

- Caltech's new equity office
- Visual culture joins the curriculum
- Unearthing hidden tech treasure
- A new campus center opens its doors

## Caltech's Newest Nobel Laureate

Hundreds of members of the Caltech community, along with local elected officials, gathered along the Olive Walk on November 8 to honor Frances Arnold, who received the 2018 Nobel Prize in Chemistry for the "directed evolution of enzymes."

During the ceremony, Arnold, the Linus Pauling Professor of Chemical Engineering, Bioengineering and Biochemistry, told the crowd she felt "incredibly lucky and grateful" to have worked for more than 30 years at Caltech, "a very small and special institution that made it possible for me to do the work that led to the Nobel Prize."

Arnold, who is also the director of the Donna and Benjamin M. Rosen Bioengineering Center, added, "Only here could I convince students from very different disciplines (engineers, chemists, biochemists, molecular biologists, and computational scientists) to throw their hat into this ring and this completely unexplored field, and contribute their creativity to this kooky idea that you could breed proteins like you can breed cats and dogs. And only here would I have been challenged to solve ever harder problems."



For more SoCaltech, go to [magazine.caltech.edu/socaltech](https://magazine.caltech.edu/socaltech)

## Five Questions for : April Castañeda

April Castañeda, recently appointed to the newly created position of assistant vice president for equity and equity investigations and Title IX coordinator at Caltech, will design and implement a comprehensive approach to all issues pertaining to discrimination, unlawful harassment, and sexual misconduct. Though the role is new for both the Institute and Castañeda, she is no stranger to campus, having served in a variety of roles at Caltech for more than 20 years before spending two years as the assistant director for human resources at JPL.



- 1. What motivates you to do this work?**

I've spent most of my career doing things that are engaged around social justice. It's important to me that people have the rights and the ability to do good work.

When I first came to Caltech, I was reluctant to be an intern here because before then I had always worked with underserved populations, and here I saw a lot of privilege. My adviser at the time said to me, "April, pain is pain, no matter if it's in a suit or on the street." And she said, "You have to decide. If you're trying to alleviate pain and help good things happen, there's a place for you here."
- 2. How is your office different from the former Title IX office?**

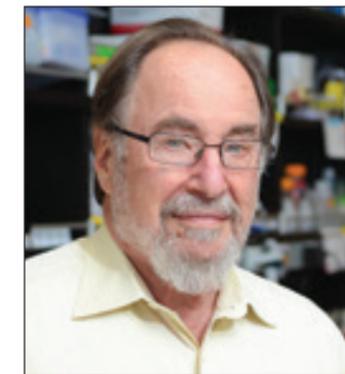
The office now includes not just Title IX [a law that covers discrimination on the basis of sex] but also Title VII and Title VI, which cover discrimination based on race, color, religion, sex, and national origin. We also have state regulations, and California has about 40 different protected classes. So anything that involves a protected class comes into this office.
- 3. How have things changed now that the office is part of HR rather than Student Affairs?**

Although the office is now part of HR, we maintain very close connections with Student Affairs, working closely with the vice president, the deans, and the many other offices that serve our students. We've also hired an education and deputy Title IX coordinator for Student Affairs to ensure that the needs of the student community are met.
- 4. How do you encourage people to come forward in a way that feels comfortable for them?**

My approach is always that it is a privilege to be there in a person's life at a moment when they really need help, so I try to handle it with care and respect. The person who's reporting the incident has a lot of ability to dictate what happens. They often can come in and file a report without us taking action. I follow

**"The general worry is that if we develop the ability to modify the germline, only wealthy people will be able to take advantage of that, and so it may exacerbate the difference between the opportunities available to the wealthy and the impoverished."**

**David Baltimore**, Caltech president emeritus and Robert Andrews Millikan Professor of Biology; chair of the Second International Summit on Human Genome Editing, held in November 2018 in Hong Kong



What happens when you take computational science (CS) and combine it with another discipline? That was the question Adam Wierman, director of Information Science and Technology at Caltech posed last year at a kickoff event for a new initiative called Caltech Computes: Disrupting Science and Engineering with Computational Thinking. His answer? Something new and disruptive. The goal of the initiative is to bring together faculty and students from across campus for seminars and workshops, to create courses and educational programs in "CS+X," and to seed research in emerging CS+X areas too new to receive support from external grants. Here are some examples of how CS is being combined with different disciplines at Caltech.

where they lead. That said, there are things we have to move on if we feel like there's a danger to the community or someone is a danger to themself.

- 5. What does success look like for the equity office?**

I'll know it's successful if the number of our cases goes down and the number of our office visits goes up. I want people to come in before things escalate. Absolutely there are times when we need to do an investigation, but there are also lots of things that we can do to build inclusive communities. We want people to worry about school, work, their research, winning Nobel Prizes. We don't want them to worry about, "Am I safe? Am I OK?"

Read the whole interview at [magazine.caltech.edu/post/april-castaneda](https://magazine.caltech.edu/post/april-castaneda)

- Medicine:**  
Developing a prosthesis that can use machine learning to help patients with spinal injuries stand again.
- Nature:**  
Distinguishing individual bird and tree species using a combination of machine learning and expert human input.
- Astronomy:**  
Searching for supernovas by scanning enormous data sets gathered by sky surveys.
- Biology:**  
Using DNA origami to create a real-life version of "Hermione's bag."
- Physics:**  
Exploring how quantum mechanics can be utilized to create unbreakable cryptography.
- Economics:**  
Improving the algorithms that govern the way doctors are matched with hospital residencies, kidneys with donors, and children with public schools.
- Chemistry:**  
Paving the way toward more efficient and less volatile lithium-ion batteries.
- Visualization:**  
Applying algorithms from quantum mechanics to generate computer-simulated fluids.
- Energy:**  
Using algorithms to govern electric-vehicle charging, reducing the need for a vast charging infrastructure.

## BRAIN Power

19

Number of BRAIN grants from the National Institutes of Health received by Caltech in the four years of the program, the second highest for any institution (only Stanford has received more)

\$22

Million total

14

Caltech faculty members as principal investigators

5

Caltech divisions represented

Research has included:

- ▶ Using non-invasive methods such as ultrasound and light to stimulate or suppress individual neurons
- ▶ Tracing the wiring of brain circuits that control movement, emotion, and thirst
- ▶ Developing brain-machine interfaces to help quadriplegic people regain motor function



## Object Lesson: Historic Hardware

Caltech is a treasure trove of vintage computing equipment ... if you know where to look. “You see these e-waste piles all around campus and people just stick old equipment in them,” says Albert Tseng, a sophomore majoring in computer science. “Most of it is actual waste, but sometimes you find really interesting things being discarded.”

Tseng teamed up recently with fellow sophomore Hongsen Qin, whose particular passion is old keyboards. The pair recruited junior Karthik Karnik and, together, the three undergrads turned their hobby into a new student club dedicated to preserving, collecting, and showcasing vintage computing hardware used on the Caltech campus.

Through word of mouth and social media, the Vintage Computing Club has garnered interest from a broad swath of students and alumni. Labs around campus are starting to contact the group about “old computers sitting in attics,” says Tseng, who notes that many of these computers were integral to the history of their former labs or to the history of Caltech. “We’re finding these rare workstations that were very expensive at the time. And they still work!”

Beyond the thrill of unearthing hidden tech treasure, the trio’s goal is to gather enough items for a campus exhibit along the lines of Paul Allen’s Living Computer Museum in Seattle. To that end, they are restoring the machines that come to them, keeping the patina of age and the Caltech property tags but making them operational. As Tseng says, “It’s no fun just seeing something behind a glass case.”

The club’s broader aim is to begin to document computing at Caltech through the decades. “We’re looking at the history of different labs, different research groups,” says Qin. “We’re showcasing them because it’s an important part of Caltech history.”

Pictured above is an IBM Selectric typewriter, one of the most well-known pieces of office and computing equipment of the 20th century. Machines such as this one (which came from the applied physics department) were used at Caltech as makeshift printers and for terminal keyboards. Although quite complex, with more than 1,000 parts, they were remarkably reliable and rarely broke down. The design of the Selectric allowed the user to switch typeballs for different fonts as well as math symbols and other characters.

See more vintage finds at [magazine.caltech.edu/post/historic-hardware](http://magazine.caltech.edu/post/historic-hardware)

### Class Act:

## Visual Culture

A new visual culture program is about to make Caltech a lot more colorful. From tours of neon art around Los Angeles to campus artists-in-residence, the program will offer something for anyone interested in art and its potential for intersecting with science.

Funded by the Andrew W. Mellon Foundation and still in the planning stages, the program will be part of the Division of the Humanities and Social Sciences (HSS) and will include new course offerings, a postdoctoral instructor, artists-in-residence, guest lecturers, and the addition of a visual culture professor to the faculty.

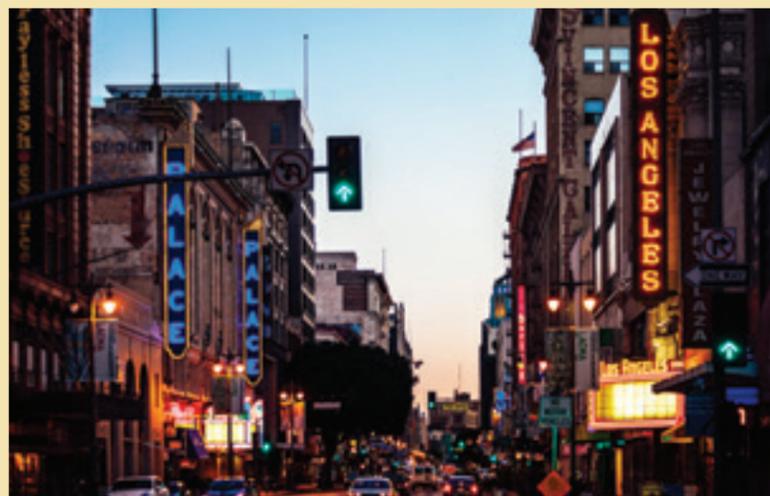
### Soft launch

English professor Dehn Gilmore, who is overseeing the program’s launch, says this academic year is a pilot for the program, but adds that there is already a full slate of activities planned for the next several months, including a student trip to the Los Angeles County Museum of Art (LACMA) to see a 3-D-themed exhibit.

Visitors to campus will include Malian textile artist Abdoulaye Konaté; Katherine F. Chandler, a professor and artist at Georgetown University whose work has explored, among other things, drone aircraft and drone warfare; and Scott Chimileski, a microbiologist and photographer of microbial life.

### Stay awhile

A centerpiece of the program will be an artist residency that brings artists for extended stays on campus to work with students and organize exhibits and other events, including public lectures. “This will be an opportunity to bring in numerous artists to develop deeper conversations and collaborations and cross-pollinate



ideas,” says Hillary Mushkin, research professor of art and design in mechanical and civil engineering, who co-directs Caltech’s data visualization program and is involved in shaping the artist-in-residence program.

The first artist-in-residence will be Leslie Thornton, an experimental filmmaker best known for *Peggy and Fred in Hell*, a 17-episode series that follows two children acting out lives as adults in a chaotic world.

### Creative collaborations

Other Caltech faculty members involved in the visual culture program are Professor of English Catherine Jurca, who studies classic Hollywood cinema and the American novel, and history professor Nicolás Wey-Gómez, whose lecture series *Exploration: The Globe and Beyond* will be expanded as part of the program.

The program will also involve collaborations with The Huntington Library, Art Collections, and Botanical Gardens that connect the Caltech community with artists, exhibition culture, scholars of visual culture, and The Huntington’s extensive collections of visual materials.

“It will be very exciting for undergrads to learn new ways of thinking and looking,” says Gilmore. “I think that will inspire new research avenues and hopefully inspire a new set of conversations among the faculty.”

**“We hit the Martian atmosphere at 12,300 mph, and the whole sequence to touching down on the surface took only six-and-a-half minutes. During that short span of time, InSight had to autonomously perform dozens of operations and do them flawlessly. And by all indications that is exactly what our spacecraft did.”**

—*InSight project manager Tom Hoffman*



InSight Principal Investigator Bruce Banerdt, left, and Hallie Gengl, data visualization developer, celebrate InSight’s Mars landing on November 26.

# New on Campus: The Hameetman Center

In late February, the Caltech community will have a new place to gather. The Hameetman Center, named in honor of Caltech trustee Fred Hameetman (BS '62) and his wife, Joyce, features a large public lounge, an expanded Red Door Marketplace, the Caltech Store, music-rehearsal facilities, student-club rooms, a multipurpose room, and a conference room. The rehearsal space is made possible by a gift from Steven Frautschi, emeritus professor of theoretical physics, and his wife, Mie.



An earlier student hub known as the Dugout (opened in 1924) featured a fireplace built with the proceeds of a fundraiser in which engraved bricks were offered for a dollar apiece. The fireplace wall, composed of bricks bearing names of students, clubs, and donors, has been incorporated into the Hameetman Center on the Olive Walk side of the building.



On February 28, a final brick, honoring the Hameetmans, will be placed in the center of the wall at a special dedication ceremony.

This bas-relief terracotta beaver, now located on the main staircase landing wall, was originally created for the Winnett Student Center by sculptor Albert Stewart (1900–1965).



Carpenter Francisco Estrada  
Carpenter Shop Supervisor Ed Rhoads



Though the venerable Engelmann oak that stood for more than 350 years between Dabney Hall and Parsons-Gates succumbed to disease two years ago, its memory will live on in the Hameetman Center. Ed Rhoads, manager of Caltech's architectural shops and trades, in collaboration with

David Kremers, who serves on the campus arts committee, has designed a 24-foot table for the Red Door Marketplace using wood from the tree. The two long edges of the table will follow the natural shape of the wood, forming what is known as a live edge.

## Shreyas Vissapragada (second-year graduate student)

**#SoCaltech** is an occasional series celebrating the diverse individuals who give Caltech its spirit of excellence, ambition, and ingenuity. Know someone we should profile? Send nominations to [magazine@caltech.edu](mailto:magazine@caltech.edu). Shreyas Vissapragada is a second-year graduate student studying planetary science. In addition to studying the formation of rings around small solar-system bodies and using Caltech's Palomar Observatory to explore the chemistry of exoplanetary systems, Vissapragada is searching for an unknown molecule in Venus's atmosphere.

"In the planetary atmospheres class I took with Andy Ingersoll, we learned about this unknown molecule that absorbs UV light that is present in Venus's atmosphere. The fact that there's still a molecule in Venus's atmosphere that we don't know about was kind of just baffling to me. I mean, it's right next door! So I was reading up on it, and I came across a hypothesis for what this molecule could be that I thought looked fairly plausible. I realized that it was observable with ALMA [the Atacama Large Millimeter/submillimeter Array], which is used mostly for problems outside our solar system. So I was like, 'Why not?' I took this idea from class and turned it into one of my graduate research projects. It was a scientific whirlwind to put together the proposal to use ALMA because it was the first proposal that I had ever written myself. When it got approved by ALMA's scientific committee, I was expecting to feel such joy. But I remember feeling so scared that I messed up a calculation or something until I talked to a fellow grad student in the department who said something to the effect of, 'Don't worry if you got a calculation wrong. You're going to have fun and learn a lot.'"



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