



Hubble, ALMA probe primitive nature of “space blob”

CYNTHIA ELLER
Caltech Today

The Subaru Telescope, an 8.2-meter telescope operated by the National Astronomical Observatory of Japan, has been combing the night sky since 1999. Located at the Mauna Kea Observatories in Hawaii, the telescope has been systematically surveying each degree of space, whether it looks promising or not, in search of objects worthy of further investigation. One of the most fascinating objects to emerge from the Subaru Telescope’s wide-field survey—Himiko—was discovered in 2009. Himiko, a “space blob” named after a legendary queen from ancient Japan, is a simply enormous galaxy, with a hot glowing gaseous halo extending over 55,000 light-years. Not only is Himiko very large, it is extraordinarily distant, seen at a time approximately 800 million years after the Big Bang, when the universe was only 6 percent of its present size and stars and galaxies were just beginning to form.

How could such an early galaxy have sufficient energy to power such a vast glowing gas cloud? In search of the answer to this question, Richard Ellis, the Steele Family Professor of Astronomy at Caltech, together with colleagues from the University of Tokyo and

the Harvard-Smithsonian Center for Astrophysics, undertook an exploration of Himiko using the combined resources of the Hubble Space Telescope and the new Atacama Large Millimeter/

prodigious rate of star formation, equivalent to about one hundred solar masses per year. This is more than sufficient to explain the existence of Himiko and its gaseous halo. The observation of the three

universe. When these dust clouds are heated up by the ultraviolet light emitted by the developing stars, the dust reradiates the ultraviolet light out into the universe at radio wavelengths. But ALMA

the dust clouds of heavier elements that astronomers find in typical energetic galaxies. Instead its interstellar gas is composed of hydrogen and helium—primitive materials formed in the Big Bang itself.

Ellis and his fellow astronomers did not come to this conclusion quickly. They first carefully ruled out several other possible explanations for Himiko, including that the giant blob is being created by the magnification of a foreground object by a phenomenon known as gravitational lensing, or is being powered by a massive black hole at its center. Ultimately, the team concluded that Himiko is most likely a primordial galaxy caught in the moment of its formation between 400 million to 1 billion years after the Big Bang, a period astronomers term the cosmic dawn.

“Astronomers are usually excited when a signal from an object is detected,” Ellis says, “but in this case it’s the absence of a signal from heavy elements that is the most exciting result!”

The paper reporting the results of this research, titled “An Intensely Star-Forming Galaxy at $Z \sim 7$ with Low Dust and Metal Content Revealed by Deep ALMA and HST Observations,” will be published in the December 1, 2013, issue of the *Astrophysical Journal*. The work was funded by NASA through a grant from the Space Telescope Science Institute, the World Premier International Research Center Initiative (WPI Initiative), and the Japan Society for the Promotion of Science (JSPS).



-www.caltech.edu

submillimeter Array (ALMA) in Chile’s Atacama Desert. The data collected through these observations answered the initial question about the source of energy powering Himiko, but revealed some puzzling data as well.

The Hubble images, receiving optical and ultraviolet light, reveal three stellar clumps covering a space of 20,000 light-years. Each clump is the size of a typical luminous galaxy dating to the epoch of Himiko. Together, the clumps achieve a

stellar clumps is exciting in itself, as it means that Himiko is a “triple merger,” which, according to Ellis, is “a remarkably rare event.”

But a surprising anomaly emerged when Himiko was observed by ALMA. Although the giant gas cloud was bustling with energy at ultraviolet and optical frequencies, it was comparatively sleepy in the submillimeter and radio ranges that ALMA detects. Ordinarily, intense star formation creates dust clouds that are composed of elements such as carbon, oxygen, and silicon, which are heavy in comparison to the hydrogen and helium of the early

did not receive significant radio signals from Himiko, suggesting that heavier elements are not present. Also missing was the spectral signature associated with the emission of gaseous carbon, something also common in galaxies with intense star formation.

Both of these nondetections—of substantial radio waves and of gaseous carbon—are perplexing since carbon is ordinarily rapidly synthesized in young stars. Indeed, carbon emission has heretofore been recommended as a tracer of star formation in distant galaxies. But, as Ellis and his fellow astronomers found, Himiko does not contain

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< **100** words about the world this week – topics sorted from good to bad

by *The Tech* Eds

U.S.-Iran gridlock broken	35- yr. gridlock broken when Iran negotiated on nuclear program	[CNN]
1000th album tops chart	1000 th album to be #1 in the UK is Williams’ <i>Swings Both Ways</i>	[BBC]
Dr. Who airs special show	10 mil. viewers tuned in to Doctor Who’s 50th anniversary episode	[BBC]
Samsung to pay Apple	\$290 mil. must be paid to Apple by Samsung for patent infringement	[ABC]
Swiss against salary cap	65.3% voted against capping bosses’ pay at 12x the lowest salary	[BBC]
Rebels rally in Ukraine	100k protested in Ukrainian capital against delaying EU agreement	[BBC]
Drone attacks Pakistan	5 confirmed dead, including students and militants, in US drone strike	[BBC]

Food with Mannion!

*Do you like eating food?
How about free food at nice restaurants?
Ever want to tell the world exactly what you think of said food?
The Tech will be beginning a new column to chronicle the foodie experiences of new writers every other week... The Catch: They'll be going head-to-head with Tom Mannion who will be reviewing the same restaurant. If you have ever thought you were more of a gourmand than our resident master chef, now's your chance to prove it!
Email us for a spot on the list at tech@caltech.edu*

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ASCIT Minutes

sMinutes for November 19, 2013. Taken by Catherine Jamshidi

Officers Present: Zach Rivkin, Connor Coley, Malvika Verma, Connie Hsueh, Michelle Tang, Catherine Jamshidi

Guests: Connor Rosen, Margaret Lee

Call to Order: 9:05pm

President's Report (Zach):

- In my candidacy statement from April, I advocated for student leadership to take a level headed approach with the administration and focus on increasing student mental health resources. The process has usually been successful, and the most recent and largest accomplishment is an evening hours pilot program. After half a year of civil discussions with Kevin Austin, Leslie Nye, Tom Mannion, Anneila Sargent, John Dabiri, plus many other invaluable participants, along with a recent hardline passionate Faculty Board presentation, a limited evening hours trial will go into effect until the end of this academic year. This is an incredible step forward for the Caltech safety net and auspiciously points towards a positive shift in relations between students and student affairs. I hope to see further improvements during the next half of ASCIT's term and in the years ahead. Significant thanks goes to those mentioned above along with the student leadership, the Head UCCs, and especially to the IHC Chair Connor Coley for spending an innumerable number of hours and offering constant support through the entire process.
- Club funding has been completed.
- The ASCIT retreat and midyear reviews occurred. Survey responses were very helpful for framing discussions and supplying appropriate feedback.

Officer's Reports:

- V.P. of Academic Affairs (ARC Chair: Malvika):
 - o Meeting with Provost Online Education Committee
 - o Flipped classroom vs. online courses
 - o Faculty don't want to dumb down standards
 - o Concrete proposal: CS0
 - o The second Student-Faculty Lunch was this past Thursday. We have continued to see a large amount of interest in this program from both students and faculty.
 - o The ARC is interested in adding a compliments section to the ARC Concern Box on Donut.
- V.P. of Non-Academic Affairs (IHC Chair: Connor):
 - o The IHC is working with Jon Webster and Dining to enter nutrition information of food options. If you're interested in helping us with data entry (for some money), send me an email. We'll likely begin around winter break.
 - o Invite your professors to your house dinner! It's a great way to get to know them in a non-academic context.
- Director of Operations (Connie):
 - o Remember that you can still register a new club anytime! Apply at clubs.caltech.edu
- Treasurer (Monica):
 - o We finished Club Funding and I will be publishing the breakdown of the 2013-2014 budget on Donut.
- Social Director (Michelle):
 - o The Ice House comedy show event will likely be made a termly event.
 - o Page Interhouse: Daft Punk was this past weekend.
 - o The Wallpaper. concert will be Friday, December 6th, at 9PM on Bechtel Mall (just west of Millikan).
 - o There will probably be an after-party (details to follow) with a Snap Yourself! Photo booth.
- Secretary (Cat):
 - o Connor Rosen and I have created a follow-up survey to gauge trends in feedback on the student experience. It should take no more than 5 minutes to complete and there will be several Amazon Gift Cards awarded to randomly selected people who responded to the survey. Go fill it out!!
 - o I sent out all of the club funding decision emails and tried to provide reasoning for our decisions. If any clubs have any questions, please do not hesitate to ask!
 - o I'm working to schedule ASCIT meetings for 2nd term.
 - o I've posted all of the recent minutes on the Donut Website and have compiled a list of action items to follow-up on for each BoD member.

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.

Meeting Adjourned: 10:53 pm

Caltech Y Column: Look out for new events

**PHOEBE ANN
LAURA SANTOSO**
Contributing Writers

Hi everyone! This is the Caltech Y Column, designed to inform you about the Y and the opportunities we provide for you to inspire your passions, whether by participating in our programs or leading your own!

1. Ice Cream Competition!

North Houses:

Sunday | December 1st | 7:00-9:00 pm | Caltech Y

South Houses:

Wednesday | December 4th | Evening, Time TBA | Caltech Y

The Caltech Y is hosting a Fosselman's Ice Cream Competition among the houses, sponsored by Tom Mannion! The houses will be competing to create the best flavor of ice cream, and the winner will get their ice cream flavor featured at CDS dinners in addition to \$2000 for the house retreat fund. The other semifinalist will win \$1000, and there will be additional prizes from the Y.

There will be two semifinal competitions taking place at the

Caltech Y house (505 S. Wilson Ave). Winners will be decided by popular vote but the finer points are still being worked out.

2. Social Activism Speaker Series presents: Boots Riley Social Activist and Front Man of the Coup Monday | November 25th | 7:30 pm | Beckman Institute Auditorium

For decades, Boots Riley, musician, vocalist, writer, and public speaker, has been an integral part of the progressive struggle for radical change through culture. Boots has appeared on Fox News's Hannity and Colmes, PBS's Democracy Now!, and ABC's Politically Incorrect with Bill Maher. He has been featured addressing a variety of subjects from music to grassroots organizing, to US imperialism and racism, recently winning awards from the AFL-CIO for his participation with the Tell Us the Truth Tour. Riley continues to effect social change through his artistic and political work. Contact caltechy@caltech.edu for more information.

3. Lion King Broadway Musical – Caltech Y Explore LA Series – Enter

the Undergrad Ticket Lottery at the Caltech Y Today until Monday, Nov. 25th at Noon

Show Details: Saturday | January 11 | 8:00 pm (2 hours and 40 minutes with intermission) | Pantages Theatre | \$35 each | Undergrads

The Master of Student Houses (MOSH) and the Caltech Y announce a lottery for undergrads interested in purchasing tickets to Disney's THE LION KING – a Broadway musical at the Pantages. Marvel at the breathtaking spectacle of animals brought to life by award-winning director Julie Taymor, whose visual images for this show you'll remember forever.

Visit the Caltech Y to enter an undergrad lottery for limited tickets to the Lion King starting today until this Monday, November 25th at noon. The Caltech Y - located in the Tyson House (Bldg. 128), just north of the Caltech Credit Union – is open Monday through Friday, 9am to 5pm. First priority will be given to students who have not participated in a MOSH affiliated event in the past year (i.e. West Side Story or Book of Mormon). Students will be permitted to enter the lottery for one or two tickets;

however their guest must also be a Caltech undergraduate. Students will be notified of the lottery results by Wednesday, Nov. 26th. Explore LA is coordinated by the Caltech Y in partnership with the Master of Student Houses. Contact Laura Santoso (Santoso.laura@gmail.com) or Jessica Yeung (jsyeung@caltech.edu) with any questions. Transportation is not provided.

4. Adventure 101: Winter Sports in Southern California

Thursday | December 5th | 12:00

Are you looking for some fun and local winter activities, but think that Southern California only offers summer sports? Come find out about all different types of winter sports activities here in Southern California at the next Caltech Y Adventure 101 talk. Space is limited and lunch is provided so sign up is required. Location details will be included in your confirmation.

5. Outdoor Adventures T-Shirt Design Contest

Do you have graphic design skills? We need your help! The Caltech Y Outdoor Adventures

group is designing and printing custom T-shirts to wear when hiking, having fun outdoors, or even for daily use around campus. We are looking for a cool design that incorporates our love for hiking and outdoor activities with our Caltech affiliation. The creator of the winning design will get a free T-shirt and a \$25 discount on the Caltech Y Outdoor Adventures camping trip of their choice (good for trips to Yosemite, the Grand Canyon, and other National and State Parks). Submit your design in .pdf or .ai form to [Jeremy Sandler](mailto:Jeremy.Sandler@caltech.edu), jsandler@caltech.edu.

If you have any questions at all, feel free to contact the Caltech Y at (626) 395-6163 or caltechy@caltech.edu. Feel free to drop by at one of our weekly meetings at the Caltech Y (505 S. Wilson, next to CEFCU), Mondays at noon. Lunch is provided. Go to <http://caltechy.org/lists/> to self-subscribe to announcement lists for upcoming events.

For a student's perspective, feel free to contact Phoebe Ann at phoebe.ann2@gmail.com or Laura Santoso at santoso.laura@gmail.com.

Insights into ASCIT: Caltech club funding

ASCIT BOARD OF DIRECTORS
Contributing Writers

Hey everyone! We, the ASCIT Board of Directors, are going to try to give you insight into what we're working on by writing a series of Tech articles.

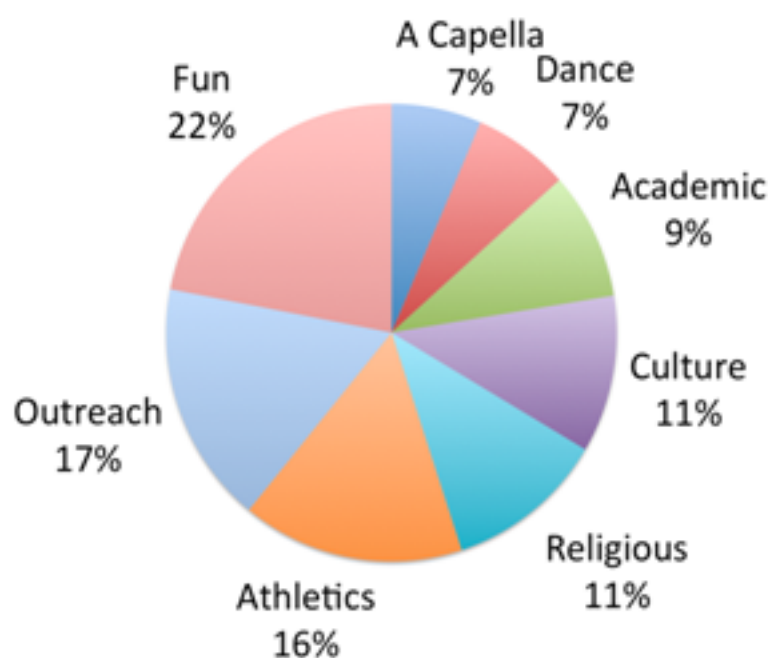
These articles will be written as needed and will cover various aspects of what we discuss at our meetings.

We have recently finished the club funding process by holding a number of meetings to discuss how best to distribute our club-related budget. This year, we distributed a total of \$16,625 to 50 different clubs on campus. We've broken them up by category for convenience (see pie chart).

Our goal is to fund clubs that will directly benefit Caltech undergraduates; we are trying to support general student well-being and build community amongst Techers through your shared interests.

In addition to general club funding, ASCIT also has event funding for special events that you would like to put on. We encourage you to apply for this different source of funding (open throughout the year).

If you have any questions, comments, or concerns, we will be holding our next meeting on Monday, December 2nd, at 10PM in Chouse. Please feel free to join us in our discussions or just chat with us. We will have delicious free cookies and hot cider while it lasts!



NOMINATE YOUR FAVORITE PROFESSOR FOR THE FEYNMAN TEACHING PRIZE!

Here's your chance to nominate your favorite professor for the 2013-14 Richard P. Feynman Prize for Excellence in Teaching! You have from now until January 2, 2014 to submit your nomination package to the Provost's Office to honor a professor who demonstrates, in the broadest sense, unusual ability, creativity, and innovation in undergraduate and graduate classroom or laboratory teaching.

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, post-doctoral 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 2, 2014.

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

From a Caltech alum: Seven steps to a stronger community

CHRIS KOLNER
Caltech Alumnus

This is the third of three parts of this editorial, which is being published in consecutive issues of the Tech. It deals with the vanishing trust and respect between undergraduate students and Caltech administrators, and how we might work together to rebuild that link and strengthen the community. The full text of may be found at http://ugcs.caltech.edu/~ckolner/pubs/caltech_editorial.pdf and conspicuously on the Internet. Up this week – suggestions on how to address student mental health issues and a call to arms for students, alumni, and their leaders. Be brave, and speak for what you believe.

6. Use the RAs and UCCs as a safety net and mental health resource, not as social programmers.

“Social programming” seems to be the new buzzword being handed down to UCCs these days. They have been constantly encouraged – along with RAs and RLCs – to schedule social events for their Houses. Additionally, they have also been pushed to interfere in house governance. For example, during the Ricketts fiasco, a directive from the administration was disseminated through RAs to UCCs, instructing them to try to quiet speculation as to the true nature of the events surrounding the situation. These things ought not to be the responsibilities of the RA and UCC programs. Houses have separately elected social teams whose duty is to organize such social events. And if the administration wishes to announce something to students less publicly than an e-mail, the IHC and proper house governmental channels are waiting. Actual implementation of the UCC system varies widely by house, but their principal role has always been that of counselors and support resources. The UCCs – and by extension the RAs – ought to exist so that they can be a first line of eyes to watch for problematic mental health symptoms and serve as an always-available counseling resource to students in need. To push them to add their voices to social programming and house governance – places where their voices are sometimes decidedly unwelcome – is needless overreach

and distracts from the true purpose of the programs: to ensure student mental health.

7. Downsize the RA and RLC program and use the resources more efficiently to focus on mental health.

Among the more controversial changes in recent years has been the increase in the number of graduate RAs and the hiring of Residential Life Coordinators (formerly known as Area Coordinators) to supervise undergraduate life. It goes without saying that such an increase must incur the Institute significant expense – the average RA apartment occupies four undergraduate bed spaces, so that’s \$49,776 in lost revenue per RA per year, not even including the summer term or RA stipends and (considerable) RLC salaries. It would be fair to estimate that the seven RAs and several RLCs added in the past three years will cost the Institute more than \$500,000 annually as more beds are removed to make space for them.

And for what gain? Students have forfeited their beds, forcing more of them to live in less desirable off-campus locations further from the support network, and have in turn received more “adult supervision”. I do not wish to understate the critical part which graduate RAs play in the safety net – they are a unique and irreplaceable resource – but unfortunately adding multiple of them per House has not had what I hope was the intended effect. Head UCCs from multiple houses have confided to me that the extra RAs have not improved their ability to serve students’ mental health. Instead, they are as likely to cause organizational problems, as each assumes the other will take care of various responsibilities, and therefore important duties go neglected. Certainly in the first years of a multiple-RA approach

during my years as a student, I directly felt that both RAs were more distant than in the past, in part because they each assumed the other to be present. In short, having two RAs per house *doesn’t help*. In fact, it can hurt, and it reduces the number of much coveted on-campus bed spaces.

Like the administration, I too am deeply concerned for the mental health of Caltech students.

A Path of Hope

At this point, I suspect many of you – especially current students – will be asking how we could ever accomplish such change. Sadly, I find many students gripped by a crippling sense of helplessness and apathy, stuck between fear of speaking out and a conviction that it wouldn’t change anything anyway. The administration holds all the cards and all the power, so why should they listen to students at all? What is the use of fighting, of speaking up when it will accomplish nothing?

The answer is that the school needs the goodwill of its students and alumni to function. The threat of upset alumni withholding donations from Caltech is bringing trustees and administrators to the table right now, and it underscores the point that students always have the power to negotiate with the administration and express their dissatisfaction. The Deans understand this, even if our leaders don’t. It’s why they were involved in

I know that our leaders will say that such things take time, and are better done in friendly negotiations than with a pitchfork-wielding mob. I respect that, and I understand it more than most, I really do.

But at the end of your term of office, your success can only be measured in results. What good is being on friendly terms with the administration if you do not lift a finger when they walk all over us? Sadly, I do not have words strong enough to condemn the abject cowardice and incompetence of the ASCIT presidents and IHC chairmen I watched in my years at Tech. These “leaders” followed a path of appeasement, rightly working hard to stay on good terms with administrators, but then steadfastly refusing to leverage that connection, standing idly by and saying nothing as our rights and traditions were curtailed, one by one. It is sad to say that every one of these seven items is merely to make Caltech *more like it was in 2009*, yet already they seem like a long list of lofty ideals.

With a new leadership team assuming office, I don’t want to judge them by the performance of their predecessors. You, the new leaders, have the chance to rise up and do great things. This list can hopefully provide a drawing board of real, tangible results that we can expect along the path to better student-administrator relations. And to you, the students of this great Institute, do not be afraid to expect great things from your leaders. Grant them the respect and patience they deserve, but also expect results. Make them earn their titles and shiny awards, Mannion dinners and Gnome membership. If they are not capable of showing progress, perhaps new leadership should be in order. You are the electorate of a democracy, and the ultimate power is in your hands. Make your leaders remember the meaning of public service. Ask them, what have they done today to win back these parts of our way of life?

I firmly believe that Caltech is not beyond saving, and that if we band together and speak up using our collective voice, we can still reverse the toxic trend that threatens to tear our institution to the ground.

I dearly hope to see Caltech continue to be an institution which honors the ideals which led me to make it my alma mater. But if the course of the ship of state cannot be righted, I fear it will lead to a future where I can derive no pride from having attended Caltech, and I will be able to speak only of legend and myth, rather than a school which is still the best there is in all the world. So if these problems and solutions ring true to you, remember to fight, because our future is not beyond saving.

“ I do not wish to understate the critical part which graduate RAs play in the safety net - they are a unique and irreplaceable resource - but unfortunately adding multiple of them per House has not had what I hope was the intended effect. ”

And while I understand that adding RAs was a good-faith (if misguided) attempt to further that goal, I think there are much more effective ways to use these half-million dollars to achieve a healthier community.

The Counseling Center is currently open from 8 a.m. to 5

“ I firmly believe that Caltech is not beyond saving, and that if we band together and speak up using our collective voice, we can still reverse the toxic trend that threatens to tear our institution to the ground. ”

p.m. on business days only – hardly the most convenient hours for students to seek regular counseling if they need to attend a full load of classes and are on a typical Techer sleep schedule of waking up around noon.

This funding could be used to keep the counseling center open during the evening, or perhaps on weekends. Additionally, the money could be used to keep the center better staffed.

Multiple people have confided to me during my years as a student that they felt that the counseling center was overworked, and tried to “dump” them because they didn’t have to time to help. If indeed the Counseling Center is so overworked – they are, after all, visited by 20% of the community each year – then what better way to improve mental health than to give it more funding? It certainly will help more than extra RAs and RLCs.

some negotiations in the Ricketts affair, and why, even though their actions may seem unilateral, they have worked hard and succeeded at securing the public approval of student leaders on the matter.

These suggestions are reasonable things which, based on my knowledge of the Institute and my long years learning the ropes of politics there, I believe could be implemented without completely unreasonable side effects. Certainly, some of these things represent radical changes of policy and would not be happily endorsed by the current administration, but none of them go further than making Caltech more like it was in 2009 than it is now. Therefore, as individual students and alumni, you should hold your leadership accountable for making these things happen. Dare to believe, and dare to demand that your leaders might accomplish something during their term in office.

“ To push [UCCs and RAs] to add their voices to social programming and house governance - places where their voices are sometimes decidedly unwelcome - is needless overreach and distracts from the true purpose of the programs: to ensure student mental health. ”

The Hunger Games: Catching Fire: Awaiting the sublime

SHANNON WANG
Contributing Writer

Spoiler Alert: The entire movie is spoiled in this review, so if you haven't watched this movie yet but plan on doing so, turn back now.

I originally intended to write about the similarities between *Les Miserables* and *Catching Fire*. I wanted to discuss the sudden influx of movies about revolution; I wanted to show how the fury in the films is reflective of the anger and disappointment thrumming through the real world. And then I watched the film and realized that there is nothing I can write that will manage to even touch the passion in the film—the cast brought their characters to life with such ferocity that they made the despair palpable, the fear tangible. The director's brilliant use of symbolism has given us such perfect descriptions of the rising crescendo of revolution that I can only write about his genius and hope that I do his work justice.

For those who didn't pay attention to all the doors in the movie, *Catching Fire* is all about thresholds, entrances and empty spaces that need filling. It's about yearning; it's about awaiting the sublime. The symbolism makes its appearance at the beginning, when Katniss and Gale slip under the chain link fence and show the audience that District Twelve is a bleak wasteland. Once started, the motif of hollow spaces following entrances doesn't stop—when Katniss enters the Victors' Village, we're struck by how similar the

village is to a graveyard. When she barges into Haymitch's house, the house may as well be empty, for all it holds is disappointment and coldness. Entering her own house doesn't lead to a much nicer environment—the walls are all bare, the house seems un-lived in, and when she ventures further, she encounters President Snow, who rips away her hope and leaves her with damnation.

This is when we start to have an inkling about what these symbols mean—this is when we notice how every door that Katniss passes through is a choice she didn't get to make. Katniss is called through the doors by President Snow, dragged behind them by Peacekeepers, sped through them on trains, and hurtled through them into the arena on glass elevators. That relentless motion she is trapped in is reminiscent of a conveyor belt, as it should be—Katniss and her fellow victors may as well be pigs ready for slaughter.

The very act of entrance has become the butcher's knife; it represents jumping out of the frying pan and into the fire. Katniss is yearning for hope and rescue every time she enters a room, but every place she ends up in is "empty" for

it holds nothing of interest to her and "hollow" because it's waiting for her to initiate the change. She represents the sublime, but until she realizes this, the yearning—both her own and the districts'—will only intensify and the spaces she is thrown into will remain unchanged. Katniss will always be disappointed and terrified of what lies in the room, until she makes the

angel in *Catching Fire* is revolution, then we can understand Katniss's reluctance to embrace revolution at first. But the people of Panem no longer fear annihilation. If the bleak, desolate world we see at the beginning is the empty chamber, then revolution is what will enter and fill it. And it does—slowly, gradually, and surely throughout the film, as riots and uncontrollable

into that one scene is stunning. Katniss is a Christ figure now—we can see that from the way she lies in a crucified pose. But what makes this scene so beautiful is that it highlights how she is being forced into the role of the martyr and the scapegoat—the way she's being lifted by one of the Capitol's hovercrafts and taken away from Peeta shows how she really has no say in her rescue. She has no choice in how she is presented. And the fact that her free will is being taken away again after she has made her first choice in a year foreshadows her role in the upcoming revolution. For those who have read *Mockingjay*, it foreshadows what exactly her fate will be.

There is so much more to analyze. There's Josh Hutcherson's excellent portrayal of Peeta's unrequited love, which is a hollow space itself that awaits the sublime. There's the fact that unrequited love is so often associated with martyrdom and rebellion. There's the last door Katniss bursts through that leads her into the new world. I could go on for pages, but I won't, because they're not what the movie is about. *Catching Fire* is about hurtling towards revolution—it's about dragging the audience through every stage of despair until they reach the emotional tipping point. It's about being robbed of all choices and watching safety disappear behind slammed doors. It's about making us understand why there is revolution—and I think that after watching the film, we do. And that's enough for me to call the film a success.



[-http://thehungergames.wikia.com/](http://thehungergames.wikia.com/)

choice to open a door for herself.

It takes the entire film for Katniss to realize this and open the figurative door, but she can be forgiven for this. To quote Rainer Maria Rilke's *Duino Elegies*, who, if the people cried out, would hear them among the angels' hierarchies? And if an angel did swoop down and gather the people to his breast, then the people would be annihilated by the angel's mere presence. "Every angel is terrifying," Rilke writes, and if the

fury spread like wildfire across the districts. Katniss is the girl on fire—she represents revolution, so she must enter the world. And so she does.

At the climax of the film, Katniss shoots down the force field in the sky and allows revolution to flood her life, thus cementing her role as Mockingjay and martyr—the shot of her lying in the clutch of the hovercraft with her arms flung out took my breath away, because the amount of symbolism worked

Brad/Chad Couture: Trainer Edition - Gym Couture Part 2

BRAD CHATTERGOON
Contributing Writer

It's week 9 guys! Term is almost over. This week's article picks up where the previous article left off.

3.) Pants. These are obviously non-negotiable when out in public (what you wear, or don't wear, in your dorm room is your business).

The first thing that I want to mention about this item at the gym is that I don't want to see anyone wearing jeans to the gym.



...I don't want to see anyone wearing jeans to the gym. Let me repeat that for clarity: NO DENIM.



Let me repeat that for clarity: NO DENIM. Here is the list of what I think the gym community would consider acceptable attire:

- Sweatpants. These have "sweat" in the name so, that's right you guessed it, they are appropriate for knocking out those calories at the gym.

Sweatpants are generally fairly comfortable and stretchy which are great qualities for dealing with movement and bending, which is what you do a lot at the gym.

These usually come in pretty neutral colors, navy blue, black and gray being the staples.

If you're using these, then show some school pride by picking up a pair of Caltech sweats.

- Track pants. These are similar to sweatpants except that they are usually made of a nylon

based fabric that works well at wicking moisture away from your body. There are versions of these that come with tabs along the leg that allow you to open up the pant to some degree which is useful if you want to cool down a bit faster. The color rules for sweatpants also apply here.

- Shorts. This is my number one recommendation. I strongly suggest picking dri-fit shorts that are designed for working out but in some cases board shorts or khaki walk-shorts can be acceptable depending on what you're working out that day.

Shorts are all around the best choice for working out. They don't restrict any movement, they allow your body to manage its temperature much better than full length pants, and of course, they let you show off those hard earned calf muscles. You have a bit more freedom when it comes to the coloring of your shorts but I suggest picking a neutral colored pair that has accents of brighter coloring in preference to a neon pink pair.

- Yoga-pants (girls only). I've been told these are very



Caltech junior Phoebe Ann shows off her gym gains in some stylish athletic clothing.

-Stanford Schor

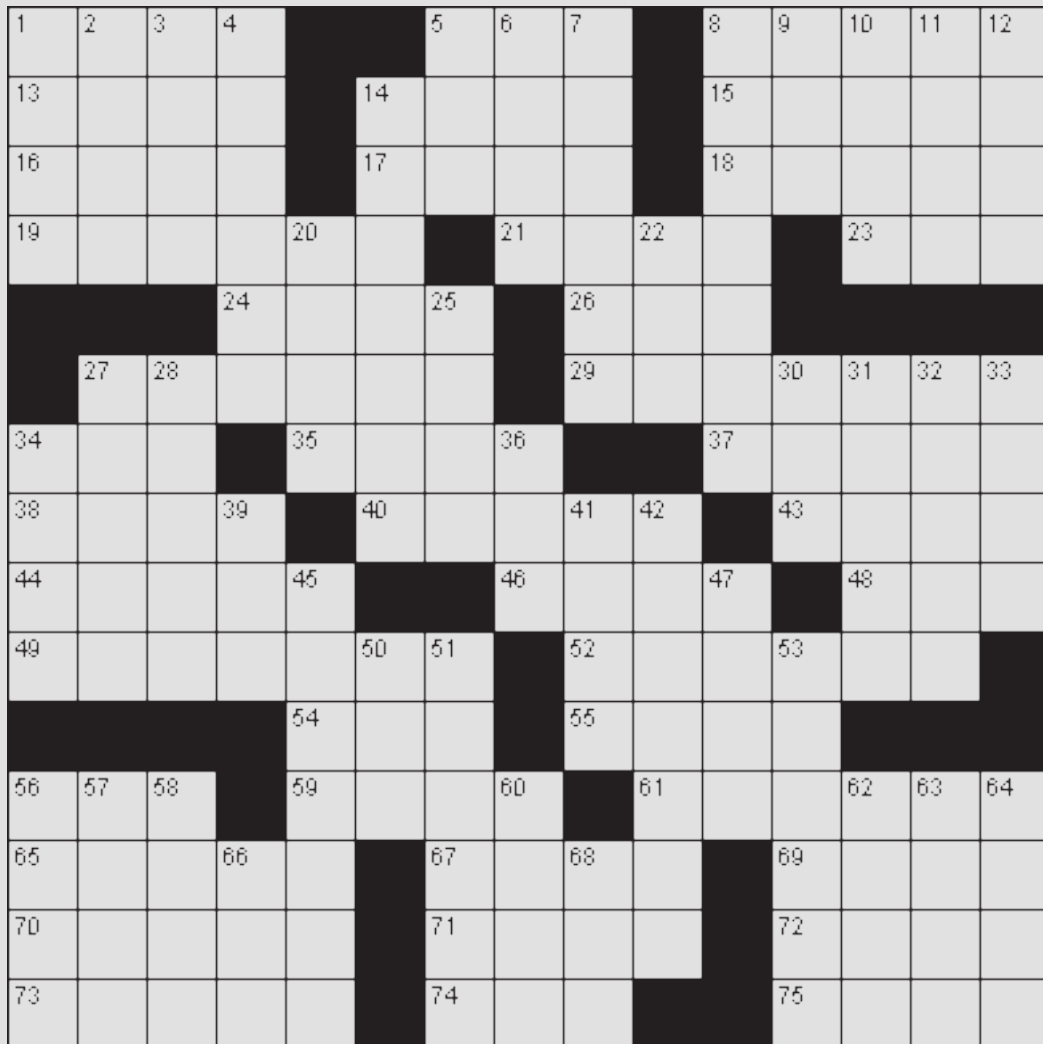
comfortable and they are definitely stretchy as all hell, since you know... they're YOGA pants. Get 'em in black.

4.) Shoes. I spoke about athletic trainers in an earlier article and those are generally expected at the gym for most all activities. There are some exceptions, however.

For sports played on a grass field, get cleats, and for the weight lifting activities of dead lifting and squatting, get a pair of sneakers as these lifts are best performed with a flat based shoe, which trainers are not in general. As I had mentioned previously, you have a lot of room to experiment with the color of your trainers so be adventurous.

Next week I will be either continuing the trainer series or doing a piece on travelling, so look out for that! Hope you guys are pulling through with these last couple weeks.

Today's Puzzle: Crossword



Across

- 1. Celestial body
- 5. Circuit
- 8. Hard kind of stone
- 13. Field sport
- 14. Female horse
- 15. Spooky
- 16. Remove from office
- 17. Pivot
- 18. Used to control a horse
- 19. Theatrical group
- 21. Molecule
- 23. Unit of play in tennis
- 24. Bird shelter
- 26. Female sheep
- 27. Solemn
- 29. Reclamation
- 34. Assistance
- 35. Snare
- 37. Clan
- 38. Baby bed
- 40. Projecting bay window
- 43. Sweet pulpy tropical fruit
- 44. Summarize
- 46. Way out
- 48. Regurgitated food of a ruminant
- 49. Put into the care of someone

- 52. Talisman
- 54. Jurisprudence
- 55. Excavation
- 56. Globe
- 59. A turn made in skiing
- 61. Bid
- 65. Herbaceous plant
- 67. Pleasant
- 69. Donate
- 70. Distribute
- 71. Trampled
- 72. Large woody plant
- 73. Shelf
- 74. Hankering
- 75. Group of animals

- 20. Vegetable matter, can be used as fuel
- 22. Be obliged to pay
- 25. Rend
- 27. Temptress
- 28. Decree
- 30. Epoch
- 31. Flinch
- 32. Approximately
- 33. Give temporarily
- 34. Unit of area
- 36. Pastry item
- 39. Exclude
- 41. Set of evaluating questions
- 42. Restricted
- 45. Throb
- 50. Was seated
- 51. A score in number
- 53. Continuance in time
- 56. Ellipse
- 57. Irritate
- 58. Fearless and daring
- 60. Morass
- 62. Desperate
- 63. At any time
- 64. Part of a woodwind instrument
- 66. Captain's journal
- 68. Swindle

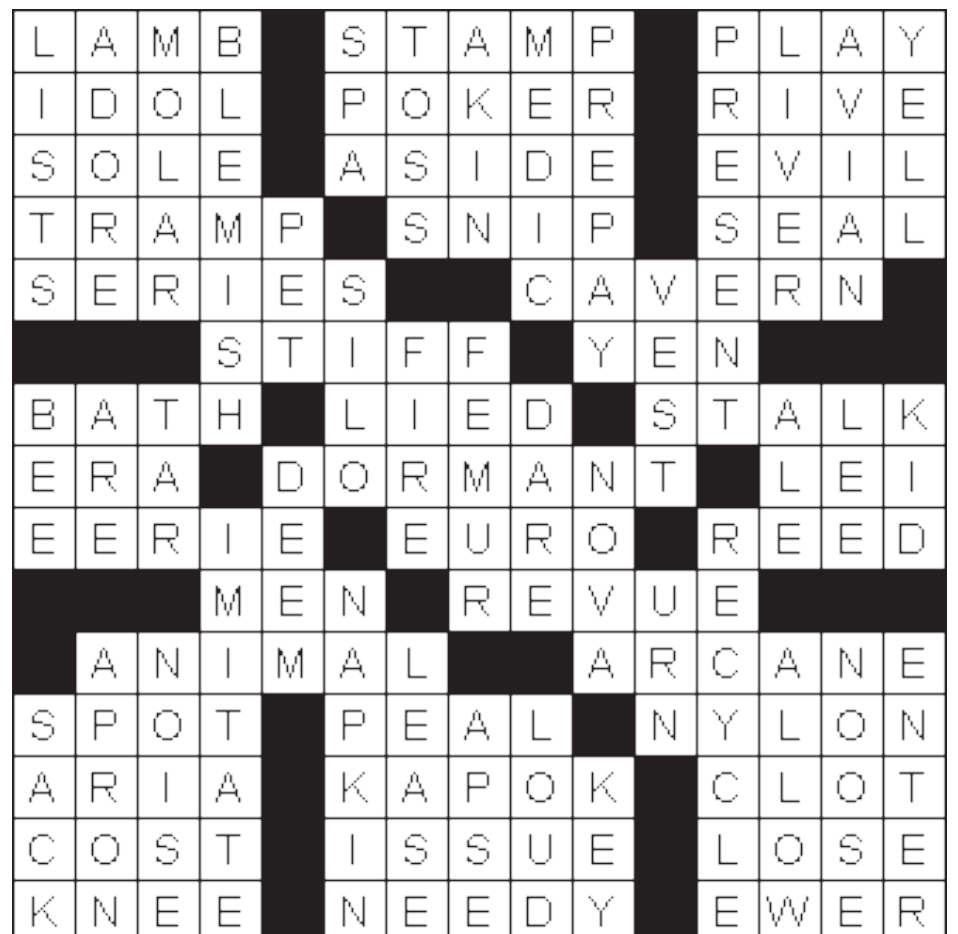
Down

- 1. Blemish
- 2. Travel
- 3. In addition
- 4. Corpulent
- 5. Slack
- 6. Song for solo voice
- 7. Annoy persistently
- 8. Agitation
- 9. Sheltered side
- 10. Part of the eye
- 11. Value of Roman IX
- 12. Trial
- 14. Artist of consummate skill

[www.puzzlechoice.com]

Answers to Nov. 11's crossword puzzle from puzzlechoice.com

Answers to last week's crossword puzzle from puzzlechoice.com



Beavers' have strong momentum at game's start

GoCaltech

The Beavers started well but couldn't continue that early momentum as they fell to Linfield 60-54 at the Hilton Winter Tournament hosted by UC Santa Cruz on Saturday afternoon.

Caltech was clicking on all cylinders during the game's first 6:42. The Beavers held the Wildcats to just one field goal en route to a building a 15-4 lead. Four different players scored for Caltech, led by Bryan Joel's five points, during that early outburst.

Linfield responded with a scoring burst of their own. During the contest's next 6:28, the Wildcats outscored Caltech 14-2 as they took their first lead of the game 18-17.

The lead changed hands four times over the next four-plus minutes. Linfield grew a 23-22

lead by scoring the half's final nine points in taking a 32-22 lead at the intermission.

One of main culprits for the Beavers was a 14-turnover half which Linfield turned into 15 points in building their 10-point lead and helping them overcome their early deficit.

The Wildcats were able to keep their lead in double digits from a majority of the second half but a defiant Caltech team fought back. Despite being down by 52-35 with just over eight minutes left the Beavers dwindled that lead down to single digits.

After seemingly having the game wrapped up, Linfield was forced to hit foul shots

down the stretch. Joel hit a three-pointer with 16 ticks left to bring the Beavers within 57-51.

The Wildcats hit just one of two free throws on their ensuing possession then Joel hit another three-pointer with seven seconds left.

With Caltech down 58-54, they pressured the inbounds but Linfield was able to put the ball in-play then sealed the game with a pair of free throws.

Joel led all scorers with 20 points on the strength of four made shots from behind the arc during his 7-for-12 shooting effort.

Lawrence Lee hit all five of his field goal attempts in helping him produce a 13-point effort. The first-year also grabbed a game high and career best eight rebounds in helping Caltech hold a plus-eight rebounding edge.

Mason Rodby came off the bench and went 8-for-9 from the floor in leading all Linfield scorers with 17 points.



Sophomore Kelechukwu Ikenna Emezie tries to keep the ball from Linfield.

-gocaltech.com

Beavers swimming, diving team travels to Redlands for first meet of the season

GoCaltech

The Caltech swimming and diving squad began the 2013-14 campaign with a dual meet against SCIAC foe Redlands on Saturday morning.

It was also the coaching debut for Jack Leavitt as the Beavers head coach.

With a vast majority of the men's team still competing for the water polo team, the Beavers were at a severe disadvantage from the start. Nonetheless there were still highlights for Caltech.

Alex Place won both the one- and three-meter diving competitions. The first-year scored 182.05 points to claim the three-

meter win by nearly 20 points. During the one-meter event he scored 149.85 points to win by 9.50 points.

Kevin Yu had a solid opening meet. During the 100-yard butterfly he clocked a time of 54.66 to finish second in that event. During the 100-yard breaststroke he took second as well by touching the wall in 1:05.53. He also competed in the 200-yard IM where he finished third with a time of 2:06.36 which was just .32 seconds away from second place.

The women's team garnered their points from a variety of sources during the meet.

Zofii Kaczmarek scored in both one- and three-meter diving. In

her first ever diving competition she scored 119.35 during the one-meter competition for a fifth place finish. She placed in the same spot during the three-meter with a score of 77.60. Her agility comes from her high school days in gymnastics.

Suzannah Ozekowsky scored two points in the 100-yard backstroke (1:24.99).

Iris Liu's time of 1:10.27 in the 100-yard freestyle put two more points in the Beavers team total.

Aashrita Mangu also scored two points with a time of 1:32.29 in the 100-yard butterfly.

In her first collegiate meet Kalyn Chang time of 27.72 in the 50-yard freestyle also tallied two team points for the visitors.



Caltech's swimming and diving team showed great effort at their first meet.

-gocaltech.com

Weekly Scoreboard

Men's Water Polo
vs. La Verne
@ Orange
L, 8-16 Final

Men's Basketball
vs. Linfield
@ Santa Cruz
L, 54-60 Final

Men's Swimming & Diving
at Redlands
L, 178-31 Final

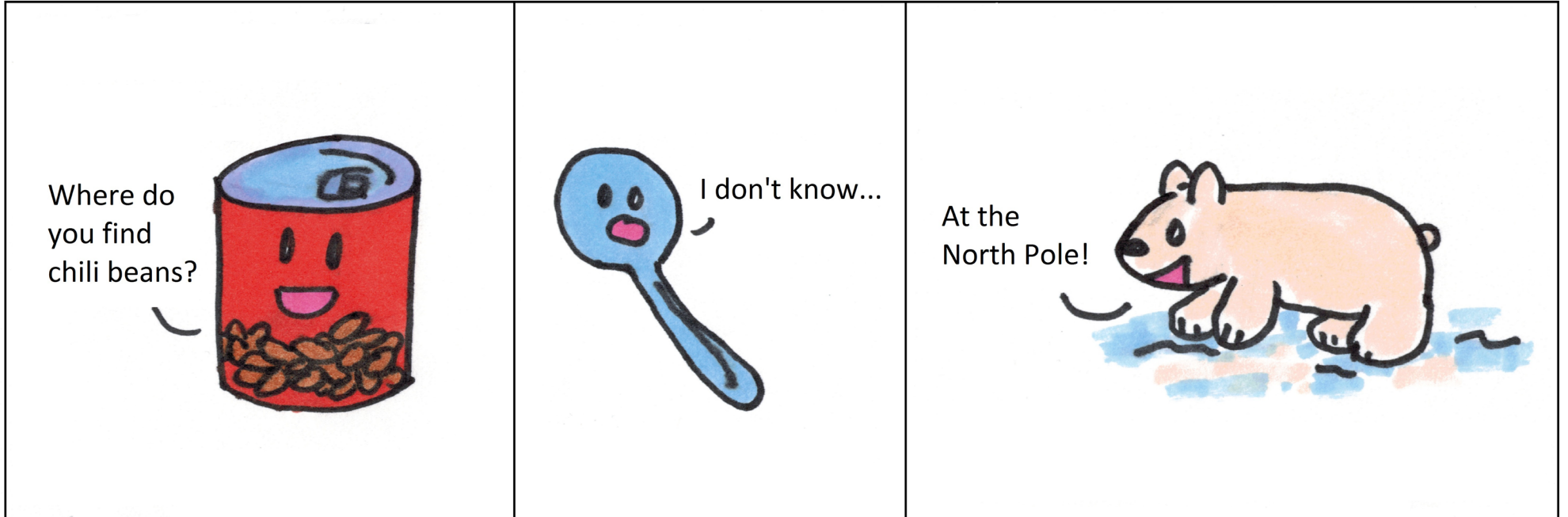
Women's Swimming & Diving
at Redlands
L, 200-24 Final

Men's Water Polo
at Occidental
L, 6-13 Final

Men's Basketball
vs. St. Vincent
L, 67-77 Final

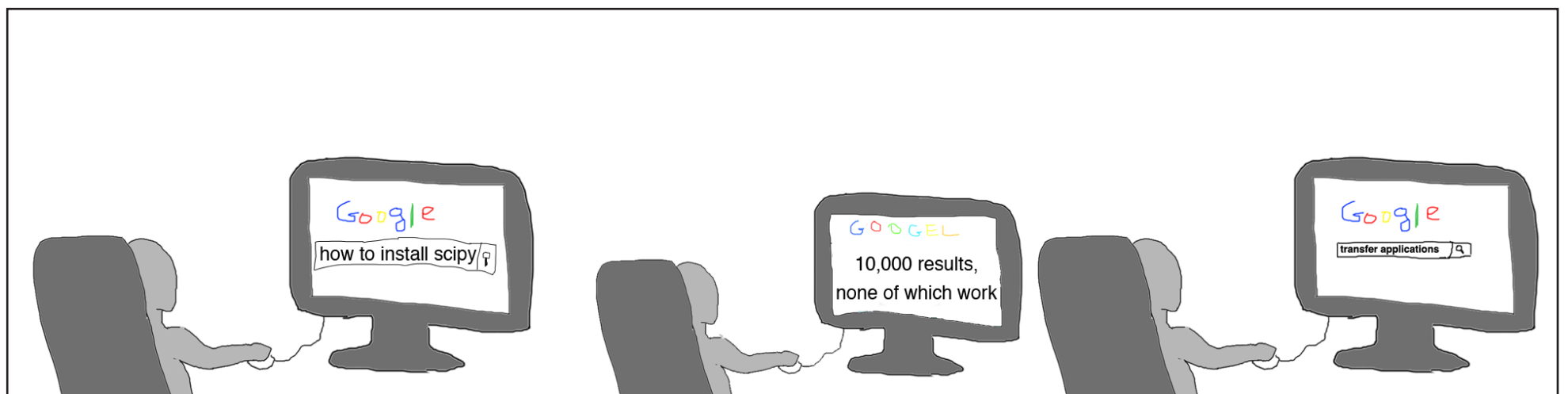
Unoriginal Jokes

Kerry Betz



Acquired Taste

Dr. Z



*For more photos,
videos, and archives
of previous issues,
check out the Tech
website!*

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