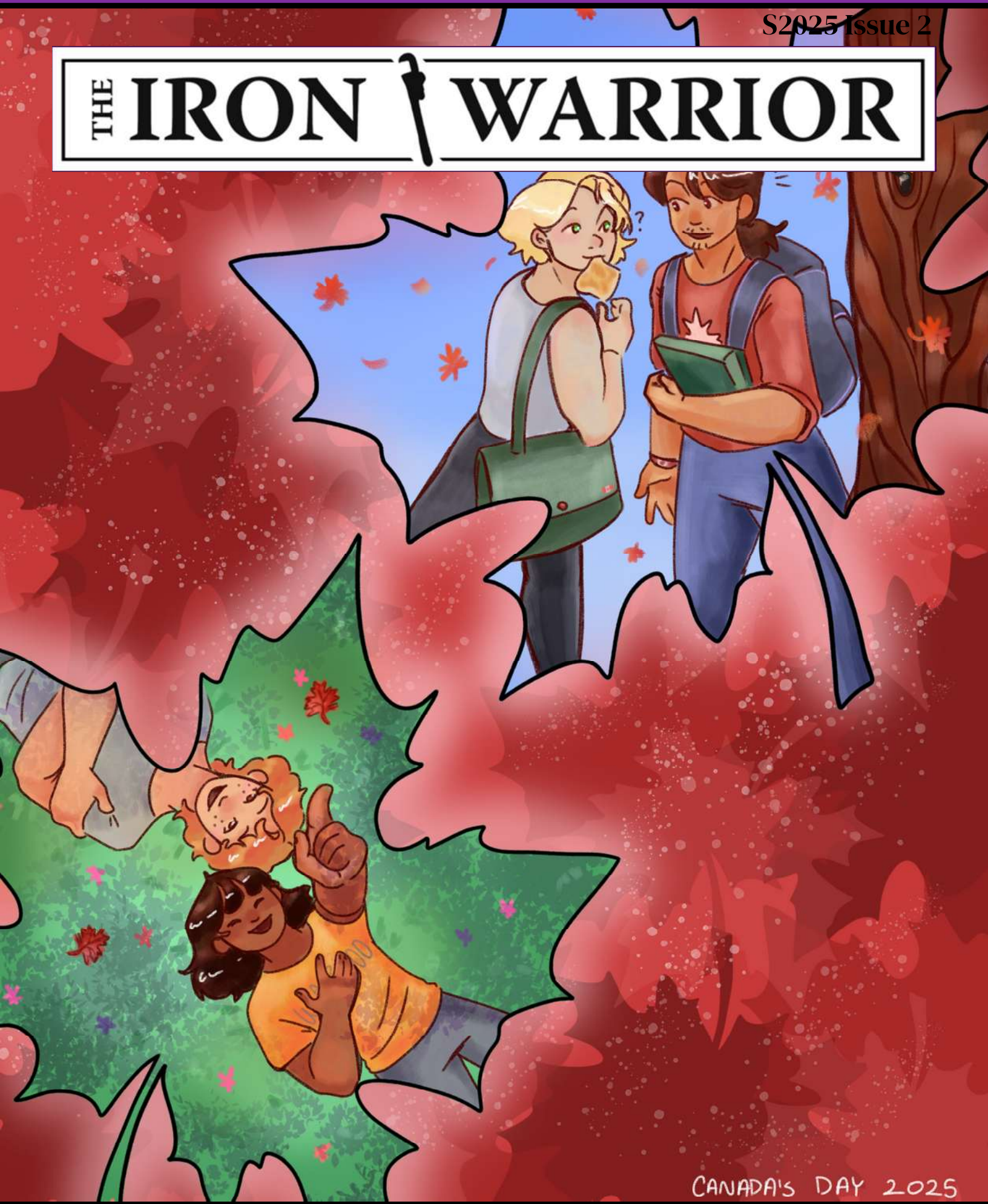
S2025 Issue 2

THE IRON WARRIOR



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Raison D'Engineering

Spruha Khadilkar, 1B Chemical

If you're anything like me, you knew for a long time that you wanted to be an engineering student, especially at Waterloo. The only thing that made me hesitate to apply was the fact that I had to choose my discipline before I even attended. Not only does your discipline become the rest of your life, but it is also a community that you'll be adopted into when you get to school. But I also believe that when my gut told me to apply the way I did, there was a reason. So what was everybody else's reason?

CEAG

CEAG is a tight-knit community of Civil, Architectural, Environmental, and Geological engineering students. Miia Hunt, a 1B Architectural Engineering student, chose her discipline because she would be able to work with buildings, and look closer at the design aspect of things. Chris Wong, a Civil Engineering student currently on co-op, concurs, saying that Civil Engineering is a field which "leaves a lasting impact on society."

A 1B Environmental Engineering student, Lara Kylas, chose her discipline because she wanted to make a real change in the world. She references the Fridays for Future climate strikes that happened when she was in middle school, "[which] is when I realized I want to do something about the climate crisis." She also knew she wanted to do engineering, since subjects like math and various sciences were always her strong suit. After weighing her options, Environmental Engineering seemed like the best fit.

CEAG students also get to work on some entertaining projects. When asked about his favourite project so far, 1B Geological Engineering student Nathaniel Pagtakhan mentioned his design project from his 1A concepts class. "We designed a new residence around Minota Hagey, [where] guest speakers can stay instead of renting a hotel," he recalls. The project was extremely hands-on, and the CEAG students got to use Civil 3D and InfraWorks. Nathaniel remembers many late nights working on that project, but also feels that it really brought the people in his program together.

I also made sure to ask all of my interviewees what they would tell a high schooler who is trying to choose an engineering discipline. Chris defends Civil, saying that "[Its] diversity makes Civil Engineering ideal for those still exploring their interests and provides a strong job outlook." Civil engineers can truly see the physical impact they make on the world, as well as the chance to "explore a wide range of sectors, including transportation, structural design, water systems, and more." Miia also comes to the defense of Architectural Engineering, explaining that it not only allows you to learn the engineering aspect of things, but look at the aesthetic side of things as well. "We bridge the gap between civil engineers and architecture students," she states. Overall, it seems that CEAG is a cluster of programs in which a student can not only make a positive impact on society, but see it too.

CHE

Devishi Talwar, a 1B Chemical Engineering student, realized she wanted to do Chemical Engineering due to her love of rock music. "Our physics project was to explain topics learned in class, and I [decided], 'Okay, I'm going to do guitars!'". It was during that project that Devi decided she wanted to pursue a physics-based career like engineering. Coupled with her love for chemistry, Chemical Engineering seemed like the obvious choice.

Devi's favourite projects done in CHE so far are all of the lab assignments done in the concepts course. Devi has always wanted to work in research, specifically in a lab. "I love researching about how things are made, and it also relates to cancer research, which is what I want to do in the future," she states. She is passionate about eventually going into the cancer research field after graduation, so that she can make a large impact on the world.

Devi also makes some convincing statements to get others to choose Chemical Engineering. "Chemical Engineering is the foundation of every source of life. Think about it! Chemical Engineering is so broad that you can even do research with a Chemical Engineering degree." Devi's main point is that since Chemical Engineering is such a broad subject that's incorporated into every part of life, it's a field in which people can make real changes to the way they go about their day-to-day lives. Devi sufficiently explains, "All aspects of life just come down to Chemical Engineering."

MME

Much like with other disciplines, MME students started with their passion for physics and math, which then evolved into a passion for mechanical aspects. Valerie Gieb, a 1B student in Mechanical Engineering, reminisces about her first week of school at Waterloo. “When I got here, I realized that this is actually much more cool than I expected. It’s not just physics, but there’s a lot of hands-on stuff too.” she states.

When asked about his favourite course so far, Kevin Hu, a 1B Mechatronics student, mentions his Materials class. “It’s so applicable to our careers, and it just makes sense.” Materials seems to be the heart of MME, since it really forces students to think about not only what they’re designing, but how to go about it.

Both Kevin and Valerie have a lot to say about the importance of MME. “There doesn’t seem to be a limit on what you can do [in MME],” Kevin claims. Valerie agrees, and finds it interesting that MME students are able to work with so many new materials and gadgets beginning in first year. “We take a really cool mix of courses. You’re taking all the math and science and stuff, but you’re also doing some hands-on, really fun courses.”

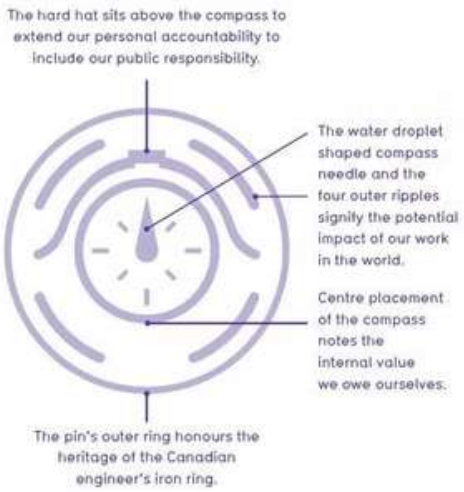
ECE

Electrical and Computer Engineering go hand-in-hand at Waterloo, always at the frontier of technological advances. Aayan Mufti, an Electrical Engineering student in his 1B term, chose his program because of his interest in hardware and software and using them in his school’s robotics team. He notes, “I realized that Electrical Engineering gives me the tools to turn abstract ideas into tangible, impactful solutions in the future, having applications in everything that we use.”

Aayan’s favourite project that he’s worked on was in his project studio class, in which his group designed and implemented a “Smart Desk.” “[It was] designed to make classrooms more inclusive by supporting students with diverse accessibility needs at the convenience of their own desk,” he describes. The project allowed him to not only use new and interesting equipment, but also learn how his discipline can make a positive impact on the world.

Much like other disciplines, Aayan encourages others to pursue Electrical Engineering due to its applicability to almost every industry, such as electronics, transportation, power systems, and more. He emphasizes, “If you’re curious about modern technology and want to help shape its future, Electrical Engineering provides the depth and versatility to design the systems that power our everyday lives!”

Unfortunately, I wasn’t able to ask every discipline about their stories, since many of them are spending their summer enjoying co-op, but I’m sure that they would have come to the same conclusion as me. Choosing our discipline was not an easy choice, but it was an important one. Every one of us wanted to see the impact we make in the world in some way, and it was our personal aspiration that led us down our own curated paths. While we may be divided into different disciplines in our classes, we all have the same goal in mind: to make a difference.



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Your "Now" - A Dive into the Physics of Time

Yasmin Abu-Narr, 1T Mechatronics

What if I told you that you already finished reading this article?

In this article, I'll be discussing the theories that were introduced in a Kurzgesagt – In a Nutshell video. The video is titled "Did The Future Already Happen? - The Paradox of Time." I highly recommend watching that video as it touches on many complex physics topics in a simplified way. The studio, Kurzgesagt, releases entertaining, simple science videos that introduce confusing concepts in an easy-to-digest format.

The past, present and future have always been understood as three distinct entities: you were born in the past, you live in the present and you will die in the future. However, with modern physics, things take a different turn.

In 1916, Albert Einstein published the General Theory of Relativity. This theory was preceded by the Special Theory of Relativity which he published in 1905. In the Special Theory of Relativity, Einstein establishes a concept called "space-time" an idea that weaves the three dimensions of space with time. This idea was completely foreign at the time, but over the next decade, Einstein worked to incorporate gravity into his theory, and this ultimately resulted in the General Theory of Relativity [2]. Simply put, massive objects cause the space-time fabric to stretch, which causes a dent in space-time and allows smaller objects to be attracted to larger objects [3]. But how does this relate to the past, present and future?

In Kurzgesagt's video, a helpful image is shown, a cube representing space-time. If space is the XY-plane and time is the Z-axis, you get a cube representing the universe. This is where the idea of relativity comes in. If you are moving through space, according to the theory, you are moving through time as well. This means that if someone is moving through space differently **relative to you**, then they are also moving through time differently **relative to you**. This introduces the idea of "your now" [1].

Andreas Albrecht, a theoretical cosmologist at the University of California, Davis, says, "When you try to discuss time in the context of the universe, you need the simple idea that you isolate part of the universe and call it your clock, and time evolution is only about the relationship between some parts of the universe and that thing you called your clock." [4]. You are experiencing time differently than someone on the International Space Station, so does that mean that another person's "now" is invalid? No. This is the basis of cosmic democracy. Every observer's point of view is equally as valid in the universe. The example given in the video is quite helpful. Three alien spaceships moving at different speeds either away or towards you would theoretically contact the version of you from the past, the present and the future. This implies that, as the video says "things don't happen in the universe, the universe just is." That is the theory of the Block Universe, a theory backed up by the General Theory of Relativity. This means that all the events in the universe are already pre-determined and written [1].

However, quantum physics tells us a different story. Radioactive atoms are described to be inherently random. They could decay at any instant without any way of knowing when. Scientists can only predict when the decay might occur, but no one knows for certain. This poses an issue for the Block Universe theory. Since these atoms make up life, they could change or mutate a living organism such that in a hundred years it will be a completely different species. This means that things might not be truly certain and the future is not already written [1].

This introduces the theory of the Growing Block Universe. Instead of the Block including the past, present and future, it instead only encompasses the past and present, where the present is not a flat, thin plane on the surface of the block, but instead an uneven surface that slowly rises as things occur and become certain. This surface is uneven because it contains all of the different perspectives of "now" of which are all equally valid [1].

Are you confused yet? Because I sure am. The Block Universe and Growing Block Universe theories have roots in physics as well as in philosophy, and since these theories are quite difficult to prove, many continue to believe in their own concepts of time. I know what I believe in, so what do you believe? Is the Block Universe the ideal theory, or is the Growing Block Universe better? Maybe a completely different theory is what makes sense to you. Oh, you don't know what I'm talking about? Oh, how could I forget? You haven't even read this article yet!

References

[1] Kurzgesagt – In a Nutshell. Did The Future Already Happen? - The Paradox of Time. (Jan 30, 2024). Accessed: Jun. 20, 2025. [Online video]. Available: https://youtu.be/wwSzpaTHyS8

[2] "Albert Einstein – Biographical," NobelPrize.org, https://www.nobelprize.org/prizes/physics/1921/einstein/biographical/ (accessed Jun. 20, 2025).

[3] B. Mattson, "100 years of general relativity," NASA, https://asd.gsfc.nasa.gov/blueshift/index.php/2015/11/25/100-years-of-general-relativity/ (accessed Jun. 20, 2025).

[4] R. L. Kuhn, "The illusion of time: What's real?," Space, https://www.space.com/29859-the-illusion-of-time.html (accessed Jun. 20, 2025).

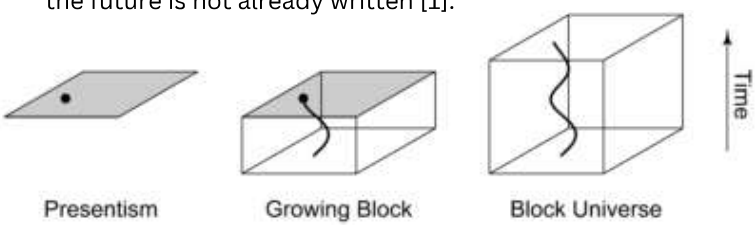


Photo credits: Anthony Dekker (2021). Three views of time: in Presentism, only the Present exists; in the Growing Block Universe, the past exists as well; and in the Block Universe, the universe forms a four-dimensional spacetime "block" in which the future is already written. Scientific Gems.https://scientificgems.wordpress.com/tag/metaphysics/

Pokémon Engineering

Jeremy Bijoux, 1B Chemical

No, this is not a new program for the Faculty of Engineering. Though it would be cool if it was...

I had another subject planned, but as I always do, I started at the last minute, and then I decided this subject would be better suited for a bigger audience (like in the Fall term, when all the new first years are gonna be here), so... I decided to write about something else. Me being me though, and just having gotten out of Hell Week (and a 2-day gaming session of Metroid Prime 2), my brain is everywhere but on articles. I was gonna tell the EIC that I wasn't going to have an article ready (though she said to notify her of this last week), but my roommate, the GOAT Tanaka C., came up with an idea that sparked this article subject.

The Faculty of Engineering here at UW has 15 undergraduates programs; there are 18 Pokémon Types (19 if you count Stellar), but I'll try to make each program's typing unique. Like Pokémon, all degrees will have at most 2 types; honorary mentions are other types that could characterize the degree or got left out due to the type limit. Please keep in mind, these are just my opinion! If I really wanted to be objective, I'd have to do 15 bachelor's degrees...

Architecture/Architectural Engineering – Fairy, Rock

Architects and AEs know their way with materials, physics, and aesthetics. They're artists, reaching for the most beautiful, safest building possible. Their steady attitude in the face of gigantic projects deserves respect!

Photo Credits:AdeptCharon | DeviantArt. The 18 Pokémon Types and Their Symbols. Esports.net. https://www.esports.net/wiki/guides/pokemon-go-type-chart/

Honorary Mention: Flying. If you're scared of heights, how are you going to work on tall buildings?

Biomedical Engineering – Dark

While the very name "Dark" may seem evil, Dark types are super cool (look no further than Greninja, Urshifu and Incineroar) and the type has some of the toughest Pokémon ever. A tough program like BME only accepts cool, tough students, and produces cooler, tougher engineers (e.g. Ash's Krokorok->Krookodile).
Honorary Mention: Normal. Like SYDE, BMEs need a mastery of multiple systems to get the job done. That requires knowledge of the basics, and a lot of coverage moves (see SYDE).

Chemical Engineering – Poison, Ice

No, we're not trying to poison anyone (that would be the Chemistry students). No offense to my other CHEs, but if our specialty is gonna be working with large amounts of chemicals, we might as well have a type related to chemicals. As for the Ice type? That's because one of my professors was talking about the applications of ice-baths for temperature measurements.
Honorary Mention: Fire. Sometimes we cool stuff down, sometimes we heat stuff up. Also, some chemicals are terrifyingly combustible or explosive :(

Civil Engineering – Fighting, Rock

Whenever I think Civil Engineers, I think big, buff -- oh wait, I'm thinking of constructions workers (Gurdurr, specifically). Still, I consider CIVEs to be the muscle of Engineering, the trusses that support our cities and infrastructure.
Honorary Mention: Flying (same remark as AE).

Electrical/Computer Engineering – Electric, Fire

Electric types, obviously! Also Fire types because:
1. Electrons generate heat, especially when they go through some resistance.
2. Short-circuits... Especially if the short-circuit causes a fire.
Honorary Mention: Ghost. ECE seems hard. Life-sucking even...

Environmental Engineering – Grass, Ground

We admire your passion for the environment! Please save us from global warming before it's too late!!!!

Geological Engineering – Ground, Rock

We admire your passion for earth! Maybe you'll discover some cool minerals on your expeditions! With your Ground typing, you should be safe from electric currents (unlike ECEs).

Management Engineering – Dragon, Psychic

Dragons are powerful, fearless leaders, aces in (almost) every situation... Your prediction abilities with data analytics and optimization are scary good... maybe as good as an Alakazam's (and it has an IQ of 5000)!

Mechanical Engineering – Water, Steel

Though this reasoning might not do the MEs justice, Water is the most abundant Pokémon type, and there are always a lot (and I mean A LOT) of MEs (I swear, Mechanical IS the most popular Engineering discipline). Also, you (probably) use hydraulics a lot?
Honorary Mention: Fire. Be careful not to get burned when welding! Make sure to have lots of Burn Heals on you!

Mechatronics Engineering – Steel, Electric

A combination of ECE and Mechanical Engineering, Mechatronics is where all the fun is at. When you work with circuits, softwares and robots, you're working with Steel and Electricity. If you want a role model, look no further than Gym Leader Clemont (from the anime, not the 3DS games).
Honorary Mention: Psychic (see Software Engineering).

Photo Credits: pkmnveteranrick 1.5" Pokémon Pokéball Pattern Sprite PC Icon Pixel Glossy Waterproof Sticker Art. Ebay. https://www.ebay.ca/itm/165681747655

Nanotechnology Engineering – Bug, Electric

I've been learning quite a few things about Nanotechnology Engineering in the past few weeks, mainly that it's not all about tiny tech. Alas, the only thing I can think of that screams tiny is Bug Pokémon (actually, 2 of the 6 smallest Pokémon are Bug types). Well, if it's any consolation, NEs can think of themselves as being just as tough as Ant-Man. Just don't steal his suit so you can shrink down to work on your mini-circuits!

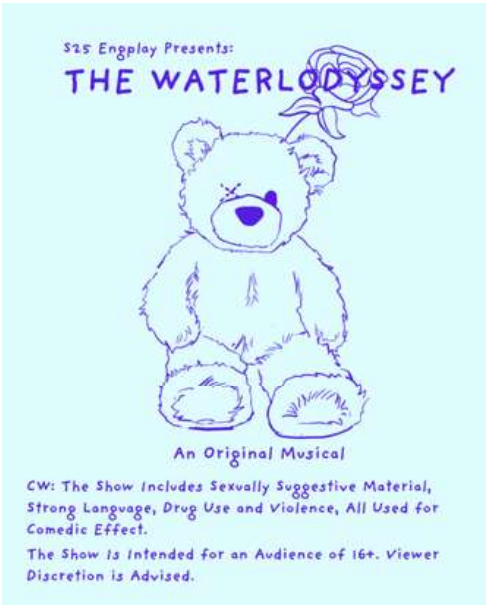
Software Engineering – Electric, Psychic

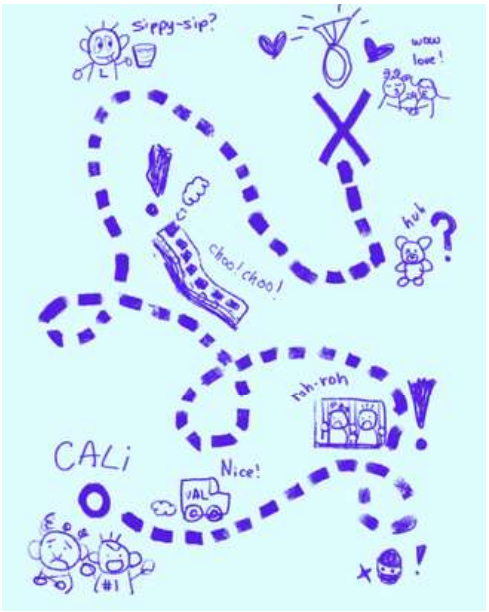
When you're working with code, you need some level of psychic prowess to be able to predict what will happen before you run it (especially if you're coding on paper COUGH TRONs COUGH). Plus, working on the softwares of the latest tech, and figuring out how to make them work for all kinds of people... that also takes major brain power (no wonder they ask for super high grades to get into this program!). Hopefully, you don't get zapped as often as ECEs...

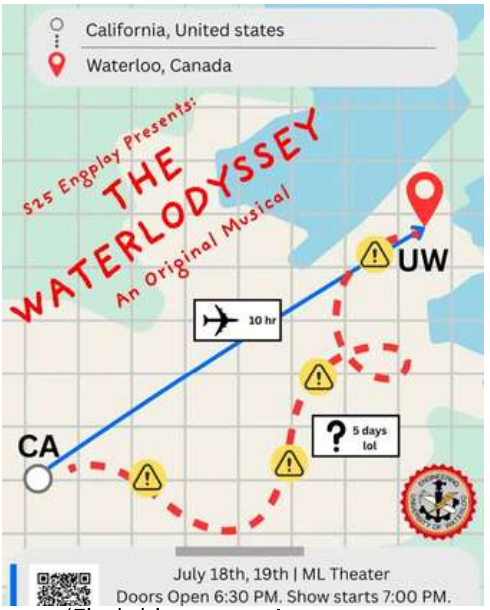
Systems Design Engineering – Normal

Though Normal types seem basic, they are anything but. Normal types can be jack-of-all-trades, being able to use moves from many different types, and many Normal types having a second type to buff them up. When I think of SYDE, I think of engineers who are strong in the fundamentals, but possess strengths in other Engineering areas.

One final thing: GET YOUR ENGPLAY TICKETS!!!!!!! In-person ticket sales start on the week of July 7th, or if you go to @uwengplay, and look at the posts for "The Waterlodyssey", you should be able to find a ticket link! If both Iron Warrior and MathNEWS are telling you to go... it's because you should! We all deserve one evening of comedy, drama and good songs... before Finals hit us like a truck.







(Find this post on Instagram to get to the ticket link!)

Running Late

Amara Damji, 3A Global Business Digital Arts

THE IRON WARRIOR

ENGDAY PHOTO CONTEST

Send us your best EngDay photos for a chance to be featured in the Iron Warrior Oweek issue!

@matthewhuang12 & @chadmanalo_
one of the winning photos from last year

How to Submit:

Email to **theironwarrior@gmail.com**
or DM us **@theironwarrior_UW**

Deadline: July 17, 2025

Eng Prof Quotes

(In reference to QA and testing.) “You could be working for a tech giant, where it affects people's lives; or Tesla, where it could affect people's lives but somehow they don't care.”
Patrick Lam, SE 465

“If it's not sharp, study up!”
Owen Sharpe, MATH 118

[talking about the differential equation for logistic population growth] “k is a constant which measures how horny people are... but you didn't hear me say that!”
Owen Sharpe, MATH 118

“Cumbersome.”
Peter Angelo, CHE 101/CHE 220

“Do you verstehe what I kapeesh?”
John Straube, AE 301

“This is a torus, it’s like a donut so it’s like... tasty.”
Sean Speziale, SYDE 112

Submit your prof’s quotes here!

THE IRON INQUISITION

“How will you celebrate Canada Day?”

“Celebrate not having classes”

KATIE, CHE 1B

“Hang out with family”

MIIA, AE 1B

“Sleeping and drinking with friends”

CLAIRE, AE 1B

“Watch fireworks in Kitchener”

ALYSHA, TRON

“Go out with some friends”

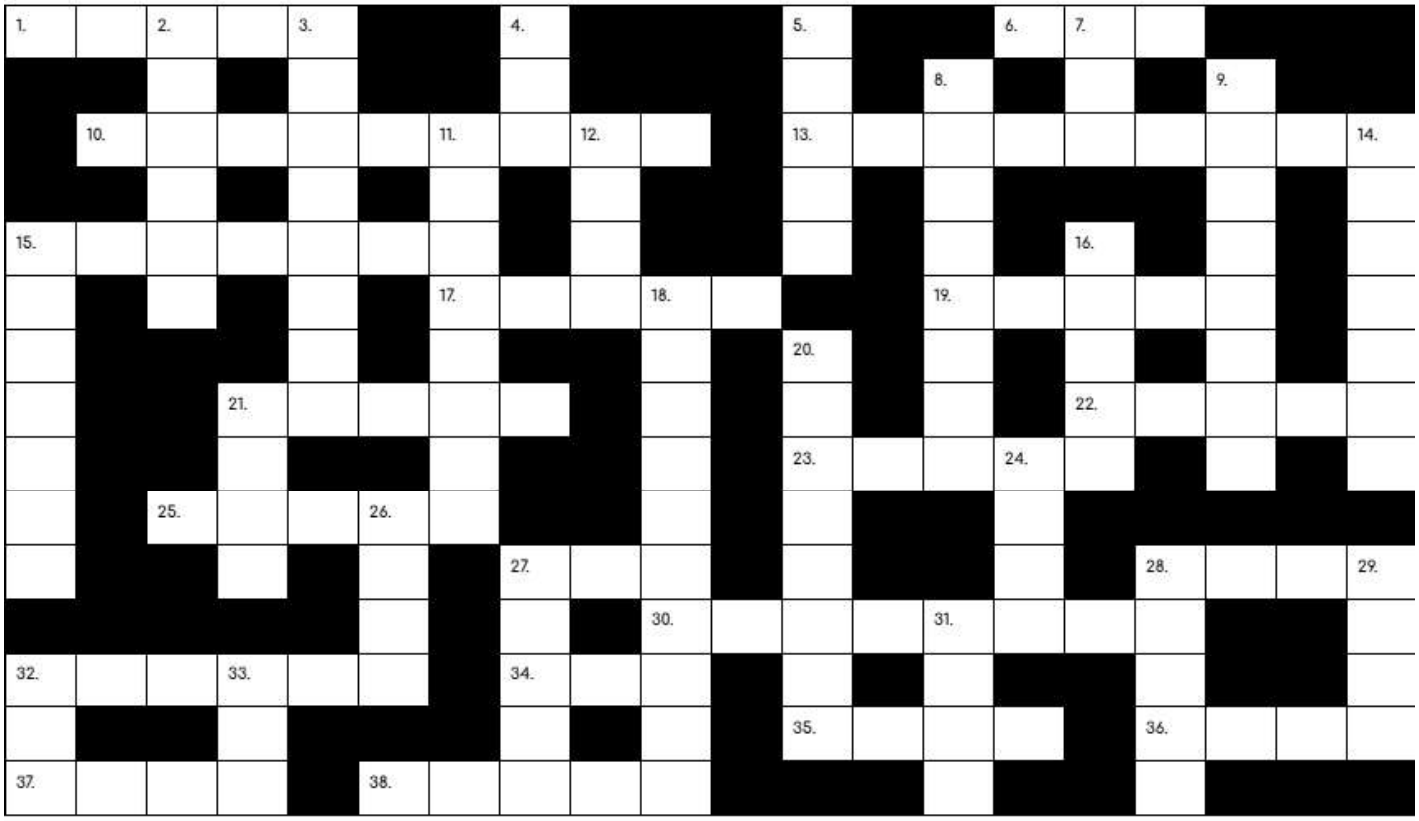
YASH, SYDE 1B

“Go to the beach”

DENNEY, AE 1B

Check out our instagram for even more Iron Inquisitions @theironwarrior_uw

S25I2 Crossword



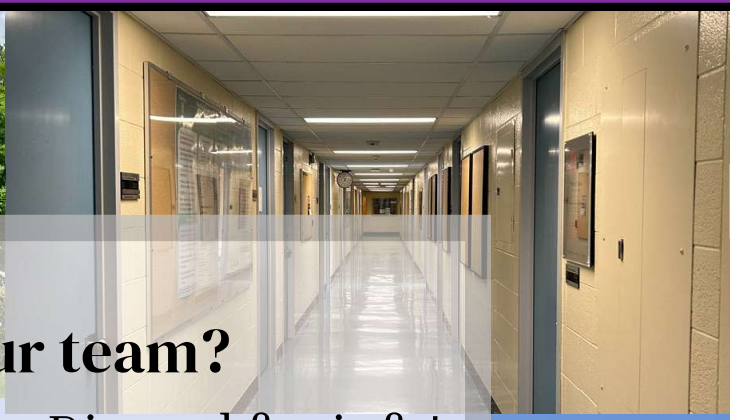
Across

1. H2O
6. A shiny stone
10. Negative thinker
13. Hormone of happiness
15. A document authorizing an action of administrative justice
17. Below
19. A phantom
21. Has 4 legs, 2 arms and a back
22. Doesn't ever happen
23. When the sun has set
25. Having knowledge of something private
27. A tasty 3.14
28. A member of the Pinnipeds
30. Historical landmark
32. The app to find your class schedule
35. Being deserving by effort
36. A piece of folded paper often given in accompaniment with a gift
37. An energy field around living beings
38. The website you pay your tuition on

Down

2. A tested and confirmed explanation for an aspect of the natural world.
3. The collection, organization and analysis of evidence.
4. A unit of pressure
5. Noodles with sauce
7. The consumption of food
8. Boastfully talking about your achievements
9. Not active
11. It comes with age and experience.
12. An estimated 7.5 quintillion grains of it on Earth
14. A system connecting devices for communication and resource sharing.
15. A musical instrument wielded by lifeguards
16. Tally up
18. The state of being occupied
20. Gibberish
21. A push vehicle in a grocery store
24. Very large
26. A head garment worn by brides
27. Ctrl + V
28. Unable to move
29. Ground
31. Additional
32. A small green sphere found in a pod
33. Made by stepping herbs, flowers, roots or fruits in hot water

Past Sudoku/Crossword Solutions ->



Want to join our team?

Come to our meetings! See Discord for info!

LOCATION:

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