



"WHAT IS LOVE? (BABY DON'T HURT ME)"

DON'T HURT ME, NO MORE.

Welcome all, to the 5th issue of **mathNEWS**.

We have a delicious issue for you with topics that will appeal to everyone in some family, somewhere! We touch upon (gasp!) love, heartbreak, anime, games, consciousness and of course, math. After all, what is **mathNEWS** without math? Just **NEWS**? Preposterous.

It should be noted, however, that this issue does not contain either **mathASKS** or a featured professor. We apologize for this massive inconvenience </3

Looking to the next section on the same page, there are so many differing opinions about the definition of love which begs the question: is love quantifiable?

Perhaps "What is hate?" would have been a better question. Hate, after all, is one of the most tangible and satisfying emotions that unites the most unlikely people together. How many friends have you made bitching about the assignment you both procrastinated on? *Exactly.*

Turning to music for an answer, I check Spotify and find only 10 songs including the keyword "hate", and at least 232 songs with "love"! (Not including songs that do not have "love" in its title.)

To show that love is felt differently by all, here is a tiny love playlist lovingly handpicked from me to y'all:

- Hello, I Love You – *The Doors*
- What Is This Thing Called Love – *Bill Evans*
- Bold as Love – *Jimi Hendrix*
- Love Lockdown – *Kanye West*
- Possibly Maybe – *Björk*
- Love Of My Life – *Queen*
- Can't Buy Me Love – *The Beatles*
- Love Hurts – *Nazareth*

If you love the playlist, please do everything with love. If you don't, you should be doing everything with love anyway. Take care. Bang out those penultimate assignments (with love)!

stapLED
Editor, **mathNEWS**

itorED
Editor, **mathNEWS**

ME	I don't know shit about love.
SOVIET CANADIAN	A chemical reaction in the brain that leads to potential stability and reproduction.
YANG CHEN	Love is sharing.
TNA	A table.
ITSH	This question alone is too profitable for those in power to allow it to ever be answered.
NVRCK	The most dangerous drug.
DIANE	An endless supply of snacks.
ROMANCE RICK	The missing piece of the puzzle.
LOVE	I am.
SAPPY STEVE	No more...
STEVE	A single white rose... or a fart.
MELISSA	My favourite weapon.
DINOSAUR	rawr (<i>Editor's Note: xD</i>)
SOME DUDE	♪ It's all you need ♪
NOT SHREK	Shrek is love.
GLOVER	My middle.
HERBIE	By Exo.
WALDO@<3LE-GASP.CA	Nothing I get from STATs but everything I get from Soviet Canadian, and more!
THE DEPRESSIMIST	A dangerous liability. (She hurt me.)
TBDED	Volunteering to help out.
STAPLED	From my observations, I'm inclined to say Tinder... ??
YCLYPED	Zero points in a violent tennis game.
SWINDLED	Offering to write the mastHEAD
ITORED	Someone eating your food without permission and you not getting mad at them.

ARTICLE OF THE ISSUE

This issue's article of the issue goes to *Approximating romantic compatibility using 2D polygons*. Many great shapes were drawn in this article, and hopefully will continue being drawn in future.

Congrats, Romance Rick! Come to the **mathNEWS** office to pick up your prize of a \$25 gift card to Conestoga Mall.

No.

ESTHER AHN, **mathNEWS** EDITOR FOR SEASON 2018
ALONG WITH CLYDE BROWN, ANUJ OPAL, HEATHER STONEHOUSE AND MICHELLE ZHU

profQUOTES 137.5

PMATH 320: BENOIT CHARBONNEAU

“ Sometimes I start to do things on the board and then you regret it.

AFM 372: FRANK HAYES

“ It's not a bug, it's a feature!

CS 136: PHILLIPP KINDERMANN

“ You stay overnight with someone, in the morning, their husband comes home, so you leave... the shirt's gone.

CS 488: GLADIMIR BARANOSKI

“ If you try to be cute in the final, you are dead.

STAT 337: CECILIA COTTON

“ I went mountain biking once, and super-manned over the handlebars. I'm not a wimp, but that was enough for me.

“ Takeaways from STAT 337: Wear your helmet when you're skiing, wear your helmet when you're biking, and get vaccines!

“ I hope you never have to spend a weekend reading randomized control trial literature...

CS 200: BARBARA DALY

“ A lot of CS profs don't know how to use Excel. It's staggering. I make it easy for them by adding button.

“ The LCBO ... my daughter called it "Lick-bo" ... and then I heard it called that on the radio ... *shudders*

“ There's a ridiculous amount of students on campus ... especially in Fall ... not you though. You're not ridiculous. You're awesome.



Yang Chen

N WAYS RESEARCH PROJECTS CAN BE MADE EASIER

VIOLATING ACADEMIC INTEGRITY NOTWITHSTANDING...

- A thesis statement/research topic is plainly given to you, along with every single publication that you should be reading/researching
- Summaries of papers you have to read are available in easily digestible bullet lists
- Computers are able to just read your mind and make sense of what you're researching so you don't have to waste time typing and re-typing all your stuff because it didn't make sense the first time
- You don't have to present your research projects in a manner that involves public speaking
- Using Wingdings font (no one can question what they can't understand right? Right?)
- Bonus! For group projects: You and your group mates are 100% on the same page and they don't end up changing things in a less-than-ideal manner on you

Narf Dert

N COMMENTS TA'S HAVE LEFT ON MY FIRST YEAR ASSIGNMENTS

- Incorrect reasoning
- You cannot assume this
- This is a little hand-wavy
- This is just not true
- What you have written doesn't make sense
- But why?
- How did you get it though?
- Simplify your numbers... it is not the marker's job
- Not necessarily true
- What?
- The fact is, both a and b are badly written proofs
- NO
- This theorem does not exist...
- You cannot conclude that
- This is 0! How did it end up as 8?
- Then?
- This is not true and it wasn't what the question asked
- How do you know?
- Nice

THE BEST ANIME FOR YOU, WHO HAS RECENTLY BROKEN UP WITH YOUR PARTNER

Before I give you the anime that you're guaranteed to get hooked on, let me say that different circumstances call for different treatments. Therefore, I encourage you to find the category(s) you fall under to see which anime fits you best.

YOUR PARTNER BROKE UP WITH YOU BECAUSE THEY UNDERESTIMATE YOUR CAPABILITIES:

Megalo Box: Don't take it too hard my friend, you know that you're the real deal so who cares what others think? Enjoy the journey of a young man who is determined to prove to the world, and to himself, that he isn't a fraud and he can make it to the top.

YOU BROKE UP WITH YOUR PARTNER BECAUSE THEY'RE LAZY, WHINY, AND HOLDING YOU BACK IN LIFE:

Berserk: Great decision, my friend. If you aim to be great, you shouldn't let weaker beings hold you back. I'm sure you'll connect with some of the characters in this show as they grow stronger and achieve their objectives all by themselves, even if it means sacrificing others along the way.

YOU BROKE UP WITH YOUR PARTNER BECAUSE THEY THINK ANIME IS STUPID:

Danshi koukousei no Nichijou / K-On: Just some anime boys (and girls) going about their daily lives. Very entertaining and has the mysterious potential to make you laugh, smile and generally feel good no matter how hard of a situation you're in.

YOUR PARTNER BROKE YOU UP WITH YOU BECAUSE YOU'RE A "NORMIE" WHO ISN'T INTO ANIME:

Brooklyn 99: Well, if you're not into anime, why would I recommend an anime? Anyway, this is a genuinely funny show and you'll probably enjoy it.

YOUR PARTNER BROKE UP WITH YOU BECAUSE YOU CAN'T COOK AND THEY'RE TIRED OF THE PILE OF TAKEOUT GARBAGE YOU HAVE INFESTING YOUR ROOM:

Sword Art Online: Why bother eating and doing all the healthy stuff these adults are expecting you to do? Simply put on your VR headset and live inside an MMORPG!

YOU BROKE UP WITH YOUR PARTNER BECAUSE YOU'RE A TRUE CHEF BUT THEY DON'T RECOGNIZE YOUR TALENT:

Shokugeki no Soma: Share your passion with Soma, a young chef who is determined to become the best chef there ever was and to serve the best dish he can at every occasion.

YOUR RELATIONSHIP ENDED BECAUSE ONE OF YOU LOST THEIR MEMORIES AND ARE UNABLE TO REMEMBER ANYTHING ABOUT THE OTHER:

Golden Time: Telling the story of Tada after his amnesia, this anime will hit hard. It is funny at times and very sad at others. Torn between the person who he is and the person others remember him to be, the protagonist lives a divided life until he reconciles his present and past and starts to look at a bright future.

YOUR PARTNER BROKE UP WITH YOU BECAUSE OF SOMETHING YOU DID THAT THEY THOUGHT WAS IMMORAL, BUT YOU DID IT TO CLAIM WHAT IS YOURS:

Code Geass: What is rightfully yours is yours to claim. Follow the story of Lelouch Vi Britannia as he reclaims the throne of his kingdom after being cast away.

YOUR PARTNER BROKE UP WITH YOU BECAUSE OF SOMETHING YOU DID THAT THEY THOUGHT WAS IMMORAL, BUT YOU HAVE TROUBLE UNDERSTANDING WHAT THEY MEAN:

Violet Evergarden: Follow this female war veteran as she struggles through integrating back in society after the end of the war and losing the person she held the most dear.

YOU BROKE UP WITH YOUR PARTNER BECAUSE THEY'RE BORDERLINE INSANE AND HAVE A TWISTED WAY OF THINKING:

B: The beginning / Psycho Pass / Monster: Some people are just beyond salvation, congrats on making the necessary decision in your life. These anime will reassure you that you're not alone, and that for every twisted individual, there is a righteous one trying their best to stop them.

YOUR PARTNER BROKE UP WITH YOU BECAUSE THEY DON'T BELIEVE GOD IS SPEAKING TO YOU AND GIVING YOU A MISSION YOU'RE HAPPY TO FULFILL:

Death Note: If you receive great power to change the world, isn't it your responsibility to do so? Follow the journey of Kagami Light as he turns the world upside down all by himself.

YOUR PARTNER BROKE UP WITH YOU BECAUSE THEY DON'T BELIEVE THAT THE GOD SPEAKING TO YOU IS EVIL AND WILL END ALL HUMANITY IF NOT STOPPED:

Seikasuru Kado: What would you do if a supernatural being came and talked to you about improving the human race, giving it infinite energy and elevated senses, but you're the only one who realizes what their true motive is? Follow the adventure of Kojiro as he negotiates his way with a higher being to save humanity.

YOUR PARTNER BROKE UP WITH YOU BECAUSE THEY THINK YOU'RE OVERLY ATTACHED AND A THREAT TO THEIR SAFETY AND THE SAFETY OF THEIR SURROUNDINGS:

Mirai Nikki / Higurashi: Well, your partner agreed to be with you, and they also said they'll be by your side forever until death does you part right? It's only right to make sure they keep their promises.

YOU BROKE UP WITH YOUR PARTNER BECAUSE YOU FOUND OUT THEY WERE WEARING FAKE CAT EARS AND DIDN'T ACTUALLY POSSESS FLUFFY TAIL & EARS:

Wolf & Spice / Omamori Himari: I recommend the first if you're looking for a rich story that is both captivating and thought-provoking, and the second if you're only looking for a laid back experience of watching a cute cat spirit samurai girl sometimes fighting with a sword.

YOU BROKE UP WITH YOUR PARTNER BECAUSE YOU FOUND OUT THEY WERE ACTUALLY DRINKING TOMATO JUICE & KETCHUP AND ARE NOT REALLY A VAMPIRE:

Vampire Knight / Rosario to Vampire: It's up to your romantic preferences, you'll know which one is for you by either looking at the first page of Google Image Search or the first 5 minutes of the 1st episode.

YOU BROKE UP WITH YOUR PARTNER BECAUSE YOU WANT TO GO ON A JOURNEY WITH YOUR BEST FRIEND ACROSS THE WORLD EXPLORING NEW PLACES:

Hunter x Hunter / Magi: The Labyrinth of Magic: Fun adventure filled with action and exploration carried by a courageous main character and a cool side kick.

YOUR PARTNER BROKE UP WITH YOU BECAUSE YOU REFUSE TO LET THEM SEE THEIR FRIENDS AND GO ON ADVENTURES WITH THEM THAT DON'T INVOLVE YOU:

Mirai Nikki / Higurashi: Please refer to 4 paragraphs ago.

YOUR PARTNER BROKE UP WITH YOU BECAUSE YOU'RE ATTACHED TO YOUR SIBLINGS MORE THAN THEY'D LIKE AND THEY REFUSE TO LET THEM MOVE IN WITH YOU:

No Game No Life: The story of an inseparable brother and sister who got transported into an alternate world where they have to lead humanity to win against the other fantasy races.

YOU BROKE UP WITH YOUR PARTNER BECAUSE THEY'RE SPENDING TOO MUCH TIME WITH THEIR FAMILY THAT COULD BE BETTER SPENT WITH YOU:

Mirai Nikki / Higurashi: Please refer to 2/3 paragraphs ago.

YOUR PARTNER BROKE UP WITH YOU BECAUSE THE GOVERNMENT FORCED THEM TO AS THEY ARE WATCHING YOUR DAILY MOVES AND CONTROLLING WHO YOU'RE WITH / YOU BROKE UP WITH YOUR PARTNER BECAUSE YOU FOUND OUT [OR AT LEAST SUSPECT] THAT THEY'RE EMPLOYED BY THE GOVERNMENT TO SPY ON YOU:

NHK ni Youkoso: You will be right at home in this club, and you'll make lots of friends. Maybe together you'll be able to unveil the conspiracies surrounding us.

Sun Tzu

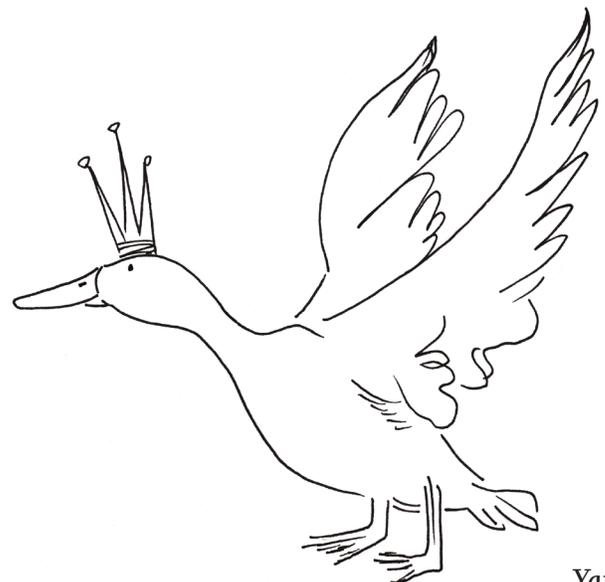
FREE PIZZA FOR ME

I have class 6-9 Monday, so it's become somewhat problematic for me to write for **mathNEWS**. That class has made me miss many spicy events, such as the Ontario election. But, it's fine, politics are for Dota 2 players anyways.

Another spicy event happened some weeks ago when some noob started a fire in STC. Luckily he was a failure, so at least no one was hurt, and the building is still standing. However, it still caused millions of dollars worth of damage, forcing rescheduling of courses that was uncalled for. The place was closed for weeks. I am pretty pissed because STC was the go-to place for me to study.

One last spicy event is the world cup. I am surprised Russia with their advanced medical technology didn't advance past top four. More interesting than that, England, the country we thought started this mess, are one match away from returning home.

Anyway, that's pretty much it for the updates. I am going to get some pizza for me now.



Yang Chen

MY HOUSE OF MIRRORS



I recently completed my undergraduate degree of Global Business and Digital Arts at the University of Waterloo. The four years I spent there seemed long at first, but in hindsight they flew by quickly. As a whole, I feel like a different person while some parts of me seem like they will never change. At the end of the four years, I looked into the mirror and struggled to recognize myself. I did not know who I was and I had no idea where I was going.

One unexpected thing I learned during my undergraduate experience is that we as humans have never seen our own faces and most likely never will. We can only see an image that will always be augmented, but never exact. We only see our reflections in mirrors, objects and through people. In the words of Thomas Cooley, a distinguished American sociologist “I am not who you think I am; I am not who I think I am; I am who I think you think I am”. No matter where I go in life, this always sits in the back of my mind.

If we only see ourselves through mirrors, photos, and through other people, our sense of “self” is likely heavily connected to the people around us, given that we interact with people more than our own reflections. While it is not the best idea to use other people’s opinions as the only source of self-worth, they are often the best starting points when looking at the bigger picture and when reflecting on our lives. The people we surround ourselves with become our house of mirrors, showing us different versions of ourselves.

Looking ahead now as I step forward into what adults call “the real world”, I realize this is why it is so important for people to stay connected. My friends, my loved ones, former classmates, and peers, they are my house of mirrors. You are my mirror, as I am yours.

Maintaining a clean house of mirrors can be challenging. This is when we need to evaluate the mirror we are looking through and determine if that reflection benefits us or hinders us. It is important to be aware of those negative reflections but even more so, be aware of ourselves and our well-being. Determining which ones aren’t the right ones for ourselves is easier said than done. In some cases, these mirrors have been part of our lives for so long, we do not even recognize that they do not reflect the best versions of ourselves. This leads

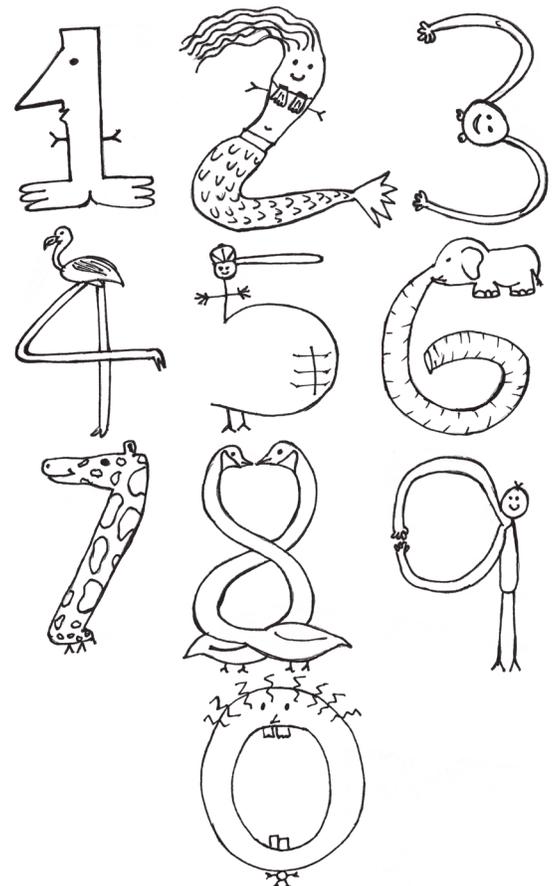
to limited growth, belittled self-worth, and harsh realities. It’s important to surround yourself with people who will challenge you and push you to become the best person you can be.

During my time in university, I also faced the challenge of becoming self aware and when facing that I learned to be kind to myself. I have always been critical of myself and beating myself up for every mistake, I now know that will not get me very far. I have always admired the exceptional, the best of the best, the world changing people. I want to be that, but I will not get anywhere if I am not kind to myself, just as I would be for a friend.

It has been three months since I completed my undergraduate degree and after going through this reflection process the mirrors around me began to change. As I connected to those who were similarly passionate about the design world and started tackling new challenges, my perspective changed. Through them, I saw different and new versions of myself and these reflections were invaluable to me. I see futures where I have accomplished my goals and helped changed the world for the better.

Now I have a better idea of who I am as a person. I still do not know where exactly I am going, but I am curious to see where my new house of mirrors will take me.

Razan Q.
(<https://medium.com/@RazanQaoud/>)



ULTIMATE GENERAL: CIVIL WAR

DECENT CAMPAIGN GAME: NEEDS MULTIPLAYER

The Steam summer sale has come and gone and many of us find ourselves with new games in our digital libraries. For me I have picked up and been putting some time into Ultimate General: Civil War, a real-time strategy game with a focus on campaign-play/persistence set in the American Civil War of 1861-1865 where you get to lead an army for the Union or Confederates. You start small early in the war with a pair of understrength divisions of a couple thousand troops and by the end you are leading multiple Corps each with tens of thousands of troops each.

The battle mechanics are simple enough, those that have played non-basebuilding strategy games (so anything that isn't in the vein of Starcraft) before should be at home with unit facing, morale, exhaustion, flanking attacks and the like. The battles flow well and feel sufficiently epic with the heavy booming of artillery punctuating the cracks of muskets and shouts of charging men. Skirmishers and cavalry perform scouting, delaying actions and harrassment, while the infantry and artillery clash.

The part that is interesting to me though is the persistence between battles, where your casualties, troop experience, equipment losses and the like make you sit and think even harder than the battles, as you dole out the limited replacement troops and whatever equipment you have scavenged or can purchase to your troops. You need to think about how big your units should be based on the leaders that oversee them, you need to give special treatment to some units which are your go-to problem solvers, ensuring they get the expensive replacements and equipment while other units get farmers with the simplest of equipment. The four unit types of infantry, skirmishers (light infantry), cavalry, and artillery are simple enough to understand, but with the different weapons and skills you can give them they can be specialised into very different things. Skirmishers for instance can be used just as light scouting infantry, but they can also be given marksmen rifles and play the role of snipers that harrass from out of sight, or you could give them repeating rifles so they can dish out rapid-fire punishment to an enemy at close range before falling back .

Unit types, experience, skills, and equipment are all interesting enough, and on top of that your general has his own stats that level up over the course of the war, giving bonuses to various things from the costs of equipment and the rewards from battle, to the maximum size of your units and the ammunition they can carry. All of this together means that most of the time is spent (in my experience) poking through the camp tabs between battles, hiring replacement officers, creating stocks of replacement equipment, re-organising units to fulfill different roles within their division, and dividing roles within corps. Bringing the troops into a battle and having the force you created smash the enemy is a great feeling indeed.

The game has a few problems though. The AI, while decent, is still AI and thus makes mistakes, weird decisions, and becomes predictable/exploitable after a time. The two campaigns (for north and south) are always the same sets of battles so replayability is limited. Lastly, although the sound is good, visuals are meh when you get close and realise everything is just sprites (this isn't too bad since you would spend all your time zoomed out looking over the entire battlefield, where everything looks fine).

If you feel like sitting down and organising your forces, then planning your way to victory with aggressive maneuver and risky charges, give Ultimate General: Civil War a look.

Soviet Canadian

CONFUSING TERMINOLOGY IN MATH

If you're here in the summer term, that means you already had at least 2 terms of study in UW Math. I'm quite sure that during that period of time you faced some really non-intuitive terminology that makes you think "WHY WOULD ANYONE CALL IT THAT??", so let me share my favorite ones with you:

- Sometimes we call a set a "Hilbert Basis" even if it is not actually a basis.
- Sometimes we say that 2 functions are equal almost everywhere but they are actually never equal.
- A set could be both open and closed at the same time.
- We sometimes call a set of things a "Class" when it is just a "set" of things just because we don't want math to break down. (Thinking about it, that is quite reasonable, I don't want math to break down).
- We call certain vectors independent of each other even though they are defined in terms of each other.
- We call certain vectors independent even though they live in the same space.
- We can have a "square-free" number that is in fact a square.
- We call some numbers "Happy" even though numbers are unable to feel emotions.
- We call a matrix positive semidefinite or positive definite even though it's not positive.
- We call a sequence "Cauchy" even though Cauchy was a mathematician and not a sequence property
- We call some "cuts" a "bond" even though cuts and bonds do the opposite things.
- We call **mathNEWS** "**mathNEWS**" even though sometimes it has no news.

Sun Tzu

APPROXIMATING ROMANTIC COMPATIBILITY USING 2D POLYGONS

Welcome to this term's official unofficial well-intentioned romance experiment!

Hello, **mathNEWS** readership. Before I share my scientific findings, I will present you with a bit of background information regarding my personal love life situation in the hopes of reducing misunderstandings and communicating any biases.

I am a super-queer dude that loves my friends and definitely has a touch of Asperger's so the way that I operate romantically is leagues different than that of my cishet allistic peers. I literally cannot understand flirting so my version of "making a move" usually involves a very deliberate line of questioning and frequent confirmation of romantic intention and continued sexual interest. That's how I work and not being able to be coy has been very fruitful in a loins-touching kind of way... However, most of my straight friends have all these weird rules about "when it's okay to text back" or about "dropping hints" and they often have profiles on dating apps that are collecting dust and advertising information.

So I turned their romantic/sexual frustration, and my frustration regarding their frustration, into an algorithm for setting people up on "group blind dates". This experiment was conducted last term with promising results, so the participants were not as hesitant in the second round, compared to the hesitant original cast.

Last round, the six people were mostly straight UW students and we used percentages derived from the "gut feelings" of my roommates to predict their compatibility. There was an inverse relationship between predicted compatibility and actual compatibility, so our prediction tactics had to be refined.

This time around, the six people were, again, mostly straight UW students and their compatibility was determined through abstract interpretations of two-dimensional polygons.

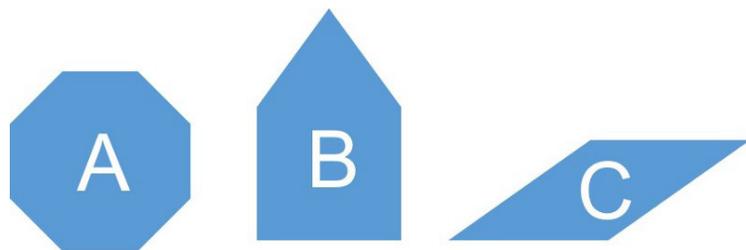


Figure 1

Pairing A's success estimation was best approximated by a regular hexagon. (*Editor's Note: An octagon is pictured above. The author could not be reached for clarification.*) They had been friends since first year and the consensus was that even if the date couldn't spring them from platonic to passionate, it wouldn't ruin their already well-rounded friendship. This was the

pairing with the lowest chance of becoming romantic, but it also had a very mild worst-case scenario and the individuals brought a good mix of introvert energy and extrovert energy to the group date.

Pairing B's success estimation was best approximated by an irregular pentagon, namely one shaped like a house. I was friends with each party separately and had concluded that whichever way their relationship went, whether platonic or passionate, it would be simple and stable. They had similar senses of humour and were attractive enough to be paired with each other so the biggest determining variable, the point of the pentagon, was the Spark Factor. If they had a spark, then they would quickly settle into a healthy romantic relationship, and if the spark was absent, they'd travel down the opposite side of the "rooftop" and land into an easy friendship.

Pairing C's success estimation was best approximated by a rhombus that kind of looks like a collapsed IKEA SKUBB storage box. While these two individuals were not searching for The One, they were both looking for A Someone To Be With Right Now Because It's Summer And Hormones Are A Thing, so their union was the most volatile, due to its lack of structural integrity, yet simple due to its small number of sides and large area.

Below is a non-exhaustive list of requirements that went into the creation of the very nuanced date-building algorithm:

- Set up three couples at a time. One-on-one dates have shown to cause too much stress in the individuals and double-dates are too prone to producing a "classic teen-movie style love triangle". Having four couples would be too reminiscent of a kid's 12th birthday party, so the ideal number of couples was deduced to be three.
- Have a balance of introverted and extroverted individuals. If the group is too quiet, then there is a lower chance of love-connections being made, but if they are all super-chatty, the same problem will also arise.
- Make sure that the people know each other enough so that it's not super awkward, but not so much that it just feels like a group hangout.
- Pick a good location. These past two dates have been held the largest East Side Mario's (ESM) on the planet Earth, conveniently located ten minutes from King and Columbia Street. This location is PERFECT in multiple ways. Firstly, it is easy enough for all of the candidates to travel to, yet distant enough from campus and student housing to create a cognitive distance between the date and just grabbing dinner with a study group. The food at East Side Mario's is okay so no one will leave hungry, but not so good that people can be distracted by the rich flavours of their meals and

not talk to each other. It also has a wide array of dietary options and can serve halal, vegan, gluten-free, and picky eaters quite well. To mitigate any dinner-related anxiety, their full menu is available online so that those with medical conditions related to food, can pre-plan their meal accordingly. This ESM is preferred over others in the region because the fact that it is the world's largest is a fun, silly fact that everyone can bond over if the conversation gets slow. Also, the staff at this location are very chill and will make placeholders out of scrap paper to ensure that the participants will be sat across from their date.

- Plan the date two weeks in advance and present two time options to arrive at a consensus faster. Organizing six university students to meet on a Friday night is very difficult and ~10 days advance seems to be a decent amount of time to ensure that no one has planned a trip home, but not so far into the future that higher priority items like midterms will bump the date off of their agenda.

A notable requirement is intent of the researcher. While these dates have a lot of silly elements, they are truly planned in the hopes of setting up my friends in successful, healthy, REAL relationships. I don't make any promises regarding The One, but I have been able to uphold my promise of, "worst-case scenario, you fill up on soup and bread, have a new experience, and get to reheat day-old pasta for lunch the next day while updating your group chats about your weird date with a cute person".

...The mathNEWS pizza is about to arrive and I'm getting tired of writing about this right now so I'll save the rest of this article for a part 2 or something...

Romance Rick

allegedNEWS FROM "MELISSA"

**(EDITOR'S NOTE: THIS IS NOT REAL NEWS.
PLEASE DO NOT TAKE ANY OF THESE
FALSEHOODS FOR TRUTH.)**

- Pink tie stickers are back.
- The Math C n' D accepts WatCard.
- The MC bathrooms have wifi now.
- Google wants you.

Melissa

Send more profQUOTES.

THE ENTIRE mathNEWS READERSHIP

N THINGS OVERHEARD AT mathNEWS

- I usually eat half a pizza on my own
- I'm missing class for this
- NO CARBONE
- I can't find a legitimate source
- What's the word for not autistic?
- That's not how you overthrow a country...
- That's so cute
- Garlic doesn't really count

The Biggest Brother

MATH POEMS?

I love math
as much as
I love ass
ignments ~ ~ <3

Roses are red
I wet the bed
because in my dream
I was getting head of linked list

Pizza isn't pizza without cheese
Life isn't life without cheese
Cheese isn't cheese if it's vegan
I hate vegans.

if u and i were in a graph,
there would be a path connecting us.

But you're hell of a distraction.
Instead of thinking of you,
I need to think about these fractions

Fractions are rational,
but humans are irrational.

If she pulls out a knyfe,
make her ur wyfe
treat her well
for the rest of yo lyfe

Oliver Twist

THINGS ARE DEFINITELY THE WAY THEY ARE BECAUSE IF THEY AREN'T THEN WE UNDERSTAND NOTHING

Water is the fundamental giver of life, except when life is formed in other ways. For us, water is the fundamental giver of life. We rely on it to drink, we rely on animals that rely on water to survive, and most importantly, 70% of all of us is water. Water is the same matter as ice or steam, except in a different state of which there are 3, or 7 or something, states of matter are weird. Sound is just a vibration, except it can affect our physical reality. When water becomes ice it has the potential to form crystals. Happy sounds have been shown to create beautiful crystals when frozen, whereas loud and aggressive sounds cause the water not to crystalize. Put rice in jars of water, shame one daily and praise one daily and watch the praised rice ferment nicely while the shamed one rots. Of course, this could be nothing, or it could make sense on a level of understanding of our universe that we haven't yet reached. Sound can be a weapon after all, despite our usual understanding of sound to be something incapable of causing such harm.

Consciousness exists because without it I couldn't be writing this and aware that I'm writing it, and you wouldn't be reading it or aware you were. In some respects we have far more proof of something we will never be able to scientifically find and prove than some of the fundamental truths we hold about this place we exist in, simply by being. Not everyone experiences it the same, and we have no way to know if other organisms experience it, but we do know that it's easier to picture consciousness as one singular shared experience than some of the alternatives. We are made of elements that formed in stars, and these elements make up everything except for what is made of its exact opposite. Can't have hydrogen without antihydrogen. I'm autistic, and I know that what I feel when I hear live music isn't the same as allistic people. Music can transport me to distant lands, can free me from the world around me and surround me in its grip. A siren can feel like a hammer chiseling my skull. There is no hammer, and it might not hurt you, but I'll be damned before you try to tell me I shouldn't protect myself from the pain I know is incoming. Anyway, back to nature for now.

We've been to the moon but we don't know how lightning works. We don't just not know how it works, but it doesn't even make physical sense. But we see it, we see its effects, we see its commonality. This is a bit of an aside but I find it crazy that we do not understand lightning and 90% of our oceans are unexplored (despite the fact some of the most interesting and ancient plants and animals reside there), yet are grasping fundamental theories of the universe that encompass everything we currently know and everything that remains yet to be discovered about everything. Also lightning creates anti-particles for some reason. They're weird fuckers.

We need energy to live. Dark energy might exist and if it does then the expanding universe that we live in makes sense a little bit. We don't know what it is or how it works, just that it might have to. There are strings of energy that stretch across

the entire expanding universe somehow. Energy can't be created or destroyed, but maybe we can get an infinite supply from two dimensional graphene, so maybe there's no end to energy, or maybe there is, but we just have to ignore the fact that small objects contain potentially limitless amounts just from wave motion.

The Earth needs energy from the Sun until the Sun destroys it in a few billion years. Time is all that separates survival from destruction. And time is stable except when it isn't. Traversing around the event horizon of a black hole can make you come back to earth in the future. Every few years is a year longer than a year. Every day ends after 23 hours, 59 minutes and 59 seconds except when they don't because of leap seconds. The faster you travel in relation to something else, the more you distort time itself. Except you're more distorting your experience or observation of time, which continues to kind of exist. When you travel at the speed of light you are time travelling. Light is a particle. And a wave. At the same time, which I guess is okay. Many of the stars we see in the night sky are dead, their light just takes too long to reach us for us to be able to see that it isn't sending more. Everything exists on a plane of spacetime, we invented time but it still interacts with mass and energy, and they might actually reside inside of it, kind of? We created time, which remains an illusion, yet the universe exists on its plane, we think.

Gravity is not a force but a result of the curvature of spacetime, which it can bend? Gravity affects everything evenly except for places like Northern Ontario where gravity is weaker. Everything is made of matter, except for all of the antimatter that has to exist, or else gravity which definitely affects everything doesn't affect anything the way we think it does, with the small consequence of completely upholding all of our understanding of how the universe and all of our galaxies have been created and held together.

Everything we see, we see through a complex system within our eyesight which sends information to our brain which parses that information into data we can conceptualize against our understanding of the world. Much of our scientific understanding comes from what we can see or observe, except for when it comes from what we can't see and is unobservable. Many of our observations only work in the context of our humanity. Drugs like DMT alter our mindstate significantly, and drugs like LSD alter how we see and process the world significantly. We accept that these are simple retreats from the real world; the way we feel and interact with the world on those drugs is dismissed. We expect that the walls around us aren't moving because we don't see them move. But why then, when on a drug, do we dismiss the reality of the moving walls? What gives you in that moment any proof that the walls aren't moving, what makes this alternative experience of the world any less real? Imagine if we lived our whole lives with brains affected by DMT or LSD. We would have created systems to explain why things move the way they

do, created explanations for all of the things we currently view as outside reality. All of this would have made sense to them. Any substance that reverted our mind's back to the state most of us are currently in would, to them, be equivalent as taking a heavy drug. Our sober state in a different context becomes foreign, often unexplainable. Nothing in this system fits the rules this society has so vigorously molded to appease their minds, there is stillness where there should be motion. Our sense of being sober is only the way it is because we are used to it. I bet we could be used to a lot of different ways of living. I'm not saying this to be mythical but to be practical. When discussing what we know, we need to really think about what that even means. Do we understand it, or just understand it in context? Are we seeking answers to truly understand or to put our minds at rest? Because if it's the latter, we will always be able to find things that seem to fit our narratives. The universe is complex, layered, paradoxical and wholly incomprehensible. Being selective, we can prove or disprove anything. But that's only the end if you want it to be. We use things like math to try to make sense of the world around us. Funnily enough, sometimes math seems to understand things more than we do.

ITSH

mathPOEM

BOXES

A box containing another empty box
 Is not empty
 But the one inside is
 And emptiness does echo
 Much louder than mathematics or logic
 So even though the box contains a box
 It contains an empty box
 And holding nothing of significance
 Is not holding anything
 If I hold us and we are nothing
 I am holding nothing
 Even if I am holding us

@eve.nyandwi on Instagram
 (follow for more poems based on
 Python 2.7 data types)

THE mathNEWS ARTICLE OF THE ISSUE

One of the two statements below is true:

1. This article will win article of the issue.
2. If this article does not win article of the issue, then the editors are poo poo heads that eat their boogers.

Melissa

N WAYS TO FLIRT THIS SUMMER

- Tell them with your words
- Have sex with them
- Read a Cosmopolitan article and try to flirt with them through **mathNEWS** (?)

Romance Rick

APPRECIATE YOUR J.A.S.M.I.N.E.

I have a Jasmine in my life that will be turning another year older this week! Wow!

If you have a J.A.S.M.I.N.E. in your life, aka someone who is:

Jolly
 Always listening to good music
 Super cute
 Master of cooking and baking
 Intelligent, both academically and emotionally
 Nice to talk to
 Excellent at giving hugs

then you should be happy to have them in your life and send them a cute GIF or something.

Sappy Steve

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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THE gridWORD STREAK CONTINUES!

Joseph is the hot puzzle-solver on campus this term. He officially wins for the third issue in a row! Of course it doesn't help matters that there were only two submissions. I blame midterms for the lack of puzzling this time around, but make sure to get your entries in next time. You could win a tidy \$5 cash to spend at the C&D! That's enough for like two and a half coffees. You could start a terrible sitcom with that many coffees. Something to think about!

The tiebreaker wasn't needed, but the two answers provided to the **gridQUESTION** "What's your favourite illegal activity?" were "Jaywalking" and "Printing copies of **mathNEWS**". And people say Waterloo math students are nerdy. Ha! We be fucking badasses, yo!

Joseph you can collect your prize at... ah hell, you know the drill by now.

Last issue's **gridWORD** theme was mascots at Canadian Universities. This time it's a mathematical quotation (see 20, 36, and 54-across). Clues preceded by an asterisk (*) have a cryptic flavour to them.

This week's **gridQUESTION**: But what's the *real* essence of mathematics? Submissions are due by 6pm on Monday July 23rd, either in the **BLACK BOX** next to the Math C&D, or via email to mathnews@gmail.com. Friendly reminder: you can also use either of the above methods to submit **profQUOTES**.

yclepED

ACROSS

- 1. You and your roommate do this, in short
- 6. Instance of a frog's or bachelor's hangout
- 10. Karate school
- 14. Garlic mayonnaise
- 15. Hoopster Bryant
- 16. Copied
- 17. "Shame! Shame! Shame!" speaker _____
Unella
- 18. Tightest bounds tide time
- 19. Notability
- 20. (Quotation part 1)
- 22. Ctrl+Alt+Del meme
- 23. Everglades rides
- 27. Characteristic of a time
- 31. Divisors, in a sense
- 32. Toothbrush brand
- 35. Downy duck
- 36. (Quotation part 2)
- 41. For all to hear
- 42. With 43-across, the author of this puzzle's quote
- 43. See 42-across
- 45. Obeyed the octagon
- 50. Sideways
- 53. *rettuB substitute
- 54. (Quotation part 3)
- 57. "I Just Had Sex", e.g.
- 60. A Disney villain (possibly the very first one)
- 61. A data transfer protocol
- 62. Arcade unit
- 63. Henry VIII's last wife
- 64. Flax fabric
- 65. Sean Connery, for one
- 66. He just had sex, according to song
- 67. Congenital absence of

- 12. #1 Hologram
- 13. What you may write if you're feeling 46-down
- 21. _____ beside the flutes, in an orchestra (2 wds.)
- 24. Autobahn auto
- 25. Ex-husband of H.Locklear and P.Anderson
- 26. Gentlemen
- 28. A big ol' party!
- 29. Equip with a Nerf N-Strike Surgefire Blaster, for example
- 30. Union of Lanthanum and Silver, or a Kashmir-based TV show
- 33. Bluetooth standard
- 34. Motherboard component, or blurbs about people with 19-across
- 36. A morningstar is one type
- 37. "When I was but ____" (2 wds.)

- 38. Two paired together make a gripper
- 39. Project led by Alan Turing at Bletchley Park
- 40. Old-timey screens
- 44. *Daytime host Kelly violated by online presence
- 46. Kind of license
- 47. A "rules lawyer" is one type
- 48. Runaway bride (or groom)
- 49. 1-2, for example
- 51. Porterhouse, e.g.
- 52. *Retail outlet mixup, or -gen prefix
- 55. "Charlotte's Web" girl
- 56. A kind of beer (archaic term)
- 57. Airline to Stockholm
- 58. One of the O.G. D&D races
- 59. Cpl., e.g.

DOWN

- 1. Defensive chess move
- 2. A little jump by a French goose
- 3. "I sure _____" (2 wds.)
- 4. Linux kill code, with Ctrl
- 5. What theta-hat is most likely off by
- 6. Berlin blemishes
- 7. Latin "penalty", often paired with sub-
- 8. Old-timey counters
- 9. Take the curl out of
- 10. "I Wandered Lonely As a Cloud" flower
- 11. Crisis management firm on "Scandal"

1	2	3	4	5		6	7	8	9		10	11	12	13	
14						15					16				
17						18					19				
20										21					
22							23					24	25	26	
27				28	29	30			31						
				32			33	34		35					
36	37	38	39						40						
41							42								
43						44			45			46	47	48	49
50							51	52			53				
				54					55		56				
57	58	59				60					61				
62						63					64				
65						66					67				

haltingPROBLEM

BE SURE TO SOLVE YOUR MASYUTINE

Well met, dearest **puzzleSOLVERS!**

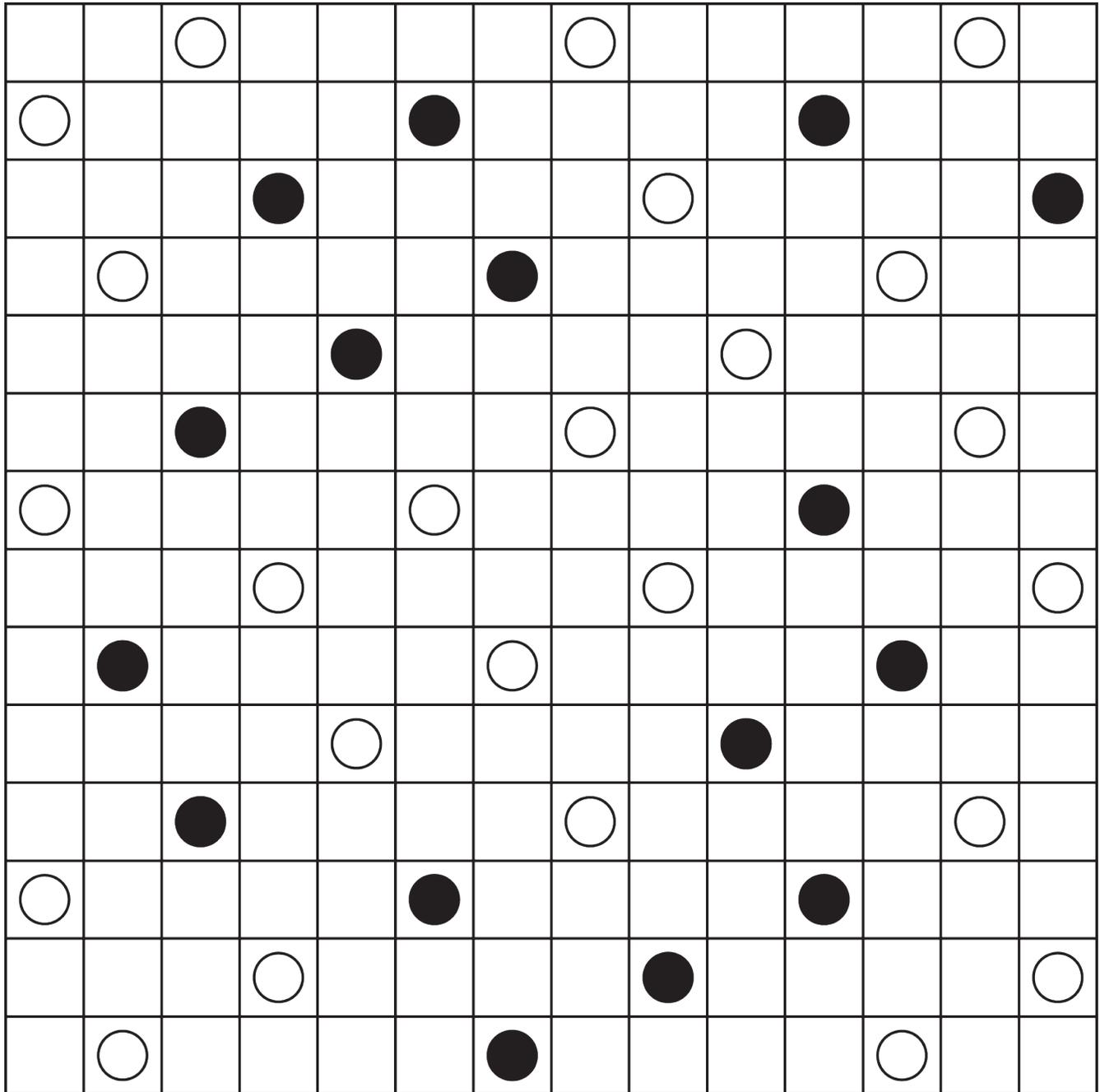
Once again, your glorious **puzzleMASTER** is speaking! Our time is coming to a close, to be honest. After this term, Masyu may never again grace the pages of this esteemed publication. Which is to say, grad school's starting for me, and Masyu takes time, and time is money! Grad students are broke! But I hope you're enjoying the time you've had solving so far. Now it's time for your biggest Masyu challenge yet.

As usual, here's the rules: the goal is to draw a single, unbroken loop from box to box, which never crosses over itself. Squares

with black circles indicate corners, and the loop must make a turn in the square, AND in each of the squares where the loop extends from the black circle, it may not make a turn. Squares with white circles indicate straights, and the loop may not make a turn in the square with the white circle. Furthermore, the loop must turn in one, or both, of the squares where the loop extends from the white circle.

You're gonna have to do a lot of guessing this week! **goodLUCK!**

the puzzleMASTER



lookahead

SUN JULY 15

MON JULY 16

TUE JULY 17

WED JULY 18

THU JULY 19

FRI JULY 20

SAT JULY 21

Fall 2018 schedule viewable in Quest

Fall 2018 Add/Drop period begins (check appointment time)

SUN JULY 22

MON JULY 23

TUE JULY 24

WED JULY 25

THU JULY 26

FRI JULY 27

SAT JULY 28

mathNEWS 137.6 production night

Last day of classes Monday schedule

mathNEWS 137.6 published

Online course exam day

LAST WEEK'S SOLUTIONS

MCGILL WESSTERN
 ANEMIA ASSURANCE
 DESIGN DASHIKI
 ED BACADIA
 WATERLOO ATKA
 AREAS UTFRONT
 NEXT CALGARY
 ILLAM
 TOWNLEGG LARS
 OHHSID FIRST
 ROTI CARLETON
 QUEENS YOU
 TIMAMEE SEEOUT
 SOSPEEDY SNOBBY
 RYERSON ATTICS

WATERLOO
 WESSTERN
 ASSURANCE
 DASHIKI
 BACADIA
 ATKA
 UTFRONT
 CALGARY
 ILLAM
 TOWNLEGG
 OHHSID
 CARLETON
 QUEENS
 SEEOUT
 SNOBBY
 RYERSON

VELOCITY START

presents

WHAT

At this workshop, you will be introduced to five different billion-dollar problems! Learn what makes them empire-building opportunities, what mistakes were made in previous attempts to solve them, and what a powerful solution would need to deliver.

WHO

Larry Smith, Adjunct Associate Professor of Economics, University of Waterloo

WHEN & WHERE

Thursday, July 19
 7:30 P.M. - 9:00 P.M.

Velocity Start,
 2nd Floor SCH
 Pizza & water provided

VELOCITY START A PLACE FOR ANYONE TO LEARN ABOUT ENTREPRENEURSHIP

Register for this and more Velocity Start events at velocity.uwaterloo.ca/events



BILLI000, 000,000N DOLLAR BRIEF

