

## Anderson wins prestigious student-athlete honor

LORI DAJOSE  
Contributing Writer

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Rob Anderson, a junior on the Caltech men's basketball team, has been named to the 2015 Allstate National Association of Basketball Coaches Good Works Team. The community service award "honors student-athletes for their off-the-court achievements and commitment to giving back to their communities and positively impacting the lives of those around them," according to the NABC.

"I learned that I was named to the team at 8:30 a.m. after pulling an all-nighter, so it didn't really hit me at first," Anderson says. "I feel extremely honored to represent Caltech and our team on a national scale."

Anderson, who is studying mechanical engineering and business economics and management, was selected for his extensive work researching and designing sustainable energy projects. During his senior year of high school, he designed a 17-foot solar-powered boat for the 2012 Solar Splash Competition.

Upon his arrival at Caltech in the fall of 2012, he joined both the basketball team and the Institute's 2013 Department of Energy Solar Decathlon team, which collaborated with architectural design students from the Southern California Institute of Architecture to design, build, and operate a solar-powered house.

During the summer of 2013, Anderson returned to his home state to conduct research at the University of Minnesota, where he designed and coded a tool to calculate the economic feasibility of growing crops that could be converted to fuel in the form of cellulosic ethanol.

"After the Solar Decathlon ended in autumn of 2013, I began looking for another engineering sustainability project," Anderson says. "I noticed there were a few empty gas-engine go-karts in Fleming [one of Caltech's eight undergraduate houses] and I realized I could re-engineer them to use electric power."

Anderson reached out to Caltech and the Resnick Sustainability Institute, and proposed repairing the vehicles, one using battery power and another using a hydrogen fuel cell. He also reached out to the undergraduate population to gauge interest in a sustainable vehicle club. Eventually, more than 100



Photo Courtesy of Lance Hayashida/Caltech Office of Strategic Communications

students signed up for the club's mailing list.

"That's basically how the Sustainable Vehicle Club was born," Anderson says. "The people at the Resnick Institute were excited that a student wanted to lead an engineering project around sustainability. They have played a key role in advising the club, connecting us with the right people around campus and in the corporate world, and have been our main source of funding for purchasing the parts we need."

"Now we're using the old go-kart shells to experiment with

drivetrains—the components that deliver power to the driving wheels—and battery systems. We're working with local companies to gather most of the parts." Anderson and his team aim to enter the 2016 Society of Automotive Engineers Formula One Electric Race, an electric vehicle design competition for college engineers.

In addition to design and engineering, Anderson and his group conduct research into the feasibility and efficiency of fuel cells.

"In general, sustainable energy can go either the electric route

or the fuel cell route. We're analyzing both systems with respect to these go-karts to figure out their overall energy efficiency."

Engineering the go-karts to run on sustainable energy is still a long-term process. In the more immediate future, Anderson will soon be traveling to attend the NCAA Division I "Final Four" college basketball playoffs with other student-athletes on the NABC's Good Works team. Later in the year, the team will also participate in a community works project and hold a basketball camp for younger players.

"Rob epitomizes the term student-athlete," says head basketball coach Oliver Eslinger. "His character and commitment, both as an academic standout and teammate, are highly valued in our program. He is a perfect representative for athletics and our university, in that he brings efficiency, creativity, and focus to his daily activities. We are so proud of this honor and what it means for Caltech. I know that the folks he meets during Final Four weekend will be impressed with his efforts and abilities to balance basketball with all of his research and academic pursuits."

## Caltech economist Richard Roll wins Onassis Prize in finance

KIMM FESENMAIER  
Caltech Media Relations

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

Richard Roll, the Linde Institute Professor of Finance at Caltech, has been named one of two recipients of this year's Onassis Prize in Finance. Awarded only once every three years, the Onassis Prizes honor the contributions of top thinkers in the fields of finance, international trade, and shipping.

"As the Linde Professor of Finance, Richard Roll anchors a revitalized program in finance at Caltech that is now making great strides in both original research and in improving the course offerings for both undergraduate and graduate students," says Jean-Laurent Rosenthal, chair of the Division of the Humanities and Social Sciences at Caltech. "It is wonderful to see him recognized with this prestigious prize."

The Onassis Prizes are awarded jointly by the Alexander S. Onassis Public Benefit Foundation and the Cass Business School, part of City University London. Roll shares

this year's award for finance with Stewart Myers, an economics professor at MIT.

"The Onassis Prize in Finance has been awarded previously to Nobellaureate Eugene Fama, Caltech trustee and Deutsche Bank Prize recipient Stephen Ross, along with my esteemed corecipient this year, Stewart Myers. I am humbled and deeply honored to be included in such company," says Roll.

In a statement, the Cass Business School and Onassis Foundation noted, "This year's winners have made foundational contributions to finance since the beginning of its transformation to a rigorous science-based discipline, nearly a half century ago: Stewart Myers in corporate finance and Richard Roll in capital markets."

Roll is known for his work on portfolio theory—the design of optimal investment portfolios—and asset pricing. His most widely cited paper has come to be known

as "Roll's Critique." That work cast into doubt empirical tests of the capital asset pricing model,

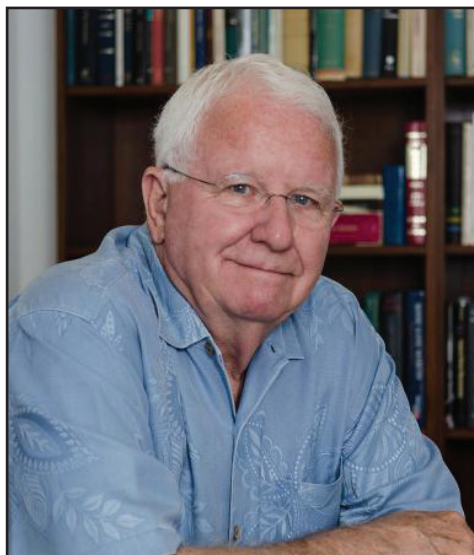


Photo Courtesy of Lance Hayashida/Caltech Office of Strategic Communications

then a premier model of risk and return. Roll has also collaborated with Caltech alumnus and trustee Stephen Ross (B.S. '65) to test Ross's alternative model of risk and return known as the arbitrage pricing theory. Roll continues to work in this area; in his most recent working paper, he proposes a new

way to test the most prominent modern asset pricing theory.

Roll joined the faculty at Caltech in 2014 after spending nearly 40 years at the UCLA Anderson School of Management. He has also held faculty positions at Carnegie-Mellon University, the European Institute for Advanced Study of Management in Brussels, and the French business school Hautes Études Commerciales near Paris.

He earned his undergraduate degree in aeronautical engineering from Auburn University. He then was employed by Boeing, where he worked on the 727 and wrote the operating manual for the first stage booster of the Saturn moon rocket, while earning his M.B.A. at the University of Washington. Realizing that he was more interested in business than engineering, he quit his job and completed a Ph.D. in economics, finance, and statistics at the University of Chicago.

In addition to his academic positions, Roll has founded several companies and has served as a consultant to numerous

governmental agencies and corporations. He was a vice president of Goldman, Sachs & Co. from 1985 until 1987. He also served as president of the American Finance Association in 1987.

Roll has published more than 100 peer-reviewed articles and has won Graham and Dodd Awards for financial writing four times. Among other achievements, Roll has won the Leo Melamed Award for outstanding scholarship by a business school professor (1990), the Roger F. Murray Prize from the Institute for Quantitative Research in Finance (2001), and the Nicholas Molodovsky Award from the Association for Investment Management Research (2002), and was named "Financial Engineer of the Year for 2009" by the International Association of Financial Engineers. He is also a fellow of the Econometric Society.

The winners of the Onassis Prizes were announced by Alderman Alan Yarrow, the Lord Mayor of London, at Mansion House in London on March 20. Roll and the other 2015 honorees will receive their awards at a ceremony in September.

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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. 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. Make-A-Difference Day 2015

Saturday | April 4th | Join over a hundred Caltech students

Volunteer for Make-A-Difference Day on Saturday, April 4th. Sign up now through Tuesday, March 31st.

The Caltech Y is partnering with agencies from all over Pasadena and the greater LA region for one day of community service. All members of the Caltech community are invited to participate in one of a variety of community service projects at the Boys and Girls Club, Monrovia Canyon, Habitat for Humanity, LA Arboretum, and many more sites. You can choose to work with kids or animals, do construction or outdoor projects or visit with the elderly. Projects are led by other students and will be 3 to 6 hours - including travel, depending on the project. Meals, transportation, and t-shirts are provided.

For more details on the projects and to sign up, please visit [www.caltechy.org](http://www.caltechy.org) and rank your preferences on the web form. Signups are requested by Tuesday, March 31st but we will continue to add volunteers in as space allows.

#### 2. Caltech Y Centennial T-Shirt Competition

Submissions due Wednesday, April 8th at Noon

The Caltech Y is turning 100 and would like to commemorate this momentous occasion with a centennial t-shirt. We are looking for a creative and original design and invite all undergraduate and graduate students to participate.

Email your design to [caltechy@caltech.edu](mailto:caltechy@caltech.edu).

There will be a 36 hour voting period for all students to select the top 3. A committee from the Caltech Y and Caltech Store will pick the winning design from the top 3 to be on the official centennial t-shirt by Monday April 13.

Each of the top 3 submissions will receive a \$25 gift card to the Caltech Store. The winning design will be printed, and t-shirts will be sold at the Caltech Store.

Art must fit on the front chest area of t-shirt. Designs can have up to two colors.

#### 3. The Studenski Award

Proposals Due Friday, April 17th no later than noon

Are you wondering about the next step in your life? Have you reached a crossroad where you would benefit from an opportunity to explore? Would a trip, an opportunity to volunteer with an organization, or a chance to try a new skill or interest this summer help you gain clarity? If you answered yes to any of these questions, then the Studenski Award might be for you.

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:

Studenski Informational Dinner  
Monday, April 6th - 5:30 PM  
Hosted by Tom Mannion at his house

RSVP by April 2nd to <http://tinyurl.com/studenski>

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

#### 4. 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 an opportunity to pursue an interest in community service or advocacy.

Partner with an organization that is changing the world. Explore real world issues in our local community, across the nation, or around the globe - and make a difference in the world. The \$4500 award offers 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.

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

#### 5. Leadership Lab: "The Uncertainty Principle"

Saturday | March 28th | 8:30 AM - 2:00 PM | Avery Library

Open to students (free) and alumni (\$20)

Brunch is provided. Space is limited, registration required by Thursday, 3/26. Register at <https://docs.google.com/forms/d/1HoPIP1hofwcecUAF8EhFupoGTFnwVv5suDrouNHuno/viewform>.

The Caltech Y is partnering with Tim Boyd, Caltech Alum, Caltech Y Board Member, and Leadership Consultant with The Bottom Three, to present a leadership workshop for current students and alumni.

This interactive leadership lab will focus on critical decision-making and embracing uncertainty while leading through turbulent times. Through a customized role-play simulation for the Caltech community, participants will be required to make decisions while acting as executives within a company and presenting critical strategic plans to a Board of Directors. Participants will review their understanding of fundamental leadership skills by testing them against unpredictable constraints of time and resources, while reinforcing the often underestimated urgency of stress-management.

The Leadership Lab will conclude at 2:00 pm to allow interested participants to attend Caltech Athletic's Orange Out Lunch and Baseball Game There will be free food and free t-shirts. Please come and support our athletes at the final Orange Out of the year. All are welcome.

The Bottom Three is a group of consultants focused on changing the way the world views leadership leveraging experiential hands on training to transform the world, one leader at a time.

The Leadership Lab kicks off the Caltech Spring Student Leadership Series and is made possible with generous funding from Caltech Student Affairs. Visit [www.caltechy.org](http://www.caltechy.org) for more information or contact [caltechy@caltech.edu](mailto:caltechy@caltech.edu) if you have questions.

#### 6. Hathaway Sycamores Tutoring

Monday | 5:30-8:00pm | Highland Park

Volunteer at Hathaway-Sycamores, a group that supports local underprivileged but motivated high school students. There are a variety of ages and subjects being tutored. The service trip includes about an hour of travel time and 1.5 hours of tutoring. Transportation is included. For more info and to RSVP email Sherwood Richers at [srichers@tapir.caltech.edu](mailto:srichers@tapir.caltech.edu). Eligible for Federal Work Study.

#### Other Announcements - Beyond the Caltech Y

##### YWCA TECHgyrls

Monday and Wednesday | 4:00 - 6:00 PM | 1015 N. Lake Ave. | Pasadena

The YWCA teaches tech classes to girls 10-17. Volunteers are needed to teach lessons or help students with projects. They are really open to ideas and suggestions. Check out their website for more info on the program. Email [ljackman@caltech.edu](mailto:ljackman@caltech.edu) to volunteer.

# Argerich and Valčuha dazzle at Walt Disney Hall performance

## JERRY FENG

Contributing Writer

Last month, Walt Disney Hall was graced with tremendous musical talent. Martha Argerich, who is essentially the prima donna of the piano world, came to perform Schumann's Piano Concerto with the Los Angeles Philharmonic. Argerich shot to fame exactly half a century ago by winning the prestigious Warsaw Chopin Piano Competition at the age of 24. After a 15-year-long career of concertizing as a solo artist, Argerich switched her whole focus to concerti and chamber music.

While I and a large constituent of the concertgoers may have been most excited to listen to Argerich play one of her specialties, we were also treated to the very capable guest conductor Juraj Valčuha. While still relatively unknown in the states, Valčuha is an up-and-coming conductor from Slovakia who made his debut in 2005 with the Orchestre National de France and has been the Chief Conductor of the Orchestra Sinfonica Nazionale della RAI, Torino since 2009.

Valčuha opened the concert with British composer Benjamin Britten's *Four Sea Interludes* from *Peter Grimes*. *Peter Grimes* is an opera that was actually written in Southern California in 1941 while Britten was on extended leave during the early days of World War II (he was a devout pacifist and left Britain for a time because of its involvement in the war). The opera received its LA Phil debut in 1945. It seemed as if Valčuha chose the piece in order to extinguish any potential doubts that the audience may have had about him. Valčuha deftly maneuvered the symphony orchestra through four interludes with exceptional precision and control. Under Valčuha's baton, the orchestra weaved through the many emotional moods of the piece that is so characteristically Britten. Particularly compelling is Britten's ability to convey stories using only music, and Valčuha was effectively able to capture that Brittenesque essence.

I can't help but compare Argerich to Clara Wieck Schumann, who was not only Robert Schumann's wife but also the most prominent female pianist of the 19th century. Like Clara, Argerich has enjoyed a long career as a concert artist: Schumann spent 61 years as a pianist before her death in 1896 at the age of 77, and Argerich has spent 58 years as a concert pianist. Moreover, both are known for the promotion of promising young artists, Argerich with her support of Ivo Pogorelich and Schumann with Johannes Brahms.

Of the multitude of piano concerti in Argerich's repertoire, perhaps none fit her as well as Robert Schumann's. Argerich is known to be temperamental as a musician and as a person. She once explained that her relationship

with music was a peculiar one: one day she could dream of nothing but music, yet the next she could equally hate it and feel like she never wanted to play again. As a young soloist, Argerich once deliberately cut her finger with a knife in order to avoid playing a concert. Schumann suffered from a similar love-hate relationship with music and once wrote in his diary, "Music, how you disgust me and repel me to death." Argerich's disposition and personality complement Schumann's representation of his imaginary alter egos — Eusebius the dreamer, Florestan the passionate, and Meister Raro, who represented Schumann himself — in his works. The moods in Schumann's pieces are incredibly mercurial as a result of his rapid switching between these characters.

As Argerich situated herself at the piano before she and the orchestra played the famous dramatic opening attack, the audience became dead silent, anxious to hear the legendary performer. I was personally in bliss every time Argerich donned Eusebius's mask — Argerich just has this way of touching the listener's heart with her tenderness. Valčuha gave her the perfect support, allowing the orchestra to help bring out the nuances in Argerich's interpretation of the piece. As was to be expected, the performance was flawless.

Thunderous applause erupted as Argerich finished the final triumphant arpeggios of the third movement. An unrelenting standing ovation lasted nearly three minutes and was filled with whistling and calls of "Encore!" in an attempt to coax Argerich to play again. I was eager at the prospect of hearing the great Martha Argerich play a solo piece live. Shyly, she returned to the piano to the audience's delight and without another word, began to rattle off *Traumes Wirren* from Schumann's *Fantasiestücke*, Op. 12. The piece is incredibly virtuosic, yet Argerich played it with the ease of making a cup of tea.

Following an intermission, Valčuha conducted Richard Strauss's *Death and Transfiguration*. The tone poem depicts a dying man whose thoughts turn to his childhood, his adulthood, his ideals and, at the end, the transfiguration of his soul. The piece is all about gradual transformation throughout the movements and sudden transitions between movements, and Valčuha handled the difficult-to-conduct piece beautifully. He exerted so much patient control that the transfiguration theme, finally being played near the end of the work, sent shivers down my spine.

*Jerry Feng attended the LA Phil concert as part of a class field trip organized by music lecturer Tom Neenan.*

## Bronson's playful lyrics on *Mr. Wonderful* provide little substance

**NAILEN MATSCHKE**  
Contributing Writer

Action Bronson's *Mr. Wonderful* is just one of several highly anticipated hip-hop albums that came out over the past couple of weeks, but while the others were produced by influential artists at the forefront of their genre, the unapologetically unconventional personality that is its creator sets it apart as a unique element on the hip-hop playing field. Born in Flushing, Queens to an Albanian immigrant father and a Jewish mother, Arian Asllani spent several years working as a chef in New York City before switching to his hobby of rapping, as Action Bronson.

Like quite a few of his peers, Bronson has found success largely due to the fact that it's 2015 and hip-hop is far from just rapping (just ask Kendrick Lamar), allowing those who can leverage Internet culture to rise to unprecedented heights. Since his debut album in 2011, Bronson has been picked up by the Vice Media empire, whose Vice Records imprint now distributes his music, while the video division handles his Food Network-style show *F---, That's Delicious*.

What is immediately apparent about Bronson in anything he does is that he's a character, and he revels in it.

His lyrics are dominated by lines about food, sex, and analogies relating the two, and while his flow doesn't stand out too much from other New York-area rappers, his tastes for rock-influenced beats and absurd lyrics have helped paint an unforgettable picture.

This doesn't change much on *Mr. Wonderful*, which is largely a predictable dose of its titular character. The singles that led up to its release dominate the album, providing a nice range of instrumental styles and showcasing Bronson confidently rapping his typically outlandish and somewhat disjointed verses. Closing track "Easy Rider" serves as a prime example, with Bronson spewing a collage of glimpses at his lifestyle, "[riding] the Harley into the sunset" on top of a laid-back beat carried by a funky bassline and some drums, with a hazy synth drifting over. The montage is nonstop, and when Bronson finishes showing us one clip, he starts rapping about the next thing that comes to mind, as in the first verse where the image of him "leaned back with the Les Paul" is followed up by three consecutive lines about the quality of his weed, "[spilling] dressin' on the vest at the festival," and how he "best of all, had a midget Puerto Rican at [his] beck and call." Entertaining and somewhat tongue-in-cheek lyrics like these make Bronson's antics amusing, but overall it's pretty one-

dimensional. However, his lyricism is surprisingly strong on this track, and he pulls off some slick internal rhymes such as "Playing Frisbee in the West Indies, did the tango

oysters / And speak six languages in three voices," this time on top of a slick electronic beat supplied in part by longtime Drake producer Noah "40" Shebib. The vocals are

again amusing and delivered without a hitch, but they cover such a narrow scope that it all runs together. The token foods are "melon and prosciutt'," and we get bits about Bronson driving no less than three different cars; while these are at some level funny ideas, this style gets tiresome.

This might be a surmountable issue if Bronson could back up his main fare with variety,

cut of Bronson singing over an energetic but plastic-sounding blues-rock number, in addition to respectable tracks like "Baby Blue," featuring Chance the Rapper. Bronson's verses are functional but unremarkable as he discusses his problems with a woman and explains his own behavior, but his lines are forgettable as the whole show is stolen by Chance, thanks to his unique flow and creative wishes of petty inconveniences. Bronson ends up in the same boat as Riff Raff, who can't make an album of his best material because it is based around such a simple concept but can't branch out because it is antithetical to his persona.

On *Mr. Wonderful* Bronson tries to toe the line between experimentation and playing it safe, but ultimately it's probably best to just pay attention to his hits. Apart from the relatively similar singles, most of the songs on this album are on the one hand not unenjoyable, but on the other not worth listening to. There's certainly something to be said for an artist willing to open up his major label debut with a song featuring multiple errors on his part, and who generally does what he wants when he wants. But without a struggle like Kendrick Lamar's with racial identity, Earl Sweatshirt's with drug addiction and depression, or Death Grips' with social norms, it really doesn't seem like Bronson has a lot to rap about, and the album suffers as a result. Action Bronson is an entertainer, and at the end of the day I'd rather watch him do absurd things than hear him rap about it decently at best.



-<http://theearlyregistration.com>

with my kidneys" and substantive remarks like "And I'm crazy tan, from all the places that I've been / Just from writing words with a pen."

This is the fun sort of music we've come to expect from Bronson, prioritizing entertaining listeners over making an artistic statement, but the problem is that this limits what he's capable of producing. "Actin Crazy" is another single with a theme similar to that of "Easy Rider," as Bronson delivers embellished rhymes centered on his crazy life such as "Uh, all I do is eat

but the moments when he tries to branch out are unfortunately often the least enjoyable. The majority of his music that's worth listening to is found on his mixtapes and the EP *Saaab Stories*, where it's fine for him to just throw together a half-hour or so of in-your-face material and call it a day, but the artistic expectations that come along with a major label debut don't play well with this strategy. Bronson seems to realize this and makes an effort to cover new territory, resulting in oddities such as "City Boy Blues," a four-minute

### Submit your:

- photography - short stories
- poetry - traditional/
- prose - digital art
- sculptures - etc.

to TOTEM, Caltech's literary and visual magazine, by March 30!

Submissions, questions, comments and concerns should be sent to:

[totem@caltech.edu](mailto:totem@caltech.edu)

- \* submission should contain name (or anon), title, and medium (i.e. watercolor, digital)
- \* short stories are <6 pages single-spaced
- \* maximum of 10 entries/person accepted
- \* photographs are >300 dpi.

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## Teacher learns lessons, gains perspective from fifth grade classroom

**KSHITIJ GROVER**  
Contributing Writer

Every Friday, I take a couple hours out of my day to visit an underserved school in the Pasadena area, attempting to teach the basics of computer science with an amazing team of undergrads from Caltech. To be honest, I didn't think it would be that challenging at first — after all, I've been at their stage and I've dealt with young kids in the past. Piece of cake — just takes some time.

Boy, was I wrong.

I was shocked at nearly every step; things have changed dramatically in the last decade. Here's what surprised me most in the classroom, disregarding material-specific revelations:

- **Technology ≠ Magic.**

Especially in the Silicon Valley, there's this false sense of belief that technology will suddenly lead to innovation in the classroom — stemming from increasing access to resources. I disagree. The students we work with uniformly have access to Chromebooks. They regularly use Google Docs as fifth graders (!). They can explore on their own with code.org or Khan Academy. Yet, there are classrooms with immensely better learning environments than others: this comes from the teacher's ability to focus and direct the class, not how many laptops they have or how well-trained the students are in surfing the internet. Of course, the discipline of the students, their backgrounds, etc. are all in play here, but technology is no magic pill. A child being able to activate Siri, unlock an iPhone, and download an app doesn't correlate with the tangible basics of education. There are real problems here that we can't solve with a wave-of-the-hand startup.

- **Wonder -> Curiosity -> Motivation.**

Here's where the education system needs to be taking its biggest leaps. Nearly 100% of these students are blown away by video games or animations: the end result. They love the way the characters in Frozen move around and how their favorite cars dart from one edge of the screen to the other. Out of that 100%, about

65% are curious. These kids care about why something happens or what makes the computer act in a specific way — at a very basic level, this is the first sign of intellectual engagement, and the mark of any academic. Out of this 65%, I'd say about 33% (at the fifth grade age) are motivated to learn about it. Here's where I want to focus my efforts moving forward with this program: my gut feeling is that the leap from wonder to curiosity comes innately and with age, but making the shift from being curious to acting on it can be taught. Whether teachers present material in a novel way or homemade experiments bring out the life in a boring topic, curiosity is the perfect starting point.

- **Luck is a big part of education.**

There are so many things that need to go right in the classroom, and it's something I'd never thought about. As a fifth grader, most of this isn't in your control. Your teacher can't be a drag — otherwise you'll despise the material. The environment at home needs to be healthy — otherwise you won't want to step foot in school. Financials need to be in order: at the end of the day, school *isn't* free. Friends matter: say no all you want, but peer pressure is an ingrained part of society. The person who sits across from you all year in fourth grade? It makes a difference. I can't list all the factors here, but there's no easy way to pinpoint why someone is having a hard time in school, especially when they're as young as 10 years old. I chalk it up to luck simply because this is the part of education that's hardest to change. It's the part of life that's hardest to change.

Maybe the most important lesson here is sometimes you have to get up and see it for yourself. Teaching these young kids has taught *me* more than I could have ever imagined.

*Huge shoutout to Darius, David, Joe, Matt, Meera, Phillip, Sachi, Sid and Zack (among others!) who have regularly helped out and been amazing with these kids. The Microsoft/Caltech partnership (<https://www.facebook.com/CaltechMicrosoft?fref=ts>) and Outreach@Caltech (<https://teachlearn.caltech.edu/>) have also been invaluable here.*

## Research Spotlight

The Tech would like YOU to submit your research! If you would like your research featured, submit part of your research paper, your abstract, pictures of your lab, and/or pictures of your cool science to be featured in the paper. Email [tech@caltech.edu](mailto:tech@caltech.edu).

## Caltech Space Challenge asks students to tackle speculative mission design problem

**CASEY HANDMER**  
Contributing Writer

During spring break most Caltech students enjoyed a week of well-earned rest and recuperation. This was not so for the participants of the Caltech Space Challenge, held from March 22 to 27. Conceived in 2011, the Caltech Space Challenge brings together 32 of the brightest young minds in aerospace from

without giving too much away to the other team.

On Wednesday everyone was bused up to JPL for a workshop session with the A Team, a group of people whose job is literally dreaming up crazy mission ideas and spec'ing them out. I felt as though I was in the company of gods, larger-than-life personages 12 feet tall and capable of shooting laser bolts from their eyes. Our

At 1 p.m. we reassembled for the presentations. Team Explorer went first, and the Voyagers sat in profound suspense waiting for the first slide to drop. For the next hour, Explorer explained to us and the judges the essence of their mission design. Surprisingly similar to our own, matching political, science, and crew support needs involved a Falcon Heavy-launched Habitat module and an SLS-launched



Team Voyager brainstorms ideas in Mission Operations Control at JPL.

Photo Courtesy of Randii Wessen/A-Team Lead Study Architect for JPL's Innovation Foundry

universities around the world to tackle a speculative mission design problem. Split into two teams of 16, each team worked independently in secret to bring their plans to fruition. The team in which I was a participant (Voyager) set to work on Sunday night in the palatial Keck Institute for Space Studies, a major sponsor of the entire event.

The problem: Design a mission from the ground up to send astronauts to a captured asteroid near the moon, extract resources, and have everyone survive. With fewer than 2,000 person hours, that's exactly what we did. Voyager and Explorer broke into subteams concerned with orbits, propulsion, science, risk management, vehicle design, environmental control and life support, human factors, radiation shielding, guidance, navigation and control, system, policy and outreach, structures and thermal, and a myriad other factors necessary to have a hope of meeting the competition requirements. Working in one room was a great way to dynamically reallocate human resources to solve problems as they emerged.

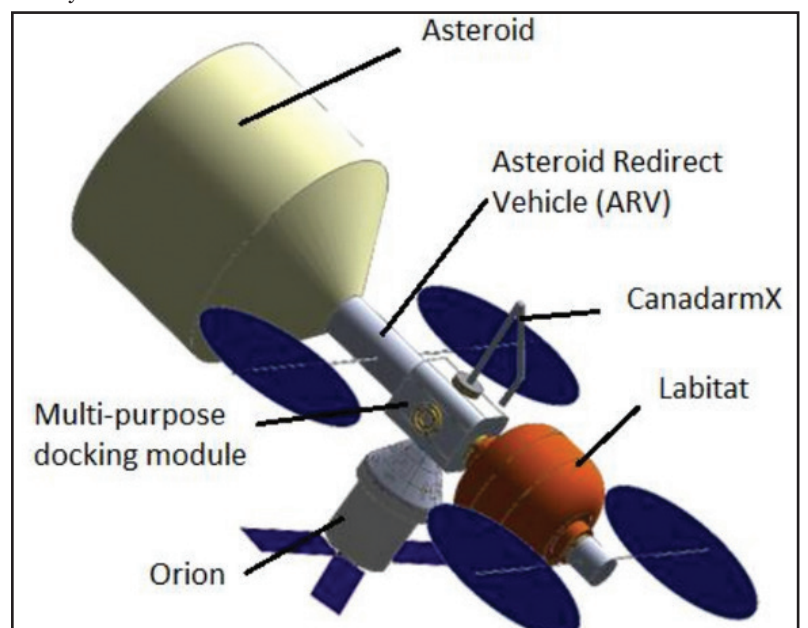
However, we didn't spend the entire time in the workshop. Program organizers scheduled a series of gripping lectures by the leading luminaries from JPL, Lockheed Martin, SpaceX, Planetary Resources, and several other key players in aerospace engineering. After each lecture we grilled the presenters for information, trying to seem specific and knowledgeable

interactions couldn't have been more different, as the experts proved to be profoundly humble and very enthusiastic, I found getting an "I don't know" to an answer empowering. When we worked out the details ourselves, we were now the world experts.

Thursday night bled into Friday morning as the finishing touches were added to our report, fact sheet and slide presentation. With one hour to go the report integration reached fever pitch. Wholesale abandonment of version control and collaborative editing added drama and desperation. With seconds to spare the relevant PDFs were dumped onto a flash drive and whisked away to the judges and, intensely relieved, we stumbled away to lunch.

Orion with three astronauts, a 25-day stay orbiting the moon, with 8 days at each end to get to and from. Both teams had to confront the reality that we collectively know *nothing* about what's inside asteroids. Devising methods to discover what we don't know is at the heart of science and, in a very Bayesian sense, is often driven by what we know how to discover.

Then it was our turn. Slides blurred before my sleep deprived eyes, I rose to moderate the Q&A section, and then we had to pack up and prepare for the evening reception and closing ceremony. A week of tremendous opportunity, collaboration, discussion and creation, the Caltech Space Challenge was a dream come true.



Team Voyager's Mission Concept involved a Falcon Heavy-launched Habitat module and an SLS-launched Orion with three astronauts.

Photo Courtesy of Structures sub-team (of Voyager's computer aided design team)

# Baseball hosts MIT, no foul play detected yet...

**GOCALTECH.COM**  
Actual Sports Content Editor

PASADENA, Calif. (Mar. 26, 2015) – Two of the most prestigious schools in the entire world clashed in sunny Southern California as the Caltech baseball team hosted MIT on Thursday.

The Beavers outthit the Engineers through the first seven innings but MIT took advantage of a whopping 14 walks and four errors to claim the victory, 23-7. MIT improves to 4-2 this season while Caltech drops to 2-19.

The Engineers took a 2-0 lead in the top of the first thanks to back-to-back leadoff walks and a passed ball that allowed one run to score on a groundout and the other on a sacrifice fly. MIT tacked on four more in the second, but Caltech struck in the bottom of the frame to pull the margin back to four at 6-2. Sophomore Harrison Jacobs (Tucson, Ariz. / Catalina Foothills) laced a double to deep left field to score senior Derek Kearney (Carlsbad, Calif. / La Costa Canyon) for the Beavers' first run and junior Daniel Chou (Blue Bell, Pa. / Wissahickon) smacked a

single to right centerfield to bring Jacobs home.

MIT exploded for another six runs in the top of the third, but the Beavers' bats stayed consistent with two more runs of their own. Caltech loaded the bases with no outs, setting up sophomore Chris Bradley (Half Moon Bay, Calif. / Serra), the water polo star making his debut with the baseball team today, for the bases-loaded walk in his first-ever plate appearance to bring home freshman David Watson (Fort Collins, Colo. / Windsor). With starter Kyler Kocher departing the mound at that point, Jacobs then added to his RBI count with a single to left center, plating freshman Garrett Levine (Columbus, Ohio / Columbus Acad.).

Caltech scored another run in each of the next two innings while shutting down MIT. A leadoff infield bunt single by freshman Chris McCarren (Kenilworth, Ill. / North Shore Country Day) set the table for Levine to rip a double down the left field line in the fourth inning. After senior Oliver Curtiss (Hudson, Ohio / Western Reserve Acad.) sat the Engineers down

in order in the top of the fifth, McCarren brought sophomore Schaeffer Reed (Miami, Fla. / Westminster Christian) home to make the score 12-6.

MIT mustered three runs in the sixth inning and Caltech was unable to score despite getting two men on base with just one out, but the Beavers did get back on the board in the seventh as Chou led off with a single, stole second and third and scored on a groundout by Levine.

After three scoreless innings in the last four, MIT managed another six-run outburst in the top of the eighth and pushed two more across in the ninth as the Beavers' bats were kept quiet down the stretch.

Chou and Jacobs led the Beavers with three hits apiece while McCarren, Watson and senior Ryan Casey (Valencia, Calif. / Valencia) each recorded two hits, with Watson adding two walks. Jacobs and Levine tallied two RBI each, while Jacobs led the pitching staff with just one earned run and a strikeout over 1 2/3 relief innings.



Harrison Jacobs really hit the ball out of the park with that one.

-<http://gocaltech.com>

## Lebby and Joshi use power of friendship to win

**GOCALTECH.COM**  
Actual Sports Content Editor

PASADENA, Calif. (Mar. 23, 2015) – Sophomore Morgan Lebby (Laguna Beach, Calif. / Laguna Beach) and junior Rushikesh Joshi (Sunnyvale, Calif. / Archbishop Mitty) won their second straight match at #2 doubles against West Region No. 10 Pacific (Ore.) University on Monday morning.

With a 2-1 Pacific lead in hand after doubles, three of the top four singles spots were hotly contested through the first set before the Boxers separated themselves in what became an 8-1 victory. Pacific improves to 9-2 overall while Caltech dips to 4-5.

The visitors jumped out to the 2-0 lead with quick wins at #1 and #3 doubles, but Lebby and Joshi got an early break at #2 and held on for the 8-4 victory to halve the deficit before singles play.

Lebby carried the momentum into his match at #4 singles, taking the first set 6-3. Sophomore Ruthwick Pathireddy (Irvine, Calif. / Whitney) dropped a tiebreaker at #1 as the Boxers took the first set in the other three singles matches, but sophomore Sathwick Pathireddy (Irvine, Calif. / Whitney) dominated the second set at #3, 6-1, to force a third set while Lebby also found himself in a third set.

Meanwhile, Pacific picked up a quick win at #2 singles and the regionally ranked Giancarlo Battaglia claimed #1 to bring the Boxers within a point of clinching the match, which they did with victories at both #3 and #4. Pacific tacked on two more as #5 and #6 singles followed the first four matches, although junior Alexander Henny (Scarborough, Maine / Scarborough) made his opponent work for the victory at #5 (6-2, 7-5).



Morgan Lebby watches his partner Rushikesh Joshi go for the ball, knowing that they will celebrate victory together later.

-<http://gocaltech.com>



Grace Yao has been doing pretty well at tennis (according to my very accurate Caltech sports inside source). Here is a photo of her gingerly redirecting the ball toward her opponent.

-<http://gocaltech.com>



Stop. Wait a minute. Fill my cup, put some of my love for Mary Boyajian in it.

-<http://gocaltech.com>

# ASCIT Minutes

## ASCIT Board of Directors Meeting

Minutes for 13 March 2015. Taken by Sean McKenna.

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

**Guests:** Margaret Lee, Anand Poozhikunnel, Elliott Simon

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

### President's Report (Cat):

- Absent

### Officer's Reports:

- **V.P. of Academic Affairs (ARC Chair: Nima):**
  - Teaching quality feedback report is being made
  - Core problem set due times will be discussed at the next Committee on Undergraduate Education meeting
  - Option Fair is happening April 7th
- **V.P. of Non-Academic Affairs (IHC Chair: Connor):**
  - New IHC Chair has been elected (Cat).
  - Admissions decisions today, so remember that rotation rules are in effect when interacting with prefrosh.
  - IHC Committee Appointments will happen at the beginning of next term.
- **Interim Director of Operations (Sean):**
  - ASCIT Food for Prefrosh Weekend will happen on Thursday night. Pizza, donuts, and other goodies provided.
- **Treasurer (Patrick):**
  - Nothing to report
- **Social Director (Annie):**
  - ASCIT Formal Ticket sales are happening Saturday - Tuesday
  - ASCIT Movie night tentatively scheduled for Friday 1 May.
  - Harvey Mudd Party in May
  - Trip to Aquarium in May
- **Secretary (Sean):**
  - Nothing to report

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 March 31st at Noon in SAC 15.

**Meeting Adjourned:** 12:32 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

## 2015 CALTECH UNDERGRADUATE WRITING PRIZES

Each year the division of Humanities and Social Sciences awards a number of prizes for undergraduate writing. Consider submitting your work to be recognized and rewarded for your work as a writer.

Submit your Writing this year for these prizes:

### MARY A. EARL MCKINNEY PRIZE IN LITERATURE

AWARDED TO THE BEST ORIGINAL POETRY AND FICTION. SUBMIT UP TO 3 POEMS. FICTION SHOULD NOT EXCEED 12,000 WORDS.

Prize amount: \$ 500.00/each category

### HALLETT SMITH PRIZE

Awarded to an outstanding essay related to the work of Shakespeare.

Prize amount: \$500.00

### Submission Guidelines:

**Deadline: April 3<sup>rd</sup>, 2015**

Only currently enrolled full-time students may submit. Entries should be double-spaced PDFs. Winners will be announced in June, and winners' names will be in the commencement program. Winning writing will be archived using CODA through the Caltech Library. Email entries to Sini Elvington at [elvington@hss.caltech.edu](mailto:elvington@hss.caltech.edu), noting the prize to which you are applying in the email subject and filename.

Contact Sini Elvington at [elvington@hss.caltech.edu](mailto:elvington@hss.caltech.edu) with any questions

# Caltech Public Events Hiring Ushers

**Flexible hours.**  
**No experience needed.**  
**Outgoing Personality.**  
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**Caltech Students  
only!!**

**Contact: Adam Jacobo**  
**626.395.5907**  
**[ajacobo@caltech.edu](mailto:ajacobo@caltech.edu)**

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## Brad/Chad discusses housing: The pros and cons of moving off-off

**BRAD CHATTERGOON**  
Contributing Writer

Welcome back to Caltech for the launch of spring term. Spring is often a time of reflection marked by a change toward warmer weather after the last six months of chill. Spring also marks change for many of us. For about a quarter of us that change is graduation and finally packing our bags and moving out of Caltech. For others it's a time to start planning a bit for the following academic year, and one item in particular that many will have to face is determining housing options. Having lived off-off campus (i.e., in housing not provided by Caltech) for both my junior and senior years, as well as being off campus (i.e., in any Caltech-provided housing except the houses) my sophomore year, I think that I am qualified to provide a brief listing of the positives and negatives of living off-off, and to some extent off, campus.

**Pros:**

- More space. Living off-off usually means an apartment or condo shared among 2–3 people, although I have heard the occasional park bench can work too. These apartments come not only with bedrooms but also with a living room and kitchen, which amounts to much more space than one can have near-personal control over, as opposed to space offered in the house environment.

- No requirement to enroll in the campus board plan. Complete control over your diet is possible off campus. This usually can present itself in one of two ways. One can eat as cheaply as possible and save money. Alternatively one can have greater decisions about what quality and type of food one wants to consume, which especially great for pursuing the dietary side of fitness goals.

- The opportunity to learn how to live like a real adult. With off-off housing comes responsibilities. These can take the form of needing to set up an account with city water and power, setting up an internet subscription, paying bills on time, taking out the trash, etc. They are great preparation for when you leave Caltech either during the summer or after graduation. As a case where this is relevant, I recall opting into campus housing during a summer that I spent at Harvard. In retrospect, this was a terrible decision as facilities were somewhat limited or difficult to deal with; for example, the dining hall was only accessible at specific times. Had I already experienced living off campus, I would have opted to find an unaffiliated living situation

where I could stock a pantry and fridge with food available for consumption whenever I wanted.

**Cons:**

- You do have to fend for yourself. You have to find your own food whether you like it or not. This means one of three things: cooking, consuming only ready-to-eat foods like cereal, or buying takeout every day. I have seen people implement each of these three scenarios and if you are living off campus it is important that your expectations about food be sorted out and that those expectations be realistic. I have been part of the group that claims each person will take turns cooking, only to have that never follow through. But I also have heard of groups making the same claim and doing so. This brings me to my next point.

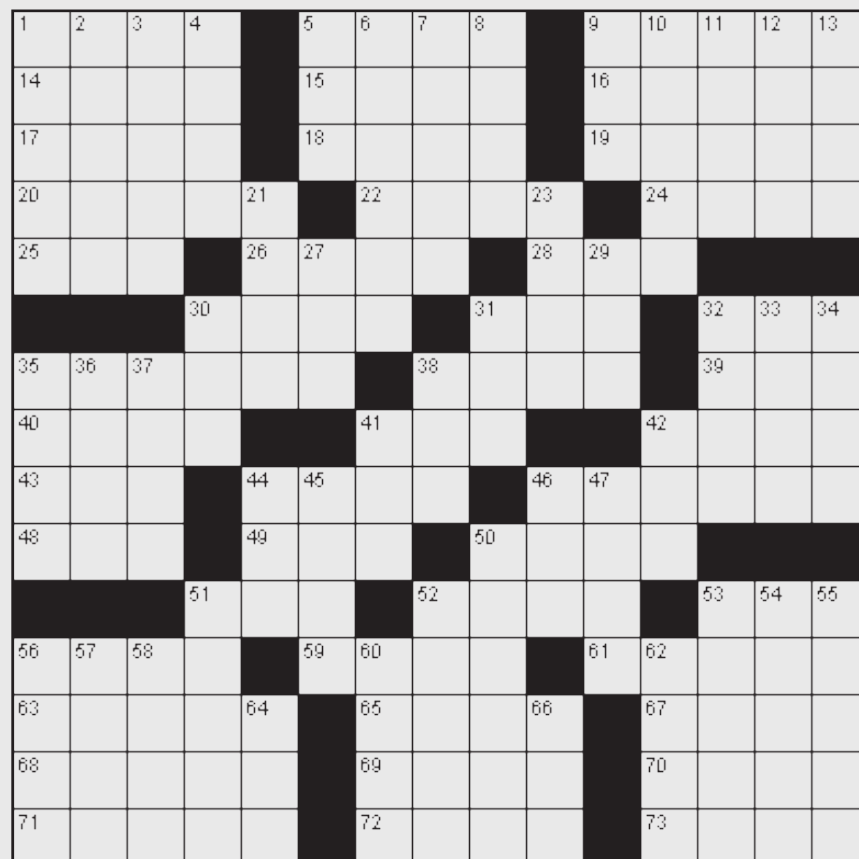
- The group or person that you choose to live off campus with will have a bigger effect on your experience living off campus than a roommate on campus would. I place this in the cons section because if this becomes a con, it will be quite possibly one of your biggest cons for living off campus.

- If moving off-off for the first time, it can be quite costly up front. Most, if not all, off-off accommodation will lease the living space and nothing else short of perhaps a fridge and stove, and if lucky a dishwasher and laundry unit. This means needing to purchase a bed, desk, and other furniture, as well as kitchen utensils and wares. Bearing this in mind, it is worth the investment if you are planning to live off-off for the remainder of your time at Caltech, and it is possible to mitigate a lot of the cost by either “inheriting” an apartment from another group of Techers and paying them for the furniture within the apartment or by purchasing from an off-off graduating senior like myself (yes, I'm selling my stuff).

One more thing that may be a pro or con, living off-off campus often means that your social life is very much what you make of it. It is possible to be really involved on campus but it does take a bit more work. On the flip side it is also a lot easier to devote more time to school or hobbies outside of Caltech. At the very least, by being off-off Caltech feels more like a place that one is strongly associated with but can take a break from for a while, compared to on campus, where it is much more difficult to escape from the Caltech bubble.

-Brad/Chad

### Crossword



-http://puzzlechoice.com

**Across**

- 1. Exchange
- 5. Curved masonry structure
- 9. Hold firmly
- 14. Present location
- 15. Commercial transaction
- 16. Artery
- 17. Fury
- 18. Leg joint
- 19. Promise solemnly
- 20. Start abruptly
- 22. Sodium chloride
- 24. Challenge
- 25. Staining substance
- 26. Heavy metallic element
- 28. Beam
- 30. Oval fruit
- 31. Snakelike fish
- 32. Consumed
- 35. Thoroughfare
- 38. Run away quickly
- 39. At this time
- 40. Support
- 41. Subdued
- 42. Shrivelled
- 43. Lubricant

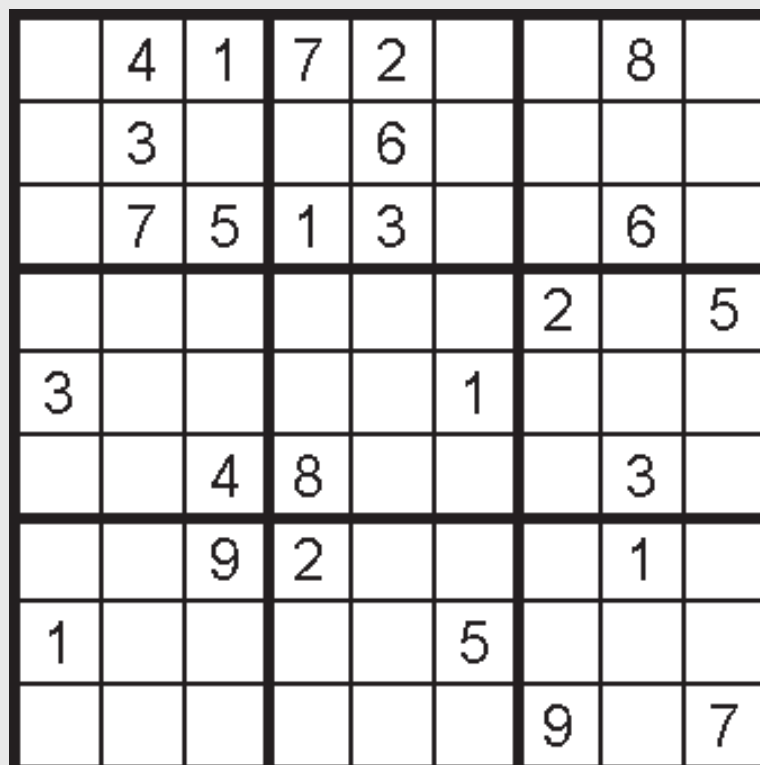
- 44. At any time
- 46. Brief period of precipitation
- 48. Digit
- 49. Line
- 50. Water hen
- 51. Floor covering
- 52. Exchange goods for money
- 53. A quick short straight punch
- 56. Not in favor of
- 59. Malevolent
- 61. Musical composition
- 63. Tied
- 65. Shaft
- 67. Public violence
- 68. Boredom
- 69. Male red deer
- 70. Unit of area
- 71. Taunt
- 72. Novice
- 73. Rind

- Down**
- 1. Small piece of cloth or paper
  - 2. Fatigued

- 3. Debate
- 4. A secret look
- 5. Request
- 6. Payment for the release of someone
- 7. Remove unwanted substances from
- 8. Part of a shoe
- 9. Fuel
- 10. Raucous
- 11. Length by width
- 12. Principal actor
- 13. Trim
- 21. Roofing material
- 23. Large woody plant
- 27. Furrow
- 29. Beer
- 30. Liveliness and energy
- 31. Tree
- 32. Afresh
- 33. Ripped
- 34. Pitcher
- 35. Blemish
- 36. Group of three
- 37. Theatrical part
- 38. Conifer
- 41. Condensation

- 42. Chronic drinker
- 44. Historic period
- 45. Referendum
- 46. Ancient Roman god
- 47. Cavity
- 50. Storage space where wines are stored
- 51. Arithmetic operation
- 52. Value of Roman numerals LX
- 53. Liquid extracted from fruit or vegetables
- 54. Worship
- 55. Asian pepper plant
- 56. Assist in wrongdoing
- 57. Not any
- 58. Large marine food and game fish
- 60. Immense
- 62. Snare
- 64. Perish
- 66. Self

### Sudoku



-http://puzzlechoice.com

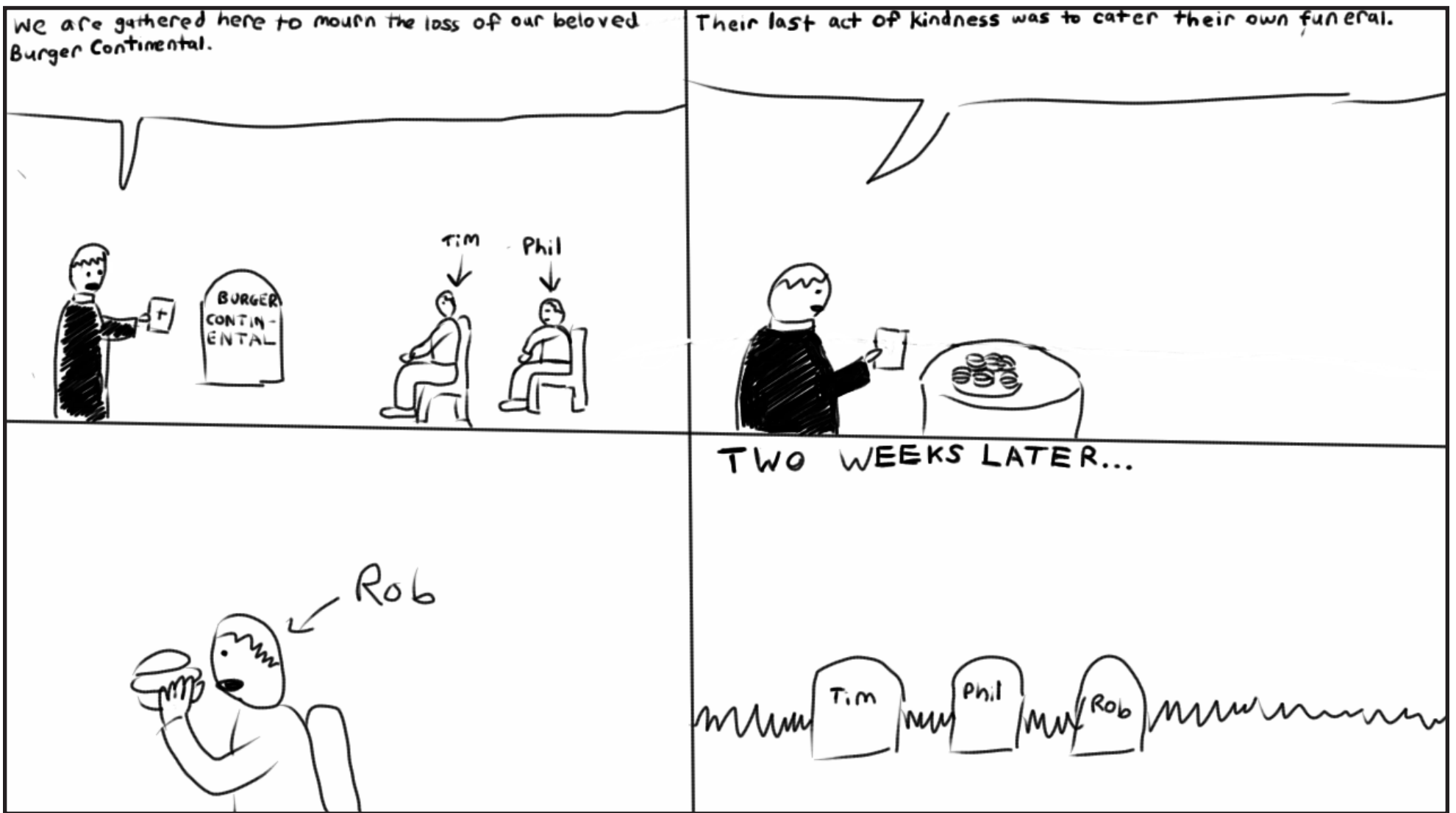
## "Alma mater"

Georgio Kraggman

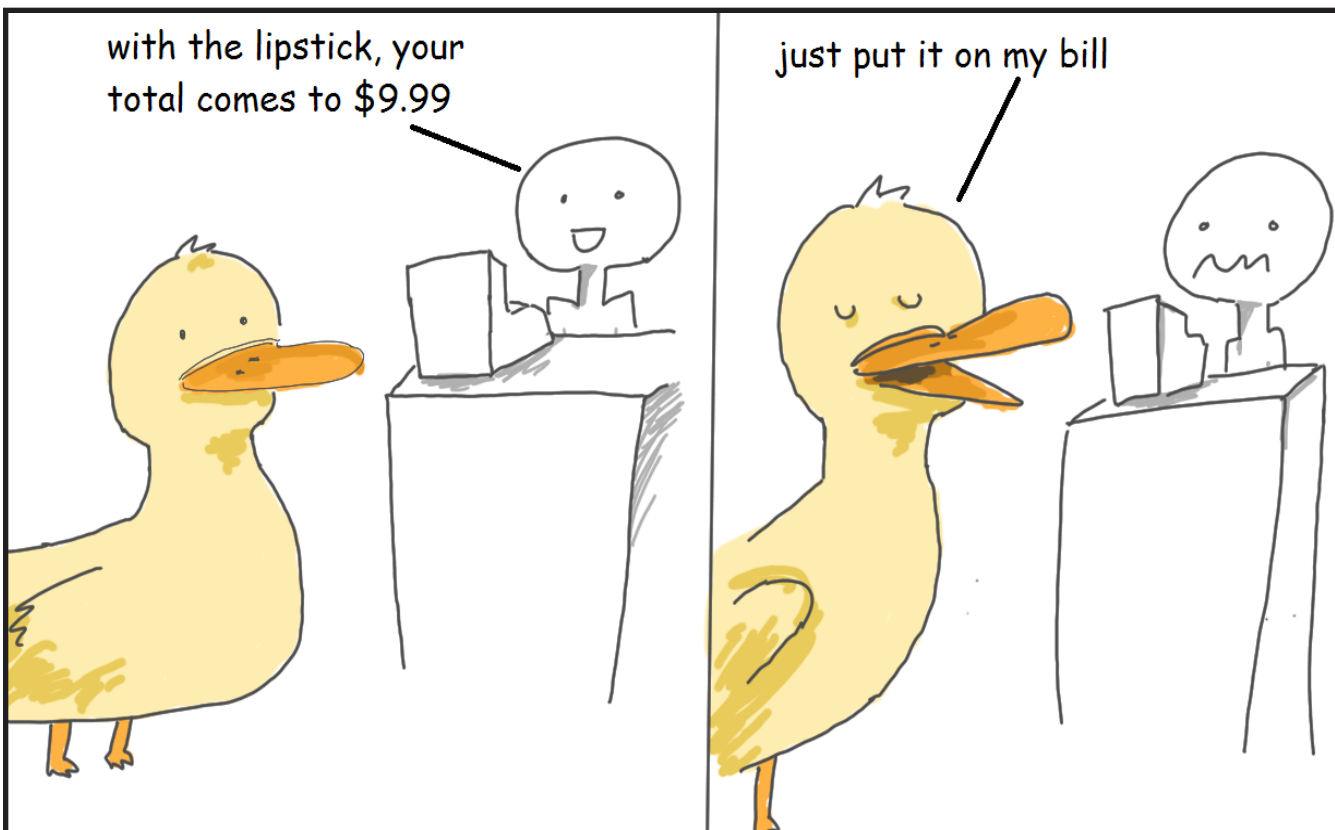


## Acquired Taste

Dr. Z



Liz Lawler



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