Six from Caltech, JPL elected to National Academy of Engineering

Caltech alumni wants to connect world to Internet

Google X is a research lab of Google, but it’s not just interested in problems related to the company’s core business. We look for big problems that might require radical solutions and breakthrough technology.

The self-driving car is perhaps our best-known project and a great example. The problem: People are generally terrible drivers; we cause traffic jams and get into accidents. A radical solution might be to teach computers to drive. Technology exists that might make that possible, but it’s an enormous technical challenge. It’s a big problem, radical solution, breakthrough technology.

Project Loon is an attempt to solve the problem of Internet access around the world. Right now, two-thirds of the world’s population does not have the ability to use the Internet. You might consider it a luxury, but access is now so closely correlated with economic development. There is an emerging global digital divide. People in developing countries could be greatly helped by gaining access.

So that’s the problem: global Internet access. The radical approach and the breakthrough technology are doing it by balloon—and not just stationary balloons hovering over one location and providing access to a small group willing to pay a lot. Most likely, that approach actually turns out not to be technologically feasible.

Instead, the idea is to let the balloons float freely, travel with the winds in the stratosphere, and have just enough of them to cover the whole globe. The approach actually turns out to be technologically feasible.

People in developing countries might consider it a luxury, but access is now so closely correlated with economic development. There is an emerging global digital divide. People in developing countries could be greatly helped by gaining access.

Why balloons? Why not use satellites?

Well, satellites are also a great solution, but they’re extremely expensive to launch.

There’s a long time delay between when a satellite is proposed, when it’s built, when you can get a launch window, and the duration that it has to last in orbit to sort of pay for itself. You might be developing technology for a satellite that launches five years from now. It has to last for the next 10 years to become economically viable.

See page 4 for candidate statements for Off Campus BoC rep and Off Campus CRC rep.
The Caltech Y Column serves to inform students of upcoming events and volunteer opportunities. The list is compiled by Nereah Shah from information given by the Caltech Y and its programs.

Upcoming Events


Monday February 24th | 9pm
Avery Library
Lunch is provided, but space is limited
RSVP email: vkkumar@caltech.edu

For the next installment of our scientific reproducibility series, we will be discussing qualitative methods in biology and publication standards. This topic is relevant because research in biology has steadily become more reliant on analytical methods, yet many biologicalists are not formally trained in mathematics or statistics. We aim to address how this trend has impacted reproducibility.

Prof. Perona will give an introductory presentation on his experiences followed by an open question and answer session.

Dr. Pietro Perona is the Allen E. Puckett Professor of Electrical Engineering at Caltech. He is the director of the NSF Engineering Research Center in Neuromorphic Systems and Engineering. He also directs the Computation and Neural Systems PhD program centered on the study of biological brains and intelligent machines. Professor Perona’s research centers on vision. His research is focused on computational models of vision to help design machine vision systems. He has contributed to the theory of partial differential equations for image processing and boundary formation, and to modeling the early visual system’s function. He is currently interested in new categories and visual recognition.

Presented by the Caltech Y Social Activism Speaker Series. RSVP email: vkkumar@caltech.edu

2. Horseback Riding at Griffith Park

Monday | February 16th | 9:15 AM
Want to go horseback riding through the dusty trails of Griffith Park? As a Caltech Student, you can volunteer with LEARNs to go horseback riding event!

Where: Meet at the Caltech Y (905 S. Wilson Ave) to fill out waivers; drive to Circle K Ranch (about 30 min away).
Price: $15 per person for one hour of riding, paid the day of, in cold.
Transportation is not provided. Since sign-ups are first come, first serve, and there is a limited number of spaces, you are expected to come if you RSVP. Please RSVP here: http://goo.gl/forms/OTcFpYh.2
A confirmation email will be sent out by Friday, 2/13.

3. Federal Work Study Through the Caltech Y

Volunteer for community service through the Caltech Y. All are welcome and encouraged to volunteer. Students receiving Federal Work Study can also earn $20 an hour for doing select community service programs through the Caltech Y.

Caltech Y Front Desk (ongoing)
Work during office hours (9am-5pm) at the Caltech Y. Duties include checking out equipment, answering phones, making reservations and as assigned. For more information email amychoi@caltech.edu.

Rise Tutoring (Monday—Thursday)
Tutor 8th-12th grade students in math and science at Caltech. For more information visit: http://caltech.org/programs_services/tutoring/

Hathaway Syacoreos Tutoring (every Monday) - Volunteer at Hathaway-Syacoreos, 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@tapir.caltech.edu.

Pasadena LEARNS Tutoring (every Friday) - Come volunteer at Madison and Jackson Elementary School! We are partnered with the Pasadena LEARNS program and work with their Science Olympiad programs or do regular tutoring along with occasional hands-on science experiments. Transportation is provided. For more information contact vkkumar@caltech.edu.

4. Alternative Spring Break

Multiple Locations | Multiple Dates | More Info Coming Soon
Explore a new place, meet new people, serve a community, and have fun! Join other Caltech students experiencing a non-traditional spring break volunteering in the community.
A few suggestions for this year include: Catalina and Monterey Bay. More info and applications coming soon.

5a. Snowball LEARNS
Friday | 3:30 – 5:00pm
Madison and Jackson Elementary School
Come volunteer at Madison and Jackson Elementary School! We are partnered with the Pasadena LEARNS program and work with their Science Olympiad team or do regular tutoring along with occasional hands-on science experiments. Transportation is provided. For more information contact vkkumar@caltech.edu. Eligible for Federal Work Study.

5b. Hathaway Syacoreos
March 3 | 5:30-8:00pm
Highland Park
Volunteer at Hathaway-Syacoreos, 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@tapir.caltech.edu. Eligible for Federal Work Study.

Other Announcements Beyond the Caltech Y

Community Science Event at Caltech
Monday | March 2nd | 4:30 - 7:30 pm
Caltech
Our first Community Science Event will be headlined by Prof. Ken Libbrecht on the topic “The Secret Life of a Snowflake.” It is free to all K-12 teachers and volunteers who wish to participate.

The intended audience is K-12 teachers with an interest in working together to create lessons taking into account new NGSS and Common Core guidelines. We welcome volunteers to host lab activities and demonstrations as well.

The event will be held in Wimbett, with a schedule as follows: 4:30 pm to 5 pm – Keynote seminar by Prof. Ken Libbrecht 5:30 pm to 6:30 pm – Activities and lab demos by partners 6:30 pm to 7:30 pm – Collaborative lesson creation by teachers.

CaltechVolunteers (undergrads, grads/post docs/staff...) are registered. Here is the schedule for the day: http://csa.caltech.edu/cse/Volunteer. More info can be found at: http://csa.caltech.edu/cse

PCC Veterans Tutoring Program
Flexible Schedule | Tutor on Caltech’s Campus or at PCC’s Veterans Resource Center
Veterans at PCC Need Your Help? Tutors are needed in: Math, Physics, Chemistry, and Life Sciences with particulars in need of student Study Skills, Homework Review, and Test Preparation. The Veteran students at PCC would appreciate it if our tutors could come and help them. We offer a variety of services for their civilian and academic careers. Having been out of school for several years creates special challenges, and that’s where we can help them overcome. An hour or two per week could be a huge boost! How to get involved: One can sign up for sessions with self-identified Veterans. For more information and to volunteer contact Urte H. Teller. The caltech@csacom.net or 626-379-7747.

Balloons offer road to Internet

Continued from front page

So you’re dealing with technology that might be 10 or 15 years older by the time it really gets used.

With balloons, we have more freedom in where we can make them cheaply. We can refresh and iterate the technology on a month-to-month basis. So it’s sort of low-stakes aerospace. We get the altitude and coverage similar to a satellite and gain some flexibility—all at a much lower cost.

What are the challenges involved?

It’s a terrific challenge of engineering. There’s a big jump between making a balloon that can last one day and one that can last 100. Going through the day-and-night cycle is treacherous, regulating what’s called a super-pressure balloon. Then, there’s the navigation. With balloons, we’re within the range of altitude-control tend to travel in one direction, which we can take advantage of to navigate. The balloon needs to be able to change altitude to catch a current headed in the right direction.

My responsibility is the communication, connecting the balloons to the end users on the ground. As balloons drift in and out of range, we need the connectivity to feel seamless. We also need to link the balloons to one another, back to ground stations, and the Internet. One of the first basic challenges we faced was the fact that most transmitters are polarized, meaning the signal transmits in only one direction. But balloons rotate. So we designed special hardware that provides a signal no matter which way the balloon is oriented.

So to make this all work, we need: balloons capable of staying aloft for 100 days, altitude-control and real-time “air-traffic control” system that can predict weather models, and a network to tie them all together.

What stage of the project are you in?

Well, we’ve already done pilot testing in Brazil. We’ve been working this past year to grow a team here in Pasadena and have a bunch here right now.

What’s the project then—what’s the thing you’re working on?

So we’re dealing with communications. We get the altitude and coverage similar to a satellite and gain some flexibility—all at a much lower cost.

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So we’re dealing with communications. We get the altitude and coverage similar to a satellite and gain some flexibility—all at a much lower cost.
This week, Tech editors Monika Enlow and Liz Lawler requested that I review Nicki Minaj’s most recent album, The Pinkprint, which was released on Dec. 12. I’ll admit up front that this is the first of her albums I’ve listened to, and that in general I haven’t given much attention to her music over the past few years. I have, however, been aware of her reputation as an underrated rapper, largely due to the overwhelming presence of pop songs on her first two albums.

Throughout The Pinkprint there are times where this claim seems like it has some truth to it, and the album certainly goes farther than her previous LPs in terms of solidifying her voice as a unique female presence, particularly in the hip-hop world. This assertion of independence and talent really is the point of the album, and as its title suggests it tries to establish a concept of who Minaj is both as an artist as well as a real person.

Some tracks offer surprisingly candid glimpses into her personal life, while others proudly show off her ability to pull off the extreme. Unfortunately, there are still some sections of the album which are almost cringe-worthy, and these beg the question of how Minaj’s The Pinkprint is and how much is aimed for the mainstream.

One thing immediately apparent about this album is how impressively long it is, clocking in at just under 67 minutes, not counting the seven bonus tracks split across releases. Minaj uses this time strategically, with the album’s 16 tracks transitioning between a handful of moods without too many abrupt jumps. The first, “All Things Go,” decisively sets the stage for Minaj to take some time to give listeners a serious look at life from her point of view. For example, in the first verse she explains that she’s all right with life’s finite span “as long as seven years from now, I’m taking my daughter to preschool,” and later in the third verse she hints at the abortion she had as a teenager. However, her rapping still feels almost lethargic on this intro along with its similarly emotional follower, “I Lied.” For fans of Minaj who are interested in the intimate details of her life, these songs are some of the most meaningful in her discography, but musically there simply isn’t much to write home about. The singing-heavy “The Orying Game (feat. Jessie Ware)” completes a trilogy before the album moves into its next phase.

The following five tracks are all downtempo, bass-heavy, straightforward hip-hop, and while they play it safe, they make up one of the most enjoyable sections of the album. “Get On Your Knees (feat. Ariana Grande)” is co-written by Katry Perry, and is confidently unrecognizing in its explicit sexuality, giving even Gangsta’s Boos’s verse in Run the Jewels’ “Love Again (Akinuye Back)” a run for its money. This is followed by the banger “Feeling Myself (feat. Beyoncé),” which is again saturated with innuendo that can’t quite contain itself, reiterating the point that Minaj is the “queen of rap,” and which ends with a verse laden with jabs at her competition, as she takes a convincing stand against the view that she’s just an industry-controlled pop star.

Next is another standoutcut featuring Chris Brown and Minaj’s Young Money labelmates Drake and Lil Wayne, “Only,” which sees all three deliver competent verses. Drake’s somewhat tongue-in-cheek lines relating his appreciation of Minaj’s figure prove to be the most memorable, while Brown’s delivery of the verses is completely uninspired.

The album continues like this for a while and is generally enjoyable, but like all good things this comes to an end, beginning with “Buy a Heart (feat. Meek Mill).” Meek Mill absolutely throws away one of the song’s two verses, and begins the track by blinding the listener with its painful hook. The following “Trini Dem Girls (feat. LunchMoney Lewis)” isn’t any better, serving as the album’s token inclusion of Jamaican influence with an almost impressive lack of substance. Together, these two filler tracks back-to-back kill the album’s momentum, and this feels like a waste, especially when some of the bonus tracks such as “Shanghai” and “Truffle Butter (feat. Drake and Lil Wayne)” showcase some of Minaj’s best flows. It’s clear that she wanted The Pinkprint to be about more than her just as a rapper or as a pop singer, but these songs are just flat-out not good. Next up is “Anaconda,” which you probably already know how you feel about. Personally, I’m a fan; even though it’s largely a remix of Sir Mix-a-Lot’s “Baby Got Back,” I think it crosses the uncanny valley with its commitment to being abrasively ludicrous and ends up being one of the most unique tracks.

Most of the album’s remainder can be skipped, as it starts off with the unforgivably awful EDM crossover “The Night Is Still Young.” “Pills N Potions” is a somewhat touching piano-based pop ballad with impressive vocals, but this formula is then used for the album’s last two songs, detracting from the feeling. It’s usually sobering to hear artists’ struggles, and Minaj does make an effort to open up to the audience with lines such as “Couldn’t believe that I was home alone, contemplating / Oversdozin’,” but ultimately these songs don’t have very much to say, and this makes them come off as a bit forced in their attempts to emotionally impact the listener. The final song, “Grand Piano,” also features quite a bit of singing from Minaj, but it drags on and brings the album to a boring close.

Minaj’s The Pinkprint is clearly an album about her, and certainly stands above her previous two. It probably won’t convince anyone of her rap skills, but that’s what her mixtapes are for. The LP serves to establish what she wants herself to sound like, and it works most of the time, although the end result is far from perfect. I suggest checking out some of The Pinkprint’s singles, but unless you’re already a fan of Minaj you probably won’t get a great deal out of the album.

The Pinkprint: A showcase for Nicki Minaj’s rapping?

NAILEN MATSCHKE
Contributing Writer

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 3rd, 2015

Only currently enrolled full-time students may submit. Entries should be double-spaced PDF. 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, noting the prize to which you are applying in the email subject and filename.
The position of BOC rep is not one to be taken lightly. The time commitment is significant, the responsibilities are enormous, and the decisions can be emotionally taxing. But believe that I am capable of living up to the expectations and fulfilling the duties responsibly. Student involvement in protecting the honor code is an invaluable part of Caltech, and I want to be a level-headed BOC rep.

In all honesty, I never wanted to go to Caltech. Up until my first day on campus, I was researching transfer application deadlines for other universities. I am now embarrassed by how ridiculous I was then. Since starting at Caltech, I have been immensely happy. I cannot imagine transferring. Talking to my parents, I have narrowed down why I love Caltech to three major categories: my research, the people, and the honor code. I am now ready to make the honor code a bigger part of my life, because I have always devoted myself to things that really matter to me. The honor code makes me feel safe and comfortable everywhere on campus. I love how the honor code allows me to collaborate with my friends, never worrying that they’ll simply work my or take advantage of my ideas. By adhering to the honor code’s ideals during my study parties, I have learned more about the material and have made better friends faster than I could have imagined. I want to be a BOC rep, because I want to support this important part of my life. I also believe that I would be a great BOC rep. I am able to stay calm and collected when I am forced to make difficult decisions. Balancing the honor code’s ideals and the individual situation, I am confident that I’ll be able to make tough decisions when necessary, but be understanding when I know that there was no malicious intent. I want to be a BOC rep to apply to this essential part of Caltech.
Kate Lewis gets 10th double-double of season, still hungry

GOCALTECH.COM
Actual Sports Content Editor

CLAREMONT, Calif. (Feb. 14, 2015) – Sophomore Kate Lewis (San Antonio, Texas/ Ronald Reagan) left no doubt in breaking the program single-season scoring record with her 10th double-double of the season to lead the Caltech women’s basketball team at Pomona-Pitzer Colleges in an 81-52 defeat on Saturday afternoon.

Lewis posted for her third straight and ninth 20-point effort this season to bring her season total to 996, shattering teammate Stephanie Wong’s 2012-13 mark of 957. They have both moved past it.

“We found shots, they just didn’t seem to fall and it complicated us finding any momentum,” Marbut said. “It wasn’t doing – some games are a battle for reasons you can’t identify and this was one of those nights. We will look at who is next up and move past it.”

Lewis’ 27 points were just one shy of her career best, while her 11 rebounds completed the double-double and marked the sixth straight game she has been in double figures. Junior Stephanie Wong (Palos Verdes Estates, Calif. / Palos Verdes Peninsula) chipped in 12 points, seven rebounds and three assists while her sister, sophomore Michelle Wong (Palos Verdes Estates, Calif. / Palos Verdes Peninsula) added three assists and two steals.

“She broke a big record tonight in a big way and, after La Verne’s five-run top of the sixth, Watson crushed his homer to right field with the Beavers’ first hit in the third inning and made it 9-0 in the second, eventually stretching out to 18-0 in the sixth. Senior Oliver Curtiss (Hudson, Ohio / Chestnut Hill) kept the home squad in the frame ended.

Casey added a single in the fifth inning and, after La Verne’s five-run top of the sixth, Watson crushed his homer to right field with one out in the bottom of the seventh inning. Freshman Garrett Levine (Columbus, Ohio / Columbus Academy) laced a single to shortstop but was later caught at third base on a fielder’s choice.

Junior Michael Klionsky (Boca Raton, Fla./ Atlantic) recorded two outs in a clean frame while Jacobs finished things off with a hitless seventh inning, allowing just one walk.

Watson hits first Beaver home run in quite some time

GOCALTECH.COM
Actual Sports Content Editor

PASADENA, Calif. (Feb. 13, 2015) – Freshman David Watson (Fort Collins, Colo./ Windors) clubbed the Beavers’ first home run since April 5, 2013 as the Caltech baseball team dropped a doubleheader to the University of La Verne on Saturday.

La Verne tacked on another unearned run in the top of the first inning, but was later stranded as the Leopards scored again in the eight inning, but was also stranded as Caltech committed a season-low eight turnovers. Pomona-Pitzer improves to 6-16 overall and 2-8 in the SCIAC while Caltech is now 0-22 (0-12).

Both defenses stepped up at the start to keep it a 2-2 game over the first three minutes, but Pomona-Pitzer went ahead by making single digits at 17-6, with 9:41 left to play. The Beavers hung near single digits as late as the 11:16 mark, when they trailed 23-15, but a 9-3 run to end the half saw Pomona-Pitzer surge to a 32-24 halftime lead.

Watson’s two-run shot in the seventh inning, allowing just three earned runs and one walk over 8 1/3 innings. Sophomore Harrison Jacobs (Tucson, Ariz. / Catalina Foothills) became Caltech’s first baserunner with a leadoff single in the first inning and made it 10-6 with a double play erased the runners in the third.

Junior Daniel Chou (Blue Bell, Pa. / Whitemarsh) kept the home squad in the mix all the way to his final pitch, allowing just three earned runs and one walk over 8 1/3 innings. Sophomore Harrison Jacobs (Tucson, Ariz. / Catalina Foothills) became Caltech’s first baserunner with a leadoff single in the bottom of the third inning, but the Beavers could not advance him any further.

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ASCIT Minutes

ASCIT Board of Directors Meeting
Minutes for 13 February 2015. Taken by Sean McKenna.

Officers Present: Cat Jamshidi, Connor Rosen, Patrick Nikong, Sean McKenna

Guests: Margaret Lee, Elliott Simon, Chris Dosen, Allika Walvekar, Alex Hartz

Call to Order: 8:04 pm

President’s Report (Cat):
• Alex Hartz discussed a proposed change of the BoC bylaws which would need to be approved by vote of the undergraduate student body. A few minor dates and wording have been fixed, but there is also a more substantive proposed change. The purpose is for the Dean to have records of dismissed cases. In doing so, the Dean of Students would be involved in some capacity in dismissals, and this capacity will be negotiated by the Dean and the BOC Chair.
• ASCIT and the BOC will work further to come up with an exact wording of the proposed changes before calling for a vote by undergrads.
• Furthermore, the report suggested that some BoC and CRC responsibilities could be redelegated to ASCIT, potentially having an “Honor Code” representative on the Board of Directors. This position could take responsibility for things like BARC lunches and training new faculty. The BOD will determine if these issues would be better addressed by a position on the ARC or through ASCIT.
• Elections are on Tuesday 17 February for off-campus BoC and CRC reps. We have a non-trivial number of people running for both positions!

Officer’s Reports:
• V.P. of Academic Affairs (ARC Chair: Nima):
  o The ARC is working with the Dean’s office on freshman peer advising for next year. More details will come in the next couple of weeks, but it should look something like the option mentoring program from two years ago, where freshmen get paired with upperclassmen who can advise them.
  o The Dean’s office is setting up a fund for option clubs to put on option-specific meet-and-greet events. This fund will be usable to start up new option-specific clubs rather than for established clubs.
  o You should take a prof to lunch! Get a small group of friends together and invite a professor to have a good lunch with you. Details are here: http://arc.caltech.edu/roshalsunch.cn
• V.P. of Non-Academic Affairs (IHC Chair: Connor):
  o Waiting for Ricketts President to turn over before the new IHC starts to ramp up.
• Interim Director of Operations (Sean):
  o ASCIT projector/screen/speakers will be ready for use some time this week.
• Treasurer (Patrick):
  o Allika Walvekar requested event funding on behalf of the Tech Society of Women Engineers for their Introduce a Girl to Engineering Day event.
• Social Director (Annie):
  o Nothing to report.

Secretary (Sean):

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 February 20th at 8pm in SAC 15.

Meeting Adjourned: 8:49

THE CALIFORNIA TECH

ANNOUNCEMENTS

Vienna Boys Choir
Beckman Auditorium
Call campus x 4652
visit the Caltech Ticket Office 101 Winnett Center

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

WANTED: Actors, singers, musicians, technical personnel, and designers for new, original Caltech musical Alice Through the Wormhole! This musical is currently in the development phase with a world premiere run Feb 20-March 1, 2015! If you are interested in any facet of production, including script development, contact Brian Brophy directly (brophy@caltech.edu).

Caltech Public Events

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Nehal Shah

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Hey, Caltech. Week 7 is upon us and that means Drop Day is just around the corner. Midterm grades are in and while you’re likely to be happy or angry...
Acquired Taste

Dr. Z

“This comic is not about Liz Lawler” (It’s about TA-ing)

Georgio Kraggman

Grading

Phone Calls from Students

Left to grade

Hello?

Graded

Hey, how do you do number 3?

Not Apache: Revenge

Being Recognised at Parties

Ahh! Is that our TA?

What is he wearing?

My eyes! They burn!

Answers to previous Sudoku

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- http://puzzlechoice.com