

## Undergraduates Jermyn, Tschirhart awarded Hertz fellowships

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*This article was originally published online at caltech.edu.*

Caltech seniors Adam Jermyn and Charles Tschirhart have been named 2015 Hertz Fellowship winners. Selected from a pool of approximately 800 applicants, the awardees will receive up to five years of support for their graduate studies. According to the Hertz Foundation, fellows are chosen for their intellect, their ingenuity and their potential to bring meaningful improvement to society. Jermyn and Tschirhart bring the number of Caltech undergraduate Hertz fellows to 60.

Jermyn, a physics major from Longmeadow, Massachusetts, works with so-called “emergent phenomena,” which “is a broad term referring to situations where we know all of the laws on a fundamental level but where there are so many pieces working together that the consequences aren’t known,” he said. For example, the basic laws governing fluid mechanics are simple equations that relate such easily measured quantities as density, velocity and temperature to one another, but simulating the behavior of two gases as they mix in a turbulent

flow can tax the capacity of a supercomputer.

Jermyn’s senior thesis models how a pulsar — a type of celestial radio source that flashes as fast as a thousand times per second — disrupts the atmosphere of a companion star. Pulsars are neutron stars — supernova cinders that pack the mass of a couple of suns into a sphere roughly the size of Manhattan. The spin imparted by the supernova’s explosion and equally violent collapse creates a beam of tightly focused radiowaves. If a neutron star were “aimed” at Earth, the beam’s fleeting illumination would register as a flash in our radio telescopes every time it swept across us. Meanwhile, the pulsar’s intense gravity distorts the companion star, creating a bulge on its surface. Like Earth’s moon, the star’s rotation is tidally locked, always presenting the same side to its dominant neighbor. The companion star’s atmosphere gets siphoned away, layer by layer,

forming a turbulent tendril of gas that winds in an ever-tightening spiral around the pulsar as the



(From left) Charles Tschirhart and Adam Jermyn won Hertz fellowships, which will support them during their graduate studies.

Photo Courtesy of Lance Hayashida

stolen material accretes onto its surface.

Tschirhart of Naperville, Illinois, is a double major in applied physics and chemistry. His interests lie at the opposite end of the scale — in the world of nanotechnology, where lengths are measured in nanometers, or billionths of a meter. In the summer of 2012, he was part of a team that built nanoelectrodes — tiny silicon needles that penetrate a cell wall without damaging the cell to monitor the electrical activity within.

Tschirhart and Jermyn share an interest in fluid mechanics. “I think the biggest difference

between what Adam and I do is that he is a theorist, and I am an experimentalist,” Tschirhart said. “Physicists pretend that a fluid is a continuum of infinitely divisible matter and thus doesn’t have any ‘graininess’ to it.” But because atoms and molecules do have finite sizes, “once you get down to small enough scales,” he said, “even water becomes ‘grainy.’” The fluid becomes more viscous, as it takes effort to force

the grains past one another.

For his senior thesis, Tschirhart determined the nanoviscosity of silicone oil by measuring the thickness of a thin film of oil, smearing it even thinner with a stream of air and measuring its thickness again. The thickness should decrease in a linear manner, but this doesn’t happen when the layer gets thin enough. “These films aren’t much thicker than the size of a molecule,” he said. “This is where non-continuum effects show up.” These effects could affect how engineers approach tasks as

diverse as lubricating hard drives and extracting crude oil from porous rocks.

Both students took Ph 011, a course taught by the late Professor Thomas Tombrello. Tombrello launched this class in 1989 to encourage freshmen to think creatively, and taught it annually until his death in September 2014. This year, Jermyn and Tschirhart are helping teach it. “Ph 011 really shaped the way I ask questions, and I have Tom Tombrello to thank for that,” Jermyn said.

“He pushed us to think about things obliquely,” Tschirhart said. “After I got over my initial nerves, I found myself enjoying [the two rounds of Hertz interviews], which made it much easier to answer the questions creatively.”

Both plan to defer their Hertz doctoral fellowships while they take advanced degrees in England. Tschirhart will be attending the University of Nottingham as a Fulbright Scholar for one year, where he plans to develop new applications for atomic force microscopy, a powerful technique for “photographing” nanoscale objects. Jermyn will be at the University of Cambridge for two years as a Marshall Scholar investigating the processes by which planets form around binary star systems.

## Boston Marathon bomber Dzhokhar Tsarnaev found guilty

CASEY HANDMER  
Contributing Writer

On April 6, surviving Boston Marathon bomber Dzhokhar Tsarnaev was found guilty of all 30 counts, 17 of which may carry the death penalty. Nearly two years since the April 15, 2013, bombing and subsequent manhunt, which injured 280 and killed four, debate rages over motive, law enforcement procedure, intelligence failures and the prospect of state execution.

*“Dzhokhar Tsarnaev survived to be captured and was immediately questioned for 16 hours.”*

Dzhokhar Tsarnaev, and his elder brother Tamerlan Tsarnaev, both ethnically Chechen Muslims, autonomously built pressure cooker bombs and planned the attack using al-Qaeda in the Arabian Peninsula’s online English language glossy magazine Inspire. The two bombs were detonated

remotely near the marathon finish line 13 seconds apart. The brothers evaded capture until a shooting on April 18, 2013, followed by a final manhunt on April 19, 2013, four days after the bombing.

Dzhokhar Tsarnaev survived to be captured, and was immediately questioned for 16 hours. Subsequently read his Miranda rights, the admissibility of prior testimony is a matter of controversy. Despite a call for him to be tried as an enemy combatant, prominent legal scholars including Alan Dershowitz successfully argued that doing so would jeopardize the case against Dzhokhar Tsarnaev, as it has for many remaining Guantanamo Bay inmates, and the federal court system was judged sufficient to handle Dzhokhar Tsarnaev’s case.

Immediately following the bombing, questions about handling of intelligence were raised in the media. As in the cases of the underwear bomber (Umar Farouk Abdulmutallab), the shoe bomber (Richard Reid), the Times Square bomber (Faisal Shahzad), the 2009 Fort Hood shooter (Nidal Malik

Hasan) and a few others, it seems hints arising from the Tsarnaev brothers’ not exactly stealthy activities were either ignored or not connected. Indeed, it was revealed that Russian intelligence services had even warned the FBI about the Tsarnaev brothers. There is now an alarming disconnect between two types of home-grown terror attacks. In the first, a handful of disaffected American citizens have successfully advanced plots to execution, often harming or even killing American civilians. In the second, dozens of plots funded and instigated by paid FBI informants have successfully entrapped financially desperate and/or mentally ill men in hastily written anti-terrorism legislation. Naturally these “plots,” which are actually exploiting society’s weakest members for PR and pose no threat to security, have been disrupted “in the nick of time.”

In the investigation after the Boston marathon bombings, the FBI shot and killed Ibragim Todashev, a friend of the Tsarnaev brothers, during an interrogation in Florida. It has been suggested that Ibragim confessed to, and

implicated Tamerlan Tsarnaev in, a triple homicide that occurred in Waltham, Massachusetts, on Sept. 11, 2011. No further evidence has emerged, however.

The number of Americans killed and injured during terrorist attacks over the last 30 years pales in comparison to those killed in vehicle accidents, home shootings, police shootings, food poisonings, lightning strikes, livestock accidents, as soldiers fighting overseas, etc. The heightened violence and mayhem combined with our free and open press serve to greatly amplify the terror and horror, which is precisely why violent extremist attacks against civilians are so effective.

How our society responds to brazen but ultimately futile attacks such as these is largely an open question, as information technology continues to redefine our systems of communication and interaction. As Bruce Schneier is

wont to say, engineering security is nontrivial. Two concrete examples surrounding the bombing illustrate this.

In the first, some members of the online community reddit tried to analyze social media to discover the identity of the bombers,

*“Dzhokhar Tsarnaev’s ultimate fate, execution or life in prison, rests on proving that Tamerlan Tsarnaev was the prime actor and Dzhokhar Tsarnaev a partially-willing follower...”*

possibly contributing to the suicide of an ultimately innocent suspect. The court of public opinion poses a real risk to the application of justice even as well-meaning participants try to leverage new technology.

In the second, parts of Boston were put under lockdown for almost the entirety of April 19, 2013. It’s far from clear that such extreme action assisted the

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# Caltech Y Column: News & Events

## 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.

Founded by students in 1916, the Y was organized to provide extracurricular activities planned and implemented by students as an opportunity to learn leadership skills and discover themselves. The mission of today's Y remains the same—to provide opportunities that will prepare students to become engaged, responsible citizens of the world. The Y seeks to broaden students' worldviews, raise social, ethical, and cultural awareness through teamwork, community engagement, activism, and leadership. 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. Learn to fix your bike!

Saturday | April 18th | 11:00 AM - 3:00 PM | Caltech Bike Lab (<http://caltechbikelab.blogspot.com/>) | Instructors: Jonathan, Daven, Jeff

Caltech BikeLab is partnering with the Caltech Y for a basic bike repair class. **YOU MUST SIGN UP IN ADVANCE!**

Bring your bike, and learn:

1. How to fix a flat
  2. How to adjust your brakes
  3. How to adjust your shifters and gears
  4. Advanced topics (you decide!)
- Free Lunch Included, courtesy of the Caltech Y!

Only 16 slots available. Sign up at <http://doodle.com/bkttiaa5nqmhyzfg>.



Caltech students have participated in the LA River Clean Up for several years.

Photo Courtesy of Caltech Y

#### 2. LA River Clean Up

Saturday | April 18th | 8:00 AM - Noon

Join the Friends of the Los Angeles River (FOLAR) for the annual Los Angeles River Clean Up! This annual "work party" will include live music performances, gift giveaways, family activities and refreshments. Join a group from the Caltech Y to volunteer at a site in Glendale Narrows. We will be picking up trash along the

LA River. Work gloves provided. Eligible for Federal Work Study.

RSVP at [https://docs.google.com/forms/d/1QqjmbHKFNBNkTrfpmZRw-oTsOh2MyQuRb4IGyPoXxM/viewform?usp=send\\_form](https://docs.google.com/forms/d/1QqjmbHKFNBNkTrfpmZRw-oTsOh2MyQuRb4IGyPoXxM/viewform?usp=send_form).

Email Christine Chou [cshou@caltech.edu](mailto:cshou@caltech.edu) with questions.

#### 3. Iron Mountain Hike

Sunday | April 26th | 7:00 AM

Join the Caltech Y Outdoors group for a hike to the summit of Iron Mountain. Iron Mountain is one of the most isolated peaks in the San Gabriels. The trail to the summit is the most strenuous single peak trail in the entire mountain range, but the rewarding view and accomplishment of reaching the summit is worth the effort. The hike is 14 miles round trip with a whopping 7200 feet of elevation gain.

This hike is intended for very experienced hikers only. We will leave the Caltech Y at 7:00am and expect to hike all day. If you are interested in the hike, sign up at the link below. If you have any questions, email Jeremy Sandler at [jsandler@caltech.edu](mailto:jsandler@caltech.edu).

<http://google.com/forms/U1rTmvQYTV>

#### 4. The Studenski Award

Proposals Due Friday, April 17th no later than noon

The Studenski Memorial Award is a grant of up to \$6000 established in the memory of Paul Studenski, a Caltech student who was killed in an automobile accident while traveling across the United States in 1974. It is awarded to a Caltech undergraduate who, having reached a crossroads in life, would benefit from a period away from the academic community to obtain a better understanding of self and to explore possible directions for the future.

Studenski proposals (1 to 2 pages maximum) are due Friday, April 17th no later than 12:00 noon to [caltechY@caltech.edu](mailto:caltechY@caltech.edu) (in word format). For more information, contact Athena Castro [athena@caltech.edu](mailto:athena@caltech.edu) or Greg Fletcher [gregf@caltech.edu](mailto:gregf@caltech.edu) or join us for dinner:

More info and the application can be found at [http://caltechy.org/programs\\_services/areas/Studenski/index.php](http://caltechy.org/programs_services/areas/Studenski/index.php).

#### 5. Caltech Y ACT Award

Applications are due by Friday, April 17th at noon

The Caltech Y ACT Award, made possible through the generous support of the Caltech Employees Federal Credit Union, offers students an opportunity to pursue an interest in community service or advocacy.

The \$4500 Caltech Y ACT Award offers students an opportunity to explore an issue, engage in a cause, and lead a campaign to educate and engage others at Caltech. Caltech Y activists determine the cause they will address, the organization with whom they will partner, and the type of campaign they will lead on campus. The Caltech Y ACT Award helps Caltech Students expand their understanding of the world, unleashing them to change the world for the better as active citizens.

Stop by the Caltech Y during our office hours to learn more about this exciting opportunity, contact us to ask questions or set up a separate time to meet.

More info and the application can be found at [http://www.caltechy.org/programs\\_services/commservice/ACT/index.php](http://www.caltechy.org/programs_services/commservice/ACT/index.php).

#### 6. 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](mailto:vkumar@caltech.edu). Eligible for Federal Work Study.

#### Other Announcements - Beyond the Caltech Y Huntington Library Plant Sale Volunteers Needed

Friday - Sunday | April 24th - 26th | Shifts from 10:00 AM - 4:30 PM | Huntington Library

The Huntington Library is in need of volunteers to assist guests to transport their plant purchases from the checkout area in the Botanical Center to the designated pickup area in the Parking Lot. Dolly carts are provided by The Huntington, but due to the volume of customers and distance to the pickup location, we need volunteers who are able to assist with the following:

Loading plants on & off of carts  
Walking carts to & from the checkout area & designated pickup location

Returning carts to checkout area & assisting the next guest in need

It is a physically demanding job and there is a high volume of customers, but it is one of the most important roles in the Plant Sale and tips are frequently given for the assistance.

Contact Mikki Heydorff at [mheydorff@huntington.org](mailto:mheydorff@huntington.org) for more info and to volunteer.

#### Pasadena Ronald McDonald House

The Pasadena Ronald McDonald House provides housing, comfort, care and support to families with children who have serious or life threatening illnesses. Families need to have a medical referral

## "The Great Satan" gives diplomacy another chance

SEAN MCKENNA  
Contributing Writer

On occasion, I have been known to consider my physics homework the "Great Satan," or part of the "Axis of Evil," but I still must engage with it and reach a somewhat agreeable solution. Last week, the Great Satan and a key member of the Axis of Evil finally reached a somewhat satisfying conclusion as they scrambled to reach a deadline, also akin to my

Experts conclude that the breakout time is currently two months, and the agreement would push it to 12 months. This is achieved through a substantial reduction of Iran's enriched uranium stockpiles (from 10,000 kg to 300 kg), a similar reduction in the number of active centrifuges (from 19,000 to 5,000), and the complete dismantling of weaponry capabilities in its plutonium enrichment facilities. The International Atomic Energy Agency will gain additional

powers to verify that these steps are taken; Iran's cooperation will result in the lifting of some economic sanctions imposed by the United Nations and the United States.

Of course, Republicans responded by decrying the deal as appeasement to the enemy, a sentiment shared by the Israeli prime minister. With

both houses of Congress held by Republicans, this is a potentially complicating matter. The Senate is considering a bill requiring a 60-day congressional review period for the agreement, which would give Congress the power to vote it down. If Congress passes this agreement into law before the terms of the deal are finalized, the negotiations would become greatly more complex by forcing diplomats to consider whether the deal would be acceptable to Republicans.

I believe Congress should keep its distance from the negotiations. American diplomats need room to maneuver when working with a hostile counterparty. Instead of interfering, Congress can find other ways to prove that the United States is not friends with Iran, such as supporting the Yemeni government in its conflict with Iranian-supported Houthi rebels. Congress can toe the line that the United States is pursuing the deal out of self-interest, sparing itself the trouble of a military response if Iran were to obtain a nuclear weapon. This agreement is important and worthwhile precisely for that reason: we have a chance to overwhelmingly reduce the probability of more American military conflict in the Middle East.

*"This agreement is important and worthwhile precisely for that reason: we have a chance to overwhelmingly reduce the probability of more American military conflict in the Middle East."*

work with physics sets. On April 2, diplomats announced tentative details of an agreement between the United States, China, Russia, Britain, France, Germany and Iran to limit Iran's nuclear program in exchange for reprieve of economic sanctions. This is arguably the most important foreign policy development of President Obama's second term, so you should know what's included in this deal. I'll go over its background, details, implications and how I think Congress should respond.

The deal with Iran was set up by a negotiations breakthrough in November 2013, dubbed the Geneva Accord, which set up the current round of negotiations. Representatives met throughout the winter and spring as a self-imposed deadline of March 31 approached for releasing the framework for a comprehensive deal. The negotiators took a two-day extension on the deal and released the details on April 2. The framework is a prototype of the full agreement, which must be reached before the self-imposed deadline of July 1.

The highlight of this deal is the increased "breakout" time, or the time it would take Iran to convert its nuclear material into a weapon.

to stay at the House, and come from at least 25 miles away from home. We work with a number of local hospital partners, including Huntington Hospital, City of Hope, Shriners Hospitals for Children - Los Angeles, County USC, and UCLA Medical Center. We have 12 bedrooms in which families stay, and we are more than a House. We provide a fully stocked pantry, volunteer groups who prepare meals, computers, a large yard with sitting areas, playground and outdoor toys, pet therapy, and recreational activities and parties for the families. Last year we operated at 98% occupancy

and since opening in 2004 we have assisted more than 12,960 children and their families.

The following volunteer programs are offered at the Pasadena Ronald McDonald House Internships

Individual and group volunteer opportunities

House Tours

Various other involvement opportunities - Meals of Love, Supply Drives, Casual Day for the Cause, Pennies with Purpose

Contact Elizabeth Dever for more information via e-mail at [edever@rmhsc.org](mailto:edever@rmhsc.org) or by phone at 626-204-0400.

## Shlohmo's release *Dark Red* is a slow but rewarding listen

**NAILEN MATSCHKE**  
Contributing Writer

Of the current, post-2000s generation of electronic music producers, Shlohmo has found a way to stand out from the pack with tracks featuring disheveled percussion and an apathetic atmosphere while maintaining recognizable, memorable melodies. With EPs released in 2009 and 2010, the Los Angeles-based producer first presented a sound that mixed hip-hop beats with the malleable, unpredictable instrumentals you might expect from a slowed-down Flying Lotus. His subsequent debut *Bad Vibes* was then remarkably successful, as the volume was dialed way back

(for the most part) to embrace an analog, chillwave-esque haze swimming with ambient noises. Instead of ever-shifting rhythms, however, Shlohmo's two solo EPs since then have toyed with current trends in the genre (*Vacation*) as well as elements taken from trap (*Laid Out*), managing both well but not spectacularly. The 2014 collaboration EP with Jeremih, *No More*, ended up being a remarkably

underwhelming aesthetic combination that didn't really play to either artist's strengths, and personal life has apparently not been kind to Shlohmo during the past year or two either. As one might expect, this comes out in full effect on his recently-released sophomore album *Dark Red*, an effort packed with feelings like anger and despair, reaching an emotional boiling point far more often than its predecessors. At its worst, some tracks get too caught up in one specific moment to continue in interesting directions, but at the same time the pain expressed through this album coupled with a noticeable artistic progression can really grab the listener's attention and demonstrate that Shlohmo's future has no lack of potential.

The album starts off with the slow-burning "Ten Days of Falling," which builds from some static and an aimless synth to an earsplitting drone that needs clock-like ticking in the background to remind you it's not just noise, only to drop back to a sane level to support a muffled beat that sounds like it could be coming from next door. This is then contrasted by "Meet Ur Maker," which also takes a couple minutes to build momentum, but ends up with sprawling layers of synth textures backed by driving, breakbeat-centered percussion. Compositionally, these songs have differences that are easy to pick out, but what's striking about them

is that they are both solid entries to the tracklist without being that representative of what Shlohmo has put out in the past. This is continued on the third track, "Buried," which drifts around for a while before the beat drops and the weeping melody kicks in, which for me was one of the album's most memorable moments. However, this song is almost seven minutes long, and past a certain point it demonstrates *Dark Red's* biggest flaw: a tendency to repeat the same segments over and over in order to squeeze out as much feeling as possible.

It's completely understandable that artists who have gone through rough times would use their music to help cope, and it's tough to really

old-school IDM lately, as the track's first half presents a lengthy chord progression carried by distorted synths layered impressively cohesively, and a beat that were it not absurdly loud could be right off a Boards of Canada record. I also love the way the wailing, horn-like lead on the second half of this track cuts straight through the mix and hits the listener hard. Other tracks where Shlohmo experiments with various subgenres of electronic music also tended to be solid, such as "Apathy (feat. D33J)," which I would go so far as to label witch house, or "Fading," which by nature of its vocal samples, incredibly dark and bass-heavy mix, and breakbeat sounds like *Untrue*-era Burial as a hip-hop producer. While the longer tracks may tend to drag, the shorter ones don't outstay their welcome, and few sound particularly alike so that the album as a whole doesn't have as much of a problem with variety as one might expect.

*Dark Red* definitely isn't the best thing Shlohmo has put out, yet at the same time I don't feel as though it was a disappointing release. The biggest issues I have with it are straightforward, and not inherent to any aspect of Shlohmo's style; with enough practice, I really think that he'll be able to achieve a balance between the collage-like nature of *Bad Vibes* and the drawn-out epics of *Dark Red*. We're also seeing Shlohmo incorporate a broader range of sonics into his songwriting, and while I think he hasn't made them wholly his own yet, that sort of thing will come with time. This album won't make waves in the scene like the one it follows, but it puts Shlohmo in a great position for whatever he will do next.

fault Shlohmo for doing just that, especially considering that he does a great job of building up to a passionate climax and belaboring the frisson-inducing end result. Unfortunately, if the listener isn't in a mood to wallow in negative emotion, many of the tracks will be tough to sit all the way through. On "Buried," for example, the song peaks with a bright, staccato synth pattern countering the central theme, but suddenly discards the latter to rebuild from the former. On their own, the notes sound marimba-like and out of place, and as the melody is reincorporated along with the same deafening stadium rock drums as before, everything plays on loop basically without alteration until the outro, which takes almost another minute to trail off into a short keyboard lick that ends abruptly with a dissonant chord.

I enjoyed the rest of the album, but after it was over it struck me that the unexpected ending was one of the more musically interesting moments throughout its significant length. Considering some of the other tracks, this album is not an awful effort at writing longer, more progressive music, but I think Shlohmo needs more practice in order to reach competence.

That said, *Dark Red* is very much not without its high points. Many of the instrumental parts on "Emerge From Smoke" suggest Shlohmo's been listening to some



-http://www.thelineofbestfit.com

## From the (Interim) President's Desk: 12-term tuition policy

**CONNOR ROSEN**  
Interim ASCIT President

Three years ago, a policy requiring students to pay for 12 full terms of tuition, even if they graduate early, was put into place. Additionally, under this policy, students who take below a full-time course load for any reason receive a reduction in financial aid, but not a corresponding reduction in tuition — effectively charging students on financial aid to underload. Overall, this policy creates a severe financial burden for students, and should be repealed.

In the initial announcement of this policy to the Faculty Board, there were three reasons cited for the implementation of this policy. "(i) reports that students refused to take recommended but non-required courses because of the additional cost; (ii) the existence of apparent attempts to 'game' the system by overloading so as to graduate early, to the detriment of students' education; and (iii) concern that students' mental health may be adversely affected by pressure to graduate early and save tuition money." It is unclear whether these issues ever really existed, how prevalent they were, and whether this policy is actually stopping them.

Students who graduate a year early are generally strong, motivated individuals who are taking full advantage of the coursework available at Caltech, rather than compromising their education to save money. Likewise, students may easily graduate one or two terms early without ever overloading or facing unusual academic pressure — to graduate in 11 terms requires fewer than 45 units per term, a typical Caltech course load. Additionally, only about seven students a year graduate in 11 terms (in addition to the few who graduate in 3 years), so it should be easy to "keep an eye" on those students without forcing

them to pay for additional terms of tuition.

The more dramatic effect of this policy is that students enrolled in fewer than 36 units no longer receive a tuition reduction, even though students on financial aid will have their aid reduced. On average, almost 60 seniors on financial aid underload each year — and all of those students will, starting next year, suffer financial consequences. It is especially unreasonable to place an extra financial burden on students who have financial aid and who find themselves in these situations through no fault of their own — a medical underload could cost a student with financial aid thousands of dollars under this policy. While students may petition the dean and provost for an exemption in "exceptional circumstances," they should not have to jump through hoops during what is already a stressful situation to avoid the financial consequences.

This policy creates a severe financial burden on high-performing and low-income students to address a problem that may not in fact exist, and is readily addressed by more careful examination of overload petitions (as is already common practice for first-year students). Numerous students who would have been able to graduate early or underload have expressed that they would be unwilling to donate to Caltech in the future, as they are already being forced to extend or pay after their time at Caltech due to this policy. Overall, this policy has backfired and made Caltech a more difficult place to attend for those with financial need.

The student body overwhelmingly supports the repeal of this policy. We urge faculty, staff and administrators to repeal the policy and allow motivated and capable students, or students with financial aid, to graduate early or underload without suffering severe financial consequences.

## Tsarnaev awaits sentencing of execution or life in prison

*Continued from page 1*

manhunt or helped to protect lives. Ron Paul claimed that it violated civil liberties and represented a worrying precedent. In any case, like breathless media coverage, such action only amplifies the effect of the attack and may encourage further violence.

How should a coordinated response between police and residents act to contain the violence and rebuild after? It's clear that fighting religious fundamentalism with violence has a particularly poor record of success. Other obvious options

have been tried. Engineering a fault-tolerant and robust society compatible with an ever increasing degree of globalization and almost certain economic catastrophes is a challenge worthy of the best thinkers of our age.

Sentencing begins on April 21. Dzhokhar Tsarnaev's ultimate fate, execution or life in prison, rests on proving that Tamerlan Tsarnaev was the prime actor and Dzhokhar Tsarnaev a partially-willing follower, possibly brainwashed by his brother's influence. Recent years have seen a resurgent discussion of the merits of the death penalty. Nearly all other developed nations have long since

consigned the extreme measure to history, if only out of a recognition of the imperfection of the legal process, not to mention forcing state complicity in a compromising act of ultimate violence. Even if Dzhokhar Tsarnaev had acted alone, would killing him undo his harm, bring back the dead and absolve his guilt? Perhaps Dzhokhar Tsarnaev, like other violent criminals, could use a life of confined reflection to understand his mistakes. Perhaps Dzhokhar Tsarnaev's example could one day be a bridge for other disaffected and confused youth to forsake political violence and rejoin the mainstream of society.

# Caltech life explained by rap lyrics

**KSHITIJ GROVER**  
Contributing Writer

Let's just get straight to the lines. There's no doubt that these big name rappers had the inside scoop on Caltech.

*And you can be the one for me when the other numbers aren't adding up*

*I've been thinking about you, thinking about you*

*And we can be like two digits, cause ain't no one equivalent to you*

— Hoodie Allen ("Numbers")

Caltech students profess their love in mathematical terms on a daily basis, and we love it when rappers aren't afraid to pull out the equations. Hoodie knows what's up and it's no surprise he's a campus favorite.

*Four in the mornin', and I'm zonin'*

*I think I'm possessed, it's an omen*

— Kanye West ("Black Skinhead")

The average Techer is most definitely in the zone at four in the morning, much like Yezy professes as an omen.

*All right stop, collaborate and listen*

— Vanilla Ice ("Ice Ice Baby")

It's fabled that Vanilla Ice once taught a course at Caltech, and this was the only line on his syllabus.

*The block got my back*

*And my boys do too*

— Fabolous ("Imma Do it")

If you're working alone on a set, you're going to have a bad time. I'm with Fabolous — my boys got my back.

*Sometimes I just feel like, quitting I still might*

*Why do I put up this fight, why do I still write*

*Sometimes it's hard enough just dealing with real life*

— Eminem ("8 Mile")

Come midterms week, this is the "Party Rock Anthem."

*It's like a jungle, sometimes it makes me wonder how I keep from going under*

— Grandmaster Flash ("The Message")

Noonneedstoexplainthis—Grandmaster Flash is prophetic. The innocence of Pasadena never fails to transform into a jungle from time to time.

*Wasn't cool in high school, but that's expected with geniuses*

— Childish Gambino ("It's On")

Gambino is a mastermind ... and he's not afraid to say it. I could see Donald fitting right into the lecture hall.

*Everybody lack confidence, everybody lack confidence*

*How many times my potential was anonymous?*

— Kendrick Lamar (i)

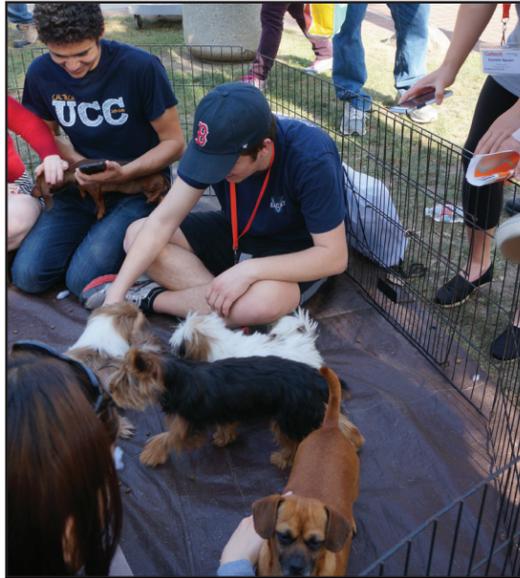
Ah, the famous Caltech imposter syndrome. Kendrick Lamar loves himself and there's no reason everyone shouldn't prove their potential.

*Now who's to say if I was right or wrong?*

— 2Pac ("Until the End of Time")

No one can tell you if you're doing things right — not even that pesky GPA.

# Students, prefrosh engage in shenanigans



The annual Prefrosh Weekend took place from April 9 to April 10. While there was an opportunity for prefrosh to experience academic life at Caltech, current students also made sure to entertain the prefrosh. Among some of the activities that Techers put together for the prefrosh were group kick-off games such as themed fashion shows; Ruddock Greens, a miniature golf course set up in Ruddock; Boba and Games Night at Avery (not pictured); and a boat-building competition held at Millikan Pond.

Photos Courtesy of Ching-Yun (Chloe) Hsu

# Men's track and field kills it at SCIAC Duals #winning

GOCALTECH.COM  
Actual Sports Content Editor

CLAREMONT, Calif. (Apr. 11, 2015) – Junior Anup Kishore (Chappaqua, N.Y. / Horace Greeley) paced the Beavers with a total of 16 points across four events as the Caltech men's track and field team earned its first SCIAC dual victory since 2011, 92-48 over Chapman University, as it joined the women's team in a four-way multi-dual at Claremont-Mudd-Scripps Colleges on Saturday.

"Coming into today, it looked like things would be very close against Chapman," Head

Coach Ben Raphelson said. "The final score was indicative of what an outstanding team performance we had today. A lot of student-athletes stepped up and today showed great progress for both programs."

Kishore took fourth place overall in the triple jump with a leap of 39 feet, eight inches and fifth in both the high jump (five feet, one inch) and pole vault (11 feet, ¼ inch), rounding out his day with a javelin throw of 90 feet, 11 inches for ninth place.

Junior Morgan Hill (San Diego, Calif. / Wasatch Acad.) earned a pair of five-point hauls and one three-pointer against Chapman, placing 10th overall in the discus

and shot put and sixth in the hammer. He saved his best throw for last on each occasion, including a full three-foot improvement in the shot to beat out the Panthers' top thrower.

Senior Ben Grabowski (Lake Forest Park, Wash. / Inglemoor) and sophomore Jordan Bonilla (Weston, Fla. / Cypress Bay) racked up 11 and seven points, respectively, across three events each, with Bonilla narrowly missing out of the scoring in a fourth. Grabowski earned five points in the discus and javelin and snuck into the scoring in the hammer with one point, while Bonilla picked up three points in the hammer and javelin and one in the shot.

The Beavers picked up some big points in the running events as well. Their top individual scorer was Freshman Alec Ho (Vancouver, Wash. / Columbia River), who made his debut in both the 110-meter and 400-meter hurdles, earning five points in each. In the 5000-meter run, senior Juan Adame (Sylmar, Calif. / Sylmar Math, Science and Tech.) and junior Alex Anemogiannis (Atlanta, Ga. / Marist School) placed third and fifth overall, respectively, to claim a combined eight points over Chapman behind a pair of career-best times. Adame ran a 16:22.49 while Anemogiannis made up significant ground to blow past a Panther runner in the final strides for a four-point swing. Junior Elliot Simon (Alexandria, Va. / Thomas Jefferson) and freshman Christopher Haack (New York City, N.Y. / The Browning School) teamed up to collect a combined four points in the 800-meter run. Senior Victor Duan (Darien, Ill. / Illinois Math and Science Acad.) and junior Kevin Yei (Carlsbad, Calif. / La Costa Canyon) held down the sprints as usual, combining to score seven points. Duan shaved .10 off his

100-meter dash time to record an 11.65 and clocked his first sub-24-second time in the 200-meter dash, running a 23.94, while Yei dropped nearly three full seconds to finish a mere .04 behind Chapman's top runner in an impressive 54.25.

Senior Jared Forte (Lake Elsinore, Calif. / Elsinore) and junior Aditya Bhagavathi (West Windsor, N.J. / West Windsor-Plainsboro North) also claimed five points apiece in the dual scoring. Forte debuted in the 3000-meter steeplechase with the sixth-fastest time in program history at 10:08.74 to place third overall, while Bhagavathi was the runner-up by just .43 of a second in a deep and fast 1500-meter run field, cracking the four-minute barrier for a second straight time. The 4x400-meter relay team of Bhagavathi, Yei, senior Eric Martin (The Woodlands, Texas / College Park) and Ho capped the scoring with a six-second margin of victory over Chapman, clocking a 3:39.05.

On the women's side, junior Bridget Connor (Albuquerque, N.M. / Albuquerque Acad.) inched closer to the top pole vault mark in program history, clearing a height of nine feet, two ¼ inches, and picked up another top finish vs. Chapman in the javelin. Sophomore Lucy Chen (Boonton Township, N.J. / Mountain Lakes) posted career-best marks in the 200m (14.92) and triple jump (30 feet, seven inches), improving by a half second and two feet, respectively. Freshman Serena Delgadillo (Denton, Texas / Texas Acad. of Math and Science) picked up a handful of points with a fifth-place overall finish in the hammer throw, while senior Stephanie Reynolds (Tallahassee, Fla. / Lawton Chiles) garnered several points against both Chapman and Whittier College in the 800m and 1500m.



Anup Kishore embarks his inner warrior and does it, I quote, "for Sparta."

-<http://gocaltech.com>

# Women's water polo loses senior game, makes up for loss by having very cute seniors on the team



I, Monica Enlow, will miss Shalini Majumdar, Emily Shih, Liz Lawler, Jing Xu and the rest of the team more than I can express in a mere photo caption or Facebook post.

-<http://gocaltech.com>



Sure, we don't win games, but at least we are patriotic and awesome. This game gave me all the feels. It's bizarre that four years ago I could barely swim, and last Saturday I started in my last home game at Caltech. No, I'm not crying, there's just a branch in my eye.

Photo Courtesy of Monica Enlow

Do you like sports? Are you witty? Do you want to bring joy into people's lives every week???? Then YOU should become the sports page contributor! Email [tech@caltech.edu](mailto:tech@caltech.edu) for more details. Do it for America; your country needs you.

# ASCIT Minutes

## ASCIT Board of Directors Meeting

Minutes for 7 April 2015. Taken by Sean McKenna.

**Officers Present:** Connor Rosen, Nima Badizadegan, Catherine Jamshidi, Patrick Nikong, Annie Chen, Sean McKenna

**Guests:** Chris Dosen, Elliott Simon, Nikita Sirohi, Anne Dorsey, Bianca Lepe

**Call to Order:** 12:09 pm

### President's Report (Connor):

- Still talking with faculty and administrators on the 12-term tuition policy.
- BOC bylaws discussion continues. Still planning on a town hall to describe changes.

### Officer's Reports:

- **V.P. of Academic Affairs (ARC Chair: Nima):**
  - Sending out a library survey about effect of closings.
  - Sending out ASCIT Teaching Awards nominations today.
  - Frosh choose their majors this week; info was sent about ISP program.
  - Option Fair happened.
  - Talking with Dabiri to help frosh and RA's understand eligibility rules and UASH.
- **V.P. of Non-Academic Affairs (IHC Chair: Cat):**
  - Reappointed Margaret Lee as IHC Secretary
  - \$300 allocated to houses for PFW events by admissions.
- **Interim Director of Operations (Sean):**
  - ASCIT Food for Prefrosh Weekend is happening Thursday night at midnight.
  - Club Fair Friday afternoon.
- **Treasurer (Patrick):**
  - Patrick is looking for money that is owed to people. May be related to direct deposit. Finishing up budget records for the next treasurer.
- **Social Director (Annie):**
  - ASCIT Formal went well.
  - Avengers confirmed for ASCIT Movie Night on May 1st.
  - Trip to the aquarium, Harvey Mudd party will happen in May if we can find open weekends.
  - Battle of the Bands is happening before BFP on the *Saturday* of Memorial Day weekend.
- **Secretary (Sean):**
  - BOD meet and greet on Saturday 11 April at 6pm to meet current position holders in advance of upcoming elections.

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 meeting will take place on April 14th at Noon in the Winnett Common Space.

**Meeting Adjourned:** 12:24 pm

**YOU ARE NEVER ALONE.**

**REMINDER FROM  
THE COUNSELING CENTER:**

*Meditation Mob*  
(drop-in mindfulness  
meditation group)  
Meets every Tuesday  
Bottom floor of Winnett  
12:00-12:50 pm

Celebrate

# EARTH DAY



**all month**

## April 2015

<b>Tuesday, April 14</b> Watson 104 12pm-1pm	<b>Climate Change Adaptation</b> Robert Lempert, Director, Pardee RAND Graduate School Lunch provided
<b>Thursday, April 16</b> Winnett Lounge 12pm-1pm	<b>Remote Sensing of Global Carbon and Water Cycles</b> Narendra Das, JPL water and carbon cycle scientist Lunch provided
<b>Friday, April 17</b> San Pasqual Walk 11:30am-1:30pm	<b>Earth Day Community Fair</b> Come check out a variety of local environmental organizations and learn how you can get involved
<b>Friday, April 17</b> SFL 328 7pm-9pm	<b>Movie Night: Growing Cities</b> This documentary examines the role of urban farming in America: how it can revitalize our cities and change how we eat Food provided
<b>Saturday, April 18</b> Catalina Apts. Community Garden 2pm-4pm	<b>Workshop: Gardening 101</b> Come exercise your green thumb at this workshop lead by Jeri Huston, UC Master Gardener
<b>Monday, April 20</b> SFL 328 5pm-6pm	<b>Workshop: Citizen Engagement</b> Learn more effective ways to take productive action to implement change Food provided
<b>Wednesday, April 22</b> Winnett Lounge 12pm-1pm	<b>The Energy/Water Nexus</b> Steve Frei, Principal, Affiliated Engineers Lunch provided
<b>Wednesday, April 22</b> Beckman Mall & Ramo Auditorium 5pm-9pm	<b>Ask a Scientist &amp; TACIT Performance of Two Degrees</b> Open Q&A with climate scientists followed by a special performance of <i>Two Degrees</i> written by Tira Palmquist Food provided
<b>Friday, April 24</b> SFL 328 5pm-6pm	<b>Workshop: How to Reduce Your Carbon Footprint</b> Calculate your carbon footprint! You might be surprised at what steps you can take to reduce it Food provided

Caltech sustainability



Caltech  
Graduate Student Council

Flyer Courtesy of John Onderdonk/Director of Sustainability at Caltech

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only!!**

**Contact: Adam Jacobo**  
**626.395.5907**  
**ajacobo@caltech.edu**

*The California Tech*

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## Brad/Chad Business Tutorial: Not just theory (part 2)

**BRAD CHATTERGOON**  
Contributing Writer

Hey Techers. In case you weren't keeping track, it is currently week 3 which means add day will be creeping up on us at the end of the week. Be sure to finalize your add cards earlier rather than later so as to avoid the reckless sprinting between your professor's and the registrar's offices. I had said that I would continue talking about soft skills and how they relate to the Ellen Pao case but due to recent developments which I will get into, this article has become more of a commentary on the relationship between feminism and employment in the technology industry.

To start, Ellen Pao, as interim CEO of reddit, has now issued a proposal to remove salary negotiation as part of the hiring process at reddit. According to several articles, in The Huffington Post and others, the argument for this move is that this should solve the income inequalities between men and women that start at the hiring level. I agree that income inequality is an issue that should be addressed but this seems to be a poor way to address it for at least two reasons.

The first is that in industry, one of the important soft skills, more often than not, is negotiation. Being able to convince someone of something is crucial. It's also something that does not show up in a meaningful way on paper but does present itself in a situation like negotiating a salary. Business is by definition based on trade. Being able to close a deal on the terms that you want can often make the difference between making it and breaking it. The point is that negotiation behavior is valuable and it should be valued as such at the company, ergo the award of a higher salary

to someone demonstrating strong negotiation skills.

The second reason is that the solution to income inequalities between men and women arising from women not being good negotiators (the previous not being my view but one that showed itself in the articles) is not to remove negotiation, but instead to make women better negotiators. Removing negotiation from the hiring process is akin to saying, "Hey, we'd be willing to pay you more if in addition to your other skills you can speak an additional language, but since we're not allowed to check your proficiency in a second language, we're just not going to check it and we'll pay you less than you can earn if you had demonstrated that proficiency." Claiming that women are not good negotiators and then saying that that means we should remove negotiation simply panders to the viewpoint that women are somehow less capable, which I strongly believe is inaccurate.

The definition of feminism can in some sense be paraphrased to "leveling the playing field." Leveling the playing field, however, is not the same as "changing the rules of the game" or, even more severe, changing the game entirely. Polarizing the population into male and female is tricky this far into the gender equality movement. In some cases it can be beneficial to highlight discrimination but in others it removes the focus from individuality and it classifies people into groups, leaving behind the idea of "you're bad or good at something" and going into "your group is bad or good at something." But isn't that exactly what gender equality is supposed to be removing?

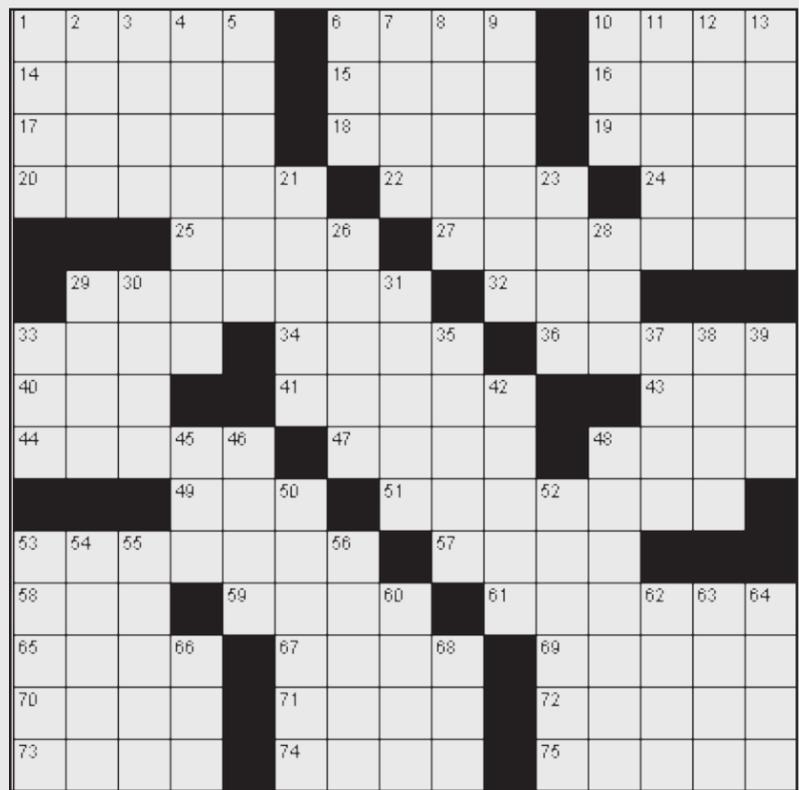
-Brad/Chad



Salary negotiations are common in job interviews in the business world.

-<http://salesleadershipblog.sellingpower.com/>

## Crossword



-<http://puzzlechoice.com>

### Across

- 1. Form
- 6. Adjoin
- 10. Exam success
- 14. Woven fabric
- 15. Money
- 16. Dull pain
- 17. Representative
- 18. Genuine
- 19. Sound of a contented cat
- 20. Foil
- 22. Fall vertically
- 24. Pull hard
- 25. Reported information
- 27. Person receiving support from an influential patron
- 29. Written evidence of payment
- 32. Type of tree
- 33. Speed competition
- 34. Borsch
- 36. Temperamental
- 40. Residue of a fire
- 41. Restorative
- 43. Compete
- 44. Evil spirit or ghost

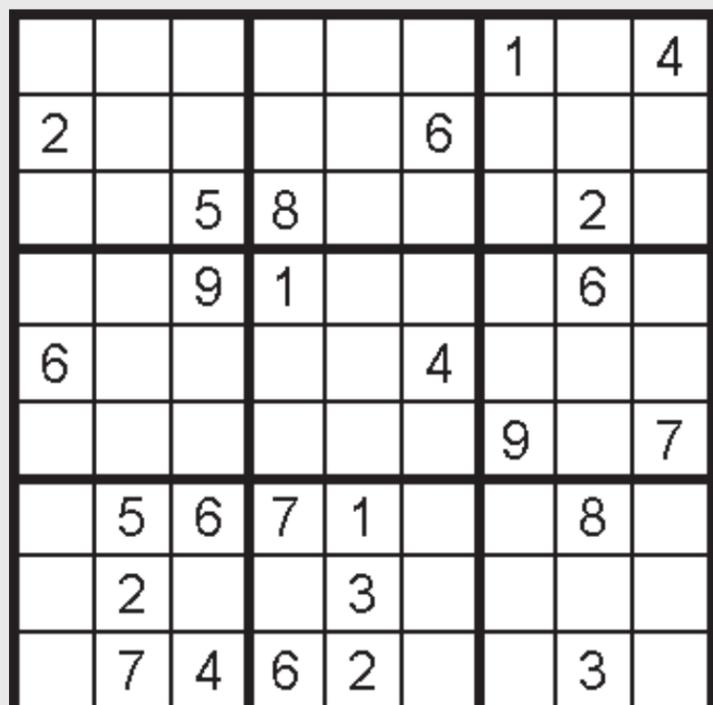
- 47. Plant with pendulous flowers
- 48. Flowerless plant repuduced by spores
- 49. Large body of water
- 51. Deprive of freedom
- 53. High-pitched noise
- 57. Joust
- 58. Metal-bearing mineral
- 59. Edible fat
- 61. Short sleep
- 65. Departed
- 67. Female horse
- 69. Female relative
- 70. Notion
- 71. Level
- 72. Twist into a state of deformity
- 73. Student sleeping quarters, in short
- 74. Anything necessary but lacking
- 75. Kind of heron

### Down

- 1. Spline
- 2. A lofty level
- 3. Afresh
- 4. Voluntary self-punishment
- 5. Main course
- 6. Perform
- 7. Poet
- 8. Seize and take control without authority
- 9. Unverified explanation or concept
- 10. Worthless or oversimplified ideas
- 11. Instense
- 12. Gesture involving the shoulders
- 13. Twilled woolen fabric
- 21. Unforseen turn of events
- 23. Ode
- 26. Bobbin
- 28. Number in a brace
- 29. Reckless
- 30. Reverberation
- 31. Loose fitting cloak
- 33. Tatter

- 35. Aviator
- 37. Kitchen appliance
- 38. Desperate
- 39. Japanese currency
- 42. Faultfinder
- 45. Employ
- 46. Sediment from fermentation
- 48. Accessory to a larger system
- 50. Insightfulness
- 52. Rim
- 53. Of one substance throughout
- 54. System of principles or beliefs
- 55. Send or direct for treatment
- 56. Throw with great effort
- 60. Large woody plant
- 62. Approach
- 63. Unit of area
- 64. The dressed coat of a mammal
- 66. Woolen cap of Scottish origin
- 68. Conclusion

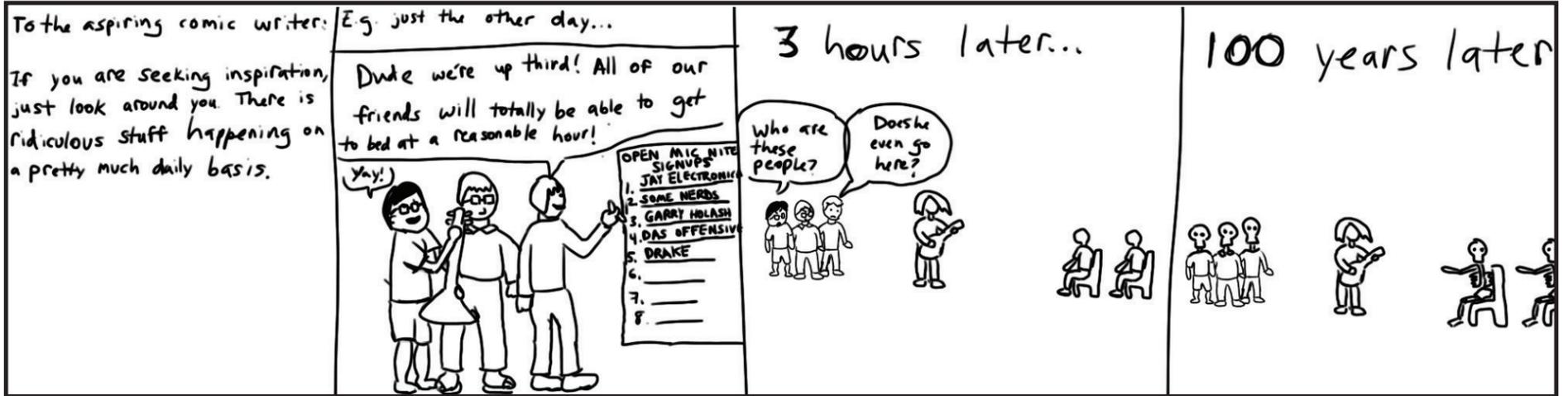
## Sudoku



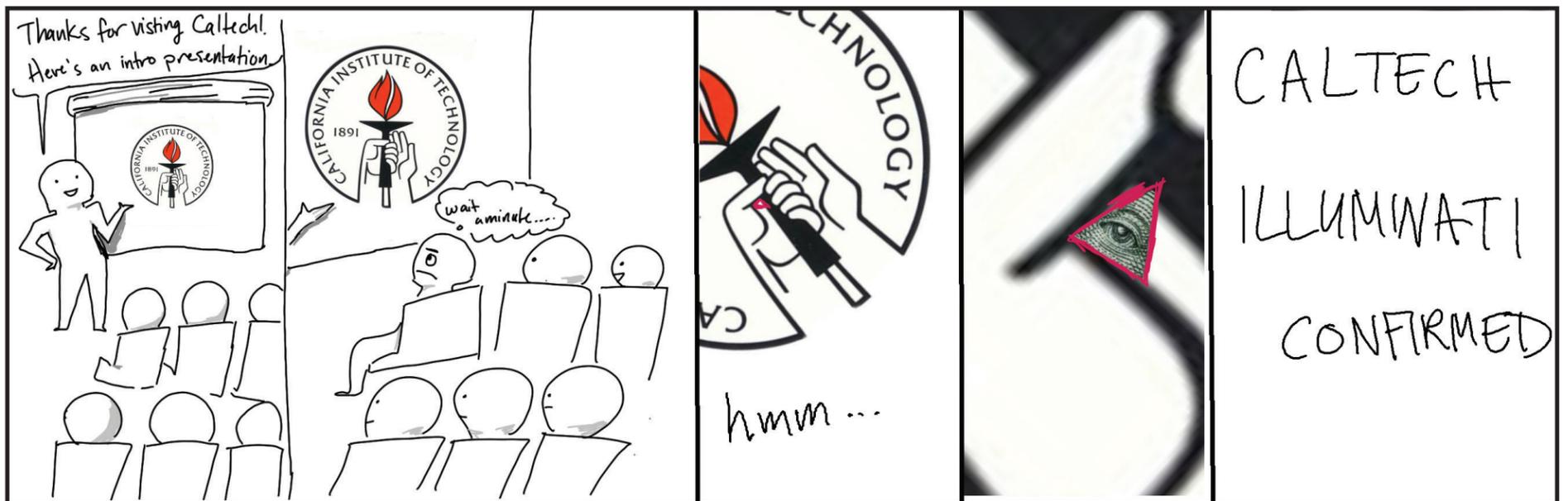
-<http://puzzlechoice.com>

## Acquired Taste

Dr. Z



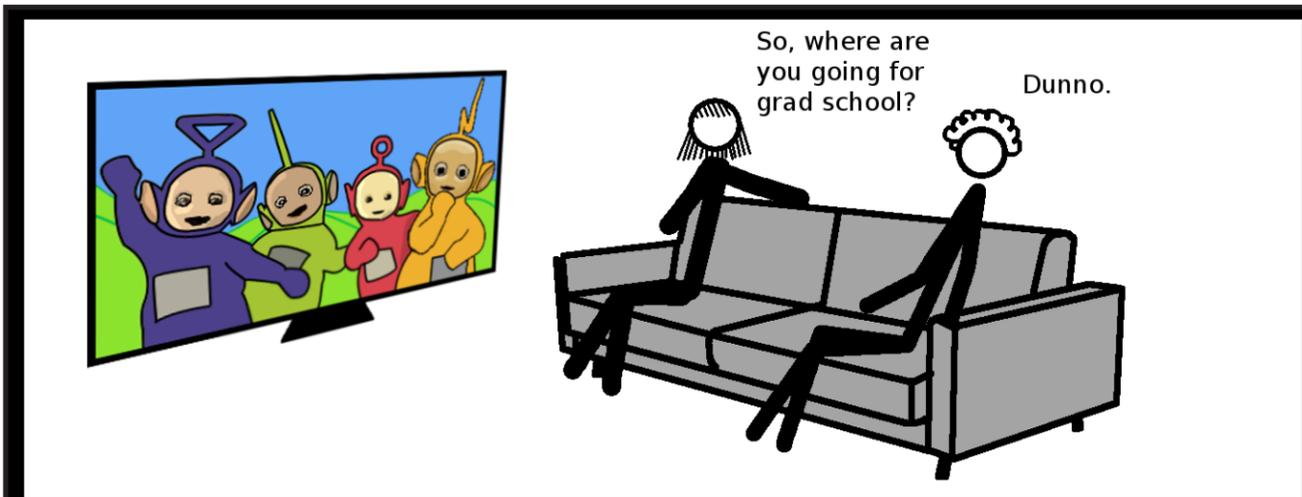
Liz Lawler



## "Only the next 6±1 years of my life"

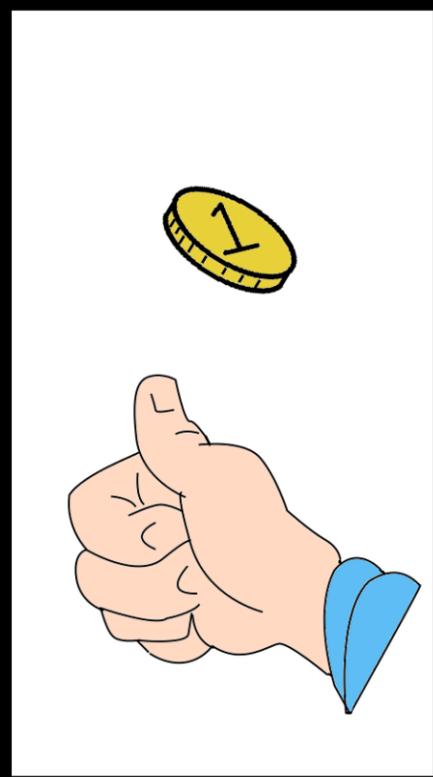
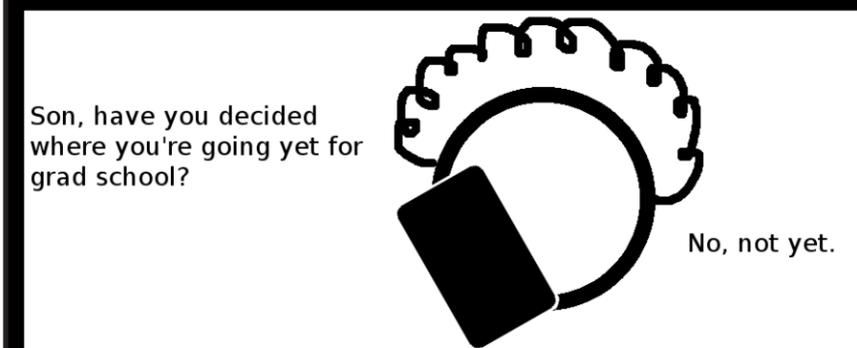
Georgio Kraggman

Answers to previous Sudoku



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

-http://puzzlechoice.com



**Graduate school decision** ➡

Grad school to: me Dear Georgio, decisions are coming up. Please make sure to let us know as soon as possible!

Awaiting your reply.

Sincerely,  
Graduate school admissions

The California Tech  
Caltech 40-58  
Pasadena, CA 91125