

## Knowing the vote: Alumna Erin Hartman develops election forecast methods

CALTECH ALUMNI ASSOCIATION

The pollsters are back.

With the 2016 presidential race fully underway, candidates are crisscrossing the country to shake hands with the common folk, eat pie and take their case to the American public. Just where they stump, however, is increasingly determined by armies of statisticians, continually checking the pulse of the electorate. And this time, many of them are building upon methods introduced by Erin Hartman (B.S. '07) back in 2012.

During the last presidential election cycle, Hartman served as an analyst on Obama's campaign, where she was tasked with studying data from its massive polling operation, which was conducting more than 30,000 telephone interviews per week. Hartman's team needed to quickly sift that data to predict which voters would turn out, how they would vote and who

was capable of being persuaded. Their analysis was then used to deploy armies of volunteers.

Hartman soon realized that the models could be more accurate. "I was completely new to the process. So I didn't have any preconceptions about how things should be done," she said. Hartman credits her broad-based analytical training at Caltech, which set her apart from other operatives with more traditional political campaign experience, for allowing her to spot an opportunity.

Hartman started with the observation that randomly conducted polls end up being not that random, after all.

"Usually pollsters will call 1,000 participants within a region as a sample. But it turns out not everyone likes to talk about politics when you call them at dinner," Hartman said. Some demographics, particularly younger generations, are disaffected, discouraged, or not interested — and they just hang

up the phone. "In so doing, these groups systematically remove themselves from the polling."

And the trend is getting worse. Whereas 50 years ago, nearly half of those called might participate, today it's down to just 5 percent. "So the question is, who are these 5 percent? Are they truly representative of the region's voters?" Hartman asked. "It turns out they're not."

Imagine a fictional city in which half of the active voting population is over the age of 50, while those under 25 make up 10 percent. When it comes time to poll, however, the numbers shift: The Baby Boomers jump up to 75 percent of responses and Millennials fall to just 2 percent.

How do you predict the intentions of someone who doesn't participate in a poll? After all, just because someone hangs up the phone on a pollster doesn't mean he or she won't actually vote.

While attempting to build models for Obama's team, Hartman realized that if she knew the population's actual voting habits, she could rebalance the poll. As it turned out, by 2012 new and publicly available voting data offered a wealth of just such information. Hartman was able to synthesize detailed demographics and voting histories and apply them to her models. In the case of our fictional city, Hartman could now reweight the 2-percent response of the younger group to form 10 percent, reflecting the true voter turnout. The result: a more accurate prediction.

How much more accurate? According to Andrew Claster, then the deputy chief analytics officer for the Obama campaign and now a consultant, it was a game changer. "At one point, we saw the Romney campaign dramatically increase their investment in Michigan and Minnesota. Clearly, they thought the states were in play. We wondered 'What are they seeing?'" he recalled. "But our polling showed a comfortable lead, so we didn't feel the need to counter."

Obama won both states by more than 8 percentage points. Claster added, wryly, "Obviously, their models were flawed."

Following the 2012 election, Hartman and several partners formed a consulting group, BlueLabs, that has since advised a number of Democratic campaigns, including New Jersey Senator Corey Booker and Virginia governor Terry McAuliffe.

Now this year, the presidential campaigns have taken note.

According to Matthew Holleque, who cofounded BlueLabs with Hartman, many of the current candidates employ operations with similarly sophisticated practices. "Polling is really about efficiency," Holleque said. "Erin took a complex mathematical problem and found a solution that makes campaigns much more efficient."

Claster put it more bluntly, "I believe Erin's work resulted in the most significant improvement in public-opinion survey methodology in more than 30 years." Within campaign circles, Hartman has received numerous accolades, including being named this year to the Influencers 50 list by Campaigns & Elections.

But while the 2016 campaigns may benefit from Hartman's methods, it will be without Hartman, who has returned to academia. Currently finishing post-doctorate work at Princeton, she will join UCLA as an associate professor in statistics and political science next year. She wants to go beyond observing and predicting how voters behave, she said. Now she wants to know why.

"Erin was an outstanding student who perhaps fell into social science," said Michael Alvarez, professor of political science at Caltech. "She accomplished important work in the political sphere and shows the same rigor and inventiveness as a social scientist."

Asked to predict the 2016 election, Hartman just smiled, "I look forward to finding out along with everyone else."

### News briefs from around the globe

A brief list of events from the past week, compiled by the editors

#### Lock of John Lennon's hair auctioned

\$35k paid for four-inch piece of hair cut off in 1966 [TIME]

#### Obama imposes new sanctions on North Korea

\$50M dedicated to humanitarian aid in the country, but assets of those involved with the nuclear program frozen [BBC]

#### Jeb Bush drops out of presidential race

18 percent was his highest polling, hadn't led "crowded field" in almost a year [CNN]

#### Harper Lee buried in Alabama hometown

89-year-old Pulitzer Prize winner died Friday in her sleep [BBC]

#### Uber driver goes on shooting spree in Kalamazoo, Michigan

6 killed, two injured by Jason Brian Dalton over seven hours [CNN]

#### Cyclone Winston hits Fiji

20 dead, hundreds without power or shelter after "most powerful storm on record in the Southern Hemisphere" hits Pacific island [CNN]

#### ISIS claims responsibility for more attacks

122 killed in multiple car bomb and suicide attacks [CNN]



Erin Hartman created new models for predicting voter habits.

Photo Courtesy of Matthew Mahon

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## Caltech Y Column

### CALTECH Y

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

Founded by students in 1916, the Y was organized to provide extracurricular activities planned and implemented by students as an opportunity to learn leadership skills and discover themselves. The mission of today's Y remains the same—to provide opportunities that will prepare students to become engaged, responsible citizens of the world. The Y seeks to broaden students' worldviews, raise social, ethical, and cultural awareness through teamwork, community engagement, activism, and leadership. More information about the Caltech Y and its programs can be found at <https://caltechy.org>. The office is located at 505 S. Wilson Avenue.

Ongoing and past programs hosted by the Caltech Y:

Alternative Spring Breaks: Costa Rica, New York, Yosemite, San Diego, San Francisco

Make-A-Difference Day: Hillside Home for Children, LA County Arboretum and Botanic Garden, Children's Hospital Los Angeles (Coachart), Eaton Canyon, Lifeline for Pets

Explore LA: Lakers game, Next to Normal musical, Norton Simon Museum trip

RISE Tutoring program (an afterschool math and science-focused tutoring program that serves public school students between grades 8 and 12)

#### Upcoming Events

#### 1. The Groundwater Crisis in California - Science Policy Series

Thursday, February 25th | 12 - 1:30pm | Location TBA | Lunch Provided, RSVP Required

A Conversation with Dr. John Hall Professor of Civil Engineering

RSVP at <http://www.goo.gl/forms/xqJ7oDQJ2c>.

The Caltech Y's Social Activism Speaker Series is pleased to host Dr. John F. Hall, Professor of Civil Engineering. Dr. Hall

received his B.S. from West Virginia University and his M.S. from the University of Illinois before completing his Ph.D. at the University of California. He first came to Caltech as a research fellow in 1980 and joined the faculty as an assistant professor in 1983. Dr. Hall served as Executive Officer for Civil Engineering and Applied Mechanics from 1998 to 2005, as Dean of Students from 2005 to 2010, as Acting Vice President for Student Affairs from 2006 to 2007 and is a former member of the Caltech Y Board of Directors. His research has focused on earthquake dynamics, earthquake reconnaissance, and structural engineering.

Dr. Hall took a recent sabbatical to learn more about the state, regional, and city water systems that store and distribute water to California's urban populations, not only from an engineering perspective, but also because of the environmental, legal, and political issues that may represent some threat to our water supply (see an interview here for more detail). Please join us for a lunch presentation and discussion on the effects of drought, future water sources, and associated issues confronting Southern California.

#### 2a. Pasadena LEARNS

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

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

#### 2b. Hathaway Sycamores

Wednesday | 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 2 hours of tutoring. Transportation is included. For more info and to RSVP email [SherwoodRichers@tapir.caltech.edu](mailto:SherwoodRichers@tapir.caltech.edu).



John Hall will give a talk on California's water crisis for the Y's Social Activism Speaker Series. Photo Courtesy of the Caltech Y

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—Chicago Tribune

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## The “quality” illusion

**KSHITIJ GROVER**  
Contributing Writer

Everyone’s heard the remark by now: Aim for quality in everything, not quantity.

At first sight, there’s no problem with this. In fact, I lied in the title. Quality, in and of itself, isn’t an illusion. The way we use the word and the concept in our everyday thinking is just massively flawed.

Let’s start with this: what do we look for quality in?

- College & Career choice (occupation)
- Clothing & Merchandise (materials)
- Friends & Relationships (people)
- Vacations & Time Spent (experiences)

So, in a word, everything.

OK, so far so good. How do we judge quality?

Fortunately, this is also pretty simple. Across the board, it’s either ratings, reviews, recommendations, or past experiences. Or, well, we blindly trust and take leaps of faith — especially when it comes to people.

Yet, there seems to be something lacking here, and this is key.

People perceive quality as a property something has. Here’s where we are mistaken — this is almost never the case. Quality is about goodness-of-fit. More often than not, we skip the context — the perspective. It takes two to define quality. Quality is defined by a relationship.

Ah, you object! In some cases things are just good, you say? I mean, everyone agrees that a red, juicy apple is of undeniably good quality.

Suppose someone asks you, “Is this rotten apple of good

quality?” You might want to make sure they’re not asking you about building sustainable compost first.

All right, all right. So that example was a little contrived. In reality, my point is far more relevant. Let’s revisit our friend, the bulleted list:

- There’s no such thing as a high-quality school or a good job. It turns out your college counselors were probably right to recommend that you find some place that fits your personality and interests. And yet, most people fall into this trap. Consider all the people that go to an Ivy League or a big-name company, thinking only about that objective sense in which it’s highly ranked.

- I can save you the trouble when it comes to clothing — you know already that no matter how close you are to that best friend of yours, they just have that outfit that you can’t imagine is the “great find” they think it is.

- “People of high quality”? Doesn’t this already sound absurd? But think about it — this is how most people view relationships and dating — just looking for the stereotypical nice and pretty girl or the funny and slightly dorky guy. Compatibility shouldn’t be the first thing that gets thrown out the window.

- High-quality experiences and vacations? Most people are sold on this instantly. Let’s just say spending time on Waikiki beach isn’t for everyone, no matter how many five-star reviews it gets on Yelp.

So there you have it. Next time someone tells you that you should aim for quality, ask them if they’d like a rotten apple instead.

### *So you take early morning walks every morning?*

Religiously, yes. And the typical person you encounter at six in the morning is walking with their dog, which I don’t have, and walking on the flat, which in the foothills means east-west, whereas I’m walking north-south uphill and downhill to get more exercise. So I’m perpendicular to these other people.

### *Would you want to get a dog to walk with you?*

No, no, no. I love dogs, but I don’t want to take care of one for the next ten years. Actually, our daughters at one point wanted to get a dog, but at that time we would go to Aspen, Colorado, over the summer, and the place we stayed there wouldn’t take dogs. Plus, I knew that if we got a dog, I would be the one to take care of it for the rest of its life, rather than they who wanted the dog. So that was the end of that; I said no. Grumpy dad. But I do like dogs.

### *Do you have a favorite dog breed?*

Not really. Really small dogs make me kind of nervous. Anything bigger.

### *So you mentioned your daughters, and I wanted to ask you about your daughter’s recent performance with the Pasadena Symphony. What did you think? How long has she been playing?*

My wife got them started in the Suzuki method at age three. And it just happened that one of the first American teachers who embraced the Suzuki method was living in Altadena, less than a mile from us. So that’s how we got started, and then eventually we moved out of the Suzuki books and onto very advanced teachers and eventually the girls went to Juilliard. And now they’re both concert violinists, both of them. And that wasn’t our plan, but we’re happy with the outcome. I was delighted with her concert, two of them actually, last Saturday night. It started out as a nice side activity, but then they took it seriously.

### *Do you play instruments?*

Well, when I was in high school, I studied piano, and I practiced about an hour a day. I was reasonably good at piano, but then I got to college, and I didn’t have time to continue on. And my wife, in college, sang in a Protestant church choir in Yokohama, Japan. So that’s the extent of our family musical background, as far as producing music.

### *How did you get into physics?*

Well, when I was in high school, I took physics and biology and chemistry. I liked biology. I was not so fond of chemistry and I thought high school physics was boring,

but I knew that physics was full of math, and I was very comfortable with math. So I thought maybe ... At that time biology had very little math indeed. It has more now. So that’s one reason I decided to try physics. But also there were a couple of other things. One is something my dad — who ran the family furniture store; he was not a scientist — said once. He used to take us to church quite often on Sundays and then if the weather was good, we would walk home. On one of those walks, I must have been about 12 years old or so, I remember he said that physicists had found a small number of equations that described almost everything in the world, at least in principle. And I thought that was pretty impressive. I still think it’s pretty impressive.

At about the same time, a world event occurred, namely the first nuclear bomb explosion. And the point is not that I wanted to make nuclear bombs, but I was impressed to read these guys had taken some dirt rocks and understood how to make this remarkable new thing out of it. And I felt wow ... it just impressed me that they had that kind of insight. So that’s some of the background.

### *So what was college like?*

After growing up in Madison, Wisconsin, I went to Harvard. And I liked it very much. To me, it was like a big jar full of cookies, different things to try. After some experience I found that I’d enjoyed subjects outside of physics and math, a certain amount of history, a certain amount of literature, and so on. But I wasn’t really compelled to go deeply into them, whereas I really wanted to get to the heart of physics. Admittedly, I had a setback as a freshman when I took my first physics course, calculus-based. I had no trouble with the calculus, but I got a 20 percent on quiz two and a 63 percent on the midterm. That was trouble, so I thought maybe I’m going to have to change my prospective major, but decided to first give it the old college try, so I did all the extra unassigned homework problems in the book. In those days, the books didn’t have so many problems as now. So I did that, kind of immersed myself for a couple of weeks and somehow that got me over the hump, so by the end of the course I was getting close to 100 percent. Subsequently I never had as much trouble in a physics course as in that very first mechanics course. I had learned how to put the math together with the physics, which is a basic skill we hope everyone learns at Caltech.

### *What other things do you like to do for fun?*

Well, I’ve always liked to walk; I mentioned early morning walks, which I do religiously. The pinnacle of my walking career ... about 20 years ago I went on a couple of Sierra Club treks in the Himalayas, each time a month, and that was like stepping back into another world because we were off-road, where

people still lived the way they did a thousand years ago. So that was fascinating; it was also exhausting, of course. The first time I lost 12 pounds, and I didn’t know I had that much weight to lose.

I love classical music, always have. I like to read, particularly history and world events. My wife is Japanese, so the television dramas we watch, at any given time maybe two of them for me, tend to be one samurai drama and one modern Japanese sitcom or detective story.

### *You’ve been teaching for a lot of your life, and you’ve won the Feynman Prize for teaching and also three ASCIT teaching awards. How do you teach?*

Well, you know, I’m a theoretical physicist, and you know at any level, especially with freshmen, I’ve learned to damp down my use of sophisticated mathematics to the simplest tools effective for the job at hand. Of course, I try to get to the heart of the matter and make things clear. I try to find interesting examples. In approaching what I’m going to do each week, I look at the homework and try to make sure I say something about the more challenging aspects before the students do the homework. I’m not a master of new techniques, like where you flip the classroom, and certainly not where you use all sorts of audiovisual aids, none of the above.

The Feynman award was very gratifying, I must say. I was mainly focused on research for many years when I first came here. And then David Goodstein, when he was making *The Mechanical Universe* films for freshman physics, brought me, Tom Apostol, and other people into that project. So that’s when I became involved in freshman physics. And the last 10 years, since I became emeritus, I’ve been doing exclusively freshman physics.

### *Why only freshman physics?*

I still understand that level of physics; I might be a bit dated on more advanced subjects. But also, the physics department has professors teach some sections of freshman physics, so they need people there. But until *The Mechanical Universe* project came along, about 30 years ago, I had absolutely no experience with freshmen or sophomores.

### *Who do you think would win in a fight, a trillion lions or the sun?*

The sun? ... A trillion lions? Well, the sun is pretty hard to beat. When I think of lions, I’m impressed by the life trajectory of the male lion, a symbol of power. For a while, if they’re competent, they dominate, but then they start to get older, pick up a little arthritis or some injuries, and soon they can’t control their own hunting group. Anyway, lions hunt cooperatively. The male is the blocker, he’s coming in from

*Continued on page 4*

# Humans of Caltech: Meet Steven Frautschi

The California Tech brings you stories of Caltech community members

**KATHERINE GUO**  
Page Editor

### *Let’s talk about your Converse. So you wear a pair until it completely wears out?*

When they get really old. Also, I alternate in color, usually between white and navy blue. So when my white, the street shoe I use in school, gets grubby looking, then it becomes my walking shoe for early morning walks in the Altadena foothills, until it totally wears out. And by that time, let’s say the next one is navy blue that I’ve been wearing to school, by the time the white one totally wears out, the

navy blue one is ready for duty in early morning walks. Now, this you didn’t recognize as Converse because last summer I had a swelling in my Achilles tendon, so they said I should get shoes with inserts and more arch support, and this is a nouveau Converse, the Converse II—it doesn’t even say Converse on it because they were selling the nouveau Converse out so fast. They were selling them so fast that they didn’t have the high tops, and I wanted one immediately so I bought this low-top, which is missing the All-Star logo, but it’s still a Converse, and it’s Converse II. So that’s why I have the low cut for the moment.

# Humans of Caltech: Meet Steven Frautschi

The California Tech brings you stories of Caltech community members

Continued from page 3

one side and the prey move away from him and their attention is somewhat diverted. The females do most of the actual work. The male by himself is not that great of a hunter. Eventually, he loses his social status to a younger rival, who's in much better shape. And then he's out of it. We may feel sorry for the animal at the zoo, who doesn't have a very interesting life, but the animal in the wild, as he gets older, is just doomed if you think about it. He's not going to die of old age in bed or anything like that. He gets kicked out by a younger rival. Old male elephants can go off and join the old males club, but old male lions don't do that; I think they're in trouble as soon as they get displaced. So you asked me about the problem of lions, and it has this sort of tragic aspect to it.

#### Do you have any advice for Caltech students?

Find something you like to do. No matter what you're doing, there's going to be times where it's drudgery or slogging, so you want to love what you're doing so you can get through those aspects. For example, I love to teach, but nobody likes filling out the gradebook.



Photo Courtesy of Katherine Guo

Get more sleep; it helps to enjoy things, even to work efficiently. That particular lesson I happened to learn very early, because in high school I had pneumonia twice; I would get a really long term cold every winter. That was before the array of modern antibiotics was available, so I learned to get to bed at a pretty definite time and relatively early, and manage my time so that was possible. I ended up with that habit which I've always maintained, but the opposite behavior, where you're sleep deprived much of the time, I just don't think is pleasant, or even the most efficient. As I look around at students, I know it's very hard to manage sleep with the workload here, also with the times where everybody else is doing their homework late at night.

Also, certainly have some side activity. It can be sports, it can be music, anything you like to do outside your studies.

#### Something weird about yourself?

I normally eat dinner with chopsticks.

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## Percin becomes Caltech's first female SCIAC champion swimmer

**GOCALTECH.COM**  
Actual Sports Content Editor

LA MIRADA, Calif. (Feb. 20, 2016) – Freshman Brittany Percin became the first female swimmer to claim a SCIAC title in Caltech women's swimming and diving history on Day Three of the SCIAC Championships.

Having entered the meet already holding six program records, the rookie has continued her onslaught of the archives with two new marks in the same swim on Thursday and another on Friday. She outdid herself Saturday, threatening the SCIAC Championship meet record with a 1:52.52 200 Free, good for her first career NCAA 'B' cut.

The Beavers continued to build momentum throughout the four-day meet with an incredible

preliminary session in the morning. Freshman Gemma Takahashi kicked things off as she shocked the entire conference with a two-and-a-half second drop in the 100 Fly, posting the top time of the session in a program record 57.51. Percin immediately followed with a second-place time in the 200 Free, just one second behind the leader and nearly two clear of third place. Junior Kate Evans also shaved

six seconds to clock a 2:25.70 and freshman Xiaohan Xue trimmed four in the 100 Breast.

Takahashi picked right up where she left off after a three-



Brittany Percin's starts every meet by glaring at it until it agrees she is its master. It has worked well for her so far.

-<http://gocaltech.com>

event break, lowering her own 100 Back program record by a second and a half to qualify for the finals in seventh with a 59.62. Senior Grace Lee sealed the Beavers' perfect streak of personal-best times with a two-second drop in the 100 Back (1:19.14).

Prior to finals, junior Zofii Kaczmarek bettered last year's 10th-place finish on the 3-meter board, qualifying for finals Sunday night in seventh place. Takahashi then opened the night session just three tenths of a second off her morning time, dropping back to fourth place to earn 17 points for Caltech. The rookie found herself in sixth place at the turn but held strong through the second 50 to come within .13 of reaching the podium.

Percin left nothing to chance in the 200, chopping off another second to record an astounding 1:52.52, just .19 off the meet record and half a second under the NCAA 'B' cut threshold. She took the first 50 out easy, sitting in fifth place before steadily building the middle 100. By the halfway point, she was in third and, heading into the final 50, she had taken the lead, which she continued to stretch right to the wall.

Takahashi came with a ninth-place finish in the 100 Back to add another 12 points to the Beavers' tally, which, along with Percin's 22 and the ensuing 400 Medley Relay's 24, brought Caltech's total to 172 – almost double last year's total after three days and just 33 points out of eighth place.

## Men's basketball wins program record seventh SCIAC game, forces four-team tie

**GOCALTECH.COM**  
Actual Sports Content Editor

PASADENA, Calif. (Feb. 17, 2016) – Caltech men's basketball won its program-record seventh SCIAC game to force a four-team tie for third place in the conference behind stellar performances by freshman Brent Cahill and junior Nasser Al-Rayes in a 65-61 victory over the University of La Verne on Wednesday night.

With both teams now 9-14 overall and 7-7 in conference play, they enter a four-team tie along with the University of Redlands and

Claremont-Mudd-Scripps Colleges for the third-sixth positions in the conference standings with two games remaining. The top four teams earn berths in the Postseason Tournament, on Friday and Saturday, Feb. 26 and 27.

Cahill poured in a career-high 24 points for the Beavers' third 20+ point game of the season while Al-Rayes posted a double-double with 12 points and 13 rebounds while adding three blocks. Facing a seven-point halftime deficit, Caltech stormed back to outscore La Verne by 11 in the second half as the Beavers shot 50 percent from

the field and pulled down 12 more rebounds.

"Nasser was huge for us in many ways tonight," Eslinger said. "Securing those boards was a major factor and he was really an all-out presence... Cahill really provided a boost as he was able to produce some points for us, which generated some momentum heading into halftime. He is a catalyst, coachable and just has a knack for making all sorts of plays."

Senior KC Emezue added nine points and two steals, while Junior Ricky Galliani pulled down nine rebounds and made two steals.

## Men's swim and dive breaks three more records at SCIACs

**GOCALTECH.COM**  
Actual Sports Content Editor

LA MIRADA, Calif. (Feb. 20, 2016) – Caltech men's swimming and diving set another three new records on Day Three of the SCIAC Championships and sit in eighth place with less than 100 points

Dai then stepped up and lopped off more than four seconds to shatter the 1989 record of 1:01.69, timing in at 1:00.52 to make it back for the consolation finals in 13th place. Sophomore Hanzhi Lin and senior Kevin Yu each lowered their career-best times by about a second to finish just out of the scoring in



Have you ever thought about how cool swimming is? You kind of flail your body in specific ways and move really quickly through the water.

-<http://gocaltech.com>

19th and 20th. Senior Matthew Cedeno kept the momentum going with another one-second drop to a 1:10.22. Freshman Dylan Lu continued the trend with a 54.07 100 Back – a second faster than his best time back in November – to qualify in 13th place and cap the morning.

Steiner

separating the Beavers from fifth.

Freshman Henry Steiner claimed another record in the 100 Fly, with freshman Adam Dai notching his first in the 100 Breast and the 400 Medley Relay setting a new mark by almost two seconds at finals.

Steiner's 51.06 came in the morning session and qualified him for the finals heat in sixth place. Freshman Jonathan Willett clocked an impressive 54.90 as well. Classmate David Berger Maneiro continued an exceptionally strong meet in the 200 Free with another one-second drop from his Thursday night performance, touching in 1:48.59. Freshman Alexander Reeves shaved a whopping 12 seconds while freshman Aadyot Bhatnagar trimmed three and freshman David Gunby just snuck under his previous season best.

started the night session with an eighth-place finish to earn 13 points for the Beavers and was followed by Dai placing 14th, Lu 13th and sophomore Alexander Bourzutschky coming in ninth on the 1-meter diving board.

In the final event of the night, the 'B' 400 Medley Relay team of Lin, Yu, Berger Maneiro and senior Patric Eck posted a 15th-place finish as Lin split a 55.25 on the backstroke and Berger Maneiro clocked a 53.93 butterfly leg to beat last year's 'B' relay by almost 17 seconds. Lu then hopped into the pool for the backstroke leg of the 'A' relay and lowered his personal best to a 53.79, followed by a 50.85 butterfly split from Steiner and 46.99 100 Free by Willett to come in almost two seconds under last year's program record.

## Wang comes up clutch in women's tennis win over Oxy

**GOCALTECH.COM**  
Actual Sports Content Editor

PASADENA, Calif. (Feb. 20, 2016) – Freshman Julia Reisler and Cecelia Andrews won both their doubles and singles matches to put sophomore Erin Wang in position to clinch the match at #5 singles for Caltech women's



I don't think you're supposed to do that with your foot when you run, Erin.

-<http://gocaltech.com>

tennis over Occidental College on Saturday morning.

The victory levels Caltech's record in SCIAC play at 1-1 and marks the fifth straight year the Beavers have topped the Tigers in the regular season.

Both Oxy and Caltech took early leads in doubles at #2 and #3, respectively. The Tigers picked up a break at #1 as Reisler and Andrews finished their match at #3, 8-3. The Beavers' #2 pairing got a late break but fell, 8-4, while Wang and junior Sophia Chen still trailed by a break at #1, 6-7. Down 0-30, the Caltech duo fought back to break Oxy's serve, but the Tigers

responded in kind and held serve on the final game to win, 9-7, giving the visitors the crucial 2-1 lead heading to singles.

Oxy took quick first sets at courts #1, #2 and #5, but Caltech managed the same at #3, #4 and #6. Needing to turn one of those around to stay in the mix, the Beavers found their rallying point in Wang, who failed to win a single game in the first set but stormed back in the second to win 6-2 and force a third.

Meanwhile, all five other courts' results held, making the match score 4-4 with just #5 singles remaining. Wang built on her momentum from the second set to jump out to a 3-0 lead and soon made it 5-0 before fending off a tough final challenge to earn the deciding victory, 6-1.

Freshman Kana Moriyama did not drop a game at #4 singles while Reisler shined in a 6-1, 6-0 win. Andrews took her game up a level after doubles in an impressive 6-0, 6-2 victory at #6.

# ASCIT Minutes

Meetings are every Wednesday at 4 pm in SAC 13

## ASCIT Board of Directors Meeting

Minutes for 17 February 2016. Taken by Phillip.

**Officers Present:** Nima, Sean McKenna, Phillip An, Jay Palekar, Cat Jamshidi, Annie Chen, Kalyn Chang

**Call to Order:** 4:02 pm

**Guests:** Gloria, Yuh-Shyang

Yuh-Shyang Wang – Caltech Badminton Club

- Organizing a tourney -- \$150 for the tournament
- 4<sup>th</sup> time organizing the tournament
- Around 100 participants, with around 10-15 undergraduate students
- Money goes mainly towards shuttlecocks

Gloria Ha – Caltech A Capella groups

- Love Sucks Concert food
- Usually around 130 undergraduates attend each concert
- Four on campus groups, with 5 additional off campus ones
- \$580 funding requested – estimate around \$5 per person

## President's Report (Nima):

- Midnight donuts is tonight
- Will send out survey regarding electronic yearbooks

## Officer's Reports:

### V.P. of Academic Affairs (ARC Chair: Jay):

- Whichever house has the highest participation for midterm surveys gets a Manion dinner
- CS2 Office Hours will be moved to Monday Night – email will be sent out

### V.P. of Non-Academic Affairs (IHC Chair: Cat):

- There will be wine and beer available at Formal Dinners for people who are 21+.
- Joe Shepherd wants to start conversations about alcohol with new House ExComms
- The IHC will meet with the Parking Office to discuss possible solutions to recent loss of visitor parking spots. We're hoping to relocate some named spaces, and increase the availability of short-term parking near the Houses.
- We've received a proposal for changing the Board Program, and the IHC is gathering feedback and sending out a survey.

## Director of Operations (Sean):

- Ricketts used ASCIT lights for Apache
- Created BOD Book for documentation to ease transition process

## Treasurer (Kalyn):

- Will pay for previous yearbook debts

## Social Director (Annie):

- Be a kid Again on March 13<sup>th</sup>
- ASCIT Formal on April 1<sup>st</sup>

## Secretary (Phillip):

- Will update Bylaws
- Midnight Donuts – 9:30 at Tom's

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: 4:48 pm

## VICE PROVOST'S OFFICE HOURS

Vice Provost, Chief Diversity Officer and Professor of English, Cindy Weinstein, offers weekly office hours. These hours are an opportunity for undergraduate, graduate students and postdocs to meet and discuss what they'd like pertaining to the Council on Undergraduate Education, Caltech accreditation, the Staff and Faculty Consultation Center, Student-Faculty Programs, the Center for Teaching, Learning and Outreach, the Caltech Diversity Center and the libraries.

There are four appointments per hour, 15 min. each. Sign up the morning of the office hour in 104 Parsons Gates, Vice Provosts' Offices (x6339).

*Winter term hours: 12-1 p.m.*

*Thursday, Feb. 25      Wednesday, Feb 17*

*Wednesday, Mar. 2      Tuesday, Mar. 8*

## Title IX Office Hours

The Title IX Office is available for all students and employees to discuss and/or report concerns about sex or gender based discrimination. Felicia Hunt will be available on a first come, first served basis at weekly office hours.

**Fridays 1:00-3:00 p.m. — 205 CSS (second floor)**

## SHARE Office Hours

(Sexual Health & Assault Response & Education)

The SHARE office is a confidential resource for addressing students who want to talk about sexual harassment and/or violence. SHARE promotes healthy sexuality and relationships. Jenny Mahlum will be available on a first come, first served basis at weekly office hours.

**Mondays 2:00-3:30 p.m. and Wednesdays 3:00-4:30 p.m.**

**248 CSS (second floor)**

## Caltech

## Public Events

## Hiring Ushers

**Flexible hours.**

**No experience needed.**

**Outgoing Personality.**

**Pay Rate:**

**\$15 per hour**

**Caltech Students only!!**

**Contact: Adam Jacobo**

**626.395.5907**

**ajacobo@caltech.edu**

## The California Tech

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## REMINDER FROM COUNSELING CENTER:

## Meditation Mob

(drop-in mindfulness meditation group)

Meets every Tuesday, 12:00-12:50 p.m.

Bottom floor of Winnett

## The Veritas Forum brings Cullen Buie to share life experience

**NEERA SHAH**  
Editor-in-Chief

On Feb. 17, MIT professor Cullen Buie came to Caltech to share his story, "The Accidental Academic:

A Professor's Journey through Science, God, and making a name for himself." This Veritas Forum event was held by the Graduate Christian Fellowship, Caltech Christian Fellowship and Bridges at Caltech.

Buie gave a brief life history to trace his journey both through education and faith. Through these stories, he also shared his experience of "coming to peace." His religious life was connected to his academic growth while he attended Ohio State University and studied engineering.

The way Buie ended up at Ohio State is itself an interesting story. He had originally visited the university to pick up his brother from a football camp, but while he was there, he also visited the admissions office to see what the school was about. He ended up

talking with one of the deans of admission, who introduced him and offered him admission to the university's engineering program on the spot. Two days later, Buie packed his bags and moved in to



Professor Cullen Buie from MIT answers questions from audience members his talk for The Veritas Forum.

Photo Courtesy of The Veritas Forum

the dorms.

Buie's roommate at Ohio State was a devout Christian and his roommate's father was a pastor. Eventually, Buie became a Christian through his roommate's church. In this way, his religious and educational training were closely tied together.

After graduating, Buie pursued a master's degree at Stanford University, where he eventually ended up getting a Ph.D. After

completing his graduate education, Buie went to MIT and is currently still researching there. He is also working towards tenure, which he will be up for next year.

The stress of getting tenure is something that most academics go through, and something that greatly affected Buie as he struggled to maintain funding for his lab. This struggle was the impetus for his search for peace. He shared that eventually, he was able to decrease his stress by separating his identity and sense of worth from his material success in academia. This was his key to reaching peace and not being overstressed about getting tenure.

Following Buie's talk, the audience was invited to ask questions.

*Q & A Session (paraphrased):*

**What is your research at MIT?**

I study interactions between liquid droplets hitting soil, which releases aerosols; this is the mechanism of the phenomenon of petrichor, or the essence of rock. As far as genetic engineering, I also work with getting DNA into

microbes that haven't commonly been used in research before.

**You fill an interesting niche as an academic, Christian, person of color. What has that experience been like?**

The scientific realm has been more difficult, both as a person of color and as a Christian, because I stick out — it's a double-edged sword.

**Has your experience in church been challenging?**

It's hard to say without sounding overly critical or generalizing, but finding a church experience that satisfies all of me has been one of the challenges. For example, I tend to like some of the musical aspects of African American churches, but I also like the intellectual elements and thoughtful, scripturally based sermons of other churches. But, we all should feel somewhat dissatisfied — if not, there's not enough diversity there to challenge you.

**How do you see the collision between spirituality and scientific education that may often shoo or ridicule faith?**

Actually, there are a lot of Christian faculty at MIT. The challenge is that anti-faith people might just be a little louder. It's also a little different in each field, though.

**What are your opinions on navigating negative publicity about either science or Christianity?**

My advice is that it should feel like a struggle; there often is tension. The viewpoints of the world and of the Bible are often at odds, but don't let other opinions control you.

**Have you encountered ethical problems in your research?**

They haven't really ever come up, but there are still some tough questions I deal with. For example, do I do what will make me more money or what is more important for society?

**Have colleagues noticed your struggles?**

Actually, others have expected me to be *more* stressed about going up for tenure than I seem. But my being at peace has helped me not be as stressed.

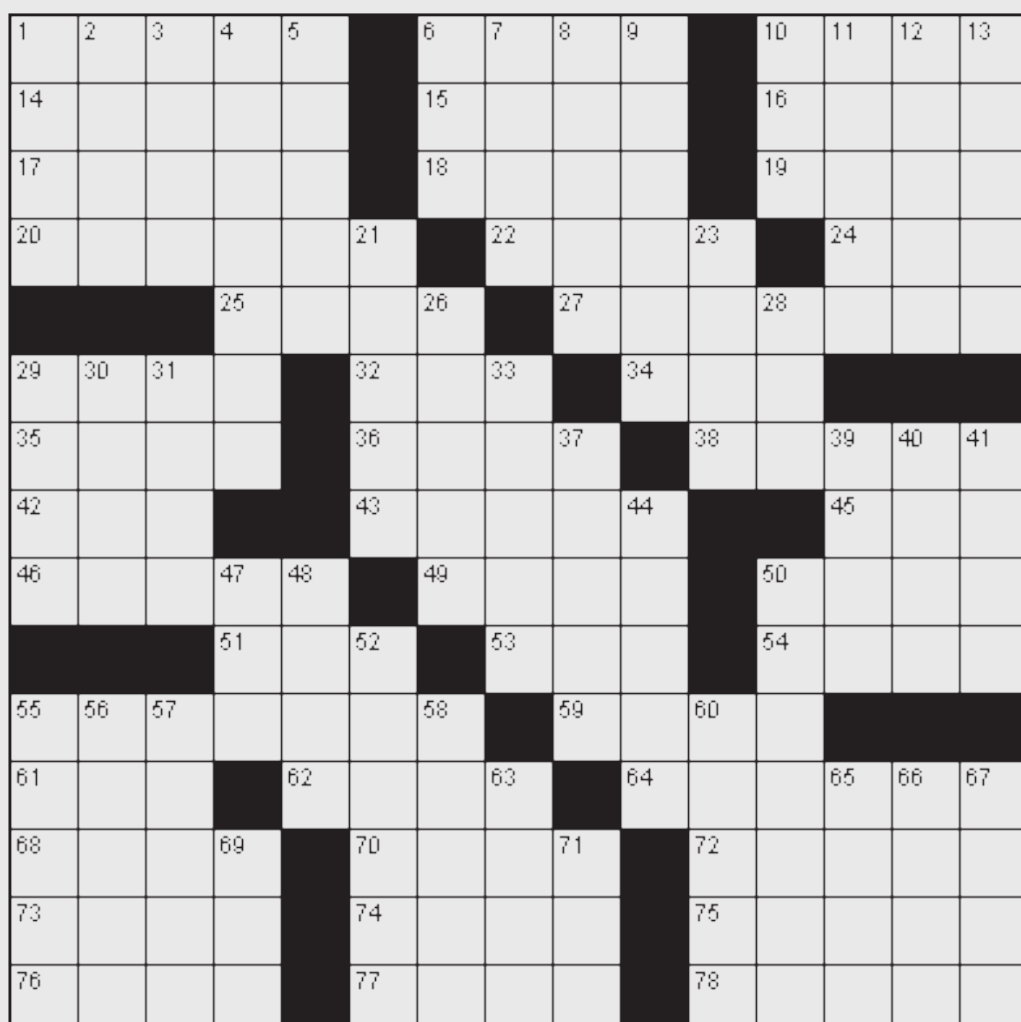
**What inspired the woman at Ohio State to accept you merely on a whim?**

I don't know. But it's one of the things that have made me believe in God. I think God is working on everyone, Christian or not.

**Do you have conflicts with other religions? If so, how do you reconcile them — especially knowing that geography can often greatly affect one's religious beliefs?**

Well, I think there is a truth, so I don't believe all other religions' claims can be true at once. But that's a hard question to answer, because I agree that geography can have an affect.

## Crossword



### Across

1. Angle
6. Plaza
10. Military signal
14. Large commercial ship
15. Chills and fever
16. Adjoin
17. Give expression to
18. Writing implements
19. Tree trunk
20. Relating to the teeth
22. A quick run
24. Employ
25. Parts of the Roman calendar
27. Adult male chicken
29. Complete duration of something
32. Perform
34. A short sleep
35. Yearn
36. Appear
38. Woody plant tissue
42. Baseball term
43. Boredom
45. Beer
46. Correspond
49. Ripped
50. Make a wide sweeping search of
51. Mischievous fairy
53. Tatter

### Down

1. Sleigh
2. Green acidic fruit
3. At another time
4. Gauze
5. Stride
6. Chart
7. Matured
8. Relating to the moon
9. Unit of instruction
10. Restaurant bill
11. Approximately
12. Throb
13. Direct the course
21. Let for money
23. Something intended to deceive
26. Fragrance
28. Secret agent

29. Decelerate
30. Rain heavily
31. Not in favor of
33. Singing voice
37. Wall painting
39. Decorative fabric
40. Flair
41. Repair
44. Block of metal
47. Metallic element
48. Give out
50. Relating to stars
52. Ship's officer
55. Computer failure
56. Quantitative relation
57. Circular coral island surrounding a lagoon
58. Large imposing house
60. One of the senses
63. Insect stage between larva and adult
65. Strong positive emotion
66. Level or straight
67. Rive
69. Travel a route regularly
71. Swindle

## Finding Happiness

Ian Preet



Answers to current crossword (p. 7)

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

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