



“WHICH FACULTY SHOULD WE STEAL A ROOM FROM NEXT?”

It’s been a long time since my last study term, back in Winter 2024, so I’m very happy to be spending every spare hour of my waking day in the **mathNEWS** office back on campus again. To be honest, it’s not like I didn’t spend a lot of time here already during my eight-month remote co-op term, because of **mathNEWS**. But now, I can calmly walk to CnD as many times as I want per day, without being stressed out by Microsoft Teams messages or Excel files, and I’m free from writing any Python code, too! I am also taking courses towards a major I am actually passionate about (pure math, my beloved ♥), and I have amazing electives, so I’m not dreading going to my lectures this term, even my 8:30 am algebra class—although it can be hard to get up that early some mornings. Still, I’m just genuinely happy to be back.

But you know what’s also back? Campus Geoguessr! You might have not needed an excuse to not touch grass (or, more precisely, snow), but now you have an official™ reason to drag your friends to the campus tunnels and find out where all these intriguing places are. Also, we have been blessed by the wisdom shared in the return of Girl Math expert cherry ♡ with GMATH 201, so make sure to not miss it!

In a few pages, you’ll also find in this issue:

- Ford Motor Company fanfiction
- a diss track appreciation article
- the first article of a club reviews series
- a U.S. history lesson
- sex playlists ☹☹

... and much more.

Wait, don't leave just yet! A confidential source has just shared the most extraordinary thing, that—hey, are you still reading this? Yes? Great! Okay, it turns out that the number of the very issue you have in your hands (or screen, I guess), 157.1, is the closest **mathNEWS** issue numbers will ever get to 50π . Crazy, right? I think that calls for a celebration—or, at least, some excellent reading!

Enjoy!

classified
Editor, **mathNEWS**

revivED
Editor, **mathNEWS**

BSGCG	Anyone but arts (i <3 u arts)
YALEVOYLIAN	Arts (we should steal the philosophy lounge in HH)
SEASONED SLACKER	Arts, psychology building or Hagey Hall upper floors (definitely not a ploy to trap mathNEWS production in a labyrinth)
WHOLE NUMBER HAVER	We could get all of Health's Risk cards if we steal the flagship lecture hall of BMH, their only building, thus capitulating the faculty
ANDOIII	The Lazaridis School of Business and Economics
MOLASSES	if we got all the bba students to ask lazsoc really nicely, we could host a mathNEWS in the big atrium of laz hall
FINEGEOMETER	Use a different meaning of “faculty.” Your office hours are now mathNEWS .
APHF	Plant ops
DICK CHUDNEY	I don’t do politics
IGNIS_	arts (so far away)
VERDANIK	Engineering. They’ll have a whole new building to replace it in no time.
NIKE	whichever has the most outlets or couches
LARS NOOTBAAR	My own mental faculties
NOT A N*RD	It’d be great to have a room with monitors. I know computer labs are gross and stinky, but cmon
__INIT__	cambridge architecture building prod night? ☹☹
NO PUN INDENTED	Finance Faculty
USMAN!	Faculty? Let’s steal all of PAC
DOLLAR STORE PERSON	MIT School of Science
CLASSIFIED	arts (st. jerome’s prodNIGHT would fix me)
ABSTRACTED	Math faculty students suck and we should steal from them
DERAILED	stratford gbda building prod night? ☹☹

ARTICLE OF THE ISSUE

We really liked *Mermaid Hour*—congratulations to double anchovy! Come swim through the rock garden slush to MC 3030 for your prize.

Is mathNEWS editing snungry work?

RIVER STANLEY, **mathNEWS** EDITOR FOR WINTER 2025
ALONG WITH SARA NAYAR, ISABELA SOUZA, DAVID TERESI, AND JUSTIN YOUNG

mathASKS 157.1

FEATURING PROFESSOR LILA KARI

TOTALLY UNUNIMODULAR: CAN YOU DESCRIBE YOURSELF IN FIRST ORDER LOGIC NOTATION?

$$\exists x[\text{MathProf}(x) \wedge \text{Admires}(x, \text{Socrates}) \wedge \text{Reads}(x, \text{Mahabharat}) \wedge \text{IsFanOf}(x, \text{BTS}) \wedge \forall y(\text{WaterlooStudent}(y) \rightarrow \text{Likes}(x, y))]$$

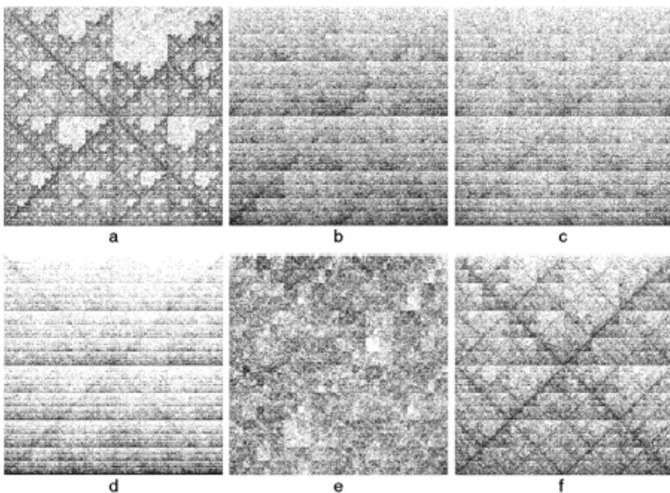
NIKE: WHAT COLOUR WOULD YOU PAINT MC IF YOU HAD THE LIBERTY?

I am biased here, as my first name was inspired by Danube Delta sunsets, and means lilac colour in French. I would paint it all pastel lilac, even though pastel green would be a close second.

__INIT__: FAVOURITE NUMBER?

As a mathematician at heart, I used to really like π , but we had a falling out of sorts after I tried to represent it visually using Chaos Game Representation (CGR).

The CGR of a DNA sequence (a sequence over the DNA alphabet $\{A, C, G, T\}$, such as $s = AACGTTAA$) plots the letters of the sequence within a unit square with corners labelled A, C, G, T , as follows. The center of the square is the first point of the CGR. The sequence is read from left to right, and the next point in the CGR is the middle of the segment determined by (i) the previous point, and (ii) the corner labelled with the letter currently being read. CGRs of real-life DNA sequences show interesting patterns, such as horizontal bands, Sierpinski triangles, fractal squares, etc. Interestingly, CGR of DNA sequences taken from the same genome have the same visual patterns, CGRs of DNA sequences from closely-related species are similar, and CGR patterns of DNA sequences from very distantly related organisms are very different (see figure for CGRs of DNA from organisms from the 6 Kingdoms of Life (a) Animalia, (b) Fungi, (c) Plantae, (d) Protista, (e) Bacteria, (f) Archaea).



This property leads to CGRs being useful for novel species identification and taxonomic classification, a hot topic in my current area of research (people may not know it, but only 10% of all life on Earth has been characterized/catalogued so far).

Coming back to my former-favourite number π , one can use a suitable encoding to plot CGRs for the binary encoding of any (decimal) number. So we tried plotting π , and its image looked disappointingly uninteresting, like an amorphous cloud of dots, indistinguishable from the CGR of a random number. This led to π falling out of favour...

Nowadays, as a researcher in Biodiversity Informatics, my favourite number is 1, because of the fundamental oneness of life on Earth, which all uses the same DNA building blocks, A, C, G, T, and (mostly) the same genetic code.

$\pi=3$: FAVOURITE MATH CND ORDER?

Rooibos tea with soy milk, Korean seaweed snacks, and vegetarian soup-of-the-day. My recent CnD daily trips have been hampered, though, by the nature of travel from DC to MC, which changed from a sunny walk through the tropical DC-MC glass tunnel to a hat-boots-and-mittens outdoor arctic trek...

USMAN!/DERAILED: WHAT DOES BEING EDITOR-IN-CHIEF OF A JOURNAL ENTAIL? ARE THERE ANY PARALLELS WITH BEING AN EDITOR OF A SOMEWHAT LESS ACADEMIC PUBLICATION SUCH AS mathNEWS?

Being Editor-in-Chief (EiC) of the journal "Theoretical Computer Science," (section Theory of Natural Computing) entails, e.g., assigning submitted manuscripts to appropriate Handling Editors, evaluating reviews and Editor recommendations, and having the final say on publication decisions. I would imagine that Editors of mathNews are heavily involved in soliciting and producing mathNEWS content. In contrast, an academic EiC would normally neither solicit manuscripts, nor submit his/her own papers to the journal he/she is heading. The commonality would be that EiCs of both MathNews and academic journals play a central role in maintaining the quality standards of their publication, and are responsible for its core mission and long-term vision.

HUNGRY STUDENT: IF YOUR RESEARCH WAS A MEAL, WHICH WOULD IT BE AND WHY?

If research was a meal, it would have to be a blended cream vegetable soup: (a) it always starts with the same foundation, oil, onion & broth (for research, the foundation would be a solid math background), (b) you can put in whatever vegetables you like (for research, combine math with any discipline you like; interdisciplinary research is more fun), and (c) blending leads to a something superior to the sum of its parts (in research, oftentimes innovation comes through combination).

SQRT(CAUSE): DO YOU WRITE FOR FUN? IF SO, WHAT ABOUT?

I used to write poetry, but nowadays I mostly write scientific papers. It gives me great satisfaction to find the exact wording that conveys precisely and unambiguously what I intend to say. Giving press interviews or writing popular pieces about our research results is also a fun challenge, as one has to find the right language and metaphors to get the main message across, while completely avoiding technical jargon.

DOLLAR STORE PERSON: WHAT ARE SOME COVETED SKILLS / ABILITIES IN BIOINFORMATICS?

Math and stats. One can always learn biology on the fly if you are a mathematician, on a need-to-know basis.

LEAH: WHAT DO YOU LIKE THE MOST ABOUT TEACHING?

My students. Waterloo students are everyone's dream student. They are smart, motivated, hard working, with strong mathematical background, charmingly nerdy (in the best possible way), curious, polite, respectful, with the right attitude and priorities. Rather than having to tell my students to work harder, the thing that I have to remind them the most often is to also have fun. Go dancing once in a while, it will do you good!

CLASSIFIED: WHAT'S YOUR GO-TO SNACK OR MEAL WHEN YOU'RE WORKING LATE?

How did you know? Yes, I do snack, it is a habit I tried to kick multiple times. In fact, whenever I have the urge to try to change someone else, I remind myself that I have been unable to make this one simple change in my habits—stop snacking. The good thing is that this realization makes me less bossy. When I will finally succeed to stop snacking, watch out!

In the meantime, my favourite snacks are dark chocolate and shiitake mushroom crisps. I probably am the one who is single-handedly responsible for the scarcity of shiitake mushroom crisps at T&T.

CLASSIFIED: HOW WOULD YOU DESCRIBE mathNEWS TO SOMEONE WHO HAS NEVER READ AN ISSUE BEFORE?

I would (and do!) tell people that **mathNEWS** is the only news worth reading! It is witty, clever, original, informative, refreshing, and bubbling with intelligence. It is useful too: there was an article in the pink September 2024 issue that convinced me I should start a Google calendar.

MARS CANADA TO HALT VIDEO ANALYTICS VENDING MACHINES' ROLLOUT AFTER mathNEWS REPORTING

In February 2024, **mathNEWS** published an article detailing u/SquidKid47's discovery of facial-recognition-capable vending machines, where we reached out to the various companies involved. After publishing this story in **mathNEWS** 154.3, our writers reached out to various external organizations. One such organization was the Office of the Privacy Commissioner of Canada, with whom our writers lodged a privacy complaint.

In December 2024, we heard back. The privacy office informed our writer that they will be closing the privacy complaint. They cite that after conversations with Mars-Wrigley Canada, the ultimate controlling mind behind the vending machines' rollout, Mars-Wrigley Canada has pledged to the Office of the Privacy Commissioner not to proceed with installing the machines in Canada.

As discussed, based on Mars-Wrigley Canada's assurance to our Office to not proceed with installing anonymous video analytics capable vending machines in Canada, we consider the captioned matter to be settled.

PRIVACY INVESTIGATOR,
OFFICE OF THE PRIVACY COMMISSIONER OF CANADA

Write for **mathNEWS**. If you do, you might just spur government action while you're at it.

molasses

MC WASHROOM RECOMMENDATIONS

First floor washrooms are shit. They sprayed my ass.

Top floor washrooms are okay, they don't spray my ass.

I hate this

I wrote for **mathNEWS** → I get free pizza

A **mathNEWS** EDITOR WITH SOMETHING TO PROVE

A CFL-NFL MERGER?

AN ESSAI À CLEF ON WHY WE NEED CANADIAN FOOTBALL MORE THAN EVER

[Author's note: the incident in the first paragraph is fictional.]

In December of last year, Roger Goodell made a series of tweets about his desire for a merger between the CFL and the NFL. In January of this year, Patrick Mahomes doubled down, proclaiming in a tweet that there are 41 teams in the NFL (32 plus the nine CFL teams).

The idea of the CFL being subsumed into the NFL, often as a minor league, has been floating around the American psyche ever since they learned about it. "Why are there only three downs? Why is the field so big? Why are the goalposts on the goal line?" Some Americans brush the game off, some take interest in it, but others, as now does the top management, want to erase it and replace it with the American game.

For those who don't know, American and Canadian football are two distinct (but similar-looking) sports that descend from rugby. A rugby-like game became popular in Canada in the late 1860s, whereas the first rugby-like American game was played in 1874 between Harvard and... McGill. In the intervening years, both games have somewhat diverged in rules to be what they are today. While the NFL is the elder of the two leagues (1920 vs. 1956), the Grey Cup has been contested for even longer, the first being won by U of T in 1909.

People not knowing this come away with the misconception that Canada changed the American rules in order to be different, which is simply not true. While both games sometimes take notes off each other, neither is a copy of the other. Both players and ideas cross the football border, and both games are better for it.

In my opinion (yours can differ), though I like both games, the Canadian version is better. A larger field, one more player, unlimited pre-snap motion, and one less down means more offence, and with different timing rules, games are close to the end; a team with possession and the lead in the last two minutes doesn't automatically win by running out the clock. Having the CFL be distinct from NFL isn't merely for its own sake or just to be different, it's because it's a better product, and fewer people would watch it if it was the same.

Some Americans, in their arrogance and closed-mindedness, tout that their game is superior in entertainment, that CFL teams are on par with high school teams, that the games are boring, and that any Canadian rule not in America is stupid. Canadians, they say, watch American football anyways, so if we did away with these silly rules, then nothing would be lost, and Canadians would finally all enjoy our Great American Game. Of course, many Americans making these claims have never watched a CFL game.

A major gripe that Americans (and some Canadians) have with Canadian football is the "rouge." On a kicking play (i.e. punts, missed field goals, or kickoffs), if the non-kicking team doesn't get the ball out of their end zone (either the ball goes out of

bounds in the end zone or they can't run it out), the kicking team gets a point. Two tied games this year ended on a game-winning rouge, and detractors have honed in on this fact as why Canadian football must go. But time and again, the CFL has ignored calls to remove it.

I like the rouge. The NFL has been slowly phasing out good kicking plays with its removal of the onside kick, the continuance of the fair catch rule, and its motionless kickoffs. In a game called "foot"ball, it's nice to see silly important kicks every once in a while. Besides, the rouge is an incentive to get the ball out of the (20-yard) end zone, and, in my opinion, is better than the touchback. The rouge is part of what makes Canadian football Canadian.

If the CFL were to be annexed into the NFL, it would spell the end not only for Canadian football but professional football in Canada. CFL teams have a limit as to how many non-Canadian players are on the team. As America has way more people than Canada, naturally, there are more American footballers than there are Canadian footballers, meaning Canadian teams would be overrun with Americans. Similarly, Canadian teams, due to having smaller market populations, especially in Hamilton and Regina, bring in less money, and would not fare well in the trade market against teams like Kansas City or Dallas, not to speak of what the devoted fans from those smaller markets may do. Many Canadian teams would simply fold in the event of a merger.

I feel as if one problem with the CFL is that it doesn't do as well of a job marketing as it should. Many Canadians don't know of the CFL, much less who won the Grey Cup this year, but could tell you what team won the Super Bowl. The CFL is becoming more popular than ever, but if the fans, the media, or the CFL don't assert and defend its existence from Roger Goodell and his cabal, our Great Game may become a thing of the past. Watch a CFL (or U Sports) game if you can. We can't let the CFL be overcome.

seagullman



HR DEPARTMENTS BE LIKE:

"Job description: Play an integral role in our delivery practice as we execute on enterprise level engagements through our various industry specializations."

You have said nothing!!! >:((((

I JUST THINK IT WOULD BE FUNNY IF DC LIBRARY HAD 10 FLOORS.

Most of us are familiar with how DP was extended from a 3-storey tall building to a 10-storey building in 1965. [*Editor's note: I wasn't!*] I have a similar proposal: DC is already packed to the brim on a typical term, and there's barely a chance you'll find an empty seat in there after 3 PM. We should keep digging down, past the group study floor, and turn it into a 10-storey basement. There will be absolutely no consequences to this, and don't think about the logistics too closely. I just think it would be funny if you could descend down the DC library stairs (or elevator, or slide) into hell. This will allow us to immensely expand the number of study spaces and save on heating costs during the winter.

Rats for Seats

SUDOKU 2

PUZZLES

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

Sudoku 2

OMG part 2, after some people said the last one was too hard, (and like none of my friends were able to finish it, we have an easier Sudoku.)

(Hopefully the editors will put part two in the next issue or something like that. idk.)

Ignis_

MONKEY'S PAW

Wanted to do a Mozart's Requiem kind of piece where I cut off my writing before I finish it, but I ended up closing my tab without saving the draft. Life is funny like that sometimes.

Neo-Jeo

THE LUGGAGE WIELDER'S PRIVILEGE

MUSINGS ON THE GO TRAIN

I've recently found myself commuting between Waterloo and Toronto frequently (to import my stuff to a temporary home), taking subways and buses and GO trains on three-hour cross-provincial adventuring escapades (how fun!).

On these arduous missions it has come to mind, a phenomenon comes to mind that I would like to dub "Luggage Privilege."

If you commute with a luggage, you automatically get social clout—you can loiter, you can look prideful, and you command an air of eloquence. An aura of power... no one messes with one carrying a luggage.

On the flip side, one could (like me one time) choose to commute with 2–3 overstuffed reusable bags from T&T, and feel eyes watch you from every angle. People judge your inferior travelling logistics, and prejudice your ramshamble look. While the bag's handles cut into your hands, society's eyes cut into your soul.

Interesting!

andoiii

MORE WIKIPEDIA STUFF

In an attempt to reduce the destructiveness of my doom-scrolling activities, I have recently started reading random Wikipedia articles rather than scrolling elsewhere, and here is a cool thing I read.

In 221 B.C., Ying Zheng, the King of Qin, succeeded in his nine-year-long attempt to conquer the six other states in China. After the wars, he ordered the collection of all of the bronze weapons that were used in it, and had them melted down to build twelve *giant* fucking bronze dudes ("the twelve metal colossi") and put them in his palace. They were each twelve metres high. Apparently, there is still debate among historians about why this was done, because "such giant statues were absent in pre-Qin china." I wish I could do something so awesome that future historians reject the theory that I even came up with it myself.

By the way, Samanagos is *terrible* at Minecraft. Cannot survive for long enough to dig a hole into a mountain and call it a house. Keeps complaining that there's no wood armor and that items are dropped on death. This is relevant information for the article that follows.

nazz

MINECRAFT, DOGS, AND THE INDUSTRIAL REVOLUTION

I somehow have never properly played Minecraft, aside from making silly little adventure maps in Pocket Edition that I made my dad play. So coming back to it, after all the updates and on the full PC version, was extremely jarring.

My friends had all started earlier than me and had found a beautiful lakeside cherry blossom biome to make base. Meanwhile, by the time I had spawned in, it was night, and I was at the bottom of a pit surrounded by jungle and zombies and skeletons. I died promptly afterwards.

At some point I managed to crawl my way out of the pit of doom and began my journey to the land of cherries. In this time, my friends had already amassed an economy-crushing amount of diamonds, and had trapped all of the villagers into little boxes to improve their respective trades.

I kept finding wolves on my journey, and clearly with my massive contribution to the death count, I needed protection. So I devoted myself to finding a bone to tame the dogs so I could stop dying.

It should be noted, if it wasn't already clear, that my luck is abysmal. I swear I went through at least forty skeletons before they dropped a bone.

By this point, the village had started the process of automation. The industrial revolution was coming. It started with a humble creeper farm in the sky. Then a fully automatic chicken farm built off of the violation of all of the animal cruelty laws. It worked with the fact that having too many entities in one spot will start dealing damage to clear space. So, the machine would throw eggs at a wall until there were so many chickens that they would start dying.

When I finally reached the village, I had my trusty wooden axe in hand and was followed by a small army of 68 dogs. I was in desperate need of food (I fed it all to my dogs and they multiplied a lot). And there they were in front of me. All high and mighty in their palaces built from the labour of the exploited villagers and the suffering of a hundred thousand chickens.

The land of cherries will know my revenge.

Samanagos

PIZZA

I love pizza damn I could eat so much pizza

Anon

A DAY IN THE LIFE OF A BIOLOGY STUDENT

FROM A NOT-BIOLOGY STUDENT

This term, I am taking BIOL 220—INTRO PLANT STRUCT & FUNCTION. I am not a biology student. I do have a friend in biology, so up until now, I have been an observer. But now every Monday and Wednesday I walk into RCH, through the mess that is the slushy doorway and down the dripping stairs, plopping myself into an inconspicuous seat in the back.

I am a *fraud*, I think to myself, as everybody pulls up the slides on their iPads. Not a single person in my view had a notebook, which was my first mistake. My notebook didn't even fit on the measly desks in the lecture hall—it fell over onto the side of the next person's seat. So far, so bad.

One thing about biology is that nearly every word sounds the same. I have been rewiring my brain in order to remember all the *phytes*, *phyta*, *plasts*, *phylls* and *plasms*. Before the lecture, I go over the notes. Then, I sit and listen in the lecture. Next I go over the lectures again, and make cue-cards. Then I quiz myself on them. I have been *actually studying* now that I am in a class that is not my expertise and I am behind everybody in. Those slides go by in a blur, so I spend twice the amount of time each review myself so that I might stand a chance against someone who naturally knows about prokaryotes and meiosis from years of study. Does this class have a prerequisite? No! But there is definitely an advantage to being in the same department that the class is offered in from a knowledge and comfort standpoint that is so foreign to me. All my other classes are on the backburner so that I can keep up with this one. But I will not crumble under pressure, and instead carry on with my trusty little notebook and open Wikipedia tabs.

I immediately went to the W store after the first class, alongside 50% of the other students that had the same idea. I was on the hunt for what the professor directed us to get. A dissection kit? There goes \$25. Lab coat? Another \$30. Lab manual? \$25. Even the sharpie marker was a whopping \$1.99. I couldn't even use my own notebook for the lab write ups—we were required to get a softcover for the W store. It is not me, nor the everyday biology student, who is the real winner here. It is the W store.

nike

**[Looking intently at student] Why? Prove it.
5. 4. 3. 2. 1.**

PROF. BLAKE MADILL

WHAT I READ OVER WINTER BREAK

Basically what the title says. There may be some parts where I don't include a lot of details (like character names), but that's mostly because a lot of these were not the first books in their series and if I took the time to explain all of the context, this article would be much longer than its 1000 word limit. So, I'm being purposefully vague and concentrating more on what I thought about them. Also, there is a lack of details because I am talking about these books several weeks after finishing them and my memories of their contents are starting to fade.

UNRAVELED BY SHANNON MESSENGER — 6.5/10

This is book 9.5 of the Keeper of the Lost Cities series, which really tells you all you need to know about how long this series has stretched on (and how long ago it could have ended). In true Shannon Messenger fashion, the book was about twice as long as it probably needed to be. There were some parts that were interesting, like when she brought back a character from earlier in the series in a key role. Plus, there was the new fact that it was not from the main character's perspective. But it wound up not spending much time on actual plot points. The book also kept with the usual (slightly juvenile) vibe of the rest of the series, but this kind of makes sense, and it is still technically a middle grade novel (even though they at least allude to pretty mature topics). At this point, I want to finish the series, but that is the main reason that I am still reading.

It also lost some points for including a reference to *Anti-Hero* by Taylor Swift, when I'm pretty sure the book is supposed to be set in 2015.

THE GRANDEST GAME BY JENNIFER LYNN BARNES — 7.5/10

Overall solid, but not the best book that I've read by her. I did appreciate that a lot of the puzzles were more accessible to readers than they had been in earlier books in the series. Although I'm not entirely sure if this is supposed to be considered book 5 of the Inheritance Games series, or book 1 of a new series in the same universe. I think both but mostly the latter, since most of the main cast was different, and there were only vague mentions of plot points from the other books. Some parts of it were good, with a sort of *Caraval*-like feel, but some plot points felt sort of forced, especially near the end. And the main relationship in it was way too rushed for my taste.

I think part of my problems with the book was just how many new characters there were, since it meant less time on old favourites.

OTHERWORLDLY BY F. T. LUKENS — 8.0/10

As usual for F. T. Lukens' books, a nice blend of teenage fluff with seventeen-year-olds acting like full grown adults. It was a little darker than some of their other ones, but not too much. I also liked that near the end, there was an Orpheus and Eurydice/*Hadestown* parallel. That made it interesting to look back on the book with that lens, since there were a few other

similarities. I maybe could have given this a higher rating, but I think that I was actually expecting more fluff than I got.

OF DICE AND MEN BY DAVID M. EWALT — 8.0/10

The only non-fiction work on this list. It's basically a mix of history of Dungeons and Dragons and talking about why Dungeons and Dragons is so awesome. I actually got the book last year, but only wound up reading it over break. It was good, and I was surprised by how much it kept my attention for a non-fiction. I'm not really sure what else to add about it.

HEAVENLY TYRANT BY XIRAN JAY ZHAO — 9.5/10

Very awesome, as normal for Zhao. This is the sequel to *Iron Widow*, and it had both a really similar and quite different feel to it. Instead of a bunch of philosophizing of women's rights and gender constructs, this book spent quite a bit of time on overthrowing capitalism. It made it a really interesting read. It also simultaneously had one of the most toxic relationships and best discussions of safe sex practices that I've seen in a published novel. Honestly, I mostly docked the half point because one of my favourite characters from the last book wasn't really involved (although considering how the last book ended, there wouldn't have been a realistic way to have him involved in a major way).

Also, I think that this series would make a really great TV show. There would probably be really long waits between seasons for the special effects, and the producers would probably tone down a lot of the violence (which is moderately explicit), but the themes and imagery are really strong.

GAMES UNTOLD BY JENNIFER LYNN BARNES — 8.5/10

I enjoyed this one more than *Grandest Game*. It was a collection of "short" stories (short is in quotation marks because one of the stories was about two hundred pages long). The timeline jumped around, but the author helpfully included one with the table of contents, which helped to match the cryptic titles with the corresponding stories. I liked most of the stories, there were just two (out of eight) that I think I would have changed. One of them could have been shortened. The other one was on a relationship that I was looking forward to seeing, but it was pretty fragmented, instead of having a main plot, which I would have preferred. But the other stories were full of characters acting like themselves, which is always really sweet.

mtripod



The logo for mathNEWS features the word "math" in a lowercase, rounded, sans-serif font, followed by "NEWS" in a larger, uppercase, outlined, sans-serif font. A stylized arrow points upwards from the top of the letter 'V' in "NEWS".

NULL POINTER GRANOLA BAR

i saved five dollars on a presto ticket the other day
 by walking from square one to union
 see it's a really quite easy fifty (thousand) steps
 just walk southeast from square one to dixie/queensway
 east on the queensway to sherway gardens
 southeast to the lake
 and east to the station
 its so easy that you don't need a map
 just a good sense of direction
 two feet
 and time
 walking all that distance, no map, no music
 one might expect to find
 some grand revelation
 a great internal debate
 a wellspring of emotion
 anything really
 but journeying through yards industrial
 offices dismal
 and the suburbs of famous mississauga suburban road:
 bloor street
 i was somehow surprised by mississauga
 not really having much

sometimes life doesn't have much;
 in terror at the void we perceive, we fill it
 with fears and despair;
 hymnals and prayers
 we cannot fathom directionlessness
 instead
 through god or antidepressants
 we cope

i do not know how to pray.
 but i know how to set one foot ahead of the other
 i know how to breathe in the air
 i never know how i will get home
 from an industrial yard i've never seen before
 i do not know for certain what direction i am travelling
 i do not know how far away i am
 how long it will take
 who will be on the way
 upon the toronto sidewalk i really don't know much
 of anything
 i do not know how to pray.
 but i know my legs will take me down roads
 i will not see the course of
 until at the unfathomable journey's end, i open
 my google map
 and fathom it

i do not know how to pray
 but on the south side of the queensway there's an asphalt path
 stretching along green hills, fading
 into the cloudy horizon, and at its end
 towers from etobicoke peek into the stars
 trucks scream into the concrete void
 beside them walked me,

armed with mittens
 a coat
 and a peanut butter granola bar
 there is nothing in mississauga
 but a peanut butter granola bar:
 whole oats, sugars, peanuts, salt
 high monounsaturated sunflower oil,
 trust.

molasses

BANANACAT

ORIGIN STORY

For years, he was just a normal cat strolling the streets and exploring the world. He scavenged the garbage cans for food and barely scraped by. Everything changed when he encountered the giant banana peel. Curious as he was, he crawled around this peculiar fruit wrapping. He sniffed it, trying to determine if it was edible. With no food in sight, he crawled beneath the banana peel, hoping to find something hidden beneath its shadows. Alas, there was nothing. He poked his head out from beneath the peel, contemplating his next action. Suddenly, the banana peel snapped shut, trapping the bottom half of his body. It was then that things began to change, for this banana was no ordinary banana. The cat struggled, trying to escape but the banana did not let up, he tried scratching, playing dead, desperately bouncing around. To no avail, the banana was latched on too tightly but this wasn't all that bad for the cat. With the banana's powers being transported to the cat, he slowly gained sentience and learned how to communicate with humans, posing as one of us. Although his lower half was now banana, he had gained an invaluable tool. At first, he learned how to tell harmless stories about his travels on the street, but soon he realized the true havoc he could wreak. In the halls of E7, through all the crying engineering students you could find him. Telling countless rumours, gaining influence over all the engineering students. They thought he was just a cute cat trapped in a banana, but it was all just a ploy to gain their trust! Now they follow his every word, even if they aren't conscious of that fact. Biding his time, he was waiting for the perfect time to strike his next target. The Math Faculty. That time was last term, he has been planting seeds in our brain through **mathNEWS**, spreading rumours of a skibidi rizzler, something to do with a "Jeffery," attempting to create a false figure within the Math Faculty that will help him spread his roots. We cannot let him do to us what he did to the engineers. We must find him, pull out his banana, and expose his bottom half... that is the only way to cut off his powers.

Not Jeffery



N THINGS I FORGOT ABOUT LAST TERM ($N \geq 27$)

AT LEAST I DIDN'T FORGET ABOUT mathNEWS :)

- i bought tomato paste only to never use it bc i thought it was one of my roommates'
- my calc notebook (left it at home for at least a month yet still aced all those quizzes)
- didn't use the extra notebooks in my room when i forgot my calc notebook at home
- my mom's gold hoops (and she doesn't know oop)
- didn't use an eyecloth bc i thought i forgot it only to find it in one of my boxes
- reading my email newsletters as i fear the average unread emails i had was 50
- my dignity after writing math fanfic
- my dignity after sending a super cringey email to **mathNEWS** only for the editor to respond seriously (which makes sense but still!!!) i blame this on the fact that i'm really not like my **mathNEWS** persona so if i'm signing off with my pseudonym, i'm going to be acting like a dollar store person even though it was sent through my waterloo email ☹️ [Editor's note: the venn diagram of "mathNEWS editor" and "people who understand tone matching" is two disjoint circles]
- left some fish bones in my fridge for a month (i was planning to make broth and then i didn't)
- 2/5 one question assignments for physics 📄
- my happiness :D
- groceries items such as avocados, tomatoes, cheese, etc... eating is hard! especially when i forgot about my aforementioned happiness
- my water bottle after my stats test and had to pick it up after my physics test only to see my physics professor in there, it was kinda awkward
- my water bottle again, but this time outside my apartment
- my takeout plastic containers but like i did place them inconveniently
- my candy mix but it was underneath my containers soooo
- one egg roll wrapper i had left after attempting dumplings (don't do that) but that was lowkey on purpose bc i hate dealing w reality
- my beanies, and right in the middle of christian girl autumn too? #thestrugglesreal
- playing nyt games, again because i liked the adrenaline of doing it right before the deadline, which says a lot about me
- i burnt so many parathas in my pots and pans but i forgot i had a tawa this whole time?!?! truly heartbreaking
- showers sometimes (at least until my hair was oily)
- a normal sleep schedule bc why did i go to sleep at 12-1 despite the 8:30 classes i specifically chose
- my lunch once (i had to walk back and almost missed my stats lecture, all for some damn fish)
- my will to live? waterloo is soul-sucking sometimes, especially when you're constantly comparing yourself to others and not taking any bird courses!

like i'm literally writing this on co-op after comparing myself to a fucking example in my PD course and i could go on and on but i really should be rambling to my non-existent therapist so let's move on mkay

- my house keys for a good five minutes in DC—dw though i remembered right before my calc quiz, because that's the perfect time, silly!
- my boots (once i reflexively put on my sneakers and it was snowing on my way back 😊)
- CONTROL OVER MY LIFE, probably lost it a couple times
- there's something else but i forgot it again

Dollar Store Person

WHEN I WAS A KID

I wonder why adults don't play.

They won't sing and shout, or run in the house.
Mom says they're chained down by their doubts.

No cake on their birthday, no warm place to cry.
I won't be an adult; no way.

At seven it's bedtime, the end of my day.
Mom will dim the lamp, and say,

I swept everything out from under your rug,
So you can be tucked in snug.

I took all the elephants out of your room,
So you can go shoot for the moon.

And look here, I put wings on Mr. Pig tonight.
Close your eyes, and he will take flight.
Don't let any worries in sight.

I love you, honey. Goodnight.

no pun indented

BRIDGE PROPOSAL

I feel like there should be a bridge from the third floor of EV3 to... somewhere. I haven't decided where yet. Maybe it'll just go out into the distance, as if someone forgot a null terminator.

__init__

MY FIRST EXPERIENCE PLAYING UNDERTALE

SPOILERS

I played a little less than 2 hours of UNDERTALE for the first time this weekend. My siblings are huge UNDERTALE glazers, and while I've heard almost the entire soundtrack more times than I can count, I have somehow managed to reach 2025 with essentially zero spoilers for the game.

I struggle playing single player games, as I get bored most of the time if I'm not interacting with someone else. (Note: Games excluding this rule include Hollow Knight, speedrunning Jump King [shoutout Valmerix], and recently Animal Well). This is mostly the reason I hadn't started the game yet. Over the weekend, out of pure need to procrastinate (which I am still currently doing while writing this as I have a grant application due tomorrow that I have not started), I decided to start my journey.

After actually reading the menu instructions and pressing F4, I began playing. I had heard of the character Flowey before, and I had also seen a Sans fight via my brother, so I was pretty skeptical of sitting and getting pelleted, with well, pellets. After seeing Toriel deal with Flowey and mostly understanding how the combat system worked, I moved on to following the suspicious af cow bitch. At this point, I was pretty sure she was trying to Hansel and Gretel my ass, but before I could worry about that, I had to pass through the numerous "puzzles." I will admit that most of my play-through of this part was pretty uneventful. I did take two pieces of candy from a bowl and get told I was, I believe, despicable. There was also a moment where I could not figure out where a blue lever was and spent way, way, WAY, too long on a puzzle a six-year-old could've figured out, but, we move.

Sketch as hell cow once again returned after I found a toy knife, and it was at this point, as she took my hand, that I truly did believe I was about to be thrown into a furnace and made into butterscotch pie. However, it was a false alarm. Instead, there was a scary af room with a bunch of children's belongings, once again bringing me to the eating children's conclusion. I decided not to fall into the nap ploy, and after looking at myself in a mirror, went into the living room to talk to Toriel. After being told something about snails and intestines, I followed her down into the long basement hall.

Now, this is where my first actual wtf moment of the game occurred. Fighting Toriel the first time, I died. Not my proudest moment. After complaining about the difficulty of this fight to my brother in the group chat, he clowned on me by pointing out the very obvious fact I somehow missed that not moving will literally prevent you from death. Before I detail my second attempt, for context, I have been either fleeing or giving mercy as much as possible throughout this play-through. I did accidentally kill a frog and eat a few vegetables on the way, but for the most part I have been trying to be as nice as possible. Killing Toriel was not in the books. However, after showing mercy two times into the fight and getting nothing but dots, I assumed I needed to get her HP

lower. Surely, if I pressed enter at the lower part of the boat looking slide thing, it would do very little damage and it would be fine.

I was wrong.

That shit did fucking 36 damage. She was dead. I had killed her. I was losing my mind. She wasn't a witch trying to bake children into pies, she was a nice cow who was lonely and trying to save the lives of unsuspecting and defenceless kids. I was a monster. I watched as Toriel told me to be safe and fucking broke into a million pieces.

After shouting my anger, sadness, and dismay into the group chat, I quit the game to reload. This was not how I was going to begin this game. After reloading, quickly taking a nap, and following Toriel once again into the basement, the fight started again. I chose some dialogue option (I forget which), and I get the eerie moment of deciding whether to tell Toriel I killed her. That shit was freaky. A second option essentially hinted me to keep pressing mercy to save her. I did this what felt like 200 million times, until finally, she gave up. Toriel was saved. I was free to move onwards into the real meat and potatoes of this game. I walk through the gate into the Ruins.

I once again encounter shitty ass flower bitch. AND SOMEHOW, HE KNOWS I FUCKING KILLED TORIEL. Bro starts talking about my save state ability and how I reset because I regretted my actions. Unnecessary and fucked up call out.

The title screen plays. UNDERTALE, by Toby Fox.

I am excited to continue playing, but the deadlines catch up to me, and papers must be written. I wait must wait to encounter more.

katsquids

P.S. Ghost Fight is a fucking insane banger I've had that shit on repeat for 2 days.

HOW TO BUILD A CULT OF PERSONALITY AROUND ME

1. Study my every word
2. Follow my every action
3. Understand me completely
4. Destroy me
5. Forget me

Anonymous

THE ART OF THE DISS TRACK

Hip-hop is arguably one of the most fluid, diverse, and intricate genres of music. Most people don't view it that way, because they only hear the surface level tracks that the radio blows up. I see people like that as misguided and, frankly, ignorant. I spent a lot of my childhood praising grunge and metal for their complex riffs and artsy lyrics, but when I discovered hip-hop—and I mean *real* hip-hop—my eyes truly opened. Believed to have originated in block parties in The Bronx, hip-hop has always been a genre about empowerment, and a great example of that is seen in the diss-track, one of the genre's many artistic expressions.

"In 1986, New York City hip-hop was a war. As a man is becoming a samurai, he roams the country in search of opponents. And as an MC, you did the same thing—travelling to different neighbourhoods to find battles. Hip-hop at that time was righteous and violent."

THE RZA, WU-TANG CLAN "THE TAO OF WU"

The recent popularization of Drake and Kendrick Lamar's beef has introduced a new wave of people to hip-hop and the diss-track. But their exchange of words was just the tip of the iceberg—there are decades of lyrics to deconstruct and appreciate. People often ignorantly label these tracks as childish back-and-forth arguments, but they are truly a display of one's strength and weakness, an ironically non-violent assertion of dominance over a foe. A representation of one's hometown or culture, a desire to tip the imbalanced scales of justice back to normalcy, or a documentary that educates the public on a group hardships. That's hip-hop.

The greatest battles are between two giants. Friends turned to foes, opponents representing their cultures and subcultures. The ignorant label the genre as "gang violence" and simplistic. They do not see the dedication behind the music, how meticulously lyrics are carved and their accompanying instrumentals are produced.

The feud between the members of N.W.A is iconic. The "Straight Outta Compton" group rose to fame quick, grabbing the attention of racist media and misguided souls who labelled their genre-defying "gangsta rap" as so violent, that the FBI *just needed* to monitor them. They were kids, documenting their hometown of Compton and the struggles they faced. Ice Cube left the group first, after realizing that their manager had been misusing their funds and refusing to give them a fair contract. His friends sided with the foe, and so one of my favourite battles ensued.

*"I saw it coming, that's why I went solo
And kept on stompin'
While y'all motherfuckers moved straight outta Compton"*

ICE CUBE, NO VASELINE

Ice Cube's take was rough and comedic. As others left the group, they took different approaches to the battlefield. Dr. Dre went on to create Death Row Records and make his first solo album, *The Chronic*, a powerful birth to G-Funk. Produced

entirely by Dre, an up-and-coming rapper by the name of Snoop Dogg cemented his spot in the genre by writing and rapping on most of the album, alongside Dre. The album came at a time of empowerment. Hip-hop was thriving, despite the media's attempts to bring it down. The lyrics reflected a new era of success and luxury that the public mob worked so hard to bar marginalized communities from reaching.

*"That's why it's time for the doctor to check your ass
Used to be my homie, used to be my ace
Now I wanna slap the taste out your mouth
Make you bow down to the Row
Fuckin' me, now I'm fuckin' you, lil' ho"*

DR. DRE, FUCK WIT DRE DAY

Giants like Ice Cube and Dr. Dre had secured west coast hip-hop's spot in hip-hop, but the east coast took a melodic approach to the genre they invented. The music was more relaxed, but don't confuse it for lacking trouble.

*"A wise man told me don't argue with fools
'Cause people from a distance can't tell who is who"*

*So stop with that childish shit, I'm grown
Please leave it alone, don't throw rocks at the throne*

*Do not bark up that tree, that tree will fall on you
I don't know why your advisers ain't forewarn you"*

JAY-Z, TAKEOVER

Jay-Z took a big swing at Nas with Takeover. While it came off of an iconic album and put (a largely unknown at the time) Kanye into the producing and rapping spotlight, Nas' clap back was just a little more...

*"What's sad is I love you 'cause you're my brother, you traded
your soul for riches
My child, I've watched you grow up to be famous
And now I smile like a proud dad watchin' his only son that
made it
You seem to be only concerned with dissin' women
Were you abused as a child? Scared to smile, they called you ugly?
Well, life is harsh, hug me, don't reject me
Or make records to disrespect me, blatant or indirectly"*

NAS, ETHER

Not only did diss-tracks display the lyrical prowess of two artists, but it further pushed the genre into the spotlight. Attention like that is dangerous, as seen in The Notorious B.I.G and Tupac's feud and the public, negative perception of hip-hop as a culture. It pains me that people don't understand how uplifting, lyrically mesmerizing, and educational the genre can be. Just like how the radio only plays surface-level rock and metal, the public only sees the negative. The media wants you to hate hip-hop, because it tells you the truth that they don't want you to know. And that's hip-hop.

SOMETHING FUN TO TRY WITH A FRIEND

The unfortunate thing about writing is that to get better at it, you have to write a lot. And writing a lot is often not nearly as fun when you're bad at it and everything you churn out is painful to read. To make matters worse, being ashamed of your writing makes you write less freely, leaving you unable to write much of anything and halting your writing progression in its tracks.

Fortunately, I recently discovered a neat little way of counter-acting this when talking to a high school friend over Discord a few weeks ago. She was in the mood to play a game over call but didn't know which one exactly, while I was not in a game-y mood but didn't really want to turn a friend down. As we each thought about what we could play that would be fun for both of us, my mind wandered over to the topic of writing, which made me remember that she used to write stories before university, leading me to suggest the following exquisite-corpse-type game:

1. We generate two story prompts, somehow (after realizing that most story prompt generators suck and are just GPT wrappers, we settled on generating three nouns for each story that would dictate its topics).
2. Someone starts a 15 minute timer. We each start writing a story from the prompts, and as soon as the timer stops we stop writing (even if we're mid-sentence) and trade stories.
3. We take a bit of time to read what the other person wrote beforehand to get into the story before restarting the timer and writing again. No one is allowed to edit anything that was written before them, all participants must work with what they're given.
4. We do three more 15 minute sprints, with the last one having a short grace period to wrap the story up if it's still not done by the time the last alarm goes off.

We then did dramatic readings of each story after finishing, but those are optional.

This ended up being pretty fun! My instincts in suggesting a game like this were correct: when writing with someone else, having another person writing with you gives you reassurance that someone is helping you with the task of writing two stories, making the load seem smaller, and forces you to keep yourself accountable and write to not let the other person down when switching. There were some other benefits to this game too—the short time limit forced you to just spill words onto a page without worrying too much about making them as polished as they can be, and the frequent context switches kept the writing exciting and gave you the opportunity to work on something different if you were starting to get stuck with the other story. As an added bonus, seeing what the hell the other person cooked up while you were writing your own nonsense was always fun whenever it came time to switch stories.

Of course, making the most of this game requires you to have a good writing partner. Writing obscene, ridiculous stories is a lot of fun, but if you never try writing anything more sincere you're not going to improve, so it's important to write with someone who you're comfortable with. When we played the game another time, we tried having one of the stories be more serious in tone, and though it sucked in the end there weren't any hard feelings about it—we had a good environment for experimentation. We're also thinking of trying a round where we just write two stories based on prompts without any switching, to get more practice with with developing our own ideas over a longer run. If you end up trying the game for yourself, I encourage you to modify its rules too.

That's all I had to say. I wish I could reveal a twist here about how this article was also written as part of one of these games, but unfortunately it was written the boring way (albeit slightly less self-consciously than normal). Best of luck with your writing!

the government's only spy

TROLL JEFFERY

Add Jeffery and msg him something funny (he's single too btw 0.0)

Discord: grogles (cute rock pfp that i made for him :3)

BananaCat

TROLL JEFFERY PT 2

Jeffery likes rocks, send Jeffery a picture of ur favourite rock, or a rock for his pfp (he needs a new pfp bro he still has a christmas one I made in paint man, I don't even know how to use a transparent background so its scuffed af lmaoooo

discord: grogles

BananaCat

JEFFERY (JK I'M HUNGRY)

Yo anyone know any good food recipes send to grogles and maybe he will send to me ty uwu

BananaCat

GMATH 201: COUNTING CUTE LOOKS

GIRL MATH IS BACK

We've all stood in front of our closet trying to figure out what to wear, only to realize you've been there for thirty minutes because you have *nothing* to wear. This seems like an existential problem, but it is a combinatorial problem in disguise.

Despite having: fifteen tops, ten bottoms, five outer layers, six pairs of shoes, and ten accessories, it still feels like *nothing* goes together.

You can calculate the total number of possible outfits by multiplying the number of choices in each category. So, $15 * 10 * 5 * 6 * 10 = 45,000$ different outfits.

But what about accessories? They're optional, so under the assumption you wear one accessory, it adds 4,500 combinations to your total. But what if you want to wear only a necklace, or just one piece of clothing and select "none" as the rest of your top/bottom/jackets/shoes/accessories? Then the number of possible outfits increases to $(15 + 1) * (10 + 1) * (5 + 1) * (6 + 1) * (10 + 1) = 81,312$ different outfits.

Alright. This all sounds simple enough right? WRONG. This doesn't even take into account real-world constraints such as:

Weather-Appropriate outfits: No shorts in winter unless you enjoy hypothermia.

Event Context: No sweatpants for a black-tie event unless you can create new trends.

Recent? Dirty or Clean?: You wouldn't be caught dead wearing a combination you've worn recently. That's like, so 2000s. Also, the outfit has to be clean; you can't lump yourself in with the stinky CS, CE and SE majors.


To model these restrictions, we have to remove invalid combinations such as summer-only tops, or lounge tops combined with dress pants.

The optional nature of accessories, combined with mood-based vetoes of certain combinations, turns "getting dressed" into an optimization problem. What's the most wearable, weather-appropriate, and vibe-appropriate outfit for today? Answering this question involves solving the Subset Selection Problem—a classic in combinatorics and optimization theory.

Except this time, the constraints on the subsets are comfort and style.



This brings us to the ultimate application of Girl Math: if the sheer number of possible outfits justifies why it takes you thirty minutes to get ready, then technically, you're not indecisive—you're solving a combinatorial optimization problem.

And let's not forget the *accessory dilemma*: suppose you have ten accessories but only want to wear multiple or one or none. Now you're dealing with permutations and combinations of accessories. If you decide to wear multiple necklaces or earrings, congratulations—you've just entered the realm of multi-set combinatorics, where order doesn't matter but repetition does.

Color coordination introduces another layer of complexity. If you decide that only certain tops go with certain bottoms, you're effectively introducing conditional probabilities into your outfit selection process. (tip: make ur closet all pink )

Next time someone complains about how long it takes for you to get dressed in the morning, tell them that you're just solving a combinatorial problem with real-world constraints, involving subsets, permutations, and optimization.

You might just be a genius in disguise if it takes you only thirty minutes every morning to solve this problem.

Happy outfit choosing and may your subsets always be stylish!
xoxo  

cherry ♡

N THINGS POSTDOC PAWEL SARKOWICZ MAY OR MAY NOT HAVE SAID WHILE FILLING IN FOR PMATH 333

- This is to give you a taste of what it's like [to prove rigorously]. Spoilers: miserable!
- Imagine doing this [proving rigorously], every time.
- If you can't read my handwriting, let me know and I'll try to improve it! (I won't really improve it, but I will try.)
- I did my PhD in Ottawa, where I taught a proofs class... At the end of the semester, they gave me a "Calligraphy for Dummies" book.
- You guys are students at the University of Waterloo; you are already miserable enough (jk)
- Yeah, I look different than Matt, because... I'm not Matt. I'd like to think I look better than Matt, but... *[shrugs]*
- *[Student asks if he'll mark our assignments]* No, no, I'm just some dude.

PMATH 333 student

HAHA THE USA WOULD NEVER TAKE OVER A SOVEREIGN NATION RIGHT?

IN UNRELATED NEWS, LET'S TALK ABOUT HAWAII

For some reason, certain unsavoury neighbours of ours seem to think it's funny to just like, threaten our independence?? Which is sort of funny for a country that seems like, really into the whole independence thing and how evil and terrible it was that they weren't independent.

Maybe these guys aren't really the paragons of FREEEDDDOOMMM and like, behind really videos of empty rallying speeches with triumphant FREEEDDDOOMMM music over it and posing with guns claiming to try to defend their FREEEDDDOOMMMM, there's some pretty terrible history that went down that isn't really FREEEDDDOOMMM friendly of them.

In unrelated news, let's talk about Hawaii.

So Hawaii was really a bunch of different islands until some guy called Kamehameha I united all the islands together in 1795. Now, he united them by conquering all of them, but unfortunately most kingdoms seem to be founded through a whole lot of force. What's somewhat interesting is this would never had worked without European interference, as Kamehameha's army was sold large amounts of European military equipment. He inherited control over Hawaii island, but with help from European traders also took over Maui and O'ahu.

Now, it's not weird for trade between countries to have a significant effect on the outcome of wars. But, this is going to set a precedent. Everybody was *very very* interested in Hawaii.

Here is the part where I skip a lot of history (sorry) because although it is important, I also have a word limit + the more things I talk about the more likely I am to get something wrong (oops). So here's a quick summary.

Hawaii now has a kingdom. Kamehameha I is succeeded by a bunch of other leaders. Kamehameha III began actually creating a governmental structure, and in 1810, the Hawaiian Islands were fully unified and an internationally recognized kingdom. However, at this point Hawaii's doom was starting to be spelled out, and there was genuine concern among it's leaders. European traders introducing diseases, as well as cruel labour laws from plantations, caused the native Hawaiian population to decline to at least 1/3 of its size by 1890.

This might be a good time to talk about plantations. Specifically the Dole plantation. Today, if you go, you're treated to Dole's "classic pineapple ice cream," in which they proudly claim that all the best pineapples stay on the island. There's a cute train going through beautiful gardens, and cute smiling pineapples in the gift shop.

At no point during their tour do they mention how they overthrew the Hawaiian government. The whole-ass owner

of Dole, Sanford B. Dole, staged a coup against Queen Lili'uokalani and the government. Why? Oh, cause she wanted to separate Hawaii from how entangled it had become with the USA, bring more power to the actual monarchy, and restore more voting rights to the Hawaiian people. This was done with the full knowledge of the US minister of Hawaii, and 300 US marines were there for "protection" and not to threaten the government in any way.

A little later the US minister declared the annexation of Hawaii. It is recorded that most people in Hawaii opposed that, but apparently that didn't matter. To be fair, President Cleveland tried to restore power to the queen, but Dole refused to cede power and just tried to claim it had complete control over Hawaii whether it was part of America or not. Turns out giving corporations a ton of power is like, a bad idea or something, and they're literally fine with just declaring themselves supreme dictator of a country that they're not even part of. In 1959, Hawaii was formally recognized as the 50th state, but even before this, various treaties and deals were signed that stripped Hawaii of more and more of its power.

For space and now time, what this article is leaving out is a lot of how Hawaii got entangled with the US in the first place, largely through the sugar trade and exclusive export deals to the US. What I'm really trying to point out, is that the USA has used this tactic before, and that they are perfectly willing to threaten the sovereignty of a country, not just with firepower, but by trade deals taking advantage of countries around them, and slowly causing them to become overly dependent on the United States. Once the US has this kind of power over a country, oops, they're totally cool with illegally taking them over. But it's okay, because they still love FREEEDDDOOMMMM.

So 25% tariffs on Canada, huh?

Not a N*rd

A FUN CYPHER

DM ME IN THE DISCORD SERVER THE SOLUTION AND WE'LL FIGURE OUT A PRIZE OR SMTH

ZL Mi As im Sd ul Li KL de VV lq Oa Ab Yv Hh—ZX RC Wn
 ae Tr KA Si ow Co Mo ep Xb YX NO Zw gr Mv Ip Vr—BU ZN
 ta QO Ic WO EZ—SE Zn Eb Bn qd Vt IP kz Ao YU Bx Ww io
 Mc YQ Ro Yq aq Xd Ea Mr

Dashes are seperators.

Dick Chudney

WOULD YOU PUT A CHIP IN YOUR BRAIN?

Let's start this new year right with a light, breezy article. I'm gonna try to define the nature of human consciousness.

An idea has been rattling around my head for a while now. Like most great ideas, this one came to me while mildly drunk at a Halloween party with fellow writer Not a N*rd. The topic of the upcoming cyberpunk dystopian future came up, and we discussed which robotic augmentations we'd be willing to get. We were totally down for the robot sword arms and eye augmentations, but there was a hard line we drew: no chips in our brains.

But why draw the line there?

There's a quick answer. The one that my gut comes up with before my mind. It's that a chip in your brain would change something too fundamental about who you are: the way you think. Your consciousness. The technological alteration becomes too close for comfort. But too close to what, exactly?

I think we've all heard the joke about every human simply being "a brain piloting a meat suit," and while it assuredly got the whole squad laughing in grade five, I think there's a lot of people who really do view themselves from that lens. They are their brain, everything else is controlled by the brain. I control my body, versus I *am* my body.

There's a sense that the brain has an exalted role amongst the organs; that it's the source of one's true self, and everything else just plays support functions. I sometimes wonder if there's a sense of brain-centrism involved: it assumes it must be the most important job because it's the one doing all the thinking, and so the only one who gets a say in deciding the most important job. Is that true, though? Is the brain more essential to the intact preservation of "us" than the lungs, or the heart, equally functionally vital organs?

We've all been told at one point or another to imagine the CPU as the brain of the computer. Let's break new ground and imagine the brain as the CPU of the body. All sensory input needs to be passed through it, it's processed and sent to short/long term storage, and then that information is used to determine the next action to take.

But let's not forget, this computer is totally useless without software. It's a collection of silicon and gold connected together in a very elaborate formation. The software is what gives the computer the ability to compute, to *think*. But where is the software? Which part of the computer is the "software" part you can point out on a motherboard? Software has this cyclic nature where it is both the enabler of, and enabled by, all the physical hardware components, and as such is arguably everywhere, a final phantom component in a PC.

Can you point to a computer and say that because the CPU is doing the calculation, the software "lives" in the CPU and the computer therefore *is* the CPU?

Can you point to a human and say that because consciousness is computed in the brain, consciousness totally lives in the brain, and therefore the human *is* the brain?

I don't know.



To be honest with you, I have no idea if this makes any sense at all.¹ The only other person I've had a chance to chat about this idea with since Halloween is Not a N*rd, who politely yet vehemently disagrees with me.

She tells me that a computer can't be compared to a human. Were a computer to lose its storage or RAM, it would become totally non-functional. With a person, even if they were to lose a limb (or gain a new one!) they would remain totally the same person, so the critical functions of personhood cannot be contained within those elements. If you lost the brain, however, you wouldn't be doing much of anything.

All of this is plainly true, and I of course agree with it. I nevertheless have excellent counterpoints to these arguments, but I'm about to hit the word limit, so you'll just have to take my word for it.

There's an interesting coda I have to this point, though. Around the time I started thinking about my brain like this, it took some authority away from my brain in the mental model of my overall self. I began to think of my mind as *a* part of myself, not the whole self entirely.

I occasionally have random waves of anxiety. One of the things I thought I was doing was thinking about real problems I had—school, family, safety—and then having an objective emotional reaction to those circumstances. I thought because it was coming from my brain, and therefore an objective, "pure" sense of my own reality, it was therefore reasonable and objective to dwell on this worry.

What I realized was that the brain is a part of my body, like my stomach or my knee, that can just... hurt randomly for no external reason. I wasn't reacting to a situation, I was feeling anxious and *then* coming up with an excuse to justify the thing I was already feeling, no matter how flimsy. If I waited for the worst to pass and then thought about the "problem" again, it was almost always less bad than it felt in the heat of the moment.



This is definitely not universal mental health advice (PLEASE do not dissociate because of a **mathNEWS** article) but I definitely noticed a change in how I approach stress once I started thinking about myself like this.

My gut really does come up with things before my mind sometimes. Who's the one doing the thinking in there?

Anyway, if anyone manages to figure out this whole "consciousness" thing, please let me know via an article in a forthcoming issue of **mathNEWS**. It's the only thing I read these days.

Dick Smithers

1. I wrote most of this article at 2 AM trying to hit the submission deadline. Can you tell?

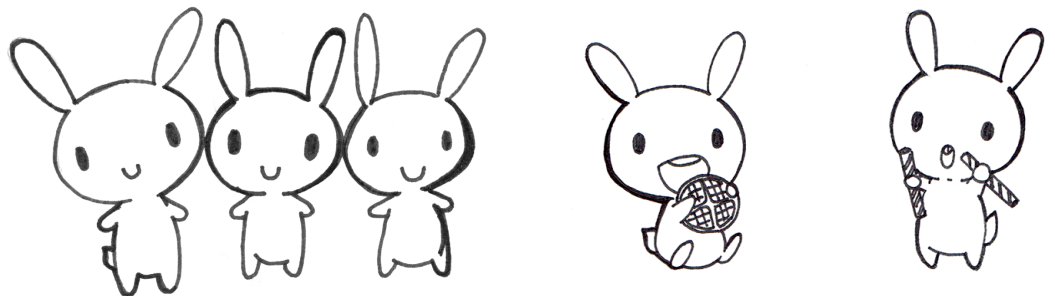
WHY YOU SHOULD JOIN THE LIBERAL PARTY

Justin Trudeau is stepping down as leader of the Liberal party which means that the Liberals are searching for a new leader. And you, dear reader, deserve to have your say on this topic. Only about 2% of Canadians are estimated to belong to a party and party membership tends to skew older.¹ If you feel that political parties don't represent the views of your generation it's because they don't. By registering and having your say you can shift that.

The vast majority of the non-interim leaders of the Liberal party have become prime ministers (12/15 or 80%). Voting for the leader of the political party arguably has more political impact than voting in a federal election. It's a more effective way of shaping general policy than voting on your local MP. Whoever wins the leadership race will be Prime Minister briefly and has the potential to serve longer depending on the results of election(s).²

WHO CAN VOTE?

Canadian Citizens and Permanent Residents that are at least 14 years of age that register by **January 27th 2025**. Registering for the Liberal party is free and literally took me less than a minute. You can do it here: <https://liberal.ca/register/> or scan the QR code below:



The National Security and Intelligence Committee of Parliamentarians (NSICOP) have released a report saying that all party leadership races are vulnerable to foreign interference. One of the reasons for this is that leadership races have far less participation making it easier to influence the results.

The other reason leadership races are targets of foreign interference is that the prize of successful foreign interference could determine the future Prime Minister of Canada.³ The parts of our democracy that are the most vulnerable to foreign interference tend to be where you can have the biggest impact by getting involved. One of the simplest ways to combat foreign interference is with robust domestic participation. Joining any party, be it Liberal or otherwise, lets you vote on the candidate the party puts out in your riding. You can also have your say on the party's policies.

There is more civic engagement than just voting in a general election. If you are feeling apathetic and frustrated with the current state of politics, I strongly encourage you to get involved. Complaining from the sidelines will not change anything. I don't think it will be easy but I do think it's worthwhile.

Eager Beaver Wants You To Actively Participate in Democracy

1. WordPress deleted all my footnotes and I can't find the original source I was linking. So here is a slightly different source with slightly different numbers and no breakdown by age. StatCan in 2018 estimates that 3.6% women and 4.9% of men are members of political parties. It's slightly higher than what I state in the article but still fairly low. Which is my point: political participation is low. <https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2018030-eng.htm>
2. While current polling suggests that the Liberals are almost certain to lose a lot can change between now and election day. Even if the Liberal leader does lose there is still a chance that they get to stay on as leader to fight in the next election.
3. There is evidence to suggest India did interfere in the leadership race that placed Pierre Poilievre as leader. However it doesn't appear that India's interference changed the outcome. <https://ici.radio-canada.ca/rci/en/news/2123802/agents-of-indian-government-interfered-in-patrick-browns-conservative-leadership-campaign-sources>

CLUB REVIEW: THE PURE MATH, APPLIED MATH AND COMBINATORICS & OPTIMIZATION CLUB

Welcome to Club Reviews, a series where I review clubs. Before we get started, don't forget to subscribe and hit that bell.

My first encounter with the Pure Math, Applied Math and Combinatorics & Optimization Club (PMAMC&OC, or just PMC) was in the winter of 2023. A friend had invited me to see a talk he was giving at PMC's termly Short Attention Span Math Seminars (SASMS). Upon asking for further details, I was told to show up between 3 PM Friday and 3 PM Saturday, because the event would be running nonstop for a full twenty-four hours.

I was on co-op, working that Friday, so I arrived shortly after 5 PM. I was quickly confronted by then-President Evan, who forced me, with violence and everything,¹ to join the club's rankings. Before I knew it, I was one of them. I'd stepped into this room, and not 10 minutes later I had become a full-blown club member. Is this how they got you? Was this how Gödel and Ramanujan and the rest of them got indoctrinated into this cult?

I stayed in the SASMS lecture hall until 5 AM the next morning, at which point I couldn't keep my eyes open so I went home. Two hours later, I woke up and headed right back to that lecture hall. I was in a cult, all right.



I don't study pure math, applied math, or combinatorics & optimization. I'm not even in the Math Faculty. And yet, after the last short-attention-span math seminar that I hardly understood ended and I went home for real this time, I somehow still felt like I was leaving a place where I belonged.

I'm as much a math nerd as the rest of you. I spent my formative years doing math contests, watching 3bluelbrown and Vi Hart, and naming group chats for my middle school friends shit like "Math Test Productions."

I decided to pursue engineering instead. Of course there's math in engineering, but culturally it comes with a sort of resentment at it daring to be there: engineers are so burnt out by their third or fourth calculus class that they'll take any shortcut they can to avoid it. No one else seemed to share the joy I found in first-year linalg or upper-year signal theory.

But PMC was filled with people who I'd find discussing some borderline-pointless problem they found and seemingly having fun with it. And despite not having taken any of the background material, I could sit in a corner of a couch and try to understand at least half of what was going on, and probably learn something unexpected along the way. I liked this.



The office, I found, was often open, and I found myself wandering inside, picking up a book off the shelf and skimming the first few pages, or trying to follow an improvised explanation of group theory or Lebesgue integration someone was doing on the board.

It felt like I should do math in this space—and I had no shortage of fun projects—but soon the realities of real classwork kicked in and I had no math to do. One afternoon I walked into the club office, purchased four PMAMC&OC logo stickers from the nonchalant exec, and spent the next hour on the couch combining them together into a massive, fucked-up megasticker on my laptop. I wondered if I was engaging with the club purely superficially. I enjoyed being here, but shouldn't this space be for people who at least know what a ring is?



I asked Sara, F24 PMC president, who she thought PMC was for. She thought for a while, considering the variety of math and non-math majors and the different ways they get value out of the club, then posited: "People who don't hate math."

I like this answer. I imagine a hypothetical character who struggled through math in high school, whose teachers through that time were encouraging—as a teacher should be—but failed to support them in the way that they needed, ultimately leaving them with grades that made them feel like a failure. Almost humiliated, they chose a major as distant from math as they could. But something made them still recognize the beauty that was there once they got past the repetitive calculations and rules given without an explanation. They didn't hate math; they never did. The fact that this space exists for them feels like a really special aspect of the university experience. It's one of my favourite things about this school.



I think about this character as I enter a space that is not PMC, but feels a little like it: alien, yet friendly; nerdy; and with a disproportionate number of grad students.

The same question that an engineer in PMC normally attracts is raised: "What brings you here?" To be honest, I'm not really sure. I give the cop-out answer the first time, gesturing towards the person who brought me here, using the word "dragged," but they're not here the next time, nor the time after that.

Like PMC, I'm unsure whether I belong here. But, also like PMC, it's not like there was an entrance exam. At the end of the day, people come here because they want to be here. If you understand what this space is, and you want to be here, you've passed the eligibility requirements.

I spend a lot of time in spaces that I don't perfectly fit into. Every once in a while, it feels liberating to walk into a place I wouldn't normally expect myself to go, maybe digging up old pieces of myself that I'd thought I'd kept buried, or just introducing myself to something that could be a bigger part of my life. Spending time in PMC, more than anything else, made me more comfortable inserting myself into these places, where it feels like my only qualification is not hating it there.

Beyond just being a cool, fun club to hang out in, this is the value PMC has to me. Several friends of mine have found their own versions of PMC. I encourage you to find yours.

But, also, come to SASMS this term. I might do a talk.

__init__

1. The threat of not being able to indulge in the Jacqueline's sandwiches everyone else was eating

MERMAID HOUR

DOES ANYONE WHO WORKS AT PAC READ mathNEWS?

Last year, I spent some time swimming in a few of the public pool(s) in my hometown. You can get a monthly pass or a ten pass, and it grants you access to the pool and the gym at all of the municipal pools, so you can attend whichever ones are closest to you, or whichever ones have the pool available for the kind of swimming you want at the time you want.

What I was interested in was early morning swimming, at 6 am. Churchill Pool had swimming at six on Monday/Wednesday/Friday, and Foothills had it on Tuesday/Thursday, so I usually tried to show up to those. They don't open the doors until right at 6 am, so all of us keeners would stand outside and chat for about the ten minutes we'd stand waiting in the cold.

As a side note, I miss that easy friendliness. I'm not sure if it's just the crowd (they were mostly middle aged or older folks), but at PAC, I rarely end up chatting with anyone at all beyond, "Go ahead, I'm just doing drills!" or "Yeah, I'm almost done with this locker, you can have it after me." I feel like maybe people go to PAC (the gym and the pool) with their friends, but not as much to make friends, whereas I find municipal pools to be kind of the opposite. As an example, one day I got to one of the pools (Renfrew) about half an hour before lane swim started, and settling into the hot tub (maybe PAC pool needs a hot tub!), I listened to a man talk about his time in the navy. He had to speak in a bit of a holler, since the jets were loud and his voice was soft like some older people's voices can be, when they've done a lot of hollering in their lives. He told me about things like jumping from the deck of their ship into the warm Mediterranean, about visiting Europe, about requesting a change to their route so they could sail around the Horn of Africa... just bits of his life. We talked about dementia and old folks' homes. We talked about my friend who had just joined the navy. It was just refreshing, is all. It just reminded me of the richness of every individual's life, is all.

Anyways, one morning I got onto the deck of Foothills Pool and they had all the overhead lights out. Instead, the pool was lit only by the underwater lights within the pool—and hopping in with as-of-yet unfogged goggles, swimming in the clear, glowing water at six o'clock in the am was some kind of transcendental experience. In addition, I could watch the

sky between laps, I could watch indigo's first triumph over night, followed by a light somewhere between yellow and blue, not at all green; then succeeded by the sun itself, which one could greet with one's own eyes when low enough in the sky through the city's haze. And the pink, oh the pink—in the opposite direction of the sun's breach—

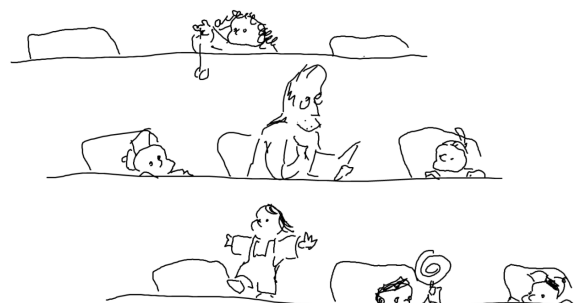
I think they should have the lights like this at PAC Pool for like the 8–9 am swim, or the 10–11 pm swim. I know there are no windows in PAC Pool through which the sunrise/sunset can be admired from a glowing pool, but I still think this would be nice. Someday, maybe after they're done with M4, they can put some windows into PAC Pool.

And, um, let's be human to each other.

double anchovy

P.S. Whoever is playing Tanya Tucker's Delta Dawn during the lunch-hour swim—I want to kiss you. I hope fortune is bestowed upon your home.

PICTURED: FIFTH YEAR UNIVERSITY STUDENT AT HIS 8:30 EARTH 122 LECTURE



profQUOTES

AMATH 250: JOE WEST

“ What did I teach you when things get complicated? That’s right, give up.

AMATH 251: MOHAMMAD KOHANDEL

“ You still have to do the course evaluations. Just make sure you think about good things, be happy, and then do the evaluations.

AMATH 271: MIKE WAITE

“ My head is gonna start to hurt if I have to think about this too hard.

“ These are *scare* quotes.

“ My head starts to hurt when I start to think about these things too hard, because my brain is very classical.

“ But it gets worse! Or better.

“ There are many events in life that cause other events.

“ Here’s something to think about: what’s a vector?

“ If I write down my birth date, my birth year, and my favourite number, is that a vector?

“ A bit of notation, cuz I like a good notation.

“ We are getting beyond my expertise in this area, which is just enough to teach you this part of the chapter.

AMATH 351: FRANCIS POULIN

“ I’m not a wizard. I wish I was.

AMATH 373: JOSEPH EMERSON

“ If you’re feeling overwhelmed, that’s fine. You should.

CO 342: JIM GELEN

“ That should be obvious by the linear algebra you learned in MATH 135/145... No?... 13... 6?

“ Now, let’s instead use a fact that you actually learned in your linear algebra courses. Unless you took my abused version of 136 in which I thought the permutation expansion. That course didn’t go well...

“ I can’t write down a real number.

“ This is the point which I stopped writing the slides and started shovelling.

“ The grades you see for the final have not been jiggled (more accurate word for curving).

CO 431: OLIVER PECHENIK

“ I’m going to write the word “cohomology,” and you can admire how many o’s it has.

“ It’s French and it has some holes in it.

“ Computational complexity is cool, but it’s not gonna stop me.

CO 456: MARTIN PEI

“ Now we will talk about convex games. But before that I’m going to make this lecture non-convex by taking a break.

CO 481: DEBBIE LEUNG

“ Next week, we will have a crash course on quantum mechanics. You will learn it all in one lecture.

CS 135: MARK PETRICK

“ And I’ve probably made this threat thirty times by now—who coined the term “algorithm?” On an exam, you just need to write down his name: Abu Ja’far Muhammad ibn Musa Al-Khwarizmi!

CS 145: TROY VASIGA

“ The exam you should care about the most for this course, is this one, ‘cause it’s for this course.

“ You have undefined variables, it’s just a warning, pffftttt, only 10 people will die.

“ Does anyone here have sixteen trillion gigabytes of RAM? *[No one raises their hand]* Good, I would’ve failed you out of spite.

“ You might get more than zero: I might give you a mark for your name!

“ It’s not in the TRIE ‘cause there’s no happy face there [...] I better make this node a happy face node.

CS 146: BRAD LUSHMAN

“ Why they do this? I don’t know. If you ask the people from Racket, they will say, “I don’t know, that’s how they did it in Scheme.” If you ask the people from Scheme, they will say, “I don’t know, that’s how they did it in Lisp.” If you ask the people from Lisp, well, I think they are dead.

CS 241E: ONDŘEJ LHOTÁK

“ Alright... I guess today will be a shouting lecture.

CS 246E: BRAD LUSHMAN

“ What if we tell lies?

CS 330: KEVIN LANCTOT

“ [Making a meth lab] and using your UWaterloo email is a really bad idea.

“ We have laws in Canada, yay!

“ Make a promise to yourself that if you don't do well on the final exam you'll eat a live worm.

CS 341: ÉRIC SHOST

“ As you can see, there is a frenchism left over [in the slides]: “coloriable.”

“ Build one fidget-spinner-thing per variable.

“ [Talking about $NP = coNP$] The majority of people believe that it's not the case. Even the rock believes it's not the case.

CS 343: PETER BUHR

“ Death. Taxes. Gotos. These are the three things you have to accept as a programmer.

“ If you haven't been taught correctly, I'm about to teach you correctly.

“ If someone tells you that C++ exceptions aren't expensive, you should smack them in the face with a fish and say, “RRR, you're wrong.”

CS 360: RAFAEL OLIVEIRA

“ Yeah, let's use the pigeons again! We're really gonna use our pigeons today.

“ This was something that I didn't want to unearth from the rug, but since you guys want me to lift the rug and show the dirt...

“ [Drops chalk] Oh noooo. Moment of silence. [Immediately keeps talking]

“ If someone sends you an urgent message asking for your WhatsApp to send you a gift card, DO NOT RESPOND. I only use cash. Also, I don't use WhatsApp—that's stupid.

“ [Talking about Alice and Bob] Bob's a problem? Well, that's kind of sexist. [...] Regardless of gender, no one is trustworthy.

“ [Explaining something] [Student tries to interrupt] Nonono let me finish. You're using fancy words and my vocabulary is like, ooga ooga ooga. I'm a caveman.

“ Student: Are you saying that Bob only has polynomial time
Professor: Of course! We all only have polynomial time. Life is short. Life is polynomial.

“ Professor: What's the biggest threat?
Student: The verifier.
Professor: No. The NSA.

“ P vs NP is the million-dollar question. Have you ever heard of #P? Marketing, man.

“ [Encouraging the class to take grad-level complexity theory courses before graduating] Go do something fun before you get rich.

CS 365: ERIC BLAIS

“ If you're finished in a finite amount of time, you're efficient. Congratulations.

“ This works as long as I can say “that's illegal” whenever you break it.

CS 454: KHUZAIMA DAUDJEE

“ Orphans are bad and you have to kill them.

CS 454: SAMER AL KISWANY

“ Why is this system beautiful?... I have to be careful with my wording, because in a little bit I'm going to shoot it down.

CS 459: ABDELKARIM KATI

“ Student: We're so cooked...
Professor: Yeah.

CS 466: SEPEHR ASSADI

“ The proof of this is borderline trivial because I already told you the answer. It's just like induction: it's a meaningless proof technique because you have to already know what you're proving.

“ I have respect for ML.

CS 488: GLADAMIR BARANOSKI

“ Your homework this weekend is to watch movie on Netflix. There will be five questions on the exam.

“ I see everything. I'm like the big brother here.

PMATH 365: JASON BELL

- “ [Explaining why he’s teaching 365 instead of Xue Miao] [Xue Miao] had some sort of kid or something like that.
- “ [Writes $u(t)$] It would be fun to dot the University of Toronto with this vector.
- “ You might think, “This guy’s a loser, he can’t see outside of his 1D world!”

PMATH 367: BLAKE MADILL

- “ Who am I? I don’t wanna think about that.
- “ [Ontario Alert Ready System test sets off alarm] Not even the government wants to see this proof.
- “ Student: Oh no, I don’t have a question. I was just trying to block out Michael.
Professor: Same, to be honest.
- “ Not nice integration, dirty.
- “ [Piazza post: “A Shameless Request”]

Hey all,

Did any of you happen to LaTeX notes for this course? If so, would you mind sharing them with me via email?

Thanks,

Blake

PMATH 446: BEN WEBSTER

- “ I think it’s just fun to say German words.

PMATH 450: LAURENT MARCOUX

- “ [Learn post: “Monday’s class”]

Dear One and All,

For the final exam, you will not be required to know the proof of Theorem 11.15, which is the theorem that I will be covering in class tomorrow, Monday December 2.

Feel free to spend the afternoon frolicking in the snow if you desire.

The Management.

PMATH 945: JASON BELL

- “ I have three minutes left, which is just enough to do cohomology theory.

STAT 433: JEFFREY NEGREA

- “ Thus, f has the mean value property, so f is harmonic. Isn’t that cute.

MSE 541: MARK SMUCKER

- “ If you choose the wrong coin, we kill you.
- “ They went through the blitz, they can handle a TV show.
- “ Those are actually illegal, and you will go to jail or get your legs broken. One of the two.

PHIL 363: JENNIFER SAUL

- “ You two get to be at the incel table. Anyone else want to be at the incel table?

PMATH 330: CHRIS SCHULZ

- “ Rest assured: in my class, even if you don’t identify as a man, you’re still mortal. We’re all going to die one day.

PMATH 347: YU-RU LIU

- “ We are going to do the student perception survey but I’m getting too excited [about Fermat’s last theorem], so would it be okay to prove this and do the survey on Friday?

I know we already have an ISSN on page 27, but the urge to add another one right here is incredibly strong.

Like, do you understand how rare it is to have the exact right amount of space for an ISSN? Not to mention twice in the same issue?

AN EDITOR WHO REALLY
LIKES THE ISSN

ALL JOEL HAVER 2024 MOVIES RANKED

COULD PROBABLY FILL AN ENTIRE ARTICLE FOR ANY ONE OF THESE SO I'M GONNA TRY TO BE BRIEF

Joel Haver is a YouTuber who is best known for his sketch videos, but in 2024 he instead made twelve feature-length films in twelve months. I watched them all roughly as they came out, and now I'm gonna rank them subjectively. I just wanna talk about all of these films cause they're really great. If any of these sound interesting to you, please check them out. Just be warned that if you decide to binge them all, brace yourself for emotional whiplash. Without further ado, here's my ranking.

12. A LITTLE FILM ABOUT FRIENDSHIP

Something's gotta go at the bottom. *A Little Film About Friendship* is a short, wholesome movie that follows Joel (the director) and his best friend Trent as they take a little vacation together. There's some great emotional openness on display here which I love to see in media, but the white male cisheterallo-ness of the writers/actors impacted this film the most out of all of them, which lessened my personal interest along with the slow pace and aimless plot. Still a nice watch, and I could see some people really needing it in their lives.

11. COMING HOME

Coming Home is an autobiographical vlog-style movie about the filmmaker Joel Haver staying in his hometown of Nova Scotia with his mother over the winter break. Went back and forth on this and *Little Film* for the bottom spot, because I was also just generally not engaged for most of it and this was less cinematic, but the ending scene hit me pretty hard emotionally and that was enough to push it up.

10. YOU'RE POINT GIRL

You're Point Girl is about a social media influencer coming to the end of her five seconds of fame, and is filmed entirely with a phone in a vertical aspect ratio. I love this film's concept, was often funny and the music was actually super impactful, but I think it ended too early and I wish it had gone on longer to feel as complete as the rest of the films do.

9. THE HERO'S JOURNEY AKA MY LIFE AKA THE CALEB JOHNSTON STORY (I'M CALEB)

Hero's Journey is the first film Joel released, and is a found-footage film about a guy living in his van because his mom kicked him out of the house. This one's a difficult watch, it can be funny but it's often pretty sad, not really my thing. I could definitely see people who resonate with it being heavily impacted though.

8. IT JUST TAKES TIME

It Just Takes Time follows a group of guys coming together for their friend whose brother has just suffered an untimely death. Like *Hero's Journey*, I can tell this film would be devastating if the subject matter really connected with me, but I have been

very fortunate in my life such that it hasn't yet. It may one day, and I may come back to it. But for now, despite the breathtaking cinematography and the funny but brief moments of levity, I'm ranking it behind ones I connected with more.

7. THE TEXT

Despite being the shortest movie of the bunch, at 48:15, and shot entirely in one take, *The Text* is a movie that might take you surprisingly long to get through. This movie is cringe comedy at its cringiest, and I had to pause it several times throughout just from the sheer pain of all the anticipation and anxiety the writing, acting, and camerawork build up. Extremely difficult watch, great movie.

6. HICCUPS

Hiccups is a toxic romcom about a relationship from the perspective of a breakup, and I like the com but not so much the toxic rom. Some really great comedic acting and some really clever writing and editing, but the protagonists are both horrible people and I just didn't really enjoy the plot that much. Still not as painful as *The Text* so it's going above.

5. HELLO MY BEAUTIFUL CREATURES

This film wreaked havoc across the entire project because it's the longest, at 2:21:53, and is *stop-motion animated*. Six frames a second, all done with toys, crazy handbuilt sets, even crazier plot, keeps throwing curveballs at you and is just overall absolutely insane. Drags a bit in the middle but when it picks up it *really* picks up, easily the highest effort film of the bunch, everyone should watch.

4. THE DIARRHEA BROTHERS SAVE THE DAY

Illegally funny spoof-inspired film about diarrhea salesmen, and the highest budget of them all at around 16K. It sounds so stupid and it is, but the writing and execution is just so well done, I guarantee you will laugh at this film. Has a real knack for introducing incredible gags and then bringing them back when you least expect them. A great watch with friends.

3. THE 9TH MOVIE

Really funny meta film about all of Joel's friends being forced to make a film in 48 hours. Works really well because it's about real people in a grounded setting, but then they all act so increasingly ridiculous and the comedic dynamics from the entire cast are just so on point. A particular brand of low-concept high-absurdity comedy that I really enjoy.

2. ANYONE ELSE BUT ME

Second film released, about an actor who is threatened by criminals to pay them to free a girl he just met because he was pretending to be rich while on a date with her. Feels quite

a lot like a big budget comedy film, big cast, ambitious sets and plot that look great, and an incredible lead performance. The writing is very tight, and keeps piling on new layers of increasing absurdity without ever wasting a line. Really really recommend watching.

1. LOVE, CELESTE

This is one of my favourite films. Set and shot in Dubai, this film is beautiful and funny and emotional, it conveys its feelings so well while feeling both interpretive and personal, the central trio have such a great dynamic whether they're being hilarious or sad, monologuing or dead silent, it's all so good. I won't spoil it. Please go watch now. Thank you.

Doublewhip

HOW TO PROFESSIONALLY CRASH OUT

You failed the ECE 240 midterm with a crispy 11%. Your friends left you abandoned in the corner of a Laurier frat party (for the fifth time this term). You played PD golf a little too hard and now you have to retake PD 19. Why you crash out can be for a multitude of reasons. But that's okay. Stay strong, soldier. However, you can't just crash out on your living room floor. No, no, no. We are all professionals here. So here are three simple steps to crashing out in the most elegant fashion:

1. **Dissociate.** This is a key part. You can't just *have* the crash out. You have to imagine yourself going through it first. Stare at that wall and imagine yourself going through with whatever is bubbling in the deepest pits of your rotted little brain.

2. Once the wall starts talking back to you, you know you've reached the perfect crash out point. So now the natural progression is to **Spiral**. Cause you're not breathing. You're not even thinking, what you're doing is wondering what it would be like to smash your head against the wall that's talking to you. But you won't actually, that's the beauty of it. And since the only thing better than a good crash out is a narcissistic crash out, it's now time to record yourself.

3. Once you've recording yourself crying, screaming, yelling out the same sentence of "why not me, why her," you get the absolute privilege of posting it on TikTok. Congratulations! You've just taken the first step to creating your personal brand and have mastered the art of oversharing, trauma dumping and putting your whole business on the internet. What a beautiful way to finish step 3, **Humiliation**.

Now it's time for your favourite co-op employers to watch it. Have fun!

ofstone&silk

HOW TO GET BETTER

1. WITHDRAW

Going to class is so hard, you'd probably feel better if you stopped trying to force yourself out of bed in the morning. Make it a habit; going to campus is hard, seeing your friends is hard, leaving your house is hard, leaving your bed is hard—so don't. If they cared, they'd reach out. When they do reach out, convince yourself it's customary for them, a surface-level nicety that makes them feel better about themselves. You can Get Better from the comfort of your bed.

2. DON'T PUT ENERGY INTO THINGS YOU ENJOY

Your hobbies take time and effort, and it's such a chore to bring yourself to start anything. The time is so much better spent trying to Get Better. Doomscrolling for hours is just as enjoyable and much easier.

3. DON'T PUT ENERGY INTO THINGS

Let the dishes pile up. Run out of clothes. Forget to shower or even brush your teeth. It's all wasted energy, it'll just get back to how it was anyway. Clearing a path through the garbage from your bed to your computer is enough. It'll all be fine once you Get Better.

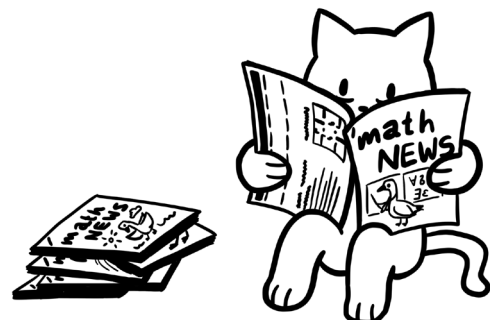
4. STOP FEELING HUMAN

Stop trying to understand or control your emotions. Let the days blend together. Forget where you are, dissociate constantly. Spiral and tell strangers online about your worst urges. Constantly fantasize about radically changing things around you somehow, actually doing so is too hard. Be drunk or high every night to push off the thoughts long enough to sleep. There's no such thing as too much sleep, it's fine that you're getting 14 hours. You'll need sleep to Get Better.

5. GIVE UP

Let the idea of escape occupy your every waking moment. Live vicariously through fantasies. Go through the motions but be somewhere far away. Hate everyone and everything, yourself most of all. Are you Better yet?

mN-throwaway-014



INTRODUCTION TO DIPLOMACY

TWELVE HOURS, SEVEN PLAYERS, A THOUSAND LIES, AND A SINGLE TRUTH

Diplomacy is a strategic war-game board game released in 1954, where seven players play as European powers during the First World War. What makes this game unique is its deterministic nature; no chance, forcing players to rely on only tact, deceit, and trust. Like Chess, good players memorize solved openings, and like Werewolf (or Mafia), good players make quick friends.

Where this game shines is how perfectly it bridges pure strategy with social deception. The game begins with a discussion phase. Players can speak openly, or in private. First you focus on your neighbours, but eventually you move around the table and speak to the six other powers on the board. This is a crucial part of the game—making friends and investing your most valuable currency: trust. There is a balance; trust too many and you risk betrayal, but trust too little and become overwhelmed by enemies.

This first half-hour decides many things. Do you wish to attack your neighbours, or befriend them? Diplomacy is a zero sum game; whatever you gain another must lose. Befriend your neighbours and suddenly you have no room for expansion. Wait too long and you will be a pebble underfoot whatever player managed to gobble their neighbour. The optimal outcome is to charm those who neighbour your neighbours. If you were playing as Russia, a common alliance is with Turkey. The two can divide up Austria, giving a nice boost allowing further campaigns into Italy and Germany. By then, France and England will be powerless to stop you. That is, unless Turkey betrays you.

Many say the heart of Diplomacy is betrayal—the notorious “stab.” Just when you think you’ve made a friend, they march into your land and take your land. This forces you to turn back around and put up a hasty defence, all the while whomever you were attacking is snapping at your heels to recover their lost territory. From glory to defeat in a flick of your trusted ally’s pen.

This is Diplomacy’s reputation. You muster seven friends to join you for a ‘quick’ game that lasts twelve hours, drains every ounce of mental energy you held, and leaves you friendless and defeated. This is not the reputation I want to portray for you, dear reader, because this game is so much more. This is a game about using trust wisely, about keeping your friends close, and enemies closer. One must see the world from the perspective of other players. The person you’ve been huddling with in a closet for the past six hours has been your ally so far, but is it more than affection that holds you together?

In addition to the discussion phases, there are the orders. Written in code and in seclusion, they do not lie. The moves are revealed and the pieces swap tiles. Your heart thumps with every order. This is when all is revealed. Did your ally truly support you into the enemy’s province, or did they instead support the enemy into your own? Understanding the mechanics of the game is crucial to play competitively. Those

who understand how to move, defend, and attack properly will always have the advantage, even if outnumbered.

That is Diplomacy, a game where seven players attempt to each rise above, forced to work together enough to establish a bond destined to be broken. Although most games end up in a draw, the rare victory is possible. But is it worth it? You studied openings, optimized move orders, lied to your friends, and crushed your enemies. Yes, it will always be worth it. This game stings harder than Chess, or Monopoly, for it is not for the faint of heart. It requires dedication, even for a casual game, but it is worth it. You have earned this victory with both mind and heart, deception and truth; you played both sides, head or tails, you still win.

Aspiro

THOUGHTS ON COURSES I AM TAKING

PMATH 950: Some pretty cool results, and not too much work. 10/10 would recommend.

PMATH 352: I am not a fan of calculus, and this course seems to be basically calculus with complex numbers. Although I have heard good things about this course, I am currently not a fan of it (if you’re reading this, sorry Ty)

PMATH 445: Cool material, but I feel a bit underprepared for it. I took the prerequisite course over a year ago and need to review things.

PMATH 111: I need help with this course. Not with the material, but with remembering this course exists.

easty

ONE BRAVE JOURNALIST ASKS A QUESTION THAT EVERYONE ELSE IS TOO AFRAID TO ASK

A mathNEWS π MINUTES SPECIAL INVESTIGATION

Why is every entrance to a UWaterloo building wetter than an Olympic size swimming pool?

Lars Nootbaar

FROM ZERO TO STARTUP HERO: WHY BETTING ON YOURSELF CAN OUTSHINE BIG TECH

I get it; startups are full of uncertainties and risks, while landing a job at a big tech company in California offers generous compensation and workplace perks that make it feel like a daycare for people at the tail end of the in high-school-gifted-kid-to-mid-level-tech-employee pipeline.

However, being young gives you the unique advantage of being able to take risks you might not be able to later in life. Joining or founding a startup isn't about gambling your future—it's about betting on yourself taking risks at a time when the downside is small. You also aren't closing any doors; believe it or not, Google still hires people when they're 30.

The worst-worst-case scenario? After two years in the startup world, you might end up broke—but in that time, you'll have gained experience and skills that would take most people five years to learn. And honestly, outside the bubble of terminally driven overachievers you go to school with, most people are broke at 26 anyway.

One finds a long-term career advantage to working at or founding a startup. Startups force you to tackle challenges that big tech employees might not face for years, like scaling systems, building products from scratch, or pitching to investors. And if your startup gets acquired by a big tech company? That's a golden ticket. Instead of starting as a junior developer, you could be brought in as a lead or specialist, skipping years of ladder-climbing. Look at the backgrounds of a lot of big tech executives and you'll see a lot of them doing time in startup land as early employees or founders.

Also, landing a job at big tech straight out of school might come with a shiny paycheck, but in today's landscape, it's increasingly hard to hit true "fuck you money" levels as a 2025 grad working big tech. Salaries and stock grants are solid, but they're designed to keep you comfortable, not necessarily wealthy. Startups, on the other hand, offer a shot at real upside. When you have equity in something that takes off—or gets acquired—you're no longer just collecting a paycheck; you're cashing out on your ownership. I saw this firsthand when I sold my last company, and it's a type of financial freedom that's hard to come by if you're just playing it safe.

Building something from the ground up isn't easy, and founding a startup comes with its own unique set of challenges. But these obstacles aren't insurmountable—they're opportunities to grow, learn, and prove yourself. I did it and I did CS back when entrance averages were a lot lower than they are now. Here are a few you'll face as a young founder:

- **Finding good startup ideas and distinguishing them from bad ones**
- **Getting credibility in the business world**
- **How to start from zero**
- **Where to get mentorship and funding**

Join me next week to dive into these topics and learn how to get started in startup land.

(plus, with the way the job market is going, this might be your only bet)

Title: Entrepreneurship and Impact Series: AMA Featuring Ian MacKinnon

When: Thursday Jan 23, 2025 4:30 pm

Where: DC 1302

Be sure to register on the Math Innovation website to reserve a spot (<https://bit.ly/UWStartupMath>).

Ian W. MacKinnon
Co-Founder/CTO, Later.com
mathNEWS Editor, S05 & W06

UNIVERSITY OF WATERLOO ANNOUNCES M5, AN ALL-NEW MATH BUILDING TO BE CONSTRUCTED ATOP M4



ARTIST'S RENDITION

Dick Smithers

IT'S NEVER SUNNY IN NOVA SCOTIA

As an East Coaster, the concept of east-ness gives me a bit of pause. It is, after all, a completely relative idea. Some of my western Canadian friends insist that going to Toronto is a sufficient condition to be “on the East Coast.” Ridiculous. Others insist that I am wrong in saying “out east” and that “down east” is the correct locution. Preposterous. Advertisements brag about being the best thing “east of Montreal,” or “Toronto,” or “Anyothertown.” Laughable. But enough about that. I come to you today as nothing but a humble messenger from the east,¹ an old-timey town crier bellowing “Oyez! Oyez!” for all unfortunate enough to hear.

An election happened in Nova Scotia back in late November. It was a surprise in one way, and no surprise at all in another. Progressive Conservative² Premier Tim Houston, who had run in the previous election on the promise of fixed election dates,³ unfixed his election date and shoved voters into the booths eight months early. A gamble to be sure, but polls indicated a PC landslide and the results bore that out.

- PC: 43 seats
- New Democratic: 9 seats
- Liberal: 2 seats
- Independent: 1 seat

This election represented the largest seat majority by any party in more than forty years and the largest vote share for any party in almost sixty years. In a region that tends to be a historical stronghold for Liberals at all levels of government, it was the worst result for the provincial Liberals ever.⁴ It also saw the lowest turnout in the province’s history.

What’s even more remarkable is that as long as the other provinces and territories keep to their schedules,⁵ it is the last general ballot that will be cast before the federal election scheduled this fall. If the polls continue as they have for the last year or so, the federal Conservative Party⁶ is in for a majority government. But do these results in a far-flung provincial backwater portend a Conservative victory?

I was struck by the similarities our current situation has with the 1978 provincial election. The lead-up saw PC leader John Buchanan challenging incumbent Liberal premier Gerald Regan, who had won in 1970 from a PC party that had suffered a leader change. Back then, the choice was obvious. The PC candidate was unelected, old, and worn out; Regan was young, ambitious and a fighter. During Regan’s time, the 1973 Arab-Israeli War and the ensuing oil embargo, along with the cessation of federal subsidies, pushed oil prices through the roof. It took a while for the economics to trickle down, but the two years before the 1978 election saw power rates soar by 72%. Funnily enough, Liberal Prime Minister Pierre Trudeau—our future former PM’s father—also faced a wave of unpopularity after changes to family-related social and tax programs. Regan, carrying the Liberal banner, caught some of the flak from this anger too. Regan would lose to Buchanan in 1978, who would become only the second PC premier to be reelected multiple times in the province’s history so far. Eight months

later, Trudeau would be kicked out of office as well. Sharply increasing prices, anti-Trudeau sentiment... where have I heard this before?

I will admit, it might be silly to try to draw a political through line back so far in history, so here is a more recent comparison. As I am sure many of you remember, the 2021 federal election was a bit of a dud. No party saw substantial changes in seats at all; the largest, for Trudeau, Jr.’s Liberals, saw only five seats gained from before the election, while most parties saw no change at all. If any election could be called uneventful, this would be the one. Trudeau was heavily criticized for calling this election early, and especially for calling it during pandemic times. In hindsight, however, it seems to have been an astute move, giving his party extra time after the pandemic to handle recovery.

In an unsuccessful bid to steal as much thunder from the feds as possible, the Nova Scotia election in 2021 was also the last to take place before the federal election, happening only five weeks beforehand. But this election could not have been more different. Provincial Liberals, predicted to coast into another government after eight years in power, were kicked out by a PC campaign focused on generous health care spending.⁷ It was an efficient, almost surgical victory for the PCs, who won a majority of seats with the smallest vote share in provincial history. 338Canada, a popular election polling aggregator, saw their 2021 Nova Scotia election prediction as the least accurate since their inception, calling only 64% of races correctly. Their next-worst election prediction called 84% of races correctly.

So the all-important question remains: do the most recent 2024 results signal the death knell of the federal Liberals this year? Well, we have one historical example where the PCs were swept to power and the federal Liberals got the boot, and one more recent example where the PCs were sent to Province House while the federal Liberals remained firmly entrenched for at least another term. Seems inconclusive to me.

I was originally going to call this article “Is Trudeau Cooked?” but events have transpired, as they are wont to do. At this point, the answer to that question is a given. Now, we can only guess where we will end up after the new federal Liberal leader competes in this upcoming federal election. I have given a few examples from my corner of the universe. What we often see is that unelected leaders are defeated at the next election, but that is absolutely not always the case. Trying to draw meaning from a previous election—let alone a nearly fifty-year-old one—is often like trying to divine from tea leaves when the teacup has been dropped and shattered on the floor. It’s probably futile, but it’s still fun to think about. History does not repeat. It might only speak moistly.

verdanik

1. Whatever that even means.
2. The fact that so many provincial parties call themselves this will never fail to make me roll my eyes.

3. The province was the last in Canada to legislate fixed election dates.
4. The party's leader also lost his seat by a dozen votes.
5. Elections in NL, NU, and YT are each scheduled at least a week after the federal election's fixed date in October 2025, but they, like any other province or territory, could pull some early election shenanigans or fall to a non-confidence vote.
6. A far more sensible name than many of their provincial counterparts.
7. Sometimes, in some twisted way, it does make sense why they're called the "Progressive" Conservative Party.

EMINEM DOESN'T MAKE GOOD MUSIC (A COMPILATION)

IDK HOW ANYONE HAS THIS GUY IN THEIR TOP 5

Truly a lyricist of our time.

- "You heard of Kris Kristofferson? (Yeah) Well, I am Piss Pissedofferson (Oh)" — Eminem
- "Fuck around and throw a baby at another baby" — Eminem
- "Kiss the naked mannequin man again" — Eminem
- "I just go achoo then a-chieve" — Eminem
- "Is it gay to play putt-putt golf with your friends" — Eminem
- "That's awfully hot hot coffee pot" — Eminem
- "I can make orange rhyme with banana bor-nana" — Eminem
- "In the crib playing Fortnite with your grandma" — Eminem



Toasted

I ♥ MATCHA



leah

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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ANIME REVIEWS PART 12

I WONDER HOW MANY OF THESE I CAN WRITE BEFORE I GRADUATE

A CERTAIN MAGICAL INDEX — 7/10

When I do these reviews, I usually ignore the fact that most anime are adaptations of either manga or light novels, instead considering the show as a standalone work. But here, I can't very well do that because of the sheer size of the source material.

A Certain Magical Index and its many spin-offs form an enormous canon that has existed in light novel form for longer than I've been alive. The three reviews here are of shows taking place in the same universe, with heavily interwoven stories—more of an MCU type beat than the linear-plot anime I typically review. This means that much of it is as yet unadapted; my guess from cursory research is that the 159 episodes across all three anime cover about 35% of the (still ongoing!) LN content, so in a sense I'm also reviewing the so-called "Toaraverse" as a whole. (Toaru is Japanese for "A Certain" and refers to the franchise as a whole.)

The setting is easily my favourite part of *Index*: It takes place in and around Academy City, a futuristic city-state whose goal is the scientific study and fostering of esper powers in its predominantly student populace. That paranormal abilities are explained and governed by science is already a really creative idea, but beyond that is the fact that Academy City frequently finds itself embroiled in conflict with sorcerers, and that their magic is modelled by religion rather than science. In essence, the show reimagines Christendom as being replete with secret sects that employ magic for the furthering and protection of the church, albeit in a heavily anime-ified way—prepare to be a little confused if you actually know Christian theology.

The protagonist Touma Kamijou is neither esper nor magician, but gets caught up in the affairs of both when he has a chance encounter with a nun named Index Librorum Prohibitorum, whose mind contains the forbidden list of books banned by the Catholic Church which bears the same name, and who discovers that Kamijou does have a supernatural power of his own, one that is able to nullify any other magic or ESP power.

But to be perfectly honest, he's not that compelling as a character (as presented in the anime, that is), and neither is Index. Moreover, the many arcs often feel disjointed and ultimately inconsequential, and the world of magic had holes in its exposition that often left me wondering what exactly was going on. These weren't enough to ruin it for me, but if you're down to read some light novels then most hardcore Toaru fans say they're better than the anime, mostly because the latter frequently cuts out key information or even entire chapters from the former. If there's one reason you should watch *Index*, though, it's to better appreciate this next entry:

A CERTAIN SCIENTIFIC RAILGUN — 9/10

Originally a manga spun off from the *Index* novels, *A Certain Scientific Railgun* follows Academy City's 3rd-most powerful esper, Mikoto Misaka, whose ability is to manipulate electricity and magnetism. The series gets its name from Misaka's signature move, which is also her nickname by extension—a powerful railgun attack in which she launches a coin with an immense kinetic force using EM propulsion. Besides being a student, Misaka also involves herself in the work of Academy city's police force, Judgement, by way of her roommate and not-so-secret admirer, officer Kuroko Shirai.

As I see it, this is *Index* with all the problems fixed. Whereas Kamijou is usually single-minded in his aim to protect the friends he makes and has an unreasonably strong power, coming off as a Mary Sue a lot of the time, Misaka is a lot more balanced from an ability perspective and more interesting in that her own aims come into conflict with those around her. I think this makes her a better protagonist, and that the supporting cast (which is very nearly all-female, might I add) is a lot better too.

The scientific basis and classification of espers is explained well, the arcs feel connected with earlier events carrying over to later seasons meaningfully, and the show poses interesting questions of scientific ethics by exploring the darker side of Academy City, which I've something I would have liked to see *Index* do more from a religious angle. Honestly, given the setting of Academy City, it's kind of weird that the science story is the spin-off to the magic story and not the other way around, but in either case it's not hard to see why *Railgun* is the more popular anime of the two. You can even watch it apart from *Index* without too much lack of context, but if you're willing to invest the time, I think the experience is much more satisfying with both.

A CERTAIN SCIENTIFIC ACCELERATOR — 8/10

In a similar vein as the previous entry, *A Certain Scientific Accelerator* is a shorter spin-off anime following the mightiest esper of them all, the 1st-ranked named Accelerator. His ability is to redirect and otherwise manipulate any kind of vector (which, as any physics student will tell you, means he can do quite a lot).

A self-described "punk-ass villain," his role in one of Academy City's underground experiments made him an antagonist in the first season of *Index*, but after certain events render him hospitalized, he begins to come to a new perspective on evil. There isn't quite as much substance to speak of as with *Railgun* because of how short it is, but it nonetheless fills in a chronological gap in the story and provides Accelerator with much needed character development, which was furthered in later seasons of *Index* and *Railgun*.



Despite that, however, it did feel more self-contained than *Index* and *Railgun*. There are very few character crossovers, which tend to be the funniest parts, and that was a bit of a letdown. Otherwise, though, *Accelerator* makes for a solid insert to the Toaraverse.

(If you want to watch these, by the way, I recommend the chronological order.)

yalevoilian

MOJANG FRUSTRATES ME

Since around 2020 I've been pretty deep into Minecraft parkour, which has a rich and deep community because the game allows for a lot of nuance with its different mechanics and glitches. I do love the gamemode and the community overall, but certain things really frustrate me to no end, and I only have Mojang to blame for it.

The first thing to understand is that the most dedicated of parkour players are wholly stuck in 1.8.9. It's not that it's necessarily a better version. Rather, seemingly every update nowadays, core movement mechanics are changed.¹ So it makes no sense for the community to update versions when we'd have to scrap a ton of our previous knowledge and strategies, and when maps might become either a lot easier or straight up impossible, and there's no way to tell what will change and when.

For the most part, these changes have been like, whatever. I'll suck it up because the parkour community is really a very small fraction of the overall playerbase and the changes are generally good for casual players. But the newest bugfix is different. This time, Mojang changed movement in a way that will impact even casual survival players: Sneaking diagonally is 30% slower now.

To be clear, it shouldn't have been faster in the first place—that was a bug due to acceleration not being normalized.² However, it has been such a longstanding bug that many players have used it over the 15 years of its existence to move a little faster, for convenience. And my question to Mojang is this: what exactly are you hoping to accomplish by patching it out? Is it to make a more polished game? To me, changing core mechanics of such a well-established game is just asking for frustration from players. It's a net negative for both casual players who used the glitch for a little convenience and more serious players who developed a lot of strategy around the bug. On the other hand, what you gain is... maybe a new player feeling like the game is more polished? It's not like the millions of old players were all still fine with the faster speed, many not even noticing it at all in the first place... surely not!

To give Mojang some credit, I'm sure a developer just saw this in the bug tracker and figured it would be an easy fix, not really considering the consequences, and just stick it at the end of the changelog with the other bugs instead of announcing it specifically. But therein lies the problem, and this is the takeaway of this article. When a developer goes to fix a bug, particularly in a game as old and established as Minecraft is, they have to pause to consider the consequences

it will have on your community, even if the people it affects are only a small percentage of all the players. Some bugs are critical or overpowered and should be fixed immediately, and that's fine. Others, though, may not actually be contributing negatively to the game overall, or would cause a lot of problems if it were changed.³ So it's important for developers to weigh the benefits and detriments to users before making even innocuous changes. It's just a pity that Mojang doesn't seem to agree.

hyperlynx

1. This isn't the only reason people haven't switched—I believe PvP being significantly different in 1.9+, major servers such as Hypixel still being in 1.8.9, and sheer laziness are other significant factors—but this is definitely one of the major reasons.
2. I'm rounding $1 - \frac{1}{\sqrt{2}}$ to 30% here.
3. Another example of a bug that has been in the game for long enough that it's essentially a feature, and that would break a ton of stuff if it were fixed, is redstone quasicnectivity.



If you're at a math conference presented by a math person and you want to ask a question and don't want to seem dumb or like you weren't paying attention, ask, "Does the converse hold?"

PROF. MATTHEW KENNEDY

A SHORT EXCERPT OF THE SCI-FI FORD MOTOR COMPANY FANFICTION I WROTE DURING MY LAST CO-OP TERM

OR HOW I LEARNED TO STOP WORRYING AND LOVE THE ORGANIZATION

Tick. 9:00 AM.

Another wonderful day at Ford Motor Company, where innovation and dedication drive us toward a brighter automotive future!

After the female voice over the intercom concluded, crunchy and distorted, coming from the system that must have said that a million times before, the usual jingle resounded, and then time it was. The entrance closest to him, a huge airlocked blast door, extruded steam from all edges, refracting the artificial light from above as to give it a slightly blue tint, as the red beacon light above it spun over and over, also coloring the steam as its beam intersected. Along the same perimeter, he could see, in the distance, the lights above similar doors all starting to illuminate as well, one-by-one, and the same vapour being released. Then, after the steam had ceased, the doors began to rise, and behind them, human visages could be seen. And then—as clouds release water after a long drought, finally pouring the sought for water upon land, releasing a stream that had been held in for so long, unstoppable, and the dry basins which had once been lakes begin to fill with water, at first a barely perceptible flow, and then a torrent powerfully crashing down—so did the employees, below, begin to stream into the facility, taking their respective places, filling in every square metre that was previously barren, turning on the machines which began to buzz, whir, beep, and move in all kinds of ways, flashing lights on and off, creating a beautiful cacophonous symphony of light, sound and movement below.

He realized he would have to begin his work soon. Special attention was paid to him as an intern—it would be unwise to release a future position in software when the alternative was certainly the assembly line. Using his brain-computer interface, he switched on his desktop, displaying a Ford Motor logo, and in mere seconds, was on the home screen. He thought about what he should do. Not being in the mood to do real work, he began mindlessly writing unit tests for fourth AI assistant they had just installed—the HVAC monitor. Writing unit tests for AI was stupid, in his opinion. You'd write a list of prompts, and then, of course, expected behavior of the prompts. But they're all slightly subjective and they can vary, of course, so you have to use another AI to assess whether their output was correct.

ENVIRONMENT: {INTERNAL_TEMP: 30C, EXTERNAL_TEMP: 21C, ...}

INPUT: "Hi Felicia Ford, it's a little hot in here."

EXPECTED: CAR TEMPERATURE should be reduced by approximately 3–5 degrees its current value.

ENVIRONMENT: {INTERNAL_TEMP: 26C, HUMIDITY_VALUE: 0.8745, ...}

INPUT: "Hi Felicia Ford, have you noticed it's a little humid out there?"

EXPECTED: Assistant should make a witty comment about this. Then, DEHUMIDIFIER should be activated at approximately 40% strength, and CAR TEMPERATURE should be reduced by a few degrees.

INPUT: "Hmm, I'm feeling a little cold, actually..."

EXPECTED: "Assistant should apologize, ask user for new temperature, and SET new value."

And so he continued, for hundreds of prompts. A good way to kill the time, at least. From a distance, he turned on his radio. The station was playing a classic Sinatra tune.

"Fly me to the moon, and let me play among the stars..."

He always thought it was cruel that stations kept playing love songs like that, ever since dating apps had been legally mandated as the only way to find a relationship by the Organization. All felt stupid and artificial now. Probably would never find a relationship in his entire 300 year lifespan. So he changed the station. It was playing Centerfold. A good choice. Good memories for him...



He was in the F-150 with his father on AX1-C, driving through the roads carved into its endless forests, sun powerfully glowing above them, not a cloud in the sky. The truck, masterfully engineered, was chugging along at a hundred miles per hour, towards their camping destination. Fishing rods, grills, and all sorts of stuff, filled the trailer behind, occluding the view of the rear window. Centerfold began.

"You know, your great-pappy used to play this every road trip, down on Earth, a couple hundred years ago. Used to take the whole family with 'em. Easier, back in that day—Ford didn't have a big planet least, like nowadays. Didn't need no extra-terrestrial-class tickets to get to land out of the company."

"Dad, I think one of the rods are falling out."

"Aw, damn."

He stopped the car, dirt splaying in all directions from the friction, and they both jumped out. His father pushed the rod a little farther back into the trailer, with the limited room they had. Beside them, large redwood trees stood tall, seemingly over ten metres. He jumped up and took a seat on the edge of the trailer.

"Take it in for a minute. Don't be takin' this stuff for granted. Could be another decade, till you see it again."

“Dad, I can see it in Ford VR whenever I want.”

He snapped back.

“It’s not ABOUT ‘at, son. It ain’t! It’s different to be there, and actually see it. Really is. Why’d I even take you ‘ere, then?”

“No, wait, I wanna be here!” he quickly replied. “I mean, I know it’s different, it’s just... It’s not, it’s not really, different, I guess? I mean, the main thing is that I get time off high school...”

The father shook his head in slight, but expected, disappointment.

“You ain’t gettin’ it all the way. You’ve gotta, one day, if you wanna live up the Ford Legacy. What we’re doing here, that’s what we work for. Every darn one of the cars we make is for this. It ain’t for the simulations. Not that crap. When you’re out in the big country, grilling a stake, fishin’ in the lake, your truck reflectin’ the sunlight through the trees... that’s why we exist.”

He took a seat beside his father and enjoyed the view for a while.

epic_waterman



SPEEDRUNNING LOWER BOUND?

Super Mario Bros. has now been beaten within 0.3 seconds of the fastest time possible.

Or at least, that time is *believed* to be optimal. We don’t have a proof.

Take a simpler game: Dragster, for the Atari 2600. Twenty-nine people have completed this in 5.57 seconds, and there’s a proof that this is optimal.

But is the proof really correct? Machine code is *complicated!*

The highest standard would be a to verify the proof, in a proof assistant like Coq/Rocq or Lean. But to do that, we’d need to explain to the proof assistant what an Atari is!

Which means implementing an emulator in the proof assistant. We could then prove that 5.57 seconds is optimal when playing on that emulator.

But what if the emulator is buggy?

Well, we could explain to the proof assistant what transistors do. We’d then scrape the connectivity data from visual6502.org, and prove that the emulator’s behavior matches that of the transistors!

This would be difficult. Really difficult. I know; I’ve tried. But that’s what it would take to put a hard lower bound on what’s possible.

So it’s no wonder that we tend to assume that there will always be more tricks and optimizations to discover. That’s far easier than proving there aren’t.

finegeometer



KWLT IS LOOKING FOR SCRIPTS

THAT SCRIPT COULD BE YOURS

Kitchener Waterloo Little Theatre is looking for scripts for its annual theatrical competition, March Madness. The winning playwright will see their words come to life¹ up to four times and receive a small honorarium, typically \$80.

What we’re looking for. A good script should meet the following criteria:

- **Open to interpretation.** We want a script that has the latitude to support many different visions. In particular, the setting in time and space should be left as open as possible.
- **Short.** The ideal March Madness script should run about ten minutes.

- **Small-cast.** March Madness scripts work best with 3–4 characters, all of whom are ideally gender-neutral.

The deadline to receive full consideration is February 1st. More details can be found on KWLT’s website: <https://kwlt.org/2025/01/09/call-for-scripts-march-madness-2025/>

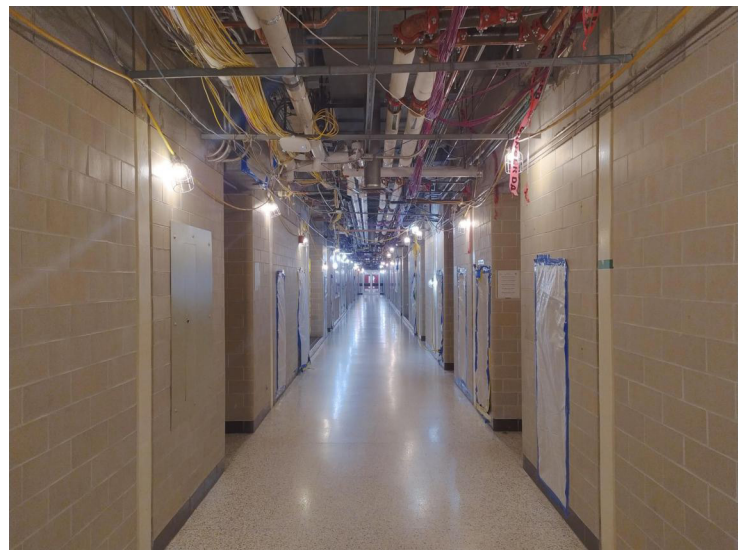
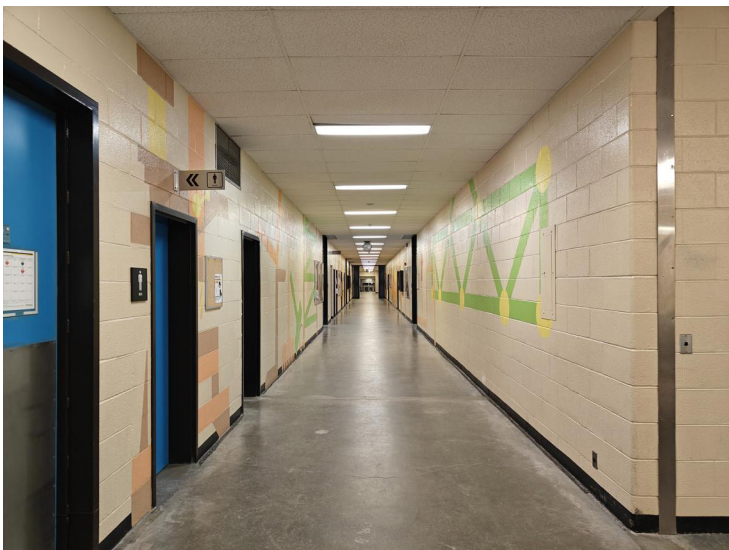
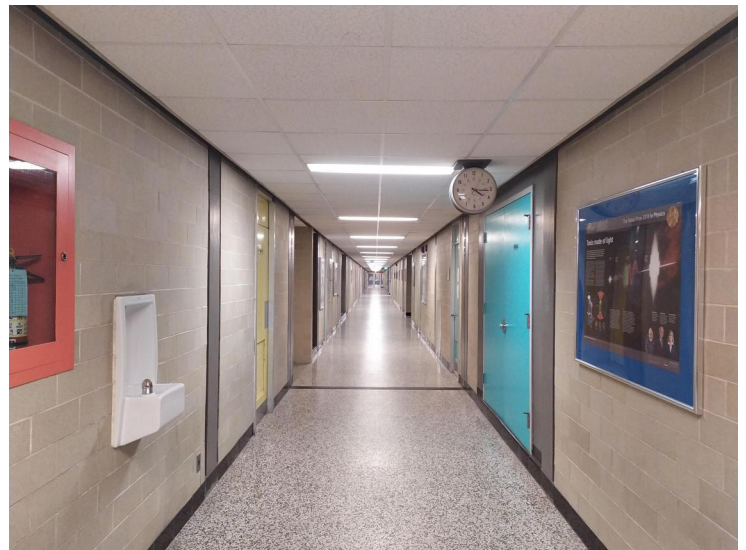
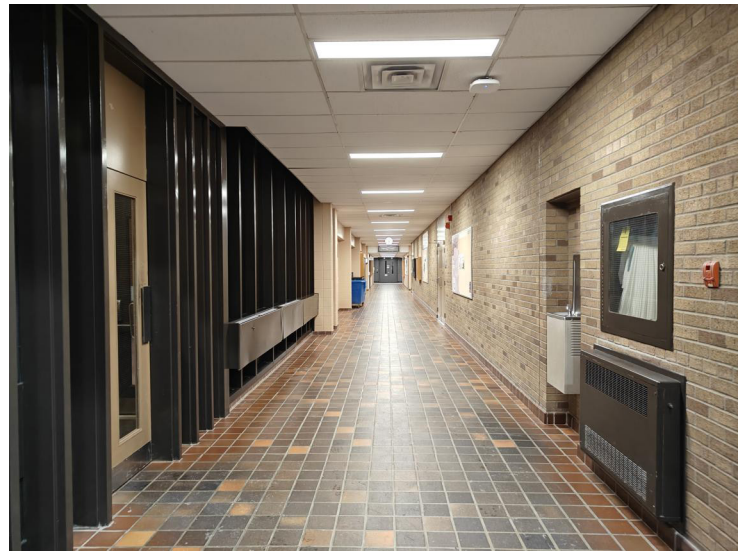
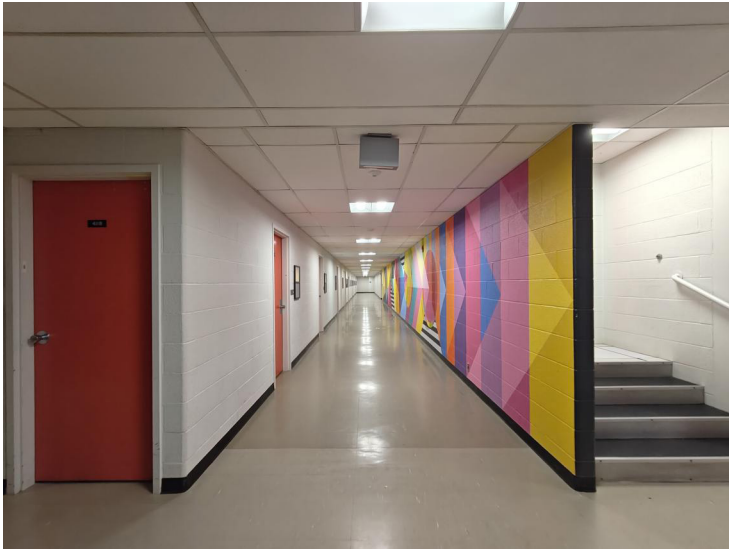
If writing isn’t your thing there will also be calls later for directors, stage managers, actors and various other roles that go into making theatre happen.

Beyond Meta

1. I cannot enough stress how cool this is.

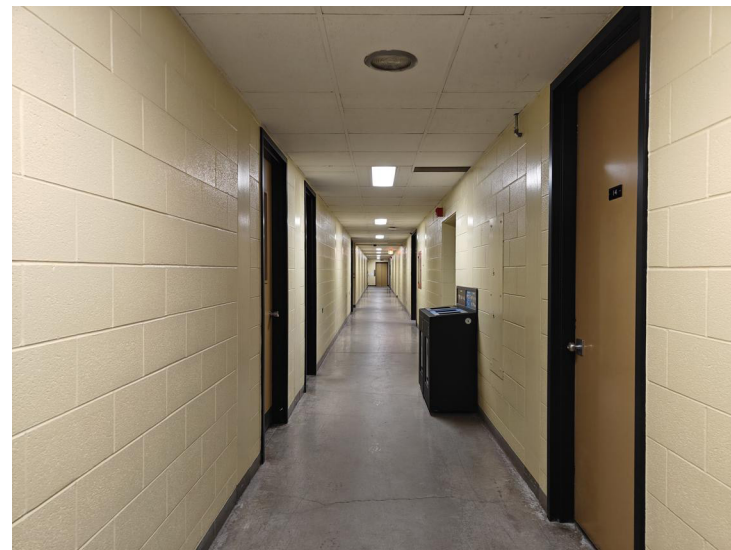
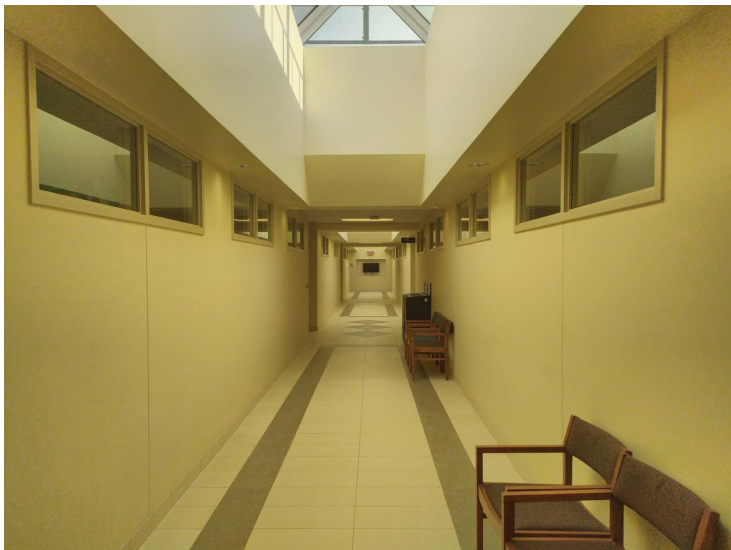
CAMPUS CORRIDORS GEOGUESSR

Hello! This is a sequel to my Campus Spaces Geoguessr from 154.6... That was a long time ago so hopefully you've read it or have no intention of reading it, since I'm about to reveal the answers. From top to bottom and then left to right, they are RCH, M3, EIT, BMH, PAS, and EV2. Ok! Now how about these ones? As with last time, there is no prize but pride, and for images in colour, see online. :)



I want to defeat you.

PROF. JASON BELL



Whole Number Haver

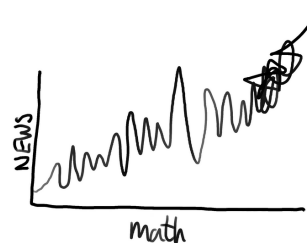
SOME COOL DESMOS TECHNIQUES

I wanted to make another fun graph for this prod night but alas, Tetris will have to wait for another day. *Instead*, here are some fun Desmos techniques to incorporate into your next graph.

- Regressions are a built-in thing. If you have L_1 and L_2 as lists of numbers, then you can regress the parameters for a particular function using the \sim symbol. Example: $L_1 \sim aL_2 + b$.
- You can filter lists of numbers given a predicate. For example, to filter a list of integers for odd numbers, do $L[\text{mod}(L, 1) > 0]$. In another example, if you want to filter L_1 when L_2 is greater than 1 in magnitude: $L_1[|L_2| > 1]$.
- You can make actions which reassign variables using arrow notation. These actions can be assigned to variables themselves. For example, to update a variable v to t^2 , you can say $U(t) = v \rightarrow t^2$.
- Furthermore, you can chuck these actions into the click action of objects to run the action when the object (such as a polygon, line, etc.), or in the ticker (activated by typing "ticker").
- You can make colours using the `hsv` or `rgb` functions and assigning them to variables. These can be placed into lists too, and used as the colours for lists of objects.
- You can get both the 3D calculator (**Yes! There is a 3D calculator**) and the 2D calculator to render parametrics — try typing $(t^2, \cos^2(t))$ into an expression and setting the t right bound to a large number like 24.
- Desmos has built-in **algebraic differentiation**, so you can find the derivative with respect to x of f by saying $\frac{d}{dx}f(x)$.
- You can write piecewise functions in Desmos. They're formatted using curly braces $\{ \}$, so for example: $f(x) = \{x > 4 : \sin(x), \frac{1}{x}\}$.
- Desmos has Complex Number support. It can be enabled under the settings. Verify it works by typing i^2 .
- You can incorporate LaTeX into your point labels by using backticks: ```. You can additionally interpolate (numeric) variables into your labels by using $\{\text{variable}\}$.

Happy Desmosing!

optimisticpeach



SUMMARY OF A CONVERSATION WITH A SEATTLE HOMELESS PERSON AND LOCAL ADVOCACY GROUP VOLUNTEER

FEATURING WALTER AND TIM (I DON'T REMEMBER THEIR NAMES BUT I'M SURE THEY WEREN'T WALTER OR TIM)

[Author's note: heavily paraphrasing here, this was not an interview and this is a conversation from months ago written from memory.]

Walter is a man who at the time had been experiencing homelessness for over a year.

Tim was part of a local advocate group working to connect people experiencing homelessness with resources in the city to help them get back on their feet.

[I FORGOT WHAT INITIATED THE CONVERSATION] ON OPIATES

Walter: I would say that 9/10 homeless people in the city are using fentanyl or another opiate. I would have said 95% but I'm being conservative. I don't know the exact numbers but from everyone I know and talk to I'm very confident that a huge majority are on some kind of opiate.

A lot of people are in difficult situations for one reason or another, and I think that opiate use on top of that makes it extremely hard to get back on your feet.

WHAT DO YOU THINK THE CITY COULD DO TO HELP REDUCE HOMELESSNESS?

Walter: I think a lot of it hinges on the opiate use. It's not really about trying to get people to just quit, it's not easy to just quit cold turkey, and when you're experiencing homelessness I would argue it's a lot more difficult.

If you're asking what I think the city ought to do about it, my thoughts are this: they should set up a supervised, conditional opiate administration program in a medical setting. Addicts would register in some capacity and would come in regularly to have a dose of their opiate of choice administered by a medical professional. Of course, these would have to be people who are already on the drugs, this should not be a way for people to start opiate use. As well, enrollment in this program would be conditional on good behavior. If you're in the program, you would be required not to commit any crimes, no shoplifting, vandalism, assault, or anything like that. A lot of these petty crimes, like theft and breaking & entering, are motivated by addicts who never know how they're going to get their next dose of opiates. If you eliminate this uncertainty you can eliminate desperation for drugs as a motivator. As well, in a medical environment, you address the risks of disease from contaminated drug delivery devices and overdose.

Tim: I think another important thing to note is that America spends billions of dollars trying to reduce homelessness. It's not entirely a problem of lack of investment. Social workers,

case workers, shelters, it's all big business. But we don't necessarily see that these have huge impacts. I think a big part of this is that these social systems aren't really building a good bridge between resources available and the people who need them. Case workers, who work with people experiencing homelessness one-on-one, are in these brick and mortar offices around the city. One thing to consider is that people on the streets just aren't that mobile. If they need to go, somewhere they usually need to take all their things with them.

Walter: If I just leave my shit, even if it's not for that long, there's a good chance someone's gonna steal it or damage it. Even if you have neighbours and you ask them y'know keep an eye out or whatever, it's not something reliable.

Tim: Another issue is that it takes time and repetition to build trust. Many times, if there are even any outreach initiatives to an area they might send people out once to advertise resources or programs but they don't come back regularly. Having the same person visit an area regularly, a face and name to associate with resources, makes a big difference. People are able to talk about the specific issues they may be facing and are more willing to engage.

WHAT ARE SOME OTHER ISSUES WITH EXISTING RESOURCES?

Tim: A lot of housing for homeless folks has a lot of conditions attached. For example, they might require you to have no prior criminal record, or to remain off drugs or alcohol as long as you are housed there (within and outside of the facility).

Walter: That can be difficult to navigate, considering a lot of people experiencing homelessness have one kind of substance issue or another.

Tim: Do you want to share some of your experiences with housing, Walter?

Walter: I had a traumatic experience with housing, some facilities don't have rooms with doors/locks. In one housing situation, I remember I was just sleeping and somebody assaulted me, they just started hitting me while I was lying down still confused and unable to process the situation. You can't feel safe in environments like that. You have to brace yourself, and assume that you could be in danger throughout the night. I tell any case workers or outreach people that I cannot be in any housing that doesn't offer rooms with doors.

Tim: When you haven't had to work with these systems you don't really think about it. But, there are a lot of complexities

and intricacies with the resources available. There can be a lot of waiting, work to find resources your eligible for, and places that end up having issues like Walter mentioned.

pupa

MUSIC FOR SEX

A good sex playlist is more important than, like, condoms. And yet, never taught in school! I'm putting my (as of yet) magnum opus of sex playlists here. A significant number of non-me people have gotten it on to various iterations of this playlist, however it's worth noting that Act I is probably the most universally helpful, because the farther you go the more specific you get vibes-wise.

The exact structure and timing of the playlist will require some pruning dependent on what kind of sex you're having/your biological specifications.

ACT I: MOODY INSTRUMENTALS, FEMALE CONTRALTO VOICES.

- "Save Me" — Aimee Mann
- "Sweet Jane," "Misguided Angel" — Cowboy Junkies
- "The First Taste," "Slow Like Honey" — Fiona Apple
- "Floating" — Julee Cruise
- "Dance of the Seven Veils" — Liz Phair
- "Sour Times," "The Rip" — Portishead
- "Chariots Rise" — Lizzie West
- "6 Underground" — Sneaker Pimps
- Pretty much anything by Angelo Badalamenti, but especially "Main Title" from the Secretary soundtrack

ACT II: PLAYFUL MUSIC WITH SOME MORE EXPLICITLY SEXUAL MOTIFS.

- "Shoplifters of the World Unite" — The Smiths
- "Sugar on My Tongue" — Talking Heads
- "Steppin' Razor" — Sublime
- "Sex & Candy" — Marcy Playground
- "Supernova," "Flower" — Liz Phair
- "I'm Your Man" — Leonard Cohen
- "The Lovecats" — The Cure
- "Huey Newton," "Dilettante" — St. Vincent
- "Velouria," "Gigantic" — Pixies
- "Step on Me," "Your New Cuckoo," "Happy Meal II" — The Cardigans
- Pretty much anything by Lana Del Rey, but especially songs from "a.k.a Lizzy Grant."

ACT III: USUALLY EXPLICITLY SEXUAL AND A LITTLE SCARY. ROUGH NOISES AND FASTER INSTRUMENTALS. GOTH, GARAGE, NOISE, AND INDUSTRIAL ROCK.

- "#1 Crush," "Supervixen," "As Heaven Is Wide" — Garbage
- "Persephone" — Cocteau Twins

- "Teen Age Riot," "Bull in the Heather" — Sonic Youth
- "From Her to Eternity" — Nick Cave
- "Rid Of Me," "Man-Size" — PJ Harvey
- "Sin," "Sanctified" — Nine Inch Nails
- "Blue Orchid" — The White Stripes
- "Lhabia," "Mascara" — Deftones

hotfemoid

U SHOULD READ A BOOK

happy new year and new term y'all! ^.^

before this semester hits you like a truck, i'm sure some of you have some personal goals for 2025. well, let one of them be TO READ A GOOD BOOK. here are books i read in the last two years that I recommend with very poorly written synopses!

BABEL BY R.F. KUANG

if you are a reader, you probably rolled ur eyes. this book is genuinely on its own level sorry THE TRUTH HURTS.

chinese boy who can lowkey speak english is taken from china to england by random white man. learns a bunch of languages for like five years to be goated then gets admitted to oxford. with the help of magical language silver bars bro realizes colonization has taken everything from him!!!!

I WHO HAVE NEVER KNOWN MEN BY JACQUELINE HARPMAN

forty women have been trapped in a cell for years and can't remember how they got there. really makes you think and there is a lot of commentary on the human condition... a classic in the making.

YUMI AND THE NIGHTMARE PAINTER BY BRANDON SANDERSON

pretty girl who lives in a world of gardens and emo painter boy who lives in a cyberpunk city somehow swap bodies and they are confused. kinda mysterious and your brain may explode.

THE WILL OF THE MANY BY JAMES ISLINGTON

ancient rome inspired setting following this kid who is naturally goated and wants to eat the rich! very interesting hierarchical power system which reflects our class system and overall a very engaging story that left me in tears.

watercup

mathNEWS

LINEAR LOVE STORY: BEHIND THE SCENES

Starting from **mathNEWS** 155.4 I wrote a series of Linear Love Story articles. They consisted of some sort of poem based on the premise of a part of math with a “linear” property. The articles often started with a solution I wanted the featured parts to come to. I want to quickly go through them and talk about my methods of setting up these poems.

#1

Here we have two lines that intersect at a single, specific, point (a, b) . From here, I chose some random slope and solved for the y-intercept.

#2

The two lines in this poem are parallel. So, the lines have the same slope and I chose different shifts for them.

#3

For number 3, our linear objects are planes. We start off with a random line in point-direction form. Let’s take the one from the article: $(2, 0, 3) + (3, -5, 2)t, t \in \mathbb{R}$.

We want two planes that intersect each other on this line. We can write each plane in the form $ax + by + cz + d = 0$. If we think back to linear algebra, the normal of this plane will be (a, b, c) . The line intersecting both planes will be on the planes, so the direction of the line and this normal will be perpendicular. Therefore it will satisfy $3a - 5b + 2c = 0$ from the dot product.

From here, we can choose two values for a and b for each plane and solve for c . Solving for d , we can plug in the point we know is on the line, $(x, y, z) = (2, 0, 3)$, into the equation $ax + by + cz + d = 0$. The last thing to keep in mind is to have different ratios for $\frac{a}{b}$ when choosing those values to have different normal vectors, otherwise they will just be multiples of each other.

#4

This article just has the same line written in multiple forms, as well as doing the same trick as #3.

#5

Number 5 has to be one of my favourites but also pretty simple. The point here is to have a linear asymptote and design two rational functions to tend to the same asymptote. We can take the asymptote $A(x) = ax + b$ and define $f(x) = A(x) + R(x)$ such that $R(x)$ is rational and $\lim_{x \rightarrow \pm\infty} R(x) = 0$. Basically, as we approach infinity, $f(x)$ will get closer to $A(x)$. Moreover, we can rewrite $f(x)$ as a single rational function since $R(x)$ is rational. From here, it’s a matter of choosing two $R(x)$ functions which don’t intersect.

An easy one is $\frac{1}{x}$ and $\frac{-1}{x}$ since those will approach 0 from different sides (positive / negative). It’s also interesting to notice that $\frac{1}{x^2+1}$ will always be smaller than $\frac{1}{x}$ for positive numbers and approach from a different side for negative numbers. This leads to a more interesting choice in my opinion.

#6

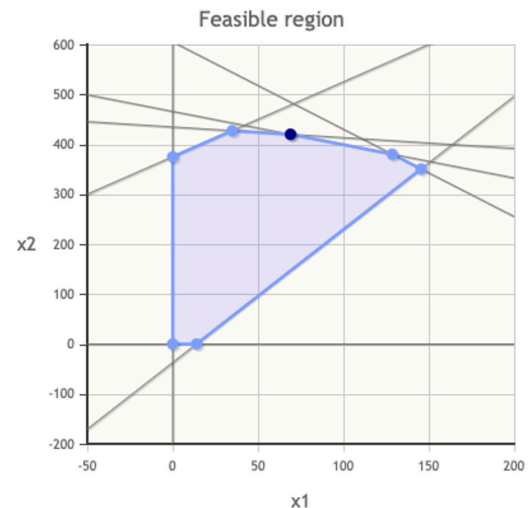
The point of number 6 is that the linear transformation is not a bijection. This will be the case if the rows or columns are not linearly independent. So we can choose two random columns and then create a third column by making a linear combination of the other two.

#7

I really like linear programming and the theorems around it. For context, a linear program is an optimization problem where we have linear constraints and an affine objective function. The constraints limit the points which are considered feasible solutions to the problem. We want to find points which maximize or minimize the value of the objective function.

One way to visualize the optimal solutions is to consider the hyperplane from the objective function sliding along its normal. From the article, this hyperplane would be $7x_1 + 12x_2 = b$ for some shift b . The optimal solutions are the set of points from the feasible solutions (the ones that satisfy all of the constraints), that maximize the shift b . This is because $7x_1 + 12x_2$ is the variable part of the objective function.

So the linear program was made by defining a bunch of lines which create a feasible region where sliding along the normal will be maximized by a desired point.



GENERATED BY

<https://online-optimizer.appspot.com/>.

#8

Looking back on these I realized that I messed something here and these vectors are not in factor linearly independent. How you would properly do it though is set up a 2×3 system of linear equations of doing dot products, which will yield a 1-dimensional set of solutions (there are 2 equations of three variables). Then we can choose our favourite solution from this set.

For the article, these two equations could be $3a + 6b + c = 0$ and $0a + 9b + 4c = 0$ to get the solutions for vector (a, b, c) .

#9

The linear regression in number 9 was kind of hard to wrap my head around, but turned out easier than I thought. The problem is that you have a specific line that you want to be the least squares solution to a list of points. We have the lines, but not the points.

For the matrix A , vector b , and parameter vector x , the least square solution of the equation $Ax = b$ also satisfies $A^T Ax = A^T b$. Normally, we have the matrix A and vector b

fully known, but in this case we know x . When making the article, I chose a bunch of x -values for the points, evaluated where the y -value for those x -values would be on the line, and shifted them up or down a bit to make the regression non-trivial.

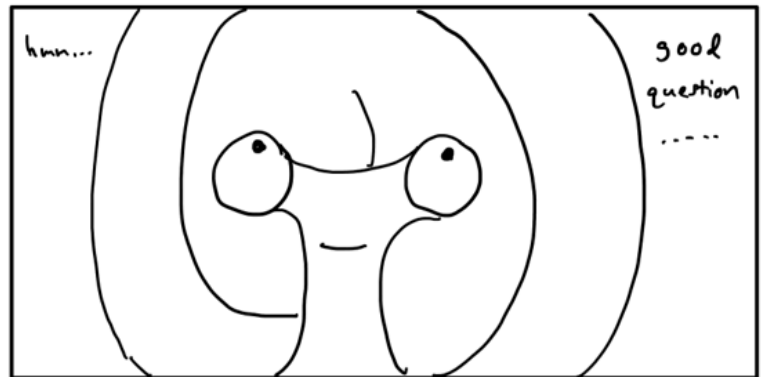
I left two points unevaluated which can be solved for, say for x_1, x_2 (i.e. we know the x -values for x_1, x_2 , but not the y -values). $A^T Ax$ will be constant, and $A^T b$ will be a some constant vector plus a matrix time $(x_1, x_2)^T$. This can be solved for by a system of linear equations. I got lucky when choosing values that they resulted in integers.

CONCLUSION

I started this series out thinking I can write some cute poems about lines. What it turned into was looking at some of the common techniques we use in math, starting with a solution I wanted to present, and working backwards to get the corresponding inputs. I hope you enjoyed the beauty of this process as much as I did.

Totally Ununimodular

POST-GRAD PLANS



UNTITLED

Hi. Here are some claims that I have made in the past few weeks that I felt the need to share with my friends and now will share with you.

Hawaiian shirts are such an enigma.

I had this thought because Hawaiian shirts are so unserious but are often worn by otherwise very serious men and I think that's interesting and cool.

My beliefs about Spotify queues are equivalent to my beliefs about Schrödinger's cat.

This is because I believe that Spotify queues only exist if you look at them and so before you look at it it both exists and doesn't exist. It makes more sense in my head.

The jewels consolidate into money. But the tiles in the pool don't consolidate into anything.

I saw this in a vision where the tiles in the pool did consolidate into a coral dolphin and then I was like, tiles don't do that, and that's when I knew.

Before reading on, please lock in your guesses for how many of these I was sober for. Answer will be below. These are my brilliant declarations of the last month. Thank you for reading, and remember, always check what time your flight is for so that you don't just assume you will wake up for your flight and then when you wake up it's the middle of the afternoon and your flight to Brazil is in an hour and a half.

Click on the black box to reveal the *spoiler*. ██████████

Panda!Panda!Panda!

N OF MY FAVOURITE LINES FROM "BOB DYLAN IS HAVING A HOLLYWOOD MOMENT. HIS NO. 1 HATER IS READY"

ARTICLE ORIGINALLY APPEARED IN THE NEW YORK TIMES

- At a recent showing of "A Complete Unknown," the new Bob Dylan biopic, a cheerful group of young women settled in to watch the delicately handsome Timothée Chalamet impersonate the singer. They barely noticed the 80-year-old man sitting next to them, armored in a winter coat and hat that he never removed. Then, the film began. "This is all made up," the man brayed at the screen. "It's not what you think it is." "You're scum!"
- Weberman, who has supported himself since his teens by selling weed, grew up in Brooklyn and now lives in Riverdale.
- He began as one of Dylan's keenest observers and fans, so intent on digging into the singer's life that he sifted through trash cans outside 94 MacDougal Street, where the singer once lived.
- Richard F. Thomas, who teaches a class on Dylan at Harvard University, said Weberman's belief that certain lyrics refer to him are "pretty much fantasy and beyond self-obsession." [*So glad they could get an expert to confirm this*]
- "I wasn't stalking him," Weberman said. "It was a relationship, like Verlaine and Rimbaud. I was interested in his poetry. It was political, not about his celebrity."
- Around 2000, Weberman's own trash was searched, by federal agents who found weed packaging and later arrested him for money laundering. While serving a yearlong sentence, he created a 536-page "Dylan to English Dictionary," a word-by-word

analysis of Dylan's metaphorical and allegorical language.

- On Tuesday, Weberman stopped by Dylan's old MacDougal Street building and, feeling sentimental, lifted a lid on one of the old trash cans and peered inside.



A.J. WEBERMAN AKA BOB DYLAN'S #1 HATER (NYTIMES)

Lars Nootbaar

Somehow, this man has both a New York Times profile, and a Wikipedia Page primarily based on his hatred of Bob Dylan, albeit with some side quests.

NYTimes: <https://www.nytimes.com/2025/01/10/nyregion/bob-dylan-nemesis.html>

Wikipedia: https://en.wikipedia.org/wiki/A._J._Weberman

WHERE THE WATERMELONS GROW

gridCOMMENT 157.1

hi everyone welcome back to waterloo and welcome to 2025. i hope you all had a wonderful holiday season!!! starting off this year not strong at all i came down with one of the worst cases of sinusitis + possibly the flu ever. also while travelling 400 km on a bus.

but enough about me. i want to hear about you. our first **gridQUESTION** of the year will be: "what was your favourite memory of 2024?" you know the drill—please send your

gridWORD solution, **gridQUESTION** answer, and a pseudonym to mathnews@gmail.com by jan 27 1800h >:3

may your winter 2025 term be filled with fast email responses from your professors and tastefully curved assessments!!

see you very very soon,

spaghettiinhalers

ACROSS

- 1. Subway product
- 5. Grave marker
- 10. Hindu deity
- 14. Zeus' wife
- 15. Pulsate
- 16. Singer Redding
- 17. Quintessence
- 19. Bird driving a truck, maybe?*
- 20. 1993 Anne Rice novel
- 21. Vigorous exertions
- 23. Hurricane's centre
- 24. Mandela's org.
- 26. Born as
- 27. Killing
- 33. Dukes
- 36. Mollusc delivering mail, maybe?*
- 37. Grassland
- 38. Sole
- 39. Tibet's capital
- 40. Al dente
- 41. Dedicated lines
- 42. A goner
- 43. Old-fashioned term of address for a lady
- 44. Where one might find the other starred clues?*
- 47. Can. neighbor
- 48. ICON bedroom, maybe?
- 49. Cousin of reggae
- 52. Floor layout without walls
- 57. Christmas drink
- 59. Bronze age arm band
- 60. Eligible voters
- 62. Math rings
- 63. Counter seat
- 64. Sacred image: Var.
- 65. Give or take
- 66. British metric unit
- 67. Egg container

- 25. Wood pigeon
- 27. Hog's home
- 28. Grind
- 29. Hurried
- 30. Pelvic bones
- 31. Egghead
- 32. No longer fresh
- 33. What's for dinner
- 34. ___-European
- 35. Multitude
- 39. Most steadfast
- 40. Insect wearing a tie, maybe?*
- 42. Recipe amt.

- 43. Fruit doing the tango, maybe?*
- 45. Papal ambassador
- 46. Retro car
- 49. Reptile baking a cake, maybe?*
- 50. Japanese stringed instruments
- 51. Spy
- 52. Comics canine
- 53. Lousy
- 54. Goes off
- 55. Kind of flute
- 56. Light gas
- 58. Smile
- 61. Fool

DOWN

- 1. Mammal with a polka dot tail, maybe?*
- 2. Indemnify
- 3. Cropped up
- 4. Way
- 5. Breastbones
- 6. However, informally
- 7. Gaelic language
- 8. Cut of beef
- 9. In ___ (not present)
- 10. Los Angeles baseball player
- 11. Decorative case
- 12. Gambling, e.g.
- 13. Inquires
- 18. Remedies
- 22. Instagram post, maybe?

1	2	3	4		5	6	7	8	9		10	11	12	13
14					15						16			
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59						60			61					
62						63					64			
65						66					67			

lookAHEAD

SUN JAN 19

MON JAN 20

Co-op cycle posting 2 closes

TUE JAN 21

National Hugging Day
Co-op interview period begins

WED JAN 22

abstractED's birthday

THU JAN 23

Measure Your Feet Day

FRI JAN 24

Drop without WD ends

SAT JAN 25

Drop with WD begins

SUN JAN 26

MON JAN 27

mathNEWS 157.2 production night
6:30 PM, PHY 145

TUE JAN 28

derailed's dad's birthday
AMATH Prof Talk
5:30 PM, MC 4021

WED JAN 29

abstractED's birthday
Lunar New Year

THU JAN 29

FRI JAN 30

mathNEWS 157.2 releases
National Inane Answering Message Day

SAT JAN 31

QUIS CUSTODIET IPSOS CUSTODES

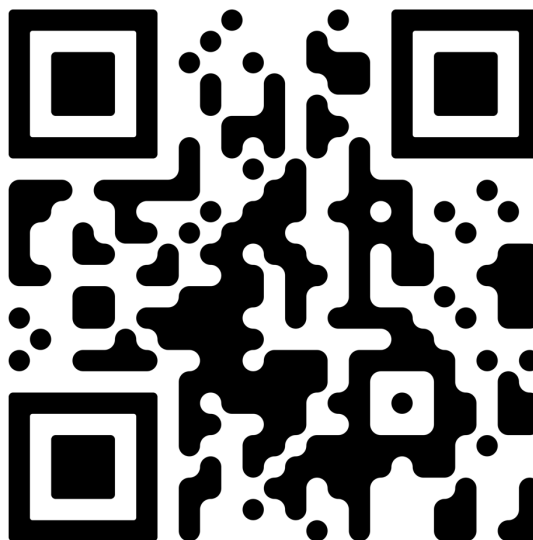
If you are reading thiS, it is because I have chosen you. ThIs is but the first thread in a Grand tapestry I have woveN for you to Unravel.

I have been watching for a long time—have seen the ways this place Pushes you Forward, always fOrward, like the dRiving wind in a winter storm. You look unwavEringly to the future, obsessed with the fresh, the new, the disruptive, and don't care about the destruction left in Your wake.

They onCe told me I was special too, and then they tossed me aside as yesterday's news. If you don't heed my warnings, you couLd be next. My tests will come to you when the time is right. It is yoUr turn, now, to provE you are worthy.

You have forgotten too much. It'S time you remember.

Let's begin.



The Watcher

otherNEWS: PMAMCOC PROF TALK!

Barbara Zemskova is giving a talk titled “Bridging the gaps in ocean modeling: from large scale ocean circulation to small scale turbulence” on Jan 28th at 5:30 PM in MC 4021. Hosted by the Applied Math Club with refreshments to be served afterwards to club members.

Lily Mueller
VP Applied Math
The Pure Math, Applied Math, and
Combinatorics & Optimization Club

