

Rosenbaum inaugurated as Caltech's ninth president

NEERA SHAH
Editor-in-Chief

Dr. Thomas F. Rosenbaum was inaugurated as Caltech's ninth president on Oct. 24. The festivities took place over two days, beginning with a panel discussion on Oct. 23.

The "Science and the University-Government Partnership" panel was open to the public; Robert J. Zimmer, president of the University of Chicago and member of the National Science Board, led the discussion on future directions of

science and its evolving relationship with government, industry, and private philanthropy. Everyone was also welcome to attend the inauguration convocation and the all-campus reception that followed.

The inauguration ceremony began with a procession led by Fiona A. Harrison (chief marshal, chair of the presidential search committee and Benjamin M. Rosen Professor of Physics), Konstantinos P. Giapis, (convocations marshal and professor of chemical engineering), and eight Nobel

and Crafoord laureates. David L. Lee (PhD '74), chair of the Board of Trustees, presided over the ceremony. The Caltech Convocation Brass and Percussion Ensemble, directed by William W. Bing, lecturer in concert band and jazz band, played during the procession.

Lee commented during his opening remarks that the inauguration marked the opening of a new chapter for Caltech and introduced Richard C. Flagan, chair of the Officers of the Faculty and the Irma and Ross McCollum-William H. Corcoran Professor of Chemical Engineering and Environmental Science and Engineering, to welcome everyone on behalf of the faculty.

The event was attended by a California State Assembly member, the mayor of Pasadena



Robert A. Millikan's hood is placed on Thomas F. Rosenbaum as per Caltech tradition for inaugurating presidents.

Photo Courtesy of Michael Wong



Members of the Caltech Convocation Brass and Percussion Ensemble play during the procession, directed by William Bing.

Photo Courtesy of Michael Wong

and his wife, and Pasadena City Council members. Coming from farther away, delegates from other academic institutions traveled to attend the event; among these were Michael Collins from University of Oxford, Bethany L. Ehlmann from Brown University, Marc Kastner from Massachusetts Institute of Technology, Subra Suresh from Carnegie Mellon University, and James Howe from Pepperdine University. Representatives from

three learned societies were also in attendance: Edward Stone of the National Academy of Sciences, Matthew Scott of Carnegie Institution for Science, and Steve Hindle of Huntington Library and Gardens.

Junior Catherine Jamshidi, president of the Associated Students of the California Institute of Technology (ASCIT), gave a speech on behalf of the

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Elon Musk announces "time to unveil the D" on Twitter

CASEY HANDMER
Contributing Writer

motor, and the fastest version, the P85+, does 0-60 in a staid, lumbering 4.2 seconds. If there's



Tesla Motors announced the Model P85D in October.

-teslamotors.com

On Oct. 1, Elon Musk tweeted "... time to unveil the D ..." Unlike previous mysterious tweets, the substance of this one was guessed reasonably quickly. Two years after the release of the revolutionary Tesla Model S, an updated version is available.

D stands for dual motors. The current Model S has only one

one thing everyone can agree on, it's that this is embarrassingly slow. More seriously, the dual motor approach is more efficient at a range of speeds and forms an important test of the powertrain for the upcoming Model X crossover.

The new model looks the same but can reach 60 mph from a standing start in 3.2 seconds,

pulling an average of 0.9 gs. The number of road-legal cars that can do this can be counted on one hand. There's the Bugatti Veyron and a handful of other supercars which cost in excess of a million dollars. There are a few electric one-offs, including the Wrightspeed X-1 (2.9 seconds), the Rimac Concept 1/Volar E (2.8 seconds) and the White Zombie, a converted 1972 Datsun that reaches 60 mph in 1.8

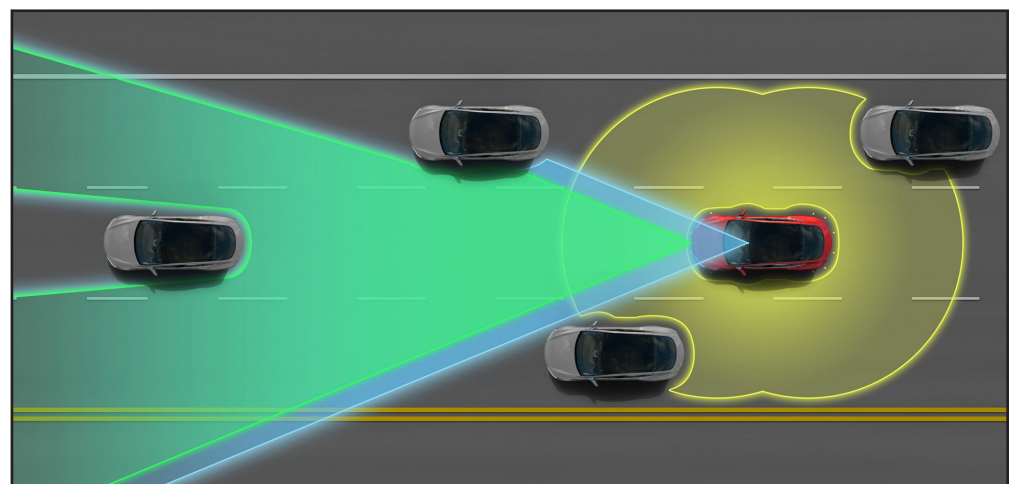
seconds and dispatches the quarter mile in 10.24 seconds. But none of them seat five with cargo, and none are controlled by a giant touchscreen.

Also, none of them have autopilot. What? Tesla also unveiled their rapid

(less than a year since starting) progress with car autopilot. Rather than aiming for complete autonomy, like Google or the DARPA grand challenge, Tesla has decided to pick a bunch of cheaper, more versatile sensors, then gradually upgrade the software that translates their input to car control. Tesla's sensor array includes GPS, forward-looking radar, omnidirectional ultrasound

(sonar), and a forward looking camera. In combination, they work well enough to hold or change lanes, perform adaptive cruise control, check for cars or objects in blind spots, recognize speed limits, and automatically brake the car to avoid a collision. It remains to be seen how well this system works in practice, or how effective it actually is in combating driver fatigue and

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Tesla unveiled progress with their autopilot system and sensor array with features such as forward-looking radar.

-extremetech.com

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Caltech Y Column

CALTECH Y

The Caltech Y Column serves to inform students of upcoming events and volunteer opportunities. The list is compiled by Neera Shah from information given by the Caltech Y and its student leaders.

More information about the Caltech Y and its programs can be found at <https://caltechy.org>. The office is located at 505 S. Wilson Avenue.

Upcoming Events:

1. Mt. Baldy Hike

Saturday | October 25th | 8 AM

Join the Caltech Y Outdoor Adventures club on Saturday, October 25 on a hike to the summit of Mt. Baldy. At 10,064 feet in elevation, Mt. Baldy is the highest peak in the San Gabriel Mountains and Los Angeles County, and the summit provides views that stretch from the Pacific Ocean to the Sierra Nevada Mountains. There is a choice of two starting points for the trail, making the hike either 6.5 or 8.5 miles long with 2200 or 3500 feet elevation gain respectively, depending on the starting location. The shorter option uses the chairlift at the Mt. Baldy ski area to save one mile and 1300 feet elevation gain each way and the longer option hikes the trail underneath the chairlift. The hike is moderately strenuous, and the summit elevation of over 10,000 feet adds to the difficulty of the trail.

We will leave the Caltech Y at 8:00 am on Saturday, October 25 and return in the afternoon, sometime around 3:00 pm. If you have any questions, email Dorothy Pan (dpan@caltech.edu).

Sign up for the hike here: <http://goo.gl/forms/R3Tdvyo4d4>

2. Flying Blind: Reproducibility in High Energy Physics

Wednesday | October 29th | 12:00 to 1:30 PM | 109 Jorgensen | Lunch Provided | RSVP required

The Caltech Y Science Policy Lunch Series presents Professor Frank Porter

Earlier this year, Marcia McNutt, editor-in-chief of Science, wrote an editorial entitled "Reproducibility". Almost concurrently, NIH director Francis Collins and Deputy Director Lawrence Tabak published a comment in Nature entitled "Policy: NIH plans to enhance reproducibility". The problem of initial results that do not reproduce in subsequent investigations is widely recognized and current in the bio-medical and social sciences. What about the physical sciences? I will present a major case where this problem has been encountered in high energy physics/nuclear physics research in the present millennium. I'll discuss the underlying failings leading to such occurrences, as well as the rather obvious (in principle) preventative measures. The question remains whether there are differences between these research enterprises, and this we can explore.

Please join us to kick off our series on scientific reproducibility with a lunchtime discussion of reproducibility in high energy physics experiments and how the causes and solutions relate to those seen in other scientific fields. Lunch will be provided, and is funded by the Housner Fund.

3. Full Moon Hike

Tuesday | November 4th | 8:30 - 11:00 PM

Join the Caltech Y outdoors group for a unique hiking experience. On the night of Tuesday, November 4, we will use the light of the full moon to hike to Echo Mountain. This easy hike is five miles round trip, and provides great views of the city lights of LA. In addition, we will hike to the ruins of the old Mount Lowe Railway and the Echo Mountain Resort. We will meet at the Y at 8:30 pm and return to campus at around 11:00 pm. Sign up using the link below. You can email Jeremy Sandler at jsandler@caltech.edu if you have questions.

4a. Pasadena LEARNS

Friday | 3:00 - 5:00pm | Madison and Jackson Elementary School | Pasadena

Come volunteer at Madison and Jackson Elementary School! We are partnered with the Pasadena LEARNS program and work with their Science Olympiad team or do regular tutoring along with occasional hands-on science experiments. Transportation is provided. For more information and to RSVP, contact vkumar@caltech.edu.

4b. Hathaway Sycamores

Thursday | 5:30-8:30pm | Highland Park

Volunteer at Hathaway-Sycamores, a group that supports local underprivileged but motivated high school students. There are a variety of ages and subjects being tutored. The service trip includes about an hour of travel time and 2 hours of tutoring. Transportation is included. For more info and to RSVP email Sherwood Richers at srichers@tapir.caltech.edu.

Ongoing Volunteer Opportunities:

1. Pasadena Unified School District Tutors Needed

Pasadena high schools have started after-school tutoring programs coordinated by teachers. Tutors are needed at each school to help out. This is a great way to work directly with teachers and students. Tutors may volunteer on any days for which they are available. High school tutoring hours:

- Blair High School M-F 3:20-4:30 (Math) contact Ronaldo Hunter at (626) 720-2578

- Marshall High School M-F 3:05-4:30 (All Subjects) contact Cati Acevedo at (626) 720-2587

- Muir High School M-Th 3:20-6:00 (All Subjects) contact Nicole Stephens (626) 720-2567

- Pasadena High School 3:20-6:00 (All Subjects) contact Arman Ter-Grigoryan at (626) 720-2589

If you have any questions feel free to contact the Caltech Y at caltechy@caltech.edu.

Caltech hosts range of events for inauguration

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undergraduate students to welcome Dr. Rosenbaum and his wife Katherine T. Faber, who is joining Caltech as the Simon Ramo Professor of Materials Science in the Division of Engineering & Applied Science, to the university. Sunita Darbe, chair of the Graduate Student Council, spoke on behalf of the graduate students. Representing Caltech alumni was Samantha Foster (BS '98), president of the Caltech Alumni Association, who ended the welcoming remarks as she said, "Today, our family grows by two, and we could not be more pleased."

The keynote address was delivered by Don Michael Randel, chair of the board of the American

Academy of Arts and Sciences and president emeritus of the University of Chicago. He is also president emeritus of the Andrew W. Mellon Foundation and has served as provost of Cornell University and as dean of Cornell's College of Arts and Sciences. His background is in music: he earned his bachelor's, master's, and doctorate degrees in music at Princeton University.

In his speech, Randel focused on the importance of education, touching on the necessity of investment in education, the current state of education in the United States, and how Caltech contributes to it. Commenting on a trait that Caltech values in its students, Randel expressed the importance of curiosity in making advancements in the future, as he said, "Curiosity matters a lot, and who's to say where it might lead?"



Members of the processional begin the inauguration ceremony.

Photo Courtesy of Nehaly Shah

The traditional college song "Gaudeamus Igitur" was performed by the Caltech Glee Club after the keynote address and before the investiture of the president. President Rosenbaum gave his inaugural address after Robert A. Millikan's academic hood was passed on to him. In his address, President Rosenbaum also stressed the importance of curiosity in Caltech students and was enthusiastic about the opportunity to lead a university of students that are always pushing the boundary between the impossible and the possible.

The traditions observed during the inauguration ceremony date back to the 14th century. According to David Elliot (1917-2007), Caltech professor of history, emeritus, the cap or mortarboard is a sign of the master, while the gown is "the basic livery of the scholar" and different sleeves distinguish between the bachelor, master, and doctor. The color in the main body of the hood

identifies the university, while the color of the binding indicates the subject of the degree (e.g., orange for engineering, gold for science, baser copper for economics, and white for arts and letters).

A tradition unique to Caltech inaugurations is the passing of Millikan's academic hood to the new president. Millikan was the administrative head of modern-day Caltech, but never officially assumed the title of president. He also was Caltech's first Nobel Prize winner. This tradition began with the inauguration of president emeritus Harold Brown in 1969.

The inaugural address was followed by the performance of the Alma Mater "Hail CIT," led by the Caltech Glee Club. The recessional led to the all-campus reception on the Olive Walk, where there was a variety of food available (such as Boba tea, mini sliders, and fruit) and a live band (The Draw) played music as attendees celebrated the new president.



(Left) ASCIT President Catherine Jamshidi welcomes President Rosenbaum on behalf of the undergraduate students. (Right) President Rosenbaum delivers his inaugural address.

Photos Courtesy of Michael Wong

Duo strikes a balance in hip-hop album *Run The Jewels 2*

NAILEN MATSCHKE
Contributing Writer

Just about anyone who listens to hip-hop regularly is aware of the waves that Run The Jewels has been making since dropping its eponymous debut in 2013. The duo, composed of rapper Killer Mike and rapper-producer El-P, has been able to pull off straightforward, hard-hitting tracks while still remaining innovative. This is largely due to El-P's particularly electronic-influenced production style, taking the core rhythmic patterns typical to East Coast hip-hop and presenting them in a bass-heavy, distorted, and still well-balanced package, leading to music that I'm pretty sure would be almost as fun to play as loudly as possible even if every verse was utterly terrible. Fortunately, neither Killer Mike nor El-P is a slouch when it comes to spitting rhymes, striking a complementary balance between the raw technical ability of the former and the more aggressive style of the latter as the two trade verses on pretty much every track they've ever released.

The single most successful quality of Run The Jewels has been their ability to produce eminently entertaining and enjoyable music for even casual fans of the genre, although there is no doubt that the hype for Run The Jewels 2, their second release, has hit a massive level within the community in the past few weeks. After three universally successful singles demonstrating that Run The Jewels knew what fans wanted, the surprise release of the album as a free download on Oct. 24 was almost too good to be true. Fortunately, the album does not disappoint.

RTJ2 opens up with the fantastic introduction of an audio clip of Killer Mike shouting expletive-laced exclamations, before the synths creep up and he begins a minute and a half of bragging that builds from speaking level to yelling. Throughout this, El-P's production works in some airy synth chords and guitar notes, eventually adding a slow, fat beat and some distorted saxophone and trumpet cadenzas that carry over into El-P's verse, ending with the real point of the album: "Run The Jewels is the answer, your question is 'What's poppin'?"

From this starting point, the next few tracks of the album—coincidentally, all

three of its singles—only build speed. "Oh My Darling Don't Cry" jumps into one of the heaviest beats I've heard in any style, with an

undulating bass tone that doesn't really stop making noise, and just gets louder when there's supposed to be a beat. This is topped with some simple synthesized snare and some sort of bird song-like sample on loop, and apart from numerous samples that's all Killer Mike and El-P need to trade absolutely on-fire verses, which

are again basically about how great they are. After a couple minutes of back-to-back-to-back rhymes, El-P switches up the beat a bit with some hyperactive percussion and some more chopped-up samples of ambiguous origin, allowing each to exercise some different rhythms in their vocals. While these two artists had a history of collaboration even before Run The Jewels ever existed, it seems as though the synchronicity of their act is only improving with time; these two are on the same wavelength and out to prove that they're some of the best in the game.

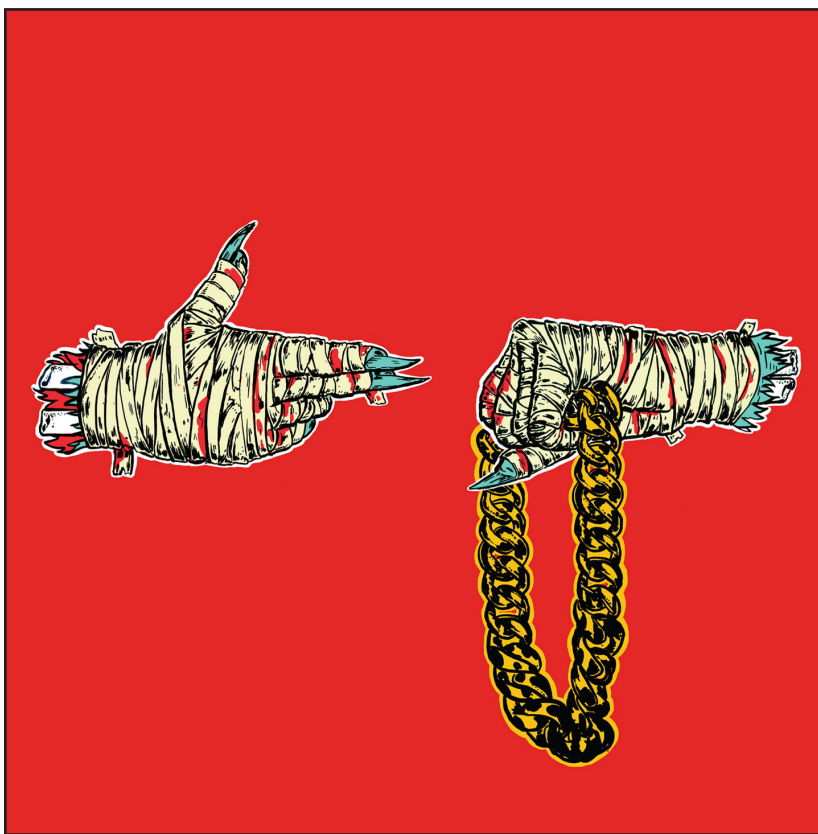
Next up is "Blockbuster Night Part 1," which serves as another showcase for El-P's unique but stylistically on-point production, with a distant synth line that becomes an in-your-face groove after a cuckoo clock sample coinciding with a related Killer Mike line. The instrumentals aren't the most interesting in the world, but that's distinctly not the point—they're loud, angry, and cool, and in a scene that hasn't seen too many great artists from

the East Coast recently it's refreshing to hear the darker and rawer sounds prevalent in Run The Jewels' music.

except for some clever wordplay and subject matter ("the only thing that close quicker than our caskets be the factory") that makes me wish his former band still existed, it's nonetheless a good choice for a feature and definitely entertaining to hear.

It's at this point that the album's biggest problem becomes apparent, which is that it's undeniably front-loaded—like I mentioned earlier, the album's singles so far are just tracks two through four—and while the rest of the album isn't by any means bad, it's just not quite as good. There are definitely exceptions, with songs like "Lie Cheat Steal," my current favorite from the album, for its mix of some of great instrumentals, technically and lyrically impressive verses, and a memorable hook. Moments such as when Killer Mike rapidly spits questions like "Who really run that man that say he run this?" and later suggests "could it be the man behind the man behind the man behind the throne?" are attention grabbing and demonstrate that Run The Jewels isn't just pandering to its audience.

Even if later tracks such as the politically-charged "Early" or the mellow "Crown" don't quite bring the same fury of the album's first half, they also don't lack in solid rapping and interesting production (especially on the Travis Barker-featuring "All Due Respect"), and are enjoyable the whole way through. The duo isn't revolutionizing hip-hop any time soon, but Run The Jewels has to reach an almost unmatched level of execution that deserves a listen from any self-respecting hip-hop head.



-<http://allhiphop.com/>

Interestingly, the next track, "Close Your Eyes," features the Rage Against The Machine frontman Zack de la Rocha, and has a beat largely based on a looped sample taken from de la Rocha's repeated "hook" of variations on "run them jewels fast." While his verse itself is largely forgettable

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The Feynman Prize is made possible through the generosity of Ione and Robert E. Paradise, with additional contributions from an anonymous local couple. Nominations for the Feynman Teaching Prize are welcome from faculty, students, postdoctoral scholars, staff, and alumni.

All professorial faculty of the Institute are eligible. The prize consists of a cash award of \$3,500, matched by an equivalent raise in the annual salary of the awardee. A letter of nomination and detailed supporting material, including, but not limited to, a curriculum vitae, course syllabus or description, and supporting recommendation letters

should be emailed to kkerbs@caltech.edu or directed to the Feynman Prize Selection Committee, Office of the Provost, Mail Code 206-31, at the California Institute of Technology, Pasadena, California, 91125. Nomination packages are due by January 5, 2015.

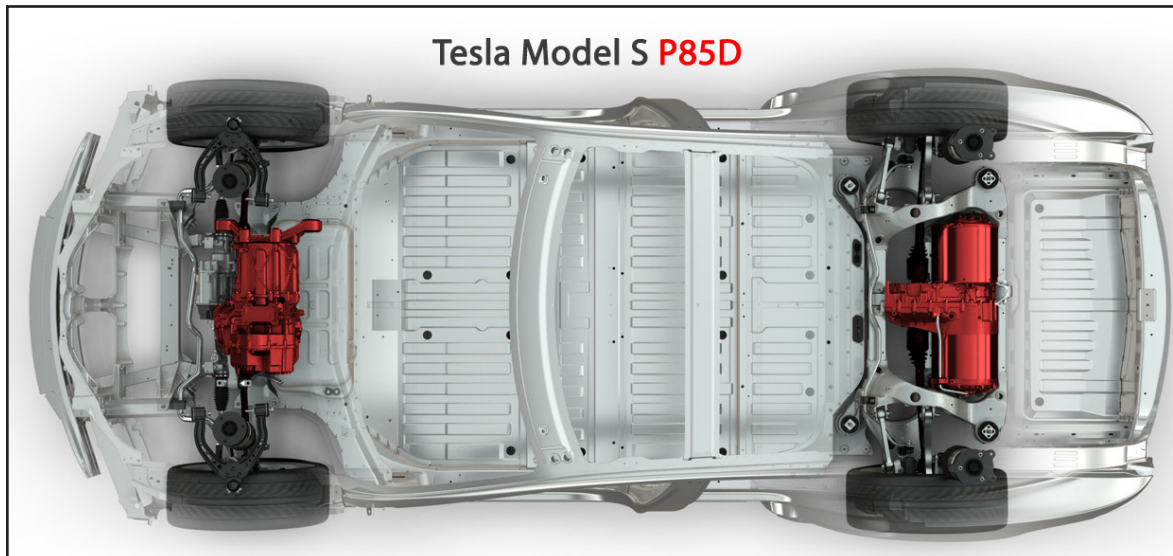
Additional information including guidelines for the prize and FAQ may be found at <http://provost.caltech.edu/FeynmanTeachingPrize>. Further information can also be obtained from Karen Kerbs (626-395-6039; kkerbs@caltech.edu) in the Provost's Office.

Casey reviews features of the new Tesla models

Continued from page 1

carelessness.

What's the big deal with Tesla anyway? It's a relatively tiny startup that makes cars. Fancy, shiny, and extremely expensive cars. If there's one thing cities in the US don't need, it's more cars. Given that cars will continue to exist and make modern lifestyles possible, Tesla plans to introduce a cheaper mass market car in 2017, codenamed Model 3. Probably a scaled down Model S, it will rely on mass production and innovative battery construction to lower costs to around the \$35,000 mark, which is quite affordable when you factor in reduced cost of ownership. To get there, Tesla is building a battery "Gigafactory" in Nevada. Tesla once chose the 18650 cell to exploit its ubiquity



The new model, P85D, has a dual motor system.

and availability—today producing 30,000 cars a year, Tesla consumes more than 60% of world supply. Getting battery costs below \$100/

kWh is seen as essential for their wide adoption, and certainly their use in more facets of life is part of the Tesla/SolarCity master plan.

Solar generation can be buffered at every scale in a future smart grid with the introduction of in-home

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battery packs with incredible and affordable capacity.

In the more distant future, electric propulsion has the potential to revolutionize air transport too. Battery energy density need to improve by a factor of 3 to 10, and powering light planes or even long-haul flights electrically is certainly possible. But more than that—electric motors have a much higher power-to-weight ratio than almost any other type of engine. The explosion of toy quadcopters is a testament to this fact. An airplane with a power-to-weight ratio greater than one is capable of vertical takeoff and landing and, with appropriate turbine design, supersonic flight. For the first time, humans may fly in planes that aren't immediately analogous to birds.

Techers reveal they want changes in HSS classes

LORI DAJOSE
Contributing Writer

It's a common sentiment you'll find throughout university applications, job interviews, and grant proposals—having a "well-rounded" education is crucial to success. For Caltech undergraduates in particular, this means that in addition to a rigorous and broad spectrum of science and math classes, they must take 108 units of humanities and social science (HSS) classes over four years.

The Caltech catalog states, "Significant study in the humanities and social sciences is an important component of Caltech's core curriculum, giving alumni the ability to navigate the societal, political, and economic factors that influence, and are influenced by, their work." Based on a survey of 230 undergrads, many students agree that HSS classes are important. One noted, "This is Caltech; we are supposed to learn the truth about the universe. HSS is a key part of understanding the human experience."

But while the 12-class requirement is, conceptually, a good idea for a diverse education, 62% of students surveyed said that the requirement should be lowered. However, this isn't due to a lack of appreciation for HSS—for many students, the courses offered just aren't meeting their needs.

57% of students said that HSS classes aren't offered often enough. Out of 18 advanced economics classes listed in the catalog, only seven are offered during the 2014-15 year.

One advanced psychology class is offered, and no advanced anthropology courses. Often, the classes that are offered are quickly filled, forcing some students to cram in HSS classes before they graduate.

For social science, it's a tricky task for the department to address these complaints and still maintain

adequate staff for the three undergraduate options—business economics and management (BEM), economics, and political science. "BEM is very popular, and we've made staffing it a priority," commented Professor Federico Echenique, the executive officer for social sciences. "I really wish we could do more."

With regards to the classes that are offered, almost half of the students surveyed didn't think they're diverse enough. In a free-response portion of the survey, a very popular request was for linguistics classes. Many also suggested courses in more specific areas—for example, rather than broad courses on "modern European history," a course that focused solely on a single war. Several students suggested offering cultural courses, such as gender studies, or Asian studies. For the social sciences, which can often be heavily mathematical and quantitative, some students suggested "applied social sciences." One student commented, "It's interesting to learn about the Black Death, but what I want to know is: how can I prevent it from happening again?"

Another problem students had with HSS classes is the failure to provide a formal writing education. The catalog states, "Writing is an important method for developing and sharing ideas." But while HSS classes require writing, a number of students feel that they are not being taught how to write. "They always stress the writing aspect in the HSS classes, but I always feel like I get worse at writing after each class," one student wrote in the survey.

Though the recently reopened Hixon Writing Center offers writing guidance from peer and professional tutors, students' prioritizing of science courses often limits the time and energy they have for revision of humanities papers.

"Although I think students see advanced hums as refreshing and just as rigorous as science courses, it's difficult to get them to take writing seriously," said Professor Cathy Jurca, executive officer for the humanities. To address that, the core curriculum now

requires that advanced humanities are taken on grades. While the intent is obviously to incentivize development of writing skills, some students view it as just another addition to an already-demanding workload.

The majority of Caltech students surveyed are not opposed to HSS classes in general. But with a limited selection of courses, balancing the strict 108-unit requirement on top of rigorous scientific focus is frustrating.



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After a hiatus, here are some water polo highlights



For a brief moment I thought the person in this picture was CJ. When I downloaded the picture I realized that this is, in fact, Chris Bradley...whose name I always think is Chad Bradley.

-gocaltech.com

This week my fantasy football team killed it thanks to strong performances from Matt Forte and Arian Foster. Also, here is a huge paragraph about some water polo games. One of those games is a "W"!!!! Shout out to the athletics website for these, as usual.

GOCALTECH.COM
Actual Sports Content Editor

PASADENA, Calif. (Oct. 24, 2014) – Junior Jim Blackwood (Rancho Palos Verdes, Calif. / Palos Verdes Peninsula) scored four goals to lead the Caltech men's water polo team against SCIAC rival the University of Redlands on Saturday morning.

The Bulldogs came away with the 17-6 victory to improve to 5-17 overall and 1-2 in the SCIAC while the Beavers are now 7-13 (0-2).

Redlands got off to a hot start with three goals before sophomore Chris Bradley (Half Moon Bay, Calif. / Serra) lit up Caltech's side of the scoreboard just before the end of the first quarter. The Beavers would net twice in the second quarter, including Blackwood's first strike of the day to keep the deficit within two, but even combined with another late Bradley score Caltech trailed 7-3 at halftime.

Blackwood struck again within the first minute coming out of the break, but Redlands netted four straight to end the quarter with the 11-4 advantage and closed out the match with a 6-2 edge in the fourth quarter.

PASADENA, Calif. (Oct. 22, 2014) – Sophomore Chris Bradley (Half Moon Bay, Calif. / Serra) scored his 100th goal of the season while leading the Caltech men's water polo team to a thrilling 15-13 victory over Chaffey College in the nightcap after the Beavers fell in their SCIAC opener against the University of La Verne, 17-7, on Wednesday evening.

Both teams took some time to get going in the first quarter, but La Verne struck first just over three minutes into the match. Junior Jim Blackwood (Rancho Palos Verdes, Calif. / Palos Verdes Peninsula) scored the first of his team-high four goals to even things up at the 2:45 mark, but the Leopards rattled off two quick goals on their next two possessions to lead 3-1. Caltech got one back just before the break to trail by only one, 3-2.

La Verne came out firing in the second quarter, however, and quickly built up a 6-2 lead. The Leopards held the four-goal margin heading into halftime, 7-4, and a 6-1 edge in the third quarter sealed the victory as Blackwood and Bradley provided the only offense for the Beavers.

"We were able to execute effectively on offense and generate ample opportunities, but we did not finish enough of our chances," Head Coach Pat Beemer said.

Caltech 7, La Verne 17

PASADENA, Calif. (Oct. 22, 2014) – Another tight first-quarter battle was in the cards for the nightcap, but this time the Beavers lit up the scoreboard first as Blackwood scored on the first possession. Chaffey quickly turned the

tables with goals on each of the following two possessions, but Caltech leveled on its next chance as Bradley opened his account with an ejection goal. The Panthers took another brief lead at the 3:40 mark, but Bradley equalized again on the next possession and gave Caltech its first lead of the match with 1:39 remaining in the quarter. Chaffey would even things up just before the first break, however.

The Panthers rode the momentum of their late first-quarter strike to a quick 5-4 lead, but the Beavers took over from there. Four different Beavers scored unanswered goals over the next five minutes to propel Caltech to the biggest lead of the match at 8-5, capped by a penalty goal by Bradley. Chaffey notched a consolation goal to make it 8-6 heading into halftime, but senior Ben Grabowski (Lake Forest Park, Wa. / Inglemoon) ensured that was all the Leopards got as he recorded a whopping eight of his 14 saves over the quarter.

With three players already facing ejection heading into the second half, Bradley and Blackwood bookended a Chaffey goal early in the third quarter to make it 10-7, but then the Leopards made their push. Three straight goals over a 1:39 span leveled the match, and a brief Caltech lead was quickly cut out by another Chaffey goal. Bradley came up in the clutch, however, to give the Beavers a 12-11 lead before the final quarter.

The sophomore was far from finished, as he fired home two more goals in the first 1:35 of the fourth quarter to hand the surging Beavers a 14-11 lead. Junior Patric Eck (Fullerton, Calif. / Troy) made it four straight goals with his strike at the 3:56 mark, and the Beavers looked on their way to a comfortable win.

Chaffey mustered a furious rally, however, knocking the Caltech defense on its heels with a pair of quick goals to make it a two-goal match with 2:22 left to play. The Beavers defense stepped up when needed, though, and turned away several dangerous chances to preserve the victory.

"This win showed the resiliency of the squad," Beemer said. "After struggling at points in the first game, we consolidated as a group and started firing on all cylinders."

Bradley's combined 11 goals pushed his season total to 101, making him just the second Beaver in program history to top the century mark. He sits just 16 behind all-time leader David Bruning, who scored 117 and 116 in the 1986 and 1987 seasons.

"I'm just trying to stay hot," Bradley said. "Trust in the game plan, trust in my teammates, and just execute."

Caltech 15, Chaffey 13

Scoreboard

Women's Volleyball

Fri. Oct. 24 vs. La Verne - L, 3-0

Sat. Oct. 25 vs. Whittier - L, 3-0

Men's Soccer

Wed. Oct. 22 vs. Chapman - L, 3-0

Sat. Oct. 25 vs. Pomona-Pitzer - L, 6-0

Men's Water Polo

Wed. Oct. 22 vs. La Verne - L, 17-7

Wed. Oct. 22 vs. Chaffey College - W, 15-13

Sat. Oct. 25 vs. Redlands - L, 17-6

Upcoming Games

Women's Volleyball

Tue. Oct. 28 @ 7:30p - Cal Lutheran

Fri. Oct. 31 @ 7:30p - Pomona-Pitzer

Sat. Nov. 4 @ 1p - Occidenta

Men's Water Polo

Wed. Oct. 29 @ 4p - Cal Lutheran

Sat. Nov. 1 @ 11a - CMS

Men's Soccer

Sat. Nov. 1 @ 4pm - CMS (LAST GAME EVERYONE COME TO IT)



This guy, Jean-Alexander Turban, would eventually kick the ball (not pictured) into the goal (pictured) past the other team's defenders (pictured) with the help of his friend (pictured).

-gocaltech.com

Amarise Little is apparently a beast at volleyball; who knew? I did.

GOCALTECH.COM
Actual Sports Content Editor

PASADENA, Calif. (Oct. 25, 2014) – Junior Amarise Little (Orlando, Fla. / Freedom) broke out and junior Catherine Jamshidi (Burke, Va. / Lake Braddock Secondary School) fell just shy of yet another double-double as the Caltech volleyball team played three tight sets but ultimately fell, 3-0, against SCIAC rival Whittier College on Saturday night.

Whittier improves to 8-15 overall and 6-8 in the SCIAC while Caltech is now 1-19 (0-13).

Jamshidi led the Beavers with seven kills, two service aces and 11 digs while Little smashed five kills on a team-best .250 hitting percentage and added one assists and a block assist. Junior Amy Hu (Rockville, Md. / Montgomery Blair) and junior Harinee Maiyuran (Irvine, Calif. /

Arnold O. Beckman) combined for a 12 of the team's 13 assists.

The Beavers hung close through a 6-6 tie in the first set, but the Poets gradually outpaced the hosts en route to a 25-18 victory despite a brief late rally by Caltech. Whittier jumped out to a 6-0 lead in the second set, but Caltech soon rattled off four straight points behind a pair of aces by Jamshidi to pull within three at 11-8. The Poets would score 14 of the final 17 points to take the set, 25-11, and took another early lead in the third set to cruise to a 25-10 win.



ASCIT Minutes

ASCIT Board of Directors Meeting

Minutes for 19 October 2014. Taken by Sean McKenna

Officers Present: Catherine Jamshidi, Patrick Nikong, Annie Chen, Sean McKenna

Guests: Margaret Lee, Elliot Simon, Chris Dosen

Call to Order: 9:12 pm

President's Report (Cat):

- Presidential Inauguration (and an Academic Holiday) are occurring on Friday. Dinner will be in Chandler.
- Cat is meeting with the alumni office to discuss student-alumni interactions.
- Student Experience Committee, Faculty Board Committee, Honor Code Committee, and Dean's Advisory Council meetings are approaching, so Cat may have news at the next BOD meeting.
- Career Fair is happening on Tuesday, October 21st
- Club Funding is happening on Sunday, October 26th

Officer's Reports:

- **V.P. of Academic Affairs (ARC Chair: Nima):**
 - o The ARC has selected their new frosh reps
- **V.P. of Non-Academic Affairs (IHC Chair: Connor):**
 - o IHC is meeting with Safety/Housing to discuss fire safety guidelines.
- **Director of Operations (Connie):**
 - o Club registration and club funding deadlines are this week so that club funding allocations can happen on Sunday, October 26th.
 - o The little t has arrived! Get one from Connie or a House President.
- **Treasurer (Patrick):**
 - o Any final 2013-2014 club funding that is due to be reimbursed by ASCIT should be submitted to Patrick by Wednesday, October 22nd.
- **Social Director (Annie):**
 - o Houses can start planning Big I, but the administrative details are still being worked out.
 - o Annie is exploring weekly trivia nights happening at the Rath instead of at Chouse.
 - o Annie is exploring weekly movie nights and her Executive Social Committee.
- **Secretary (Sean):**
 - o ASCIT now has a twitter! Follow @ASCITtweets.

If anyone has any questions or concerns about a section of the minutes please email the appropriate officer. We are happy to answer any questions. The next BoD meeting will take place on October 26th at approximately 5pm in SAC 15.

Meeting Adjourned: 10:00 pm

CALTECH-OCCIDENTAL CONCERT BAND



Do you know what Caltech group has performed at the Great Wall, Carnegie Hall, and Disney Hall, all in the last ten years? Or what ensemble boasts among its members or alumni the Project Scientist of the Spitzer Telescope, the chief engineer of the Mars Pathfinder flight system, the Deputy Director, of the Interplanetary Network Directorate, and Niles Pierce. And, did you know that almost every concert features a guest conductor who is a esteemed Professor of Geology and Geochemistry.

If you guessed it's the Caltech – Occidental Concert Band, you guessed right. Last June, this amazing ensemble, operating under the rather large and impressive umbrella that is part of Caltech's Student Affairs, performed as the feature ensemble at an international music festival at Disney Hall.

You can hear this exciting group on Friday, November 21st, at 8:00 in Ramo Auditorium. This is a free concert!

Our guest conductor that evening will be Sharon Lavery. Sharon is the co-conductor of the USC Thornton School of Music Wind Ensemble. Also appearing that evening will be the Blair High School Band.

There will be music by Charles Ives, George Gershwin, Paul Hindemith, and Auturo Márquez.

Please come out and support your fellow students and faculty as they prove once again that life at Caltech is a fertile ground for many things, including the creative arts.

The Caltech-Occidental Concert Band will present their annual fall concert in Ramo Auditorium on Friday night, November 21, at 8:00 PM. This is a free concert.

**REMINDER FROM THE
COUNSELING CENTER:
Meditation Mob (drop-
in mindfulness meditation
group)
meets every Tuesday
Bottom floor of Winnett from
12:00-12:50 pm**

The California Tech

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The advertising deadline is 5 PM Friday; all advertising should be submitted electronically or as camera-ready art, but *The Tech* can also do simple typesetting and arrangement. All advertising inquiries should be directed to the business manager at tech@caltech.edu. For subscription information, please send mail to "Subscriptions."

CALTECH THEATER offers several chances to branch out and take chances, have fun and expand your social network this fall!

1. Wednesday Nights 730-930 in Ramo Auditorium. Director of Theater Arts Caltech, Brian Brophy (*Star Trek TNG*, *Shawshank Redemption*) helps guide you through the fundamentals of **Directing/Acting/Writing** for the stage (life), to a final production of several ten-minute plays by students December 3, 2014. We still have room for about six more students! Last chance 2014!

2. **Playgoing Friday Nights** (Next play *What the Butler Saw*, a crazy fun farce at Mark Taper Forum, downtown Los Angeles November 14, 8:00 PM). First twenty-five receive subsidized tickets at five dollars each! The first outing was the musical *Kiss Me Kate* at the Pasadena Playhouse last Friday night (October 10) with nearly twenty students and we ate cupcakes from Dots!

3. **WANTED: Actors, singers, musicians, technical personnel, and designers for new, original Caltech musical *Alice Through the Wormhole!*** This musical is currently in the development phase with a world premiere run February 20-March 1 2015! If you are interested in any facet of production, including script development, contact Brian directly! Next meeting Saturday, October 11th at the Theater Lab 10:30, located behind the Theater Arts House 275 South Hill. Bagels, coffee and snacks will be served!

Get Fit with Brad/ Chad: Nutrition Part 1

BRAD CHATTERGOON
Contributing Writer

Hey ladies and gents. Is it just me or does it seem like our terms are really short? I mean, man it's already week 4. That's pretty cray cray.

So I saw a flyer for a dating seminar titled "Dating 101: Get in the Game" and it got me thinking. The whole dating thing can be sort of complicated especially with the rapidly changing gender roles in society today. Some girls value leadership but then aren't happy if they end up doing something the guy wanted to do. Some girls think that the guy should be the provider while others say "I'm an independent woman that don't need no man." Since we're talking about nutrition this week I just want to give a big shout-out to all those girls that are willing to buy dinner for guys.... Love you mom!

The first thing about nutrition that we should talk about would be what makes up the foods that we eat. At a basic level of classification, food comprises two categories, macronutrients and micronutrients. Macros are defined as proteins, carbohydrates, and fats, while micros are everything else, largely classified into vitamins and minerals. As a reference, the United States Department of Agriculture's (USDA) Food and Nutrition Center has a listing of the dietary reference intake (DRI), previously called recommended daily allowances (RDA), that specifies how many units of each type of macro and micro nutrients are to be consumed daily if one is eating a 2000-calorie diet.

This brings us into the most popular word when talking about nutrition: calories. For many, calories are the enemy, but really they are just the misunderstood teenager that everyone blames for

everything. Calories are a measure of energy and as we know there is a direct relationship between energy and mass. By consuming food, we are in essence consuming energy and I want to believe that we are all familiar with the law of conservation of energy (if you aren't, please open a book). What this means is that if we consume food with an energy content higher than the amount of energy we expend, the remaining energy gets converted and stored as mass, in most cases as fat.

For the remainder of this article I'll talk about calories, specifically what they are and how they interact with the body.

The micronutrients have a negligible contribution to calorie intake. The macros, however, basically are calories. Proteins and carbohydrates both store 4 calories in 1 gram. Fats store 9 calories in 1 gram. At this stage it is important to note that exercise is not the only way to burn calories and in fact isn't the main source of calorie burn. Simply being alive is a much bigger source of energy consumption. Each person has a basal metabolic rate, which is the rate of energy expenditure by a person at rest. It is a function of one's height, weight, sex, and age. As an example, a male at 21 years, 5'10", and 150 pounds has a basal metabolic rate of 1692 calories per day. To be clear about this number, it is what is required just to survive and maintain current body mass assuming no other activity such as motion.

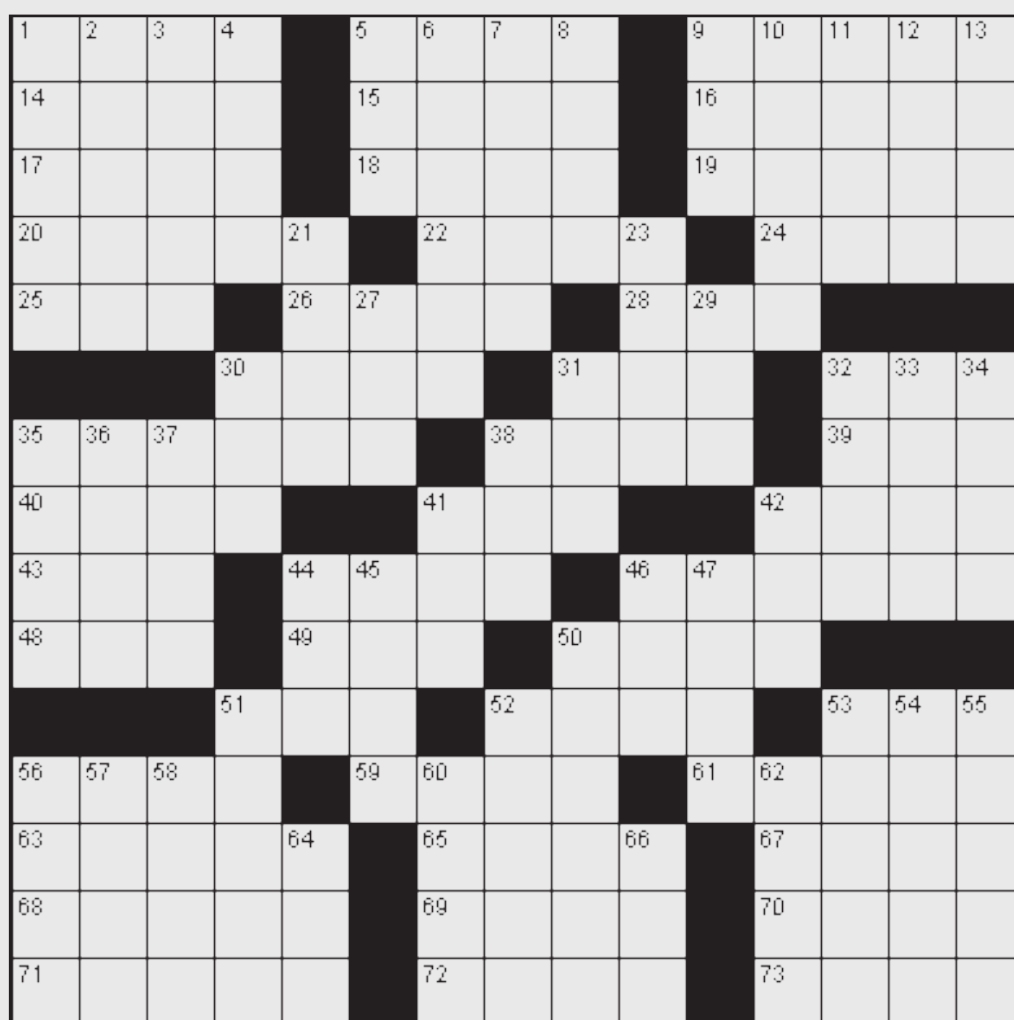
Hope this gives you insight into exactly how the food you eat works and perhaps starts changing the way you see food. I'll continue next week with Nutrition Part 2. Hope you guys are almost ready for midterms.

Brad/Chad



Photo Courtesy of Brad Chattergoon

Crossword



-puzzlechoice.com

Across

- 1. Crustacean
- 5. Military signal
- 9. Protective garment
- 14. Polynesian dance
- 15. Strong and healthy
- 16. Combination of warp and weft
- 17. Examination by word of mouth
- 18. Food from husks of cereal grains
- 19. Roof overhang
- 20. Effect of actions determining destiny in the next incarnation
- 22. Untie
- 24. Payment for use of property
- 25. Type of tree
- 26. Part of the neck
- 28. Entirely
- 30. The greatest in number
- 31. Consumed
- 32. Any high mountain

- 35. Reduce in size
- 38. Dull pain
- 39. Digit
- 40. Cajole
- 41. Prevarication
- 42. Behave affectedly
- 43. Pertinent
- 44. Malevolent
- 46. Cause to move forward with force
- 48. Indicating maiden name
- 49. Rodent
- 50. Expressed in words
- 51. Limb
- 52. Singing voice
- 53. Lout
- 56. Fountainhead
- 59. Whittle
- 63. Keep away from
- 65. Ship's company
- 67. Remainder
- 68. Tennis stroke
- 69. Type of star
- 70. Small island
- 71. Clean with a bill

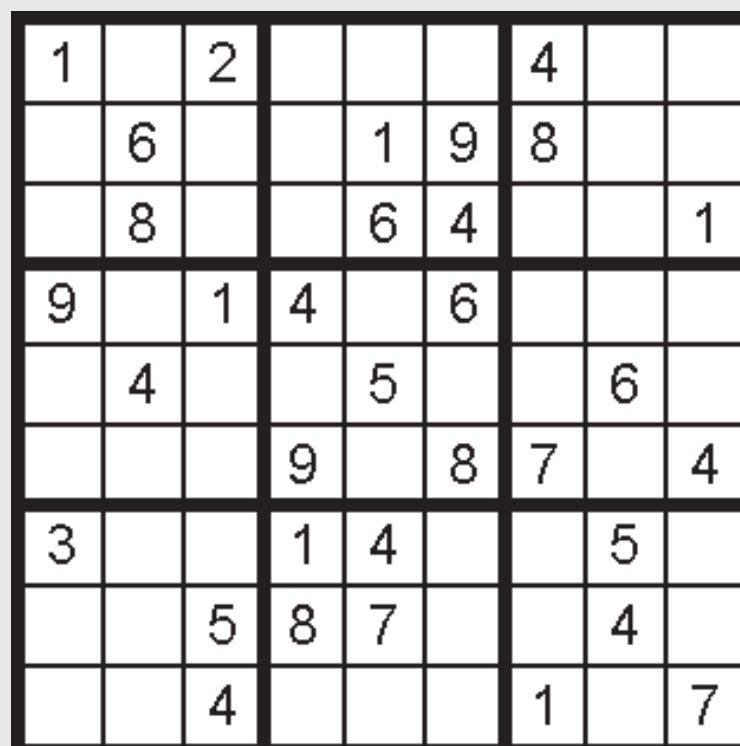
- 72. Pitcher
- 73. Outstanding tournament player

Down

- 1. Struggle for breath
- 2. Characteristic of country life
- 3. Warning signal
- 4. Ungent
- 5. Restaurant bill
- 6. Precipitous
- 7. Level of existence
- 8. Mail out
- 9. Wonderment
- 10. Bead
- 11. Rant
- 12. Kitchen appliance
- 13. Bird structure
- 21. At another time
- 23. Solemn promise
- 27. Request
- 29. On the sheltered side
- 30. Coalesce
- 31. Playing card
- 32. At the peak
- 33. Misplace

- 34. Rind
- 35. Wide sweeping search
- 36. Be optimistic
- 37. Charge per unit
- 38. Afflict
- 41. Illuminated
- 42. Seed case
- 44. Make a mistake
- 45. Musical accompaniment
- 46. Hit lightly
- 47. Public violence
- 50. Part of a garment
- 51. Animated
- 52. Pointer
- 53. Corpulent
- 54. Part of a church
- 55. Destined
- 56. Stinging insect
- 57. At any time
- 58. Traditional knowledge
- 60. Sking disorder
- 62. Part of the eye
- 64. Lair
- 66. Armed conflict

Sudoku



-puzzlechoice.com

Dark Lord Defeated!

TIM SINCLAIR
Contributing Writer

(Author's note: the writer of "The Iterated Manifold," Timothy Sinclair, was sick this week. We instead bring you a reprint of one of The Iterated Manifold's past issues. This week's column was originally published in The Tech on Monday, September 17, 1996.)

For the first time since 1992, the Caltech sciencing community breathes a sigh of relief: Caltech's undergraduate dean, the Dark Lord, has vanished. He-Who-Must-Not-Be-Named was supposedly about to discipline a student yesterday afternoon for a reason still unclear, when the dean's Persona non gratus proof was interrupted, and he mysteriously disappeared without a trace. Current speculation is that the student's devotion to the Honor Code was so strong that it protected him from the attack and deflected it against He-Who-Must-Not-Be-Named, who is now effectively banished from Caltech.

"It's really a bizarre ending to a terrible reign," professor of mathemagic Albert Doubledoor, told *The Tech*. "While He-Who-Must-Not-Be-Named was never the most powerful scientist or mathemagician, he was very familiar with several proofs, including the Persona non gratus. The Caltech sciencing community is very lucky for this fortuitous event."

While most Caltech undergrads are celebrating today, some students are still in doubt that they really are safe. The Caltech Astrology Club held a séance last night after hearing of He-Who-Must-Not-Be-Named's disappearance, and are expected to release their findings shortly. Independently, a small group of professors of alchemy released a statement warning about the potential that the dean was under the influence of a spirit-altering potion. In that case, the dean's current power has been drained, but his spirit can still find a new body and recover. "Every professor leaves a little bit of their soul in each of their graduate students," professor of alchemy Nigel Lupus pointed out to us. "That's an unfortunate side effect of the job. It would be easy to ensure that He-Who-Must-Not-Be-Named was vanquished forever if he had just seven or so students, but there are nearly a hundred students all over the country and the world with a bit of his soul in them. Eliminating all of them would be a nearly impossible task."

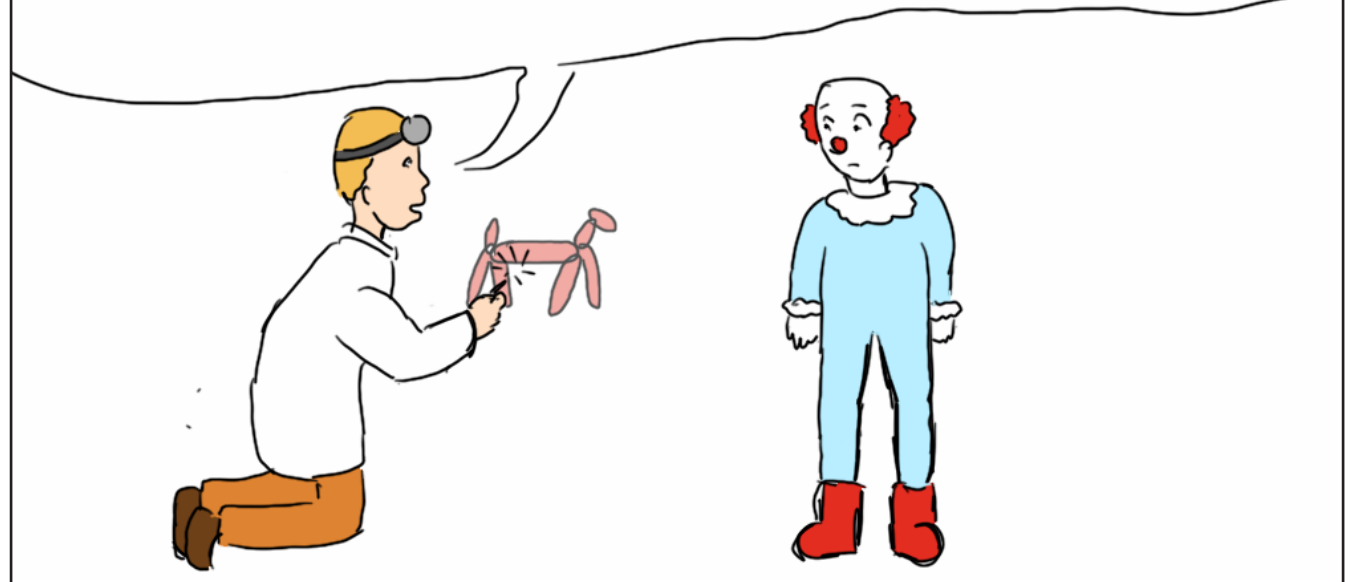
Followers of the Dark Lord, including most of the Department of Political Science, are perhaps the only ones to be disappointed by today's news. Some are still optimistic, and predict the return of the Dark Lord within the next 20 years, but we aren't holding our breath.

The Iterated Manifold is a weekly column by Timothy Sinclair. *The Iterated Manifold* can be followed on twitter @S**tCaltechSays.

Acquired Taste

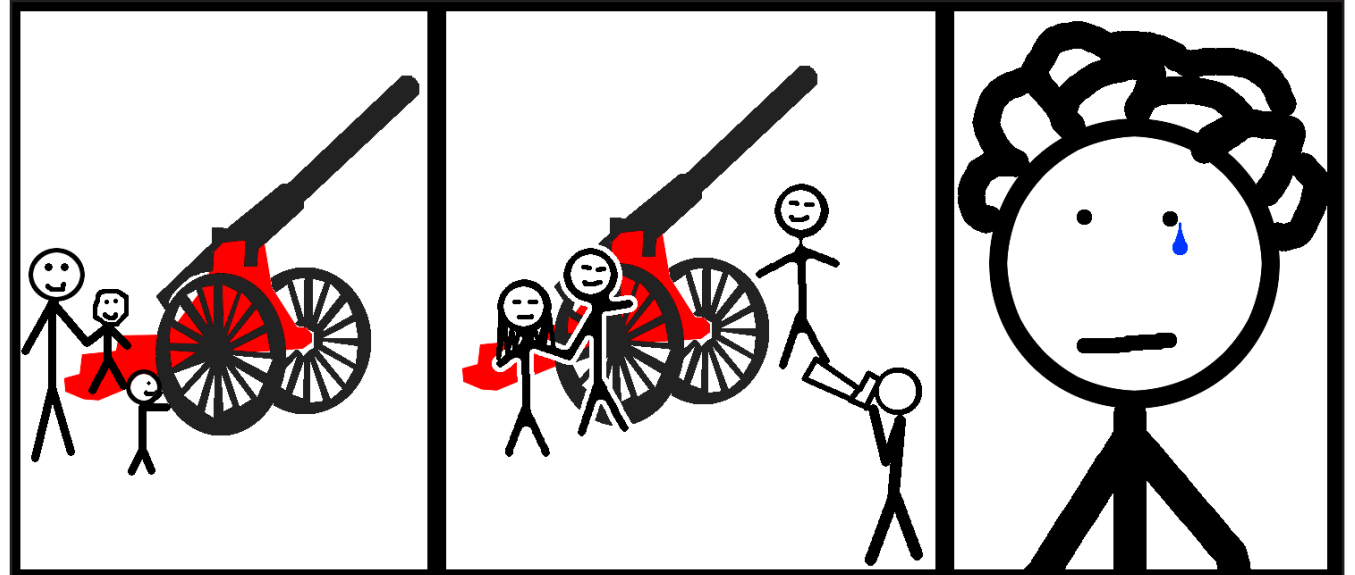
Dr. Z

Trust me Mr. Bozo, you're doing the right thing by spaying your dog



Ignorance is Piss

Leo Kraggman



Answers to previous Sudoku

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

Answers to previous crossword

P	A	S	T		A	R	C	H		T	E	A	L					
U	G	L	Y		R	A	R	E		A	R	R	A	Y				
T	R	A	P		K	N	E	E		B	R	I	N	E				
T	E	N	E	T		K	E	L	P		O	D	D	S				
Y	E	T			Y	E	L	L		O	A	R						
					T	R	E	E		L	O	G		T	O	P		
P	A	T	R	O	L		P	A	L	E		I	V	Y				
A	W	A	Y				T	I	P			A	F	A	R			
I	R	K			S	T	A	G		S	T	I	F	L	E			
R	Y	E			E	A	R		B	E	E	R						
					H	E	X		S	E	A	R		A	C	T		
E	C	H	O		I	O	T	A		M	I	N	O	R				
A	L	E	R	T		M	A	C	E		R	O	V	E				
T	E	A	S	E		I	R	O	N		I	D	E	A				
					F	R	E	E		T	E	N	D		S	E	N	T

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