

Caltech Joins Federal Lawsuit Over DOE Grant Funding Cuts

Emily Yu
News

On April 14, Caltech joined eight other American research universities in filing a lawsuit against the Department of Energy (DOE). The lawsuit seeks a temporary restraining order to block DOE's decision to cap the indirect cost rate on all academic grants at 15%. "If DOE's policy is allowed to stand, it will devastate scientific research at America's universities and badly undermine our Nation's enviable status as a global leader in scientific research and innovation," argued the complaint.

When a grant is awarded, direct costs fund the research itself, while indirect costs are an additional percentage added to cover overhead such as administration and facilities. According to the lawsuit, Caltech "receives substantial annual funding from DOE." It states that a reduction in the indirect cost rate to 15% "would reduce Caltech's annual indirect cost recovery by nearly \$6 million." Caltech currently has 83 active awards and subawards from DOE. In Fiscal Year 2024, the Institute spent over \$25 million on DOE-supported research, including nearly \$8 million in indirect costs.

In an email to the Caltech community on April 14, President Thomas Rosenbaum and Provost David Tirrell an-

nounced the Institute's participation in the joint lawsuit. They emphasized that "Caltech's DOE-supported research, along with that of our peers, enables important fundamental advances and the development of new technologies in energy, nuclear science, AI, and quantum information science, among other fields."

Current DOE awards at Caltech support research in both theoretical and experimental high energy physics. Areas of focus include quantum field theory, scattering amplitudes, string theory, lepton flavor violation, and the direct detection of dark matter. Other subject areas of DOE-supported research at Caltech include catalysis science, environmental genomics, and photosynthetic systems.

DOE reports that it provides over \$2.5 billion each year to more than 300 colleges and universities to support research, and that the average indirect cost rate at these institutions exceeds 30%. By capping indirect cost rates at 15%, the policy will reportedly save \$405 million, halt "inefficient spending," and "ensure proper stewardship of American taxpayer dollars." In a press release dated April 11, U.S. Secretary of Energy Chris Wright stated that the purpose of DOE funding to academic institutions is "to support scientific research—not foot the bill for administrative

costs and facility upgrades."

The DOE-rate cap comes in the wake of a similar action by the National Institutes of Health (NIH) to implement a 15% cap on indirect cost rates for grants. NIH's cap, announced in February, is currently blocked by a federal court after multiple legal challenges, including one jointly filed by Caltech.

In the lawsuit against DOE, the plaintiffs state that "DOE's action is unlawful for most of the same reasons [as the NIH cap] and, indeed, it is especially egregious because DOE has not even attempted to address many of the flaws the district court found with NIH's unlawful policy." They also argue that the rate cap is "arbitrary and capricious" for several reasons—among them, that DOE applies the new 15% cap exclusively to universities and not other grant recipients, without offering any rationale. Additionally, DOE has not explained why its own audits of indirect costs would be insufficient to improve efficiency and reduce spending.

"The pace of scientific discoveries in the national interest will be slowed," the lawsuit further states. "Progress on a safe and effective nuclear deterrent, novel energy sources, and cures for debilitating and life-threatening illness will be obstructed. America's rivals will celebrate, even as science and industry in the United States suffer."

IYQ 2025: Caltech's Role in 100 Years of Quantum Mechanics

Gregory Miller
News

This year marks a century since the establishment of quantum mechanics as a formal discipline. Considered a scientific revolution that has reshaped our understanding of the physical world, from early debates about wave-particle duality to the latest breakthroughs in quantum computing and entanglement, quantum mechanics has consistently pushed the boundaries of science. Significantly, Caltech played an essential part in expanding quantum theories, leading innovations, and expanding the possibilities of what science can be achieved.

Recognizing the importance of this field, the United Nations has declared 2025 the International Year of Quantum Science and Technology (IYQ) to commemorate a century of quantum mechanics and its global impact. At Caltech, this legacy is evident in the institute's ongoing leadership in quantum research, building on a tradition established by some of the most influential physicists of the past century.

As researchers celebrate this milestone, Caltech continues to lead cutting-edge projects that build upon the foundation laid by quantum pioneers. For example, at Caltech's Institute for Quantum Information and Matter (IQIM), scientists are developing next-generation quantum technologies, furthering Richard Feynman's (B.S., Caltech, 1939) vision of quantum simulations and expanding on John Clauser's (B.S., Caltech, 1964) groundbreaking work on entanglement. Both Feynman and Clauser won the Nobel Prize in Physics; Feynman received the award in 1965, while Clauser was awarded in 2022.

Unquestionably, Caltech has been the catalyst of scientific discovery for decades, especially in quantum mechanics. This is due to physicists like Feynman, whose pioneering theories created prominent advances in quantum computing and gravitational wave detection. While Caltech has significantly shaped the field, at the heart of this legacy are not just theories and equations but the brilliant minds dedicated to unraveling the mysteries of the quantum world.

As we see it today, quantum mechanics owes much to Feynman. His path integral formulation introduced a novel way to understand quantum mechanics, demonstrating how particles behave by considering all possible paths. This approach remains a cornerstone of quantum field theory and continues influencing modern physics.

Beyond his theoretical contributions, Feynman played a crucial role in envisioning new technological applications. He was among the first to propose the concept of quantum computing, which has steadily gained momentum. During the 1980s, he suggested that quantum systems could be used to model complex physical processes that classical computers struggle to simulate. His vision laid the foundation for a technological revolution that Caltech researchers continue to explore today. While Feynman advanced quantum theory, Clauser, would take these ideas from theory to experiment—pushing quantum mechanics into uncharted territory.

While Feynman's work has been significantly monumental, Clauser's achievement further pushed Caltech to the frontier of quantum research, advancing quantum networks while improving secure quantum communication and exploring the landscape of new quantum states, thus catapulting the field into unknown territory.

Extrapolating from the theoretical groundwork already laid, Clauser took Caltech's quantum legacy from theory to experiment. In the 1970s, he and his colleagues conducted the first major experimental tests of Bell's inequalities, demonstrating that entangled particles exhibit correlations that classical physics cannot explain. His findings provided the first definitive evidence of the non-local nature of quantum mechanics—one of the field's most counterintuitive yet fundamental aspects.

Yet, Clauser's path was not without resistance. Even Feynman, a towering figure in quantum physics, dismissed further experimental tests as unnecessary. Reflecting on this, Clauser later remarked, 'Feynman similarly told me that further testing the predictions was pure folly. If I had taken Feynman's

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Caltech President Thomas Rosenbaum Announces Retirement

Troy Zhang
News

Caltech President and Professor of Physics Thomas Rosenbaum will retire from Caltech and assume emeritus status at the end of the 2026 academic year, according to a campus-wide announcement delivered last Monday.

While initially tapped for a third term, Rosenbaum indicated that he "[felt] strongly that there are natural rhythms in the life of a university, and [fifteen] years seemed too long." Instead, Rosenbaum will serve for an abbreviated two years, during which the Board of Trustees and faculty will conduct a search for the next Caltech president.

Professor Rosenbaum's service as president "helped to en-

sure the security and well-being of our own community while catalyzing research and innovation to help the public both understand and confront these hardships," remarked Dave Thompson (MS '78), chairperson of the Board of Trustees. "I have admired Tom's ability to function as a top-ranked scientist, an informed historian of higher education, and a constant voice emphasizing the importance of science and technology as a primary means of improving the human experience."

During Rosenbaum's tenure, Caltech invested in a broad array of research initiatives and collaborations, including the construction of the Tianqiao and Chrissy Chen Institute for Neuroscience and the Resnick Sustainability Institute. Both facilities now host robust teach-

ing and research programs, including the laboratories of several Caltech faculty members.

The search process for Rosenbaum's successor will occur as a joint effort between the Board of Trustees and the Faculty Board, according to an announcement released by Thompson and Gil Refael, chairperson of the Faculty Board. The effort comprises an 11-member Search Committee, tasked with seeking and referring candidates to the search process, and a 10-member Selection Committee, which will interview the candidates and nominate one finalist to the Board of Trustees, which holds final appointing authority.

Rosenbaum will maintain his laboratory group upon assuming emeritus status and has indicated that he intends to remain an active faculty member.

Volunteering for Change: A Day with Caltech Y at Friends in Deed

Camilla Fezzi
Student Life

On April 12, 2025, members of the Caltech community gathered for the annual "Make a Difference Day" event organized by the Caltech Y. This article explores one volunteer team's day at Friends in Deed, a local nonprofit food pantry in Pasadena, highlighting their community impact and personal growth through service.

The Caltech Y's "Make a Dif-

ference Day" enables students and community members to support local organizations through meaningful service projects. This year's volunteers worked on various initiatives, including recovery efforts after the Eaton fire. Among the participants was a dedicated team led by Maddie, who served at Friends in Deed, a nonprofit addressing food insecurity in Pasadena.

Helping at Friends in Deed
From the experience of Mad-

ison Tongco, Venerable House
"I led a small team to volunteer at the food pantry of Friends in Deed, a local nonprofit in Pasadena. We sorted through a large amount of donations, including 20 boxes of frozen items from local Starbucks chains, as well as toiletries and a total of 96 large boxes of cereal and spaghetti. On a day with a high of 81 degrees, we also had a great time washing out the milk crates they use for storage."

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advice to abandon my pursuit, I never would have won the Nobel Prize.'

Unapologetically, Clauser's research not only confirmed Bell's theorem but also reshaped our understanding of quantum entanglement. His groundbreaking experiments challenged long-held assumptions about locality and determinism, paving the way for advancements in quantum networks, secure quantum communication, and the exploration of new quantum states.

Ultimately, Clauser's pioneering work earned him the 2022 Nobel Prize in Physics. And while he has made many contributions to quantum mechanics, his research on entanglement remains his most defining achievement. His legacy, like Feynman's, continues to shape Caltech's role at the forefront of quantum science. Today, his experiments continue to influence a new generation of quantum research at Caltech, where scientists are building on these foundational discoveries to drive new innovations.

Building on Clauser's discoveries, Caltech researchers have continued exploring how quantum entanglement can be applied to computing and secure communication. His findings have fueled research into quantum cryptography, quantum networks, and the development of quantum computers that leverage entanglement to outperform classical systems. As Clauser's work showed, "Our experiments demonstrated that there exist quantum mechanical entities [qubits] that violate the fundamental premises of Local Realism, whereupon Local Realism must be discarded as a fundamentally incorrect universal description of nature."

Clauser's work not only revolutionized our understanding of entanglement but also cemented its role in the future of quantum science. As quantum mechanics transitioned from theoretical exploration to practical applications, Caltech emerged as a leader in experimental research. At IQIM, physicists, computer science, and engineers collaborate to push the boundaries of quantum science and explore new possibilities.

Caltech has been a crucible for quantum physics, producing and attracting many of the field's most influential minds. Feynman, longtime professor of theoretical physics, revolutionized quantum electrodynamics and later laid the conceptual groundwork for quantum computing. Clauser, a Caltech alumnus, conducted pioneering experimental tests of Bell's inequalities, advancing the understanding of quantum entanglement. Murray Gell-Mann, former professor of theoretical physics, reshaped particle physics with his quark model and contributions to quantum chromodynamics. Kip Thorne, Feynman Professor of Theoretical Physics,

bridged quantum theory and general relativity through his work on black holes and gravitational waves. John Preskill, professor of theoretical physics and director of Caltech's Institute for Quantum Information and Matter, is a leading figure in quantum information science. Frederick Reines, Caltech Ph.D. alumnus, co-discovered the neutrino, while Jeff Kimble, professor emeritus, pioneered advances in quantum optics and cavity quantum electrodynamics. Visiting scholars such as Alexander Polyakov and Jeff Goldstone have also left

Theoretical Physics at Caltech, alongside Rainer Weiss of MIT and Ronald Drever, professor of physics at Caltech. Thorne, together with Weiss and fellow Caltech professor Barry Barish, was awarded the 2017 Nobel Prize in Physics for contributions leading to LIGO's historic detection of gravitational waves—an achievement rooted in astrophysics, but enabled by advances in quantum optics. In bridging the quantum and cosmic realms, LIGO exemplifies Caltech's enduring legacy of transforming quantum principles into groundbreak-

“One of the most important challenges is to unify quantum mechanics and general relativity. Caltech physicists have made important contributions in the past, including Feynman’s discovery of a concept known as the Faddeev-Popov ghosts in the quantization of gravity, and Schwarz’s discovery that string theory contains Einstein’s gravity in low energy. More recently, the close connection between quantum error-correcting codes and the holography of quantum gravity was discovered, in which Caltech physicists played a key role. With the world-leading programs in quantum information, high energy theory, and gravitational physics, Caltech is an excellent place to develop such connections.” — Prof. Hiroshi Ooguri, Fred Kavli Professor of Theoretical Physics and Mathematics and Founding Director of the Walter Burke Institute

their mark, further cementing Caltech's role as a nucleus of quantum innovation.

Among the surfeit of Caltech's significant contributions is cavity quantum electrodynamics (cavity QED), a field of quantum physics that explores confined light-matter interactions.

Under the leadership of physicists like Jeff Kimble, who was a professor at Caltech, researchers have studied the precise interactions between atoms and photons under controlled conditions. These experiments paved the way for advancements in quantum communication and computing.

Moreover, Caltech physicists have made important progress in quantum error correction, identified as a principal challenge in building reliable quantum computers. Alexei Kitaev, who also worked as a professor at Caltech, was a key figure in the field who introduced topological quantum computing concepts that are now being investigated to create more stable and scalable quantum systems.

Although Caltech is widely recognized for its work in quantum computing and information science, it has also extended quantum principles into astrophysics. One notable example of this interdisciplinary approach is the Laser Interferometer Gravitational-Wave Observatory (LIGO), one of Caltech's most ambitious projects, which detects spacetime distortions from cosmic collisions using laser interferometry. This groundbreaking project was co-founded by Thorne, Feynman Professor of

ing technological and scientific achievements.

Initially developed in partnership with the Massachusetts Institute of Technology (MIT), LIGO made history in 2015 when it caught gravitational waves for the first time. This validated a key prediction of Einstein's theory of general relativity and marked a significant milestone in astrophysics.

Though quantum technology, particularly in quantum optics, played a crucial role in LIGO's success, Caltech researchers continue to pioneer squeezed light techniques, enhancing the sensitivity of LIGO's interferometers, thus allowing them to detect faint gravitational signals from crashing black holes and neutron stars, which are the expelled remnants of supernovae.

Caltech remains at the forefront of quantum science, shaping the next-generation quantum technologies. This is why researchers are developing quantum networks that leverage entanglement-based encryption, a breakthrough that could revolutionize secure communication.

Concurrently, experimental physicists continue discovering new ways to manage quantum states for practical applications. Whether advancing photonic quantum computing or refining superconducting qubits, Caltech researchers are at the forefront of pushing quantum technology into new frontiers.

As scientists build upon the work of pioneers like Feynman and Clauser, they grapple with fundamental questions: What is the true nature of reality? How can quantum mechanics be harnessed for technological breakthroughs? Moreover, ultimately, how will quantum science transform our understanding of the universe?

From its foundational theories to the advanced experiments that have shaped modern quantum mechanics, the work of visionaries like Feynman, Clauser, and their successors underscores Caltech's



Richard P. Feynman receiving the 1965 Nobel Prize in Physics from King Gustav VI Adolf of Sweden. (Credit: Caltech Archives)



John F. Clauser receiving his Nobel Prize from H.M. King Carl XVI Gustaf of Sweden at Konserthuset Stockholm on 10 December 2022. (Credit: Nobel Prize Foundation)

“Quantum mechanics is the backbone of modernity, the efforts of those early theorists and experimentalists having paved the way for the information age and its innumerable splendors. What I believe Caltech manages to stress like few other institutes, however, is the incalculable value of fundamental science in and of itself. While their work may have led to it, Bohr, Heisenberg, Planck, and their cadre weren't motivated by transistors and MRI machines, but rather the demystification of the universe for its own sake. Will quantum gravity prompt another technological revolution? It's impossible to say, but we shall work tirelessly to understand it anyway.” — Damian Wilson, PMA undergrad and high energy physics researcher at INQNET

lasting influence on quantum science and technology. As the world celebrates a century of quantum mechanics, Caltech

stands as a driving force, shaping the quantum frontier for generations to come.

“We are getting to understand quantum mechanics better, including measurement, locality, non-locality, and soon will get to answer the questions we have the right way, so we'll get insights on whatever is shaking with quantum gravity. Expect rapid theoretical and experimental progress!”

— Prof. Maria Spiropulu, Shang-Yi Ch'en Professor of Physics



Do you like keeping up with sports?
Do you live for the game winner,
the epic comeback, or the roar of
the crowd? Do you love my only
sunshine LeBron James?

If you said yes to any of
these questions...

The Tech

needs YOU!!!

We're on the hunt for sports fanatics with a flair for
storytelling to join our team of writers.

Are you in? tech.caltech.edu/write



Every Game Shown in the March Nintendo Direct and How Excited I Am

Clare Wu
News

Dragon Quest I & II HD 2D Remake – 3/10

Remakes don’t usually excite me as the core mechanics and plot are usually the same as the original, just with better graphics. Unless a remake is practically an entirely new game—think *Final Fantasy VII* remake I don’t have any interest in buying it as it’s incredibly likely that one could emulate the original *Dragon Quest I* and *II* with little issue. That seems to be the case here and with other remakes announced. It looks pretty, though.

No Sleep for Kaname Date – From AI: THE SOMNIUM FILES – 7/10

I’ve heard really good things about this series, and it looks cool. Additionally, it seems like it has an interesting take on the mystery genre where “choices will affect the story”: a claim many games have attempted to fulfill, only to fall flat with minimal changes from player choice.

RAIDOU Remastered: The Mystery of the Soulless Army – 6/10

Looks really nice and seems to have expanded on the gameplay beyond better graphics. It also tackles one of my favorite historical settings, Taishō-era Japan. Additionally, it’s from the same team as *Persona*, and it shows. I like how the captured demons have uses in the open world. and it includes iconic classics such as Jack Frost and Shouten. If you’re a fan of *Persona*, you’ll probably like this game.

Shadow Labyrinth – 4/10

This new *Bandai* game seems to be a post-apocalyptic 2D side-scroller with a unique art style. However, the actual gameplay looks a bit stilted and slow, where I would say that usually a side-scroller is more fast-paced and exciting.

PATAPON 1+2 REPLAY – 8/10

Yes, it’s another remake/port to the Switch. But I had never heard of this gameplay before, and it looks really cute! I’m a sucker for games with unique mechanics, and while battle simulators are somewhat common, this one is a bit more than the regular *plop-down-some-troops-and-watch-them-die*. Here, troops are commanded with chains of button presses that are to be in time with the beat of the music. That fun addition seems to make all the difference. Beyond vibrant sound, the art is also fun, with black-and-white little guys who stand out against colorful backgrounds as they march menacingly into war. It’s cute and seems to take a simple mechanic to extremes with growing complexity and different levels of difficulty.

STORY OF SEASONS: Grand Bazaar – 5/10

The newest *Story of Seasons* entry, *Grand Bazaar* fits right into that cozy gaming niche with a quaint little town, NPC relationships, and farming mechanics. Personally, not my taste—as I am incapable of fully relaxing—but if you’re a more casual gamer and like the Switch Lite more than the Switch because “it’s aesthetic,” this might be the game for you!

Metroid Prime 4: Beyond – 9/10

With the *Metroid Prime 3: Corruption* having been released in 2007, fans of the *Metroid* series have been waiting 18 years for this game. From the trailer, it seems that the wait was worth it. After the success of *Metroid Dread*, a side-scroller different from the usual First-Person Shooter (FPS) *Metroid* style, it seemed like it would only be a matter of time until the next mainline *Metroid* game. Now, 4 years after *Dread*, *Metroid Prime 4* will be released on both the Switch and the Switch 2. I’m excited to see how gameplay between the two consoles will work, especially with the Switch 2 mouse joycons, and how the new psychic powers will affect gameplay. If you’re a fan of FPS exploration games like *Halo* or *Doom Eternal*, check this out.

Disney Villains Cursed Café – 0/10

I do not care about this game. It is an obvious cash grab and will probably cost anywhere from \$40 to \$60, which is way overpriced for a type of game that has been done before with better and cheaper execution.

Witchbrook – 5/10

Similar to *Story of Seasons*, this is another cozy game that offers the experience of a witch academy. With a pleasant pixel art look and a seemingly large open world, *Witchbrook* offers lots of fun activities, multiplayer co-op, and lots of customization. Compared to the 3D approach of *Story of Seasons*, it veers closer to *Stardew Valley* in terms of looks and it’ll probably have a lower price tag as well. If you’re waiting for ConcernedApe, *Stardew*’s creator, to release *Haunted Chocolatier* this might hold you over until then.

Eternal Life of Goldman – 8/10

In a world of more and more game studios pivoting towards AI to generate “art”, we have the opposite approach with a game of entirely hand-drawn and animated assets. In this delightful 2D platformer, we follow Goldman, an old man funnily enough, who uses his customizable cane with different powers to navigate through steampunk docks, rocky caves, and more. His goal? “To eliminate a mysterious deity.” If you missed the mystique and platforming of *Hollow Knight*, this could be for you.

Gradius ORIGINS – 1/10

It’s a collection of bullet hell arcade games on the Switch.

Rift of the NecroDancer – 6/10

While I’ve heard of this game, I’m surprised how little I’ve seen. That said, I’m a sucker for any game that gives us good music and fun rhythm games. I see some *Rhythm Heaven* influences, but it looks like a smaller *Guitar Hero* style game. Still, with three lanes instead of five like in *Guitar Hero*, I fear it’ll be too easy. The *Celeste* and *Pizza Tower* DLC pleasantly surprised me! I’m excited to see more, but only if there is more.

Tamagotchi Plaza – 5/10

You might be noticing a trend, but this is yet another cozy game. Does anyone even remember *Tamagotchi*? I couldn’t name a single character. While I’m sure that there are fans and plenty of hype for

this game, I might be too young to understand it as *Tamagotchi* was before my time. The game takes place in a town/city with multiple activities to do with cute characters like having a tea party or going to the dentist. It’ll probably satisfy some *Animal Crossing* itch.

Pokémon Legends: Z-A – 9/10

The new Pokémon game seems to promise a fresh battle mechanic and some extra love to underrated starters like Chikorita and Tepig. This particular trailer showcases the new trainer battles. A play on the classic “when two trainers eyes meet they must engage in battle”, it has built on this idea even more with stealth mechanics that’ll allow one to launch surprise attacks. Furthermore, it’s taken a more unique idea to the game progression with different level zones and trainer ranks (ranging from Z-A, yes that’s where the name comes from) being spread throughout the map, instead of the more linear routes and gym battles that all mainline Pokémon games follow. Additionally, the battle system is much different from the typical turn-based combat fans are used to with different attack having different ranges and timings. It’s exciting to see it come later this year.

Rhythm Heaven Groove – 100000000/10

RHYTHM HEAVEN IS BACK. It’s been 10 years since the last *Rhythm Heaven* game, and it was very much looking like Nintendo had long forgotten its existence. For a while, it seemed like the only hope we had were *Rhythm Heaven*-inspired games like *Bits and Bobs*. Now, *Rhythm Heaven* fans (me) can rejoice, as Tsunku is back with more wacky rhythm games. For those unfamiliar with the franchise, *Rhythm Heaven* has only had 3 games released internationally and yet remains one of the most unique and charming franchises ever created. From wacky wrestler interviews to wolves chopping wood, there is so much creativity in each game, but you can still play the whole thing with your eyes closed. The music is iconic and spans many genres—there’s nothing like it. As soon as I heard the iconic boop of dialogue advancing, I screamed.

Virtual Game Card – 3/10

Not a game, but an announcement of how they plan on letting you transfer digital games between systems. I used to be more excited about this as it allows people to lend digital games and transfer games between their Switch and the upcoming Switch 2. However, ever since learning that the Switch 2 will be \$450, my excitement has died down. It’s a great idea, but I will not be using it for quite a while.

High on Life – 8/10

Another FPS game with a sci-fi touch, this one is a little more light-hearted, going for a comedic touch. Your gun is, notably, a little guy that trash-talks you—classic comedy. Similar to *Metroid*, you might like it if you like *Halo* or *Doom*. (Particularly if you like *Doom*.)

Star Overdrive – 3/10

If you’re looking for a sci-fi exploration on a hoverboard, this is the game. The shown footage seems to demonstrate

a nice variety of environments and some fun combat.

The Wandering Village – 7/10

Cute-looking management game with a twist. The idea of having the lands that buildings are built on constantly changing as the village moves is a welcome change to the normal factory-building genre. Additionally, it seems like an added challenge would be the limited amount of land to work with, when normally these games can have an infinite area. If you like *Factorio*, this could be for you.

King of Meat – 6/10

Seems like a fun action and platforming co-op game.

Lou’s Lagoon – 4/10

Looks good, but the character customization being a selling point throws me off a little. There was also one clip that looked very similar to the “Island Flyover” game from *Wii Sports Resort*, which felt out of place from the rest.

FANTASY LIFE i: The Girl Who Steals Time – 3/10

This game gives me *Ni No Kuni 2* vibes with the battles, but *Animal Crossing* vibes with terraforming and house decorating mechanics. Don’t know much more—it just seems like generic fantasy.

SaGa Frontier 2 Remastered – 3/10

Just another remake. It advertises new events, but it doesn’t seem like a drastically different game from the original. However, I can’t be sure as I’ve never played the original. It

still seems like a cool game, I’m just not a fan of remakes.

Monument Valley/Monument Valley 2/Monument Valley 3 – 2/10

These are games that you could easily get on your phone, and it seems like they’ll be marked up for the Switch. The only new thing is *Monument Valley 3*, which I can see easily being on mobile as well. Nothing exciting.

EVERYBODY’S GOLF: HOT SHOTS – 0/10

They have to advertise the motion controls *somehow*.

MARVEL Cosmic Invasion – 5/10

Amazing animation shown. It seems like a classic beat-’em-up with fast-paced character combos between your favorite superheroes. It also seems like it could have fun multiplayer.

Tomodachi Life: Living the Dream – 10000/10

Absolutely the best game to end on. It’s been 11 years since *Tomodachi Life*’s release on the Nintendo 3DS, and it was looking like it would not return with the death of the Wii. Miis are so inherently related to the Wii console that as it was replaced with the Switch, we saw fewer and fewer of the iconic customizable avatars. Now, one can once again enjoy simulating the lives of countless people on a giant island. Solve interpersonal conflicts, facilitate relationships, and play minigames with your Miis to grow the island. It marks an exciting return to form, in my opinion, where Nintendo fully embraces creativity and being weird.

Earthquake Early Warning Survey

Alicia Zhang
Science & Tech

The January 2025 SoCal fires are still impacting many. The Caltech Seismological Laboratory

is surveying how people received/responded to emergency alerts— vital for fires and Earthquake Early Warning. Your feedback helps improve future alerts! Take the survey & share:



Letter to My Coach

Camilla Fezzi
Inner Voices

I know, this will never be a typical newspaper article. I will not tell you about a recent event, nor will I comment on the latest news that runs on the news. Poor Michael and Damian know me by now: I am not a model journalist. When they give me a task, I tend to write less than I should and enjoy myself even less. And yet, there is something that works in the chaos of my way of doing things, something that pushes me to continue, taking the usual tangents that are so typical of me.

Today, I want to talk about a figure that we too often take for granted: coaches, instructors, guides who surround us and who, in one way or another, transform our lives. They are like sculptors who, with patience and dedication, shape the clay that we are, smoothing the edges with the chisel and helping us find a shape that we often cannot see on our own. And yet, we never thank them enough. Sometimes we only focus on what is not for us, on mistakes, on what we would like to happen but do not. Today I write because I feel I have to. I write to express something that is inside me, and so here I am.

Seven months have passed since I have been here. Weeks that seem like years, in which I have experienced a profound change, almost imperceptible at the beginning, but which is now impossible to ignore. Something inside me has transformed, and for this radical change, I have to thank one person: my riding instructor, David.

Let me tell you a story. Mine. I am a girl who grew up too quickly, a child who found herself an adult with too many choices to face. I dared to change continents, to leave everything behind to follow new adventures, but I brought with me a subtle, almost invisible fear, that of breaking the patterns that I have always imposed on myself. I am that girl with horses, yes, the one who wakes up before dawn every morning, puts on her worn and muddy boots (I know, I should clean them, but there's never time!) and runs to the riding stables. That's where my parallel life lives. I train, I get dirty, I sweat, but I go home with a smile on my face, happy to have breathed that different air, far from the bubble of academic daily life. That little moment of freedom makes me happy. Or rather, I will make myself happy. For a few months, that happiness had been spent. I found myself waking up with a knot in my stomach, overwhelmed by anxiety. I felt insufficient, incapable. Every morning, when the alarm went off, I woke up with the fear of doing everything wrong, of living a day completely out of place. The only relief seemed to be sleep, that unconscious moment that protected me from the constant thought of reality.

And now I'll explain why. The riding school, which was once my refuge, the place where I found peace, had become a source of frustration. I didn't feel good enough, strong enough, enough... nothing. Every mistake felt like an insurmountable failure. Every misstep made me doubt myself. And all of this was suffocating me. Then something happened.

David, my instructor, saw what was happening. He didn't say big words or make big gestures. But he taught me to see things differently, to not seek perfection at all costs, to understand that every step forward, even the smallest, is a goal. He never left me alone, not even when I felt lost. With his perseverance, patience, and silent guidance, he was there to remind me that riding is not just a question of technique, but also heart, of trust, of connection with yourself and with your horse. This letter is for him, for David, but also for all the instructors who, often without realizing it, change the lives of the people they meet. They do not do it with spectacular gestures, but with their presence, their dedication, their ability to bring out the best in us, even when we have stopped believing in it.

Thank you, truly. And to all of you who read: remember to thank your coaches, instructors, and guides. Because, like sculptors, they are working every day to help you find your best shape.

It was only four years ago that I set foot into a stirrup for the first time. Riding was prescribed as therapy, a way to create space for myself, to give my mind a chance to escape to places where it could finally breathe again. And so, my beloved horses came into my life. The first time I rode was unforgettable. It felt as though I had been doing it my entire life. I still remember my father, terrified of horses, accompanying me and trying it out with me. I loved it immediately. It was like a form of sleep, where my mind was completely focused on something else, far away from my usual consciousness. Two days in, I was trotting. Six days in, I was galloping.

I started at a small riding stable near my family's vacation home. What I learned there, above all else, was love—love and care for these incredible animals. I began riding more and more, and it became a necessity, a way to escape reality. My parents constantly reminded me (and still do) why I took up this sport: to take care of myself, to give myself those precious hours of freedom.

Still, that competitive fire reignited within my drive to train, to push harder. Soon enough, I switched to a stable closer to home and got my first horse, Orchidea. She was a chestnut mare, incredibly difficult for a beginner like me, but in all our shared madness, we were a perfect match. I threw myself into it with all my dedication, training every single day at a highly competitive barn—a clear trigger for a nuclear reaction inside me.

And yet, the feeling was different this time. I started jumping, and I became addicted to the adrenaline. I no longer needed roller coasters; I had my own amusement park in the form of horseback riding.

They say that to heal one obsession, you often replace it with another. Slowly, my life became a balance of school and riding. My coach at the time, Carlo, began putting me on an old Grand Prix champion, Alex, a 17-year-old horse who still felt like a youngster at heart. Alex was the horse who taught me the most. He was a challenge, a true test of my patience and skill. Like me, Alex wanted to make all the decisions, to run freely without restraint—but, oh, could he jump.

When I arrived at this new

stable, I was like a bolt from the blue. I had only been riding for a short time, but I found myself taking lessons alongside people who had been riding for years. Once again, I became the outsider, the intruder. But not to my instructor. To him, I was a talent, someone with a spark worth cultivating. My wildness, my inability to hold back, became something to encourage. People began calling me a prodigy, but for me, it was never enough. What I was doing was insane, and now, thanks to David, I can finally see that I was guided by my craziness and adrenaline.

I rode then, and I ride now, every single day—and I suffer when I can't. This unconscious fear was born back in Italy, where, if I didn't train my horses, no one else would. No one even cleaned them if I wasn't there. So, I found myself playing the role of groom for four horses a day, on top of school, terrified that everything would fall apart if I stopped.

David, maybe you'll read this, maybe you won't. But for me, riding (perhaps too much) is a way to express the affection I struggle to show. It's my way of giving to them—my horses—what I need most for myself: galloping to forget, moving and letting it all out so I can refocus afterward. I know, I should limit myself, but I'm afraid. Afraid that what I'm giving them isn't enough, that I'm not doing enough for them.

In Italy, I reached the point where I was jumping in important categories after just three years of riding. I burned through every possible stage of progression. I even trained horses that belonged to other owners, and I was given young horses to ride/train. But somewhere along the way, something changed. Where was that young girl who started riding out of pure love for these animals? She was still there, always there, but hidden, blinded by the allure of success, by faster times, higher jumps, the adrenaline of 13 obstacles, and the rush of a jump-off.

Orchidea, my first mare, stayed with me during all of that. She was always by my side, and now she enjoys her days in a vast green pasture, peacefully living with her equine friends. But I will forever carry the pain of what I put her through. I'll never forgive myself for it. After two intense weeks of preparation for a competition, Orchidea started limping. Months later, I learned the truth: a perforated tendon. For a horse, it's practically an aneurysm waiting to burst. One wrong move could have snapped it entirely. The veterinarians assured me that the injury was an old one, something that had been developing for a long time. But I had aggravated my obsessions had aggravated it.

Meanwhile, school continued its relentless rhythm of solitude and perfectionism. Riding continued too, but at least I had the animals, right? The flame inside me hadn't burned out. On the contrary, the more I learned, the more I wanted. And so, we made a significant investment in Deesse, the mare I brought with me here. From that moment on, I focused solely on her, and together we became something extraordinary. We placed fifth at the Italian Junior Championships, and our bond became unbreakable. I started to feel happier. Finally, school was coming to an end, and the dream I had



fought for years to achieve was becoming a reality: studying at one of the best universities in the world while obtaining great results in my sport.

But deep down, I knew that my approach to sports wasn't entirely healthy.

Every course became a mathematical equation. I tried to count every single gallop stride, to calculate the exact takeoff and landing distance for each jump. I began creating rigid plans to follow, adopting rituals I couldn't break, and listening to voices in my head that told me what to do. And so, my obsessions finally became two.

Here enters the present, the seven months of reflection I've undergone, and my letter of gratitude to David. I arrived here with the relentless desire to excel in everything I do, but on one hand, I've been failing miserably—and that is equestrianism. When I landed, I won a competition within a week, and from there, it felt like my chaotic mind was out of control. I became consumed by my old patterns: obsessing over distances, second-guessing every stride, and putting immense pressure on both Deesse and me. My horse began to feel my tension, and the stress I was imposing on both manifested in her refusals and my mistakes. It was no longer the joyful partnership it once was. I was riding, yes, but not with heartily calculations, anxiety, and the burden of my expectations.

It was David, with his calm directness, who finally broke through, as only a Belgian can do. Before that time, I considered myself a competitive athlete and very into the field. In November, after yet another refusal in competition, he told me

with brutal honesty, "You're not what you were before." Those words hit me harder than any fall from a horse ever could. But they were exactly what I needed to hear. He wasn't cruel or dismissive, he was clear, firm, and, most importantly, he believed in the possibility of starting over. David didn't see my mistakes as the end of the road; he saw them as the start of a new chapter. His words weren't a judgment but a call to action—a challenge to rebuild myself not as the anxious, obsessive rider I had become, but as the balanced, thoughtful athlete I could be.

David reminded me of what I had forgotten in pursuing success: that this sport isn't about perfection, ribbons, or adrenaline. It's about the bond, the trust, and the communication between horse and rider. He stripped away all the noise in my head and brought me back to the foundations, riding not for the accolades but for the love of it. He taught me to listen to my horse, to respect her needs, and to accept that progress isn't linear. Some days, it's about galloping forward; other days, it's about standing still and finding your balance. And I am sorry for all the messages I write to you, but it is my way to have control over the situation. I was not able to trust anyone, but now I feel I can.

One moment stands out vividly in my mind. It was late January, and I competed with Deesse after a while. We had struggled in the higher categories, and we decided to take a step back and enter a smaller class. David supported the decision without hesitation. "Ride well," he said, not "Ride to win." And I did. We didn't soar over towering fences or

set records that day, but we rode clean, smooth, and harmoniously. For the first time in months, I felt at peace. After the round, I bent down to pick up a dirty, discarded ribbon lying in the dirt. It wasn't mine, but it felt symbolic. I wrote on it later: "Because you agreed to start again. Because you embraced failure. Because you are human."

David, if you ever read this letter, I want you to know that you've done more than just coach me—you've reshaped the way I see myself, my horse, and my journey. You've taught me that being an athlete isn't about trophies or rankings; it's about resilience, humility, and the courage to embrace imperfection. You've shown me that it's okay to pause, to fail, and to rebuild. You've reminded me to love the process, to honor the partnership with my horse, and to ride for the sheer joy of it—not for the expectations I impose on myself.

So, thank you, David. Thank you for seeing me when I couldn't see myself. Thank you for teaching me that starting over isn't a weakness but a strength. Thank you for believing that there is always a way forward, even when the path feels lost. And thank you for reminding me that, above all else,



riding is about connection—not just with my horse, but with myself.

This journey isn't over, and I know I have a long way to go. But because of you, I'm no longer afraid to take the first step. And that, to me, is worth more than any ribbon.



Volunteering

continued from page 1

While we didn't get to interact with any patrons of the food pantry, it was a very fulfilling experience - getting away from campus to be able to make a good change in the lives of others - and we all had a wonderful time.

Thanks to my team and the Caltech Y for organizing MAD day!

The Caltech Y's "Make a Difference Day" is a shining example of the organization's unwavering commitment to community service and making a positive impact. The annual event mirrors the Caltech Y's overall goal of involving students and community members in being good global citizens.

Through "Make a Difference Day," the Caltech Y provides students with the opportunity to become actively engaged with local and global concerns. Students can volunteer with various organizations, participate in service projects,

and lend a helping hand to those less fortunate. Not only do those who receive the students' efforts reap the rewards of these experiences, but they also leave a lasting impression of civic responsibility and personal growth on the volunteers themselves.

As the Eaton Fire Collaborative moves forward with its vital recovery work, events like this become ever more significant. They are a means of reaffirming community bonds, strengthening resilience, and demonstrating the power of community action. By involving students and community members in helping their neighbors, the organization is contributing to long-term healing and renewal in the affected communities.

Caltech Y's dedication to community service extends well beyond "Make a Difference Day." Through its numerous programs, the organization allows students to make valuable service, both locally and internationally. From monthly Union Station dinners to international service trips, the



Caltech Y provides endless opportunities for students to make a tangible difference in others' lives. ALWAYS REMEMBER TO VOLUNTEER!

At the heart of Caltech Y's mission is the belief that together we can create lasting, positive change. The organization's unwavering commitment to this principle is evident in its unrelenting passion to serve and enhance the communities in which it operates. We can continue to inspire and mobilize the next generation of world citizens so that their impact will be felt for generations to come.

Dropbox

Victoria Davis
The Outside World

They dropped off a dropbox at the corner of Blanche and Michigan. It must have been around September? Maybe October? When they did it. I passed it walking every day. I passed a house, too, that had a blue sign with grey duct tape slapped across it. You could make out the name in white text that used to be visible on the sign underneath the duct tape and the year 2024 was still clear as day below the duct tape. Someone took black sharpie and wrote block letters that read "DEMOCRACY" across the duct tape. The modified yard sign now read Democracy 2024.

November came and went. The yard sign stayed for a while. But then it probably was put away in December around the holidays.

The dropbox still stayed though. I wondered why.

Everyday I pass it. A giant metal box with yellow, white, and blue. You can't miss it. It sits there. Visible. But no one takes it away.

Day after day, the dropbox sits next to the playground. Children and parents play, laugh, and weave through the playground. The dropbox is still there.

Dogs and their owners walk past. Little league teams practice baseball on the field. The dropbox is still there.

It's not being used as a dropbox. I wonder if it is now the gatekeeper of the park. But no one pays it any mind. People come and go.

December turned into January. The dropbox is still there. I wondered why.

The fires happened. Trees came down. Ash fell everywhere. But the dropbox is still there.

Maybe January was supposed to be when the dropboxes get picked up? But the fires happened and so pickup was delayed?

January turned into February. February into March. March into April. The dropbox is still there.

There isn't an election coming up, I don't think? I wonder why it's still there.

Day after day, scene after scene, the world goes on. But the dropbox is still there.

I wonder if it will stay there all year.

I wonder why they didn't pick it up.

Is it something we no longer need? A relic of a bygone era?

No one has picked it up.

Someone should tell someone that it is still there.

The dropbox is still there.

TS PMO: Places You Shouldn't Be

Tom Zhang
Humor

There's a lot of places around campus that no one has any reason to be at. However, the Google Maps algorithm somehow manages to place them all near the top of whatever category you select.

SuzieCakes

Perhaps you wanted to get your friend a birthday cake, and so you look up "cake" on Google Maps, and so you go to SuzieCakes to buy a big one but it's \$90 dollars (with tax and other fees).

Nine-inch cake for \$90 dollars??? At that point, I'd rather just spend it all on chicken nuggets.

Chicken Nuggets: An Order-of-Magnitude Calculation

If 40 chicken nuggets cost \$15 dollars, then with \$90 dollars we can get 240 chicken nuggets from McDonald's instead of a mid birthday cake. If there were 20 people, then everyone could enjoy about 12 pieces on average.

That sounds like a hell of a good time.

Or, if we wanted to buy some organic frozen nuggets

and bake them, just spend the 90 bucks and buy a few bags from Trader Joe's. If each bag is worth \$5, then with tax you could probably buy 16 bags (half of *few* times 10). Note that *few* is a number that's approximately 3.14, I think? And *few*² is equal to 10, roughly.

Since it's a few hundred grams per bag, 20 grams per nugget, so do some division to get that there are (*few*/2 times 10 nuggets) in each bag.

Then multiply the nuggets per bag by (*few*/2 times 10 bags) is (*few*²/4 hundred nuggets), which is 1000/4 due to the aforementioned property of *few*².

So, you can buy approximately 250 nuggets. Split them and put them into various ovens to bake.

Ultimately, you could get a LOT of chicken nuggets for 90 bucks.

Fantastic Sams

... is a hair salon with cheap prices, but there are only a few reasons you would go there:

1. You couldn't be bothered to look at any of the salons outside of walking distance
2. You have some great friends (enemies) who told you it's a good place to get a haircut
3. You are a masochist

(not unusual at this school)

There are numerous occasions in which I have seen a horrendous haircut on a friend and asked where they got it, and a surprising majority of the time, they said Fantastic Sams.

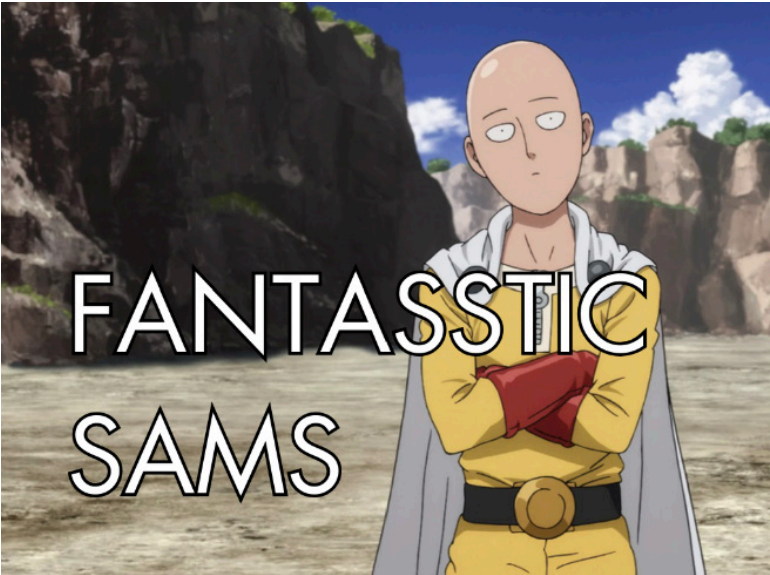
Does that mean that Fantastic Sams is always bad? No. Is my sample biased? Probably.

People mistakenly make 80% of their decisions based on 20% of the things they see, but if 80% of the bad haircuts I see are from the same hair salon, maybe I should go there 20% of the time?

After my first bad haircut in freshman year, I asked my friend who always has great haircuts where he gets his, and he said some place far away that costs at least a Benjamin. I'd prefer somewhere more affordable, like the Shaolin Temple. I heard they also feed you organic, washed vegetables there (the house dinner bok choy from a few weeks ago had dirt in it, by the way), but I don't think they'll have Wi-Fi when I get my haircut, so maybe not.

Like a dog always goes back to eating its own feces, I went back to Fantastic for my second haircut a few months later, just to see if it would be any different.

From the results of the ran-



Saitama from the anime One Punch Man, who is immune to bad hair days. (Credit: Madhouse & Tom Zhang)

dom sample and a P-value of 1 > 0.05, I fail to reject the null hypothesis that a haircut from

Fantastic Sams is always Fantastic.

The science of thought: philosophical insights into scientific practice

The Three Pillars of the Eleatic School

Camilla Fezzi
Column

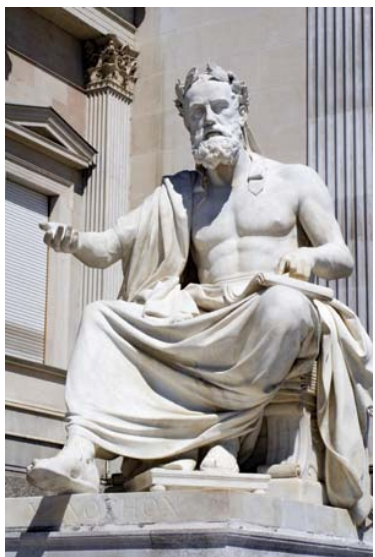
Eternal Truths and Illusions of Motion

The Mediterranean sun hung low over the horizon, casting long shadows across the olive groves. The whispers of ancient wisdom swirled in the air, carried by the voices of those who dared to challenge the beliefs of their time. It was an era of profound philosophical discovery—a crucible in which the ideas of being, motion, divinity, and truth were forged and tested. Among these daring thinkers stood Xenophanes of Colophon, Parmenides of Elea, and Zeno of Elea, their minds ablaze with questions that would echo through the ages.

Xenophanes of Colophon – The Poet-Philosopher of Eternity

There was a bold voice that dared to question tradition and reflect critically on the divine and the cosmos. That voice belonged to **Xenophanes of Colophon**, a wandering poet and pre-Socratic philosopher whose revolutionary ideas laid the groundwork for a new way of thinking. Born around 570 BCE in Colophon, an Ionian city, and passing away around 475 BCE, Xenophanes was a bridge between the rigorous rationality of Ionian thought and the metaphysical depth that would later define the Eleatic school.

Now, imagine Xenophanes as a visiting lecturer at Caltech. Would he fit in among the brilliant minds, the humorous pranks, and the quirky traditions of one of the world's leading scientific institutions? Absolutely. Let's explore his philosophy while sprinkling in some of the unique lifestyle quirks of Caltech, a place where the eternal truths of science meet some of the funniest antics on campus.



A Life of Wandering (and Maybe a Few Too Many Coffee Breaks)

Xenophanes lived an itinerant life, leaving his hometown of Colophon (possibly due to political unrest—classic ancient drama) and traveling across the Greek world. He settled in places like Zancle (modern-day Messina in Sicily) and eventually in Elea, where he became

an intellectual influencer for Parmenides and the Eleatic school. As a wandering rhapsode, Xenophanes recited his poetry and shared his philosophical insights, often criticizing the status quo.

Now, if Xenophanes were a modern-day academic, he'd probably be one of those eternally jet-lagged visiting professors, hopping between international conferences and Caltech seminars. Picture him sitting in a lecture hall at Caltech, sipping his nth cup of coffee from Red Door Café, lamenting the "eternal truth" that coffee is both his lifeline and his undoing. He'd probably be the type to lose track of time in a spirited debate with physicists about whether the universe is truly eternal or just a simulation.

The Critic of Anthropomorphic Gods

One of Xenophanes' most striking contributions was his critique of religion. He argued that humans created gods in their image, attributing human traits like jealousy, dishonesty, and greed to divine beings. He famously noted:

"Ethiopians imagine their gods as dark-skinned and flat-nosed; Thracians believe their gods have blue eyes and red hair. But if horses or oxen could paint, they would depict gods that look like horses and oxen."

Now, let's bring this to Caltech. Imagine Xenophanes observing the campus culture with the same critical gaze. He'd probably quip, "If Caltech students could create gods, those gods would have lab coats, perpetually messy hair, and an uncanny ability to solve differential equations while surviving on instant ramen." He might even find inspiration in the quirky traditions of "Ditch Day," where students come together to create elaborate puzzles and pranks. Perhaps he'd call it evidence of the human tendency to anthropomorphize creativity and chaos in equal measure.

God and Being: Eternal and Unchanging (Like Caltech's Honor Code)

For Xenophanes, the true nature of God was not the flawed, human-like deities of Homer and Hesiod but a singular, eternal, and unchanging entity. He described God as omniscient, immovable, and perfect—a being that "shakes all things with the force of thought alone."

At Caltech, this idea might resonate with physicists pondering the fundamental forces of the universe. God, in Xenophanes' view, could almost be interpreted as the ultimate equation—a universal constant that governs all existence. Imagine Xenophanes sitting in on a lecture about quantum mechanics, nodding sagely as the professor describes the immutable laws of physics. He might even chuckle at the irony that while Caltech students seek to decode the eternal truths of the universe, they also spend their weekends designing trebuchets to hurl water balloons across campus.



Knowledge: Just an Opinion (Unless You're a Nobel Laureate)

Xenophanes was a skeptic, emphasizing the limits of human knowledge. He famously said:

"No one has seen the certain truth, nor will there be anyone who knows it. Even if someone were to state the complete truth, they would not know they had done so."

This philosophical humility would fit right in at Caltech, where the pursuit of knowledge is a never-ending journey. Scientists there push the boundaries of what's known, often discovering that the more they learn, the less they truly understand. Xenophanes might even appreciate the student tradition of celebrating Pi Day (March 14) with elaborate pies and debates about whether π is truly as infinite as it seems. After all, pie (or pi) is a great metaphor for the endless quest for knowledge—delicious, circular, and fundamentally irrational.

Observing Nature: Fossils and the Science of Everything

Xenophanes was also fascinated by the natural world. He observed fossils of shellfish embedded in rocks and concluded that the Earth had once been submerged in water. He proposed that the sea was the source of all rain, rivers, and clouds. For his time, these were groundbreaking ideas, rooted in empirical observation.

Today, Xenophanes would probably feel right at home in Caltech's Division of Geological and Planetary Sciences, marveling at the Mars Rover data or debating plate tectonics over lunch at Chandler Café. He might even join students in one of their signature pranks—like filling a professor's office with sand and fossils to create a "prehistoric" workspace. After all, what better way to honor his love of Earth science than with a little geological humor?

The Legacy of Xenophanes (and Why Caltech Needs Him)

Xenophanes' philosophy of questioning assumptions, challenging traditions, and seeking deeper truths aligns perfectly with Caltech's spirit of innovation and inquiry. His skepticism about absolute knowledge would resonate with researchers who embrace uncertainty as a fundamental part of discovery. And his wit and critical eye would make him a hit at campus events like the annual "Pumpkin Drop," where students test the laws of physics

by dropping pumpkins from the top of Millikan Library.

In the end, Xenophanes' life and ideas remind us that the pursuit of knowledge is both a personal and collective journey—one that requires humility, curiosity, and a willingness to laugh at ourselves along the way. Whether in ancient Greece or on the campus of Caltech, the quest to understand the universe is an eternal adventure, filled with both profound insights and hilarious detours.

Parmenides of Elea – The Philosopher of Being, Eternity, and the Illusion of Change

Parmenides of Elea (circa 515 BCE – 450 BCE) was a monumental figure in the history of philosophy, someone who fundamentally reshaped how humanity thought about reality, existence, and the nature of truth. Born in Elea (modern-day Ascea in the Campania region of Italy) in Magna Graecia, Parmenides is considered the founder of **ontology**, the philosophical study of being. His work, encapsulated in his only known poem, *On Nature* (*Peri Physis*), stands as one of the most profound contributions to Western thought. With his unyielding logic, he declared that the universe is eternal, unchanging, and indivisible—assertions that would influence philosophy, science, and even modern physics.

So, how does this ancient philosopher connect to a modern institution like Caltech? Imagine Parmenides as a visiting philosopher at Caltech, presenting his radical ideas to students and faculty.

A Philosopher of the Static and Eternal (At Caltech's Coffee-Fueled Campus)

Little is known about his early life, but it is said that he was a student of Xenophanes of Colophon. Later, Parmenides founded the **Eleatic school of philosophy**, which included notable disciples like Zeno of Elea (famous for his paradoxes, as we will see later) and Melis-

sus of Samos.

Now, picture Parmenides pacing the halls of Caltech, surrounded by physicists and cosmologists debating the nature of the universe. While Parmenides would likely appreciate the institution's dedication to uncovering the fundamental truths of existence, he might be baffled by the sheer pace of modern academic life. "Why do you rush?" he might ask the students scrambling to finish problem sets before 11:59 pm. "The universe is unchanging. Your deadlines are but an illusion."

The Poem On Nature: A Journey to Truth

Parmenides expressed his philosophy in a cryptic and poetic work titled *On Nature*. The poem, written in hexameters, survives only in fragments, but its core teachings remain clear. The narrative begins with a **mythical journey**: Parmenides describes himself traveling in a chariot pulled by celestial horses, guided by maidens who lead him to the gates of truth. The goddess Dike (Justice) opens the gates, granting him access to two paths: the way of truth (*alētheia*) and the way of opinion (*doxa*).

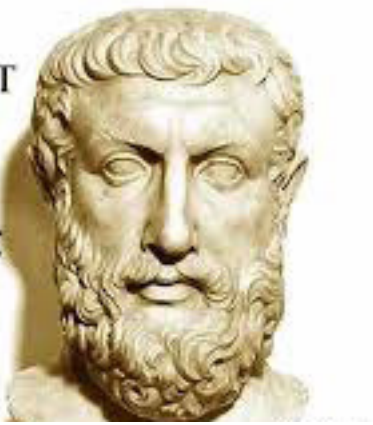
- **The Way of Truth:** Parmenides argues that *being* is eternal, unchanging, and indivisible. "What is, is. What is not, cannot be." For Parmenides, reality is a single, unalterable whole. Change, motion, and multiplicity are mere illusions created by the senses.

- **The Way of Opinion:** This path represents the deceptive beliefs of mortals, based on sensory perception. According to Parmenides, the senses lead humans to believe in a world of change and diversity, but these are illusions.

If Parmenides were to present his poem at Caltech, he'd likely captivate the audience with his vivid imagery and unrelenting logic. He might even find a kindred spirit in the physicists working on the-

"IT IS INDIFFERENT
TO ME WHERE I
AM TO BEGIN,
FOR THERE SHALL
I RETURN AGAIN."

-PARMENIDES



ories of spacetime, who argue that time itself is an illusion—a notion that parallels his rejection of change and becoming. During the Q&A session, however, he might have to fend off skeptical engineering students who demand practical applications for his metaphysical ideas. “Practical?” Parmenides might muse. “Truth needs no utility.”

The Concept of Being: A Timeless Constant (And Caltech's Honor Code)

Parmenides’ central claim, that *being* is and *non-being* is not, is a radical departure from earlier Greek thought, which sought to explain the natural world through change and flux. For Parmenides, the concept of nothingness was incoherent. Being, as he described it, is **eternal, immovable, indivisible, and finite**, often likened to a perfect sphere.

At Caltech, where many scientists study how to heal the world and find the beginning of the universe, Parmenides might find himself in heated debates about the Big Bang theory. He would likely insist that the universe has always existed, unchanging in its fundamental nature. “Ex nihilo nihil fit,” he would say—“Nothing comes from nothing.” His arguments might even resonate with physicists exploring the concept of a finite yet boundless universe, akin to Einstein’s theories of relativity.

Parmenides’ insistence on logical consistency would also align well with Caltech’s Honor Code, which emphasizes integrity and intellectual honesty. “The honor code is the path of truth,” Parmenides might declare while drinking a cup of matcha. “Deviation leads only to the way of opinion.”

The Illusion of Change

One of Parmenides’ most controversial ideas was his rejection of change and motion. To him, the world perceived through the senses was deceptive; true reality was unchanging. This idea directly contradicted Heraclitus, who famously claimed that “everything flows” (as we saw in one of the previous issues) and that change is the fundamental nature of reality.

At Caltech, Parmenides might find himself at odds with experimentalists who thrive on observing change, whether it’s the motion of particles in a particle accelerator or the evolution of stars. Imagine a scenario where Parmenides argues with a physicist about quantum mechanics. “Motion is an illusion,” he’d assert, while the physicist counters, “Tell that to Schrödinger’s cat!”

On a lighter note, Parmenides might struggle to reconcile his philosophy with Caltech’s lively traditions. For example, Inter-houses or ditch day—a campus-wide event where seniors leave behind intricate puzzles

for underclassmen—would confound him. “Why create such fleeting distractions?” he’d ask, only to have a student reply, “Because the puzzles bring us joy, and joy is eternal!”

Parmenides’ Legacy at Caltech: From Logic to Cosmology

Though ancient, Parmenides’ ideas remain deeply relevant to modern science and philosophy. His insistence on logical consistency laid the groundwork for **formal logic**, and his exploration of being influenced metaphysics, epistemology, and even modern physics. Concepts like spacetime curvature and the eternal nature of the universe echo his vision of a reality that is finite yet boundless.

If Parmenides were alive today, he might find a home at Caltech, where the pursuit of fundamental truths takes precedence over practical concerns. He’d be fascinated by the institution’s work in theoretical physics, particularly projects that challenge our understanding of existence and time. However, he might also be amused by Caltech’s quirky traditions, from pranks involving the Hollywood sign to the campus’s obsession with pie (both the dessert and the mathematical constant).

Zeno of Elea – The Master of Paradoxes and the Ultimate Troll of Ancient Philosophy

Ah, Zeno of Elea, last but not least. The man who turned logic into a weapon, reality into an illusion, and movement into an existential crisis. Born around 489 BCE in Elea (modern-day southern Italy), Zeno was a loyal disciple of Parmenides. But while Parmenides talked about the unchanging nature of existence, Zeno took it a step further—he weaponized logic to the point where even walking across the room became a thought experiment. Aristotle called him the **inventor of dialectics**, but let’s be honest, Zeno was also the father of trolling in ancient philosophy.

Zeno: The Charismatic Philosopher Who Could Confuse Anyone (Even Himself)

Zeno wasn’t just a philosopher; he was a showman. Plato described him as **"tall and handsome"**—the philosophical equivalent of a Greek god, but with better arguments. He was a devoted follower of Parmenides and, according to some sources, even his adopted son (and possibly lover—ancient Greece was complicated like that). Together, they traveled to Athens, where Zeno made a splash with his mind-bending arguments. But Zeno wasn’t just about philosophy. According to legend, he was also a political rebel who plotted to overthrow the tyrant of Elea. When captured, Zeno allegedly bit off his tongue and spat it in the tyrant’s face rather than betray his co-conspirators. Now that’s commitment—not just to philosophy, but also to being a complete badass.

Zeno’s Paradoxes: Making You Question Reality Since 450 BCE

Zeno’s fame rests on his infamous **paradoxes**, which were designed to defend Parmenides’ view that motion and plurality are illusions. Let’s explore some of his greatest hits—and imagine how they’d play out at Caltech.

1. Achilles and the Tortoise

The setup: Achilles, the fastest runner in Greece, races a



tortoise, the slowest creature imaginable. The tortoise gets a head start. Zeno argues that Achilles can never overtake the tortoise because every time he reaches the spot where the tortoise was, the tortoise has moved a little farther ahead. This keeps happening infinitely, so Achilles never wins.

At Caltech: Imagine a student trying to explain this to their professor during a physics lab. “You see, I didn’t finish the experiment because, much like Achilles, I couldn’t catch up to the timer on my stopwatch.” Meanwhile, the professor rolls their eyes and mutters something about calculus.

Modern twist: Zeno would be that guy in the quantum mechanics department who insists that particles never actually move—they just teleport to slightly different positions in space. He’d also probably create a puzzle that makes students chase a tortoise around campus, only to realize the tortoise doesn’t exist.

2. The Arrow Paradox

The setup: An arrow in flight is, at any given moment, stationary. Why? Because in that exact moment, it occupies a specific position in space and isn’t moving. If every moment in time is like this, then the arrow never actually moves—it just exists in a series of still frames.

At Caltech: Zeno would make a great guest lecturer in the film studies department. “Reality is just a series of frames,” he’d argue, while showing a slow-motion video of a cat knocking over a coffee mug. The students would applaud, not because they understood, but because they’re too caffeinated to care.

Modern twist: Zeno would absolutely thrive in the age of GIFs and video loops. He’d probably break the internet by posting a loop of an arrow frozen mid-flight with the caption, “See? Told you so.”

3. The Stadium Paradox

The setup: Imagine two rows of objects moving past each other in opposite directions. Zeno argued that depending on your perspective, the objects seem to move at different speeds—or not at all. This paradox challenges the very concept of relative motion.

At Caltech: Zeno would love the chaos of lunch hour at Brawn. He’d sit in the middle of the chaos, watching students dart back and forth between

tables, and declare, “None of you are actually moving. You’re all just illusions!” Then he’d steal someone’s fries because “ownership is an illusion too.”

Modern twist: Zeno would be the guy who gets into arguments about whether time is real or just a social construct. He’d probably troll everyone by saying, “Time doesn’t exist, so technically I’m never late.”

Zeno at Caltech: The Ultimate Prankster-Philosopher

If Zeno were alive today, he’d absolutely thrive on Caltech’s campus. His paradoxes would make him a hit in the math departments, where professors would use his arguments to teach concepts like infinite series and limits. Meanwhile, students would embrace his love of logic and mischief, inviting him to join their pranks. **FOR EXAMPLE!**

• **Ditch Day Contribution:** Zeno would design a puzzle where teams have to solve infinite regressions to open a locked door. Every time they think they’ve solved it, they’d find another layer of complexity. The final prize? A note that says, “The journey was the destination all along. Love, Zeno.”

• **The Great Caltech Tortoise Race:** Inspired by his Achilles paradox, Zeno would organize a campus-wide race where students chase a robotic tortoise. The twist? The tortoise moves slower and slower as you approach it, and it’s programmed to never actually be caught...or maybe program directly the ones in the pond 🐢

• Zeno’s Office Hours:

Imagine students showing up to Zeno’s office hours for help with their philosophy papers, only to be greeted with cryptic questions like, “If you never arrive at the door, are you truly here?” Then he’d close the door and walk away, leaving them to ponder their existence.

The Legacy of Zeno: Eternal Confusion and Infinite Laughter

Zeno’s paradoxes might have started as serious philosophical arguments, but they’ve become much more than that. They’ve inspired centuries of debate, advanced mathematical theories, and even influenced modern physics. But perhaps more importantly, they remind us to question our assumptions and find humor in the absurdity of life.

At Caltech, Zeno would be a living legend—the philosopher who turned logic into a game, reality into a riddle, and movement into an illusion. Whether he’s debating quantum mechanics, designing impossible puzzles, or stealing someone’s lunch “because possession is a paradox,” Zeno would embody the curious, mischievous spirit that defines both philosophy and science.

So the next time you’re rushing across campus, late for a lecture, just remember: According to Zeno, you’ll never actually reach your destination. But that’s okay—because, as he might say, “Getting there was never the point.”



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Caltech Theater Club

The Day I Died

Raquel Maldonado
Inner Voices

I died, and it wasn't from pain, or old age, or illness. I died, and it wasn't from mourning, from ending, from longing, from joy. I died, and it wasn't sadness, hate, work. I died, and it wasn't in past lives or future lives. I died, and it wasn't from anguish, loneliness, bitterness. I died! I died of being me.

Walls built with high walls and rough stones died in me. Walls that were so real that I thought they were mine were bigger than the Great Wall of China. Walls of prejudice, dogmas, thoughts, beliefs, certainties, and absences. Walls that I had to climb for miles and miles, that went as high as the moon. Years and years climbing the walls of certainties, and when I arrived and jumped to the other side, I saw that there was no other side.

Walls that were like cancers were installed in me. It was re-

volting; it seemed to be my organism, myself, but they were just walls getting in the way of life's harvest. Someone put walls there on some distant day and said, "You have walls, and they are like your heart; you can only live with them." Walls of great and spectacular illusion.

When I dragged myself between them, trying to climb, trying to understand, trying to notice, trying to think, "Walls, why do I have them? Why do they exist?" Walls of ancestral sovereignty. Pure concrete walls of fear, paralysis, resentment. Pure icebergs of tears. Tears uncried, hardened, that turn to iron and hurt. They hurt so bad, I thought living with walls was life. I looked around, not noticing the others with walls. Do they disguise themselves? Could it be that I come from the planet of walls made of icebergs of tears?

Then one day, before I died, I realized that it was a wall, but it might not be. I could just be

someone who carried walls. Could I break down these walls? Wouldn't it break me? I couldn't kill me. I never had suicidal thoughts. I loved life, even with the walls. Sometimes I put some plants on the walls, or painted them colorfully. It was no use. The walls are megalomaniacs. It's not the paintings that soften them. They are not. They were not.

Was I attached to the walls? I've never had a knack for masochism. I wanted to live without them, being them. My God. What a contradiction. Every day I asked myself, "Are you really going to live like this?" And I answered myself, "I'm stuck here, there's no way out, do you see one?"

I was born on walls, and walls were born in me. Just like language, when you are born and learn it, you think you are that. I'm Portuguese. I'm English. I'm Korean. I'm Chinese. I am what I was taught to be—who I was taught to be—until I overtook my first language: anger.

Beyond the walls—me being me—I, like dragons, spit fire. I was born in the kingdom of dragons, and everyone spat fire, so I spat too. *After all, I'm a dragon*, I thought. When the fire I spat began to burn the others, I didn't care, I thought that was it. Maybe I felt something was wrong, but after all, the dragons in my kingdom spat flames at me—it's an accustomed pain.

One day, while I was spitting fire, I cried and could see that the tears had put it out. So I understood that when the crying comes, the fire goes away. From then on, I became fireless and stopped being a dragon altogether. Every time I wanted to spit volcanoes, rivers gushed out of me. The sad thing is that since I'm no longer a dragon, my kingdom doesn't want anything to do with me anymore. And there I went away with my walls inside.

A while later, already far away, I discovered that walls are not me; it was then that I

died and was reborn like a rose. I faced the darkness of being buried in the earth, not knowing if I was alive or dead. I became a sprout that struggles to get out of the ground, get air, and go toward the light. But I only did this when I died, and dying is harder than being reborn.

Because I came to understand that the giant walls of liquid concrete that permeated me were oceans of tears of pain, I had to remember every ounce of pain. I cried red tears from the death-blood of not being giant walls and died. I died; I was reborn; I went to the light; I am in it.

I am not a dragon, nor a wall. I no longer belong to their kingdom. Today, I define myself as the eagle that pulls its feathers and breaks its beak, thinking that it had reached its end. Months later, new wings and powerful beaks are reborn, and I am rejuvenated.

I fly high and alone.
I fly far.

My Dream Lab: How AI Transformed My Self-Analysis

Raquel Maldonado
Opinion

I analyzed my dreams for two years using AI, and this is my testimony.

My interest in dreams began when I was a teenager, and my father, after graduating in Civil Engineering and Computer Science, decided to enroll in a Psychology course to understand the human psyche. I lived with him, and there was a clear rule in my house—no one could watch TV, and it was impossible to access any type of electronic device (only adults could). All I could do was read. I did nothing but read.

I read a lot of books: books about programming, engineering, philosophy, psychology. Since then, I have been fascinated by psychology, especially Carl Jung. While Sigmund Freud, a pioneer of psychoanalysis, was more interested in healing traumas through dream analysis and free association, Jung focused on personal growth and the integration of contradictory aspects of the personality to achieve psychological completeness. For Freud, dreams can represent neuroses and repressed pain. For Jung, dreams represent symbols of our psyche, which are a language encoded in images.

Jung captivates me more than Freud because he studies the power of myths. I like fiction more. Both began studying people's unconscious through hypnosis, with Freud focusing more on neuroses, guilt, and sexuality. Jung, who was once a disciple of Freud but later found his own path, went further and more profound. The main difference between Freud's and Jung's studies lies in their conceptions of the unconscious and personality development.

I've read many psychology books and have been in therapy for over 15 years. My father always told me to write down my dreams every time I wake up, before I do anything else. That's what I always do, but for the past two years, I've been using technology to combine it with my self-study. The tool fascinated me as soon as ChatGPT was launched. I thought: *Will this tool be suitable for such a subjective study?* After all,

it wasn't a program I wanted to code or some specific question with a straightforward answer. It was self-analysis. Since 2022, I've been writing down and analyzing my dreams with AI. Sometimes, I recall two or three dreams a night. Yes, I am a dream factory. I believe that, because I developed the habit early on, I have this facility. *Usus promptos facit*: Practice makes perfect.

I use three AIs to analyze my dreams: ChatGPT, Claude, and Gemini. All three tools are very good, and I have long conversations with each AI to best develop my analyses. ChatGPT is the most natural. Claude is also great, but a little more technical. And Gemini, in my opinion, is the best because it doesn't miss important details, such as the blue color of my dress in the dream. I know, for you, future and already scientists, it seems crazy, but the study of our own psyche, the self-understanding of our traumas and neuroses, is crucial for you to live well.

I will give an example of a short dream because I usually include a lot of details, but in this case, I didn't remember much. Let's see how the AI analyzed it:

The prompt I made for the AIS: *"Analyze these dreams from a Jungian perspective."*

First dream: *"I dreamed of a swimming pool that looked like a kind of lake, and I kept looking at it. Then, a horseman passed by in the pool, guiding a horse. One underwater submerged and another out of the water. Suddenly, he jumps out of the 'pool' and pulls the horse from underwater, which jumps out and leaves with a collar."*

Second dream: *"I dreamed of riding a winged horse. A feeling of freedom."*

The AI responses:

Claude
From a Jungian perspective, these connected dreams contain rich symbolic content related to the unconscious mind and personal transformation.

First Dream Analysis
The Pool/Lake:

- Water represents the unconscious in Jungian psychology
- The ambiguous nature (pool that looks like a lake) suggests a threshold between the conscious (structured,

man-made pool) and unconscious (natural lake)

The Horseman and Horse:

- The horse is a powerful archetypal symbol representing instinctual drives, vitality, and natural power
- The horseman represents conscious control or direction of these instinctual energies
- Their positioning (one submerged, one above water) symbolizes the division between conscious and unconscious aspects of the self

The Emergence from Water:

- This represents the integration of unconscious content into consciousness
- The horseman pulling the horse from water symbolizes reclaiming or acknowledging repressed instinctual energies
- The collar signifies that these wild energies are now contained and directed by consciousness

Second Dream Analysis
The Winged Horse (Pegasus):

- Represents the transcendent function in Jungian terms - the union of earthly instinct (horse) with spiritual aspiration (wings)
- Suggests successful integration of the unconscious content from the first dream

The Feeling of Freedom:

- Indicates psychological liberation that comes from integrating previously unconscious aspects of the self
- Suggests you've achieved a new level of self-understanding and wholeness

Connected Meaning
These dreams appear sequentially related, telling a story of psychological development:

1. First, recognizing the division between conscious/unconscious (the pool/lake boundary)
2. Witnessing the integration process (emerging from water)
3. Experiencing the freedom and transcendence that comes from successful integration

This progression aligns with Jung's concept of individuation - the process of becoming more whole by integrating unconscious aspects of the psy-

che.

ChatGPT
First Dream Analysis

- **The Pool as the Unconscious:** The body of water resembles a **lake** rather than a regular pool, suggesting a **deep unconscious realm**. In Jungian thought, water often represents the **collective unconscious**—the vast, mysterious part of the psyche where symbols, instincts, and hidden knowledge reside.
- **The Horseman as the Ego or Guide:** The horseman (a figure in control of horses) may symbolize a guiding force—perhaps your **ego consciousness** or an inner guide (a psychopomp) navigating between different levels of awareness.
- **The Dual Horses (One Submerged, One Above Water):** The horse is a **powerful symbol of instinct, energy, and freedom**. The submerged horse could represent **repressed or unconscious energy**, while the horse above water could symbolize **conscious or accessible vitality**.
- **Emerging from the Water:** The act of the horseman pulling the submerged horse out could symbolize **integration**—bringing something from the unconscious into conscious awareness. This could relate to **personal transformation**, reclaiming a hidden strength, or confronting something previously buried in the psyche.
- **The Collar:** The fact that the horse leaves with a collar suggests **taming or controlling instinctual forces**. Perhaps this dream reflects a process of gaining mastery over **powerful emotions or instincts**.

Second Dream Analysis

- **The Winged Horse as a Spiritual Symbol:** The winged horse is a **transcendent image**, often associated with **Pegasus**, which in mythology is linked to divine inspiration, poetic creativity, and a bridge between the earthly and the celestial.
- **Riding It as Mastery of Spiritual Power:** In contrast to the first dream (where control is emerging), this dream suggests you have **fully embraced your in-**

stinctual and spiritual energies, allowing you to experience freedom and transcendence.

- **Feeling of Freedom:** This suggests that an **internal integration** has occurred—where the unconscious material from the first dream has been successfully incorporated, leading to an experience of psychological liberation.

Possible Psychological Meaning

These dreams could represent a **process of individuation**—moving from **unconscious struggles (the submerged horse) to conscious mastery and transcendence (riding the winged horse)**. Instinct may be **transformed into spiritual or creative energy**, reflecting personal growth, emotional integration, and a rising above old limitations.

Gemini
Let's analyze these dreams from a Jungian perspective, focusing on the symbolism and potential archetypal themes.

Dream 1: The Submerged Horse and Horseman

- **The Swimming Pool/Lake:**
 - ◊ In Jungian psychology, water often symbolizes the unconscious. A large body of water like a lake suggests the vastness and depth of the dreamer's unconscious. The fact that it resembles a pool may indicate a contained, somewhat artificial or constructed aspect of the unconscious.
 - ◊ The act of "looking at it" suggests the dreamer's conscious mind is becoming aware of and contemplating their unconscious processes.
- **The Horseman:**
 - ◊ The horseman can represent the animus (in a female dreamer) or the self (in any dreamer). The animus is the unconscious masculine side of a woman, representing reason, action, and assertiveness. The self is the totality of the psyche, encompassing both conscious and unconscious aspects.
 - ◊ The horseman in the water shows that this aspect of the psyche is currently operat-

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Courses That Don't Suck

Tom Zhang
Opinion

Here are some classes I found fun, even if they're not everyone's idea of a "good class." While most of the Core and other courses are designed just to introduce the fundamentals of a subject, the ones below stood out for being especially engaging.

Bi 1 — The Great Ideas of Biology: Rob Phillips

I've actually never been enrolled in Bi 1, I just showed up to most of the lectures because it was very interesting to see what was up.

The best part of Bi 1 is that it is not a biology course at all.

In Bi 8 and Bi 9, you are basically learning how to eat the book, just like in AP Biology in high school. Sure, if you have made it to Caltech, you probably know how to eat a book, but as Ben Franklin (a recurring character within the class) said, "Eat not to dullness."

Near the end of the course, the topics become slightly more intense, stepping into an introduction to thermodynamics and statistical mechanics. However, they are presented in a way that is completely understandable for any frosh with no background knowledge.

Rob mentions that in an ideal Caltech, frosh-year core should just be playing around and exploring topics. What is the point in memorizing ten things per week that you will forget after the final, if you could deeply learn one thing every week and remember it forever?

Some people don't enjoy Bi 1, perhaps because they have other things that they value more, but if you try to enjoy it, it's actually quite interesting.

CS 179 — GPU Programming: Al Barr

... is kind of an insane class. Al Barr will give the lecture for about 15 minutes, and then go on some insane tangent and tell you all these insane things from the pre-USSR collapse world, such as:

- A 300-year research plan to end global warming with GMO trees
- Being David Kirk's PhD advisor
- Having a rare chronic illness which means he can only eat protein powder
- Telling the Caltech Cosmic Cube team that it won't be able to add floats

Then there will be 20 minutes left in class, so you might as well ask a question like, "Are you still eating the protein powder?" or "How has your illness changed your outlook on life?" And from that, you can learn quite a lot about living, but I guess the GPU programming part of the class has gone out the window.

As one TQFR from 2022-23 put it, "I went to the first three lectures and realized that material was never actually going to be taught in the lecture..." This person is correct that material is not taught in lecture, but considering that everyone skips every lecture, what difference does it make whether the material is taught in lecture? "If a tree falls in lecture and no one is at lecture, will it be on the final exam?" is the correct question to ask.

CS 101 — Introduction to Computational Social Science and Data Science in Python: Jedi Tsang

This term's CS 101 is not to be

confused with the other CS 101, Pedagogy in Computer Science.

So far, the class has been somewhat interesting, but certainly useful with the application of the Pandas Python library. If you don't know anything about programming, "Pandas Python library" probably sounds really funny.

Jedi often brings snacks to class like Hello Panda, and the homework is relatively fun. Later on in the course, there will be some more technical data science ideas introduced, as well as some interaction with the ChatGPT API, which I'm really looking forward to.

CS 42 — Computer Science Education in K-14 Settings: Claire Ralph and Adam Wierman

In this class, you design your own short lesson for teaching elementary/middle schoolers some CS concept, and then apply it by going to a local school and teaching it.

I originally thought it would be more of a lecture-style setting with perhaps 30-60 minutes to teach a concept, but it's more like a science fair where the students are walking around and will sit down for 5-10 minutes to do the activity.

In my group, we designed an activity where students learn to encode letters with beads to make the phrase shorter, and at the end, they get to make a bracelet. There were some flaws, like how time-consuming it is, but those are just small issues that can be ironed out.

Bi 1C — Biology Through the Algorithmic Lens: Lior Pachter

Unfortunately, this class is a lottery class in the winter term, but fortunately for me, I got in when the course first came out!

I think this glazer on TQFR put it quite well:

"Bi 1C is to the catalog what a deep cut is to an album, like 'The Story of Us' on Speak Now. If I could take it twice, I would!"

If the faculty invented a 1-quarter course called Bio 2C, I would enroll in that course before I enroll in my hum, which would run out of seats faster than a Taylor Swift concert.

My favorite lesson was either the one about tiling a XXX with YYY or the one about AAA cycles and the BBB Graph.

I also liked the first lesson where we learned that 'CCC are just DDD that went back in the water.' I also enjoyed learning fun facts like how Person 1 and Person 2 co-taught a course at Caltech and Person 3 (likely) drew the first math graph. If you are curious what those hidden words are, you just need to take the class. The only problem with Bi 1C is that not everyone who wants to take it can.

The seats are limited because it's presentation-based. I think a few more students could fit if the final project was more like a gallery/peer review and the midterm presentations continued through the second half of the term."

There's really nothing more to say after that, so you should probably take it.

PVA 62 — Drawing and Painting: Jim Barry

Drawing and painting were never really my strong suit, but I think I improved a lot in this course, which is offered every term.

In a talk by Kip Thorne where he was trying to sell his poetry and art book, he mentioned that the best course he took at Caltech was "Sketching for Engineers" or some variation of that, and that it's very useful for scientists to know how to draw. I took that advice and signed up for Drawing and Painting because I've always felt bad about how I could only draw stick figures.

The strange thing about this class is that Mr. Barry will never tell you what to do and rarely gives you advice on what to do better unless you ask for it. He told me that lots of students come in expecting to do assignments like hammers looking for a nail, but he's found that it's better to have students learn to be creative and explore their own interests.

It's a rare experience to be able to just stop thinking about problem sets for three hours straight in the middle of the week, and I was very surprised the first time I went to class. If you want to come to class, you don't even need to enroll: just show up from 7-10 PM on any Tuesday or Wednesday.

(By the way, the nude model usually shows up around 8:30-9:00.)

What Really Matters?

In most situations, many students, including myself, are simply playing the GPA maximization game. It's not bad to solve this optimization problem, since companies and grad schools seem to care a lot about whether you know how to hand in homework on time, but we do so at our own risk.

Good enough is better than perfect. Not every 0.33 step down in some class used in computing your mean cumulative GPA is worth losing sleep over.

If you are actually about to fail, then obviously don't listen to me, but most of the time, when people say they are about to fail, they mean they are going to get a B.

Past some age, it just becomes too difficult to learn as fast as you did when you were younger. Every second spent maximizing your grade in the class you hate is a second not spent on learning interesting things.

Dream Lab

continued from page 9

ing within the unconscious.

• The Horse:

◊ Horses are powerful symbols of instinctual energy, vitality, and drive. They can also represent the libido.

◊ The fact that one horse is submerged and the other is above water suggests a conflict or tension between conscious and unconscious drives.

◊ The submerged horse could be a representation of repressed instincts.

• The Action of Pulling the Horse Out:

◊ This act signifies a conscious effort to bring unconscious content into awareness. The horseman, representing an aspect of the psyche, is working to integrate the submerged, instinctual energy.

◊ The horse that jumps out and leaves with a collar could symbolize the integration of the instinctual energy into the conscious personality, but also that it will be controlled or directed. A collar is a symbol of tamed power.

Dream 2: Riding a Winged Horse

• The Winged Horse:

◊ A winged horse, like Pegasus, is a powerful symbol of transcendence, spiritual aspiration, and the integration of instinct and intellect.

◊ Wings represent the ability to rise above earthly limitations and achieve higher levels of consciousness.

◊ Riding:

◊ Riding the winged horse signifies a sense of mastery and control over one's instinctual drives.

◊ Feeling of Freedom:

◊ This feeling indicates a successful integration of unconscious content and a sense of liberation from inner conflicts. It shows a feeling of personal growth.

Jungian Interpretation:

• These dreams suggest a process of individuation, the psychological journey toward wholeness. The first dream depicts the initial confrontation with the unconscious and the struggle to integrate repressed instincts. The second dream reflects a successful integration and a sense of liberation.

• The first dream shows a process of bringing the unconscious to the conscious. The second dream shows the result of that process.

• The transition from a submerged horse to a winged horse indicates a transformation of instinctual energy into a more refined and spiritual form.

• The horse being colared could be a sign of a necessary control, or a fear of letting the instinct run wild. It is important to consider if this control is healthy or restrictive.

• The progression from a lake-like pool to a winged horse suggests a movement from the depths of the unconscious to the heights of spiritual awareness.

• Consider the dreamer's current life situation. Are they facing inner conflicts or seeking personal growth? These dreams may be reflecting these inner processes.

Key Jungian Concepts:

• The Unconscious: The vast realm of thoughts, feelings, and memories that are not readily accessible to the conscious mind.

• Individuation: The process of psychological development that leads to the integration of the conscious and unconscious aspects of the self.

• Archetypes: Universal, primordial images and patterns of behavior that reside in the collective unconscious.

• Animus: The unconscious masculine side of a woman.

• The Self: The totality of the psyche, encompassing both conscious and unconscious aspects.

These examples were just to illustrate. I usually then delve into the elements by researching myths and symbols. For example, in these dreams, I studied in depth the symbols and myths of horses in different cultures. I tried to see where the horse had been part of my life, and I stitched together the narratives. In this case, when I was little, I lived in a house with many horses in front. This may be showing something within my psyche. We need to think about the feeling they brought me. In this case, they brought joy; I liked to see them through the window. So, I delved deep into the image of Pegasus in Greek mythology. The lake, the mirror, the knight. It is simply fantastic to emerge in the "fiction" of our own being, to stitch together the patchwork of our improvement. I remember that during the pandemic, I had recurring dreams of death and people dying around me.

Jung said in one of his books that when he analyzed people shortly before World War II, he could "predict" that the war was coming. It was all in the subconscious of the people and the community. And it is not magic because magic does not exist. It is simply the subtleties of the social environment in which we live, and we absorb narratives, and successively, our dreams bring us precise images of this. Dreams often emerge as answers to studies or problems that we are experiencing. Dmitri Mendeleev provides such an example, having visualized the periodic table elements in his dream after a few days of thinking about them. Einstein said that he (day)dreamed about sliding along a ray of light, an image that later inspired him to develop the theory of relativity.

These cases illustrate how the dream state can allow creative connections that escape conscious and rational thought. That is why I study my own dreams. Some ideas have already emerged from there. I did not know what decision to make, so I made them based on a dream, and some answers came from this subjective world.

It is cool, fun, and profound when you ask the AI to analyze your dreams. I had this experience not long ago, and I can say that it was fantastic. Afterward, I shared it with my therapist, who was also impressed. The insights, ideas, reflections, and changes that they can bring to our lives are worth a lot. After all, our choices and patterns are always based on our minds, and everything emerges from there.

Caltech Wildlife: Bird Immigrants

Jieyu Zheng
Column

Everyone knows Los Angeles is a huge melting pot of human culture, but did you know it's also home to many animals from around the world?

Pasadena alone has a surprising number of foreign bird species. Look closely and you can spot these feathered visitors daily at Caltech—including some that are endangered. This week's wildlife column is about these special bird immigrants. *(Some photos were taken in the greater Pasadena area, but all the birds mentioned can be found on or near campus if you're lucky!)*

Where there's water, there's mallard. On a hot afternoon, you might see a mallard duck floating in the Caltech Pond or Turtle Ponds. They rest beside the turtles or dip their heads into the water to feed. Mallards came from Eurasia, but they've made their career here. In 1963, one mallard flew 21,000 feet over Nevada, setting the North American avian altitude record to date (<https://web.archive.org/web/20140209231019/>

<http://archive.audubonmagazine.org/birds/birds0011.html>).

Many birds in Pasadena were brought here as pets. For example, the Indian peafowl sometimes wanders around the baseball field on South Campus. These peafowl were first brought to Arcadia by a man nicknamed "Lucky Baldwin," and their descendants now live across Pasadena. You might see them in San Marino, "meowing" loudly from the mansion rooftops. Another Asian bird is the red-whiskered bulbul, named after their red cheek patches. They sing distinct and melodic songs – every time I see or hear them, it reminds me of home.

Do you also know that at least four types of parrots are present around Caltech every day? Originally from Central and South America, they follow the routines passed down from their rainforest ancestors. At sunrise, they gather in the trees near the Cats graduate residence, waking up nocturnal students with screaming baby cries. Once the morning vocal warmup is over, the par-

rots fly off to search for food in the city. In the evening, they return in small groups—either in duos of life partners or trios of parents and child—flying with short, quick wingbeats. If you're walking across campus at sunset, take a moment to look up. Their loud calls and swift flights are a daily sign that the day is ending and it's time (for you too) to head home.

As funny and silly as they look and sound, the background story of the parrots is a sad one. Red-crowned and yellow-headed amazons, the two most common parrot species seen around Caltech, were once prized pets. People loved their bright feathers and their uncanny intelligence to mimic human speech. As a result, wild populations were devastated by poaching and habitat destruction, which pushed their native populations in Mexico near extinction. While beloved in captivity, these parrots were demanding companionship from conspecifics, producing calls up to 120 decibels, comparable to a jet engine. These sounds, which help them talk to each other in the forest, don't work well in



a human home. Many owners couldn't handle the noise and set the birds free.

Fortunately, Los Angeles has many fruiting trees and plants that aren't native either, so the parrots found enough food to survive and reproduce. Over time, they formed stable flocks of thousands in the city. Today, there may be more of these parrots living in LA than in their native habitats, where they are still endangered.

Pasadena has become a rare place where birds from all over the world can live side by side. Biologists are amazed by how well they share space and how

this mix came to be. These birds didn't come here by choice—people brought them, often for selfish reasons. But now, generations have hatched and fledged in Pasadena, forming communities that might even proudly name themselves LA parrots (or Caltech parrots, for those who love the trees in the Cats Garden).

If Pasadena hadn't made space for them, these birds could have disappeared forever. So let's treasure this living melting pot of cultures and creatures. It is what makes this place so special.

All photos courtesy of Jieyu Zheng.



I'm Still Here

Raquel Maldonado
Culture

I'm Still Here is a 2024 Brazilian historical drama directed by Walter Salles (*The Motorcycle Diaries*, *On the Road*, *Central Station*) that won Best International and was nominated for Best Picture and Best Actress in a Leading Role at this year's 97th Academy Awards. The film's story is based on a memoir (*Ainda estou aqui*) by Marcelo Rubens Paiva, telling the story of his family. It is set in the 1970s, in Rio de Janeiro, during the dictatorship that lasted 20 years in Brazil. The story portrays a beautiful family consisting of Rubens Paiva (played by Selton Mello), Eunice Paiva (played by Fernanda Torres), and their five children. They are a free, loving family who know how to live life, live near the sea, go to the beach every day, dance, have fun, and are truly happy. When you watch the film's first act, you connect with the characters and feel like you're part of the

family, or at least you want to feel that way. There is peace, there is humanity, there is freedom. In their home, a new possibility of another country pulsates. A country that everyone wants to be a part of, reflecting a time when art was flourishing against political repression. Musical and film movements were emerging, such as Tropicalia (a counterculture movement) and Cinema Novo (a film movement in which films were more realistic and less theatrical). Despite censorship, the culture of democracy still lived on in this family's home. It is a vibrant and genuinely alive home.

They lived under this dictatorship until Rubens Paiva was taken to testify by agents of the military regime, and so the family's life began to fall apart. The events brought tension, fear, and silence—not knowing where her husband was, Eunice Paiva was forced to reinvent herself and keep the family together. The audience experiences limbo. Eunice does not cry; she shows bravery and has to care for herself and five children alone. What the characters don't say in words, they

express through their looks and gestures. It's as if we, the audience, also have to remain silent. Fernanda Torres acts brilliantly. She is resilient and powerful, and you quickly understand why she won the Golden Globe for Best Actress and why the Academy nominated her. The film is fantastic, poetic, sad, beautiful, and extraordinary. With her resilience, fear, and insecurity, Eunice Paiva protected her children until the end. A wife and mother, a true heroine. It's no wonder that the film received a 10-minute standing ovation at the Venice festival. It's a real-life feminist tale.

The focus of the film is not the dictatorship itself, but the story of a family affected by it and of a woman who has the profound capacity to fight for her family. *I'm Still Here* is an unflinching portrait of emotional turmoil, a beautiful film worth watching that delivers a powerful message: we cannot lose the memory of these moments of pain in which humanity lived through wars, dictatorships, and scarcity to avoid repeating them. And that art, joy, and freedom of spirit are what set us free.



The California Tech

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