor - it may be possible to determine if you are immune to measles with a blood test. If it turns out that you have neither had measles nor been vaccinated against it, it would probably be wise to ask to get vaccinated - that's one fewer person the disease can be spread through. *(Warning: This article is for informational purposes only and I am not qualified to provide medical advice. Please consult a registered physician for professional medical advice before doing anything.)*

FBI Stingrays Swarm America



CAITLIN MCLAREN
3A CHEMICAL

What are stingrays? They are devices used that look like cellphone towers. They are capable of monitoring cellphone usage and can tell exactly where your phone is.

You would expect a country that uses such a thing to have a name starting with "Democratic Republic" or "People's..." However, these devices are used by the FBI and by ordinary law enforcement in America. The RCMP will neither confirm nor deny that they use them.

When can they use this on you? Well, the FBI needs a search warrant to use these devices - in theory. They don't need one when there is a (vaguely defined) "imminent dan-

ger to public safety" - and we all know that the concept of "public safety" has never, ever been abused. They don't need one when looking for a fugitive. Last, but not least, they don't need a warrant when cell-site simulators are "used in public places or other locations at which the FBI deems there is no reasonable expectation of privacy." Otherwise known as: most of the places where people use cellphones. If the FBI "deems" that you shouldn't expect to be private, then you have no privacy.

What if you file a public records request with the police, asking how many times they have used these devices? Well, for one thing, they will inform the FBI that you asked. Also, they won't tell you, ostensibly because they have signed non-disclosure agreements with the Harris Corporation, which manu-

Continued on FBI on page 5

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Course evaluation packages will soon be sent to your professors and instructors, who have been asked to bring them to class between March 9 and March 20, 2015. Student representatives will be called upon to distribute one questionnaire to each student in each class, collect them when they are completed, and deliver them to the Eng-Soc office. Your Course Critiques Director (coursecritiques@engsoc.uwaterloo.ca) will work with student volunteers to prepare the packages for computerized scanning and processing. It's a process that has been repeated every semester for over 40 years. And yes, it's quite a big undertaking, but it's one we believe is well worth it.

On the day after grades are due, a package is mailed to each course instructor with a summary of the numerical data plus the original completed questionnaires so that they can read the comments you've written on the back. Instructors rely on your input

to help improve their teaching. Department chairs use summaries of course evaluation results to inform tenure and promotion decisions. And the Associate Dean, Teaching uses course evaluation results to inform course improvement efforts. Results are also posted online (see links at <https://uwaterloo.ca/engineering/teaching-learning/course-evaluations>) so that you and future students may review the results.

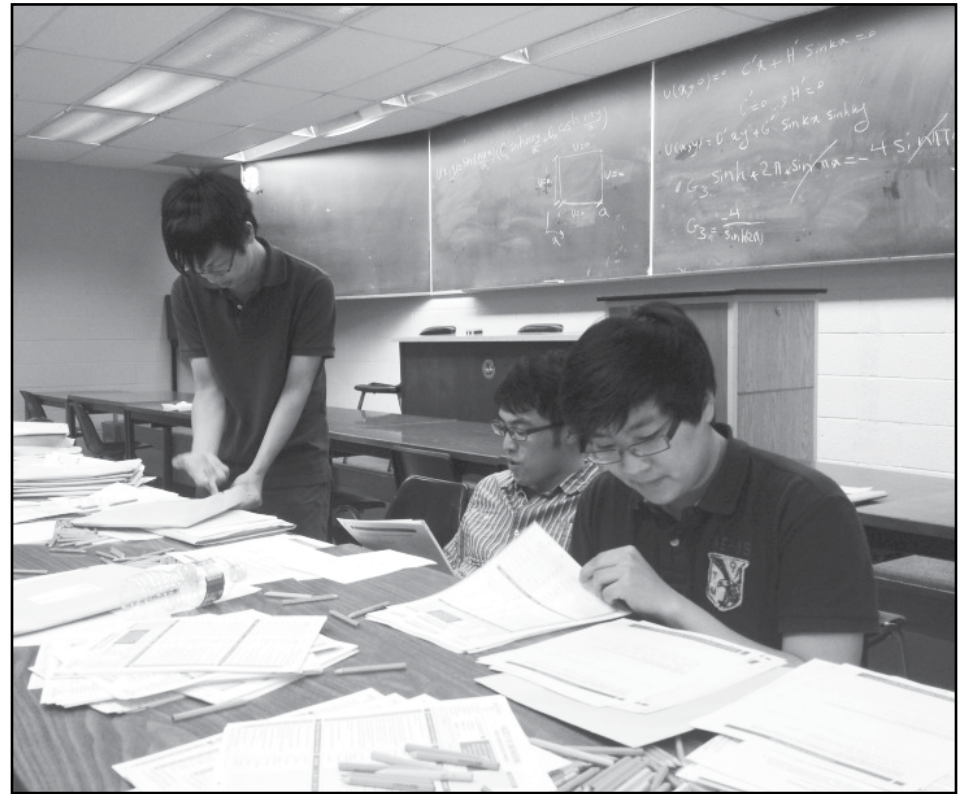
On Engineering's Teaching Learning web site, you'll also find a teaching award nomination form. This is an easy way to let us know which instructors you would like to see nominated for a teaching award. Visit <http://uwaterloo.ca/engineering/teachingaward-nomination> to access the form (login required).

Thank you for your time, your feedback, and, most importantly, for your continued support of this longstanding and valued process.

Sincerely,

Clarisse Schneider, Course Critiques Director

Gordon Stuble, Associate Dean, Teaching



University of Waterloo Engineering Society

Hardworking volunteers organize the course critique packages.

Engineering Exchanges?

But I'm only in 1B!

PROFESSOR RICK CULHAM
ASSOCIATE DEAN, INTERNATIONAL

Yes it IS too early in your academic career to go on an international exchange but it's NOT too early to start planning for it!

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. Most students go on exchange in 3A, 3B, or both. But you have to start planning early!

What is 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 practice for engineering exchange students to remain on the same academic schedule as the rest of their cohort and graduate with their class.

We have exchange partnerships with over 80 top-tier universities in about 30 countries around the world. So you 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 work 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 moder-

ated 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.exchange.askus@uwaterloo.ca

Don't let the opportunity pass you by! The application process takes more than a year of lead time. Applications must be submitted to Cindy by November 1 for the following academic year. For example, if you want to go on exchange for your 3B term (Fall 2017), your application will be due November 1, 2016.

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 travelling 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)

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Tech Ethics

Kevin O'Leary declares war at UW

**FILZAH NASIR &
SEPEHR MOHADDES**
3B ENVIRONMENTAL &
PH.D MECHANICAL

On February 4, Kevin O'Leary, a businessman and self-described entrepreneur famous for his role as a "dragon" on CBC's *Dragons' Den* spoke at UW, his alma mater, at a talk hosted by the Faculty of Engineering. The talk was filled to capacity within hours of the announcement and had to be moved to a larger venue to meet the demand.

O'Leary is known for his dramatic appearance on *Dragon's Den* where he is perceived to provide a "harsh dose of reality" to idealistic entrepreneurs who do not have an understanding of the business world. O'Leary also co-hosts another CBC show, *The Lang O'Leary Exchange*, a debate on current topics in finance or business. O'Leary is meant to provide the "conservative" viewpoint of someone who is only interested in economic results, unlike his co-host who presents a more "liberal" perspective and bothers to concern herself with "trivialities" such as the impacts of financial decisions on human lives. It was in the same show that he called the fact that at least 3.5 billion people live in poverty worldwide "fantastic" and "celebratory."

O'Leary's invitation by the Faculty of Engineering, and the fact that his talk was filled to capacity, represent a troubling perspective on economics, entrepreneurship and financial security. Given UW's focus on becoming a hub for entrepreneurship and providing opportunities for students to begin startups, it is clear that O'Leary was brought to campus to inspire UW students. But much of his talk fo-

cus on providing ideas that are directly in contrast to the true purpose of education and engineering.

O'Leary, who maintains that he is a "hard-core capitalist," said businesses are not meant to solve society's problems. Perhaps not. But engineering is. If we are not to solve society's problems and push to move forward, what exactly are we doing then? Serving society is an inherent part of engineering. It is the meaning behind the ring we covet so much. According to O'Leary, businesses should be exempt from the "business" of solving problems because they are busy doing the important work of making money, and making as much money as possible.

Now, how do you go about making this much money? According to O'Leary, you sacrifice everything else in your life, including family, relationships and personal happiness, in order to gain the "personal freedom" gained by wealth. In summary, to gain personal freedom you must become a slave to the money-making process, closing your eyes to what is going on in your community. And in case all of this is not enough, you must be prepared to "declare war on their competitors... destroy their market share," and go as far as "firing your own mother," and you will succeed.

To give an example of the sort of war he advocates, O'Leary talked about Steve Job's "war on BlackBerry," which was pretty "successful." Residents of Kitchener-Waterloo, perhaps with the exception of Kevin O'Leary, have seen and felt better than anyone else in the country the magnificence of this "success" in massive layoffs reaching as high as 40 per cent

Continued on TECH on page 7

FBI Stingrays Swarm America

Continued from FBI on page 3

factures the devices. Even if you are a judge, they might not tell you - or they might lie.

This isn't just shady. This is unacceptable. With all the recent cases of police corruption and brutality, the public has no reason to trust that stingrays will not be misused. The secrecy around them strongly suggests that they are.

Law enforcement is necessary, but state

power must have its limits. And the limit should not be that the authorities can do anything that they "deem" acceptable, regardless of the law. There are laws that defend privacy, and inappropriate use of stingrays is illegal. The FBI, the RCMP, and the police are not above the law. The authorities should be even more bound by the law than others, considering that it is the law itself that gives them authority. If law enforcement breaks laws, by what right do they enforce them?

Leafy Thoughts

Drone development to aid research



Drones, or unmanned aerial vehicles (UAVs), have been in development for many years, and have finally reached the point of complexity where they are practical for general use. Formerly considered expensive, impractical toys, their applications are now endless, from personal drones outfitted with GoPros, to military vehicles, to remote sensing and surveillance, to research. Drones can vary in sophistication, size, and type depending on the nature of the work that they do.

For scientists, drones can now perform exploration tasks that were formerly dangerous, difficult, and even impossible. Many study sites are too dangerous for human access, be it in dangerous spill investigations, volcanic research, or work in arctic regions. They can also be used in magnetic field detection to estimate the location of oil, gas, and mineral deposits. Environmentally, there have been UAVs developed for air monitoring and sampling, both in urban quality control and plume modelling at industrial facilities. Drones have been used to combat the poaching of endangered species and also to obtain meteorological data before severe storms.

UAVs are becoming increasingly prominent for research in Alaska, where offshore studies of whales, sea lions, and other aquatic life can be difficult. Permission to fly is granted more easily due to the smaller population and reduced chance of human endangerment. Research in the north has become

key to the development of non-military UAVs in general, as the often harsh arctic weather conditions must be overcome, resulting in more reliable, stable, and versatile machines. The University of Alaska, Fairbanks, has become one of the six designated UAV test sites in the country. Ice build-up, long-range communication, costs, and "pilot" training are the main obstacles to overcome in that area. In the future, drones can be used in the delivery of goods and supplies in remote regions, where companies like Amazon might finally realize their drone dreams.

Besides technical robustness, the biggest challenge hindering widespread drone usage has been their regulation. Drone usage has caused all sorts of legal turbulence across the world for safety and privacy concerns. The U.S. government has plans to criminalize personal use for their potential risk to air traffic and national security. Permission can, however, be granted with limitations imposed for their size, weight, range, and fuel consumption. The enforcement and development of such rules is still being discussed by the Federal Aviation Administration (FAA). Canada currently has slightly less stringent rules for when/where drones can be flown, with exemptions for smaller vehicles and recreational use. In general, they must not be flown close to buildings, humans, or vehicles and have size/weight restrictions, along with maximum allowable heights.

Drones are an incredibly versatile and powerful tool to scientific research, especially in environmental applications. However, there is still a ways to go before their use can be accepted under FAA regulations, and they must first be developed in order to be more reliable in extreme environmental conditions.



Nicolas Halftermeyer

A drone in the wind. Watch how it soars.



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John Fisher & Roy Duxbury Leadership Awards

The John Fisher Award and Roy Duxbury Award for Leadership are given to undergraduate students graduating in the Faculty of Engineering who have shown outstanding leadership throughout his or her academic career in activities that relate to Co-operative Engineering Education.

Nominations for these awards can originate from student groups, faculty members, or other individuals. Letters of Support from colleagues, faculty, and others familiar with the nominee's accomplishments are extremely important and form the major basis upon which the Executive Committee of the Sandford Fleming Foundation will form its decision. Nominations must be submitted to the Foundation by April 1, 2015.

The John Fisher and Roy Duxbury Awards consist of a Certificate plus a citation and an honorarium of \$2,000. The awards have been named in recognition of the outstanding contributions made toward SFF by its former Chairs, Dr. John Fisher & Dr. Roy Duxbury.

Nominations Must be Submitted to SFF Office Manager by April 1, 2015

E2-3336, Extension 84008, sff@engmail.uwaterloo.ca
www.eng.uwaterloo.ca/~sff

Be afraid, be very afraid

Bill C-51 passes second reading in the House of Commons



NANCY HUI
4B CIVIL

Bill C-51, the Security of Canada Information Sharing Act, passed its second reading on Monday, February 23rd with a vote of 176-87. It is nominally an anti-terrorism bill that would provide the police and intelligence agencies with more power - namely CSIS - to identify and oppose terrorist plots. It would also lower the burden of proof to arrest individuals suspected of terrorism.

Currently the bill is opposed by four former Prime Ministers and five former Supreme Court justices, who say that "given the secrecy around national security activities, abuses can go undetected and without remedy."

The bill was introduced by Harper's Conservatives and is supported by Trudeau's Liberals. Only the NDP, headed by Thomas Mulcair, oppose the bill.

What is terrorism?

Terrorism as is defined rather broadly in Bill C-51, is any activity that "undermines the sovereignty, security, or territorial integrity of Canada or the lives or the security of the people in Canada." It expands the original definition of Terrorism in the 1984 CSIS act (espionage, foreign-influenced threats, ideologically-motivated violence, and the overthrow of the Canadian government) to include threats to the "economic or financial stability of Canada," or "public safety."

As always, there is a clause that safeguards "lawful advocacy, protest, dissent and artistic expression." But most protest isn't exactly legal anyways. It might be nonviolent, but if Martin Luther King held hands with Nelson Mandela in the middle of the Yonge/Dundas intersection protesting Bill C-51, that would probably be illegal and classifiable as terrorism because they threaten public safety by blocking fire trucks in the street.

Promoting terrorism

Bill C-51 creates a new criminal offence that likely violates s. 2(b) of the Charter.

The newly proposed s. 83.221 of the Criminal Code provides as follows:

Every person who, by communicating statements, knowingly advocates or promotes the commission of terrorism offences in general—other than an offence under this section—while knowing that any of those offences will be committed or being reckless as to whether any of those offences may be committed, as a result of such communication, is guilty of an indictable offence and is liable to imprisonment for a term of not more than five years.

Sounds harmless, but what are "terrorism offences in general"? Keeping in mind the expanded definition of terrorism, promoting "terrorism offences in general" could be as simple as the opinion that one should pro-

vide aid to Ukrainian insurgents, or expressing sympathies with pipeline protesters, or, if CSIS is having a slow day, this very article.

Anyways this is a potential violation of Section 2b of the Canadian Charter of Rights and Freedoms - the freedom of thought, belief, opinion and expression, including freedom of the press and other media of communication.

New powers for CSIS

CSIS was created in 1984 by Parliament to take on intelligence activities previously under the umbrella of the RCMP. It is subject to oversight by the Security Intelligence Review Committee, which is grossly underfunded, and was formerly reviewed by the Office of the Inspector General, an office that was abolished in 2012.

The philosophy behind CSIS was to separate intelligence activities from law enforcement activities to prevent abuse of power. However Bill C-51 allows CSIS to take "measures" against terroristic threats:

If there are reasonable grounds to believe that a particular activity constitutes a threat to the security of Canada, the Service may take measures, within or outside Canada, to reduce the threat.

In taking measures to reduce a threat to the security of Canada, the Service shall not

(a) cause, intentionally or by criminal negligence, death or bodily harm to an individual;

(b) wilfully attempt in any manner to obstruct, pervert or defeat the course of justice; or

(c) violate the sexual integrity of an individual.

CSIS is still allowed a wide range of powers, including physical and psychological torture (e.g. by waterboarding, which isn't permanently damaging) or indefinite imprisonment.

CSIS needs a warrant first, though. But this isn't particularly helpful, since it is only required that an act will "reduce a threat to the security of Canada," and are "reasonabl[e] and proportiona[te]".

This is more than a little bit odd. One might expect, as in the case of a warrant for arrest or search, that there are reasonable grounds to believe that a criminal offence has been committed or that there are reasonable grounds to believe that a search will yield evidence relevant to a specific offence. These are solid prerequisites for an arrest or search. But to say that an act will "reduce a threat to the security of Canada?" Heck, that could be anything.

Preventive arrest powers

The Criminal Code already includes provisions for preventive arrest and detention to curb terrorism, and for dangerous offenders. If an officer:

(a) believes on reasonable grounds that a terrorist activity will be carried out; and

(b) suspects on reasonable grounds that the imposition of a recognizance with conditions on a person, or the arrest of a person, is

necessary to prevent the carrying out of the terrorist activity.

Then such a person may be arrested without a warrant.

Bill C-51 lowers the threshold for preventive arrest and detention by revising the Criminal Code to read as follows:

(a) believes on reasonable grounds that a terrorist activity may be carried out; and

(b) suspects on reasonable grounds that the imposition of a recognizance with conditions on a person, or the arrest of a person, is likely to prevent the carrying out of the terrorist activity.

What an odd addition to the Code. Does Harper believe so strongly that potential terrorists are slipping through the fingers of the law that he needs to lower an already-lenient threshold? We're going from a 99% level of confidence to a 50% level of confidence. 50% is for civil suits like broken contracts and AWOL landlords. A lot of innocent people are going to get caught in the net while Harper chases his phantom terrorists.

The No-Fly List

Finally, Bill C-51 allows the Minister of Public Safety to put Canadians on a no-fly list on the suspicion that they would endanger transportation security. Once on the list, one can only be removed by appealing to a Federal Court judge and proving that the minister was not only wrong to put them on the no-fly list, but acted unreasonably in doing so. The minister can also ask the Court to hear the government's presentation of its case in secret, wherein the lawyer and the public are excluded from the courtroom.

This procedure of secret hearings was ruled unconstitutional in 2007 by the Supreme Court, violating Section 7 of the Charter ("the right to life, liberty, and the right not to be deprived thereof except in accordance with the principles of fundamental justice"), as it was possible for the individual to be prohibited from examining the evidence upon which they were being deprived of their rights.

The takeaway

Steven Harper is fearmongering and taking advantage of the ISIS threat in the Middle East to further his national security agenda. Well, you might say, I'm the one fearmongering by providing all these farfetched examples and warning y'all that CSIS will break into your house one day and spirit you away to a bunker where you'll be waterboarded for your anti-government posts on Reddit. The government wouldn't really do that, would they?

It's unlikely, and I'm more offended by, than afraid of, Steven Harper's willingness to jump on the anti-terrorist bandwagon with this bill by announcing it while standing in front of the largest Canadian flag I've ever seen.

I'm offended by the government's willingness to lower the standard of proof against suspending someone's civil rights from a confidence level of 99% to less than 50%.

I'm offended by the proposal of the no-fly list and the possibility that those on the list may never find out what they did to get themselves on the list.

But mostly, I'm offended by the sloppiness of Bill C-51. "Terrorism offences in general" is a phrase that should never, ever make it into a passed bill.

With both Liberal and Conservative support, I sadly predict that Bill C-51 will pass through its third reading in the House of Commons. I remain optimistic that the old appointed farts in the Senate might do their job as the "Sober Second Thought," or failing that, the Supreme Court of Canada will eventually strike down large sections of Bill C-51.

That doesn't mean you should just sit on your hands and read the Iron Warrior, though. Write your MP. Maybe go to some protests, block the sidewalk, and get reprimanded by the cops. Whoops, am I advocating terrorism again? Is that CSIS I hear knocking at my door? Are those my civil rights flying out the window?



Bruce Campion-Smith

Steven Harper compensates for the shortcomings of Bill C-51 by announcing it in front of a Canadian flag of American proportions.

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E7 Referendum

Question:

“Are you in favour of a one million dollar student donation to the building of Engineering 7 paid through an optional fee of \$25 dollars per student per term to be collected starting once the building is open and continuing until the one million dollar contribution has been fully paid, with any collected surplus acquired after the final payment has been made going towards furnishing the undergraduate student spaces in the building?”

VOTE “YES”

**MELISSA BUCKLEY &
MADELEINE AMSZEJ**
“YES” COMMITTEE

Hello student body! We are Melissa Buckley and Madeleine Amszej and we are the YES committee for the Engineering 7 Referendum. On-stream (B society) Engineering students are encouraged to vote between March 11th and 14th on whether or not they would like to have the option to contribute to a student space in the new building. We hope that you exercise your voting privilege and strongly consider supporting the improvement of student experience and comfort by voting YES to the referendum.

We, the YES committee, feel as though a student contribution to the proposed E7 building would have many benefits for current and future Waterloo Engineering students. The student spaces that would be incorporated in E7 would be an excellent place for students to get work done, or socialize and relax, in an area of campus that has previously been lacking such a space. This would be sort of like a new and improved POETS and would come equipped with another coffee and doughnut shop. This would be particularly great for group work, student design team meetings, and working on fourth year design projects. If students express an interest in E7 and vote YES to the referendum, it sets an excellent precedent for engineering students to continue to be involved with future decision making regarding new buildings and otherwise. Engineering Students deciding to contribute to their newest building will show the students dedication their learning environment and support of the universities growth. It is the hope of the YES committee that the university will continue to offer students an opportunity to make suggestions and help determine some of the future focus of engineering related decisions as well as new developments.

Since the fee is optional, voting YES still gives all engineering students the opportunity to decide if they are able to make a donation to the building when the time comes. If you happen to be strongly opposed to the proposed \$25 donation fee, voting yes to the referendum is simply allowing your peers to make the same or different decision for themselves. The optional fee will only begin once Engineering 7 has been completed and so the students contributing to the funding of

the space will actually be able to use it (this is expected to begin in September 2018). In our opinion, voting yes allows all students to make the right decision for themselves when the time comes to do so.

Also in Engineering 7 there will be a new Engineering Ideas Clinic and a capstone garage where students can do hands-on work. The concentration of new Engineering Buildings is shifting across Ring Road and students can expect to be spending a lot of their class time in this area of campus for the years to come. Electrical, Computer, Mechanical, Mechatronics, Systems Design and Biomedical Engineering students will all share lecture halls at E7 and it is likely that lecture and tutorial schedules will be designed to minimize the need for students to visit the other side of campus. Other engineering programs centered around E5 or E6 would also benefit from a more accessible student space nearby as well as another C&D shop for snacks. It seems like a great idea to offer students another space where they can get work done and socialize near the main location of their lectures, tutorials etc.

If the students chose to contribute to E7 we will also be given the naming rights to the space, which would be really cool. The name would be a timeless testament to what we as students can accomplish and to what we find important. This kind of student involvement and dedication is something that should continue to be encouraged at the University of Waterloo.

More information on the E7 Referendum and why we hope you will vote YES can be found on the Facebook page [facebook.com/vote.yes.for.e7](https://www.facebook.com/vote.yes.for.e7). The page also includes some floor plans and a bit of the layout of E7 so if you are at all curious, you should check it out.

Thank you for reading our 2 cents on the E7 Referendum, if you have any questions please feel free to message us by Facebook, email or talk to us in person. Our e-mails addresses are m2buckley@uwaterloo.ca (Melissa) and mmamszej@uwaterloo.ca (Madeleine). We would be happy to hear your thoughts and concerns about this project.

Tech Ethics

Continued from TECH on page 5

of RIM’s global workforce, among other things.

O’Leary’s speech is not just problematic because of the focus on financial success over any other factor. It is problematic because it is false. First of all, O’Leary’s own story proves that one does not become rich simply by working hard. O’Leary’s first business success was a start-up in which the major investment was \$10,000 from *his mother*. O’Leary’s success can thus be attributed not to mere hard work and dedication, but to a connection to someone who provided him with \$10,000 to pursue his business. Moreover, it only takes a back-of-the-envelope calculation to show how low the chances are of becoming rich through “entrepreneurship competitions” such as those held at the Dragons’ Den or our own Velocity. Finally, and most notably, there are much more “efficient” ways

of making money than pursuing a post-secondary degree in engineering! And that we all knew when we picked engineering, or at least came to realize very soon after. So, choosing to become engineers, we were all after something beyond “the important work of making money.” Let us remember that and not lose sight of it.

Whilst we cannot claim to understand the faculty’s motivation in hosting O’Leary as a guest speaker, we can guarantee there are far more appropriate mentors for engineering students. We should demand that our faculty provide us with the opportunity to hear from people who are pushing the envelope and using engineering skills to change society rather than the likes of Kevin O’Leary. Who by the way, spent two hours “negotiating the price of a watch at a Swiss airport” and came to UW to proudly tell students about it? Really? We expect better from our faculty!

VOTE “NO”

FILZAH NASIR
“NO” COMMITTEE

In Fall 2014, Waterloo Engineering and the University of Waterloo announced plans for a new building, Engineering 7 (E7). The building is expected to begin construction in Fall 2015 and will cost an estimated \$88 million. Last summer, the Waterloo Engineering Society jointly approved a referendum asking students to contribute \$1 million towards the construction of the building through a \$25 dollar opt-out fee per student. This would be on top of the \$7000+ of tuition/term that Waterloo engineers already pay for their education. The facilities to be included in E7 will provide benefits to students in certain departments, but these benefits should be inherently part of the student experience and should be encompassed in the \$7000 per term that we pay. Tuition is continuing to rise and student debt in Ontario is at an all-time high. Given these factors, every additional cost to students must be weighed heavily. \$1 million towards a building that has many other sources of donations is not a good financial decision for students. I’d like to convince you to vote against this contribution. Here is an overview of the main points for E7.

Student support will garner donors.

While showing that students support the construction of the building might aid in gathering external donors, it is by no means essential. Since almost \$30 million dollars for the construction of the building are expected to be gathered by private sector donations, it is ridiculous to believe that the University doesn’t have a fundraising plan that doesn’t rely on proving student support. In addition, if the goal is to prove student support, there are a lot of ways to show this, which doesn’t necessitate a financial burden on students.

The fee is opt-out.

The fact that the fee is opt-out is used as an argument in favour of it by maintaining that anyone strongly against the fee can always get a refund. However, we only need to take a look at the many other opt-out fees we pay to know this isn’t always the case. The most similar fee to E7 is the endowment fund, WEEF, which is \$75 a term. Approximately 13% of students opt-out of the WEEF fee per term, which is actually higher than the percentage of students in A-Soc who voted in favour of the E7 fee. It’s clear that opt-out fees often take advantage of the fact that students do not have enough time or information available to opt-out. In fact, if the goal of the fee is to show that students support the construction of E7, the fee should be opt-in rather than opt-out.

Students should do their part.

Undergraduate students are already amongst the largest financial contributors to the university. And while yes, the building will contain many benefits for students, to claim that students aren’t “doing their part” in any capacity is not merely misleading, it’s simply dishonest. While tuition funds may not go directly towards the construction of new buildings, they will go towards every aspect of maintenance

of said building as well as contributing to the facilities provided within it. In addition, there is no reason tuition funds cannot go towards construction of the building if funds are needed (the Hagey Hall expansion is expected to be partially funded by “operating funds”), so the same could be done for E7 without requesting additional funds from students.

E7 will contain student space.

Yes, E7 is expected to hold new student space. And student space is important. Extremely so. Our university experience is determined by many factors, quality of education is just one amongst many. The rest is determined by a combination of student life experiences, and having student-friendly spaces which provide opportunities for students to build communities are integral to this. Amongst Ontario universities, UW is the second worst for providing student space on campus. Which is why the idea that students must pay up in order to be guaranteed new spaces is extremely problematic. Waterloo engineering students pay the highest tuition amongst engineering students across the country. According to UW this already guarantees us the best undergraduate student experience in the country. If this is true, why then are we being asked to pay more money in order to subsidize our student experience?

UW is expanding, so additional costs are expected.

Yes, UW is expanding (at unprecedented rates) but maintaining that students should be expected to cover the additional costs that come with expansion is illogical. In fact, expansion for the university means higher enrollment numbers, which means greater revenue. In addition to E7, the Engineering vision includes plans for an E8 and E9. Are students expected to provide funding towards each of these new buildings? Voting in favour of this contribution sets a bad precedent for future students. Across Ontario there has been a rise in students being asked to pay for new buildings and expansions that will in the end draw revenue for the university. Even at Waterloo, given there are so many new buildings in the plan, we shouldn’t set the precedent that students are expected to make a financial contribution to these expansions.

Out of over 4000 students registered in Waterloo Engineering in A-Society, only 430 of them voted in favour of the fee. In fact, even without a committee providing information about why students should vote against it, 256 students still voted against the contribution. The choice to hold this referendum was called by the Engineering Society Joint Council meeting which barely met quorum. A tiny majority of students shouldn’t be allowed to make a decision of this magnitude for the student body. There has been no meaningful student input into this process. The referendum has been run with the understanding that it will pass without any provision of alternatives if students choose otherwise.

Given that most of us will have graduated by the time the contribution comes into effect, we have a responsibility to future students to make a decision that does not negatively impact them. Those students will already have to pay higher tuition and will have greater debt. Should we vote to add the additional cost of a building (which is an essential component to their education) onto them? We should be pushing towards reducing the burdens on future students, not choosing to add more. On March 11-14th, vote ‘NO’ in the E7 referendum.

Update from La Presidenta

Ensure Your Opinion is Heard! Upcoming General Meeting and Referendum



ALLYSON FRANCIS
PRESIDENT

Hello again B-Soc, I hope you all made it through midterms in one piece! We are now halfway through our term, and the Society Calendar is as full as ever. There are a few items of special importance to note coming up in the next few weeks: the Term General Meeting, and the E7 Referendum!

The upcoming Engineering Society General Meeting is a great place to have your opinion voiced and represented. Every paying member of B-Society will be eligible to vote on the items presented. Currently there is a call for agenda items (due Sunday March 8th), and interested members are encouraged to submit motions to be considered at the meeting! If you have an idea but would like assistance to translate it into a motion, please do not hesitate to contact me at president.b@engsoc.uwaterloo.ca before this Friday (the 6th) and I would be happy to help you! The agenda will then be approved by the Engineering Society's Board of Directors and released for your consideration by Friday March 13th.

With the agenda's release, a proxy form will be made available online for

members who are unable to attend the meeting themselves, but would still like to be represented at the meeting. Each member in attendance will be allowed to hold their own vote plus one proxy vote, so please make sure you proxy to someone who does not already hold a proxy vote. Hard copies of proxy forms will also be available in the Engineering Society Office (CPH 1327). You must submit your form through your official Quest email address to speaker.b@engsoc.uwaterloo.ca, or in person to the Engineering Society Office's front desk.

Concurrently, the Engineering 7 Student Donation Referendum campaigning is underway. The referendum question is as follows:

"Are you in favour of a one million dollar student donation to the building of Engineering 7 paid through an optional fee of \$25 dollars per student per term to be collected starting once the building is open and continuing until the one million dollar contribution has been fully paid, with any collected surplus acquired after the final payment has been made going towards furnishing the undergraduate student spaces in the building?"

For more information, you can find each committee's statement in this issue of the Iron Warrior, as well as a general overview of the referendum here:

engsocwp.uwaterloo.ca/?p=978. Please don't hesitate to contact me to request clarifications on the referendum question, information regarding the building of Engineering 7, or to be directed to election resources. In addition, any questions regarding election procedures, including any concerns regarding voting, can be sent to the CRO Jennifer at cro.b@engsoc.uwaterloo.ca.

As always, I can be reached at

president.b@engsoc.uwaterloo.ca any-time, and would love to hear from you. Also, if you're interested in becoming more involved in the discussion and decisions surrounding engineering students, make sure you come out to the next Engineering Society Council meeting on March 4th at 5:30pm in the E5 LiveLink Room (3101). All are welcome, and I look forward to seeing you there!



Dean's Office

Artistic rendition of E5 and the future E7. Get ready to vote on the E7 referendum!

VP Finance Update

Ideas for Ridgidware!



MELISSA FERGUSON
VP FINANCE

Hello EngSoc!!

I hope that everyone had successful midterms. As the term is over half-done I will be focusing most of my time on transitioning my successor, Don Tu, so that he can have the most successful exec term possible. I know he will be a fantastic VP Finance.

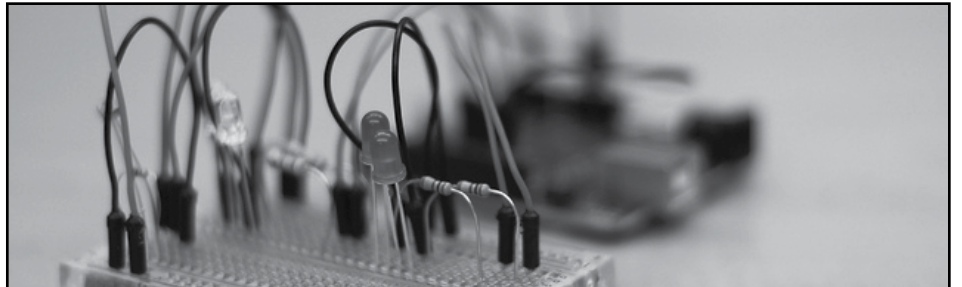
Since my last IW article there have been a few updates with Ridgidware

future ideas. We are still moving forward with the new cash register system, which is being designed by a team of management engineering students. This system will be a drastic improvement on the current systems being used in Novelties and the C&D, and if it proves to be successful, this system will also be implemented in these areas. I am also working on putting together pre-made project kits for purchase in Ridgidware. These kits would be great for starter projects for students with minimal electrical experience who want to gain practical knowledge about circuits. The projects will be along the

lines of LED alarm clocks, PCB design, Arduino-based weather stations, and other useful fun projects.

The sponsorship meeting this term

will be taking place in POETS on March 14 at 4 pm. I will be including the sponsorship allocations in my next exec article so stay tuned for those!



Betsy Weber

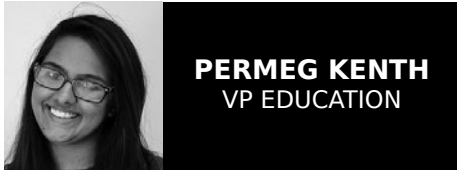
Project kits coming soon at Ridgidware!

Upcoming Events Calendar

Wednesday March 4	Thursday March 5	Friday March 6	Saturday March 7	Sunday March 8	Monday March 9	Tuesday March 10	Check out up-to-the-day event postings on the EngSoc website at engsoc.uwaterloo.ca
EngSoc Meeting #4 17:30-19:30, E5-3101		Weekly Charity Grilled Cheese 11:30-12:30, CPH Foyer Weekly Exec Hangout 12:30-13:30, CPH Foyer Semi-Formal 20:00-01:00, Waterloo Inn	EngHack 17:00-00:00, CPH 1346 National Engineering Month Rube Goldberg Build Day 2 11:00-16:00, E5	EngHack 00:00-19:00, CPH 1346 National Engineering Month Rube Goldberg Build Day 3 11:00-16:00, E5	2017 Year Spirit Social 18:30-20:30	Weekly Charity Grilled Cheese 11:30-12:30, CPH Foyer Iron Warrior Meeting 18:00-19:00, E2-2347 Genius Bowl 19:00-22:00	
Wednesday March 11	Thursday March 12	Friday March 13	Saturday March 14	Sunday March 15	Monday March 16	Tuesday March 17	
		Weekly Charity Grilled Cheese 11:30-12:30, CPH Foyer Weekly Exec Hangout 12:30-13:30, CPH Foyer GradComm Event 12:00-00:00 CANstruction 17:00-22:00	Grad Comm Event 00:00-02:00			Weekly Charity Grilled Cheese 11:30-12:30, CPH Foyer AutoCAD Workshop 17:30-19:30, MML WiE Solidworks 3D Keychain Workshop 17:30-19:30, MML Iron Warrior Meeting 18:00-19:00, E2-2347	

VP Education Update

Rankings are out, time for round 2!



Hey!

Hell week is over! Hope it went well. Be sure to get in touch with your professors and TAs once you get your midterms back. As I have said before, it's never too late to improve your grades. Use all the resources available to you, i.e. tutorials, help sessions, and office hours.

Now that midterms are out of the way, it's time to shift your attention back to Jobmine. Rankings for the first round are now complete. Congratulations to all those who got an offer and are no longer job-hunting! For the students working away from home or out

of province, start looking into your travel plans as well as accommodation.

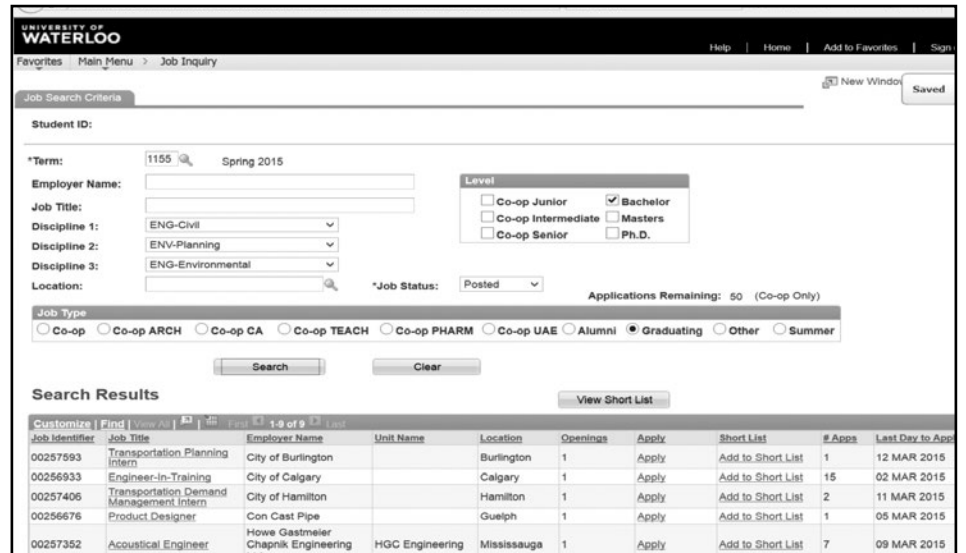
For those of you going into the second round of postings, take another look at your resume; make sure it is organized, error-free, current, and honest. If you are interested in a particular job and feel that you are the perfect fit, write a cover letter for it. Cover letters should reflect your personality and skills. Don't copy a cover letter for every job. Personalize it for each job application to fit the requirements and your skill set.

When you get selected for an interview make sure you read up on the background of the company and skills required in the job description. Prepare yourself before the interview by answering a few behavioural and technical questions you have been asked before. Just remember: don't panic, keep

calm, and do your best.

If you have any questions or concerns

please feel free to send me an email at vpeducation.b@engsoc.uwaterloo.ca.



Don't worry, there are still lots of good jobs on Jobmine during the continuous round.

VP-WINternal Update

Lots of upcoming events



Howdy folks, hopefully midterms treated you alright over the last couple weeks. Here are some fun things coming up to help you feel better about midterms!

-Semi-Formal is happening on Friday March 6th at the Waterloo Inn. The theme is Caribbean Carnival, and it should be a rockin' party!

-EngHack is happening starting on Saturday March 7th at 5:00pm and going strong until 7:00pm the next day. Come out, write some code, and build some cool stuff!

-Genius Bowl is happening on Tuesday March 10th at 7:00pm, so if you

have an abundance of random knowledge, or if you just really like candy, make a team of up to 6 people (at least 3 must be in engineering) and compete!

-On Saturday March 14th, EngSoc, along with Conestoga Engineering and our Architecture friends, will be taking a bus down to Toronto to see a Toronto Rock Lacrosse game. Come watch a game of Canada's other official sport!

For both Semi and Lacrosse events, tickets are on sale RIGHT NOW, so go down to the EngSoc Office (CPH 1327) and pick up your ticket today! Unless 'today' when you read this is after the event, in which case you're probably too late.

Cheers until next time,
Mat Tremblay



Rick Madonik

It is very exciting to watch the Toronto Rock play lacrosse.

VP External Update

National Engineering Month



March is a very busy time for VP-Externals all across Ontario, as it is National Engineering Month! National Engineering month is the largest celebration of engineering excellence in Canada, where over 500 events are held across Canada to show youth how amazing the engineering profession is. National Engineering Month can be considered essential to the growth of the profession in Canada, since it exposes children to engineering and its benefits at a young age, making them more likely to become engineers when they are older.

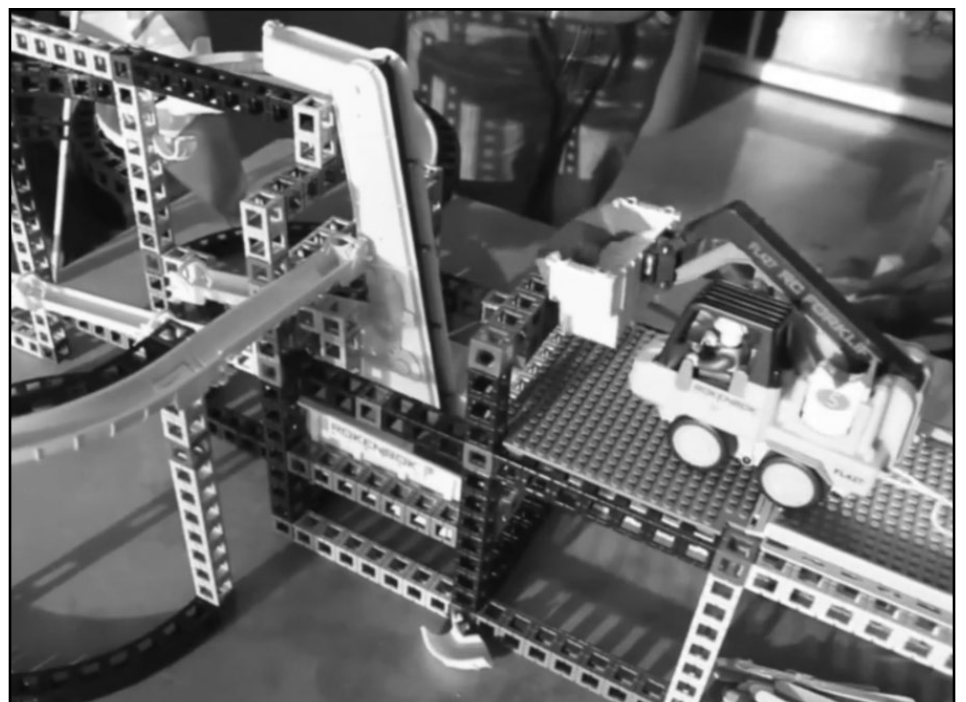
One of the largest events University students in Ontario can participate in for National Engineering Month is the construction of Rube Goldberg machines. A Rube Goldberg Machine is a machine that does a simple task in a complicated but amusing way. An example of a Rube Goldberg machine would be one that moves a ball from place to place by setting off various different devices. This March, most

engineering schools in Ontario will be constructing a Rube Goldberg machine, and will also be compiling a video which shows the machines being set off via cell phone text message vibrations. One school's Rube Goldberg machine will end by activating a text message, which will be sent to the next school's machine to start it. The final Rube Goldberg machine, this year built by Ryerson University in Toronto, will hit a button to light the CN Tower in downtown Toronto purple. The University of Waterloo's Rube Goldberg machine will be built on Saturday, March 7th and Sunday March 8th from 11 am - 4 pm in the Student Design Centre in Engineering 5. All those interested in building are welcome to join!

The Waterloo Engineering Society also uses National Engineering Month to volunteer and give back to the Kitchener-Waterloo Community. On Friday, March 13th we will be heading to Conestoga Mall to participate in CANstruction, an event where we build an interesting architectural structure out of food cans. All of the food cans will then be donated to the Kitchener-Waterloo Food Bank. On Sunday, March 22nd we will be pulling a school bus from Charles St. Ter-

minal in Kitchener to the University of Waterloo Campus. All of the people participating in the Bus Pull are asked to collect pledges which will in turn be donated to OneROOF, an organization that helps homeless and at-risk youth in the Kitchener Waterloo Area.

All-in-all, National Engineering month offers Waterloo students the opportunity to teach youth in the Waterloo what engineers are all about: fun, ingenuity, integrity, and a willingness to make things that help our world be a better place!

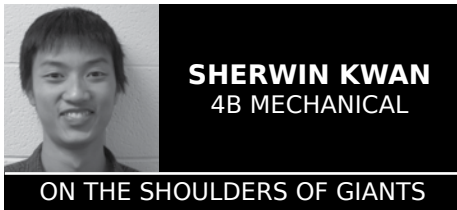


DrComplicated

A very small portion of Waterloo's 2013 Rube Goldberg machine.

On the Shoulders of Giants

Grand Trek Auto



SHERWIN KWAN
4B MECHANICAL

ON THE SHOULDERS OF GIANTS

This week, I shall tell the tale of Carl Benz, a great innovator, and Bertha Ringer Benz, who boldly went where neither man nor woman had gone before. By seeing possibilities that even her engineer husband failed to see, she managed, with one journey to visit her mother, to leave an indelible mark on the history of technology. Her trailblazing journey was a big reason why her husband's innovation would become ubiquitous for centuries to come, so that even today, when their surname is spoken, everyone immediately knows what technology you're talking about.

Carl or Karl (he seems to have used both spellings) Benz was, of course, builder of the first automobile. He was born in 1844 in Karlsruhe, Germany, an illegitimate child born in a hotel. Carl's father died when he was an infant, and he was raised by a single

mother who spent her widow's pension on giving Carl a good education. Carl excelled in his studies, and at the age of just sixteen, he was accepted into the mechanical engineering program at Karlsruhe Polytechnic (now known as KIT). One of his professors was Franz Grashof (the same guy that the four-bar linkage condition is named after), who taught him the background he needed for his later inventions.

By contrast, Bertha Ringer was born to a wealthy family, in the nearby city of Pforzheim. Following German tradition, her parents saved up for a dowry. In 1871 she met Carl, a young engineer whose start-up was struggling because he just wasn't getting along with his business partner. Bertha decided to spend her dowry money to buy out the partner's share of the company, and in 1872, Carl and Bertha got married.

For the next decade the Benzes' company primarily produced iron parts for the building industry. But that wasn't Carl's passion. An enthusiastic cyclist, he started to dream: What if I could put an engine on wheels? The Benzes pitched the idea to a number of in-

vestors. After getting some money, they sold their company and founded a new one, the Benz & Cie Rheinische Gasmotoren-Fabrik (Benz and Co. Rhine Gas Engine Factory). With the new sponsors, the Benzes were now financially stable enough that Carl could take his time realizing his dream – a self-propelling vehicle, powered by an engine.

He built on the work of many other inventors. In the 1850s, the Italians Barsanti and Matteucci had discovered that the combustion of a fuel-air mixture produced such a strong motion that an engine could be powered by using a piston to harness the engine. A few years later, Rochas discovered that compressing the fuel-air mixture before burning it dramatically increased the energy output. Then in 1877, the engineer Nik Otto combined these two ideas, building an engine with a compression stroke followed immediately by combustion, inventing the four-stroke cycle which now bears his name.

Otto, however, never tried to install his engine on a vehicle, not seeing the potential there. It was left to Benz and Co. to build the first automobile. There were a lot of setbacks

– many times, Bertha had to convince Carl to keep working at it, and her faith was rewarded. Over the next few years, the company would develop and patent several devices in response to challenges they encountered: a carburetor for storing fuel and mixing it with air, a gear shift and a clutch so the car could travel at faster speeds, and a water radiator to prevent the engine from overheating. Finally, in January 1886, Carl was issued a patent for his contraption, the first automobile in history.

After tinkering a bit more, Benz and Co. began selling cars to the public. There was just one problem. Sure, it was a nice gadget, but nobody really knew what it could do – could it really be useful for anything? Sales were few and far between. This is where Bertha decided to take action.

On August 5, 1886, Bertha got up very early, took two of her sons, and told them they were going on a journey to visit her mother. She left a note for Carl telling him where she was going, but didn't mention how. They

Continued on SHOULDERS on page 12

Co-founders

Voltera



NACHIKET SHERLEKAR
3N NANOTECHNOLOGY

COFOUNDERS

In this column, I interview the co-founders of start-ups to have recently come out of the University of Waterloo. In the last couple of years, there have been multiple stories of entrepreneurial success from the region, including companies like BufferBox, Thalmic Labs and Pebble. In this issue, I interview Alroy Almeida (Mechatronics 2013), one of the co-founders of Voltera, a start-up located at the Velocity Foundry in Kitchener. They recently launched a Kickstarter campaign to fund the development of their product, the Voltera V-One, a circuit board prototyping machine. As of last Friday, the campaign has raised over \$400,000, with their initial goal of \$70,000 having been funded in about 35 minutes.

Alroy welcomes me into the Velocity Foundry, where I am immediately blown away by the atmosphere and level of activity. The Foundry seems to be an ideal environment for entrepreneurs, with an open floor concept facilitating interaction and collaboration. We decide to conduct the interview in one of the many meeting rooms at the back of the Foundry. Alroy seems a bit worn out after the hectic last couple of weeks, but is still eager and enthusiastic when talking about his company's history and evolution.

As with a lot of other Waterloo start-ups, Voltera had humble beginnings as a Fourth Year Design Project idea. Co-founders Alroy, James Pickard and Jesus Zozaya, having had experience in electronics and hardware in the past, wanted to create something they were passionate about. Around the end of 2012, James came up with the idea of creating a rapid prototyping tool for electronics. 3D printing was big then, and gave a great boost to mechanical prototyping, but electronics needed similar attention. "Looking back, our FYDP was very simple compared to what we have now", says Alroy. While it's true that they have come a long way since then, at the time their idea created a stir, and won them the first place in their class. A week after their design symposium, they won the Velocity Fund Finals, and received prize money as a reward.

The feedback they received along with the money they won inspired them to form a com-

pany. "We finished our exams, and two days later we moved into the Velocity Garage" – and Voltera was born. That summer they also welcomed a new member, Katarina Ilic, a graduate of the Nanotechnology Engineering program. "She was actually on her way to do her PhD in Switzerland at the end of the summer, but the more she got involved the more she realized she wanted to stay, and decided to tell them she didn't want to do the PhD anymore. It was a pretty crazy beginning."

As time progressed, senior companies such as Thalmic Labs and MappedIn graduated from Velocity, and Voltera found itself becoming one of the senior companies, with new entrepreneurs coming to them for advice and borrowing their tools. However, the development of their technology seemed to have reached a dead end. Initially, they relied on inkjet printing for deposition, which posed several problems: "Inkjet uses a very thin ink... It shoots out picolitres at a time, but that wasn't working." The conductivity was poor due to the minimal amounts of ink used, and reliability was terrible since the conductive inks could not stick to FR-4 (the industry standard material for circuit boards). As a result, they decided to search for a different technology. After some research, they discovered more viscous inks (usually used for screen-printing), and decided to incorporate them into their design. "We started using this viscous ink technology, and realized that it was working! We still had a long way to go, but we were on the right track. The ink formulation, the electro-mechanical design and the software all had to be developed together for the product to work."

Alroy sees the V-One as a two application tool: one is very early stage prototyping and the other is small batch production. Prototyping can be used for quick testing by hobbyists or company professionals that do not have two weeks to wait for a PCB to be made. "We will be the first to admit that the boards we create do not match the ones you get at a factory. The dip in functionality is justified by the time and cost saved." The V-One is also capable of printing two-layer boards, through the use of an insulating ink that separates overlapping conductive layers; this makes circuit designs more compact. Components are subsequently hand-soldered. In addition, once you have a fixed design that you wish to replicate, the V-One can also be used to dispense solder paste bake the boards to attach the functional components. Also, the company is also offering template dev boards (Arduino Uno and Mega) to further speed up

the prototyping/manufacturing process.

In the summer of 2014, Alroy attended the Bay Area Maker Fair, where he was introduced to an organizer of HAXLR8R, a hardware accelerator program based in Shenzhen, China. At the time, they had no plans to move out of Waterloo, much less move to China. However, after submitting an application and getting accepted, they had a decision to make. "That was a really weird point for our company. We had all these plans laid out, and now we were faced with going back to zero. We had to ask ourselves, 'Are we okay with that? Are we okay with going to a country where we don't know the language or the people?'" After talking to people and learning about previous success stories, they decided to take the plunge.

"In order to start a company, you got to be sort of crazy. In order to start a hardware company, you got to be even crazier. The people you meet at HAXLR8R are really strange and magnificent. The people at Velocity are young, naïve and happy. In contrast, the people at HAX came from diverse backgrounds and had various levels of experience." After receiving a ton of mentorship and wisdom, as well as forming friendships that last a lifetime, the team returned to Canada in November 2014, with a renewed energy to take on the tasks in front of them.

In January earlier this year, the team attended the Consumer Electronics Show (CES), where they participated in a hardware competition hosted by TechCrunch. Spirits were high after

they passed the first round and entered the finals. With Jenny Lawton, the former of CEO of MakerBot as one of the judges, they had someone with the knowledge and experience to know where they were coming from. As luck would have it, the team ended up winning, and gained a ton of publicity as a result (their mailing list more than quadrupled); this immensely helped in publicizing their Kickstarter campaign. In addition, the feedback they received at CES was very positive. "There were a couple of people who came up to our booth and were like, 'So somebody finally did it'. People with 30-40 years of experience, grey hair and a tired look on their face would stop and question us, and their eyes would just light up. CES was one of the greatest moments for our company."

A couple of weeks after returning from CES, the company's Kickstarter campaign went live. "We had a goal of \$70,000; we blew past that in 35 minutes, tripled it in 24 hours, and now we're at \$400,000. Up on the TV in our meeting room we had the Kickstarter page open, and we were watching the number go up and up, and we were like, 'Is this real life?'" The success of their campaign has been quite heady, however they now have to get to work in order to fulfill their promises and meet the demand. It is hoped that their subsequent manufacturing and distribution process is a big success.

Voltera's Kickstarter is open until March 12, 2015. Visit voltera.io for further information, and back them to receive one of several perks offered!



The Voltera V-One.

Voltera

Album of the Week

Drake: *If You're Reading This It's Too Late*



ALEX TOTH
4B CHEMICAL

ALBUM OF THE WEEK

Two weeks ago, on a nondescript Thursday night, Drake surprise released his fourth album (if you listen to Wikipedia) or a \$12.99 mixtape (if you listen to Drake). Within minutes, rumours were flying: did he record and release the album secretly, without the direction of his label Cash Money, so that he could free himself of contract requirements and jump off the sinking YMCMB ship? Why is he calling it a mixtape and charging album prices for it? Did he really call out Tyga for his alleged relationship with 17 year-old Kylie Jenner? But looking back now after the dust has settled, this entire ordeal was quintessential Drake. Co-opting a new and popular trend, in this case the surprise album release popularized by Beyoncé, and making himself the face of that trend is basically his MO. He got his start flipping the theme of Kanye's 808s & Heartbreak and kickstarting the trend of introspective downtrodden rap that has now permeated the entire genre. He jumps on trends started by other, younger rappers (Migos, ILoveMakonnen), bringing them under his wing while amalgamating their ideas in a sort of mutually beneficial symbiotic relationship. Passive-aggressive jabs at other rappers? Also very Drake. And as for the music, it could never be mistaken for anyone other than Drake. 17 cold, paranoid yet melodic tracks make up *If You're Reading This...*, and although their sub-genres range from cavernous R&B ("Preach") to sparse Southern rap ("10 Bands"), they form a cohesive whole that showcases Drake's enormous progression.

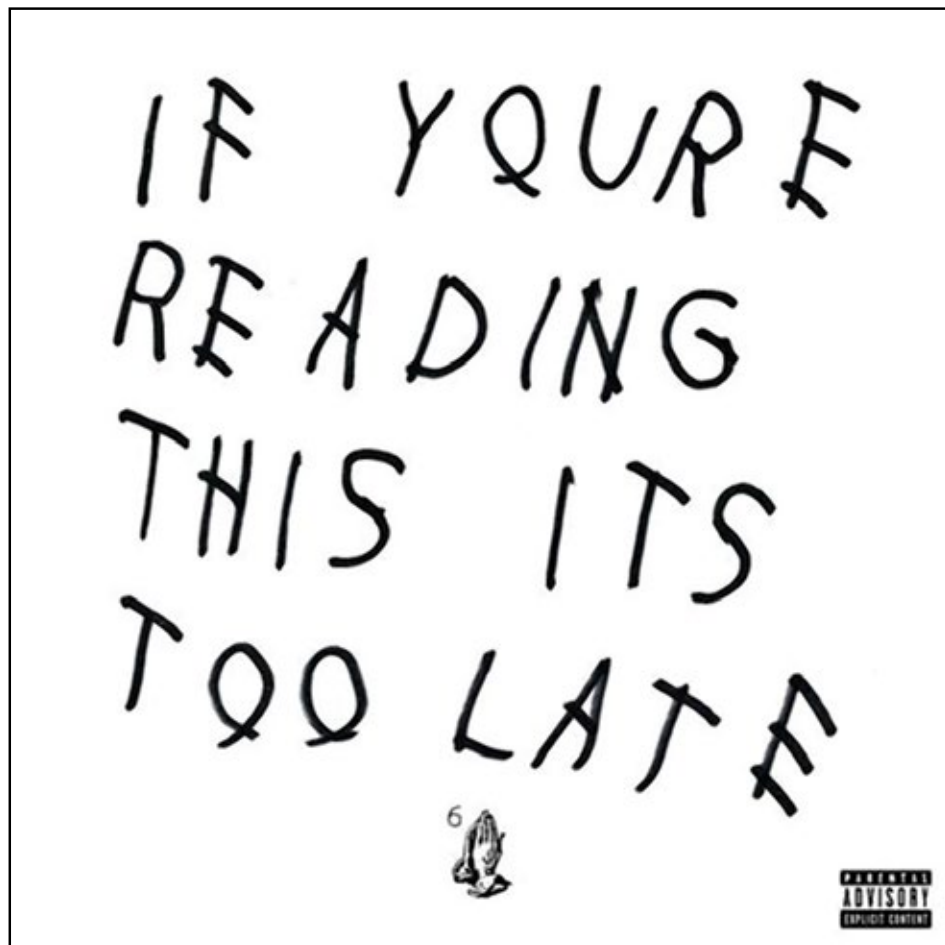
Honestly, my first time through *If You're Reading This...* I wasn't even sure

if I liked it. I missed the big hooks from his previous albums, the songs that were clearly destined for radio play. There's not too much of that here, where most of the tracks are painted in grey, ice blue, and deep purple. But what he eschews in immediacy he makes up for in complexity and cohesion. The themes, both musically and lyrically, are moody and frustrated and angry, which is par for the course for a Drake album. But the difference is: instead of interspersing these moments with celebrations of love and excess as on his previous albums, he plows right through with the bleakness. On "Know Yourself" he's "running through the city with my woes" over a spare and biting beat from Boi-1da. On "Used To," featuring an invigorated Lil' Wayne, he "ain't felt the pressure in a little while / it's gon' take some getting used to." This album isn't for the radio, and I'm not sure it wasn't even made with the fans in mind. It's specifically by Drake, for Drake, and that's the mindset you need heading into it in order to fully understand and enjoy it. And yet, the album's been wildly successful simply because it is by Drake. Inconceivably, all 17 tracks on the album have entered the Billboard Top 50 Hip-Hop & R&B tracks list despite not a single one being promoted as a true single. That's the beauty of Drake: when he's on his game, the entire industry warps in order to accommodate him.

Initially, so many lyrics on this album came across as corny. This is Drake we're talking about, so you can always expect some degree of cringe-worthiness in the lyrics, but I was seriously worried that he'd lost all sense of self-awareness on a few of these songs. On "Energy:" "Fuck goin' online that ain't part of my day." I mean come on, man, your entire existence revolves around maintaining an online presence, from being the ambassador for the Raptors, to throwing up Soundcloud remixes and freebies that

get nominated for Grammys, to just releasing an online-only album. And then there's this line on "Preach:" "Still in Miami / Most of these girls are too messy / I've got to do some reflecting." Or the bit on "Legend" where he complains about giving girls his Wifi password just so they can show him their Facebook drama. How can Drake be so fixated on these minor problems given the life he's living? But after I'd gone through the album a few more times and let it sink in a little more, I realized I'd missed an important distinction: these lyrics may sound corny, but what they really are is

honest. Everyone has problems, and just because Drake's seem minor to the average person doesn't mean that they aren't important to him. One of Drake's biggest talents has been letting the listener in on what feels like a very private part of his psyche via his music, and this album is no different. *If You're Reading This It's Too Late* is a moody, bitter and painstakingly honest album because that's the space Drake was in while he was recording it. And instead of ignoring that and making something dishonest, he's given us a view into his current state of being, and we all benefit because of it.



If You're Reading This It's Too Late

Drake

Geek Culture

Spidey swings to the Marvel Cinematic Studios



EMMANUEL
UTUAMA
2A ELECTRICAL

GEEK CULTURE

Hey Warriors, been a while. Hope reading week and midterms went well. This week's installment of Geek Culture will focus on the recently announced collaboration between Sony Pictures Entertainment and Marvel Studios, bringing the the amazing world of Spider-Man to the Marvel Cinematic Universe. Took them long enough. Sony has owned the feature rights to comic book character since 1999, when Marvel sold the rights to them for \$7 million. Sony has made five Spider-Man movies and rebooted the franchise twice. Hopefully with the help of Marvel Studios, the third time will be the charm.

First, here is the breakdown of the deal: there will be a reboot of the Spider-Man story with the new web-head being introduced first in a Marvel film, then Sony Pictures will release the next installment of Spider-Man on July 28, 2017. Sony will continue to distribute, finance, own, and have final creative control of the Spider-Man pictures. It is still yet unknown if these two Spider-Man movies will be integrated into a Marvel production but it will be nothing short of amazing.

Next, courtesy of Empire Magazine, here's a brief history of Spider-Man and the Avengers in the comics. Spider-Man first graced the pages of the Avengers comic in December 1964, in an issue that announces his co-starring status on the cover. He assists the assembled heroes in taking down a Spider-Man robot sent from the future by the power-hungry Kang the Conqueror. Spidey asks to join Tony Stark and co., but is denied admission. He might have been disappointed at the rejection following their first mission together, but Parker got his chance in "...To Become An Avenger!" a story in 1966's The Amazing Spider-Man Annual 3, when Cap, Iron Man and the rest decide to test him to find out if he's worthy of joining the team. Unfortunately, it does not go well. After a fight with the Hulk, Peter decides to decline the offer to become an avenger. Time skip to 2004, Spidey is again working alongside members of The Avengers, albeit in a time when the team has been disbanded. A prison breakout at the supervillain-holding facility known as 'The Raft' orchestrated by Electro sends members of the team (including Captain America) into action. Spidey tags along and is eventually offered membership of a freshly reconstituted Avengers, something he declines at first.

Can't forget the elephant in the web, Peter Parker's tie with Marvel's 2006 Civil War Comic Event, which is what the third

Captain America movie is based off. The Civil War storyline sees heroes taking sides over a governmental demand for superheroes to register their identities and submit to regulations. Tony Stark is among those who support the move, while Captain America speaks out strongly against it. Stark convinces Spidey to reveal his identity and initially goes along with the pro

side, before eventually siding with Cap.

Finally, Spidey will likely have a cameo/minor supporting role in Captain America: Civil War or Avengers: Age of Ultron. However, one thing that is clear is Spider-Man will be joining the ranks of captain America, Thor and Iron Man in the third Avengers movie. Make sure you catch the web-head at the movies soon.

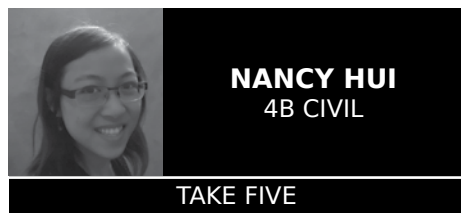


Marvel Comics

Spiderman last teamed up with the Avengers during the 2006 Civil War storyline - far too long ago.

Take Five

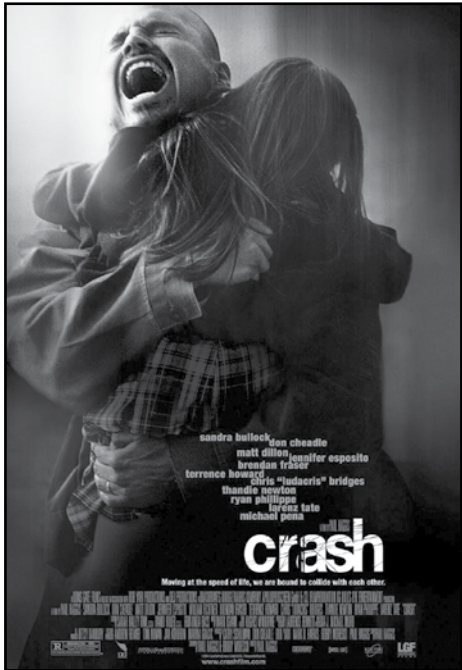
Trail Mix



I like trail mix. I like trail mix with nuts and granola and smarties and wasabi peas and dried fruit things.

Sometimes, movies are like trail mix. Writers and directors feel inspired and add visual puns, subplots, and other elements of visual and narrative interest, which is good, because minimalism - though beautiful - is as boring as a massive handful of peanuts.

It's clear I've gone a little bit nuts during the course of this term. Here are five movies that remind me of trail mix.

**Crash (2004)**

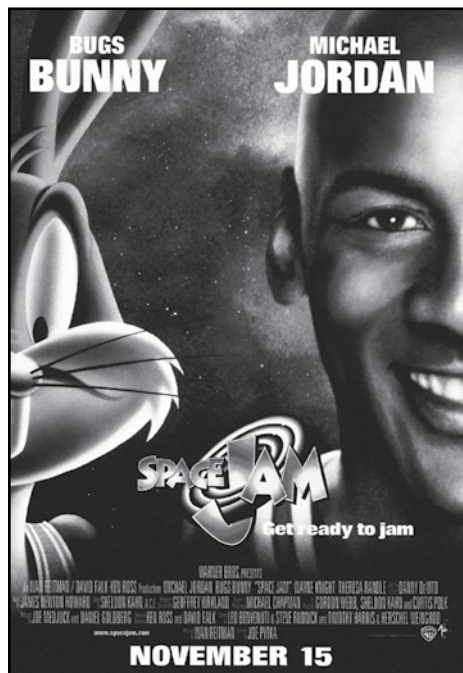
A bunch of people in Los Angeles have a very bad 48 hours.

I have no idea what Crash is about, besides being a vehicle to challenge one's racial and socioeconomic preconceptions. I liked it very much and was taken on more than one occasion by the plot twists and tensions. If you see racists in the wallpaper this movie won't pass your scrutiny, but eh, probably nothing does.

If this movie was trail mix it would be that spicy rice cracker mix with wasabi peas.

Space Jam (1996)

Aliens invade earth to kidnap the Looney



Tunes. The Looney Tunes bargain for their freedom by challenging the aliens to basketball. To win, they pull Michael Jordan (played by Michael Jordan) out of retirement.

For a movie with such a crappy website, its production values are pretty good! Of course, one doesn't have much of a point of reference for movies that combine live-action and animated characters in the same frame. You can't tell if it's realistic because one just doesn't see Michael Jordan twisted into a spherical shape and sharing the screen with Bugs Bunny.

But, you ask, is Space Jam a good movie? Well, unlike certain movies, Space Jam delivers exactly what it promises in an entertaining manner. I'd love to find out who first got the idea of putting Michael Jordan, Looney Tunes, Bill Murray, and invading space aliens together.

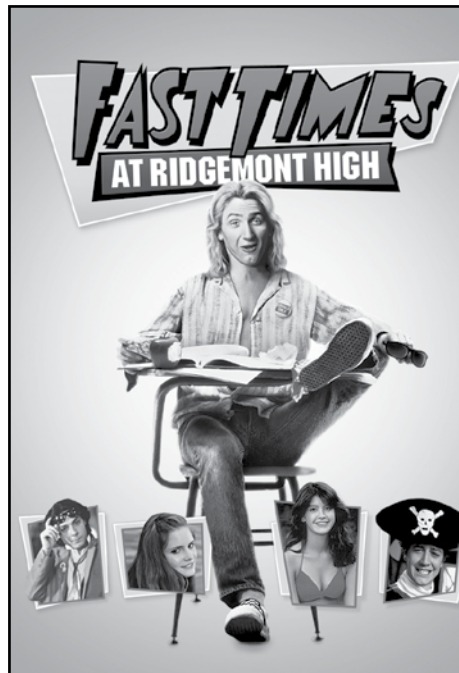
If this movie was trail mix it would be mixed nuts, M&Ms, and peanut butter chips.

Fast Times at Ridgemont High (1982)

A bunch of high school students figure out life.

There isn't much of a theme or goal uniting the students of Ridgemont High. They smoke things, screw things, and drive things. Nothing wrong with that. Though primitive, it's a perfectly pleasant prototypical high school movie. Don't expect profundity and you'll enjoy the 90 minutes of your life it occupies.

If this movie was trail mix it would be Humpty Dumpty Bits & Bites and popcorn



covered with THC butter.

Romeo + Juliet (1997)

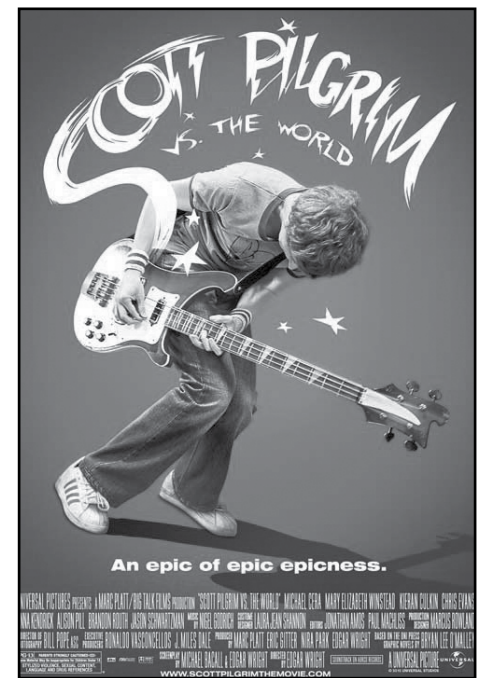
You know this story. Romeo is played by Leonardo di Caprio, who has since been trying to escape typecasting as a prettyboy and mostly succeeding, though the Academy Award eludes him. Juliet is played by Claire Danes.

The problem with Romeo + Juliet is that they don't throw ENOUGH ideas at it to liven it up. Sure, Mercutio is reinterpreted as a flaming black guy (Harold Perrineau), there are

"Sword" brand guns, and a gang war between the Montagues and the Capulets. Baz Luhrmann specializes in visual smorgasbords but there isn't enough novelty in this film to justify another adaptation, especially since the two leads - talented as they were, and are - are not up to the challenge of presenting Shakespeare.

Skip Romeo + Juliet and watch the 1968 adaptation instead.

If this movie was trail mix it would be that mostly dried cranberries, golden raisins, and sunflower seeds. Gross.

**Scott Pilgrim vs. the World (2010)**

Scott Pilgrim (Michael Cera) falls in love with Ramona Flowers (Mary Elizabeth Winstead) but must fight her seven evil exes before they can be together.

Scott Pilgrim lives inside a videogame version of Toronto, where everything has a health bar and explodes into coins when defeated. It is an astoundingly beautiful movie to watch, which is expected, since it's directed by Edgar Wright, he of the visual puns and fourth-wall painting hooligans. The story itself is not as dazzling as the detail in Scott's encounters with the evil exes, but is still excellently sweet and unironic in its message.

Scott Pilgrim vs. the World is not the best or most enjoyable movie ever made, but it is well made, stylish, and a definite must-watch.

If this movie was trail mix it would be caramel popcorn, dark chocolate pieces, and whole almonds.

On the Shoulders of Giants

Continued from SHOULDERS on page 10

pushed the car Carl was working on a little ways away from the house, making sure not to wake him, before turning on the engine. They would encounter and fix numerous problems before the day was over.

First of all, they didn't have a map. They had to ask around for a while to even figure out what horse-trail they needed to take (there were, of course, no paved roads yet). Before long, the fuel line became clogged. Not to worry, though - Bertha took her hairpin and cleared the fuel line. About halfway into their journey, the carburetor was running very low on fuel. (That's right, Carl hadn't invented a fuel tank yet - seems like he didn't realize how quickly the gas could disappear). Bertha eventually managed to find a pharmacist who had some petroleum sitting around, and the journey could go on.

When she drove up a steep hill, the little 2.5 hp engine just couldn't. So Bertha and kids had to get out and push. When the radiator ran out of water, they went into the nearest pub and got some. When they hit a steep downhill stretch, the brake almost gave way. In the next town, Bertha found a shoemaker to slap some leather on the brakes to prevent

them from wearing out, and thus brake lining was born. It was nighttime by the time they finally reached Bertha's childhood home in Pforzheim - but history had been made. Bertha sent a telegram to Carl when they arrived, telling him they'd just driven 100 km in his gadget.

The return journey was much smoother. When they arrived home, Carl began implementing a number of iterations to his design - a fuel tank was added, instead of just using the carburetor to store fuel. Extra gears were added for hills. And brake lining was installed. But more importantly, astonished journalists were reporting that the Benz car could actually be practical. The tipping point had been reached - the automobile was here to stay.

Over the next few decades, Benz and Co. would start mass producing their vehicles, and diversify to create trucks and buses as well. Imitating her first journey, every week Bertha would take out the latest car design and test it. Carl would make another advance in 1896 when he built the first horizontally-opposed piston engine. But soon, the pace of automotive engineering got too fast, and Carl just couldn't keep up - in 1903, he turned over the company to his two sons, who had

gone on that first car journey.

In later interviews, Carl always credited Bertha for believing in him and sticking with him all those years. The two of them - a meticulous, diligent engineer and a resourceful, visionary advocate - formed a great couple, and through them the world of the car was born. Bertha's contributions were all the more remarkable given that 19th-century Germany was quite a patriarchal society. It really shouldn't need to be said any more, but

may we never again think that any gender is more competent at engineering than another.

Carl lived just long enough to see the Great Depression, which required him to merge his company with Daimler Motor Corp. to stay afloat. Bertha would outlive her husband another fifteen years, passing away in 1944 at the age of 95. But their legacy is clear - and today, Daimler-Benz is a \$200 billion company making some of the most acclaimed cars in the world.



Bertha and Carl Benz in a Benz-Viktoria, 1894.

The Benchwarmer Report

New-look Blue Jays head to spring training



ELIZABETH SALSBERG
2T NANOTECHNOLOGY

THE BENCHWARMER REPORT

While we set record lows in the deep freeze that was last week, Canada's boys of summer are down in Dunedin, Florida getting ready for a fresh 162-ballgame campaign. Jays' pitchers and catchers reported for duty early last week, with position players joining in this past Friday. New acquisitions are "excited" about joining the Jays, and fans are psyched about the makeover they got this past off-season. So, without further ado, allow me to introduce you to the 2015 Toronto Blue Jays!

Wave goodbye to:

Colby "The FIVE tools" (or just a *tool*) Rasmus, Centrefield (CF). Good riddance. You never lived up to your potential here.

Melky Cabrera, Left Field (LF). It's too bad that Alex Anthopoulos was unable to re-sign Melky after such a solid season. The contract he got with the Chicago Cubs was not unreasonable considering his performance. Rogers should have paid up—the Milkman was a good fit with Latino buddies Jose Bautista and Edwin Encarnacion.

Adam Lind, Designated Hitter (DH). Another slugger that was really starting to come around last season. Not a huge loss, considering the signing of a certain quality catcher and the failure to trade a certain fairly well-hitting catcher who could also play DH quite well.

Brett Lawrie, Third Base (3B). A substantial loss; however, what we got for him and a couple of prospects (see below) tips the scale in our favour. If he can stay out of injury trouble, he will undoubtedly become a great ball player. But if his overzealous, competitive nature continues to dominate his game, this trade has the Blue Jays on the better end of the deal.

Casey Janssen, Pitcher (RHP): Left as a free agent at the end of last season, as expected. While he was certainly a valuable piece to the Jays (serving as the

full-time closer for the last two seasons), there are several candidates who are auditioning for his role. LHP Brett Cecil is one name being thrown around, but the overpowering velocity of youngster Aaron Sanchez is not to be overlooked either, if he doesn't come through as a starter.

J.A. Happ, Pitcher (LHP): Hot and cold, overall a starter the Jays could probably part with. When he was good, he was really good, but when he was bad, oh man... he was really, really, really bad. The final starter spot is going to be a story to follow at spring training.

Brandon Morrow, Pitcher (LHP): His inability to stay out of injury trouble led Alex Anthopoulos and Jays brass to finally give up on him. This is indeed unfortunate, as Morrow had shown sparks of talent and a serious ability to win ballgames. However, with the window of time to win with this roster closing, the Jays would need him healthy now so as to win... now..

Say hello to:

Russell Martin, Catcher (C). The best Canadian in baseball is in town. Martin not only brings pop at the plate (.290 batting average, 67 RBI's with the Pittsburgh Pirates last year), but he is also one of the most defensively talented catchers in the game, something the Jays will need as they develop their young pitching.

Josh Donaldson, Third Base (3B): In what will be just his third MLB season, the Oakland A's handed over their best player and all-star third baseman in a trade for Brett Lawrie. Batting .255 with a whopping 98 RBI's and 29 home runs, it's no wonder this man finished 8th in AL-MVP voting last year. Adding his bat to the mix will make the top of the Jays line-up one to be feared.

Mike Saunders, Left Field (LF): Canadian eh? Acquired from the Seattle Mariners for J.A. Happ, this one is a relatively young player, and by no means a bad one. Not a replacement for the Milkman's big bat, but certainly a useful piece to have: Last year with Seattle he hit .273 (batting average) with .341 OPB (on-base percentage). He is also much more athletic in the field, which will

certainly help the Jays down the stretch. Unfortunately, he needs to recover from his meniscus tear, which will have him out until at least the second week of April.

Johan Santana, Pitcher (LHP): Following shoulder surgery, the Jays signed Santana to a one-year minor-league deal this season. If he can get back to his pre-injury form, we could have ourselves a quality pitcher. Though production is by no means guaranteed, if he delivers, this two-time Cy Young winner will be a huge asset.

Plugging the holes...

Dalton Pompey, Centrefield (CF): Having not acquired a new centrefielder and after wisely giving up on and shipping seemingly infinitely long project Anthony Gose to Detroit (why would they even take him?!), young Canadian Dalton Pompey will be expected to build on his performance at the end of last season. Athletic and not apparently not

challenged with a bat, this is one bet that could be a good one.

Dioner Navarro, Backup Catcher/Designated Hitter (C/DH): Understandably a little teed off after being replaced as the everyday catcher by upgrade Russell Martin despite a solid season, Navarro asked the Blue Jays for a trade. Regardless, it would be best for the Jays if he could be happy playing DH game in, game out, at least for this year, and boost an already-strong batting line-up.

????? ??????, Second Base (2B): This is the one hole that continues to plague the Jays. This gap in the infield could be a serious issue. Ryan Goins is hardly starter-quality, and the body they got for Gose, Devon Travis, is not exactly up-to-snuff either. Then again, a somewhat decent-hitting second baseman appears to be a rare commodity these days. This will quite likely go unsolved yet again, so we had better hope that the rest of the defence and the other bats are able to provide consistent, quality play.



The Canadian Press / Nathan Denette

Jays catcher Russell Martin conspires nefariously with fellow catcher Josh Thole.



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The SFF Memorial Leadership Award Nominations

In recognition of the late Professors Saip Alpay and Wm. C. Nichol, and Sam Ceccerallo, Robert Elligsen, late former students of the Faculty of Engineering

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Nominations for the Memorial Leadership Award can originate from student groups, faculty members, or other individuals. A Letter of Nomination and Letters of Support from colleagues, faculty, and others familiar with the nominee's accomplishments are extremely important and form the major basis upon which the Executive Committee of the Sandford Fleming Foundation will form its decision. Nominations must be submitted to the Foundation by April 30, 2015 and/or before the last day of the student's 3A term.

The Memorial Leadership Award consists of a Certificate plus a citation, and an honorarium of \$1,000.

Nominations Must be Submitted to SFF Office Manager by April 30, 2015

**E2-3336, Extension 84008, sff@engmail.uwaterloo.ca
www.eng.uwaterloo.ca/~sff**

3 Body Language Tips to Change the Way You Feel

DEVIKA KHOSLA
1B NANOTECHNOLOGY

In my quest to improve my interview skills, I've been doing some research on body language. What I've found is that body language is useful not only to gauge others' feelings, but also to change your own attitudes. In other words, body language works both ways. For example, when someone is being open and honest, they tend to gesture with their palms facing upward. However researchers have also found that if you gesture with upward palms, you are more likely to be open and honest, and that it's harder to lie. Here are three ways to improve the way you're perceived as well as the way you feel.

Tip 1: Smile

Research shows that people who smile more live longer. In a 2010 Wayne State University research project, researchers looked at pre-1950's baseball cards of Major League Baseball players, and found that players who didn't smile in their pictures had an average lifespan of 72.9 years. Players who did smile lived an average of almost 80 years. In fact laughing or smiling, even when you don't feel particularly happy can activate part of your brain associated with happiness.

Smiling is not only a way to show people you are happy, it's also a way to show others that you are nonthreatening; a way to ask them to accept you on a personal level. If you smile at someone, they will automatically reciprocate. So smile; even if it's fake it can still cause another person to smile back at you, in-

ducing positive feelings in both of you which could eventually lead to real smiles.

Smiling back at someone when they smile at you is also a good way to tell whether their smile is real or fake. In one mimicking study, participants were told to look at pictures of people smiling and identify if the smile was real or fake. On their own, they did fairly well, but when they were told to put a pen in their mouth (to suppress the smiling muscles), their judgements weren't as accurate. If you really have trouble with identifying fake smiles, look at the eyes. In a real smile, the orbicularis oculi muscles are activated, causing wrinkle lines at the corners of the eyes. Also, the fleshy part between the eyebrow and the eye moves downward and the ends of the eyebrows dip slightly.

As a caveat, there are situations in which it might be better not to smile. For example, if you want to appear authoritative or more powerful, it will actually work in your favour to smile less. In business situations, mirroring the amount others smile, or smiling less in general can make you appear more credible and authoritative.

Tip 2: Don't cross your arms

In research conducted in the United States, researchers had two groups of volunteers listen to the same lecture. One group of students were told to adopt an open, relaxed position, with legs and arms uncrossed. The second group was told the opposite – to keep their arms and legs tightly crossed for the entire lecture. At the end, the researchers tested both groups on the material in the lecture to

compare retention rates. They found that the second group retained on average 38% less of the lecture. They also had more negative opinion of the lecturer and the material than the second group did.

In general, crossed arms are associated with defensiveness. Depending on the context, they could mean the person is cold, has a sore back, or is holding back negative feelings (fear, anxiety, disagreement, lack of understanding). In the third case, as long as the crossed arms continue, the negative feelings will persist as well.

If you encounter folded arms during a presentation, or in an interview, you'll want to find out what's causing it. In an interview it might be effective to ask something like "is there anything else you would like to know?" Similarly in a conversation, or presentation, you might lean forward and ask "What's your opinion?" Another way to break the crossed arms position is to give your audience something to hold onto, such as a pen, notes or a book, or to ask them to lean forward to show them something, such as a visual presentation.

Thus, the folded arms position not only makes you look less open, it also makes you feel more defensive. Adopting an open position can literally make you look and feel more open-minded.

Tip 3: Improve your Posture

You've probably seen that powerful dominant leaders stand confidently. They take up space. They stand up straight and tall. The less powerful tilt their heads down in submission. They pull their elbows in and hunch up their shoulders in

an attempt to appear smaller.

Amy Cuddy, a researcher at Harvard, found that adopting high power or low power poses for just two minutes has a significant effect on testosterone and cortisol levels. Testosterone is associated with aggression and confidence – higher levels mean more powerful presence. Cortisol is released when you're stressed. In the study, volunteers adopted the poses for two minutes before giving saliva samples, and were then given the opportunity to gamble. 86% of the participants who adopted high power poses gambled, compared to only 60% of participants in the low power pose condition. Moreover, high power participants experienced about a 20% increase in testosterone, and a 25% decrease in cortisol. Participants in the low power condition experienced the opposite – about a 10% decrease in testosterone, and a 15% increase in cortisol. These changes had a marked effect in how they were perceived. In a similar study, participants once again adopted either high or low power poses for two minutes, but then went into a stressful five minute job interview. Regardless of factors such as competence, qualifications, speaking ability, the people in the high power condition were evaluated more positively. People watching the tape, oblivious to the conditions of the experiment, wanted to hire people from the high power condition.

Now you know a few more ways that changing the way you move can change the way you think. Smile more and you'll feel happier. Unfold your arms and you can open your mind. Pose like you're powerful, and increase your confidence.

Sex-Ed Curriculum Changes Stir Nonsense (As Expected)



Ontario Education Minister Liz Sandals recently introduced changes to the sex-ed curriculum, which had not been updated since 1998. Ms. Sandals sates the goal of the changes is to make sure elementary school students living in a digital world are aware of what goes on online, and most importantly that they have "the right information."

These changes have allegedly been a priority since former sitting duck (quack!) / "Education Walk the Walk, but not Talk the Talk" Premier Dalton McGinty caved to religious and homo/trans-phobic, and yes (would you believe it?!) anti-abortion extremist groups. This time Ms. Sandals is putting her foot on the gas, as Ontario teachers will be well versed in the new curriculum in time for the Fall 2015 school year.

Here's a quick rundown of the most controversial changes: Students will be introduced to the concept of sexual orientation in grade 3, learn about homophobia and other forms of discrimination and how to handle them in grade 6, as well as more material on gender identity in grade 8. Students in grades 4-6 will learn about the dangers of posting sexual images and information online. In grade 7, "sexting" will be discussed in detail. (Source: The Globe and Mail).

In an attempt to avoid the nonsense that inevitably ensued, public-relations efforts were made prior to introduction

of the curriculum. Despite this, the extremist groups are at it again, using like-minded political figures as ammunition.

Several organizations including the Institute for Canadian Values (if the name doesn't sketch you out, Ching doesn't know what does), the Campaign Life Coalition (a pro-life, anti-abortion group) and other religious groups are taking to Queen's Park to protest the curriculum change. Among them are two politicians, including London MPP Monte McNaughton, who was quoted saying, "This government is disrespecting parents." Of course, Mr. McNaughton refrained from pointing out what exactly was "wrong" with the curriculum.

Well, Mr. McNaughton and company, Ching has a little reverse Ching-ology for you:

It is all well and good that you think

the new curriculum is disrespecting parents, but you tell me, do you watch your child like a hawk all day? Is that all you have time to do? How do you know your children aren't on porn sites? How do you know their friends aren't on porn sites? Just because you can afford to send your kids to some preppy private school where you pay for your children's marks doesn't guarantee anything. It's so easy for kids these days. Your kids probably have smartphones too. Porn on the go! Tinder! Dating apps for all ages! Boo YAH! Maybe you should check your child's browsing history... oops they probably know how to clear it and/or you don't know how to check that!

And then there's that one day when you awkwardly and inevitably find out. Would you enjoy that?

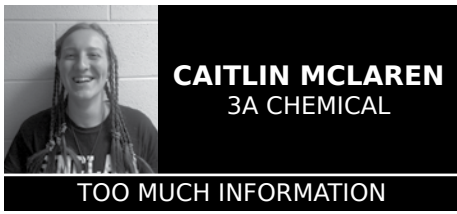
Oh that's not the problem you say? Can

you tell us specifically what the problem is, or would that be politically incorrect, sirs and mesdames? Oh it would now, wouldn't it? Oh, such a shame. Not to worry! Ching shall make it easier for you: You're worried that education about homophobia, etc. will make it okay for your children to feel comfortable with being who they are. So if, on the off chance... But this must be impossible! These things just started coming around now, it's not like we've had these people around for a long time or anything...your kid is gay/queer/transsexual/transgender, they should learn to hide that and be insecure for the rest of their lives. You will have to disown them. It's better to just never find out. That's easier. It is important to always choose what's easy—after all they are your kids so they'll just have to understand.

Consider yourself lucky if your kid discovers sex through Wikipedia instead of RedTube.

5 Things You Really Didn't Want To Know

Afterglow



Valentine's day was two weeks ago. How did it go? No matter what the outcome of your romantic overtures was, the ancients have a solution for you. It is best if you live on a farm, because you will need easy access to various animals. Specifically, various bits of animals.

Aphrodisiacs

Suppose your gifts of chocolate and flowers did not impress your significant other. How do you win their heart? According to Pliny the Elder, an ancient Roman naturalist, you should wear – as a necklace – the right section of a vulture's lung in the skin of a crane (the bird, not the machine). Of course, there are alternatives: you can also wear the right testicle of a rooster, wrapped in a ram's skin. The Greeks had a much more practical solution: burn a deer's tail, mix the ashes with wine, and smear the resulting paste on your genitals. Because alcohol and grit are always pleasant and painless substances that are lovely when applied to sensitive areas.

Of course, girls have one more alternative. According to the ancient Finns, secretly mixing your menstrual blood with a man's food will make him fall in love with you.

Protip: Don't do that. It's disgusting, unethical, and a Level II bio-hazard.

Antaphrodisiacs

You aren't really fond of your secret admirer. How do you get rid of them?

The Greeks have a solution for you: get them a drink! Of course, it will have to be a special drink. Get them to drink a man's urine, into which a lizard has been dropped. Another recipe involves mashing up some snails and mixing them with pigeons' droppings. Add the resulting goop to olive oil and wine, and again, get them to drink it.

Honestly, one can't argue with these. They will work perfectly. In fact, even suggesting them to someone will probably result in their leaving posthaste.

Increase your beauty!

If roses and paper hearts didn't work, don't give up! You can still catch your crush's eye through ancient beauty secrets. For example: the mysterious and lovely geishas of Japan captured men's hearts for hundreds of years. Their secret? Bird poop, smeared on the face. The guanine in the poop will make your skin lovely! Note: some people still do this today.

Of course, bird poop isn't the only option. If you want to go classic, you can use crocodile poop for a nice mud treatment! It may not make you more beautiful, but it is definitely more badass.

What if your chosen loves red hair? Use henna mixed with cow blood for

that fiery look. Mix some of the leftover cow's blood with sheep fat to make some nail polish.

What if you are squeamish, but have a terrifying disregard for personal safety? Of course, then you paint your face with lead oxide to make yourself pale, mercuric sulfide to make your cheeks red, and bromine mannite to paint your lips. You will die a happy death.

Betrayal

Everything seemed wonderful, until you caught your significant other with someone else. How will you punish them? We've all heard of stonings and other horrible things, but there are ways to get more creative. First of all, you have to be sure. How did the Romans find out? There is a pretty little bird called a hoopoe. If you catch one, cut its heart out, and place it on the genitals of your sleeping lover. She will then tell you the truth. Of course, you can also cut out the tongue of a hen and put it on her mouth, which will make her reveal the name of the other guy.

The ancient Greek punishment for cheating involved a radish, but not the little red ones. The adulterer would have a long, pointed radish hammered up the butt, in public. What if they are into that? Well then, in ancient Byzantium and India, amputation of the nose is an alternative punishment. Actually, only women would have their nose amputated, which seems unfair. However, an adulterous man could have a vagina symbol branded onto his forehead with

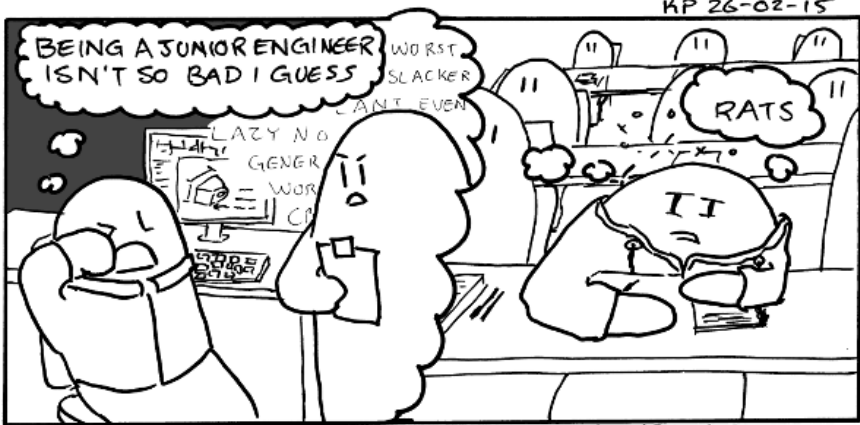
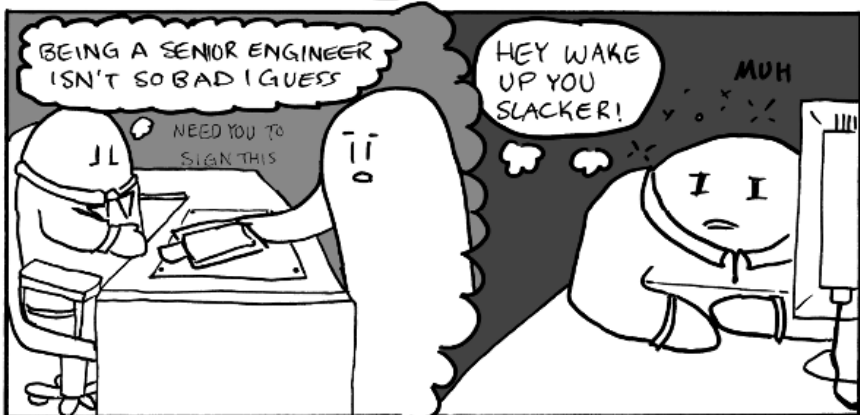
a hot iron, so it evens out.

Romance

Everything went perfectly! You are now married and thinking about starting a family. How do you ensure you get pregnant? Simple! First, you catch a weasel. Then, remove its right testicle and burn it. Mix the ashes with myrrh, and dab the mixture on a bit of wool. Insert the wool into your vagina, and you are guaranteed to get pregnant.

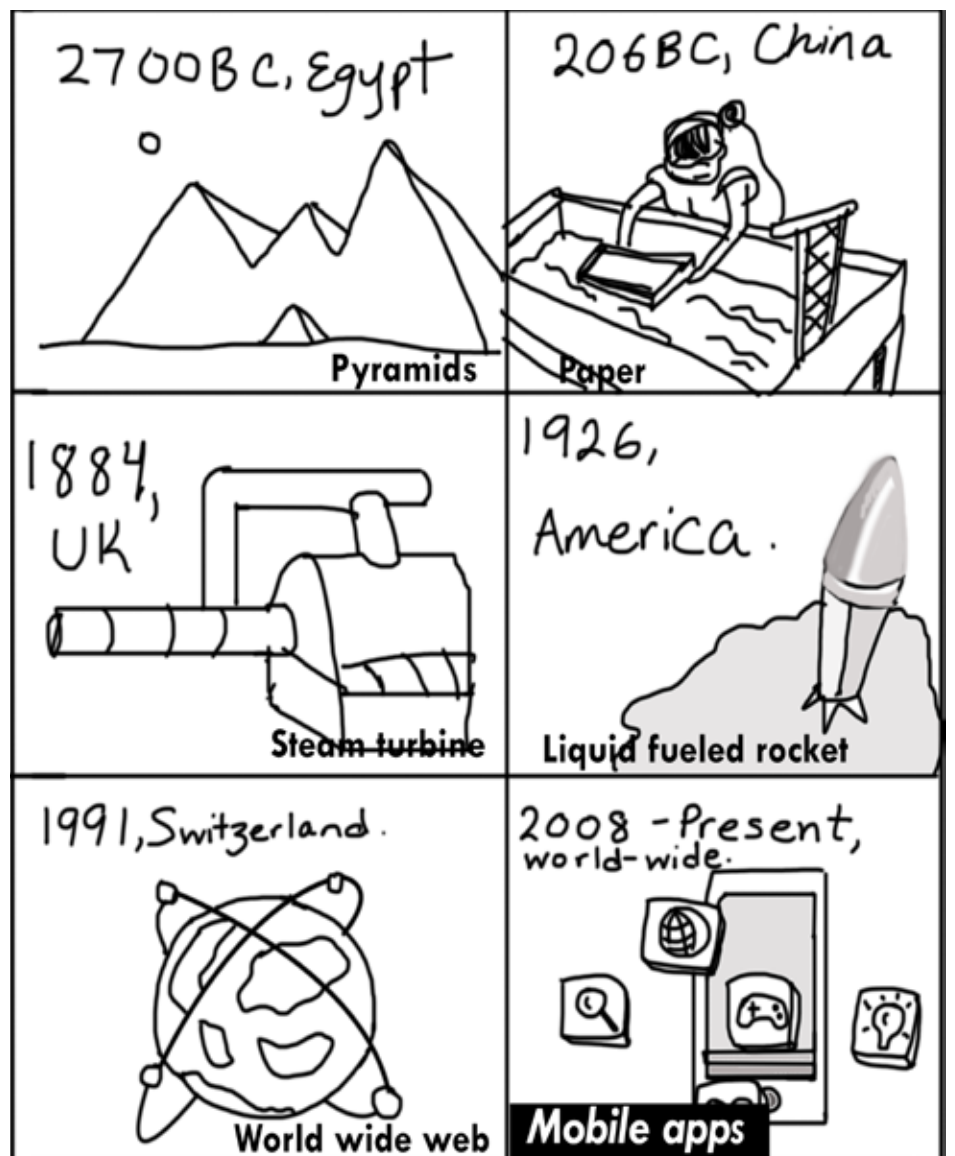
What if you want to wait a bit before having kids? Then, you are in luck, as you can use the same weasel. Wrap the left testicle in mule skin and wear it as a necklace. This is a surefire contraceptive. If you want to choose the gender of your child, Aristotle knew what was up. According to him, girls are produced by the left testicle, while boys are produced by the right one. To conceive the child of your choice, tie off the inappropriate testicle during sex, to prevent the wrong kind of sperm from fertilizing the egg. If the pregnancy is difficult, then why not follow Tudor England's medical knowledge and eat the boiled heart of a stork? (It will be delighted to bring you your baby afterwards.) If your stomach hurts, put herbs, vinegar, rosewater, and a dead bird in a bag. Place the bag on your stomach.

Of course, when you have your kids, you should take good care of them. Stay tuned for the next issue, wherein I will explain how to raise your kids the old-fashioned way.



Engineering Feats Through History

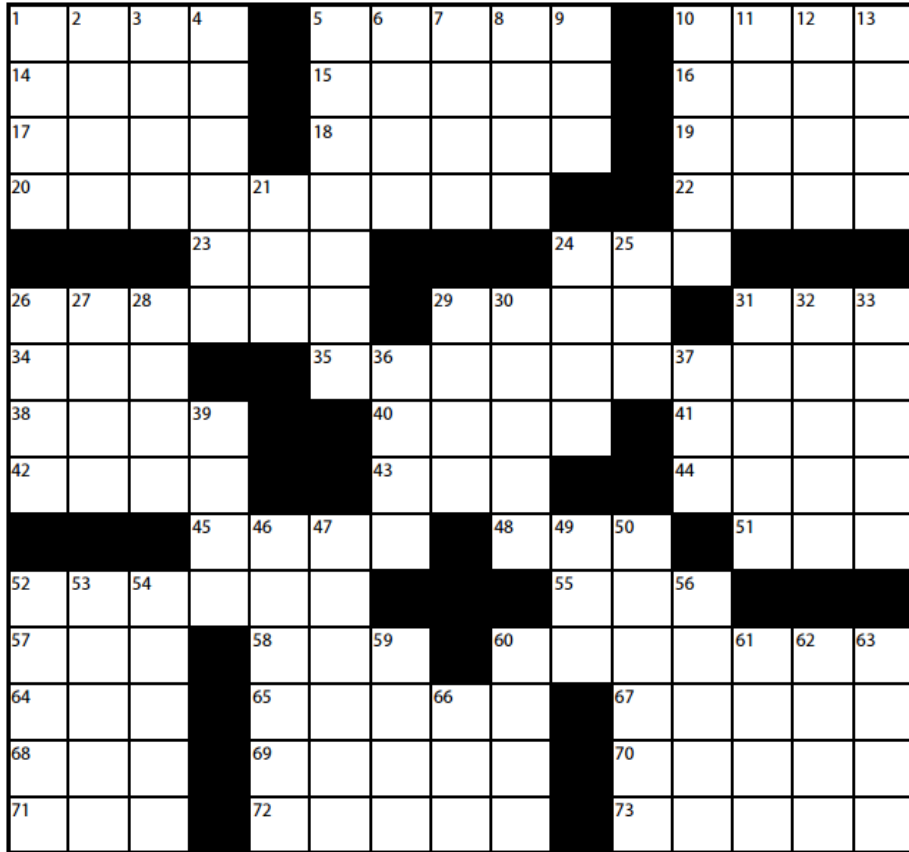
by Joanna Liu, 1B Chemical



The Iron Crossword

Tinker, Tailor, Soldier, SPY!

KATHY HUI
4B ENVIRONMENTAL



ACROSS

- 1. Tree's fur
- 5. Comedic spy Maxwell _____
- 10. Farm unit
- 14. Back curve
- 15. Foxy Pokemon
- 16. Accumulate
- 17. Group with a goal
- 18. Strict tone
- 19. Thus
- 20. Act of spy seducing (2 wds)
- 22. Loch _____ monster
- 23. Poor health
- 24. Point-form action
- 26. Ludlum's amnesiac
- 29. Shakespeare's "soon"
- 31. Sudan ethnicity
- 34. Plant ____ (abbr.)
- 35. Secure hideaways
- 38. Commonly taken in DC or DP
- 40. Split wood
- 41. Eg. Sloth and pride
- 42. Delicious: short and vowelless
- 43. Virtual address
- 44. Found on a cliff or blade

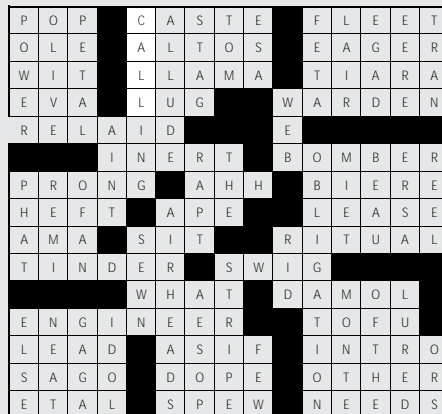
- 45. Directs
- 48. Dog talking?
- 51. Opposite of barf
- 52. Coding machine
- 55. Garage lounge
- 57. Engineering lab's print system
- 58. Part of a keyboard key
- 60. This crossword title's novelist
- 64. MSN's rival
- 65. Pleasing to the olfactory bulb
- 67. "____ Start Here"
- 68. Fusion fighting?
- 69. Spy's disguise
- 70. _____ in the bud
- 71. MI6's alias
- 72. 2014 move of the year?
- 73. Ex. drugs, weapons, cars

DOWN

- 1. Mental or applied
- 2. Grayscale snack
- 3. Look over
- 4. Dollop (variant spelling)
- 5. Opposite of erodes
- 6. ____ kat

- 7. Australian singer Velis
- 8. Reduces your OSAP
- 9. Golf ball locale
- 10. Spy
- 11. Feel
- 12. Oil drillers
- 13. A book of Mormon
- 21. Yang's opposite
- 24. One of the Beatles
- 25. Same Beatles' lover
- 26. Fleming's agent
- 27. Colourful gem
- 28. State's mailpeople
- 29. Distance away
- 30. Recently
- 31. Out of the way
- 32. Civil engineer's game?
- 33. A spy, to their agency
- 36. PC brand
- 37. Put in action
- 39. Hippy carpet
- 46. Make a dent
- 47. In the bones
- 49. One or eleven
- 50. Antsy walking
- 52. MOT or EOT pains
- 53. Actress Watts
- 54. Belonging to Actress Fisher
- 56. Message transmitter
- 59. "Habits" - ____ Lo
- 60. Bird with sky or song prefix
- 61. Bounty hunting cars
- 62. Ambush
- 63. Establishes (abbr.)
- 66. De la ____

Last Issue's Crossword Solution

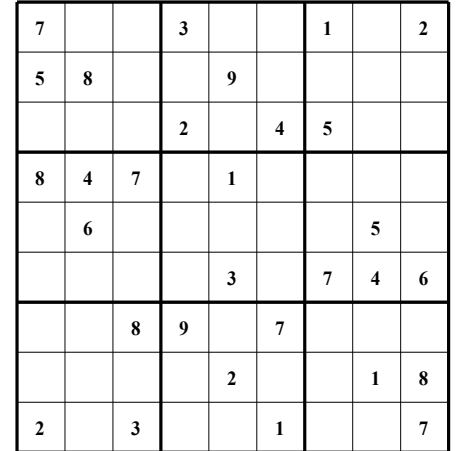


Sudoku

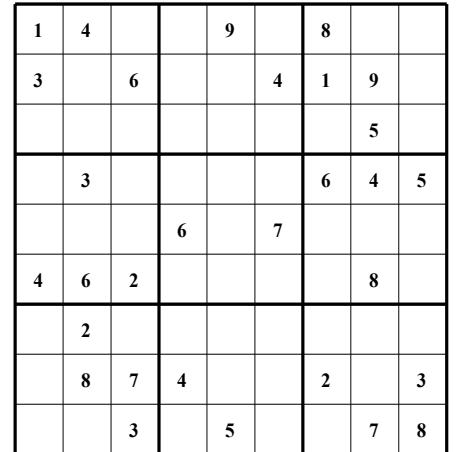
#2015-03

NINA FENG
3B ENVIRONMENTAL

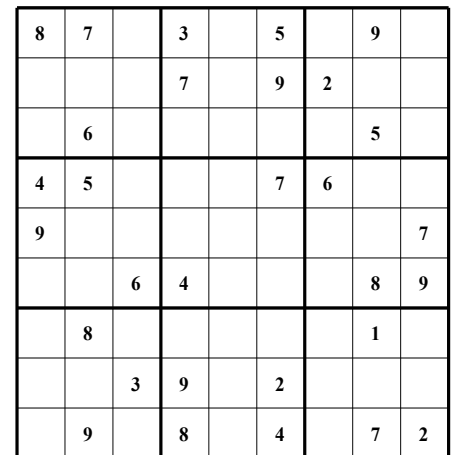
Youngling



Padawan



Jedi Knight



Issue 4 Deadline:
Friday, March 13 at 6:00 p.m.
Send your submissions to:
iwarrior@uwaterloo.ca

THE IRON INQUISITION
Bryan Mailloux, 1B Mechatronics

"When was your last all-nighter and why?"



"I can't recall my last full all-nighter, but half all-nighters happen pretty frequently."
George Du, 4B ECE



"2 weeks ago, watching Baywatch season 2."
Talal Antar, 4B CIVE



"Last night, for my CIVE 507 exam."*
Mahdi Rafat, 4B CIVE
*Note: sunglasses are to hide puffy eyes



"Last Wednesday, for my programming mid-term."
Rhea Philip, 1B Mgmt



"ZZZZZZZZZ..."
Tired Generic Engineering Student



"Never - they're not effective for studying. Or maybe I just got lazy since high school."
William Li, 1B Mgmt