Many supermassive black holes at the centers of galaxies blast out jets of gas traveling near the speed of light. The gravity of black holes pulls material toward them, but some of that material ends up ejected away from the black hole in jets. The jets are active for one to 10 million years—every few years, they spit out additional clumps of hot material. With the new gravitational lensing system, these clumps can be seen at scales about 100 times smaller than before.

“The clumps we’re seeing are very close to the central black hole and are tiny—only a few light-days across. We think these tiny components moving at close to the speed of light are being magnified by a gravitational lens in the foreground spiral galaxy,” says Readhead. “This provides exquisite resolution of a millionth of a second of arc, which is equivalent to viewing a grain of salt on the moon from Earth.”

A critical element of this lensing system is the lens itself. The scientists think that this could be the first lens of intermediate mass—which means that it is bigger than previously observed “micro” lenses consisting of single stars and smaller than the well-studied massive lenses like an active galaxy in the foreground spiral galaxy, says Readhead.
The greater Los Angeles area has a vast array of wonderful hiking options - from the San Gabriel Mountains or Griffith Park areas to the Santa Monica Mountains near the beach - to the seemingly unending supply of hiking options. Learn from Y-Outdoors Student Leaders as they share from personal experience about some of the great venues you might want to explore on your own. Registration of the talk will be included in the confirmation.

Join the Caltech Y Social Activism Speaker Series for our first seminar of the year with Dr. Victor H. Reis, former Senior Advisor U.S. Department of Energy. Dr. Reis retired on 1953 Atoms for Peace Speech to the United Nations. He will try to mitigate, echoing Eisenhower’s weapons and climate change connection between nuclear the Catholic Church.

In a recent New Yorker article, “The Atomic Origins of Climate Change: How arguments about nuclear weapons shaped the debate over nuclear warming” Harvard Professor Jill Uchida suggests that the campaign to make known the threat of a nuclear winter destroyed the concept of nuclear deterrence, but the faulty models and rhetoric used ultimately undermined environmental science. Having been in the White House Office of Science and Technology Policy in the early 1980’s, Dr. Reis will review the then ongoing nuclear debate and suggest an alternate story to Lepore’s involving the nuclear freeze movement and the Catholic Church.

There is a more fundamental story to Lepore’s involving the debate and suggest an alternate debate, which resulted in the creation of several new generations of government-sponsored supercomputers. Reis chaired and served on numerous government and laboratory advisory committees for the DoD, CIA, NASA, U.S. Strategic Command, NNSSA, U.S. Navy and Los Alamos, Sandia, Argonne and Idaho National Labs.

The Caltech Y Social Activism Speaker Series: Connecting Nuclear Weapons with Climate Change: Managing Eisenhower’s “Fearful Atomic Dilemma”

Dr. Victor Reis, former Senior Advisor U.S. Department of Energy

Thursday | October 5th | 12:00 - 1:30 PM | Beckman Institute Auditorium | Lunch Provided | RSVP Required: https://goo.gl/forms/qOdihU9uGx5XG6pdp1

Dr. Victor Reis is well known as the architect and co-spokesman of the U.S. nuclear Stockpile Stewardship Program and its Accelerated Strategic Computing Initiative, which resulted in the creation of several new generations of government-sponsored supercomputers. Reis chaired and served on numerous government and laboratory advisory committees for the DoD, CIA, NASA, U.S. Strategic Command, NNSSA, U.S. Navy and Los Alamos, Sandia, Argonne and Idaho National Labs.

Pinnacles National Park Camping Trip

October 13th - 15th | Sign up at the Caltech Y | Cost $85 due on sign up

Do you want to traverse rocky terrain to high peaks and through deep caves? Come along on a camping trip to Pinnacles National Park with the Caltech Y! Pinnacles was born from a lava field split by the San Andreas Fault, and thus supports diverse terrain and wildlife. We’ll be completing a 9 mile loop around the park to High Peaks and Balconies Cave as well as a shorter stint to Bear Gulch Reservoir. The trip departs Friday, October 13th at 1pm and returns Sunday, October 15 by 8pm. Transportation, campsites, and most meals are included. All experience levels are welcome. For more information on Pinnacles National Park, visit the National Park service website at www.nps.gov/pinn/index.htm.

To secure your spot on this trip you must sign up and pay the fee ($85) in person at the Caltech Y (505 S. Wilson the house, just north of the Credit Union). Spaces are limited. Priority may be given to those who can share the in training.

Rise Tutoring Program

Monday - Thursday | 4:00 - 6:00 PM | Chandler Cafeteria

The Caltech Y Rise Program is currently accepting new tutors for the fall term. The Rise Program is a afterschool math and science tutoring program for public school students between grades 9 and 12. The program is in its twelfth year and helps students who are struggling in math or science (getting a C or below). The tutoring takes place on the Caltech campus Monday-Thursday from 4pm-6pm. Tutors work with 1-2 students and when possible work with the same student(s) throughout the year. The program is designed to help students gain greater competency in math foundations, improve skills in math and science and prepare students for college-level math and science.

Tutoring with the Rise Program is a great way to give back to the community and work with local school students to help them succeed in math and science. For more info and to apply go to https://caltechy.org/programs_services/tutoring/Resources/index.php.

The Caltech Y Office Closed

Thursday | September 28th | 9:00 AM - 1:00 PM

The Caltech Y Office will be closed the morning of Thursday, September 28th until 1:00 PM due to maintenance work in our office. For inquiries during this time please contact us at caltechy@caltech.edu.

Hathaway Sycamores

Every Wednesday | 5:45 - 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 about 40 minutes of travel time and 1.5 hours of tutoring. Transportation is included.

For more info and to RSVP email Elisabeth at egalmei@caltech.edu. Eligible for Federal Work Study.

Beyond the Y

Help Parents and Children Reunite as a Family

Coach-Monitor Training on October 21st - 22nd, 27th - 28th

Become a trained volunteer coach-monitor and provide court-ordered supervised family visits so that children, removed from the care of their parents, can visit their parents in a physically and emotionally safe setting, with toys, games, books and art materials. These visits are an essential service to increase the family’s chances for reunification and reduce the children’s anxiety while in out-of-home placement. To learn about the importance of visitation, the role of a coach-monitor and the upcoming training, contact: inbox@fostercareproject.org.
WRITE FOR
THE CALIFORNIA TECH!

WE ACCEPT REVIEWS,
OPINION PIECES,
RESEARCH, NEWS
STORIES,
COMICS, AND MORE!

WE PAY FOR
SUBMISSIONS, SO JOIN
THE STAFF TODAY!

EMAIL
TECH@CALTECH.EDU
WITH QUESTIONS.

VICE PROVOST OFFICE HOURS

Vice Provost, Chief Diversity Officer, and Professor of English Cindy Weinstein holds regular office hours as an opportunity for undergraduate students, graduate students, and postdocs to meet for discussions 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 Caltech Libraries.

There are four 15-minute appointments available per office hour. Sign up in the Office of the Vice Provost, Parsons-Gates room 104, ext. 6339 or by sending an email to dlewis@caltech.edu. We look forward to hearing from you!

Student Office Hours for Fall Term 2017:

10/6/17 FRIDAY 11:00 A.M.-12:00 P.M.
10/11/17 WEDNESDAY 9:00-10:00 A.M.
10/19/17 THURSDAY 11:00 A.M.-12:00 P.M.
10/26/17 THURSDAY 10:00-11:00 A.M.
11/1/17 WEDNESDAY 11:00 A.M.-12:00 P.M.
11/7/17 TUESDAY 9:00-10:00 A.M.
11/16/17 THURSDAY 11:00 A.M.-12:00 P.M.
11/21/17 TUESDAY 10:00-11:00 A.M.
11/27/17 MONDAY 10:00-11:00 A.M.

ANNOUNCEMENTS
THE CALIFORNIA TECH
OCTOBER 2, 2017

NOMINATE YOUR FAVORITE PROFESSOR FOR THE FEYNMAN TEACHING PRIZE!!!

Here’s your chance to nominate your favorite professor for the 2017-18 Richard P. Feynman Prize for Excellence in Teaching! You have from now until December 15, 2017 to submit your nomination package to the Provost’s Office to honor a professor who demonstrates, in the broadest sense, unusual ability, creativity, and innovation in undergraduate and graduate classroom or laboratory teaching.

The Feynman Prize is made possible through the generosity of Ione and Robert E. Paradise, with additional contributions from an anonymous local couple. Nominations for the Feynman Teaching Prize are welcome from faculty, students, postdoctoral scholars, staff, and alumni.

All professorial faculty of the Institute are eligible. The prize consists of a cash award of $3,500, matched by an equivalent raise in the annual salary of the awardee. A letter of nomination and detailed supporting material, including, but not limited to, a curriculum vitae, course syllabus or description, and supporting recommendation letters should be emailed to kkerbs@caltech.edu or directed to the Feynman Prize Selection Committee, Office of the Provost, Mail Code 206-31, at the California Institute of Technology, Pasadena, California, 91125. Nomination packages are due by December 15, 2017.

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

WRITE FOR THE CALIFORNIA TECH!!!
Procrastination workshop
A 1-hour workshop offered 2 times this term:

Friday, October 13th, 4:00 - 5:00
Friday, November 3rd, 4:00 - 5:00

326 Sherman Fairchild Library

• 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!

More information: counseling.caltech.edu

EMOTIONAL INTELLIGENCE TOOLKIT

3 modules / 2 weeks each / 1 awesome skillset

Emotional Awareness
Get better at knowing what you’re feeling, and see how your thoughts and feelings affect each other. October 9th and 16th

Open-Mindedness
Learn how to be more flexible in the way you see the world! October 23rd and 30th

Face The Fear
Learn how to hang in there with difficult situations and emotions without having to avoid them. November 6th and 13th

Just show up!
Mondays 4:00 - 5:00

326 Sherman Fairchild Library

counseling.caltech.edu

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 study room on the 9th floor of Millikan Library.
All students are welcome, from total beginners to experienced meditators.

Mailing list and MP3 archive: counseling.caltech.edu/students/meditation
**Women's XC Bests Four SCIAC Teams at Multi-Duals**

**GOCALTECH.COM**  
Actual Sports Content Editor  

**WHITTIER, Calif.** – The Caltech Cross Country teams competed at the SCIAC Multi-Duals in La Verne, Chapman University and University of La Verne. The Beavers won’t have to wait long before returning to action on Saturday, Sept. 30 for a 7 p.m. meeting.

**Men's Results**

Junior Rohan Choudhury (California, Los Angeles) led the way for the Beavers with seven sigs. Senior Davis Tardif (Roswell, N.M.) was not far behind with six sigs. Sophomore Simon Ricci (Chicago, Ill.) and Simon Chidambaram (San Diego, Calif.) each had five sigs. Sophomore Kevin Yu (Park Ridge, N.J.) also registered a team-high three digs.

**Women's Results**

Junior Sakthi Vetrivel (Upland, Calif.) set her fellow teammates up for 16 kills when Caltech countered with a scoring run of its own. Caltech was nine of the set’s final 16 points but ran out of real estate to potential steal the set. Caltech also started fast in the second set, opening scoring on a 5-3 run following two attacking errors from the Poets. Sophomore Alexia Lauinger (Ortoville, Mich. / Brandon) led the Beavers with eight kills and freshman Christine Yu (Freemont, Calif. / Mission San Jose) followed up with seven kills of her own.

**Consistency**

“Today showed that we’re heading in the right direction, but there’s plenty of season left,” Head Coach Ben Raphelson said.

“Everyone in the conference is heading in the right direction, working his way up through the field to cross the finish line at the SCIAC Multi-Duals. The Beavers won’t have to wait long before returning to action on Saturday, Sept. 30 for a 7 p.m. meeting.”

**GOCALTECH.COM**  
Actual Sports Content Editor  

**WHITTIER, Calif.** – Sophomore Ellie Walker (Minneapolis, Minn. / Blake School) set her fellow teammates up for 16 kills when Caltech traveled to Whittier College on Friday evening. The 16 assists were a game-high for Walker in 2017. Among the team’s two key setters, Walker finished the day with five digs while freshman Kryzynna Maruszko (Redondo Beach, Calif. / Marymount), the team’s other primary setting option led the Beavers with seven sigs.

**The Beavers finished in second place in the conference standings and also had the highest scoring average of any SCIAC school this season.”

I thought this article was going to be a lot darker than it turned out.

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**Como Saves Nine at Whittier**

**GOCALTECH.COM**  
Actual Sports Content Editor  

**WHITTIER, Calif.** – Freshman goalkeeper Joe Como (Glen Cove, N.Y. / Friends Academy) had a busy day in net, turning away nine shots in Caltech’s men’s soccer clash at Whittier College on Wednesday. Como and the Caltech defense held the Poets scoreless over the game’s final 22 minutes.

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New radio observations show clumps of gas streaming from supermassive black hole

Continued from page 1

symmetrical fashion over the course of a year. The same type of event happened again in 2015. After a careful analysis that ruled out other scenarios, the researchers concluded that the overall brightening of the galaxy is most likely due to two successive high-speed clumps ejected by the galaxy’s black hole a few years apart. The clumps traveled along the jet and became magnified when they passed behind the milli-lens.

“It has taken observations of a huge number of galaxies to find this one object with the symmetrical dips in brightness that point to the presence of a gravitational lens,” says coauthor Timothy Pearson, a senior research scientist at Caltech who helped discover in 1981 that the jet clumps travel at close to the speed of light. “We are now looking hard at all our other data to try to find similar objects that can give a magnified view of galactic nuclei.”

The next step to confirm the PKS 1413 + 135 results is to observe the galaxy with a technique called very-long-baseline interferometry (VLBI), in which radio telescopes across the globe work together to image cosmic objects in detail. The researchers plan to use this technique beginning this fall to look at the galaxy and its supermassive black hole, which is expected to shoot out another clump of jet material in the next few years. With the VLBI technique, they should be able to see the clump smeared out into an arc across the sky via the light-bending effects of the milli-lens. Identifying an arc would confirm that indeed a milli-lens is magnifying the ultra-fast jet clumps spewing from a supermassive black hole.

“We couldn’t do studies like these without a university observatory like the Owens Valley Radio Observatory, where we have the time to dedicate a large telescope exclusively to a single program,” said Readhead.

Additional authors of The Astrophysical Journal studies are: Vikram Ravi of Caltech; Walter Max-Moerbeck (MS ’08, PhD ’13) and Anton Zensus of the Max Planck Institute for Radio Astronomy; Talviki Hovatta of University of Turku and the Aalto University Metsähovi Radio Observatory; Anne Lithenmäki and Merja Tornikoski of the Aalto University Metsähovi Radio Observatory; Mark Gurwell (MS ’92, PhD ’96) of the Smithsonian Astrophysical Observatory; Roger Blandford of Stanford University; Rodrigo Reyes of the University of Concepción; and Vasiliki Pavlidou of the University of Crete.

The two studies, titled, “Symmetric Achromatic Variability in Active Galaxies: A Powerful New Gravitational Lensing Probe?” and “The Peculiar Light Curve of J1415+1356: A Case Study in Extreme Scattering Events,” are funded by NASA, the National Science Foundation, the Smithsonian Institution, the Academia Sinica, the Academy of Finland, and the Chilean Centro de Excelencia en Astrofisica y Tecnologias Afines (CATA).
ASCIT Minutes
Meetings are every week in SAC 13

ASCIT Board of Directors Budget Meeting
Minutes for 27 September 2017. Taken by Dana He.
Officers Present: Sakthi Vetrivel, Kavya Sreedhar, Rachael Morton, Sarah Crucilla, Alice Zhai, Dana He
Guests:

Call to Order: 12:13 pm

President’s Report (Sakthi):
• Would like to bring back freshman dinners.
• ASCIT will have table at Club Fair with food. Possibly have social team bake cookies.

Officer’s Reports:
V.P. of Academic Affairs (Kavya):
• Course capture fully funded by Vice Provost so no need for ASCIT funding.
• Would like to increase ARC budget to cover general costs (seminars, etc.) and make take professor to lunch twice per term.

V.P. of Non-Academic Affairs (Rachael):
• Will allow Bechtel focus groups to use some of IHC budget to encourage attendance.
• Could get rid of multi-house event funding and instead have houses apply for funding in slush fund. Will consult with IHC.
• Fleming Feptathalon and Page Trivia Night canceled.

Director of Operations (Sara):
• Not in attendance.

Treasurer (Sarah):
• Budget needs to be done by September 30th, but amount allotted to each specific club can be done later.
• $14,700 budgeted for clubs last year, but only $4,000 has been used.
• In favor of having Little T sign up as a club to receive funding.
• Increasing budget for ASCIT Teaching Awards from $2,500 to $3,500, as they have historically gone over budget.
• BoC has not used any of their budget, will talk to BoC Chair.
• Will send out email reminding houses about interhouse budget.

Social Director (Alice):
• Would like to increase budget for ASCIT formal from $5,000 to $15,000. Also gets funding from MHF.
• Would like to do something along the lines of renting out Six Flags, will try to get MHF funding for it.

Crossword

Across
1. Postage token
2. Hit with something flat
6. Line made from twisted fibers
14. Private instructor
15. Expect and wish
16. Finished
17. Positively charged electrode
18. Tall story
19. Flock
20. Revoke
22. Kind of mineral
24. Regret
25. Sprocket
27. Not as heavy
29. Extreme excess
35. Former currency of Italy
36. Animal feet
38. Adult male duck
42. From a great distance
43. Informal photographs
45. Desiccated
46. Bird shelters
48. Genuine
49. Make vocal music
50. Assistance
52. Form a mental image
54. Sore
58. Small cask or barrel
59. Type of tree
60. Clean-cut
62. Debris
67. Hits
69. Give off
71. Pointer
72. Assist in wrongdoing
73. Storage tower
74. Mettle
75. Plant with pendulous flowers
76. Cook slowly in liquid
77. Ire

Down
1. Celestial body
2. Melody
3. At the peak
4. Method
5. Deliver a sermon
6. Difficult
7. Rich soil
8. Month
9. Writing implement
10. Adult male swan
11. Open
12. Variety show
13. Appliance for removing moisture
21. Closed circuits
23. Matured
26. Monetary aid
28. Annoy continually
29. Scale drawing
30. Animation
31. Divisions of geological time
32. Plaid
33. Mindful
34. Boundary
35. Cut
36. Compulsory force or threat
37. Tropical lizard
38. Part of a corolla
39. Form of legal defense
40. Urge or force
41. Restrict or confine
42. Two-masted sailing vessel
43. Score of zero in squash
44. Pitcher
45. Pig pen
70. Drag behind

NEWS
THE CALIFORNIA TECH
OCTOBER 2, 2017 7
Local cat owner attempts putting cat’s face in bread

Answers to current crossword (pg 7)

- http://puzzlechoice.com