Caltech Y Hosts World Fest 2017
**UPCOMING EVENTS**

**Caltech Y India Cultural Trip - Applications Available Now**

**December 9 - 19, 2017 | Cost: $950 | Applications Due Thursday, May 18th**

The Caltech Y, in partnership with the SURF Program and IIT Gandhinagar (IITG, India, India, India, India), will offer an exciting trip to Ahmedabad, India. Join us for an exciting trip as we explore India as an emerging nation and its potential role as a global leader in the context of its history and culture. The Caltech group will be hosted by IITGN and discussions and trips will be led by ITIIT faculty.

The trip is open to undergraduate students only - sorry no graduate students. Applications can be found at http://caltechy.org/programs/services/around/India/index.php and are due by Thursday, May 18th. Questions may be directed to caltechy@caltech.edu. Space is limited.

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**Kids Reading to Succeed**

Saturday | May 6th | 8:30 - 11:00 AM | 500 E. Villa Street & Jackson Elementary

Kids Reading to Succeed (KRS) works with the youth of Pasadena to encourage a love of reading and to improve literacy skills. The first hour (8:00 to 9:00) focuses on individualized and targeted reading, in which a volunteer is paired with a student who is encouraged to read aloud from a book chosen from the KRS library. Volunteers consistently ask questions of the student to gauge reading comprehension. The second hour of our program (10:00 to 11:00) is the interactive and fun presentation based on the monthly theme.

For more info and to RSVP go to http://www.kidsreadingsucceed.org/p/get-involved.html. Eligible for Federal Work Study. Contact Kayva Sreedhar at krsreedha@caltech.edu for questions.

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**Caltech Y Photo Contest**

Deadline May 10th

The Caltech Y Photo Contest is on again! If you have participated in a Caltech Y program and are a current student, submit your photos for a chance to win. We’re giving away a $100 prize to the winner of each of the five photo contest categories. The 5 categories come from the Caltech Y pillars of: Perspective, Adventure, Service, Civic Engagement, Leadership.

Photos should demonstrate the pillar in action. Photos of people are preferred, but exceptional scenic pictures will also be accepted. But beyond the deadline, we select the finalists, upload them to our Facebook page, and our fans vote for their favorites to determine the winners. Winners will be announced on June 1st.

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**Caltech Y Social Activism Speaker Series Presents:**

**Bringing the Divide: Effective Political Communication in a Polarized World. A talk by Prof. Robb Willer, Professor of Sociology at Stanford**

Friday | May 12th | 12:00 - 1:30 PM | Location: Lunch is provided, spaces are limited

RSVP Required: https://goo.gl/forms/etSNqgw8Lk4AeUmEY2

There will be a break for people with 1 pm classes to leave

There will also be a smaller group session from 3-4pm which will give some people more of a chance to interact directly with Prof. Willer should they ask him in-depth questions. Please indicate on the RSVP if you’d like to attend this. Spaces are limited and priority will be given to students.

The Caltech Y Social Activism Speaker Series is hosting the second event in its Bridging the Divide series with Robb Willer, professor of sociology at Stanford.

Attitude polarization and intergroup antagonism threaten democratic processes in a number of ways. Though political animosity in the U.S. has reached record levels, research on the social psychology of American politics suggests techniques for effective political communication and action. In particular, moral arguments - carefully crafted fits to the values of a given audience - offer one path to political persuasion and coalition formation. Prof. Willer will present his work on these topics and take your questions.

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**Caltech Y Explore LA Series**

**Horseback Riding in Griffith Park**

Saturday | May 20th | 9:45 - 11:15 AM | Cost: $25 | Transportation provided

Spaces are limited. Those who wish to receive a spot will be expected to visit the Caltech Y to sign up and make payment ($25) by the end of business hours, Thursday, May 18th (as space allows).

The Caltech Y Explore LA Series Museum of Ice Cream Saturday | June 3rd | 6:30 - 7:30 PM | Cost: $25 | Transportation provided

The Museum of Ice Cream has come to LA! Come see a dessert wonderland with interactive exhibits, like a pool of sprinkles, a giant banana split made from 10,000 bananas, and a melted popsicle jungle. With admission you also get two scoops of curated ice creams from local cremeries, and also some mochi ice cream samples! Tickets are limited, email kguo@caltech.edu if interested. Please also indicate if you are willing to drive.

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**Hathaway Sycamores**

**Every Wednesday | 6:00 - 8:00 PM | 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 an hour or travel time and 1.5-2 hours of tutoring. Transportation is included.

For more info and to RSVP email Sherwood Richers at srichers@tapir.caltech.edu. Eligible for Federal Work Study.

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**Pasadena LEARNS**

**Every Friday | 3:00 - 5:00 PM | Pasadena**

Come volunteer at Madison and Jackson Elementary School! We are partnered with 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 azhai@caltech.edu. Eligible for Federal Work Study.

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**Mentoring For Life**

**Every Monday | 3:30pm | Wilson Middle School Pasadena**

Stress out by college life? Step outside the Caltech bubble and mentor tweens who’ve never even thought about college. Things you could do: Build a baking soda and vinegar volcano, read a book aloud, play sports or board games, teach the alphabet of another language, do a craft. Having a mentor makes an at-risk student 55% more likely to hold a leadership position. Interested? If you have 180 seconds, you can watch this video. They anticipate that this will be their biggest year yet! Judging occurs from 6:30 to 12:00 pm (at the latest). You can volunteer for part or all of that time. If you are interested please sign up at gopusd.com/innovationsexpo

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**PUSD Innovation Exposition seeking judges**

Your help is needed for the Pasadena United School District’s Innovation Exposition help on Friday, May 12th. This is not your typical science fair! The exposition has 6 categories that students can compete in. They are: Scientific Inquiry, Reverse Engineering, Environmental Innovation, Invention, Science Fiction and 3D Printing Challenge. They are in desperate need of judges for 5 of the 6 categories. This is where your expertise is required. The most valuable part of this competition is having the students interact with and answer questions from STEM experts about their projects. You can learn more about the event and see student excitement for stem by viewing this video. They anticipate that this will be our biggest year yet! Judging occurs from 8:30 am to 12:00 pm (at the latest). You can volunteer for part or all of that time. If you are interested please sign up at gopusd.com/innovationsexpo

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**Public Lecture • Free Admission • Free Parking**

Caltech’s Beckman Auditorium

**www.events.caltech.edu • 626.395.4652**

**Wednesday, May 10, 2017 • 8 PM**

**WHAT COLUMBUS DISCOVERED**

Nicolas Wey-Gomez, Professor of History

Caltech Division of Humanities and Social Sciences

The voyages of Christopher Columbus have inspired heated debate over the true nature of his Indies enterprise. Wey-Gomez will explore some of the facts and fiction surrounding Columbus’s geographical surveys.

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**THE CALIFORNIA TECH**

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Learn tools for coping with procrastination and work avoidance.

Learn practical, behavioral strategies for responding differently to old habits.

Respond differently to unhelpful thoughts like “I can just get up early and do this tomorrow.”

Optional text-based reminder system to keep the lessons fresh in the week after the workshop is over.

A 1-hour workshop offered 2 times this term:

Section 1: Friday, April 28th, 12:00 - 1:00

Section 2: Wednesday, May 17th, 4:00 - 5:00

Location: 229 Sherman Fairchild Library

More information: counseling.caltech.edu
Earthquakes Can Make Thrust Faults Open Violently and Snap Shut

Robert Perkins
Caltech Media Relations

A team of engineers and seismologists at Caltech has discovered the mechanism by which thrust faults, which occur when two slabs of rock compress against one another, twist away from another, opening up a fault that can cause one side of a fault to twist away from the other, opening up a gap of up to a few meters that then snap shut.

Thrust faults have been the site of some of the world’s largest quakes, such as the 2011 Tohoku earthquake just off the coast of Japan, which damaged the Fukushima nuclear power plant. They occur in weak areas of the earth’s crust where one slab of rock compresses against another, sliding up and over it during an earthquake.

In 2011, Konstantinos P. Giapis, a joint PhD student at Caltech and Ecole normale supérieure (ENS) in Paris, discovered that fast ruptures of thrust faults, meaning that this phenomenon could be used in computer simulations—with modified models that were tested to remove the artificial rules against the fault opening—confirmed what the team observed experimentally: one slab can twist violently away from the other. This can happen both on land and on underwater thrust faults, meaning that this mechanism has the potential to change our understanding of how tsunamis are generated.

The paper is titled “Experimental Earthquakes Can Make Thrust Faults Open Violently and Snap Shut” and was published online in the journal Nature on May 1. The team was surprised to see that, as the rupture hit the surface, the fault twisted open and then snapped shut. Subsequent computer simulations—with modified models that were tested to remove the artificial rules against the fault opening—confirmed what the team observed experimentally: one slab can twist violently away from the other.

This can happen both on land and on underwater thrust faults, meaning that this mechanism has the potential to change our understanding of how tsunamis are generated.

Caltech has developed new ways to fabricate microstructures in computers that has figured out how to explain a nagging mystery in explaining how comets expel oxygen gas, the same gas we humans breathe.

The discovery that comets produce oxygen gas, also referred to as molecular oxygen or O₂—was announced in 2015 by researchers studying the comet 67P/Churyumov–Gerasimenko, where the European Space Agency’s Rosetta spacecraft. The mission unexpectedly found abundant levels of molecular oxygen in the comet’s atmosphere. Molecular oxygen in space is highly unstable, as oxygen prefers to pair up with hydrogen to make water, or carbon to make carbon dioxide. Indeed, O₂ oxygen is a gas, the same gas we humans breathe.

However, recent research implies that the molecular oxygen found by Rosetta need not be primordial after all but may be produced in real time on the comet.

We have shown experimentally that it is possible to form molecular oxygen dynamically on the surface of materials similar to those found on the comet,” says Yao.

“Oxygen is an important molecule, which is very elusive in the interstellar space,” says astronomer Paul Goldsmith of JPL, which is managed by Caltech for NASA. Goldsmith is the NASA project scientist for the European Space Agency’s Herschel mission, which made the first confirmed detection of molecular oxygen in space in 2011. “This production mechanism studied in Professor Giapis’s laboratory could be operating in a range of environments and shows the important connection between laboratory studies and astrochemistry.”

The Nature Communications paper, titled “Dynamic molecular oxygen production in cometary ice,” was funded by the National Science Foundation/Department of Energy Partnership for Basic Science Foundation and Science Engineering.

Robert Perkins
Caltech Media Relations

Konstantinos Giapis has shown how molecular oxygen may be produced on the surface of comets using lab experiments. His co-author, postdoctoral scholar Yunxi Yao, studied high-speed water molecules (left) and high-speed electrons, observing the production of a plume that included molecular oxygen. Oxygen atoms are red, and hydrogen, blue. Giapis says similar conditions exist on the comet 67P/Churyumov–Gerasimenko, where the European Space Agency’s Rosetta mission detected molecular oxygen.

This article is adapted from a story that was originally published online at caltech.edu. It is a common trope in disaster movies: an earthquake strikes, causing the ground to rip open and swallow cars, homes and even whole cities. The gaping earth might make for cinematic drama, but earthquake scientists have long held that it does not happen that way.

Except, it can, according to new experimental research from Caltech.

The work, appearing in the journal Nature Communications, shows how the earth can split open—and then quickly close back up—during earthquakes along thrust faults.

Thrust faults have been the site of some of the world’s largest quakes, such as the 2011 Tohoku earthquake just off the coast of Japan, which damaged the Fukushima nuclear power plant. They occur in weak areas of the earth’s crust where one slab of rock compresses against another, sliding up and over it during an earthquake.

In the Nature paper, the team hypothesizes that the Tohoku earthquake found that not only did the fault slip at shallow depths, it did so by up to 50 meters in some places. That huge motion, which occurred just offshore, triggered a tsunami that caused damage to facilities along the coast of Japan, including at the Fukushima Daiichi Nuclear Power Plant.

In the Nature paper, the team hypothesizes that the Tohoku earthquake rupture propagated up the fault and—because it near the surface—caused one slab of rock to twist away from another, opening a gap and momentarily removing any friction between the two walls. This allowed the fault to slip 50 meters.

That opening of the fault was supposed to be impossible.

“Often very difficult to perform experiments to test our ideas in this way,” is how researchers search for signs of life on exoplanets in the future. This may influence how researchers search for signs of life on exoplanets. "Oxygen is an important molecule, which is very elusive in the interstellar space," says astronomer Paul Goldsmith of JPL, which is managed by Caltech for NASA. Goldsmith is the NASA project scientist for the European Space Agency’s Herschel mission, which made the first confirmed detection of molecular oxygen in space in 2011. “This production mechanism studied in Professor Giapis’s laboratory could be operating in a range of environments and shows the important connection between laboratory studies and astrochemistry.”

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**Women’s tennis hosting SCIAC Championships**

PASADENA (May 3, 2017) – The No. 39 Caltech women’s tennis team has become the first in department history to earn the right to host a first-round match in the SCIAC Championships. The #4 seed Beavers will host #5 California Lutheran University this Friday, May 5 at 3 p.m.

The Beavers have compiled what would be the first winning record over SCIAC play in program history at 4-3, while the Regals enter the tournament at 3-4 by virtue of Caltech’s 7-2 win on Mar. 3. The victory marked the first over a nationally ranked opponent in program history, one which Caltech followed up with a second just eight days later, edging Hardin-Simmons University, 6-3.

Caltech has been strongest at #2-5 and #1-2 doubles, with every single player posting a .500 or better record in SCIAC singles competition. Sophomore Kana Moriyama has locked down the top spot in the lineup, where she went 4-3, and junior Erin Wang matched playing primarily #4 and #5 singles, respectively. Sophomore Julia Reisler went 4-2 across #2 and #3 singles, while rookie Alexandra Bodrova posted a 3-2 mark at #4. Senior Sophia Chen and juniors Sarah Cai and Vinci Chen combined to go 7-3 mainly at courts #5 and #6 in a lineup that proved formidable at all six spots.

A recent shakeup in doubles has seen the Beavers go 7-2 over their past three SCIAC matchups, leaving no easy points for opponents at any court.

CLU, which has only limited statistics publicly available, boasts a singles lineup no easy points for opponents at any court.

**Krasnoperov All-SCIAC as rookie at Championships**

PASADENA (May 5, 2017) – Freshman Alexandra Bodrova earned the clinching point for No. 39 Caltech women’s tennis in the opening round of the SCIAC Championships.

Bodrova and senior Sophia Chen each won both their singles and doubles matches, with the duo pairing up in doubles for the fourth time this spring. Their 8-6 victory at #3 was followed closely by an 8-2 win at #1 by sophomore Julia Reisler and freshman Angelica Zhou.

CLU won the final four games of the remaining doubles match to avoid the sweep, but considering that the Beavers had won just one doubles match before sweeping singles in their 7-2 victory over the Regals earlier this year, momentum was squarely on Caltech’s side.

Due to impending inclement weather, the SCIAC officially announced a series of changes to the tournament this weekend. All matches will be played to decision, which left Caltech with the 5-1 victory.

**Krasnoperov All-SCIAC as rookie at Championships**

CLAREMONT, Calif. (Apr. 29, 2017) – Freshman Tim Krasnoperov made the podium with a third-place finish in the discus and the Caltech women’s track & field team earned its first point at the SCIAC Championships since 2014 at Pomona-Pitzer Colleges this weekend.

The rookie opened the event with the second-furthest throw in the field and added nearly another meter on his penultimate attempt, but was passed by a classmate from Claremont-Mudd-Scripps Colleges who launched a throw more than two meters further than his opening mark. With one final attempt remaining and the podium already seven up, Krasnoperov gave the final throw everything he had, but it went just wide right for a sector foul. Still an All-Conference honoree, he went on to place 11th in the hammer throw, moving up a spot to fifth overall this season when Cupo went 8-6 overall with the duo pairing up in doubles for the fourth time this spring. Their 8-6 victory at #3 was followed closely by an 8-2 win at #1 by sophomore Julia Reisler and freshman Angelica Zhou.CLU won the final four games of the remaining doubles match to avoid the sweep, but considering that the Beavers had won just one doubles match before sweeping singles in their 7-2 victory over the Regals earlier this year, momentum was squarely on Caltech’s side.

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Join the Meditation Mob!

Tuesdays, 12:00 - 12:50

Want to learn more about mindfulness meditation? It’s a great way to improve your attention and to become more grounded in the present moment.

There’s no religious component. We use secular, evidence-based meditation techniques.

We meet in the small room just off the lounge in Winnett. All students are welcome, from total beginners to more experienced meditators.

Mailing list and MP3 archive: counseling.caltech.edu/students/meditation

You chose one of the most trusted institutions in SCIENCE. Now choose one of the most trusted institutions in FINANCE.

When you want unsurpassed stability, integrity and value for your money, Caltech Employees Federal Credit Union offers an honest alternative. There are no gimmicks. No annual fees. No harsh penalties.

Just some of the lowest lending rates and highest savings rates in the nation… and a state-of-the-art eBranch for easy, convenient online and/or mobile access to your account. We’re the overwhelming choice for financial services among the entire Caltech family. If you haven’t yet joined, call or visit us online or in person today. You belong here.
ASCIT Minutes
Meetings are every week in SAC 13

ASCIT Board of Directors Meeting
Minutes for 28 April 2017. Taken by Alice Zhai.

Officers Present:
Andrew Montequin, Tim Liu, Sakthi Vetrivel, Kalyn Chang, Alice Zhai

Guests:
Sara Adams, Sarah Crucilla, Vincent Park

Call to Order: 12:18pm

President’s Report (Andrew):
- Meeting with Rachael and Joe Shepherd about Bechtel town hall meeting Monday, May 1

Officer’s Reports:

V.P. of Academic Affairs (ARC Chair: Tim):
- ASCIT teaching award nominations will be up until next week
- Writing a survey about academic advising and how students use it to see whether people find it helpful
- Met with math department about rearranging the curriculum
- Course capture is happening - people will start recording lectures
- Appointing student reps on student faculty board committees

V.P. of Non-Academic Affairs (IHC Chair: Rachael):
- Absent

Director of Operations (Sakthi):
- Got proofs for ’15-’16 yearbooks - actual copies will be distributed soon
- Looking into getting an ASCIT laptop

Treasurer (Kalyn):
- Multihouse funding pairs for this term are Fleming/Lloyd, Page/Avery, Blacker/Ruddock - none of the funds have been used yet
- Filing ASCIT’s tax return
- Vincent Park pitched for funding for Chester wine tasting

Social Director (Robin):
- ASCIT Movie Night is on Friday, May 3

Secretary (Alice):
- 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.

Meeting Adjourned: 12:49pm

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Crossword

Across
1. Freshwater fish
5. Cramp
10. Uncommon
14. From a great distance
15. Spotted horse or pony
16. Comply with
17. Travel by horse
18. Part of a church
19. Finishing line of a foot race
20. Hobo
22. Fabric used to dress wounds
23. Purposes
24. Soap opera
26. Weedy annual grass
28. Fleet
31. Man or boy
32. Affectation
33. Injury or wound seriously
37. Massive tropical tree
41. Female sheep
42. Related
44. Wonderment
45. Part of a flower
47. Small pond
48. Friendly nation
49. Fuel
51. Direct the course
53. Arachnid
55. Arid land
56. Mental or physical pain
58. Flat metal tumblers in a lock
65. Song for solo voice
66. Attempted
68. Proboscis
69. Space for inserting a coin
70. Relating to the moon
71. Similar
72. Heaped wood used in a funeral rite
73. Fee
74. Give temporarily
75. Injure or wound seriously
76. Be in debt
77. Unit of play in tennis
78. Marketplace
79. Buddy
80. Massive tropical tree
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Down
1. Wheeled vehicles
2. Blazing
3. Detection instrument
4. Assumption
5. Health resort
6. Tablet
7. Not in favor
8. Support or foundation
9. Deadly
10. Large circular room
11. Humiliate
12. Repulse
13. Optics
21. Animal foot
25. Acidic fruit
27. Garden tool
29. Cultivate by growing
30. Multiplied by
32. Liveliness and energy
33. Be in debt
34. Unit of play in tennis
35. Marketplace
36. Appointing student reps on student faculty board committees
37. Injure or wound seriously
38. Be in debt
39. Unit of play in tennis
40. Marketplace
41. Female sheep
42. Related
43. Wonderment
44. Part of a flower
45. Part of a church
46. Finishing line of a foot race
47. Small pond
48. Friendly nation
49. Fuel
50. Resolve
51. Direct the course
52. Snakelike fish
53. Inclined to anger with overtones of menace
54. Earlier in time
55. Broadcast again
57. Conjure up
58. Store of arms and ammunition
59. Tendency to change
60. Fastener for a door or lid
61. Portable shelter
62. Flat metal tumblers in a lock
63. Not in favor
64. Support or foundation
65. Unit of play in tennis
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ANNOUNCEMENTS
THE CALIFORNIA TECH
MAY 8, 2017
7
Answers to current crossword (pg 7)

This picture represents a common phrase, title, or person. Think you know the answer? Take a guess at mondaysunday.com/217