The California Tech

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Caltech Joins Lawsuit Suing NIH Over Funding Cuts

Emily Yu
News

Caltech joined several other leading American research universities in a lawsuit against the National Institutes of Health (NIH). Filed on February 10, the lawsuit challenges what it describes as "a flagrantly unlawful action... that, if allowed to stand, will devastate medical research at America's universities."

On February 7, the NIH announced that indirect costs for all new and existing grants would be standardized at a rate of 15%. When a grant is awarded, direct costs are how much is spent on the research itself, while indirect costs are an additional percentage added to cover overhead and administrative expenses. Caltech received $62M in NIH awards in Fiscal Year 2024, with $18.76M being indirect costs. Since 1965, institutions have been able to negotiate their indirect cost rates for NIH grants, which have averaged between 27% and 28% over time.

In Fiscal Year 2023, the NIH spent over $35B on grants. Approximately $26B went to direct costs, while $9B went to indirect costs. The NIH has stated that the agency "is obligated to carefully steward grant awards to ensure taxpayer dollars are used in ways that benefit the American people," and that the standard 15% rate "will save more than $4B a year."

A federal judge temporarily blocked the cuts on February 10 after two other lawsuits were filed—one by 22 state attorneys general and the other led by the Association of American Medical Colleges. Following a two-hour hearing on February 21, the block was indefinitely extended until the judge issues a new ruling, for which no date has been set.

At the hearing, the plaintiffs of the three lawsuits argued that the NIH's decision violates the separation of powers and congressional appropriations law. "This is not cutting down on grant funding," said Brian Lea, an attorney for the NIH. "This is about changing the slices of the pie, which falls squarely within the executive's discretion." The NIH also justified the 15% rate by stating that indirect costs are "difficult to oversee." However, the plaintiffs highlighted the rigorous negotiation process and audit schedule that verify the proper use of funds.

The plaintiffs also argued that a standard 15% rate would cause "irreparable harm" to medical advancements and university research. John Bueker, an attorney for the plaintiffs, cited potential consequences including reduced acceptances of graduate students and halted clinical trials, which are "a last hope for a lot of people." The lawsuit that Caltech joined states:

> "Medical schools, scientific research institutes, and other grant recipients across the country have structured their programs and development of physical infrastructure assuming that the substantially higher indirect cost recovery rates would remain in place, and that any changes to those rates would be based on actual changes in cost... Even at larger, well-resourced institutions, this unlawful action will impose enormous harms, including on these institutions' ability to contribute to medical and scientific breakthroughs."

Adam Unikowsky, another attorney for the plaintiffs, noted Caltech's $200M Chen Neuroscience Research Building which is expected to be partly paid by NIH indirect cost reimbursements. "There's going to be a hole in Caltech's research budget, and actually a big one," Unikowsky said.

In an email to the Caltech community on February 10, President Thomas Rosenbaum, Provost David Tirrell, and General Counsel Jennifer Lum announced the Institute's participation in the joint lawsuit, underscoring the importance of NIH awards to the Institute's research.

"With the support of NIH funds, Caltech researchers are advancing the diagnosis and treatment of neurodevelopmental disorders, creating tools to improve imaging of tumors, developing new strategies for engineering therapeutic antibodies for treatment of viral infections, and providing new insights into the origins of addiction, birth defects, Parkinson's disease, and other disorders," the email stated. "These are just a few examples of the projects that are supported with the NIH investment in Caltech research, and provide a sense of what we stand to lose."

Caltech Faces Uncertainty Pending Federal Funding Cuts

Emily Yu
News

Over the last month, a series of federal funding cuts to scientific research has created disruptions and uncertainty for various agencies and institutions.

The National Science Foundation (NSF), which funds research across all disciplines of science and engineering, and the National Oceanic and Atmospheric Administration (NOAA), which funds climate research and oversees environmental monitoring, are both facing significant reductions to their budgets and staff cuts of up to 50%. In addition to mass layoffs at the National Institutes of Health (NIH), a proposal to cap indirect costs—which cover overhead and administrative expenses for grant-receiving institutions—at 15% threatens billions of dollars in medical research funding.

Caltech currently has 174 active projects funded by the NSF, with the awarded amounts to date totaling over $220M. It also has 129 active projects and subprojects funded by the NIH, with total funding exceeding $90M—composed of $64.65M in direct costs and $25.67M in indirect costs.

To learn more about how the federal funding cuts may impact the Institute's research, the *Tech* reached out to faculty members who described the uncertainty at this time.

As the political and legal situation is changing rapidly, the size and scope of the cuts remain unclear. For instance, the NIH's proposed 15% cap on indirect costs has been temporarily blocked by a federal judge, leaving its implementation up in the air. "The proposed cuts in indirect costs for the NIH have definitely increased anxiety in the Caltech community, but at this point, not much has changed from a practical point of view," Professor Marianne Bronner wrote in an email to the *Tech*. "Altogether, we are still operating under 'business as usual' because it's not yet clear what the changes will be."

The potential changes at NIH and NSF are already affecting the Institute's research in terms of the timing of future funding decisions, as both agencies have halted grant reviews. Professor Bronner described:

> "I have three people (2 postdocs; 1 graduate student) who got good scores on their fellowship proposals and were supposed to have heard about whether they would be funded or not in January. All of these decisions have been postponed and there is no date set for when things will resume at NIH. I have several other postdocs who don't know when their grant proposals will be reviewed or what the prospects are."

Additionally, Professor Paul Sternberg, Chair of the Division of Biology and Biological Engineering, wrote, "Recruitment of postdoctoral scholars is continual so it is hard to predict, although if grants are held up at NIH offers of postdoctoral employment will likely be delayed."

As to mitigating the current effects, Professor Sternberg stated, "Caltech is able to provide a short term buffer for delayed grants but if there are real cuts it will have an impact since buffers have limited capacity." To prepare for this, "Our current approach is to (1) not panic, (2) to identify research efforts that need some stability that we can provide with our small pool of discretionary funds, and (3) to start seeking additional funds to provide a better buffer," according to Professor Sternberg. "We are also expending more effort to more effectively share equipment and reagents; this will not be a big cost savings but we feel better asking for help if we are tightening our belts."

At other universities, the funding cuts have also affected graduate programs, leading to temporary pauses in admissions, reduced offers, and even rescinded acceptances. Caltech "has not imposed changes in admissions policies, and I'm not aware of major changes in the options," Provost David Tirrell wrote to the *Tech*. However, if the cuts come into effect, they "will ultimately reduce the number of grad students we can take," according to Professor Gil Refael, Chair of the Faculty Board.

Due to the uncertainty of the extent and impact of the federal funding cuts, Caltech is "avoiding new commitments that create financial risk for the Institute, or that draw unnecessarily from our unrestricted funds," Provost Tirrell stated. "We want to preserve as much flexibility as we can so we can respond to challenges as they arise." The Institute does not yet have a clear understanding of where shortfalls may emerge, and it is too soon to determine which programs are most at risk. Overall, "federal funding supports roughly half of what we do on the Caltech campus," according to Provost Tirrell, so "substantial reductions in federal support would be disruptive to our research enterprise."

Recent Research Sheds Light on the Relationship Between EMFs and Wildfires

Martin Pall
"Alternative" Science and Tech

In research published last year by *Ecology & Conservation Science*, I showed that electromagnetic fields (EMFs) can selectively impact low-growing plants to make them explosively flammable. The terpene hydroperoxides that EMFs produce can also cause spontaneous combustion. Fires examined in this paper each showed multiple independent starts and wind patterns with extensive periods of very low wind followed by strong gusty winds, consistent with what is predicted from the proposed four-part mechanism. Per an analysis of the Burbank Airport wind records, the recent January Southern California wildfires showed the same or at least comparable wind patterns. The fires examined in the paper each started in association with high-voltage powerlines, and were consistent with model predictions—particularly the very recent Altadena fire.

Martin Pall is an alum who obtained his PhD in biochemistry and genetics from Caltech in 1968. He is currently Professor Emeritus at Washington State University's School of Molecular Biosciences.

"How the Impact of Electromagnetic Fields on Plants Can Greatly Increase Severity of and Even Occurrence of "Wildfires": A Four-Part Structure" by Dr. Martin Pall

Frank Capra: Caltech's Six-time Oscar Winning Filmmaker

How a Rare 1960 Letter Revealed Caltech's Lasting Impact on a Hollywood Icon

Gregory Miller
The Inside World

Columbia Pictures president Harry Cohn (L) presents Frank Capra (R) with the Best Director Oscar for *It Happened One Night* at the 7th Academy Awards ceremony which took place on Wednesday, February 27, 1935, at the Biltmore Hotel in Los Angeles, California. Credit: Columbia Pictures/The Kobal Collection

As the world celebrated the 97th Academy Awards this past Sunday, March 2nd, it is only fitting that we honor Caltech's most significant contribution to the motion picture industry: six-time Oscar-winning director and former president of the Academy of Motion Picture Arts and Sciences, Frank Capra. Of his six Academy Awards, three were for Best Director, making him, outside of John Ford, tied with William Wyler and Steven Spielberg for the second-most Best Director wins, further cementing his status as one of Hollywood's most influential filmmakers. His journey from a struggling science student at Caltech to one of Hollywood's most celebrated directors, whose films profoundly influenced Spielberg and other current filmmakers, is a testament to the unexpected trajectories a scientific education can inspire. Over the decades, Capra's legacy has continued to bridge the worlds of cinematic narrative, filmmaking, and science, proving that Caltech's influence extends far beyond laboratories and equations.

In 1960, nearly four decades after graduating from Caltech, Capra, reflecting on his expansive *œuvre*, penned a letter to his friend, Oscar-winning director George Stevens, Jr., a filmmaker and founder of the American Film Institute. Among Stevens' best-known films were *Giant*, in which he directed Elizabeth Taylor, James Dean, and Rock Hudson, as well as the critically acclaimed *The Diary of Anne Frank* and *A Place in the Sun*. The latter earned him his first Oscar for Best Director.

This rare two-page letter dated September 1, 1960, which I discovered while browsing the screenwriting archives at the Academy of Motion Picture Arts and Sciences' Margaret Herrick Library, offers remarkable insight into Capra's lifelong commitment to Caltech and his belief that Hollywood had a role in advancing science.

While closely reading this letter, neatly typed on Capra's company letterhead and signed by the Oscar winning director, and analyzing his writing style after partially reading a few of his scripts, I found his ability to craft compelling narratives to be genuine. His cinematic narrative was shaped not only by Hollywood conventions but also by his scientific education. Specifically, his years as a Caltech student profoundly influenced his development of logical argumentation, persuasion, and structured writing skills. Unlike many of his peers in the sciences, Capra took an unconventional academic path, enrolling in four years of English courses while pursuing his chemical engineering degree. He also contributed to *The Throop Tech*, the predecessor of *The California Tech*, where he honed journalistic clarity, structured argumentation, and persuasive writing—all of which would later appear in his films and personal correspondences.

But beyond his coursework, Capra's scientific training instilled in him a methodical approach to storytelling. Like scientists build their arguments using evidence, hypothesis, and logical conclusions, Capra's writing more or less follows a structured flow. This is evidenced in his passion for science, which was not just a passing interest but the fundamental principle of his early life. Before his Hollywood triumphs, he was simply a student at Throop College of Technology in 1915, having no inclination that he would one day go on to dominate the art of cinema.

Born in Bisacquino, a town and commune in the metropolitan city of Palermo in Sicily, Italy, and raised in Los Angeles, Capra pursued a degree in chemical engineering, determined to carve out a future in science. However, despite his ambition, he quickly struggled with chemistry, a subject that ultimately cost him a specialized degree. Nevertheless, he graduated in 1918 with a general science degree, a compromise that allowed him to finish his education despite failing multiple chemistry courses. Still, his time at Caltech was far from wasted. He believed scientists should not become simple thinking machines, a philosophy that would later define his filmmaking approach.

It was not just literature that captivated Capra; he was drawn to visual cinematic narrative. His interest in photography emerged when he learned the craft from Edison R. Hoge, a Caltech staff photographer at the Carnegie Institution's Mount Wilson Observatory. Hoge introduced Capra to a newsreel cameraman, which planted the seed of his future career in motion pictures.

Thus, before Capra could consider a creative career, his life was defined by survival. Working multiple occasional jobs, he developed an intimate connection with the struggles of the working class, in which President Ronald Reagan later stated that Capra "helped all Americans recognize all that is wonderful about the American character." These experiences later became the backbone of his cinematic themes, reflected in films like *Mr. Deeds Goes to Town* and *It's a Wonderful Life*.

Capra remained dedicated to bridging the gap between Hollywood and science, ensuring that his success in film never overshadowed his commitment to scientific inquiry. And though some sources dispute this fact, his letter to Stevens, reflects his on-going passion and commitment to science and discusses the importance of scientific teaching and research. In his letter Capra directly describes Caltech's illustrious scientists as "The cream of American scientists and researchers."

The letter goes on to discuss Hollywood's lack of representation in the Caltech Associates, an organization Capra was a member of, while presenting supporting evidence on the contributions of other industries to scientific progress. Capra then shares ideas on alleviating the institution's financial pressures and ultimately proposes that Stevens join him for lunch with Caltech's president, Dr. Lee A. DuBridge, to learn more about the solution. This structured reasoning is a hallmark of scientific writing, reflecting how Capra's education influenced his ability to construct compelling and logical arguments.

This letter is more than just an invitation. It is a window into a different side of Capra, not the celebrated Hollywood director, but the Caltech-educated scientist who never truly left the world of academia behind. The tone of the letter is measured, analytical, and structured, reflective of a man who was as much an engineer as he was a filmmaker. Capra does not appeal to artistic sentiment or the legacy of Hollywood, as one might expect from a director writing to another. Instead, he constructs a logical case for why Hollywood should take an interest in science. Capra states, "I am writing you in the hopes that you might become interested in the greatest science center in the world: The California Institute of Technology."

Notably, Capra's words express a deep reverence for scientists, reflecting his unwavering identification as one of them, even decades after leaving Caltech. He writes with an analytical precision that reveals his scientific mindset rather than the typical Hollywood

Columbia Pictures president Harry Cohn (L) presents Frank Capra (R) with the Best Director Oscar for It Happened One Night *at the 7th Academy Awards ceremony which took place on Wednesday, February 27, 1935, at the Biltmore Hotel in Los Angeles, California. Credit: Columbia Pictures/The Kobal Collection*

Director Frank Capra on a film set with Columbia Pictures in 1934. Credit: Columbia Pictures/ The Kobal Collection.

rhetoric one might expect from a filmmaker.

In the letter, Capra asserts that he does not need to stress the importance of scientific teaching and research—suggesting that these matters should be a categorical imperative, and should also be self-evident to any forward-thinking individual. He reminds Stevens that "right in our own backyard, scientific advancements are unfolding that will vitally affect or even change the world." Here, Capra's language is deeply scientific, constructed with the precision of an academic argument.

Contrarily, being a non-scientist, Stevens found this to be a difficult entry point into the conversation. Capra's appeal is compelling, but if one is not scientifically inclined, the argument may feel inaccessible. And while the letter demonstrated a profound passion for knowledge and progress, it may have also unintentionally alienated Stevens, particularly if he felt out of his depth in a discussion about science and research.

However, Capra pivots the narrative by addressing something Stevens likely understood. He discusses 1930s Wall Street, the stock market, and its collapse, providing a historical context that grounds his argument in economic reality rather than abstract scientific ideals. He explains how certain individuals at Caltech, particularly the Nobel laureate Dr. Robert Millikan, developed a financial model to sustain the institution, collecting pledges from donors to form the Caltech Associates, which ultimately became Caltech's most significant source of private funding.

By blending scientific reasoning with economic strategy, Capra made his argument more accessible to Stevens, who was unfamiliar with scientific discourse. Albeit not merely about securing a donation, Capra's outreach was about constructing a bridge between Hollywood and science.

What makes this letter even more compelling is not just its content but what it reveals about Capra. This is not the Capra of red carpets and Oscar speeches, but the Capra who once spent long nights at Caltech struggling with chemical equations, who took pride in scientific progress, and who believed in the power of knowledge to shape the world. Even after Hollywood staked its claim, a part of him remained the young engineering student from Throop College, still trying to solve equations, still building bridges; not just between people, but between

science and storytelling. Why he chose to approach his friend Stevens with this proposal remains uncertain; paradoxically, it suggests a belief that Stevens, with his deep Hollywood connections, could serve as an ally in fostering stronger ties between the entertainment industry and the scientific community.

Nevertheless, in his brief reply, a subsequent letter, which I also obtained a copy from the Academy archivist, Stevens, who quite literally grew up around Capra, declined the offer, stating that he would need more time before allowing himself the satisfaction of personally learning about what he described as "The Great Caltech."

Without a doubt, Capra's letter to Stevens proves that his commitment to Caltech and science never wavered, even at the height of his Hollywood fame. While the world remembers him for his Academy Award winning films, Capra saw himself as more than just a filmmaker. For him, it was never just about winning six 13.5-inch, 8.5-pound, bronze, 24-karat gold-plated Oscar statuettes; it was about preserving the scientific mindset that shaped his structured filmmaking artistry, and fueled his passion for discovery. His legacy continues to inspire Caltech students, demonstrating that a scientific education can open doors to unexpected yet groundbreaking careers. Through his films, whether Hollywood classics, wartime documentaries, or science productions, Capra engineered more than just stories; he shaped ideas, challenged perspectives, and left an indelible mark on generations.

Due to copyright restrictions, we are unable to publish a photocopy of the letter. However, the contents have been verified through archival sources.

Oscar® statuettes. Photo courtesy of AMPAS/Don Emmert © 2014.

House Demographics Survey

Alicia Zhang and Maxwell Montemayor
Category

We are seeking to collect anonymous and accurate demographic information on the Caltech Houses. This study is a first- there is no data available for house-specific demographics. We need YOUR participation to make it possible! We already have 185 responses, so we're showing a quick sneak peak of the data: the pie chart shows how many people have responded per house so far, and the stacked bar chart shows the number of people who responded, who identify as queer.

This is for our Data, Algorithms, and Society (CS/VC 162) class project. If you are curious about the results, please see our contact information at the end of the article, or on the form. We may publish the results in the Tech as well. [should I add that the survey is not affiliated with the Tech newspaper? "This survey is not affiliated with the California Tech newspaper in any way, shape, or form and for our class project".]

Only summarized data will be published and analyzed. Individual responses will not be made available anywhere. Only the people running the survey (Maxwell and Alicia) will be able to see the full responses (contact information at the end of the article, or on the form). We will make no effort to personally identify any respondents.

This poll is inspired by demographic polls run in other colleges, for example by Princeton's student newspaper runs an extremely comprehensive Senior Survey: https://projects.dailyprincetonian.com/senior-survey-2023/.

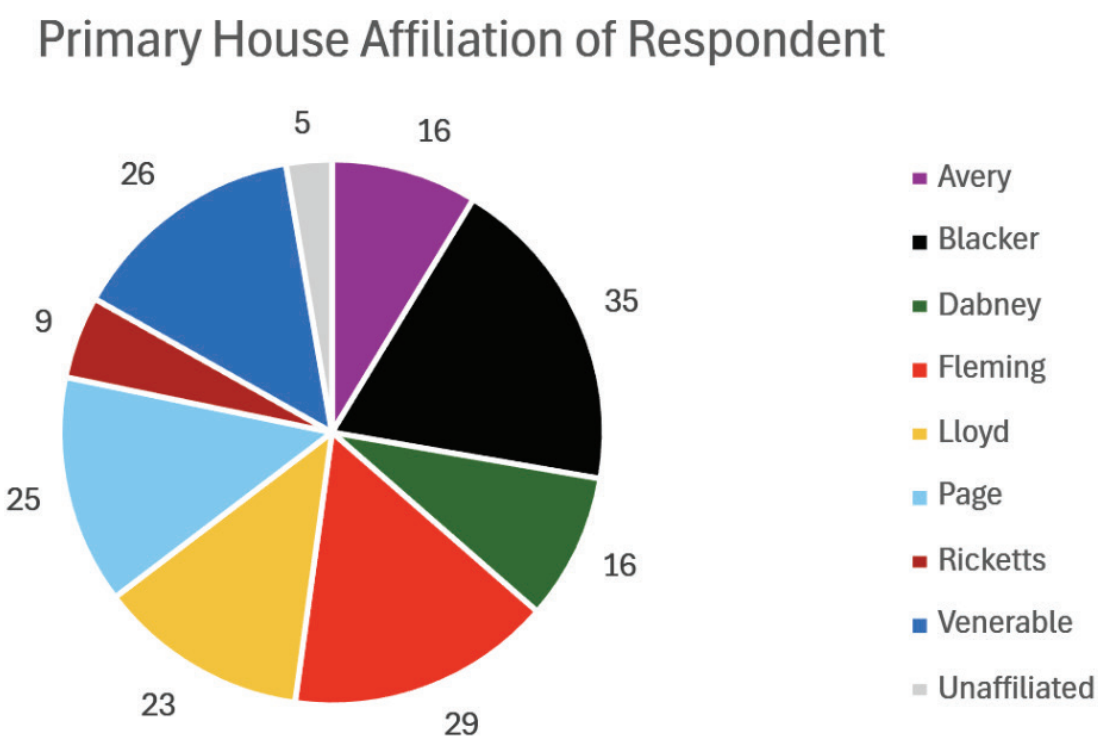
Please fill out the form according to how you identify. It should take <5 minutes. Follow the Honor code and answer honestly and truthfully!

Link: https://forms.gle/fdFBcnYUxmbRUM2T8. Share the form with your friends!

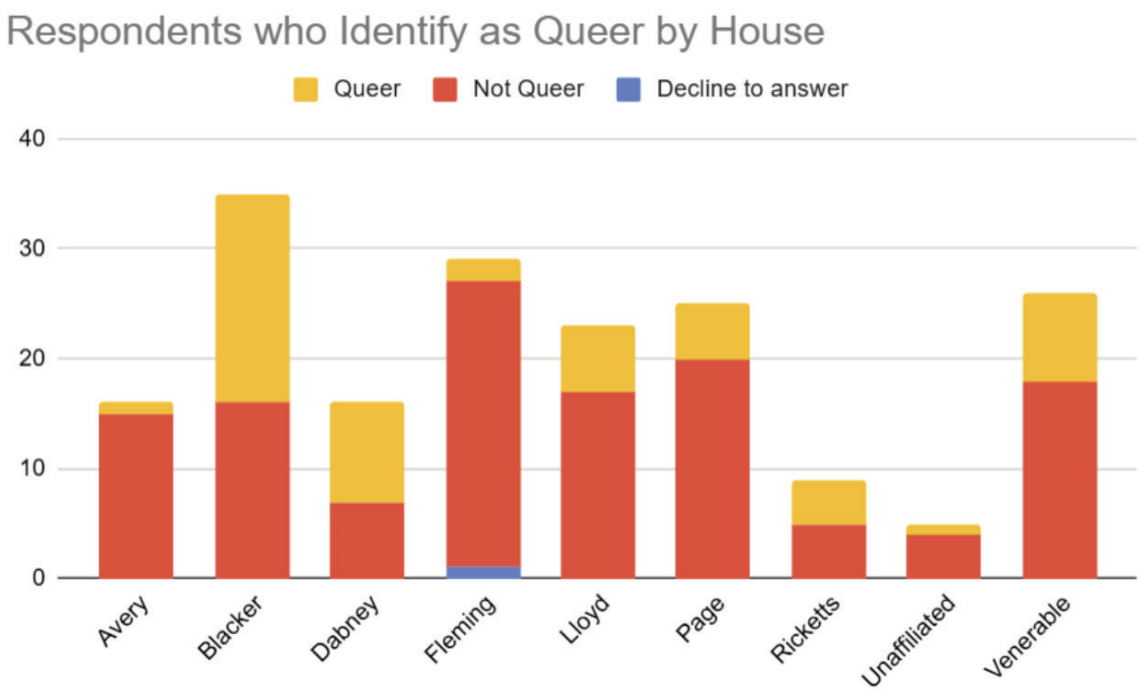
If you have filled it out already please look at it again, we have added more questions about race.

If you have any questions, comments, or concerns, feel free to contact: Alicia Zhang (alicia@caltech.edu), or Maxwell Montemayor (montemayor@caltech.edu). We look forward to your responses!

QR code for the survey!



Respondents by house, as of 3/1/25.



Respondents who identify as queer by house, as of 3/1/25. N = 185.

Parallel Lives

Camilla Fezzi
Opinion

Well, this evening I find myself with one of my usual inspirations. I promised myself that I would go to bed early, but, in this place, that is never really possible. I tried, at least, and now, in this phase of almost REM relaxation, I write. Background music fills the room, my rosettes hanging on the wall watch me silently, and in these six square meters of chaos – today I would say around 70% – I try to put my thoughts in order. It has been a tough day. The bed is still unmade, but I will sleep on it anyway, so what is the point of making it again? A questionable philosophy, perhaps, but not entirely wrong.

In recent weeks I have thought a lot about why I am here. There are a thousand reasons, of course, but that is not what I want to talk about. Instead, I have started to wonder about others too. I have discovered that, deep down, each of us secretly cultivates the desire to be elsewhere. It's as if, despite all the sacrifices made to get to one of the most prestigious universities in the world, we suddenly discover that complete satisfaction is an illusion. And I am the first to blame.

I am sitting at my desk in the Clemons Lab, immersed in work, and next to me—as always—is Jeff. How much patience you have, dear Jeff! We often find ourselves talking about this and that, and just a few days ago, when other students joined the conversation, I had a revelation. No one, deep down, wants to be exactly where they are.

"The lab is exhausting, every day without rest, and most of the time nothing goes as it should," they complain. Then, suddenly, the spark. One after the other, everyone begins to confess what they really want to do. "I would like a food truck to cook and tour the United States." "I would like to travel without borders." I would like, I would like... And it's strange because a part of me feels the same thing. These days I have done nothing but collect confirmations. At chem recitation, I discovered that Kayane has an incredible voice and that she wanted to be a singer. I discovered that among us some missionaries and athletes have dedicated their lives to sport and who, despite everything, continue to train without ever stopping fighting.

And in the end, if we think about it, it's not money that moves us, but passion. That thin, stubborn flame that burns inside us, even when everything seems to put it out. We often say it to ourselves, almost to console ourselves, when the days get heavy and doubt tugs at us forcefully: "But who made me do it?"—and yet, the answer is always the same.

It's not prestige, it's not economic security, it's not the title that drives us forward. It's the deep desire to achieve what really ignites us. It's a calling, an impulse that leads us to pursue something bigger than ourselves. And perhaps, in the end, it's precisely this that keeps us alive.

I think of Van Gogh, who painted without ever selling a painting in his life, moved only by the urgency to give shape to the colors that exploded in his mind. Or of Marie Curie, who wasted away in her laboratory, not to obtain recognition—which did come—but because she wanted to understand, she wanted to discover. "There is nothing to fear in life, you just have to understand." And so he went on, without letting himself be stopped by fatigue, loneliness, or the judgment of others.

And then I ask myself: if tomorrow I dropped everything to open a riding school in the middle of the fields, would I be happier? If I left pipettes and centrifuges to stay in the open air, breathing in the scent of hay and leather, hearing the rhythmic sound of hooves on the beaten earth, would it be easier? Maybe yes, maybe no. Because the truth is that passion is never a downhill road. It is a constant call, a hunger that never subsides, an urgency that pushes us to search, to try, to make mistakes, and to start again.

I see it in Kayane's eyes when she sings, in Jeff's smile when he talks about his projects, and in the dedication of his teammates who despite everything continue to train, to study, to pursue something that goes beyond the simple result. I see it in myself, even when the physics problem set seems like a labyrinth with no exit. Because, in the end, this is what makes us alive: the ability to dream, to desire something else, without ever losing sight of what brought us here. And then I start thinking that, perhaps, we all live in a quantum paradox, as if we were particles superimposed between different states: on one side, us of today, the one who wanders through the corridors of Caltech with problem set-like dark circles under our eyes and cold coffee in hand; on the other, us of a parallel universe, who perhaps is riding along an infinite beach, cooking in a food truck in New Orleans, or writing novels in a tiny bookstore in Paris.

What if it were like the famous Schrödinger's cat experiment? Maybe, until we "observe" our lives, we are simultaneously scientists and artists, engineers and philosophers, researchers and dreamers. Maybe in a Caltech lab there is trying to mathematically demonstrate this theory of parallel lives, while here, in my corner of the universe, I wonder if it wouldn't have been better to open a riding school. But the beauty of Caltech is that this duality is not just an abstraction: it is real, tangible, almost grotesque. There is the guy who disassembles motorcycle engines on the weekend and then on Monday morning solves differential equations as if she were making coffee. There is the girl who spends sleepless nights calibrating instruments for particle physics experiments, but then on Friday night sings jazz in the clubs of Pasadena. And there's Jeff—always him, my classmate during the long hours in the lab—who dreams of giving up everything to open a fusion restaurant where he serves tacos with Chinese influences and plays video games on the weekends.

And me? I'm staying here, balanced between these worlds, between a Western blot that doesn't work and the dream of jumping into the major leagues and curing cancer at the same time. But maybe the secret isn't choosing just one life but finding a way to live all the ones that live inside us, even if only for a moment. After all, who said we have to be one thing, forever? Maybe there's no perfect life, maybe we'll always be torn between what we do and what we'd like to do. But as long as there's passion, as long as there's that spark that keeps us awake at night writing, creating, and imagining, then it'll always be worth continuing.

And then there's us. We who wake up when the campus is still shrouded in silence, when the lights in the windows are still off and the crisp morning air brings with it the promise of a long day. I who mount my horse before the sun rises, who feel the warm breath of my racing partner as we prepare to enter the field, who grips the reins with the same determination with which I grip a pen during a physics exam. And then there are them. The other athletes.

I see them in the hallways, with backpacks heavy with books and training bags always ready, as if at any moment they could transform from students to warriors. There is the swimmer who enters the water before I even climb into the saddle, who cuts across the pool in silence while the rest of the world is still asleep. There are the runners who clock up miles before the day begins, the basketball players who shoot until their arms give out, and the wrestlers who train until they drop, knowing that every ounce of strength gained could make a difference.

We are all suspended between two lives, between the academic world that demands mental rigor and the sports world that demands physical discipline. While most students struggle with problem sets and projects, we struggle on two fronts, trying to maintain the balance between the athlete and the student, between passion and responsibility, and between dream and reality.

An entry from Columbus and L.A.-based photographer Nick Fancher's Identity *series.*

And every time someone asks me "But how do you do it all?", I would like to respond with a laugh, because the truth is that I don't even know. I only know that I couldn't live differently. I know that there is something in getting up early, in feeling the body respond to fatigue, in knowing that every sacrifice has a meaning, that makes me feel alive. It is the same flame that I see in my classmates, the one that pushes them not to give up, and to pursue their dreams even when everything seems to say the opposite.

Sometimes I wonder if there is a parallel universe in which I have chosen only one path. If there is a version of me who abandoned science to dedicate himself only to horses or another who gave up competitions to immerse himself completely in research. But then I look at my life, I look at my classmates running between training and classes, and I understand that I don't want to choose. I don't want to be just one thing.

We are not just students, nor just athletes. We are the result of both of our passions, of our dedication and of our desire to always push beyond the limit. And maybe that's the secret: we don't have to choose between our parallel lives, but find a way to live them both, because, after all, that's how we are made.

And then there's the future. That great unknown that hovers above us like a cloud full of possibilities, expectations, and—let's face it—a lot of anxiety. We spend years struggling to get here, studying until late, testing our mental and physical resistance, and then? After Caltech, what awaits us?

The rational answer is obvious: brilliant careers, PhDs, top companies, cutting-edge laboratories. Yet, if I stop to think, I realize that few of us see the future in such a linear way. There is always that voice, that thought that whispers: "What if I did something completely different?" Maybe this is the true duality that we carry within us. On the one hand, the path we have chosen is the one for which we have sacrificed time, sleep, and perhaps even a piece of sanity. On the other, the call of a parallel life, of an alternative future that tempts us with its freedom. Yes, I could continue this path, and immerse myself even more in science, research, and innovation. But I could also give up everything and dedicate myself to horses, open a riding school, and live on nature and movement, far from screens and experimental data. Maybe the truth is that we don't have to choose between these parallel lives. Maybe we can find a way to intertwine them, so as not to have to give up a part of ourselves in the name of a rigid idea of success. After Caltech, the world will be ours. But the question remains: which world will we choose? And, most importantly, should we choose just one?

The California Tech

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Caltech Wildlife: Acorn Woodpeckers

Jieyu Zheng
Column

Woodpeckers are perhaps the most overlooked yet ever-present wildlife species on campus. Like the ubiquitous fox squirrels (a topic for another day), they are a daily sight if you know where to look. Every time I mention them to other Caltech students, the most common reaction is, *"Wait, we have woodpeckers on campus?!"* And I'll nod slowly, like a long-time local: *"Yes, we have at least three families of them."*

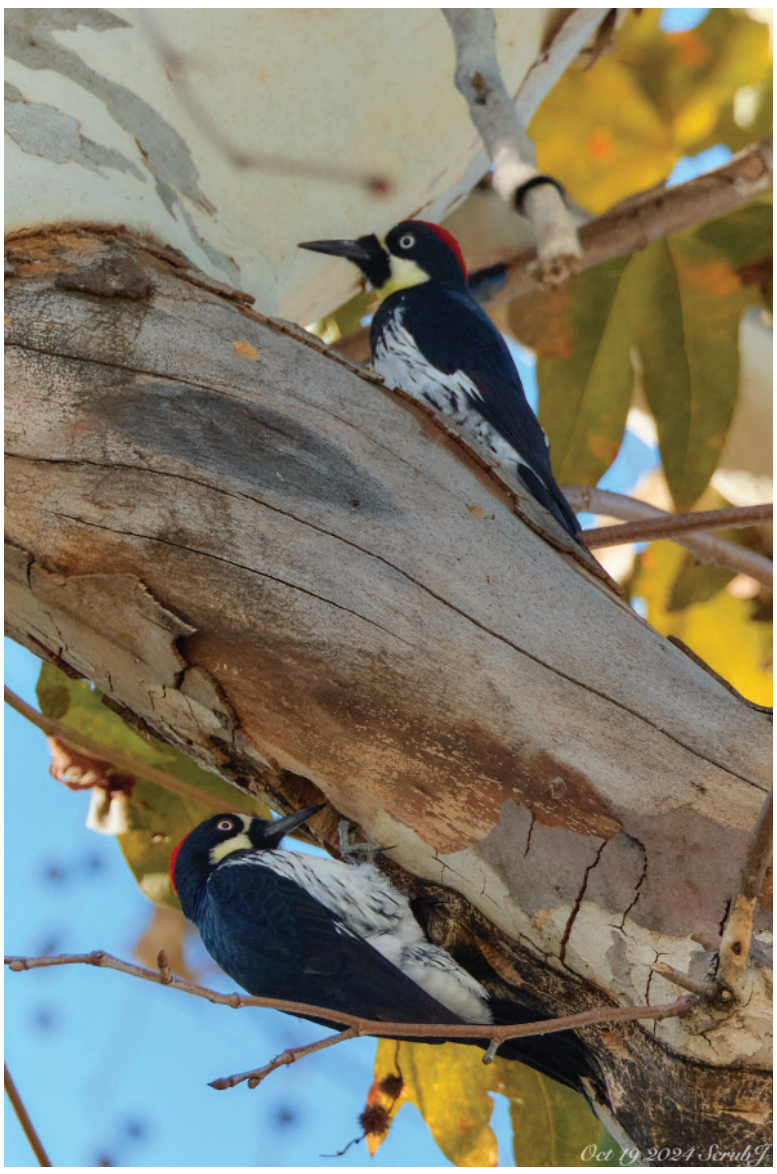
Among all woodpecker species, acorn woodpeckers stand out for their habit of drilling customized holes to store acorns—hence their name. If you look closely at the oaks and palm trees around campus, you'll likely find thousands of neatly arranged holes, enough to trigger trypophobia. Yet, the woodpeckers remain busy, diligently collecting fresh acorns and shifting older ones into better-fitting holes as they dry and shrink. If Caltech's founders had ever looked up, they might have found these birds to be a more fitting mascot—a native species to the West Coast with alert eyes shining in extreme engineering obsession.

So, where exactly are they located? I personally know of three active colonies: one near the Chen parking lot, another along the palm trees on Wilson, and a third in the central hub of the student dining area by Red Door. Each group appears to run its own "banking business" of acorns, feeding themselves as well as opportunistic squirrels and crows. Originally specialized in oak trees, these adaptable birds have expanded their service to palm trees, telephone poles, and even the seams of campus buildings. According to a longtime (20+-year) Caltech employee, the peckers once drilled holes between the bricks of Noyes, leading to water leakage issues.

To me, these birds are a simple constant source of joy and company. Every time I pass their territories, I would glance up, searching for their red-capped heads and white underwings. Their distinctive *waka-waka* calls, like a carpenter's saw, guide my eyes to their bullet-shaped bodies darting between trees—they are always on a mission. Watching their persistent work reminds me to go into the lab and tackle my own research with the same determination.

The recent fires in Greater Los Angeles have destroyed homes, affecting many from the Caltech community, including the wildlife. When a tree near the Keck Institute and another on Wilson fell, they took with them the woodpeckers' carefully drilled nests intended for spring hatchlings. Luckily, with their craftsmanship and resilience, the peckers have rebuilt new tree cavities in the remaining trees and are ready to bounce back.

I hope that after reading this, you, too, will take a moment to look for these tenacious creatures—our feathery and industrious campus companions.



All photos courtesy of Jieyu Zheng.

The science of thought: philosophical insights into scientific practice

Democritus: The Atomic Visionary Whispering Through Caltech's Labs

Democritus: The Ancient Greek Who Would Have Loved Caltech's Labs (If He Had a Microscope)

Camilla Fezzi
Column

Imagine if some guy from 2,300 years ago walked into a Caltech physics lab, took one look at an electron microscope, and said, "Yep, told you so." That guy would be Democritus, the ancient Greek philosopher who somehow managed to predict the existence of atoms without a single piece of scientific equipment—just pure brainpower, a lot of thinking, and probably too much free time.

Sure, he didn't get everything right (he thought atoms had little hooks to stick together, which is adorable but incorrect), but the sheer audacity of his ideas still resonates with modern science. If Democritus were alive today, he'd fit right in at Caltech—probably wandering around campus, laughing at his own jokes, and asking if he could borrow a supercomputer "just to check something." But Democritus wasn't just some guy who came up with atomic theory and called it a day. His philosophy extended far beyond tiny particles—he had an entire worldview built around **rationality, curiosity, and the idea that the universe runs on natural laws rather than divine whims**. In fact, Democritus had a way of looking at the world that feels strikingly modern, as if he were an ancient prototype of a Caltech scientist.

Democritus: The Original Scientific Rebel

Democritus (c. 460–370 BCE), known as the "Laughing Philosopher" because he believed happiness was the key to a good life (and probably because he found the ignorance of others amusing), was a man ahead of his time. Unlike many of his philosophical peers, who were busy debating abstract concepts like "What is justice?" or "Does reality even exist?", Democritus asked a much more practical question:

> **"What is everything made of?"**

For Democritus, the answer wasn't divine intervention, magic, or some mystical force—it was atoms and void. He proposed that the universe consists of tiny, indivisible particles (*atomos*, meaning "uncuttable") that move through empty space (*kenon*, meaning "the void"). These atoms, he argued, are eternal, indestructible, and the fundamental building blocks of all matter.

This might sound obvious today, but at the time, this was a radical idea. Most people thought the universe was made of four elements—earth, water, air, and fire (thanks, Aristotle, for setting science back by centuries). Others believed reality was shaped by gods or supernatural forces. Democritus, however, insisted that everything—from stars to stones to human emotions—was the result of atomic interactions. To put it in modern terms, think of it like LEGO bricks. If you take a bunch of LEGO pieces, you can construct a spaceship, a castle, or an incredibly unstable tower that will absolutely collapse the second you show it to someone. The pieces themselves don't change, but their arrangement does. That's how Democritus saw atoms—unchanging, eternal, but capable of forming an infinite variety of things.

Now, keep in mind, this was before the periodic table, before chemistry, before anyone even knew what oxygen was. He was just making educated guesses based on pure reasoning. No lab, no experiments—just vibes.

Democritus vs. Aristotle: The Ultimate Philosophical Smackdown

If Democritus was the cool, forward-thinking scientist of his time, Aristotle was... well, the guy who ruined everything. Aristotle was super famous, which meant that when he disagreed with Democritus (which he did, loudly), people listened.

Aristotle preferred the idea that everything was made of four elements—earth, water, air, and fire—which, let's be honest, sounds more like a rejected *Avatar: The Last Airbender* script than a scientific theory. He outright dismissed the idea of atoms, setting scientific progress back by about 2,000 years. Imagine if someone today said, "Nah, I don't believe in quantum mechanics" and then convinced everyone else to stop researching it. That's basically what happened to Democritus's atomic theory.

But science, like a stubborn Caltech student who refuses to leave the library, always makes a comeback. Fast forward to the 19th and 20th centuries, and scientists like John Dalton, J.J. Thomson, and Ernest Rutherford started proving that atoms were real. By then, of course, Democritus had been dead for over two millennia, but we like to imagine him somewhere in the afterlife, smugly whispering, "Told you so."

A Universe Without Gods? Scandalous!

Democritus's theories didn't just challenge early physics; they also clashed with religious and mystical beliefs. Many ancient Greeks believed the gods had a direct hand in shaping the world. But Democritus? He wasn't buying it. According to him, the universe wasn't created by divine beings—it simply existed, governed by natural laws. Atoms moved, collided, and combined according to necessity and chance, not the whims of Olympus. This idea, known as mechanistic determinism, was way ahead of its time. It foreshadowed the scientific principle that the universe follows consistent, predictable laws, a concept central to modern physics.

If Democritus had access to a physics lab, he'd probably be the guy constantly testing theories, trying to prove that things worked because of natural forces, not supernatural ones. He would have been all about data, equations, and experimental proof—in short, a perfect fit for Caltech.

The Laughing Philosopher: A Man Who Knew How to Have Fun

Now, you might be picturing Democritus as a super-serious, lab-coat-wearing, chalkboard-scribbling philosopher-scientist. But here's the twist: Democritus was known as the "Laughing Philosopher" because he believed that happiness came from knowledge—and he found human ignorance downright hilarious.

He wasn't laughing at people in a mean way—he just thought that understanding the universe should make people happy. He believed that fear and superstition came from not knowing how things worked, and that the best way to achieve peace of mind was through learning, rational thought, and scientific inquiry.

If he were at Caltech today, you'd probably find him:

- Laughing at how people still believe in astrology.
- Debating quantum mechanics with undergrads over coffee.
- Making bad physics puns in the middle of problem sets at 3 AM.
- Writing a paper on how the multiverse theory aligns with atomic determinism.
- Arguing that happiness is directly proportional to scientific knowledge.

In other words, he'd fit right in.

Democritus's Boldest Idea: Everything Is Just Atoms in Motion

At the heart of Democritus's philosophy was a simple but mind-blowing idea:

> **Everything in existence—planets, plants, people, thoughts, emotions—is just atoms moving around in different ways.**

This means that even things like love, music, and consciousness had to be explained in physical terms. He believed that sensations and thoughts weren't mystical forces but rather the result of atomic interactions in the body. This idea is eerily close to modern neuroscience and physics. Today, we know that emotions come from biochemical signals in the brain, that consciousness arises from neural activity, and that even the most complex phenomena can ultimately be broken down into interactions of fundamental particles. If Democritus could see the research happening at Caltech today—from quantum mechanics to AI-driven neuroscience—he'd probably be thrilled (and maybe a little smug). After all, he basically called it 2,000 years in advance.

Democritus' Radical Theory of Perception: Seeing Is Believing (Sort Of)

Okay, so Democritus didn't just believe that atoms made up everything—he also had some pretty wild ideas about how we actually perceive the world. Forget fancy neuroscience; for Democritus, all perception boiled down to atoms literally smacking into us.

His idea went something like this:

1. Every object in the world is constantly shedding thin layers of atoms called eidôla (think of it like atomic dandruff, but way more scientific).
2. These layers float through the air like tiny, invisible film projections, shrinking and expanding as they travel.
3. Only the layers that shrink enough can squeeze into our eyes, where they physically impact our sense organs, enabling us to see.
4. The further these atomic films travel, the more they get distorted—kind of like how a Snapchat filter makes your face look weird if the Wi-Fi is bad.

Now, if this sounds bizarre, consider this: he was trying to explain how vision worked without knowing anything about photons, optics, or neural processing. Given those limitations, his theory is actually *kind of* impressive. But he didn't stop at sight—every sense, he argued, worked through direct atomic contact. Taste? Different shapes of atoms bumping against your tongue. Sound? Atoms crashing into your eardrum. Smell? Atoms sneaking up your nose. Of course, not everyone was convinced. Theophrastus, Aristotle's student, pointed out a major issue: if atoms always cause the same sensations, then why does honey taste sweet to some people but bitter to others? Democritus had an answer for that too—he argued that:

1. Honey isn't perfectly pure—it contains a mix of different atoms, and while sweet atoms are dominant, bitter ones might be lurking in there too.
2. Your body has to be in the right condition to perceive things correctly. If you're sick, your sense organs might be out of whack, making you more sensitive to certain atoms.

In other words, Democritus was unknowingly laying the groundwork for the idea that perception is influenced by both external reality and internal conditions—something modern neuroscience fully supports.

Why Does the Ocean Change Color? Democritus Had a (Weird) Answer

One of the most mind-bending parts of Democritus' perception theory was his take on color. Unlike most people, who assume things look blue because they *are* blue, Democritus argued that colors aren't real properties of objects—they're just how we perceive different atomic arrangements. He thought color changed based on atomic position—so when you see the sea turn from deep blue to foamy white, it's not because the water itself is changing color, but because the arrangement of atoms is shifting, altering how the light films (*eidôla*) reach your eyes. Aristotle, ever the critic, found this idea ridiculous, but Lucretius (a later Roman poet-philosopher) backed it up, noting that if atoms themselves were actu-

ally blue, the ocean wouldn't be able to change color at all. This was a wildly ahead-of-its-time concept—essentially an early version of the idea that color is a perceptual phenomenon, not an intrinsic property of matter. Today, we know color is determined by how surfaces absorb and reflect light waves, which isn't too far off from what Democritus was suggesting, just without the atomic films.

Democritus' Theory of the Soul: Fire Atoms and the Meaning of Life

Now, if you thought Democritus' physics were weird, wait until you hear about his theory of the soul. Unlike most ancient Greeks, who believed in an immortal soul that lived on after death, Democritus took a fully materialist approach. He believed that the soul (*psychê*) was made of fire atoms—tiny, ultra-mobile particles that gave living beings their ability to move, think, and function. Why fire atoms? Because fire is always moving, and Democritus figured that anything responsible for thought and action had to be constantly in motion. (If you've ever tried to keep up with a hyperactive physics major pulling an all-nighter, you get the idea.) But this also meant that when you die, your fire atoms scatter—and that's it. No afterlife, no eternal soul, just atoms dispersing back into the void.

This take didn't sit well with a lot of people, but it was one of the earliest fully naturalistic explanations of life and consciousness. In a way, he anticipated modern neuroscience—suggesting that thought was purely physical, rather than the result of some mystical soul-stuff.

Democritus' Take on Reproduction: Atomic Genetics Before It Was Cool

Democritus even had a theory of heredity, and while it wasn't exactly *Mendelian genetics*, it was still surprisingly sophisticated. He believed that every part of the body contributes atoms to reproductive material, meaning that children inherit traits from both parents because both parents contribute atomic "seeds." He even speculated that the dominance of certain atoms in the reproductive mixture determined whether a child was male or female. This was one of the earliest attempts to explain heredity through material causes, foreshadowing later ideas about genetic inheritance.

Democritus' Theory of Knowledge: Can We Even Trust Our Senses?

Democritus had a bit of a dilemma. On one hand, he believed that all knowledge comes from our senses—after all, how else are we supposed to learn anything? On the other hand, our senses are kind of terrible. They distort reality, mislead us, and sometimes outright betray us (like when you see a mirage in the desert or when honey tastes bitter for no reason). His theory went something like this: thought and perception are both caused by tiny atomic images (*eidôla*) entering our bodies and reshaping our minds. But since these images can get distorted along the way—bouncing off other atoms, stretching, shrinking—the information we receive isn't always reliable. Kind of like how a game of telephone always ends in disaster, except instead of kids whispering nonsense, it's atoms colliding in the void. This led him to a deep philosophical crisis: if atoms are real but we can't perceive them directly, how do we know anything at all? This is the kind of thing that keeps philosophers (and overworked grad students) up at night. Some later skeptics took advantage of this, arguing that if our senses constantly contradict each other, we might as well admit that we know nothing.

Democritus wasn't having that. He admitted that our senses aren't perfect, but they're the best tools we've got. If the mind starts doubting them completely, it's basically sawing off the branch it's sitting on. So, he settled for a kind of "well, they're good enough" epistemology—sure, our senses can deceive us, but with logic and careful reasoning, we can get closer to the truth.

He even extended this idea to the gods—arguing that our knowledge of divine beings comes from massive *eidôla* (giant atomic films) floating around in the air, giving us impressions of powerful beings. Some scholars think this was Democritus' way of subtly roasting traditional religion, reducing divine visions to floating atomic residue. Others think he genuinely believed these *eidôla* were real beings, just not immortal ones. Either way, he was definitely not making friends with the priesthood.

Democritus vs. Infinite Divisibility: The First Physics Thought Experiment

If you've ever had a math teacher make you think about slicing a pizza infinitely many times until it just disappears into nothingness, congratulations—you've thought like an ancient Greek philosopher.

One of the biggest problems in early philosophy was Zeno's paradoxes, which argued that if space and matter were infinitely divisible, then motion (and basically everything else) would be impossible. Democritus and his crew, not wanting to be stuck in a paradoxical nightmare, decided to solve this by inventing atoms—tiny, indivisible building blocks of reality. But what did they mean by "indivisible"? Was it a theoretical indivisibility (as in "we just can't divide them anymore")? Or a physical indivisibility (as in "these things are literally unbreakable")? Scholars argue about this to this day, but one thing is clear: Democritus was not about to let reality dissolve into infinity.

He even had a fun little thought experiment to prove his point. Suppose you could divide something infinitely—what would you be left with? If you say "dust," then congratulations, you haven't actually divided it infinitely. If you say "nothing," then oops—how did something come from nothing? Checkmate, infinite divisibility. He also posed a weird math problem about cones that basically boiled down to this: if slicing a cone at different heights gives you different-sized circles, then shouldn't the cone have "steps" rather than a smooth surface? If not, then how do the slices magically change size? This problem haunted mathematicians for centuries until calculus came along and saved the day. But for the time, Democritus was basically just flexing his ability to break people's brains with logic.

Democritus' Ethics: The Laughing Philosopher's Guide to Happiness

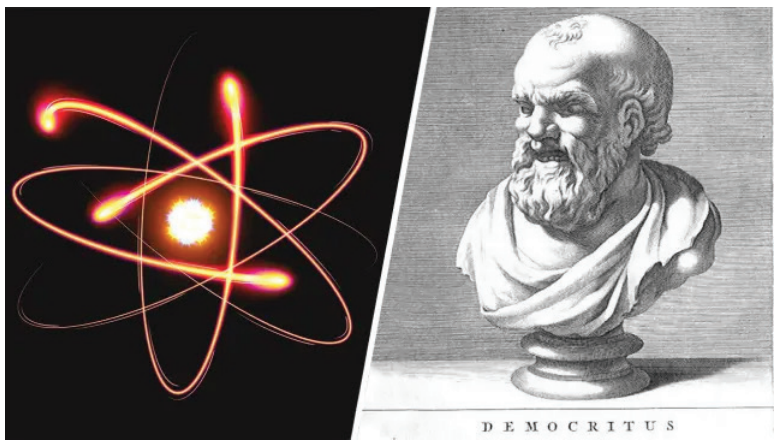
Democritus wasn't just about atoms and void—he also had a lot to say about how to live a good life. And, in true Democritus style, his ethical philosophy was both deeply insightful and surprisingly fun. First off, he believed that happiness (or "cheerfulness," as he called it) is the ultimate goal of life. But here's the twist: happiness isn't about money, power, or external stuff—it's about your internal state of mind. (Basically, Democritus was the original "happiness comes from within" guy, long before self-help books made it cliché.)

He preached moderation, self-discipline, and not getting too attached to things you can't control. He even compared taking care of your soul to medicine—just like a doctor treats the body, philosophy should treat the mind. (If he were alive today, he'd probably be a big fan of therapy.) One of his most radical ideas was that humans have the power to shape their own destiny. He didn't believe in fate or divine intervention—just atoms bouncing around and people making choices. This was a pretty bold stance in a world where most people thought the gods controlled everything.

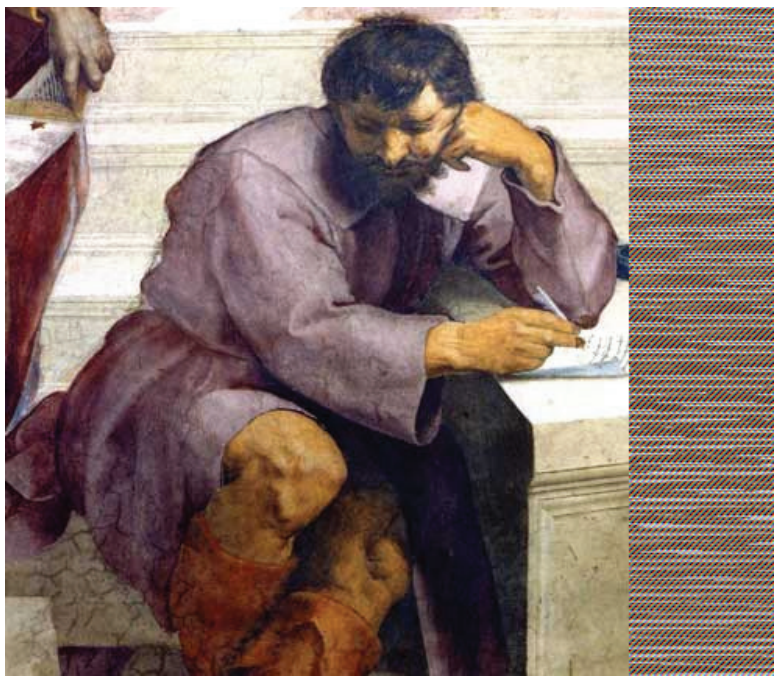
He also had some interesting thoughts on politics. Unlike some philosophers who saw society as an unnatural constraint, Democritus believed that humans naturally form communities. He thought laws were important, but only if they actually helped people live better lives—otherwise, they were just pointless rules made up by power-hungry people.

So, what's the takeaway? Think rationally, live moderately, don't obsess over things you can't control, and try to enjoy life. Honestly, not bad advice for a guy who lived 2,300 years ago.

Why Democritus Would Have Loved Caltech



Democritus, laughing philosopher and forefather of atomic physics. Credit: vinap via Adobe Stock/Public Domain via Wikimedia.



The evolution of our understanding of matter. Credit: Andreas N. Bjørndal.

François-André Vincent's Democritus among the Abderitans, *completed in the late 18th century.*

So, what does an ancient Greek philosopher have in common with a cutting-edge research institution like Caltech? More than you'd think.

1. He Was Obsessed with Finding the Fundamental Truths of the Universe

Democritus wanted to understand the *smallest* components of reality, just like Caltech physicists today study quarks, neutrinos, and other subatomic particles. If he had access to the Large Hadron Collider, he'd probably be first in line to smash some protons together just to see what happens.

2. He Believed in the Power of Logic and Reason (Even When Everyone Else Disagreed)

Caltech students know what it's like to tackle impossibly hard problems, armed only with equations, a whiteboard, and an alarming amount of caffeine. Democritus did the same thing, except instead of problem sets, he used pure logic to figure out the fundamental nature of matter.

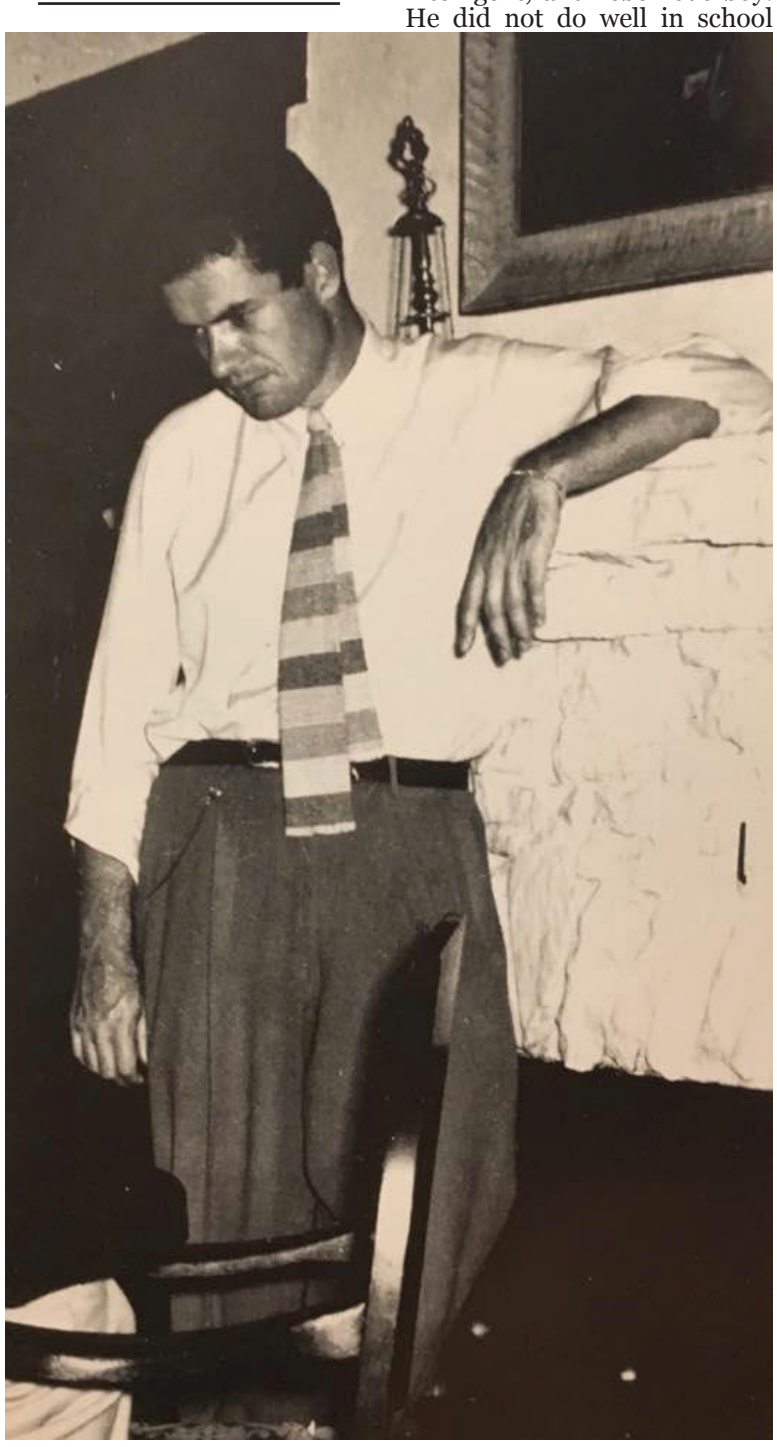
3. He Had a Great Sense of Humor, Which Is Essential for Surviving Science

If you've ever made a physics pun in the middle of a study session at 3 AM, you and Democritus would probably get along.

If Democritus were alive today, he'd probably be a Caltech physics major, hanging out at the Athenaeum, debating quantum theory with professors, and laughing at the absurdity of the universe. He'd be the one asking, "But what if we go *even smaller*?" every time someone explained particle physics. His story is a reminder that curiosity, logic, and a willingness to challenge conventional thinking can change the world—even if it takes 2,000 years for people to realize you were right. So the next time you're struggling through a physics problem set, just remember: Democritus would have struggled too—except he wouldn't have even had a calculator.

Jack Parsons: The Paradoxical Figure Who Revolutionized Rocketry

Raquel Maldonado
Humans of Caltech



Jack Parsons at the Parsonage, 1942. Public Domain.

You've probably heard a joke about JPL standing for Jack Parsons Laboratory. Or at least you've heard that Jack Parsons was one of the founders of JPL and that a crater on the moon's dark side is named after him. But have you ever delved into the subtext, personality, habits, and life of Jack Parsons? Probably not. So, that's what I'm here for.

Over the last month, I've studied the life and legacy of this charismatic, visionary, dreamy, mystical... and possibly crazy guy. Remember that in a new world that no one has explored, the first navigators to break rules and patterns and bring new ideas are always considered the crazy ones.

Jack Parsons was born in Pasadena in 1914. His real name was Marvel Whiteside Parsons; he shared his father's name. However, as soon as he was born, Parsons' mother discovered that his father was not the right guy for her, since he was dating others. So, his mother got divorced and couldn't stand calling him Marvel anymore; she started calling him John and then Jack. And so he became known to his friends and family in Pasadena as Jack. His maternal grandparents moved to Pasadena to take care of their daughter and grandson, and then they lived in the famous Millionaire's Mile in Orange Grove. Jack Parsons was always a different, curious, intelligent, and rebellious boy. He did not do well in school (his biographer George Pendle attributes this to undiagnosed dyslexia). When Jack was little, he befriended Edward Forman, another future founder of JPL. He and Edward studied together in the same school in Pasadena.

Parsons was two years younger and bullied, so Edward protected him. From there, a friendship began that lasted for years. According to the many tellings of the Parsons story, including the book *Strange Angel* written by George Pendle, the CBS All Access series on Paramount+, and the book *Sex and Rockets* by John Carter, little Jack had a somewhat lonely childhood and loved reading mythology, especially *Arabian Nights* and Arthurian legend. He was also fascinated by science fiction, such as the fantastic Jules Verne and Hugo Gernsback's *Amazing Stories*—Hugo considered among the fathers of science fiction alongside Verne and H. G. Wells—and thus began Jack's desire to reach the stars. He convinced his friend Edward to do experiments in his garden in Orange Grove, and so the two always met to read science fiction and do explosive experiments to make a spaceship fly. The two boys designed rockets based on gunpowder with aluminum foil, cherry bombs, and glue.

Jack, engaged in this crazy idea of a spaceship flying into space, simultaneously fed his mystical, occult side, making incantations to the devil before bed, a practice he also learned from magazines. Parson's interest in rocket science (still fiction) and the occult became increasingly detrimental to his studies at school. He and Edward were also interested in archery and fencing. Due to his poor academic performance, his mother sent him to a military school in San Diego to see if his performance and discipline could improve. As a result, Jack was expelled from school for having exploded the toilet. During the Great Depression, his family lost money and moved to San Rafael Avenue. In 1931, his grandfather died. At this time, Jack studied at a private school, his studies improved and he became editor of the school newspaper, *El Universitano*, and won a literary award for it. Parsons began working to help his family, who was broke. He then worked at the Hercules Powder Company, starting as a janitor, and with his intelligence and insight, he showed a great interest in chemistry, learned a lot about explosives, and worked his way up the ranks. As Parsons was a guy who didn't care much about rules or limits and always tried to go beyond them, he often stole materials from the factory to do his experiments. Jack entered Pasadena Junior College to get an associate degree in chemistry or physics but left for financial reasons. Later, he also studied chemistry at Stanford University, but left for the same reason—he couldn't afford it. Now living alone in a modest house on St. John Avenue, he worked and studied literature and poetry. In 1935, Jack married Helen Northrup.

Jack and Edward continued their rocket tests and attended seminars and lectures at Caltech. One day, the two attended a lecture by Austrian rocket engineer Eugen Sänger and approached him with ideas for designing a liquid-fuel rocket engine. William Bollay, the event organizer and a PhD student specializing in rocket-powered aircraft, introduced Jack and Edward to Frank Malina. Frank Malina was a mechanical engineer and mathematician who studied rocket propulsion. In 1936, the three young men approached Caltech, specifically the well-known professor and renowned aerodynamicist Theodore von Kármán, and proposed a research project to design a space rocket. After days of thinking, von Kármán accepted the proposal and funded the project. So began the Caltech Rocket Research Project, which later involved talented Caltech students in groundbreaking work on solid and liquid-fuel propulsion. Many people on campus warned Professor Kármán that rocket fuel work could be dangerous to operate at Caltech. Accordingly, the group soon became known as the "suicide squad."

Because of this, Von Kármán asked for the tests and research to be carried out far away. The project moved to Arroyo Seco, exactly where NASA's Jet Propulsion Laboratory is today. In 1938, the work achieved solid results, even proving theoretical studies by Malina and the Chinese student Hsue-shen Tsien. They were then recognized and gained visibility, attracting the attention of General Henry A. "Hap" Arnold, Chief of the Army Air Corps. Because of the war, the General became interested in the new technology, especially the potential for "Jet-Assisted-Take-Off" that could improve the takeoffs of very heavy warplanes. After the General's visit, a $10,000 contract came from the Air Corps to develop JATOs (Jet-Assisted Take-Off units). And so the suicide squad got an official name—Guggenheim Aeronautical Laboratory, California Institute of Technology (GALCIT).

In 1939, Jack and Helen were introduced by a couple of brothers and friends, John and Frances Baxter, to the Thelema church, an occult society founded by Aleister Crowley that was based on sex magick (yes, with a k, it refers to a magic ritual) and black magic. Aleister Crowley, British man, who proclaimed himself to be the beast, was an iconic figure who launched his religion. (He said that he received a channeling when he went on his honeymoon in Cairo, Egypt, from an entity called Aiwass that resulted in The Book of the Law, this book is considered the foundation of the religion of Thelema.) In a time of rigidity and social moralism, he had many famous followers besides Jack Parsons. Just to give you an idea of the influence of the guy and his ideas, Jimmy Page (of Led Zeppelin), The Beatles, David Bowie, Jack Kerouac, The Rolling Stones, Jay-Z, Kanye West, and many others were inspired, believing in and using the symbols of Crowley's magic. From then on, Jack began to have two opposite sides to his personality: a renowned scientist, chemist, and pioneer—charismatic, yet also an occultist and bohemian who dove deep into the abyss of his own psyche, "talked" to entities, used exotic symbols, practiced orgies, and believed wholeheartedly in the great beast.

However, what do the two lives he explored have in common? Innovation, the unexplored, audacity, pushing limits, experimenting without safety, and a passion for risk whether in the case of exploding rockets or summoning demons.

The more he consolidated himself and made history in rocket science, the more he fell in love with the metaphysical and occult world.

The group of scientists was gaining renown and prestige. Parsons invented the solid JATO fuel, with amide, corn starch, and ammonium nitrate bound together in the JATO unit with glue and blotting paper. This creation was called GALCIT-27. The first JATO was tested using an ERCO Ercoupe plane (of the Engineering and Research Corporation) in July 1941. It exploded. Jack then realized that the ammonium nitrate could be altered due to the change in weather during the night. Parsons and Malina therefore filled the JATOs in the early morning, and the operation was considered successful. In 1942, Malina suggested replacing the gasoline with aniline, which resulted in a successful test, but this time was five times safer than GALCIT-27. The group then created Aerojet to sell more than 60 JATO engines to the United States Army Air Corps.

GALCIT Project Number 1 during the JATO experiments, 1941. From left to right: Fred S. Miller, Jack Parsons, Ed Forman, Frank Malina, Captain Homer Boushey, Private Kobe, and Corporal R. Hamilton. Public Domain.

Parsons changed the future of rocket technology when he suggested using asphalt in the GALCIT-53 design. This design proved 427% more powerful and safer than GALCIT-27, as

asphalt is stable in changing weather conditions and can be mass-produced. In 1943, the Air Corps purchased two thousand JATOs from Aerojet, committing $256,000 toward Parsons' solid-fuel type.

As Parsons' success and recognition grew, he repurchased a mansion on Millionaire's Mile in Orange Grove. He made the Ordo Templi Orientis (O.T.O.), Thelema Church, also called Agape Lodge, his home. He had a thirst for magic and rituals. The Order had degrees that you could climb according to the time and effort applied to it, Jack wanted to skip degrees. So he quickly initiated himself into the degrees that were approved by his mentor, Aleister Crowley. Crowley lived in London and suffered from asthma and heroin addiction, but they exchanged letters all the time and Aleister greatly admired a renowned scientist who had joined the Order. The house was home to artists, anarchists, gays, Black people, and all the socially excluded of the time. It was a bohemian, happy, crazy, and transgressive house. Parsons nicknamed the house the Parsonage. His wife Helen began to have a whole relationship with the magus of the Order, while Jack left Helen for her sister. Animal sacrifices took place during the rites, and the Pasadena society began to get angry and accused them of making human sacrifices, which was never proven. The police often knocked on their door to check the neighbors' complaints, but they only found a charismatic and charming man, Jack Parsons, full of stories and smooth talk.

Jack gave almost all his salary to support Thelema and its followers, and even sent money to Crowley in London. Of course, all this spending of money and enthusiasm for Thelema and the time he spent performing rituals began to affect his professional life. Jack invited the secretaries from his work to participate in the rituals, since he constantly needed more members for the occult society. Parsons had a habit of reciting *Ad astra per aspera* (through hardships to the stars), a Latin phrase that he had been saying with Edward since he was a child when they were launching a project. He also began reciting Crowley's poems and performing small magic rituals during his work. His occult side raised an alarm, since he was working on confidential projects and there were rumors that Crowley was an agent of British intelligence who was betraying intelligence by spying for Germany. The Agape lodge began to be investigated by the FBI and the Pasadena police. Parsons was promoted to leader of the Order, and then the former magus was expelled from the lodge. His ex-wife Helen left with the magus, pregnant with his child.

The GALCIT project grew exponentially due to the United States' concern about Nazi Germany. They received $3 million in funding to develop rocket-based weapons and were renamed JPL (Jet Propulsion Laboratory). Jack was asked to sell his share of JPL and Aerojet, since he was being investigated and involved with the occult. Under pressure, he sold his share, completely outraged, and received $11,000.

Jack's life began to decline and become more complex. He no longer had the salary to support the Order, so he started renting rooms in the mansion to non-Thelemites. After reading a newspaper ad for room rentals, the iconic figure L. Ron Hubbard—yes, the future founder of Scientology—appeared.

From 1945 to 1946, Jack and Hubbard became best friends. Hubbard dived headfirst into black magic, witchcraft, and voodoo with Jack. The two would spend entire days trying to summon evil. However, Hubbard began a full-time relationship with Sara, Helen's sister, Jack's current girlfriend. Jack, even while practicing polygamy, became jealous and started to practice rites so that a woman would appear to him. Hubbard stayed with Sara and the two convinced Jack to invest money in a project called Allied Enterprises, which consisted of buying three yachts in Miami and selling them at a higher price between the Panama Canal and the West Coast, thus making a profit. Parsons fell for the con and gave them $21,000, so they went to Miami, bought a yacht and tried to flee the United States.

Jack discovered the scam while they were still in Miami and had already bought a yacht to escape and keep the rest of the money. Parsons flew to Miami and did black magic in a hotel to the god Mars, who—according to him—created a storm in the ocean that prevented the couple from fleeing. He sued them both, but Sara claimed that if he didn't drop the lawsuit, she would accuse him of abuse, since she was a minor when they had the relationship. Jack dropped the lawsuit and returned to Pasadena, broke. He met his new wife, Marjorie, whom he said is an evil goddess named Babalon who had appeared after his rituals. From then on, he could no longer work in his field, ran out of money, sold his house, closed the Order, and began to work on random jobs. In 1952, Parsons received explosives for a film set (he did pyrotechnics for Hollywood films) and began to work on it in his home laboratory. An explosion occurred and Jack died minutes later at Huntington Memorial Hospital. Some say it was part of a spell, while others say he was murdered. The cause of death, according to the police, was Parsons' mixing of fulminate of mercury in a coffee can, which caused the explosion.

What an extravagant, brilliant, tragic and sad story Jack Parsons, the forever co-founder of JPL and Aerojet, had. The purpose of this article is not to judge him, but rather to honor a figure who passed through our planet so quickly and brought so much innovation.

This Week in *Tech* History

March 4, 1948

Dabney Takes All At Barn Dance

The end of the annual Blacker-Dabney Barn Dance last Saturday night saw Dabney still in possession of the Interhouse Trophy, as its crew finished four men ahead of the challenging Blacker squad. Perhaps trying to follow in the footsteps of some of the participants, the Trophy itself did not last the evening and will have to be replaced.

Dabney Victorious

Dabney was also victorious in the flamer contest, with the team of Fullerton and Royce defeated Curray and Chambers.

The beauty contest was won by Miss Scripps (Sally Provine), Muehlberger's date, who was awarded a box of Kleenex by Judges Marshall and Fullerton. Chuck Auerbach MC'ed the contests and half-time entertainment, which was provided by Dave Warren's all-Dabney jazz combo.

Dancing Attempted

For the rest of the evening, the couples crowded together in the Richard L. Guy Post and danced to recorded polkas, marches, etc. Dancing was like running blindfolded through a crowded subway, but it was chummy, and no one seemed to mind. The serving of refreshments began, sustained, and rounded off a well-planned and well-executed program.

INTERVIEW SCHEDULE: SEE PG. 2, COL. 1

Ricketts to Become French Slum Cafe

The costumed APACHE DANCE this Saturday night in the Ricketts underground cafe promises to surpass even the celebrated Sorb dance in the line of novel themes. Typical costume requires the men to be unshaven, dirty, tough and dressed in old, loud trousers, striped T-shirt and beret.

New Look Out

Feminine costume calls for such fineries as vivid makeup, bow garters, heavy jewelry, appropriate sweaters, and above all, skirts above the knee. Absolutely no exceptions will be made to this rule.

Refreshments in keeping with the theme will be served in quantity, and music will be furnished by Monsieur Hal Neely.

Origin of "Apaches"

Derivation of the name, APACHE, supposedly comes from the time of early American settlement when raiding gangs of thieves beset the city of Paris. Because of their tactics, these gangs were often given names of American Indians, of which the Apache tribe was particularly the most cruel and merciless.

Strongest of the gangs and the ones to survive the longest were the "Apaches," who took refuge in the slum districts. Here they frequented the cheap cafes and dives such as will be seen in Ricketts Lounge next Saturday night.

Frosh Lunchers Hear 'Palestine' Talk

Dr. Henry McCreey gave a most enlightening talk on "What Is Happening in Palestine" at Frosh Lunch Club yesterday. His talk was made especially interesting because of the personal experience he has had in the Near East. Presiding at the meeting was John Fee, newly elected Lunch Club president.

The president's cabinet contains five house representatives: Ed Pyatt, Blacker; Joe Cain, Dabney; Fred Eisen, Fleming; Jim Enslow, Ricketts, and Bob Cobb, off-campus; as well as Vice-President Ulrich Merton, Treasurer Earl Hefner, Social Chairman John Lewis, and Publicity Chairman Bob Smith.

Next week's meeting, the last of the second term, will feature Doc Haynes of the Athletic Department as speaker.

Big Brawl

Last Saturday was the scene of the Blacker-Dabney Barn Dance in Monterey Park, although it might seem a bit of an exaggeration to term it a dance. Music could be faintly heard over the high-pitched laughter, feminine squeals, and the gurgling sound of beer being poured out. The place was much too small for dancing but there were numerous people out there wriggling about and jostling each other while Fullerton insisted on playing polkas.

Dabney Wins Crew Race, Flamer and Beauty Contest

Dabney won the crew race as well as the flamer contest. Auerbach was much chagrined to have to use good bourbon for the latter contest. There was also a beauty contest. The winner was Miss Scripps, cheered on by Bill Muehlberger. She won by the flip of a coin over a young girl from Hollywood High School, the sister of a

The California Tech Journalistic Principles

The News-Opinion divide
All articles shall be clearly and explicitly labeled as either News or Opinion/Editorial.
News articles report on topics that have been thoroughly researched by Tech staff writers, and should be impartial to any one point of view. In a News article, the writer shall not insert their own personal feelings on the matter; the purpose is to let the facts speak for themselves. The Tech assumes full responsibility for all content published as News.
In contrast, Opinion articles (including Letters to the Editor) may be written and submitted by anyone on any topic; while the Tech will edit all published Opinions to ensure no wrong or misleading information, we do not otherwise interfere. Again, the role of the Tech here is to help the whole campus communicate their ideas and share their stories, not promote specific ones. Content published as Opinions do not necessarily represent the values of the Tech or our staff.
An exception to this is Editorials, which are written by Tech staff and represent official opinions of the Tech. Any information and sources in Editorials shall be held to the same standard as News reports, but there is no promise or expectation of impartial coverage.

Fair Reporting
All facts of major significance and relevance to an article shall be sought out and included.
If an assertion is made by a source about a specific person or organization, they shall be contacted and given a reasonable amount of time to respond before publication. In other words, no second-hand information or hearsay shall stand on its own.

Quotes and Attribution of Information
Facts and quotes that were not collected directly by Tech reporters shall be attributed. Articles shall clearly differentiate between what a reporter saw and heard first-hand vs. what a reporter obtained from other sources.
Sources' opinions are just that — opinions. Expert opinions are certainly given more weight, as are witness opinions. But whenever possible, the Tech shall report facts, or at least corroborate the opinions. A reporter's observations at a scene are considered facts for the purposes of a story.

Sources
All sources shall be treated with respect and integrity. When speaking with sources, we shall identify ourselves as Tech reporters and clarify why we would like to hold an interview. Sources for the Tech will never be surprised to see their name published.
In published content, we shall put our sources' quotes into context, and — as appropriate — clarify what question was being answered.
We always ask that a source speak with us on the record for the sake of journalistic integrity. We want our audience to receive information that is credible and useful to them. Named sources are more trustworthy than unnamed sources because, by definition, unnamed sources will not publicly stand by their statements.
That being said, we realize that some sources are unwilling to reveal their identities publicly when it could jeopardize their safety or livelihood. Even in those cases, it is essential that the Tech Editor-in-Chief knows the identity of the source in question. Otherwise, there can be no certainty about whether the source and their quotes were falsified.
This also applies for Letters to the Editor and Opinion submissions to the Tech. If the author requests that their piece is published anonymously, they must provide a reason, and we shall consider it in appropriate circumstances. No truly anonymous submissions shall be published. Conversely, no submissions shall be published with the author's name without their consent.
When we choose not to identify a source by their full name, the article shall explain to readers why.

Corrections Policy
We strive for promptness in correcting all errors in all published content. We shall tell readers, as clearly and quickly as possible, what was wrong and what is correct.
Corrections to articles will be immediately updated on the online version of the Tech at tech.caltech.edu. If appropriate, corrections will also be published in the following Tech print issue.

Honor Code Applies
In any remaining absence of clarity, the Honor Code is the guiding principle.

The California Tech

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The California Tech #21

CalGuesser

Every issue we'll show you a different location on campus. Find the place and find the QR code hidden there to sign the log book and **maybe win a fabulous prize???**

"On campus" is defined as the convex hull of the buildings shown on caltech.edu/map/campus.
The QR code will be hidden somewhere within the pictured area.

LAST ISSUE'S WINNERS!

CalGuesser #20 – February 18, 2025

Congrats, you found it!
Leave your name/pseudonym, year/department, and date found :)

Maya D EE 2026 2/18 11:50 am	Madi, Ven '28 2/18 3:32
Richard, EE 2027, 2/19	Max Ven 2.18 16.35
Kevin K, '93 2/19 12:58. haven't been by the North houses in a long time :(	
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