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A TALE **OF TWO CALTECHS**

ELISE CUTTS, CHRISTOPHER JOHNSTONE, & Dan Xu | Feature Story

Professor Adam Wierman's office in the Annenberg Center for Information Technology is a neat room furnished with a long, low couch, a round table with four chairs, and a glass-top desk. Eight, maybe even ten students could meet here at once. And just outside Wierman's office, a row of three chairs sits ready to accommodate yet more students.

Another duo of chairs spans the wall space between the offices of two CS instructors down the hall. Creating a makeshift waiting room outside of one's office isn't exactly a typical choice for Caltech faculty; at a school with three students to every one faculty, it is hard to imagine a circumstance in which students would need to wait in line for time with their instructors. But that 3:1 ratio doesn't reflect reality in the computer science (CS) option.

In a 2015 presentation to the Faculty Board, Wierman, the executive officer for the Department of Computing and Mathematical Sciences (CMS), made the case that there were "two Caltechs:" one for computer science majors and

one for everyone else.

The rapid growth of the CS option, he argued, was causing problems for CS majors. While their peers benefit from the "personal faculty engagement, small interactive classes, and plentiful research" advertised by admissions representatives, students in the CS option deal with "minimal faculty interaction, huge in-major classes, and extreme competition for research."

Wierman's claim of "two Caltechs" remains both verbally bold and numerically true.

Registration for CS core courses regularly eclipses 100 students and the CS student-faculty ratio is more than 9:1. Including only research faculty, the limiting factor when it comes to creating undergraduate research opportunities, the ratio grows more dismal-13:1.

In the words of Vice President of Student Affairs and mechanical engineering professor Joseph Shepherd, Caltech is a "prep school for graduate school." The Institute is proudly focused on the basic sciences, and that value is reflected in the high percentage-about 40%-of undergraduate alumni who go on to attend graduate school. CS majors attend graduate school at a lower rate, between 20% and 30%, according to Wierman.

"I have certainly heard concerns from campus groups about the number of students in the CS major," says Shepherd. He points out that the growth of CS is an issue not only because of how it



Adam Wierman

impacts CS students, but also because it is drawing talent away from other fields. "What's at stake here in the long term is the viability of a diverse range of undergraduate options," he says. "We need to be asking what we want Caltech to look like into the next decades."

After its split from EAS in 2004, Computer Science has experienced rapid growth, from 30 students in its first year to 226 students in 2018-2019, more than the number of students enrolled in the next three most popular optionsphysics, mechanical engineering, and electrical engineering-combined.

Asking those questions is a responsibility that often falls to CS faculty. Yet

over this time period (less than 3%).

Our polls were timed to coincide with the Democratic primary debates. Nationwide, the debates have hardly tipped the scales much, except for Kamala Harris's quick rise and decline following a noteworthy performance in the first debate. Besides Harris's slip from 14% to 3.5%, we have noticed little movement from month to month in our polls. Because of the small number of Republican respondents (less than 10%), it is difficult to differentiate between their preferences and those of the Democratic and Independent respondents.

even they have found little consensus on whether or not the growth of CS is a problem.

Wierman sees it not as something troublesome, but rather as an unavoidable consequence of the times. He points out that growing interest in CS-23% of current Tech students-is a trend observed across Caltech's peer institutions.

But CS instructor Mike Vanier shares some of Shepherd's apprehensions surrounding the growth of the CS program. "If the CS major becomes more than 50%, that'll be a shame," he says. "I think it'll be okay up to 50%, but beyond that we start to lose something that makes us Caltech."

At least for CS majors, one thingsmall course sizes-has already been lost. "CS course enrollment is a logistical scaling problem. The scale of classes grows slowly enough that by the time you are fully underwater you don't have time to adjust assignments and grading to the new scale," explains CS lecturer Donnie Pinkston.

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CALTECH ACCREDITATION PROCESS UNDERWAY: WE WANT YOUR FEEDBACK

CINDY WEINSTEIN | ANNOUNCEMENT

Every ten years, Caltech participates in an intensive review in order to reaffirm our accreditation. The Department of Education requires that institutions receiving government funding explain everything from the governance structure of an institution to teaching practices in the classroom. This process of self-examination, which is currently underway, provides us with an opportunity to evaluate how well we are achieving the goals we set for ourselves, and the expectations that the accrediting agency-the Western Association of Schools and Colleges (WASC)-has established for institutions of higher education.

Our goals are outlined in Caltech's mission statement: "The mission of the California Institute of Technology is to expand human knowledge and benefit society through research integrated with education. We investigate the most challenging, fundamental problems in science and technology in a singularly collegial, interdisciplinary atmosphere, while educating outstanding students to

POLLING REVEALS TECHERS' 2020 PREFERENCES

Alejandro Lopez | Analysis

The California Tech has been conducting polls on the 2020 Democratic Presidential Primary race. Amongst the unprecedented myriad of Democratic nominee hopefuls, we found that Techers prefer progressives over the party mainstream. Two national leaders, Warren and Sanders, take a fair share of the pie at Caltech, but national frontrunner Joe Biden hardly rises above the sea of minor candidates, reliably polling below 5%. Polling Caltech shed some light on one unorthodox contender: Andrew Yang. Described by the New York Times as the "internet's favorite candidate," Yang polled high enough



on several nationwide polls to find his way onto the Houston debate stage. If his support comes from a specific subset of voters-- young, tech-savvy progressives-- Caltech might serve as a statistical microcosm of his demographic. Indeed, Yang consistently outperformed political veteran Biden amongst Caltech students in every poll The Tech conducted, despite never having held elected office. Techers endorsed Yang at more than three times the national average



become creative members of society."

The goals WASC sets for institutions include the following: 1) defining institutional purposes and ensuring educational objectives; 2) achieving educational objectives through core functions; 3) developing and applying resources and organizational structures to ensure quality and sustainability; and 4) creating an organization committed to quality assurance, institutional learning, and improvement.

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Respondents across months: 100, 85, 84, 85, respectively.

A TALE OF TWO CALTECHS

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However, students might not actually mind the large classes. "We ask about it explicitly at student faculty meetings and it just isn't the complaint," notes Adam Blank, another CS lecturer.

Compared to those of Caltech's peer institutions, Caltech CS classes are actually quite small. UC Berkeley's introductory CS course enrolled a 1,762 students in 2017 and employed over 50 teaching assistants.

Caltech will never have a 1,762 person course because it currently enrolls only 944 undergraduates. CS core classes are saturating, unable to grow much larger simply due to Caltech's small student body; even if all 231 admitted freshmen took CS 001, the class wouldn't be bigger than it already is.

Sizes for core computer science classes have consistently grown. An interesting exception has been CS 1 in recent years. However, this can be attributed to CS 1 saturating due to the number of students that enter each year.

So, instead of focusing on bringing down the size of CS core classes, Wierman is trying to improve the variety of higher level, interdisciplinary courses available to CS majors. This approach dovetails with Wierman's "CS+X" philosophy of integrating computer science with basic science research. CS+X is a bid simultaneously to provide CS majors with a small-class experience later in their studies and to bridge CS with other fields.

"We have been engaging with the idea that Caltech should be a CS+X place. We're trying to reach out to people who are using CS in their research in a meaningful way to be cross listed, to teach cross-listed courses, and to mentor CS students. And that's been successful," Wierman says.

Still, Wierman admits that CS+X can only go so far. That is why he has advocated for other solutions, including the addition of five to ten faculty to the department and hiring of two to four new instructors.

This vision has been only partially executed. Blank is the sole CS lecturer to be hired since 2015. For the 2019-2020 academic year, the division has found funding to hire only one additional lecturer. With respect to finding new professors, Thomas Vidick, the option representative for CS, explained that the division has previously been restricted to making one hiring offer each year. With competition from other top CS universities such as MIT, Carnegie Mellon, and Stanford, these offers are not always accepted.

Even without these difficulties, Wierman admits that when it comes to solving what he sees as the most pervasive problem for CS students—their relative lack of research opportunities— expanding CS+X and making new hires



Sizes for core computer science classes have consistently grown. An interesting exception has been CS 001, in recent years, due to the majority of students that enter each year taking it.

SWAFF'S PICKS VOL. 4

IZZY SWAFF | REVIEW

We've settled into a another term at Caltech ; so it's time for some fresh tunes and a new edition of Swaff's Picks! For our new readers, this column highlights some of my favorite artists, new music, concert reviews, and some songs I have on repeat at the moment. Be sure to check out this playlist, and other editions of "Swaff's Picks" by scanning the Spotify code or following me on Spotify for more!

Pleaser - Wallows

Wallows does a great job in Pleaser in



just won't cut it.

"We've made progress in a lot of ways, but the place that has been hardest to make progress is in providing research opportunities with the same kind of ease found in other options," he explains. "There's a lot of demand that can't be met through the SURF program." Even though more than half of CS majors do not SURF while at Caltech, the demand is still intense; Wierman alone receives over 40 requests for research opportunities a year. He is only able to take on eight students at a time.

While a larger fraction of CS students enter industry upon graduation compared to Caltech students, it is unclear whether this is because more CS majors prefer industry jobs or because CS majors find it difficult to get into graduate school. CS students have indicated on department surveys that they feel that they have trouble finding research opportunities and letters of recommendation.

Even if Wierman's vision of ten more CS-related faculty members is realized, it will still be hard for CS majors to find in-field research opportunities. To alleviate part of the load, a group of CS faculty is working to arrange a partnership with scientists at the Jet Propulsion Laboratory (JPL) to provide more research opportunities for CS students.

The CS faculty's approach to dealing

626 Bedford Ave. - The Drums If you want to almost suffocate, lose your shoe a couple times, and headbang to some indie pop, I would recommend you go see The Drums somewhere in LA. At their summer show at the Hollywood Palladium, I discovered how hard LA indie fans can go, and for good reason. The Drums bring together surf pop lyrics, rock-based sound, and high energy to create their unique music. 626 blends bubbly synth sound with a heavy guiding beat. Jonny Pierce, the lead vocalist, skillfully navigates vulnerability in relationships all while poking fun at the frustration he's faced in his own experiences. Pierce balances tongue-incheek lyrics like, "I regret that night of kissing you / I should have left when / You laughed at my shoes," with brave self-realizations, "Baby lets have a conversation / And god forbid we have a connection / I'd like to know what you're thinking / 'Cause I don't get near what I've been giving." 626 comes off of The Drums' latest album from this summer, Brutalism, with plenty of other synth rock tunes and acute lyrics to be had.

with the growing number of students in CS has been unflinching in its commitment to keeping the major open to all Caltech students. Proposals from the department on placing restrictions on the number of CS majors, be it either through a hard cap on the number of students with a CS option or taking intended option into account during admissions, have been rejected.

Yet, the growth of CS shows no signs of slowing. And as it is doubtful that Caltech will ever tolerate a completely CS student body, caps may one day come back on the table. As Shepherd put it, "nobody thinks that Caltech should become a full CS school, that doesn't make any sense."

For now, Caltech officials insist it will continue to uphold its commitment to admitting the most talented students, regardless of indicated major. Though earning a CS degree may be a different experience than what is usual at Caltech, the CMS division is taking concrete steps towards ensuring that its students have the best experience possible. It remains to be seen how effective those steps will be, and whether CS will ever grow truly out of hand.

"Whatever we're doing, we're doing it right because we are getting outstanding students in the CS department," says Vanier. "Are we still getting the best and brightest here? I really do think we are."

Forever Half Mast - Lucy Dacus Lucy Dacus uses Forever Half Mast to examine what it means to be American, and to celebrate America, when so many horrific headlines plaster our news everyday. The song identifies a heavy-hearted hopefulness that she and other Americans have; a hopefulness in spite of it all. Using a folk-like guitar twang, Dacus calls on common American tropes in her sound and lyrics. She describes America as "the tried and true, red and white and black and blue," saying that we are "in a state of disarray united by our darkest days." In a series of songs inspired by holidays, this take on the Fourth of July establishes the importance of understanding the history of our country and where we came from. Dacus is quoted in saying that this song tells us to "stay aware of the hurt that America does and offer up generosity, empathy, and resistance in the face of it," this especially being demonstrated in the lyrics "Yes, you're evil, but you're not that bad / You put out your palm more than the back of your hand."



showing their versatility as a band. In the intro, we hear the contrast between soft, focused lyricality and their heavy, rock-influenced sound. Each drop of the thumping drumbeat draws me into this song through every listen. Pleaser explores the emotions behind attraction to someone, especially when this feeling might not be shared by the object of attraction. Dvlan Minnette, who vou might recognize from 13 Reasons Why, begins the song by setting the scene for this unrequited young love. He sings, "back in your room remain the words I wanna say to you / but couldn't leave my mouth," the reason for which he concludes is that "silence is what I do best." This song is for every teenaged. heart-pounding crush we've ever had, and all the situations we ran through in our heads a hundred times. If you like The Regrettes or Rex Orange County, you'll definitely want to give Wallows a listen.

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JOB OPENING: EDITOR-IN-CHIEF

Albert Nazeeri | Editorial

I resign from Editor-in-Chief of *The Tech* effective immediately. According to the ASCIT bylaws, the Review Committee has the choice between appointing my replacement or calling for a special election. I am calling for a special election as I think it is important that the Editor-in-Chief of our school newspaper is elected by the students and is not appointed by some obscure committee. The job of Editor-in-Chief is quite time intensive, and I suggest tickets of 2-3 people.

Finally, I'd like to express the sincerest of gratitude towards the hard working staff members at *The Tech*. This paper has been the product of many a sleepless night. Here's to no more Sunday all-nighters!



NATIONAL OIL CUMPANY

NATIONAL OIL BUILDING + SIXTH AND GRAND

May 7, 1973

TO THE STUDENTS LIVING AT DABNEY California Institute of Technology

THERE WAS A SIGN INTHE SKY...

I. Was Wett | From the Archive

The names of most people in this article have been changed to protect their identities and to attempt to limit the number of obscene phone calls they and/or their RA receive. Names of certain people have been withheld because it is uncertain whether they will be alive at press time. Note, however, that "Richard Nixon" or "Nixon," as used herein, refers to the current president of the United States, and should not be considered to be a pseudonym.

Recent court actions indicate that the press may or may not be required to reveal its news sources. In this article, news sources are not revealed. If you cannot guess who the participants are, consult your local FBI office (796-7852).

The sign had been in planning stages for more than eleven months, following the May 11 and May 12, 1972, sign fiascos. These two signs, as you may recall, existed on the east face of Millikan library for less than six hours each. Many people who slept late on those days following the mining of Haiphong harbor never saw the "OUT NOW" landmarks.

Mark Warmbrow developed the design for the sign's expansion anchors. Research conferences were held at many locations at Caltech, and, to throw the enemy off guard, at other sites outside the United States (the Weasel River valley, for instance). Once the anchor design existed, only a sign was needed. Various members of Damney House suggested that the second-rate burglary job at the Watergate Hotel was maybe just a teensy-weeny bit less than excusable, and the phrase "Impeach Nixon" was decided upon for the sign.

WEDNESDAY

On Wednesday, May 2, the men and women of Damney House flicked in their studies to begin their independent-study project. Supplies were bought: 39 yards of muslin, 100 feet of lumber, 2 quarts of toluidine red paint, 2 pounds of aluminum, thread, nuts and bolts, and various sundries.

Construction began on three fronts on Wednesday night. Carl Josephson and Rich Keyfaker sewed muslin strips together after figuring out how to run a sewing machine. Meanwhile Pete Gloater, Tungsten Blark, and others were assembling the 16x22-foot frame, and Warmbrow and the aluminum searched for a mill.

THURSDAY MORNING

After the sewing (it was by this time Thursday morning), Keyfaker, Rich Richardson, Mike Parasite, and others trolled out the letters on the muslin ("say, how do you spell 'impeach?' "). Soon the 2x3-foot red letters proclaimed to the dining room roof: "IMPEACH NIXON." Meanwhile Warmbrow was coaxing various mills into action. After four hours of this exciting work, he decided to flick it in for the night, and so our heroes got a few hours sleep.

CALTECH ACCREDIDATION

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To be reaccredited, we must demonstrate how our mission fulfills the criteria established by WASC. Full community participation is crucial to the success of the accreditation process. To this end, we ask that you go to the accreditation page on the Caltech website (accreditation.caltech.edu) and see the committees that have been assembled, the timeline, the core learning outcomes, and the institutional themes, developed in 2018, that faculty, graduate students, undergraduates, and staff thought were particularly important for us to assess. These themes are 1) the core curriculum and 2) academic and co-curricular support structures. On behalf of the accreditation steering committee, I encourage you to provide feedback about any aspect of the accreditation process by using this link: www. accreditation.caltech.edu/contact-us/ provide-feedback. Thank you.



The California Tech

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Reporter Alejandro López

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BUSINESS MANAGER

I am an active donor and life member of the California Institute Associates of the California Institute of Technology.

The picture "Impeach Nixon" in the Pasadena Star-News dated Saturday, May 5, 1973, is going to cost California Institute of Technology \$1,000,000.00 in a contribution. I am wondering what the Dabney Family, who are also oil people, think of such publicity as this.

Yours truly, Ross McCollum, President

National Oil Company McGreghar Land Company Consoco, Inc. Atlas Royalties, Inc.

RM-G cc William H. Corcoran

THURSDAY AFTERNOON

On Thursday afternoon Warmbrow and Keyfaker drove to Altadena and Sierra Madre in search of better milling apparatus. On Thursday night the final work sessions began. Warmbrow, Keyfaker, Jim Moron, and later

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Alex Krotz

Advisor Richard Kipling

The California Tech is published weekly except during vacation and examination periods by the Associated Students of the California Institute of Technology, Inc. The opinions expressed herein are strictly those of the authors and advertisers. Letters and submissions are welcome: e-mail submissions to tech@ caltech.edu as plain-text attachments, including the author's name, by Friday of the week before publication. The Tech does accept anonymous contributions under special circumstances. The editors reserve the right to edit and abridge all submissions for any reason. All written work remains property of its author. The advertising deadline is 3 PM on Saturday; all advertising should be submitted electronically or as camera ready art, but The Tech can also do simple typesetting and arrangement. All advertising inquiries should be directed to the business manager at tech@caltech.edu.

SWAFF'S PICKS

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One to always offer a deeper meaning to each of her songs, Dacus captures her listeners with her serene and emotional voice and expressive guitar sound.

DAWN CHORUS - THOM YORKE

Lay down, turn off the lights, and plug in your headphones for this one. Thom Yorke, famously from Radiohead, has produced another solo album, ANI-MA, nothing short of ethereal in sound. Dawn Chorus is my favorite of the new tracks, lending itself to a dedicated, undistracted first listen. Yorke smoothes his lyrics over a pulsating, tranquil background, creating a scene much like that of a landscape before dawn. You feel the anticipation, the reawakening, the clarity throughout his lyrics. He repeats, "if you could do it all again," lamenting each set of words that follow. To really see and feel the emotions and dreaminess of Dawn Chorus and the rest of ANIMA, I recommend Yorke's short film of the same name, available on Netflix. It is at once bare and candid, as well as artful, and as NPR called it, "uncharacteristically revealing."

In Undertow - Alvvays

In researching this song, I learned that an undertow has two definitions; it is a type of wave pattern, or it is a way to describe the underlying meaning of something superficial. The latter definition points also to a lasting impression that is left by this implicit message, which is illustrated by the tidally-flowing chorus where Rankin sings "There's no turning back" again and again. The wave motif is a mesmerizing way to draw the listener into the song and its lyrics because you begin to feel the pull of this "undertow," both in the emotional and physical sense. Each passing repetition of lyrics lures the listener into a dreamy state. This song is a break up song, one for when the pain is beginning to dull, and you can feel how distant the relationship has become. Rankin asks "what's left for you and me? / I ask that question rhetorically" and later the reply: "you respond to my question metaphorically," which is clearly not what she was looking for in response. Rankin emphasizes the need to let go, move on, and focus on your own health and happiness in life. Through the band's upbeat musicality, Rankin can turn her melancholic lyrics into a song for moving forward in life.

This song is representative of Alvvays' vibe as a band, and I would recommend their music to anyone looking to chill out or study to some light, surfy indie pop.

1950 - King Princess

1950 is a beautiful examination of what it means to wait for love, and to be queer in today's environment. King Princess sings about misogyny and discrimination against the LGBTQ+ community in lyrics like, "I hate it when dudes try to chase me," or "So tell me why my gods look like you / And tell me why it's wrong." The song's title, 1950, calls to a time of strict gender roles for women, which King Princess subverts in her description of the object of her love and how she loves when she protects her "'Cause I'm just a lady." King Princess sings of her "gods" and implies that they all are queer women. In asking why this is wrong, she again challenges the standards of a society like that of 1950's America, with these standards still existing today. King Princess debuted her music career with 1950, and it set the stage for her well-crafted lyrics, powerful anthems, and role as queer youth royalty.

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ASCIT BOARD OF DIRECTORS MEETING

Minutes for November 3, 2019. Taken by LC Chen.

OFFICERS PRESENT: Sarah Crucilla, Varun Shanker, Rachel Sun, Irene Chang, Arushi Gupta, Yuying Lin, LC Chen

CALL TO ORDER: 8:25 PM

PRESIDENT'S REPORT (VARUN):

Faculty board meeting tomorrow. ASCIT Committee Appointments have been made and notifications have been sent out. VPSA Meeting happened last week; minutes are available on Donut. ASCIT retreat is happening this weekend; will be planning for the upcoming year. Met with Carter Stripp to discuss phone-a-thon and fundraising.

OFFICER'S REPORTS:

V.P. of Academic Affairs (Arushi):

Starting to hand out lunches for course compliments. Research page of professors who want students to work in their lab during the school year will be published soon. Student faculty lunches are happening on Nov. 22. Software seminar happened on Wednesday. Powerpoint slides will be posted soon. ARC retreat is happening on Nov 22-24. Deans meeting is happening on Nov 19.

ASCIT DROP FORM	ASCIT DROP FORM	
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V.P. OF NON-ACADEMIC AFFAIRS (SARAH):

Stewcomm chair raised concerns about housing charges. Working on social service initiative. Meeting with Felicia and Jennifer Howes to talk about PAs. IHC is discussing the alcohol policy and discussing with Felicia. Emergency Preparedness Committee's first meeting is happening tomorrow with Felicia: they'll hold emergency preparedness meetings in the houses and discuss general safety on campus.

DIRECTOR OF OPERATIONS (RACHEL):

Since the Tech hasn't been publishing, ASCIT minutes can be viewed on Donut

TREASURER (YUYING): Finalizing the budget.

Social Director (Irene):

End of Fall event well. Movie night planning. November Event brainstorming. ASCIT Formal details. Midnight Donuts.

Secretary (LC):

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: 9:37 PM

Signature: _____

Please deposit this form in the box in Ricketts Lounge.

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